STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 1, 2007

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTENTION: Mr. David Baker
NCDOT Coordinator

SUBJECT: **Nationwide Permit 23 and 33 Application and Notice of Use of Nationwide 13** for the proposed replacement of Bridge No. 49 over South Muddy Creek on NC 226 in McDowell County. Division 13, Federal Aid Project No. BRSTP-226(8), State Project No. 8.1872301, WBS Element 33536.1.1, TIP No. B-4189.

Dear Sir:

Please see the enclosed Pre-Construction Notification (PCN), permit drawings, design plans and Categorical Exclusion (CE), for the above referenced project. The North Carolina Department of Transportation (NCDOT) proposes to replace the 106-foot, three-span Bridge No. 49 with a new 120-foot, three-span, steel girder bridge that will span South Muddy Creek. The existing bridge will be replaced in place and traffic will be maintained with an on-site detour. The on-site detour will also span South Muddy Creek. There will be 33 linear feet of permanent stream impacts and 24 linear feet of temporary stream impacts to an unnamed tributary to South Muddy Creek (UT2). There are no jurisdictional wetlands located within the project area.

IMPACTS TO WATERS OF THE UNITED STATES

General Description:
The water resource impacted for project B-3606 is UT2, a perennial unnamed tributary to South Muddy Creek. UT2 to South Muddy Creek is located in the Catawba River Basin (Division of Water Quality (DWQ) subbasin 03-08-30) and is approximately 3.5 feet wide and six inches

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-715-1334
FAX: 919-715-5501
WEBSITE: WWW.NCDOT.ORG

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

deep within the project area. The DWQ Index number for this section of South Muddy Creek is 11-32-2 and the Hydrological Cataloguing Unit is 03050101. The North Carolina Department of Environment and Natural Resources classifies South Muddy Creek as "C". No 303(d) streams, High Quality Waters (HQW), Water Supplies (WS-I or WSII), or Outstanding Resource Waters (ORW) occur within one mile of the project study area.

Permanent Impacts:
There will be 33 linear feet of permanent stream impacts to UT2 as a result of pipe extension at the south end of the project and bank stabilization with rip rap. Currently, UT2 crosses under NC 226 via a 42-inch corrugated metal pipe. This 42-inch pipe will need to be extended in order to accommodate the new roadway slopes on the east and west sides of the road.

Temporary Impacts:
There will be <0.01 acre (24 linear feet) of temporary stream impacts to UT2 associated with the installation of the pipe extensions on the east and west sides of NC 226.

Utility Impacts:
There will be no jurisdictional impacts associated with relocation of utilities for this project.

Schedule:
The project schedule calls for a March 18, 2008 Let date and a review date of January 29, 2008. The date of availability for construction is on April 29, 2008.

BRIDGE DEMOLITION

The existing bridge's substructure consists of concrete caps on timber piles. The superstructure consists of a concrete deck on steel beams. The deck of the existing bridge is 21 feet above the steam bed. The steel beams and the timber piles can be removed without dropping into waters of the United States. There is the potential for the middle span of the concrete deck and the caps of the interior bents to be temporarily dropped into South Muddy Creek during removal. The maximum resulting temporary fill associated with the removal of the concrete deck is approximately 20 cubic yards. The maximum resulting temporary fill associated with the removal of the substructure is 11 cubic yards. The total potential temporary fill is 31 cubic yards. 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 May 10, 2007, the United States Fish and Wildlife Service (USFWS) lists five federally protected species for McDowell County (Table 1). The biological conclusion for all five listed species is "No Effect" due to lack of habitat.

Table 1. Federally Protected Species for McDowell County

Common Name	Scientific Name	Status	Survey Notes	Biological Conclusion
Bald Eagle	*Hailiaeetus leucocephalus*	Delisted	No Habitat	N/A
Bog turtle	*Clemmys muhlenbergii*	T(S/A)	No Habitat	No Effect
Carolina northern flying squirrel	*Glaucomys sabrinus coloratus*	E	No Habitat	No Effect
Mountain golden heather	*Hudsonia montana*	T	No Habitat	No Effect
Small whorled pogonia	*Isotria medeoloides*	T	No Habitat	No Effect

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 new bridge will span South Muddy Creek.
- The temporary on-site detour bridge will span South Muddy Creek.
- A preformed scour hole will be installed near the new bridge to reduce sediment load into South Muddy Creek from stormwater runoff.
- Water will not be directly discharged into South Muddy 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 proposes no mitigation for the 33 linear feet of permanent impacts to UT2 because the permanent impacts total less than 150 linear feet. The impacts to UT2 are minimal and will have a minimal adverse effect on the stream. In addition, UT2 is not a High Quality Water.

REGULATORY APPROVALS

Section 404 Permit:
It is anticipated that the temporary dewatering of UT2 will be authorized under Section 404 Nationwide Permit 33 (Temporary Construction Access and Dewatering). We are, therefore, requesting the issuance of a Nationwide Permit 33 authorizing the temporary dewatering of UT2. NCDOT will make use of a Nationwide Permit 13 for permanent impacts relating to bank stabilization. No written concurrence from the USACE is required for this use of Nationwide Permit 13. All other aspects of this project are being processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR § 771.115(b). The

NCDOT requests that these activities be authorized by a Nationwide Permit 23 (FR number 10, pages 2020-2095; January 15, 2002).

Section 401 Permit:
We anticipate 401 General Certification numbers 3634, 3626 and 3632 will apply to this project. NCDOT will adhere to all standard conditions. In accordance with 15A NCAC 2H .0501(a) we are providing two copies of this application to the North Carolina Department of Environmental and Natural Resources, Division of Water Quality, for their records.

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. Lucas

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

cc:
W/attachment
- Mr. John Hennessy, NCDWQ (2 Copies)
- Ms. Marella Buncick, USFWS
- Ms. Marla Chambers, NCWRC
- Dr. David Chang, P.E., Hydraulics
- Mr. Victor Barbour, P.E., Project Services Unit
- Mr. Greg Perfetti, P.E., Structure Design
- Mr. Mark Staley, Roadside Environmental
- Mr. J.J. Swain, P.E., Division Engineer
- Mr. Roger Bryan, DEO

W/o attachment
- Mr. Jay Bennett, P.E., Roadway Design
- Mr. Majed Alghandour, P. E., Programming and TIP
- Mr. Art McMillan, P.E., Highway Design
- Mr. Scott McLendon, USACE, Wilmington
- Mr. Vince Rhea , P.E., Project Planning Engineer

Office Use Only: Form Version March 05

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

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

I. Processing

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

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

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: ☒

4. If payment into the North Carolina Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here: ☐

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

II. Applicant Information

1. Owner/Applicant Information
   Name: 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. 49 over South Muddy Creek on NC 226

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4189

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

4. Location
   County: McDowell Nearest Town: Dysartsville
   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°36'15.66" °N -81°52'26.71" °W

6. Property size (acres): N/A

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

8. River Basin: Catawba
   (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: 70% forested, 30% disturbed/residential

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 28.2 out of 100) to obtain safer and more efficient traffic operations.

IV. Prior Project History

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

V. Future Project Plans

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

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

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: Permanent: 33 linear feet (<0.01 acre) of impact to UT2 due to 42-inch corrugated metal pipe extension and bank stabilization with rip rap. Temporary: 24 linear feet (<0.01 acre) of impact to UT2 associated with installation of pipe extension

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	UT2	Permanent	Perennial	3.5 ft.	33	<0.01
Site 1	UT2	Temporary	Perennial	3.5 ft.	24	<0.01
Total Permanent Stream Impact (by length and acreage)					33	<0.01

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

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
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):	<0.01 (temp) <0.01 (permanent)
Wetland Impact (acres):	0
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	<0.01 (temp) <0.01 (permanent)
Total Stream Impact (linear feet):	24 (temp) 33 (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 new bridge will span South Muddy Creek. The temporary on-site detour will also span South Muddy Creek. No deck drains will be used and NCDOT's Best Management Practices will be followed. A preformed scour hole installed near the new bridge will minimize sediment load in South Muddy Creek.

VIII. Mitigation

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

freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

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

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

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   No mitigation is proposed for this project as the permanent impacts total less than 150 linear feet.

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): 0
   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 in the same location as the old bridge.

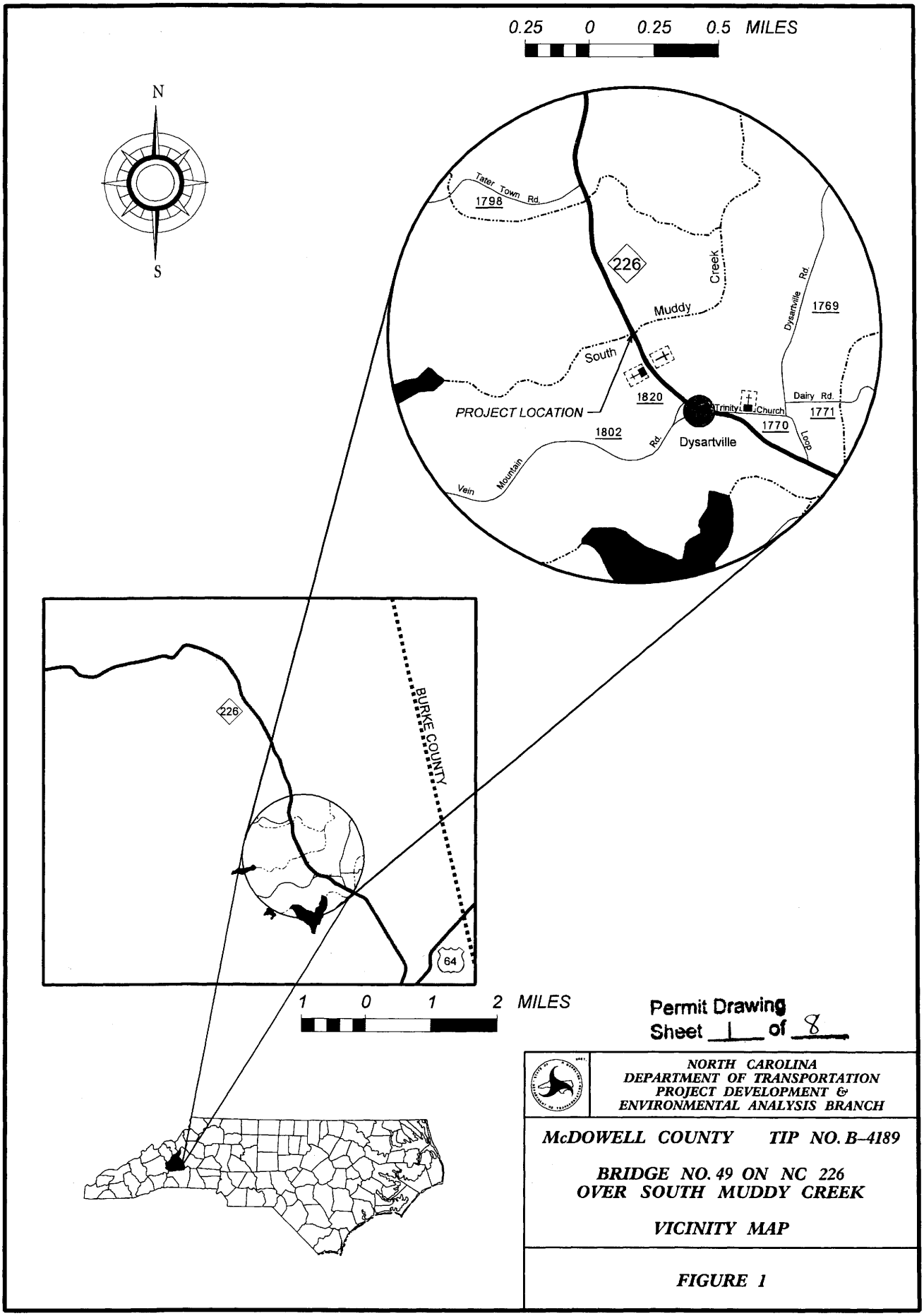
XV. Other Circumstances (Optional):

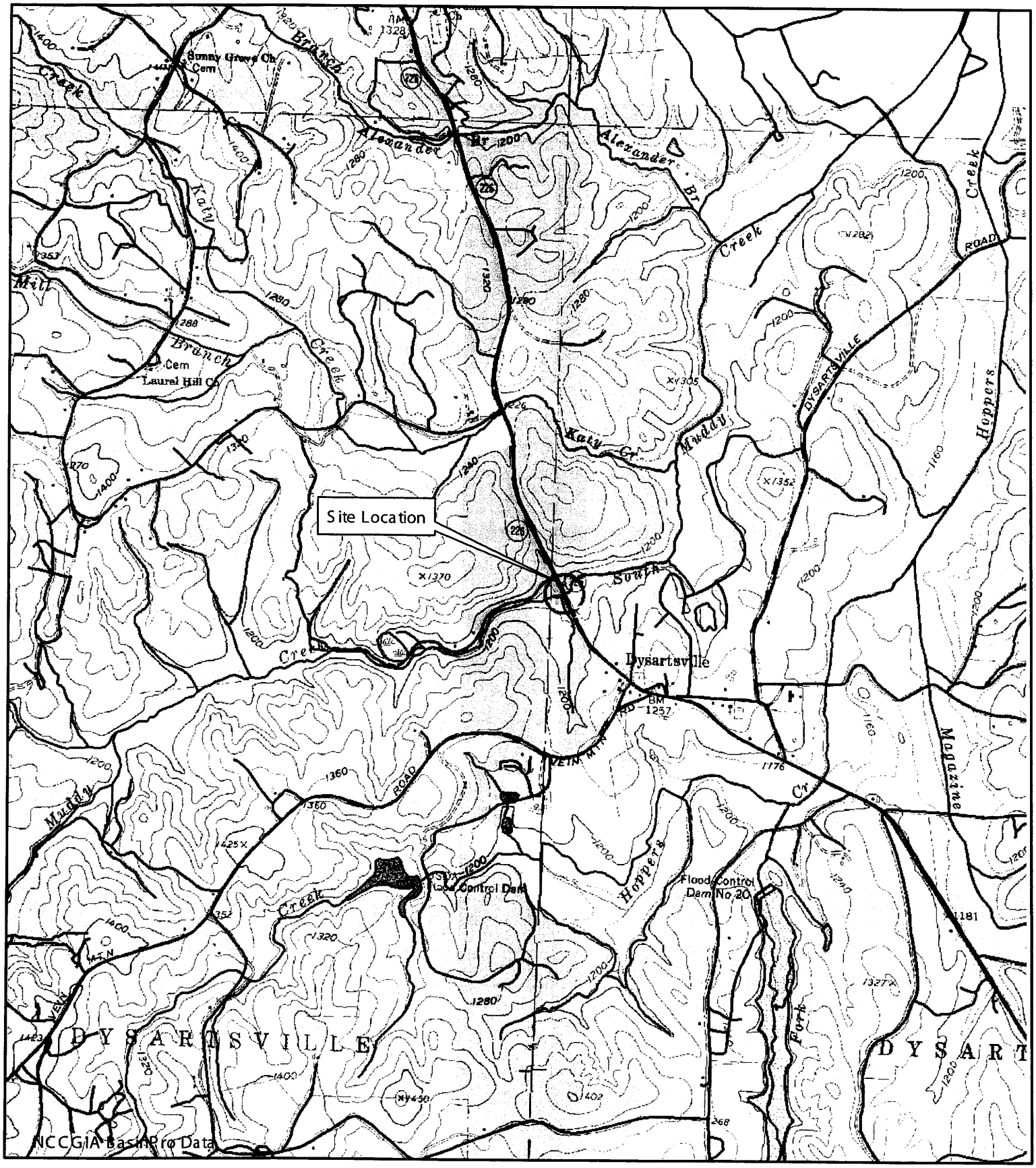
It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., 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. Luck for Gregory Thorpe, PhD 8-2-07

Applicant/Agent's Signature **Date**

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


0.25 0 0.25 0.5 MILES
N
S
Tater Town Rd.
1798
226
Muddy Creek
Dysartville Rd.
1769
South
1820
PROJECT LOCATION
Trinity Church
Dairy Rd.
1771
1770
1802
Rd.
Dysartville
Loop
Vein Mountain
BURKE COUNTY
64
1 0 1 2 MILES
Permit Drawing
Sheet 1 of 8
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH
McDOWELL COUNTY TIP NO. B-4189
BRIDGE NO. 49 ON NC 226
OVER SOUTH MUDDY CREEK
VICINITY MAP
FIGURE 1



TIP No. B-4189
Bridge No. 49
over South Muddy Creek
McDowell County

USGS Quad Map: Dysartsville

Permit Drawing
Sheet 2 of 8

M A Engineering
CONSULTANTS, INC.

WETLAND PERMIT

SURFACE WATER IMPACTS

FROM STA. -L- 9+80 TO 10+40

PROJECT REFERENCE NO.	SHEET NO.
B-4189	2A

R/W SHEET NO.

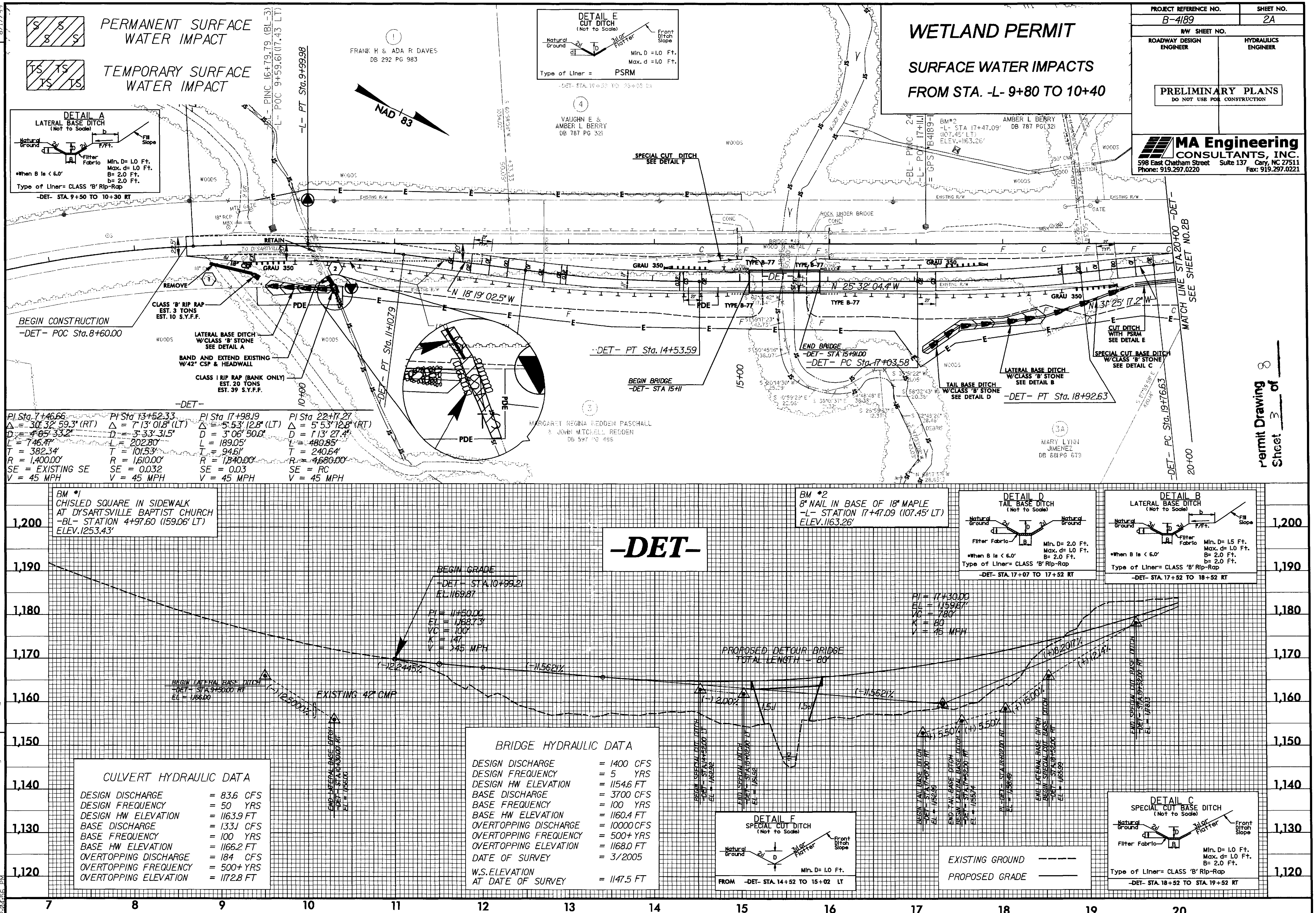
ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PERMANENT SURFACE WATER IMPACT

TEMPORARY SURFACE WATER IMPACT



PI Sta 7+46.66	PI Sta 13+52.33	PI Sta 17+98.19	PI Sta 22+17.27
Δ = 30°32' 59.3" (RT)	Δ = 7°13' 01.8" (LT)	Δ = 5°53' 12.8" (LT)	Δ = 5°53' 12.8" (RT)
D = 4°05' 33.2"	D = 3°33' 31.5"	D = 3°06' 50.0"	D = 1°13' 27.4"
L = 746.47'	L = 202.80'	L = 189.05'	L = 480.85'
T = 382.34'	T = 101.53'	T = 94.61'	T = 240.64'
R = 1,400.00'	R = 1,610.00'	R = 1,840.00'	R = 4,680.00'
SE = EXISTING SE	SE = 0.032	SE = 0.03	SE = RC
V = 45 MPH	V = 45 MPH	V = 45 MPH	V = 45 MPH

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 83.6 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 1163.9 FT
BASE DISCHARGE	= 133.1 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1166.2 FT
OVERTOPPING DISCHARGE	= 184 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1172.8 FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400 CFS
DESIGN FREQUENCY	= 5 YRS
DESIGN HW ELEVATION	= 1154.6 FT
BASE DISCHARGE	= 3700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1160.4 FT
OVERTOPPING DISCHARGE	= 10000 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1168.0 FT
DATE OF SURVEY	= 3/2005
W.S. ELEVATION AT DATE OF SURVEY	= 1147.5 FT

REVISIONS

8/17/99
07/03/2007

WETLAND PERMIT

SURFACE WATER IMPACTS

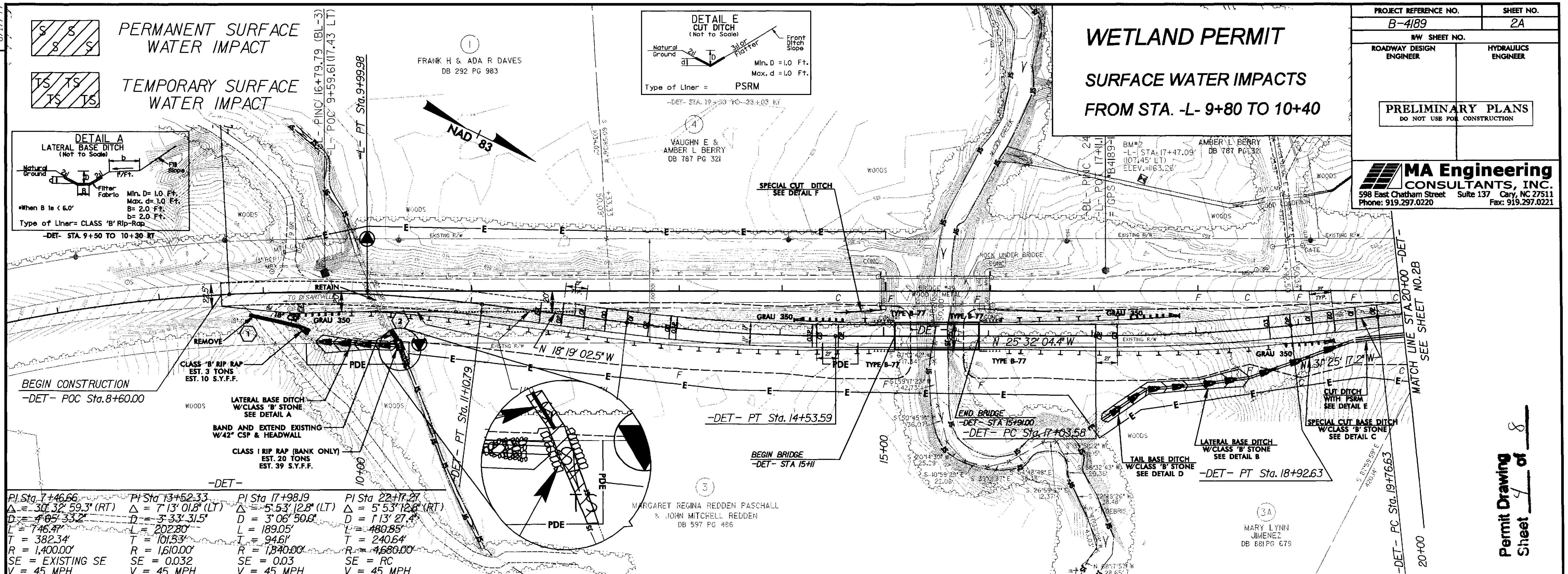
FROM STA. -L- 9+80 TO 10+40

PROJECT REFERENCE NO.	SHEET NO.
B-4189	2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

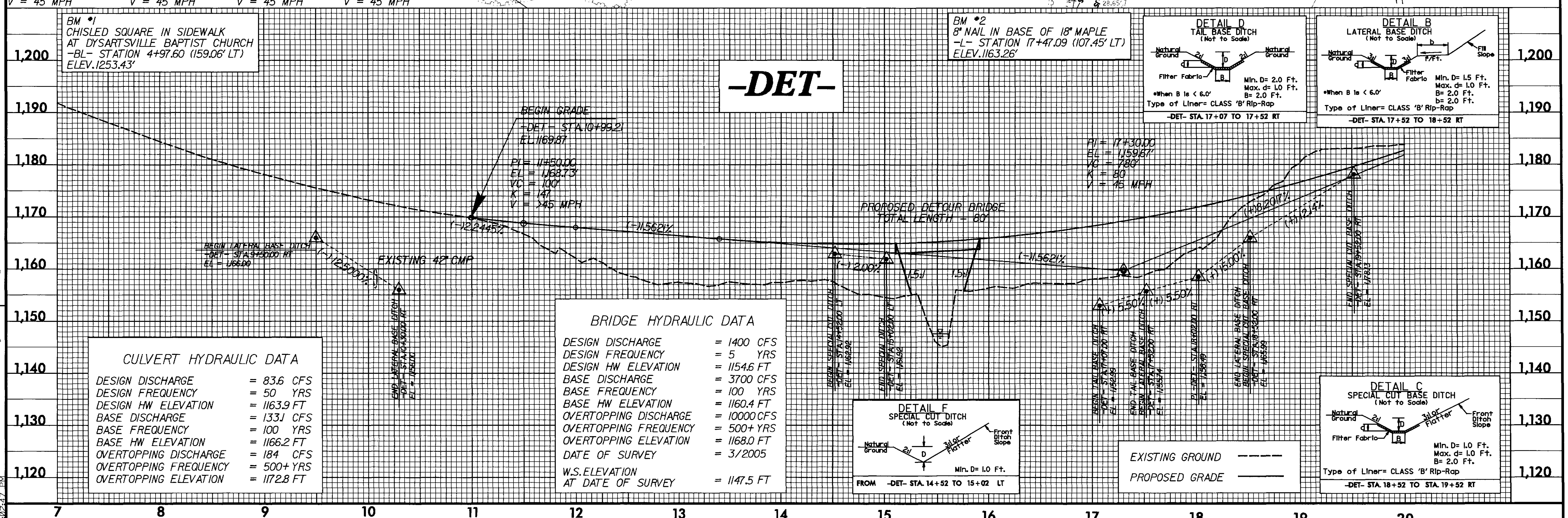
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 4 of 8



PI Sta 7+46.66	PI Sta 13+52.33	PI Sta 17+98.19	PI Sta 22+17.27
Δ = 30° 32' 59.3" (RT)	Δ = 7° 13' 01.8" (LT)	Δ = 5° 53' 12.8" (LT)	Δ = 5° 53' 12.8" (RT)
D = 4° 05' 33.2"	D = 3° 33' 31.5"	D = 3° 06' 50.6"	D = 1° 13' 27.4"
L = 746.47'	L = 202.80'	L = 189.05'	L = 480.85'
T = 382.34'	T = 101.53'	T = 94.61'	T = 240.64'
R = 1,400.00'	R = 1,610.00'	R = 1,840.00'	R = 4,680.00'
SE = EXISTING SE	SE = 0.032	SE = 0.03	SE = RC
V = 45 MPH	V = 45 MPH	V = 45 MPH	V = 45 MPH



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 83.6 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 1163.9 FT
BASE DISCHARGE	= 133.1 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1166.2 FT
OVERTOPPING DISCHARGE	= 184 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1172.8 FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400 CFS
DESIGN FREQUENCY	= 5 YRS
DESIGN HW ELEVATION	= 1154.6 FT
BASE DISCHARGE	= 3700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1160.4 FT
OVERTOPPING DISCHARGE	= 10000 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1168.0 FT
DATE OF SURVEY	= 3/2005
W.S. ELEVATION AT DATE OF SURVEY	= 1147.5 FT

REVISIONS

8/17/99

WETLAND PERMIT

SURFACE WATER IMPACTS
FROM STA. -L- 9+80 TO 10+40

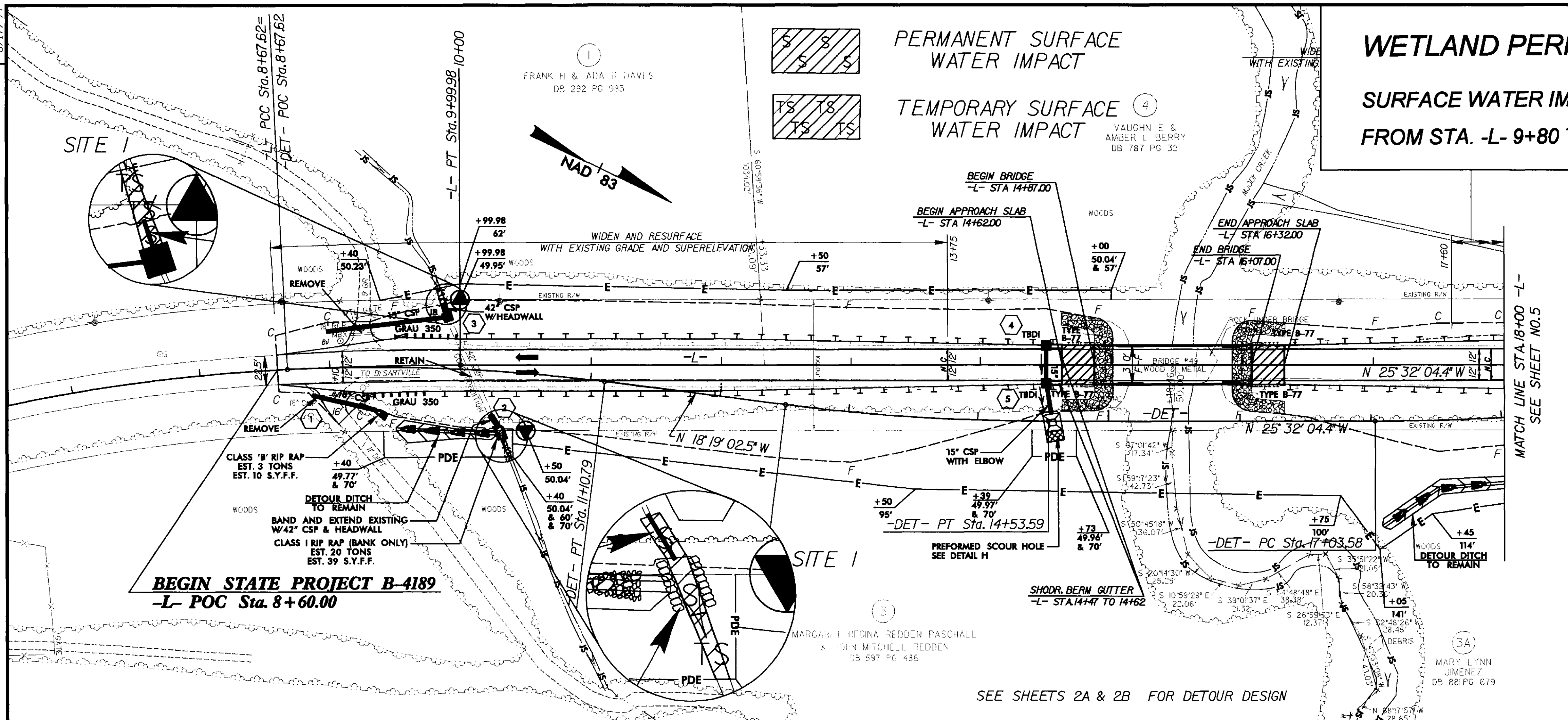
PROJECT REFERENCE NO.	SHEET NO.
B-4189	4

R/W SHEET NO.

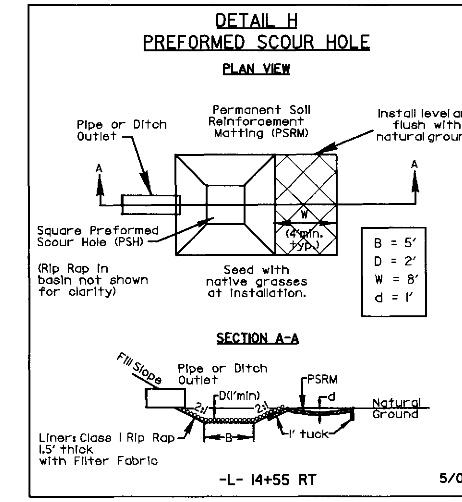
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



PERMANENT SURFACE WATER IMPACT
TEMPORARY SURFACE WATER IMPACT
SITE 1
NAD 83
FRANK H & ADA R DAVIS DB 292 PG 985
VAUGHN E & AMBER L BERRY DB 787 PG 321
-L- PT Sta. 9+99.98 10+00
-L- PCC Sta. 8+67.62 = -DET- POC Sta. 8+67.62
WIDEN AND RESURFACE WITH EXISTING GRADE AND SUPERELEVATION
REMOVE
42" CSP W/HEADWALL
GRAU 350
RETAIN
TO DYSARTSVILLE
N 18° 19' 02.5" W
N 25° 32' 04.4" W
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 S.Y.F.F.
DETOUR DITCH TO REMAIN
BAND AND EXTEND EXISTING W/42" CSP & HEADWALL
CLASS I RIP RAP (BANK ONLY) EST. 20 TONS EST. 39 S.Y.F.F.
BEGIN STATE PROJECT B-4189
-L- POC Sta. 8+60.00
-DET- PT Sta. 11+10.79
BEGIN BRIDGE -L- STA 14+87.00
BEGIN APPROACH SLAB -L- STA 14+62.00
END APPROACH SLAB -L- STA 16+32.00
END BRIDGE -L- STA 16+07.00
15" CSP WITH ELBOW
-DET- PT Sta. 14+53.59
PREFORMED SCOUR HOLE SEE DETAIL H
SHODR. BERM GUTTER -L- STA.14+47 TO 14+62
-DET- PC Sta. 17+03.58
DETOUR DITCH TO REMAIN
MATCH LINE STA.18+00 -L- SEE SHEET NO.5
MARGARET REGINA REDDEN PASCHALL & JOHN MITCHELL REDDEN DB 597 PG 486
MARY LYNN JIMENEZ DB 881 PG 679
SEE SHEETS 2A & 2B FOR DETOUR DESIGN



DETAIL H
PREFORMED SCOUR HOLE
PLAN VIEW
Pipe or Ditch Outlet
Permanent Soil Reinforcement Matting (PSRM)
Install level and flush with natural ground.
Square Preformed Scour Hole (PSH)
(Rip Rap in basin not shown for clarity)
Seed with native grasses at installation.
B = 5'
D = 2'
W = 8'
d = 1'
SECTION A-A
Fill Slope
Liner: Class I Rip Rap 1.5' thick with Filter Fabric
Natural Ground
-L- 14+55 RT
5/05

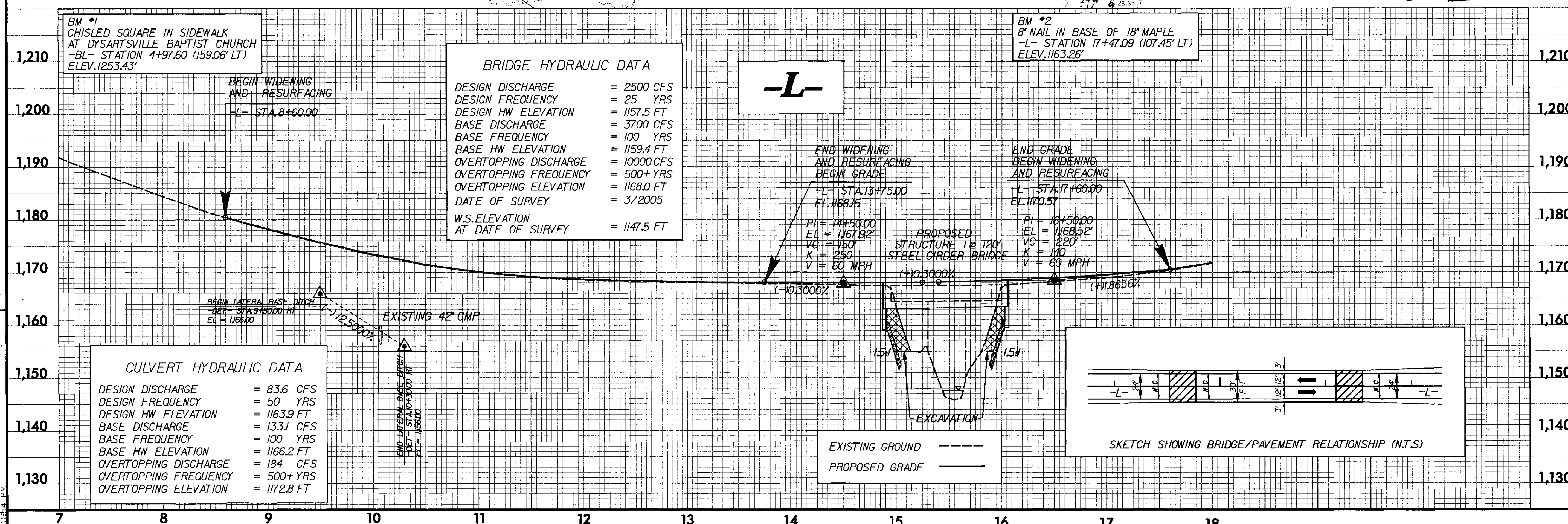
Permit Drawing Sheet 5 of 8

BM #1
CHISLED SQUARE IN SIDEWALK
AT DYSARTSVILLE BAPTIST CHURCH
-BL- STATION 4+97.60 (159.06' LT)
ELEV.1253.43'

BM #2
8" NAIL IN BASE OF 18" MAPLE
-L- STATION 17+47.09 (107.45' LT)
ELEV.1163.26'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2500 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 1157.5 FT
BASE DISCHARGE	= 3700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1159.4 FT
OVERTOPPING DISCHARGE	= 10000 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1168.0 FT
DATE OF SURVEY	= 3/2005
W.S.ELEVATION AT DATE OF SURVEY	= 1147.5 FT



-L-
BEGIN WIDENING AND RESURFACING -L- STA.8+60.00
END WIDENING AND RESURFACING BEGIN GRADE -L- STA.13+75.00 EL.1168.15
END GRADE BEGIN WIDENING AND RESURFACING -L- STA.17+60.00 EL.1170.57
PI = 14+50.00 EL = 1167.92' VC = 150' K = 250 V = 60 MPH
PI = 16+50.00 EL = 1168.52' VC = 220' K = 140 V = 60 MPH
PROPOSED STRUCTURE 1 @ 120' STEEL GIRDER BRIDGE
(-)0.3000%
(+)0.3000%
(+)1.8636%
(-)12.5000%
BEGIN LATERAL BASE DITCH -DET- STA.9+50.00 RT EL = 1166.00
END LATERAL BASE DITCH -DET- STA.10+30.00 RT EL = 1156.00
EXISTING 42" CMP
EXCAVATION
1.5:1
1,210
1,200
1,190
1,180
1,170
1,160
1,150
1,140
1,130
7
8
9
10
11
12
13
14
15
16
17
18
EXISTING GROUND
PROPOSED GRADE

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 83.6 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 1163.9 FT
BASE DISCHARGE	= 133.1 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1166.2 FT
OVERTOPPING DISCHARGE	= 184 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1172.8 FT

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S)

REVISIONS

8/17/99

07/03/2007
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WETLAND PERMIT

SURFACE WATER IMPACTS FROM STA. -L- 9+80 TO 10+40

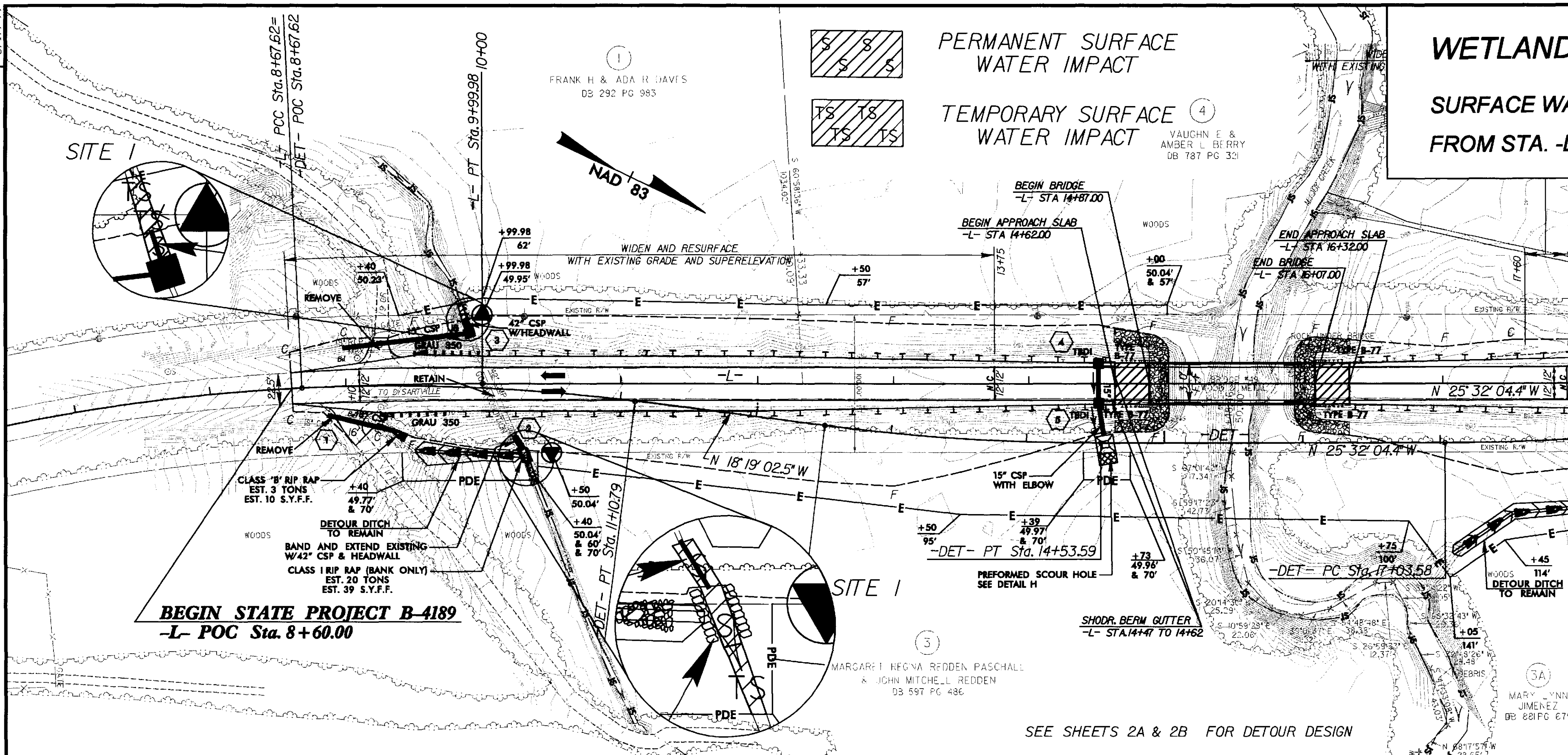
PROJECT REFERENCE NO.	SHEET NO.
B-4189	4

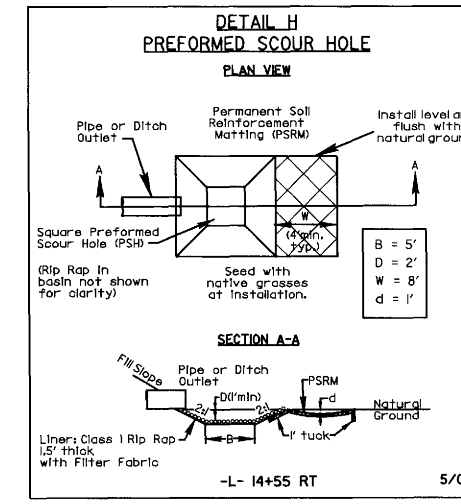
R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221





Permit Drawing Sheet 6 of 8

BM #1
CHISLED SQUARE IN SIDEWALK AT DYSARTSVILLE BAPTIST CHURCH
-BL- STATION 4+97.60 (159.06' LT)
ELEV. 1253.43'

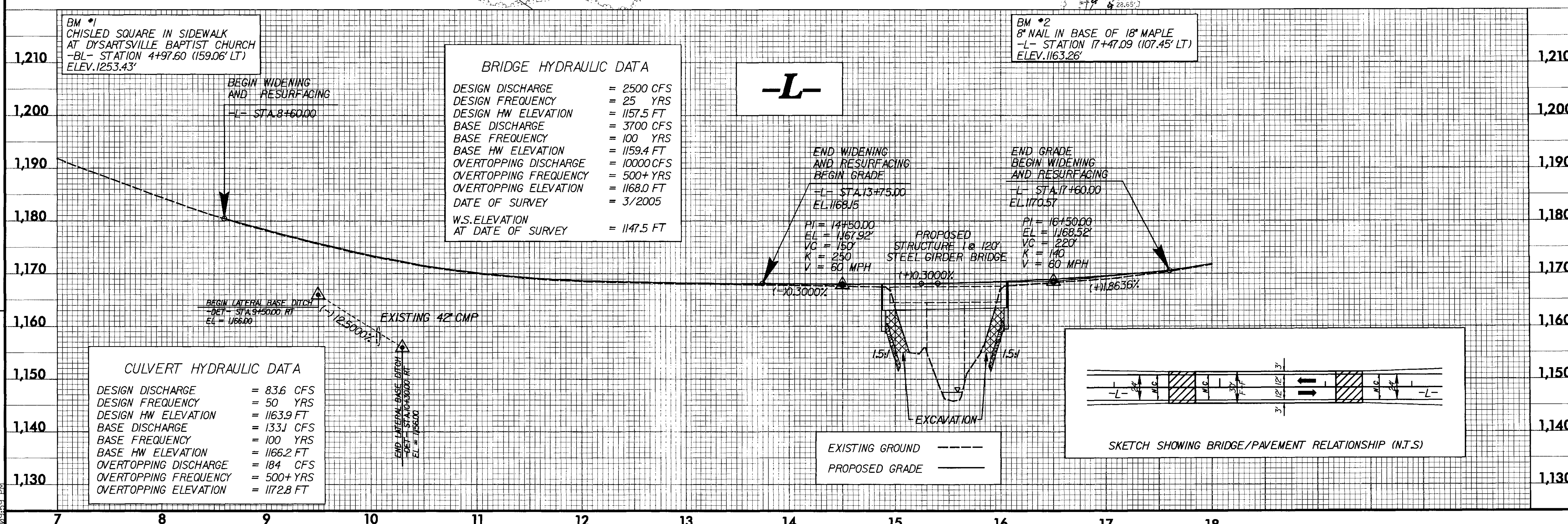
BM #2
8" NAIL IN BASE OF 18" MAPLE
-L- STATION 17+47.09 (107.45' LT)
ELEV. 1163.26'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2500 CFS
DESIGN FREQUENCY	=	25 YRS
DESIGN HW ELEVATION	=	1157.5 FT
BASE DISCHARGE	=	3700 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	1159.4 FT
OVERTOPPING DISCHARGE	=	10000 CFS
OVERTOPPING FREQUENCY	=	500+ YRS
OVERTOPPING ELEVATION	=	1168.0 FT
DATE OF SURVEY	=	3/2005
W.S. ELEVATION AT DATE OF SURVEY	=	1147.5 FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	83.6 CFS
DESIGN FREQUENCY	=	50 YRS
DESIGN HW ELEVATION	=	1163.9 FT
BASE DISCHARGE	=	133.1 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	1166.2 FT
OVERTOPPING DISCHARGE	=	184 CFS
OVERTOPPING FREQUENCY	=	500+ YRS
OVERTOPPING ELEVATION	=	1172.8 FT



REVISIONS

07/03/2007 R:\Hydraulics\PERMIT\WETLAND\B4189_rdy_PERMIT.dgn 2:09:59 PM

8/17/99

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	9+80 - 10+40 -L-	42" Extension						<0.01	<0.01	33	24	
TOTALS:			0.00	0.00	0.00	0.00	0.00	0.00	0.00	33	24	0

Permit Drawing
Sheet 1 of 1

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

McDowell County
WBS - 33536.1.1 (B-4189)

SHEET Jul-07

ATN Revised 3/31/05

Property Owners

Parcel Number	Names	Addresses
1	Frank H. and Ada Daves	**11430 Hwy 226 South Nebo, NC 27861**
3	Margaret Regina Redden Paschall & John Mitchell Redden	**11485 Hwy 226 South Nebo, NC 28761**
4	Vaugh E. & Amber L. Berry	**113 Lowder Drive Nebo, NC 28761**

Permit Drawing
Sheet 8 **of** 8

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MCDowell COUNTY
WBS - 33536.1.1 (B-4189)

SHEET 5/7/2007

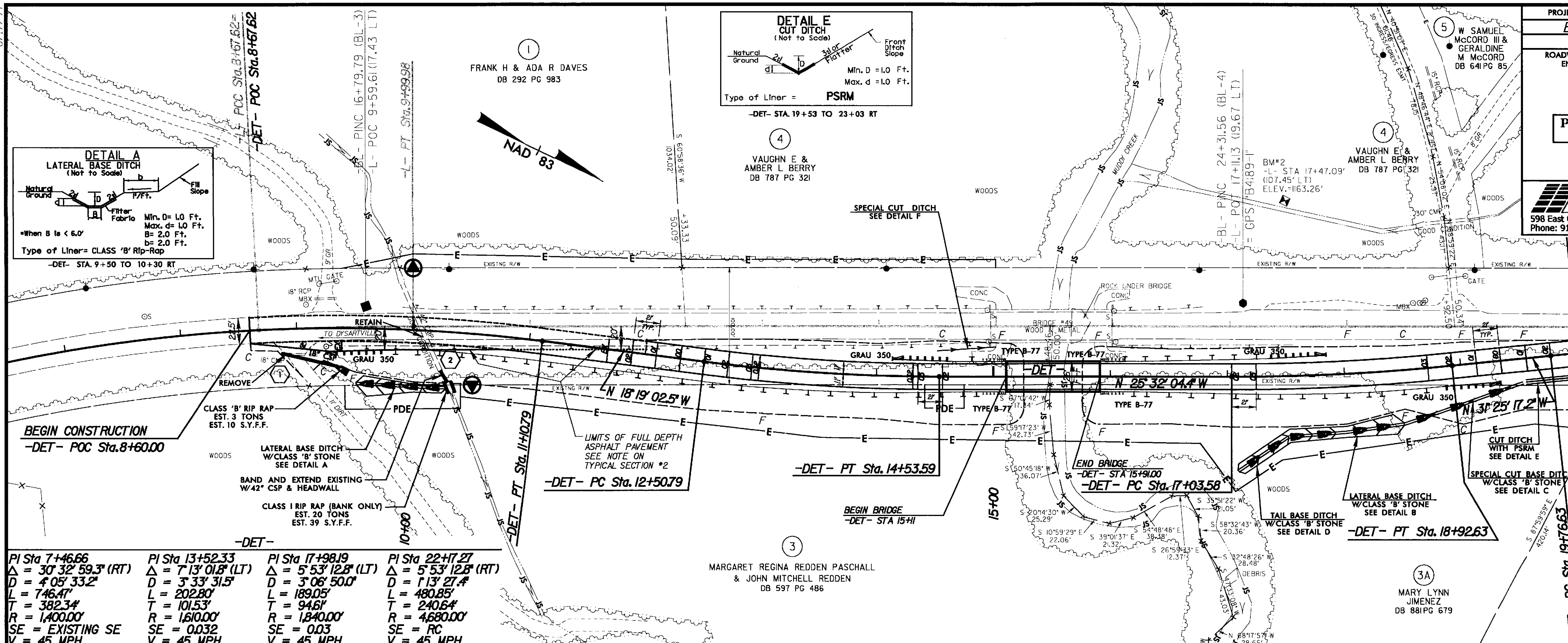
PROJECT REFERENCE NO.	SHEET NO.
B-4189	2A

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

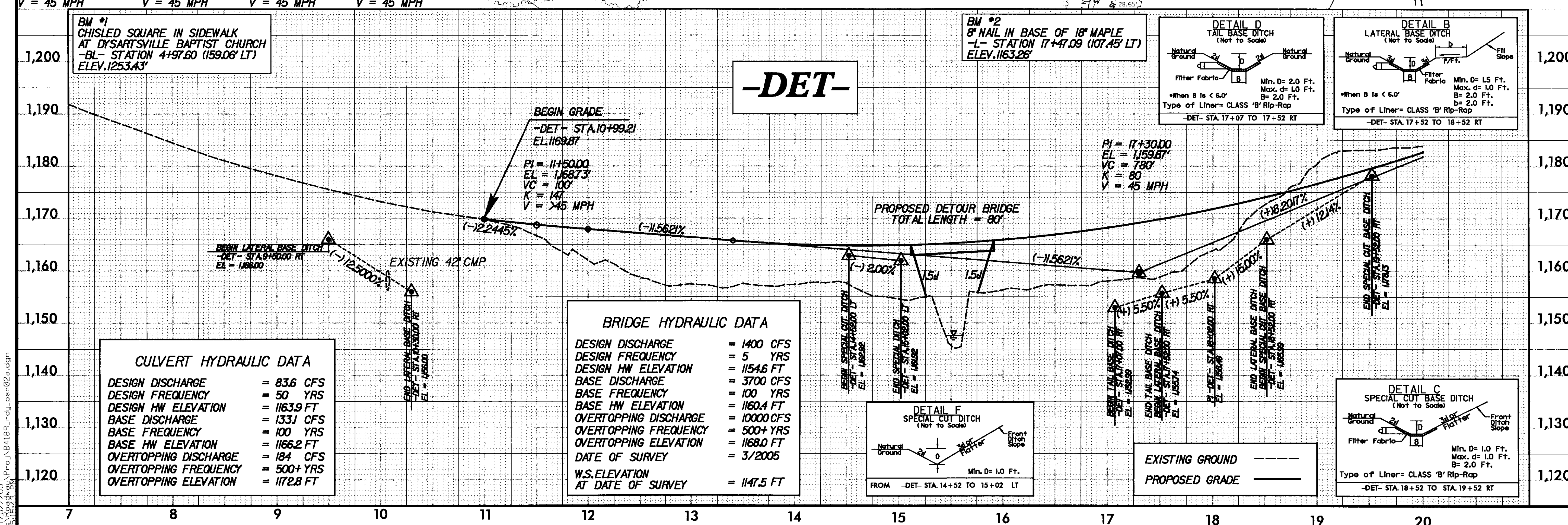

DETAIL A
LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CLASS 'B' Rip-Rap
-DET- STA. 9+50 TO 10+30 RT
DETAIL E
CUT DITCH
(Not to Scale)
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
Type of Liner = PSRM
-DET- STA. 19+53 TO 23+03 RT
FRANK H & ADA R DAVES
DB 292 PG 983
VAUGHN E & AMBER L BERRY
DB 787 PG 321
W SAMUEL McCORD III & GERALDINE M McCORD
DB 641 PG 85
NAD 83
BEGIN CONSTRUCTION
-DET- POC Sta.8+60.00
-DET- PC Sta.12+50.79
-DET- PT Sta.11+10.79
-DET- PT Sta.14+53.59
-DET- PC Sta.17+03.58
-DET- PT Sta.18+92.63
-DET- PC Sta.19+76.63
MATCH LINE STA.20+00 -DET- SEE SHEET NO.2B
N 18°19' 02.5" W
N 25°32' 04.4" W
N 31°25' 17.2" W
BEGIN BRIDGE
-DET- STA 15+11
END BRIDGE
-DET- STA 15+91.00
BM*2
-L- STA 17+47.09' (107.45' LT)
ELEV.=1163.26'
MARGARET REGINA REDDEN PASCHALL & JOHN MITCHELL REDDEN
DB 597 PG 486
MARY LYNN JIMENEZ
DB 881 PG 679
WOODS
SPECIAL CUT DITCH SEE DETAIL F
LATERAL BASE DITCH W/CLASS 'B' STONE SEE DETAIL A
LATERAL BASE DITCH W/CLASS 'B' STONE SEE DETAIL B
TAIL BASE DITCH W/CLASS 'B' STONE SEE DETAIL D
CUT DITCH WITH PSRM SEE DETAIL E
SPECIAL CUT BASE DITCH W/CLASS 'B' STONE SEE DETAIL C
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 S.Y.F.F.
BAND AND EXTEND EXISTING W/42" CSP & HEADWALL
CLASS I RIP RAP (BANK ONLY) EST. 20 TONS EST. 39 S.Y.F.F.
LIMITS OF FULL DEPTH ASPHALT PAVEMENT SEE NOTE ON TYPICAL SECTION *2
GRAU 350
TYPE B-77
PDE
-DET-

PI Sta 7+46.66	PI Sta 13+52.33	PI Sta 17+98.19	PI Sta 22+17.27
Δ = 30° 32' 59.3" (RT)	Δ = 7° 13' 01.8" (LT)	Δ = 5° 53' 12.8" (LT)	Δ = 5° 53' 12.8" (RT)
D = 4° 05' 33.2"	D = 3° 33' 31.5"	D = 3° 06' 50.0"	D = 1° 13' 27.4"
L = 746.47'	L = 202.80'	L = 189.05'	L = 480.85'
T = 382.34'	T = 101.53'	T = 94.61'	T = 240.64'
R = 1,400.00'	R = 1,610.00'	R = 1,840.00'	R = 4,680.00'
SE = EXISTING SE	SE = 0.032	SE = 0.03	SE = RC
V = 45 MPH	V = 45 MPH	V = 45 MPH	V = 45 MPH

BM *1
CHISLED SQUARE IN SIDEWALK
AT DYSARTSVILLE BAPTIST CHURCH
-BL- STATION 4+97.60 (159.06' LT)
ELEV.1253.43'

BM *2
8" NAIL IN BASE OF 18" MAPLE
-L- STATION 17+47.09 (107.45' LT)
ELEV.1163.26'

-DET-

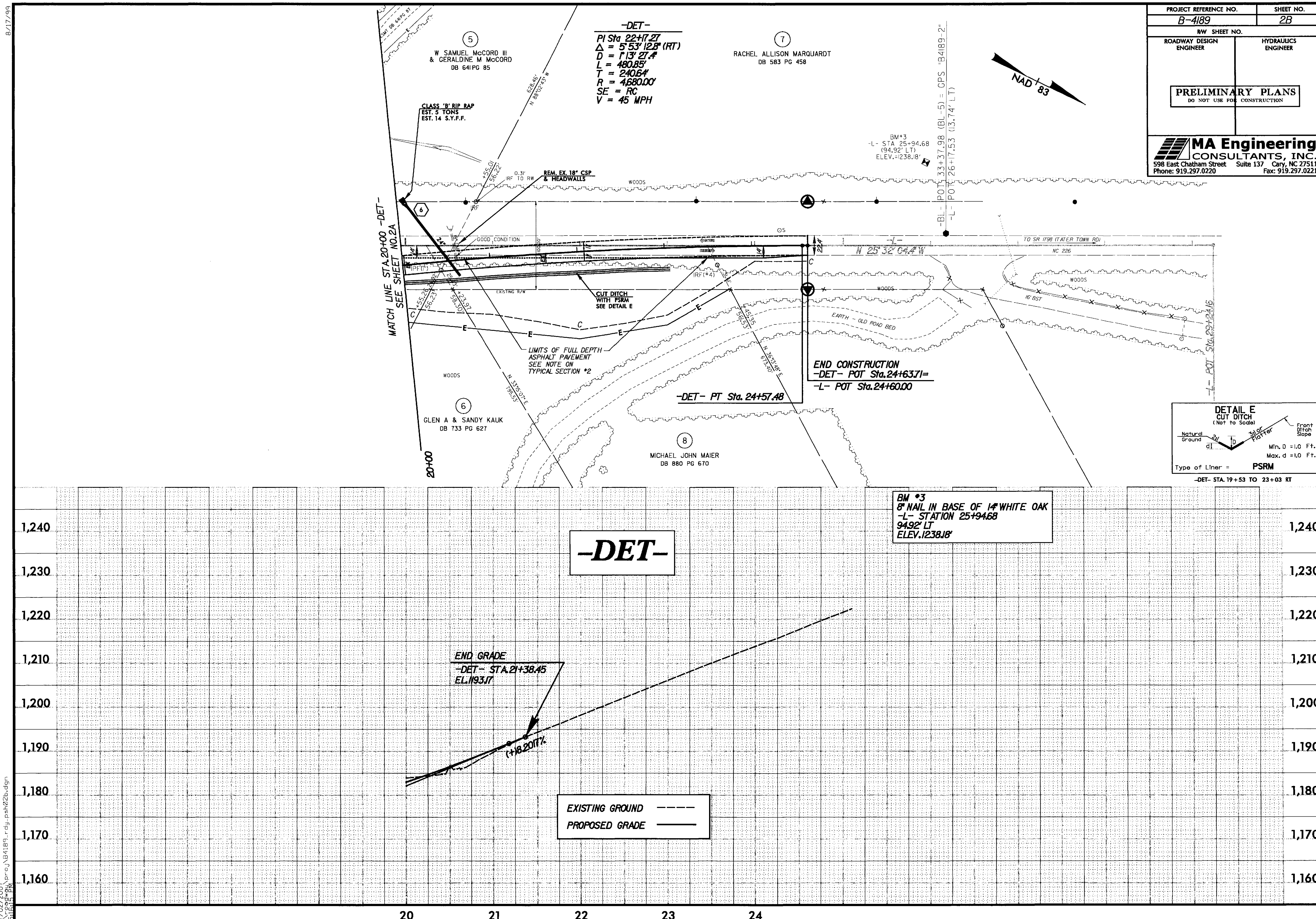

BEGIN GRADE
-DET- STA.10+99.21
EL.1169.87
PI = 11+50.00
EL = 1,168.73'
VC = 100'
K = 147
V = >45 MPH
PI = 17+30.00
EL = 1,159.67'
VC = 780'
K = 80
V = 45 MPH
PROPOSED DETOUR BRIDGE
TOTAL LENGTH = 80'
EXISTING 42" CMP
(-)2.2445%
(-)1.5621%
(-)12.5000%
(-)2.00%
(+)5.50%
(+)15.00%
(+)8.2017%
(+)12.14%
BEGIN LATERAL BASE DITCH
-DET- STA.9+50.00 RT
EL = 1,166.00
1,200
1,190
1,180
1,170
1,160
1,150
1,140
1,130
1,120
7
8
9
10
11
12
13
14
15
16
17
18
19
20
DETAIL D
TAIL BASE DITCH
(Not to Scale)
Min. D= 2.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CLASS 'B' Rip-Rap
-DET- STA. 17+07 TO 17+52 RT
DETAIL B
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
b= 2.0 Ft.
Type of Liner= CLASS 'B' Rip-Rap
-DET- STA. 17+52 TO 18+52 RT
DETAIL F
SPECIAL CUT DITCH
(Not to Scale)
Min. D= 1.0 Ft.
FROM -DET- STA. 14+52 TO 15+02 LT
DETAIL C
SPECIAL CUT BASE DITCH
(Not to Scale)
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CLASS 'B' Rip-Rap
-DET- STA. 18+52 TO STA. 19+52 RT
EXISTING GROUND
PROPOSED GRADE

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 83.6 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 1163.9 FT
BASE DISCHARGE	= 133.1 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1166.2 FT
OVERTOPPING DISCHARGE	= 184 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1172.8 FT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400 CFS
DESIGN FREQUENCY	= 5 YRS
DESIGN HW ELEVATION	= 1154.6 FT
BASE DISCHARGE	= 3700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1160.4 FT
OVERTOPPING DISCHARGE	= 10000 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1168.0 FT
DATE OF SURVEY	= 3/2005
W.S. ELEVATION AT DATE OF SURVEY	= 1147.5 FT



PROJECT REFERENCE NO. B-4189
SHEET NO. 2B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
-DET-
PI Sta 22+17.27
Δ = 5°53' 12.8" (RT)
D = 1°13' 27.4"
L = 480.85'
T = 240.64'
R = 4,680.00'
SE = RC
V = 45 MPH
W SAMUEL McCORD III & GERALDINE M McCORD DB 641 PG 85
RACHEL ALLISON MARQUARDT DB 583 PG 458
GLEN A & SANDY KAUK DB 733 PG 627
MICHAEL JOHN MAIER DB 880 PG 670
CLASS 'B' RIP RAP EST. 5 TONS EST. 14 S.Y.F.F.
REM. EX. 18" CSP & HEADWALLS
BM#3 -L- STA 25+94.68 (94.92' LT) ELEV.=1238.18'
-BL- POT 33+37.98 (BL-5) = GPS 'B4189-2'
-L- POT 26+17.53 (13.74' LT)
NAD 83
MATCH LINE STA.20+00 -DET- SEE SHEET NO.2A
CUT DITCH WITH PSRM SEE DETAIL E
LIMITS OF FULL DEPTH ASPHALT PAVEMENT SEE NOTE ON TYPICAL SECTION #2
END CONSTRUCTION -DET- POT Sta.24+63.71= -L- POT Sta.24+60.00
-DET- PT Sta. 24+57.48
TO SR 1198 (TATER TOWN RD)
N 25° 32' 04.4" W
WOODS
EARTH - OLD ROAD BED
DETAIL E CUT DITCH (Not to Scale)
Natural Ground
Front Ditch Slope
3d or Flatter
Min. D =1.0 Ft.
Max. d =1.0 Ft.
Type of Liner = PSRM
-DET- STA. 19+53 TO 23+03 RT
BM #3 8" NAIL IN BASE OF 14" WHITE OAK -L- STATION 25+94.68 94.92' LT ELEV.1238.18'
-DET-
END GRADE -DET- STA.21+38.45 EL.1193.17
(+)8.2017%
EXISTING GROUND
PROPOSED GRADE
1,240 1,230 1,220 1,210 1,200 1,190 1,180 1,170 1,160
20 21 22 23 24
8/17/99
07/02/2007

PROJECT REFERENCE NO.	SHEET NO.
B-4189	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

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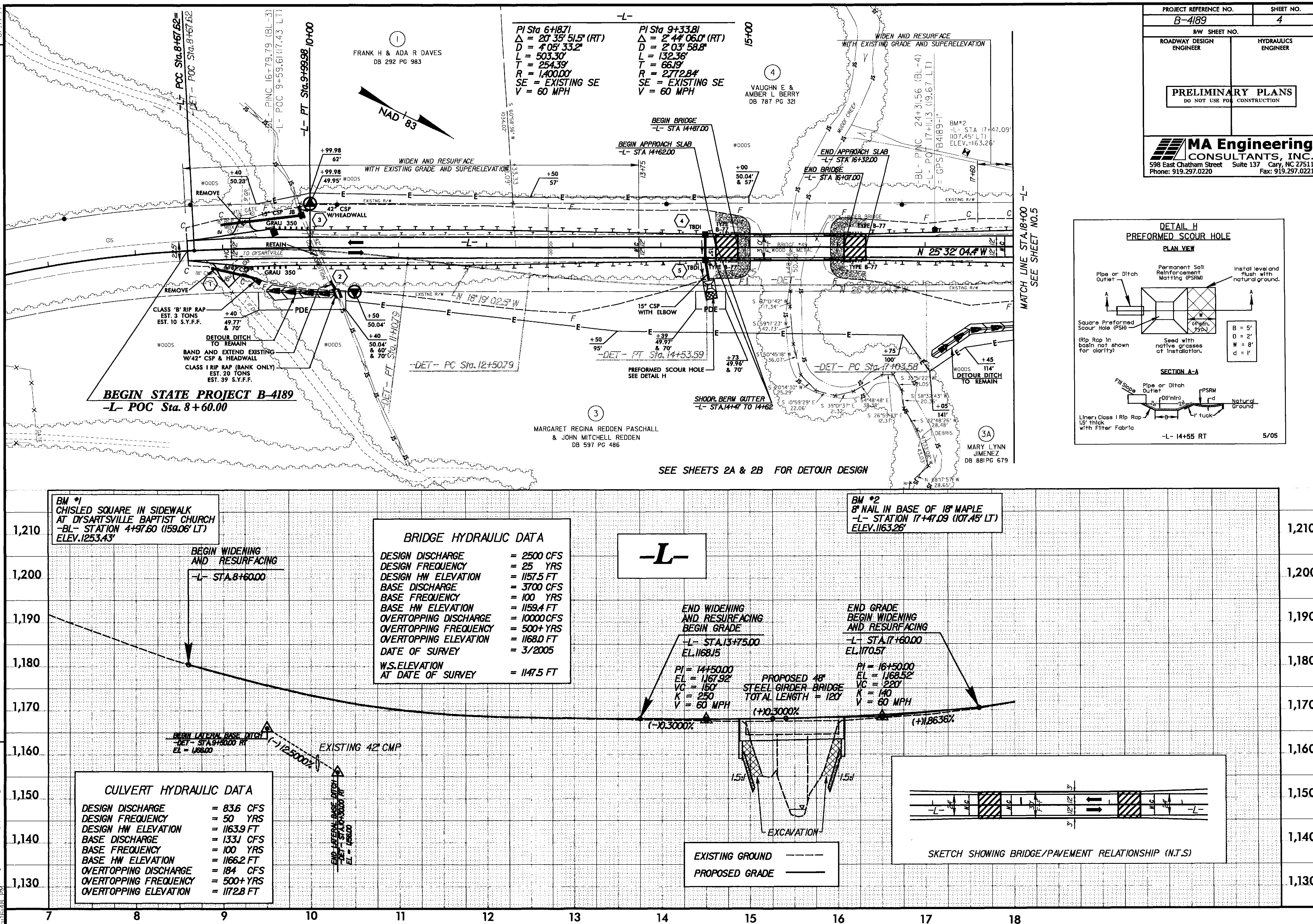

-L-
PI Sta 6+18.71
Δ = 20° 35' 51.5" (RT)
D = 4° 05' 33.2"
L = 503.30'
T = 254.39'
R = 1,400.00'
SE = EXISTING SE
V = 60 MPH
PI Sta 9+33.81
Δ = 2° 44' 06.0" (RT)
D = 2° 03' 58.8"
L = 132.36'
T = 66.19'
R = 2,772.84'
SE = EXISTING SE
V = 60 MPH
FRANK H & ADA R DAVES DB 292 PG 983
VAUGHN E & AMBER L BERRY DB 787 PG 321
MARGARET REGINA REDDEN PASCHALL & JOHN MITCHELL REDDEN DB 597 PG 486
MARY LYNN JIMENEZ DB 881 PG 679
NAD 83
WIDEN AND RESURFACE WITH EXISTING GRADE AND SUPERELEVATION
BEGIN BRIDGE -L- STA 14+87.00
BEGIN APPROACH SLAB -L- STA 14+62.00
END APPROACH SLAB -L- STA 16+32.00
END BRIDGE -L- STA 16+07.00
BM*2 -L- STA 17+47.09' (107.45' LT) ELEV.=1163.26'
MATCH LINE STA.18+00 -L- SEE SHEET NO.5
N 25° 32' 04.4" W
N 18° 19' 02.5" W
BEGIN STATE PROJECT B-4189
-L- POC Sta. 8+60.00
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 S.Y.F.F.
DETOUR DITCH TO REMAIN
BAND AND EXTEND EXISTING W/42" CSP & HEADWALL
CLASS I RIP RAP (BANK ONLY) EST. 20 TONS EST. 39 S.Y.F.F.
PREFORMED SCOUR HOLE SEE DETAIL H
SHODR. BERM GUTTER -L- STA.14+47 TO 14+62
-DET- PC Sta. 12+50.79
-DET- PT Sta. 14+53.59
-DET- PC Sta. 17+03.58
SEE SHEETS 2A & 2B FOR DETOUR DESIGN
DETAIL H
PREFORMED SCOUR HOLE
PLAN VIEW
SECTION A-A
Liner: Class I Rip Rap 1.5' thick with Filter Fabric
B = 5'
D = 2'
W = 8'
d = 1'
-L- 14+55 RT
5/05
BM *1 CHISLED SQUARE IN SIDEWALK AT DYSARTSVILLE BAPTIST CHURCH -BL- STATION 4+97.60 (159.06' LT) ELEV.1253.43'
BM *2 8" NAIL IN BASE OF 18" MAPLE -L- STATION 17+47.09 (107.45' LT) ELEV.1163.26'
BEGIN WIDENING AND RESURFACING -L- STA.8+60.00
END WIDENING AND RESURFACING BEGIN GRADE -L- STA.13+75.00 EL.1168.15
END GRADE BEGIN WIDENING AND RESURFACING -L- STA.17+60.00 EL.1170.57
PI = 14+50.00 EL = 1,167.92' VC = 150' K = 250 V = 60 MPH
PI = 16+50.00 EL = 1,168.52' VC = 220' K = 140 V = 60 MPH
PROPOSED 48" STEEL GIRDER BRIDGE TOTAL LENGTH = 120'
(-)0.3000%
(+)0.3000%
(+)1.8636%
(-)12.5000%
EXISTING 42" CMP
EXCAVATION
EXISTING GROUND
PROPOSED GRADE
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP (N.T.S)
REVISIONS
R/W REVISION 07/ /07 RWP NEW PARCEL 3A SUBDIVIDED FROM PARCEL 3; NEW PROPERTY LINES SHOWN.

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2500 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 1157.5 FT
BASE DISCHARGE	= 3700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1159.4 FT
OVERTOPPING DISCHARGE	= 10000 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1168.0 FT
DATE OF SURVEY	= 3/2005
W.S. ELEVATION AT DATE OF SURVEY	= 1147.5 FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 83.6 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 1163.9 FT
BASE DISCHARGE	= 133.1 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1166.2 FT
OVERTOPPING DISCHARGE	= 184 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1172.8 FT

PROJECT REFERENCE NO.	SHEET NO.
B-4189	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

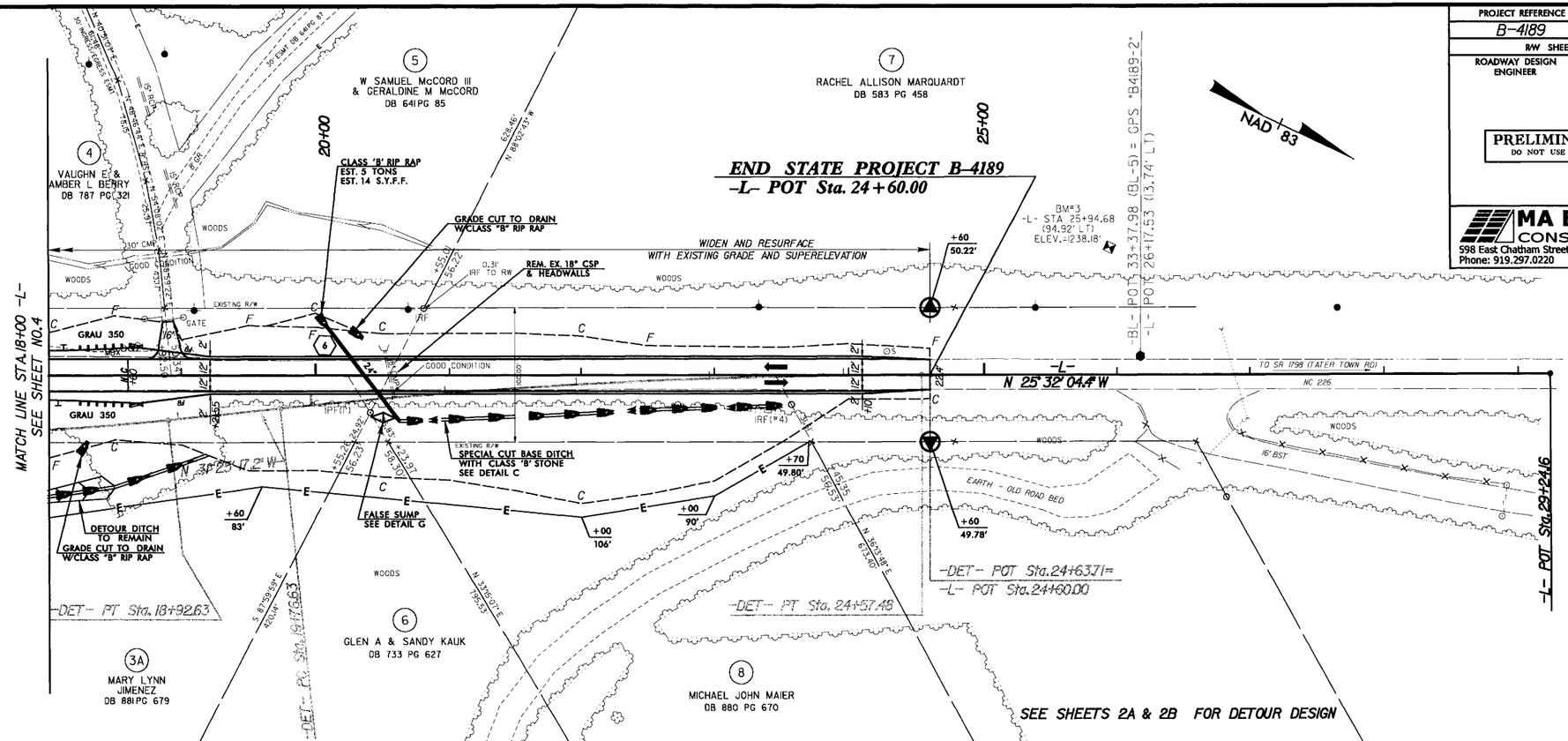
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

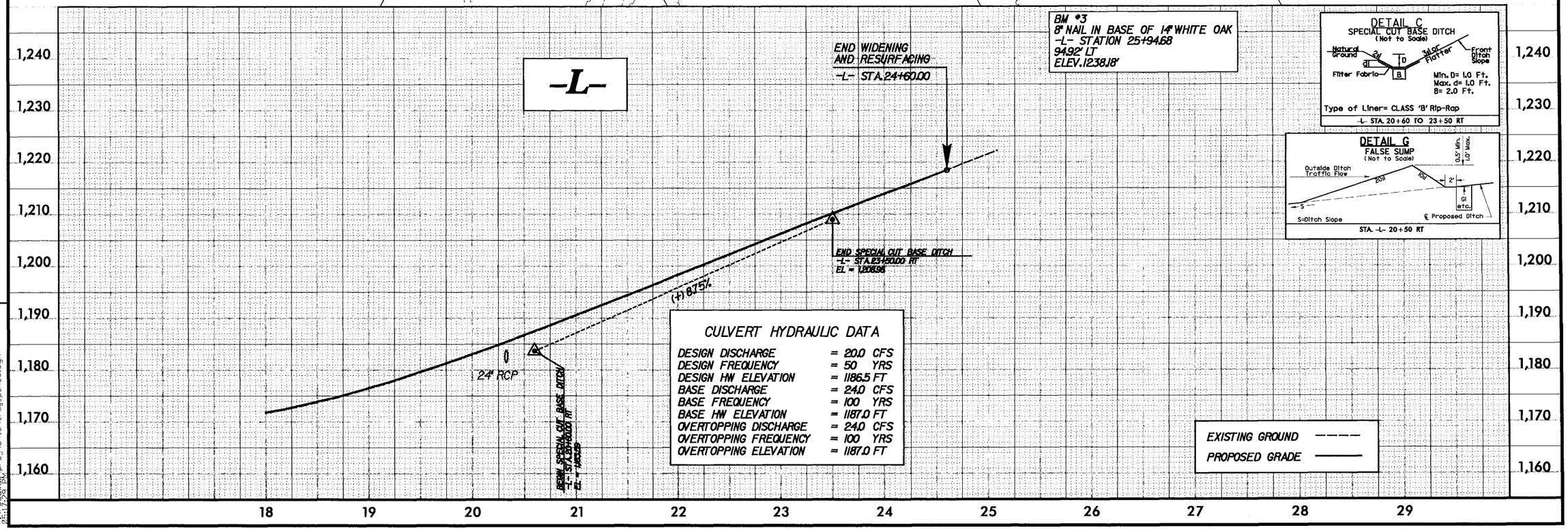
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

R/W REVISION 07/ /07 RMP NEW PARCEL 3A SUBDIVIDED FROM PARCEL 3; NEW PROPERTY LINES SHOWN, NAME CHANGE ON PARCEL 8, TOE ELIMINATED ON PARCEL 5.

8/17/99





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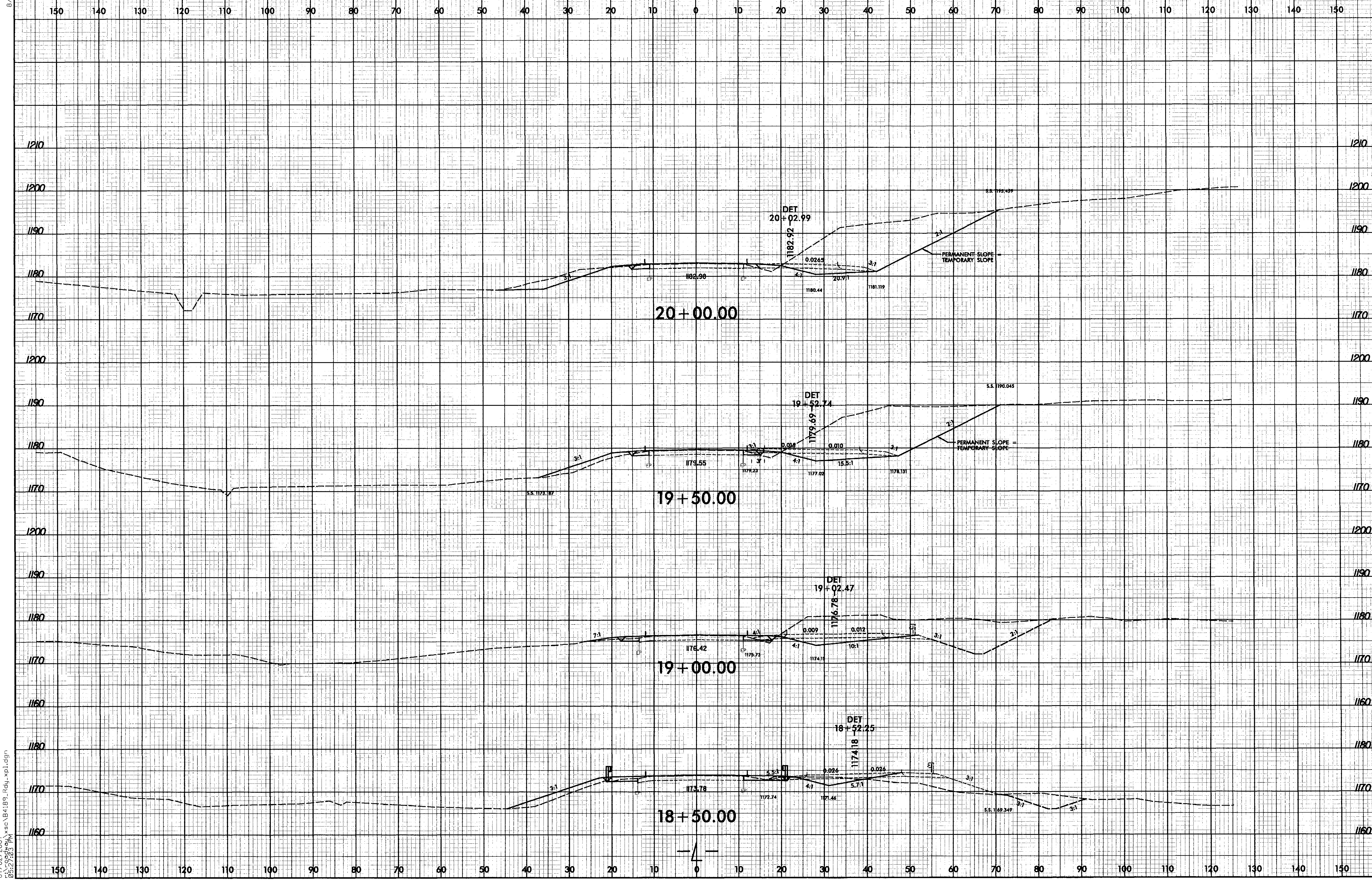
PROJ. REFERENCE NO.	SHEET NO.
B-4189	X-6



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8/23/99

McDowell County
Bridge No. 49 on NC 226
over South Muddy Creek
Federal-Aid Project No. BRSTP-226 (8)
State Project No. 8.1872301
W.B.S. No. 33536.1.1
T.I.P. Project No. B-4189

CATEGORICAL EXCLUSION
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED:

9/26/05
DATE

for **Gregory J. Thorpe, PhD.**
Environmental Management Director
Project Development & Environmental Analysis Branch,
North Carolina Department of Transportation

9/27/05
DATE

for **John F. Sullivan, III PE**
Division Administrator
Federal Highway Administration

McDowell County

Bridge No. 49 on NC 226

over South Muddy Creek

Federal-Aid Project No. BRSTP-226 (8)

State Project No. 8.1872301

W.B.S. No. 33536.1.1

T.I.P. Project No. B-4189

CATEGORICAL EXCLUSION

September 2005

Document Prepared By:
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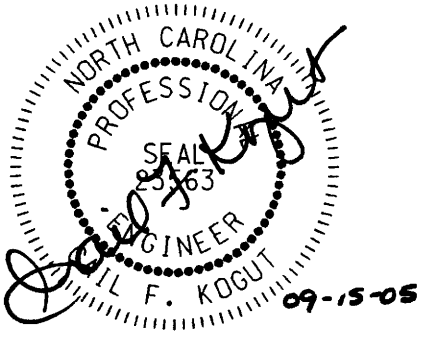
Gail F. Kogut

Gail F. Kogut, PE
Project Manager



For the North Carolina Department of Transportation:

Vincent J. Rhea

Vincent J. Rhea, PE
Project Manager
Project Development & Environmental Analysis Branch

McDowell County
Bridge No. 49 on NC 226
over South Muddy Creek
Federal-Aid Project No. BRSTP-226 (8)
State Project No. 8.1872301
W.B.S. No. 33536.1.1
T.I.P. Project No. B-4189

PROJECT COMMITMENTS

No special commitments are required for this project other than those set forth under the standard Nationwide Permit No. 23 and potentially No. 33 Conditions, the General Nationwide Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for the Protection of Surface Waters, NCDOT's Guidelines for Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification.

McDowell County
Bridge No. 49 on NC 226
over South Muddy Creek
Federal-Aid Project No. BRSTP-226 (8)
State Project No. 8.1872301
W.B.S. No. 33536.1.1
T.I.P. Project No. B-4189

INTRODUCTION: The replacement of Bridge No. 49 is included in the current North Carolina Department of Transportation (NCDOT) Transportation Improvement Program and in the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED STATEMENT

The NCDOT Bridge Maintenance Unit records indicated the bridge has a sufficiency rating of 28.2 out of a possible 100 for a new structure. The bridge is considered structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge No. 49 is located on NC 226 in McDowell County over the South Muddy Creek (Figure 2-1). NC 226 is classified as Rural Major Collector in the Statewide Functional Classification System.

Bridge No. 49 was constructed in 1950. The existing structure is a two-lane, three-span bridge with an overall length of 105.6 ft. (32.2m) and a clear roadway width of 24.0 ft. (7.3m). The bridge consists of a reinforced concrete slab with a 4½ inch (11.43cm) wearing surface on I-beams supported on reinforced concrete caps with timber piles. Bridge No. 49 currently is not posted to restrict weight limits. NC 226 has a posted speed limit of 55 mph (90 km/h) in the vicinity of this bridge. The approach roadway for Bridge No. 49 is a two-lane 22.0 ft. (6.7m) wide road with paved shoulders. The east and west shoulders are 2.4 ft. (0.7m) and 3.8 ft. (1.2m), respectively (Figure 2-1).

The creek bed to roadway crown point height is 21.0 ft. (6.4m) and the normal depth of South Muddy Creek is 1.0 ft. (0.3m).

McDowell County is a Mountain Trout Water county. However, South Muddy Creek is not listed by the NCWRC as Hatchery-Supported or Wild Trout Waters.

Aerial power and telephone lines run along the west side of the bridge.

The 2002 estimated average daily traffic (ADT) volume is 2500 vehicles per day (vpd). The projected ADT is 3900 vpd by the design year 2025. The percentages of truck traffic are 5% dual-tired vehicles and 3% TTST. NC 226 is a two-lane facility that connects I-40 and US 64.

NC 226 is not a part of a designated bicycle route nor is it listed in the Transportation Improvement Program (TIP) as needing bicycle accommodations. There is no indication that an unusual number of bicyclists use this roadway.

No accidents were reported in the vicinity of the bridge during a recent three-year period.

Four school buses cross Bridge No. 49 four times a day for a total of 16 trips per day.

Land use in the basin is forested, cultivated, or pastureland with scattered residential.

There are two North Carolina Geodetic Survey (NCGS) benchmarks located 0.3 miles (0.5km) and 0.5 miles (0.8km) south of the bridge on NC 226. The marker names and elevations (NGVD 29) are "MCD 10", 381.088m and "MCD 11", 384.747m respectively.

III. ALTERNATIVES

A. Project Description

The proposed structure will provide a 40-foot (12.2-meter) clear roadway width to allow for two 12-foot (3.6-meter) travel lanes and 8-foot (2.4-meter) shoulders on each side. The approach roadway will consist of two 12-foot (3.6-meter) travel lanes with 8-foot (2.4-meter) unpaved shoulders. Refer to Figure 3. The design speed will be 60 mph (95 km/hr) to match existing conditions.

The estimated structure requirements are based on the historic performances of the existing structure and field observations of the site. Based on field reconnaissance of the site and a preliminary hydraulic analysis, the existing structure will be replaced with a bridge with an approximate overall length of 150' (45.7m). The existing roadway elevation would be maintained. Three alternatives are considered (Refer to Figures 4A, 4B, and 4C).

According to the NCDOT Geotechnical Unit, a preliminary geotechnical field reconnaissance revealed that the site has no visible rock and will likely require deep foundations.

B. Build Alternatives

Alternative 1
Alternative 1 proposes to relocate the bridge downstream of the existing location while maintaining traffic on the existing bridge during construction.

Alternative 2
Alternative 2 proposes to relocate the bridge upstream of the existing location while maintaining traffic on the existing bridge during construction.

Alternative 3 (Preferred)
Alternative 3 proposes to replace the bridge in-place while maintaining traffic on a temporary detour bridge located downstream.

C. Alternatives Eliminated from Further Study

The "do-nothing" alternative will eventually necessitate closure and/or removal of the bridge effectively removing this section of NC 226 from traffic service.

Replacing the bridge in-place while traffic is maintained on an off-site detour was eliminated as a reasonable alternative. The high volume traffic and the large percent of truck traffic on this NC route preclude this alternative from being a feasible option.

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

D. Preferred Alternative

Alternative 3, replacing the bridge in place while maintaining traffic on-site utilizing a temporary structure, is the preferred alternative.

Alternative 1, relocating the bridge upstream will have substantial impacts to the unnamed tributary that runs along the western side of NC 226. Alternative 2, will have permanent impacts to the downstream side of South Muddy Creek. Both Alternatives 1 and 2 introduce a reverse curve on either side of the proposed structure due to the existing tangent alignment of NC 226. Alternative 3 maintains the current tangent alignment of NC 226.

In addition, Alternative 3 has the lowest cost and the least permanent environmental impacts.

IV. ESTIMATED COSTS

The estimated costs, based on current prices, are shown in Table 1:

Table 1: Estimated Costs

	Alternative 1	Alternative 2	Alternative 3 (Preferred)
Structure Removal (existing)	20,400	20,400	20,400
Structure (proposed)	472,500	472,500	472,500
Temporary Detour Structure	0	0	104,000
Roadway Approaches	343,510	340,800	202,985
Miscellaneous and Mobilization	228,590	227,300	180,115
Engineering and Contingencies	185,000	189,000	170,000
ROW/Const. Easements/Utilities*	39,600	39,600	39,600
TOTAL	$ 1,289,600	$ 1,289,600	$ 1,189,600

* The right-of-way cost was determined for Alternative 3 only. The right-of-way cost for Alternatives 1 and 2 would be higher than shown since more right-of-way would need to be purchased than in the proposed alternative (Alternative 3).

The total estimated cost of the project, as shown in the current Transportation Improvement Program, is $1,080,000 including $80,000 for right-of-way and $800,000 for construction.

V. NATURAL RESOURCES

A Natural Resources Technical Report was prepared by M A Engineering Consultants, Inc. and is available at the North Carolina Department of Transportation (NCDOT) office.

Natural resources within the project study area were evaluated to provide: 1) an assessment of existing biotic resources; 2) an evaluation of potential impacts resulting from construction; and 3) a preliminary determination of permit needs.

A. Methodology

A general field survey was conducted within the project study area on June 10, 2003. Pedestrian surveys were undertaken to determine natural resource conditions and to document natural communities, wildlife, and the potential presence of protected species or their habitats.

Information regarding the project area and region was derived from a number of resources including: U.S. Geological Survey (USGS) Dysartsville 7.5-minute quadrangle map (1993), Natural Resources Conservation Service Soil Survey Sheets of McDowell County, North Carolina (1995), United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Mapping (1999), USFWS list of protected species (February

24, 2003), North Carolina Department of Environmental and Natural Resources (NCDENR) Basinwide Information Management System, North Carolina Center for Geographical Information and Analysis (NCCGIA) BasinPro GIS Million-Acre Edition Data (June 2002), North Carolina Natural Heritage Program (NCNHP) list of rare animal species (January 2001), NCNHP list of rare plant species (January 2002); NCNHP County status database (accessed June 2003), NCDOT aerial photography of the project study area (1:100), and North Carolina Division of Water Quality (DWQ) water resource data (2003).

B. Physiography and Soils

The project lies within the Piedmont Physiographic Province. This region consists of gently rolling, well-rounded hills and ridges with a few hundred feet of elevation gain. The project region lies within the Inner Piedmont geologic belt, the most intensely deformed and metamorphosed segment of the Piedmont (North Carolina Geological Survey, 1991). The project study area is found within an intrusive rock area classified as Migmatitic Granitic Gneiss. This geologic formation is characterized as foliated to massive, granitic to quartz dioritic; biotite gneiss and amphibolite common. Elevations in the project vicinity range from approximately 1,100 to 1,400 feet above mean sea level (msl). Elevation in the project study area varies from approximately 1,100 to 1,200 feet above msl.

According to the general soil map for McDowell County (USDA, 1995), the project study area is found within the Iotla-Braddock-Rosman-Potomac soil unit. The soils in this association are described as nearly level to somewhat strongly sloping, somewhat poorly drained to somewhat excessively drained soils that have a predominantly loamy, clayey, or sandy subsoil or underlying material; formed in alluvium; on flood plains and stream terraces. Soil series found within the project study area are Edvard-Cowee complex, 25 to 60 percent slopes, Hayesville clay loam, 6 to 15 percent slopes, eroded, Hayesville-Edvard complex, 15 to 25 percent slopes, and Iotla sandy loam, 0 to 2 percent slopes, occasionally flooded. There are no soils classified as hydric by the North Carolina Natural Resource Conservation Service within the project study area.

C. Water Resources

C.1. Water Impacted

The proposed project lies within the Catawba River Basin, within the DWQ subbasin designated 03-08-30 and the USGS 8-digit Hydrologic Unit Code (HUC) 03050501. Waters within the project vicinity include South Muddy Creek (Stream Index No. 11-32-2) and an unnamed tributary to South Muddy Creek (UT1) (NCDENR, 2003). A perennial stream can be defined as a well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year. In addition, streams that are depicted on either the USGS 7.5-minute topographic map or the County soil survey maps are considered perennial. South Muddy Creek and UT1 meet these definitions and therefore, should be considered perennial.

C.2. Water Resources Characteristics

Streams have been assigned a best usage classification by the DWQ which reflects water quality conditions and potential resource usage. Within the project study area, the classification for South Muddy Creek is "C" (NCDENR, 1999). Class "C" waters are suitable for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, and agriculture. In addition, a use support assessment is made on how well each waterbody supports its designated uses. According to the information obtained from the *DWQ Catawba River Basinwide Water Quality Management Plan*, South Muddy Creek has a use support rating of FS, based on the monitored/evaluated method. UT1 would inherit the same rating as South Muddy Creek because it is an upstream tributary of South Muddy Creek. Stream width was approximately 20.0 feet (6.1 meters) upstream of the bridge. Maximum water depth was measured at 1.1 feet (0.3 meters). This indicates a width to depth ratio greater than 12. The substrate consisted of silt, sand, pebbles, cobbles and bedrock. The stream had well-defined, vegetated banks. The stream reach immediately upstream and downstream of the bridge had well-defined pool-riffle sequences. Water clarity was clear. Based on this preliminary characterization, South Muddy Creek can be classified as a Rosgen Stream Classification Type C-channel (Rosgen, 1996).

UT1 merges with South Muddy Creek approximately 80.0 feet (24.3 meters) upstream of the bridge (Exhibit 1.2.1). Stream width was approximately 3.5 feet (1.1 meters) and average depth was approximately 0.3 feet (0.01 meters). A few riffle-pool sequences were observed. Both banks are well vegetated and appeared stable. Based on this preliminary characterization, the unnamed tributary can be classified as a Rosgen Stream Classification Type C-channel (Rosgen, 1996).

No waters classified as Water Supplies (WS-I: undeveloped watershed, or WS-II: predominately undeveloped watersheds), High Quality Waters (HQW), Outstanding Resource Waters (ORW) or designated as an impaired water body under Section 303(d) of the Clean Water Act occur within 1.0 mile (1.6 kilometers) of the project study area (NCDENR, 1999).

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, which are sensitive to water quality conditions. According to the information obtained from the *Catawba River Basinwide Water Quality Management Plan* (NCDENR, 1999), the DWQ does not have a sampling station on South Muddy Creek. The closest station is located near the confluence of High Shoals Creek and Barnes Branch, approximately 2 miles (3.2 kilometers) upstream of the project study area. The site was sampled in 1986 and received a bioclassification rating of "Good".

Point sources, such as wastewater discharges, located throughout North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) program through the NCDENR. No active NPDES permits are located in, directly upstream, or within a mile from the project study area (NCCGIA 2001).

C.3. Anticipated Impacts to Water Resources

General Impacts

The proposed project is expected to affect both soils and topography. The topography is variable with moderate to abrupt changes in elevation. The proposed construction of a new bridge or associated road improvements will require the removal of soils and the placement of fill material.

The primary sources of water quality degradation in urban areas are stormwater runoff and construction. Construction of a new bridge and approaches may disturb the stream banks and expose the soil surface. This may cause water quality degradation from runoff and sedimentation. In addition, increased impervious areas can introduce other elements of degradation to water resources. These elements may include hydrocarbons, toxic substances, debris, and other pollutants. Anticipated impacts to water resources include: additional substrate destabilization, bank erosion, increased turbidity, altered flow rates, and possible temperature fluctuations within the stream channel caused by the removal of streamside vegetation.

NCDOT will ensure that preventative and control Best Management Practices (BMP's) are employed to prevent or reduce water pollution as described in the NCDOT handbook *Best Management Practices for the Protection of Surface Waters* (NCDOT 1997). South Muddy Creek is not designated as a Mountain Trout Water (NCWRC, 2003). In addition, it is not regulated as a Hatchery Supported Trout Water, Wild Trout Water, or Special Regulated Trout Water by the NCWRC. Therefore, there are no trout or anadromous fish moratoriums applicable to Bridge No. 49.

Impacts Related to Bridge Demolition and Removal

BMP's for Bridge Demolition and Removal may be categorized as one of three cases: Case 1, Case 2, or Case 3. The replacement of Bridge No. 49 may be classified as a Case 3. Case 3 categories have no special restrictions beyond those outlined in the *Best Management Practices for the Protection of Surface Waters* handbook.

Dropping any portion of the structure into the waters of the United States will be avoided unless there is no practical method of removal. In the event that there is no practical method is feasible, a worst-case scenario is assumed for calculations of fill entering waters of the United States. The existing structure consists of a concrete deck on steel beams. The substructure consists of concrete caps on timber piles. The steel beams and the timber piles can be removed without dropping into the waters of the United States. There is the potential for the middle span of the concrete deck and the caps of the interior bents to be dropped into South Muddy Creek during removal. The maximum resulting temporary fill associated with the removal of the concrete deck is approximately 20 cubic yards (15.3 cubic meters). The maximum resulting temporary fill associated with the removal of the substructure is 11 cubic yards (8.4 cubic meters).

D. Biotic Resources

This section describes the vegetation and associated wildlife within the project area that was observed during the field survey. The project area is composed of different

vegetative communities based on topography, soils, hydrology, and disturbance regimes. Potential impacts affecting these communities are also discussed. Classification of plant communities is based on a system used by the NCNHP (Schafale and Weakley, 1990). If a community is modified or otherwise disturbed such that it does not fit into an NCNHP classification, it is given a name that best describes its current characteristics. Scientific nomenclature and common names (when applicable) are provided for each plant and animal species listed. Subsequent references to the same organism include only the common name.

D.1. Plant Communities

Two highly disturbed plant communities in the project study area: Mesic Mixed Hardwood Forest and White Pine Forest. These communities are described in detail below and presented in Figure 5.

Mesic Mixed Hardwood Forest

Mesic Mixed Hardwood Forests are associated with lower slopes, steep north-facing slopes, ravines and occasionally well-drained small stream bottoms. In addition, this vegetative community is associated with deep well-drained soils. The community here can be characterized as being highly human influenced. Evidence of past logging activities was readily apparent. Dominant canopy species present includes yellow-poplar, southern red oak (*Quercus falcata*), red maple, sweetgum (*Liquidambar styraciflua*), and hickory (*Carya cordiformis*). The understory ranged from moderately dense to moderately sparse. Common vegetation included saplings of canopy species, flowering dogwood, blueberry, blackberry (*Rubus* spp.), American holly (*Ilex opaca*), viburnum (*Viburnum prunifolium*), and herbs. Within the project study area approximately 4.0 acres of this community exist.

White Pine Forest

White Pine Forest occupies the southwestern portion of the project study area. The dominant tree within this community is white pine. Hardwoods, similar to those found in the Mesic Mixed Hardwood Forest, are abundant in the sub-canopy. The shrub and herbaceous layers were sparce. Within the project study area approximately 2.0 acres of this community exits.

D.2. Wildlife

Wildlife associated with these vegetative communities include ubiquitous mammals such as raccoon (*Procyon lotor*)*, white-tailed deer (*Odocoileus virginianus*)*, Virginia opossum (*Didelphis virginiana*), and gray squirrel (*Sciurus carolinensis*). Avian species which may utilize this community include downy woodpecker (*Picoides pubescens*), Eastern screech-owl (*Otus asio*), white-breasted nuthatch (*Sitta carolinensis*), northern cardinal (*Cardinalis cardinalis*), American crow (*Corvus brachyrhynchos*)*, blue jay (*Cyanocitta cristata*), Carolina chickadee (*Poecile carolinensis*), Carolina wren (*Thryothorus ludovicianus*), eastern bluebird (*Sialia sialis*), fox sparrow (*Passerella iliaca*), red-bellied woodpecker (*Melanerpes carolinus*), red-tailed hawk (*Buteo jamaicensis*), ruby-crowned kinglet (*Regulus calendula*), and tufted titmouse (*Baeolophus bicolor*). Other wildlife which may reside or forage in this community

include the two-lined salamander (*Eurycea bislineata*), slimy salamander (*Plethodon glutinosus*), Fowler's toad (*Bufo woodhousei*), spring peeper (*Hyla crucifer*), eastern box turtle (*Terrapene carolina*), five-lined skink (*Eumeces fasciatus*), and the ringneck snake (*Diadophis punctatus*).

D.3. Aquatic Communities

The lotic systems in the project study area include South Muddy Creek and UT1. South Muddy Creek appeared to be a moderate groundwater-moderate runoff driven medium size perennial stream. In addition, it appeared to have a confined valley form with a low gradient. The channel was only slightly entrenched in the project study area. The banks were well vegetated with no sign of erosion. Vegetation along the banks is described in Section 3.1.1. Water clarity was slightly turbid and the recorded water temperature was 66° F (19° C). UT1 appeared to be a low groundwater-high runoff driven small perennial stream. It lies in a narrow, low gradient, confined valley. The channel appeared to be only slightly entrenched within its valley. Vegetation along the banks is described in Section 3.1.2. Water clarity was slightly turbid and the recorded water temperature was 64° F (18° C).

Stream systems in the upper Piedmont should hold common fish species such as rosyside dace (*Clinostomus funduloides*), bluehead chub (*Nocomis leptocephalus*), sandbar shiner (*Notropis scepticus*), marginated madtom (*Noturus insignis*), and fantail darter (*Etheostoma flabellare*).

D.4. Anticipated Impacts to Biotic Communities

The project study area consists of approximately 4.0 acres of Mesic-Mixed Hardwood Forest, and 2.0 acres of White Pine Forest. All of the alternatives have the potential to encroach into these natural vegetative communities. Based on a preliminary analysis the total acreage that may be affected within each natural vegetative community is shown in Table 2.

Table 2: Anticipated Impacts to Vegetative Communities

Community	Alternative 1	Alternative 2	Alternative 3 (Preferred)
Mesic Mixed Hardwood Forest	1.68 A (0.7 ha)	1.73 A (0.7 ha)	0.47 A (0.2 ha)
White Pine Forest	0.00 A (0.0 ha)	0.00 A (0.0 ha)	0.00 A (0.0 ha)
TOTALS	1.68 A (0.7ha)	1.73 A (0.7 ha)	0.47 A (0.2 ha)

Loss of wildlife is an unavoidable aspect of development. Temporary fluctuations in populations of animal species, which utilize these communities, are anticipated during the course of construction. Slow-moving, burrowing, and/or subterranean organisms will be directly impacted by construction activities, while mobile organisms will be displaced to adjacent communities.

Aquatic organisms are acutely sensitive to changes in their environment. Environmental impacts from construction activities may result in long term or irreversible effects. Impacts usually associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the substrate and affects adjacent streamside vegetation. Such disturbances within the substrate lead to increased siltation, which can clog the gills and/or feeding mechanisms of benthic organisms, fish, and amphibian species. Siltation may also cover benthic macroinvertebrates with excessive amounts of sediment that inhibit their ability to respire. These organisms are slow to recover and usually do not, once the stream has been severely impacted.

The removal of streamside vegetation and placement of fill material during construction enhances erosion and possible sedimentation. Quick revegetation of these areas helps to reduce the impacts by supporting the underlying soils. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site. As a result, sediment bars may form at and downstream of the site. Increased light penetration from the removal of streamside vegetation may increase water temperatures. Warmer water contains less oxygen, thus reducing aquatic life that depends on high oxygen concentrations.

E. Special Topic

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

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

Water bodies, including lakes, rivers, and streams, are subject to jurisdictional consideration under the Section 404 program. Wetlands are also identified as "Waters of the United States." Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Any action that proposes to place fill into these areas falls under the jurisdiction of the USACE under Section 404 of the Clean Water Act (33 U.S.C. 1344).

Surface Waters

The NCDWQ defines a perennial stream as a clearly defined channel that contains water for the majority of the year. These channels usually have some or all of the following characteristics: distinctive streambed and bank, aquatic life, and groundwater flow or discharge. Two perennial streams were identified within the project studya area, South Muddy Creek and UT1. Detailed stream characteristics, including specific water-quality designations, are presented in Section C: Water Resources.

Jurisdictional Wetlands
There are no jurisdictional wetlands associated with the project study area.

E.2. Permits

In accordance with Section 404 of the Clean Water Act (33 U.S.C. 1344), a permit is required from the USACE for projects of this type for the discharge of dredged or fill material into "Waters of the United States". A Nationwide Permit No. 23 (Approved Categorical Exclusion) is likely to be applicable for all impacts to Waters of the United States resulting from the proposed project. A Nationwide Permit No. 33 (Temporary Construction, Access or Dewatering) may be required if an on-site work bridge or causeway is needed during construction of Bridge No. 49.

A 401 Water Quality Certification, administered through the DWQ, will also be required. This certification is issued for any activity that may result in a discharge into waters for which a federal permit is required. Applicable General Certifications (GC) may include GC 3403 and GC 3366 for the matching USACE Nationwide Permit 23 and Nationwide Permit 33.

Impacts to the aquatic community of South Muddy Creek and/or UT1 may result from the replacement of Bridge No. 49. The removal of the substructure may create some disturbance in the streambed. Conditions in the stream may raise sediment concerns since the substrate contains silt; therefore, a turbidity curtain is recommended.

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

South Muddy Creek is not designated as a Mountain Trout Water, does not receive Hatchery Support within the project study area, and is not suitable for smallmouth bass; therefore, no moratoria on in-stream construction activities are expected to apply.

E.3. Buffer Rules

At the time of this report, the Catawba River Basin buffer rules apply only to lake shorelines and the mainstem of the Catawba River.

E.4. Mitigation

The USACE has adopted, through the Council on Environmental Quality (CEQ), a mitigation policy which embraces the concepts 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,

minimizing impacts, and compensating for impacts (40 CFR 1508.20). Avoidance, minimization, and compensatory mitigation must be considered sequentially.

Avoidance

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 USEPA and the USACE, 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. No jurisdictional wetlands will be impacted; however, some unavoidable impacts to surface waters may result from project construction.

Minimization

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 of median widths, right-of-way widths, fill slopes, and/or road shoulder widths. The following methods are suggested to minimize adverse impacts to "Waters of the United States":

1. Strictly enforce Best Management Practices (BMPs) to control sedimentation during project construction;
2. Minimize clearing and grubbing activity;
3. Decrease or eliminate discharges into the North Pacolet River's tributary;
4. Reestablish vegetation on exposed areas, employing judicious pesticide and herbicide management;
5. Minimize "in-stream" activity; and
6. Use responsible litter control practices.

Compensatory Mitigation

Compensatory mitigation is 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, which 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 action should be undertaken in areas adjacent to or contiguous to the discharge site.

Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a Pre-Construction Notification (PCN), unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection of vegetated buffers to open waters. A PCN is not required for a Nationwide Permit No. 23;

however, a PCN is required for a Nationwide Permit No. 33. Prior to the use of any nationwide permit within any of the 25 designated counties of North Carolina that contain trout waters, notification must be given to the Wilmington USACE District Engineer along with a written statement of compliance with all of the conditions of the applicable nationwide permit. This notification will include comments and recommendations from NCWRC. A plan to provide compensatory mitigation for all unavoidable adverse impacts to the mountain trout waters must be included in the information sent to the NCWRC.

F. Rare and Protected Species

Some populations of fauna and flora have been, or are, in the process of decline due to either natural forces or impacts from humans. Federal law (under the provisions of Section 7 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 USFWS. Other species may receive additional protection under separate laws.

F.1. Federally Protected Species

Plants and animals with a federal designation of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. The USFWS lists four federally-protected species for McDowell County as of the February 24, 2003 listing.

Table 3: Federally-protected species for McDowell County

Common Name	Scientific Name	Federal Status	State Status	Habitat Requirements	Available Habitat
Vertebrates					
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	E	E	High elevation forests, mainly spruce/fir.	No
Bog turtle	*Clemmys muhlenbergii*	T(S/A)	T	Bogs, wet pastures, wet thickets.	No
Vascular Plants					
Mountain golden heather	*Hudsonia Montana*	T	E	Gorge rim outcrops, rocky summits	No
Small-whorled pogonia	*Isotria medeoloides*	T	E	Forests especially with white pine	No

NOTES:

E - Endangered. A taxon which is in danger of extinction throughout all or a significant portion of its range.

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

T(S/A) - Threatened due to similarity of appearance. A species that is threatened due to similarity of appearance with other rare species.

Glaucomys sabrinus coloratus (Carolina northern flying squirrel) **Endangered**
Family: Sciuridae
Date Listed: July 1, 1985 (USFWS 1992)

The Carolina northern flying squirrel is a small nocturnal gliding mammal 10 to 12 inches (260 to 305 millimeters) in length. It possesses a long, broad, flattened tail, prominent eyes, and dense, silky fur. The broad tail and folds of skin between the wrist and ankle form the aerodynamic surface used for gliding. Adults are gray with a brownish, tan, or reddish wash on the back, and grayish white or buffy white ventrally. Flying squirrels glide from tree to tree by spreading their legs and stretching their flight skin, which acts as a sail.

The Carolina northern flying squirrel occurs primarily in the ecotone, or vegetation transition zone, between the coniferous and northern hardwood forests. Both forest types are used in the search for food (primarily nuts, acorns, lichens and fungi), while the hardwood areas are needed for nesting sites. The Carolina Northern Flying Squirrel favors moist and mature spruce/fir and coniferous forests at high elevations (typically greater than 4000 feet above msl), with a moderate to thick evergreen understory. They may occur in hardwoods, particularly yellow birch (*Betula alleghaniensis*), where old or dead trees and snags have numerous woodpecker-type nesting holes. They live in restricted, isolated habitats that are vulnerable to human disturbance where logging activity, ski areas, and other recreational developments destroy their habitat.

BIOLOGICAL CONCLUSION: NO EFFECT

The majority of the project study area has been disturbed by recent forestry activities or is being developed for residential purposes. The mesic mixed hardwood forest (dominated by yellow-poplar, southern red oak, red maple, sweetgum, and hickory) and white pine forest present in the study area show evidence of historical disturbances. Since the Carolina northern flying squirrel favors mature, moist spruce/fir and yellow birch forests at much higher elevations, the study area is not expected to provide the proper canopy, understory, or elevation to be a favorable habitat. A search of the NCNHP database showed no recorded occurrences of this species within the project vicinity. Since suitable foraging and nesting habitat does not exist within the project study area, it can be concluded that the construction of the proposed project will not affect the Carolina northern flying squirrel.

Clemmys muhlenbergii (Bog turtle) **Threatened (S/A)**
Family: Emydidae
Date Listed: November 5, 1997 (USFWS 1992)

The **bog turtle** is North Carolina's smallest turtle, measuring 3 to 4 in (7 to 10 cm) in length. It has a dark brown carapace and a black plastron. The bright orange or yellow blotch on each side of the head and neck is a readily identifiable characteristic. The bog turtle inhabits damp grass fields, bogs, and marshes in the mountains and western Piedmont.

The bog turtle is shy and secretive, and will burrow rapidly in mud or debris when disturbed. The bog turtle forages on insects, worms, snails, amphibians, and seeds. In June or July, three to five eggs are laid in a shallow nest in moss or loose soil. The eggs hatch in about 55 days.

The bog turtle is listed as Threatened due to similarity of appearance [T(S/A)]. This is due to its similarity of appearance to another rare species that is listed for protection. T (S/A) species are not subject to Section 7 consultation and a biological conclusion for this species is not required.

Hudsonia Montana (Mountain golden heather) **Threatened**
Family: Cistaceae
Date Listed: October 20, 1980 (USFWS 1992)
Flowers Present: mid to late June

Mountain golden heather is a low, needle-leaved shrub that is yellow-green in color. This shrub usually grows in clumps and retains its leaves from the previous year, which appear scale-like on the older branches. Leaves appear awl-shaped and thread-like. Mountain golden heather forms solitary, terminal, lanceolate flowers. These yellow flowers have 5 blunt-tipped petals and 20 to 30 stamens. Fruit capsules have three projecting points at the tips and are round in shape.

Mountain golden heather occurs in weathered rocky soils on mountain tops, with known populations found at elevations of 2,800 to 4,000 ft (850 to 1,200 meters). Mountain golden heather can be found on exposed quartzite ledges in an ecotone between bare rock and heath balds, which merge into pine forest. Plants do live in partially shaded areas; however, they do not appear to be as healthy as those found in open areas are. A critical habitat area for mountain golden heather exists in Burke County.

Critical habitat designated in Burke County, North Carolina is bounded by the following: on the west by the 2200-foot contour; on the east by the Linville Gorge Wilderness Boundary north from the intersection of the 2200-foot contour and the Shortoff Mountain Trail to where it intersects the 3400-foot contour at "Chimneys"--then follow the 3400-foot contour north until it reintersects with the Wilderness Boundary--then follow the Wilderness Boundary again northward until it intersects the 3200-foot contour extending west from its intersection with the Wilderness Boundary until it begins to turn south--at this point the Boundary extends due east until it intersects the 2200-foot contour (Federal Register 1980).

BIOLOGICAL CONCLUSION: NO EFFECT
No habitat is located in the project study area for mountain golden heather; the project study area is located at approximately 1,100 feet (335 meters) above msl, which is well below the elevation for suitable habitat. A search of the NCNHP database showed no recorded occurrences of this species within the project vicinity. It can be concluded that the construction of the proposed project will not affect populations of mountain golden heather.

Isotria medeoloides (Small-whorled pogonia) **Endangered**
Family: Orchidaceae
Date Listed: September 10, 1982 (USFWS 1992)

The **small-whorled pogonia** was known historically from Maine to Georgia, with the exception of Delaware along the eastern seaboard and in Michigan, Illinois, and Missouri. In North Carolina, the small-whorled pogonia is found in the Nantahala National Forest, Macon County and near Flat Rock, Henderson County.

The small-whorled pogonia is a perennial orchid with long pubescent roots and a hollow stem 4 to 10 inches (10 to 25 centimeters) tall. Stems terminate in a whorl of five or six light green, elliptical leaves that are somewhat pointed. Leaves measure approximately 3 by 2 inches (8 by 4 centimeters). One or two light green flowers are produced at the end of the stem from mid-May to mid-June. Flowers have short sepals that are 1 in (3 cm) long.

The small-whorled pogonia grows in "second growth deciduous" or deciduous-coniferous forests, with an open canopy, open shrub layer, and sparse herb layer. This species prefers acidic soils. Flowering is inhibited in areas where there is relatively high shrub coverage or high sapling density.

BIOLOGICAL CONCLUSION: NO EFFECT
Habitat for this species is open, dry, deciduous woods with acid soils, a community not found in the project study area. A search of the NCNHP database showed no recorded occurrences of this species within the project vicinity. The project study area was canvassed during the site investigation and no specimens of small-whorled pogonia were observed. It can be concluded that the construction of the proposed project will not affect any populations of small-whorled pogonia.

F.2. Federal Species of Concern

There are fifteen federal species of concern listed by the USFWS for Burke County (USFWS 2003). These species are not protected under the provisions of Section 7 of the Endangered Species Act. Federal species of concern species are defined as species under consideration for listing for which there is insufficient information to support listing as threatened or endangered (formerly C2 candidate species). The status of these species may be upgraded at any time, thus they are included here for consideration. A review of NCNHP data depicting known populations of these federal species of concern found no populations within a one mile (1.6 km) radius of the project study area. Protections afforded to species listed under state law are not applicable to this project. Table 4 lists the federal species of concern, their state status, and the existence of suitable habitat within the project area.

Table 4: Federal species of concern species for McDowell County

Common Name	Scientific Name	Federal Status	State Status	Habitat Requirements	Available Habitat
Vertebrates					
Alleghany woodrat	*Neotoma magister*	FSC	SC	Rocky cliffs, caves, bottomland hardwoods between 800 to 2500 feet elevation	Yes
Cerulean warbler	*Dendroica cerulea*	FSC	SR	Mature hardwood forests, steep slopes and coves in mountains	No
Southern Appalachian red crossbill	*Loxia curvirostra*	FSC	SC	Coniferous forests, preferably spruce-fir	No
Southern Appalachian woodrat	*Neotoma floridana haematorela*	FSC	SC	Rocky places in deciduous woods or mixed forests	Yes
Invertebrates					
Bennett's Mill Cave water slater	*Caecidotea carolinensis*	FSC*	SR	Caves	No
Diana fritillary butterfly	*Speyeria diana*	FSC	SR	Rich woods and adjacent edges and openings	No
Vascular Plants					
Cuthbert's turtlehead	*Chelone cuthbertii*	FSC	SR-L	Bogs	No
Divided-leaf ragwort	*Packera millefolium*	FSC	T	Granitic domes, other outcrops	No
Gray's lily	*Lilium grayi*	FSC	T-SC	Bogs, wet meadows, seeps, and grassy balds	No
Large-leaved grass-of-parnassus	*Parnasia grandifolia*	FSC	T	Fens and seeps over calcareous or mafic rocks	No
Northern Oconee bells	*Shortia galacifolia var brevistyla*	FSC	E-SC	Stream banks, slopes and outcrops in humid gorges	No
Roan sedge	*Carex roanenis*	FSC	SR-T	Forests	Yes
Rocky shoal spider lily[1]	*Hymenocallis coronaria*	FSC	--	Rocky shoals in rivers	No
Sweet pinesap	*Monotropsis odorata*	FSC	SR-T	Dry forests and bluffs	No
Tall larkspur	*Delphinium exaltatum*	FSC**	E-SC	Grassy balds, glades, woodlands over mafic rock	No

NOTES:

FSC – Federal Species of Concern; A taxon which may or may not be listed in the future (formerly Federal C2 candidate species).

SC – Special Concern; Any species of plant in North Carolina which requires monitoring but which may be collected and sold under regulations adopted under the provisions of [the Plant Protection and Conservation Act].

SR – Significantly rare species.

E – Endangered; Any species or higher taxon of plant whose continued existence as a viable component of the State's flora/fauna is determined to be in jeopardy.

T – Threatened; Any resident species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

-L – State range of the species is Limited to North Carolina and adjacent states. These are species which may have 20-50 populations in North Carolina, but fewer than 50 populations rangewide.

-T – These species are rare throughout their ranges.
1 – Denotes a USFWS FSC species not listed with NCNHP.
* - Denotes a Historic record; the species was last observed in the county more than 20 years ago.
**- Denotes an Obscure record; the date the element was last observed is uncertain.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

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

B. Historic Architecture

In a memorandum dated October 22, 2003, the State Historic Preservation Officer (SHPO) stated that they were aware of no structures of historical or architectural importance located within the planning area based on a search of their files.. Therefore, no further compliance with Section 106 is required. A copy of the SHPO memorandum is included in the Appendix.

C. Archaeology

The State Historic Preservation Officer (SHPO), in a memorandum dated October 22, 2003 recommended that a "comprehensive survey be conducted" in connection with this project. An archaeological survey report was completed in February of 2005. No archaeological sites were found during the investigation and therefore the project will not adversely impact any sites eligible for the National Register of Historic Places. SHPO concurred with the findings on June 6, 2005. Copies of the SHPO memorandums are included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

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

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

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

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

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

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

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

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

This Categorical Exclusion has proceeded in accordance with the Executive Order 12898 requirement that each federal agency, to the greatest extent allowed by law, administer and implement its programs, policies, and activities that affect human health or the environment so as to identify and avoid "disproportionately high and adverse" effects on minority and low-income populations. The proposed project will not directly impact minority or low-income residences, segment existing minority communities, or separate residential areas from nearby services such as schools.

The proposed project will not require right-of-way acquisition or easement from any land protected under Section 4(f) of the Department of Transportation Act of 1966.

No geodetic monuments will be impacted during construction of this project.

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service (NRCS). There are no prime or important farmlands in the immediate vicinity of the proposed bridge.

No adverse effects to air quality are expected to result from this project. The project is in an air quality "neutral" project, so it is not required to be included in the regional emissions analysis (if applicable), and a project level CO analysis is not required. Since the proposed project is located in an attainment area, 40 CFR Part 51 and 93 are not applicable. If vegetation or wood debris is disposed of by open burning, it shall be done in accordance with applicable local laws and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15 NCAC 2D.0520 and the 1990 Clean Air Act and the National Environmental Policy Act. This evaluation completes the assessment requirements for air quality and no additional reports are required.

Ambient noise levels may increase during construction of this project; however, this increase will be only temporary and usually confined to daylight hours. There should be

no notable change in traffic volumes after this project is complete. Therefore, this project will have no adverse effect on existing noise levels. Noise receptors in the project area will not be impacted by this project. This evaluation completes the assessment requirements for highway traffic noise set forth in 23 CFR Part 772. No additional reports are required.

An examination of North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality (DWQ), Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section records by the NCDOT Geotechnical Engineering Unit at the revealed no hazardous waste sites in the project area.

A field investigation and an examination of records of DENR's Division of Waste Management, Underground Storage Tank Section, revealed that no regulated underground storage tanks exist in the project study area.

McDowell County is a participant in the National Flood Insurance Regular Program. This site on South Muddy Creek is not included in a detailed FEMA flood study. Attached is a copy of the Flood Insurance Rate Map, on which are shown the approximate limits of the 100-year flood plain in the vicinity of the project (Figure 6).

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

VIII. PUBLIC INVOLVEMENT

Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with scoping letters. For this bridge replacement study, all of the alternatives will provide for the maintenance of traffic on-site during construction of the replacement structure. There are no anticipated relocates and minimal impacts to surrounding properties. Therefore, no formal public involvement program was initiated. However, a newsletter was sent to the local residents to inform them of the project.

IX. AGENCY COMMENTS

Agency comments are summarized below. Letters from the commenting agencies are included in the Appendix.

1. United States Department of the Interior Fish & Wildlife Service (USFW)

   Comment: "*. . . we recommend conducting habitat assessments and surveying any suitable habitat prior to any further planning.*"

   Response: No suitable habitats occur within the project study area for any federally listed species.

2. North Carolina Wildlife Resources Commission (NCWRC)

Comment: *"Sediment and erosion is a major concern, as a watershed restoration project is underway to reduce negative impacts to downstream resources, particularly in the Catawba River. . . . Catawba River resources of concern include brown and rainbow trout tailwater fisheries and state listed mussels, the notched rainbow (Villosa constricta), state SC, and the creeper (Strophitus undulatus), state T, which are present near the mouth of Muddy Creek. Sediment and erosion control measures should adhere to design standards for sensitive watersheds."*

Response: Construction will be restricted as noted in the Project Commitments.

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[USFWS] United States Fish and Wildlife Service. 2003. McDowell County Endangered Species, Threatened Species and Federal Species of Concern. United States Department of Interior, Washington, DC. < http://nc-es.fws.gov/>. 2 June 2003,

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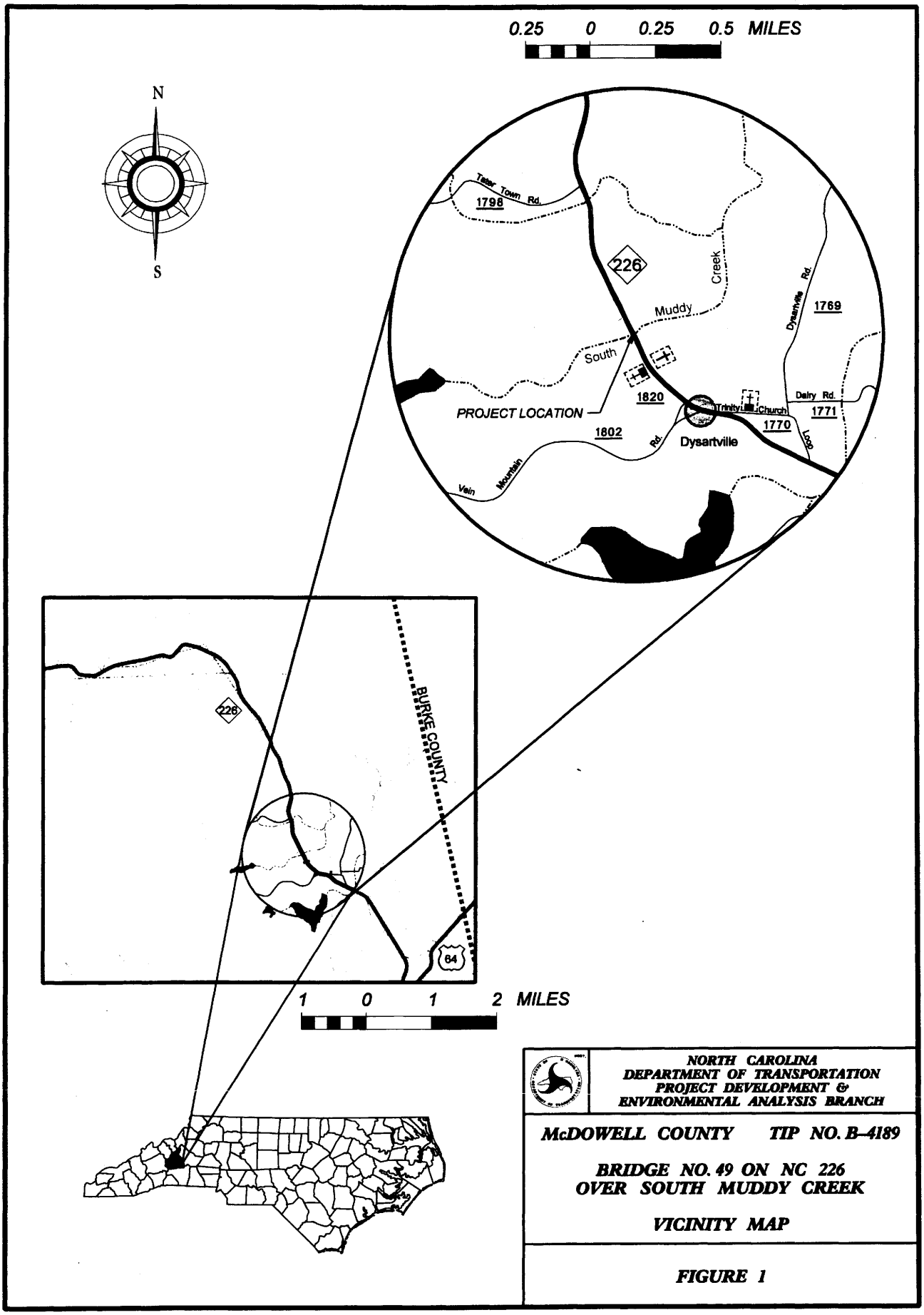
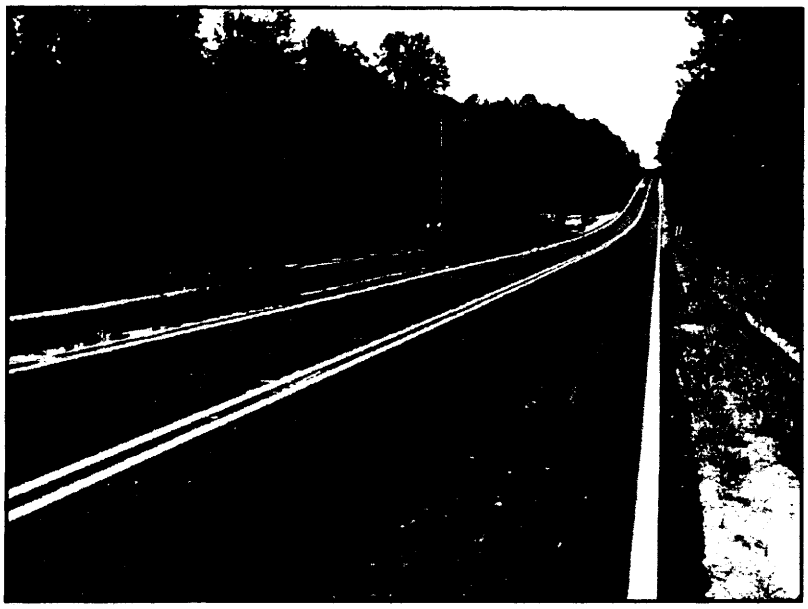
Figure 2-1	*Photographs*
Figure 2-2	*Photographs*
Figure 2-3	*Photographs*
Figure 3	*Typical Section*
Figure 4A	*Plan View Alternative 1*
Figure 4B	*Plan View Alternative 2*
Figure 4C	*Plan View Alternative 3*
Figure 5	*Natural Communities and Surface Waters*
Figure 6	*100-year Flood Plain*


0.25 0 0.25 0.5 MILES
N
S
Tater Town Rd.
1798
226
Muddy
Creek
South
Dysartville Rd.
1769
1820
PROJECT LOCATION
Trinity Church
Dairy Rd.
1771
1770
1802
Rd.
Dysartville
Loop
Mountain
Vein
BURKE COUNTY
226
64
1 0 1 2 MILES
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH
McDOWELL COUNTY TIP NO. B-4189
BRIDGE NO. 49 ON NC 226
OVER SOUTH MUDDY CREEK
VICINITY MAP
FIGURE 1

VIEW OF NORTH-WESTERN APPROACH



VIEW OF SOUTHEAST-ERN APPROACH

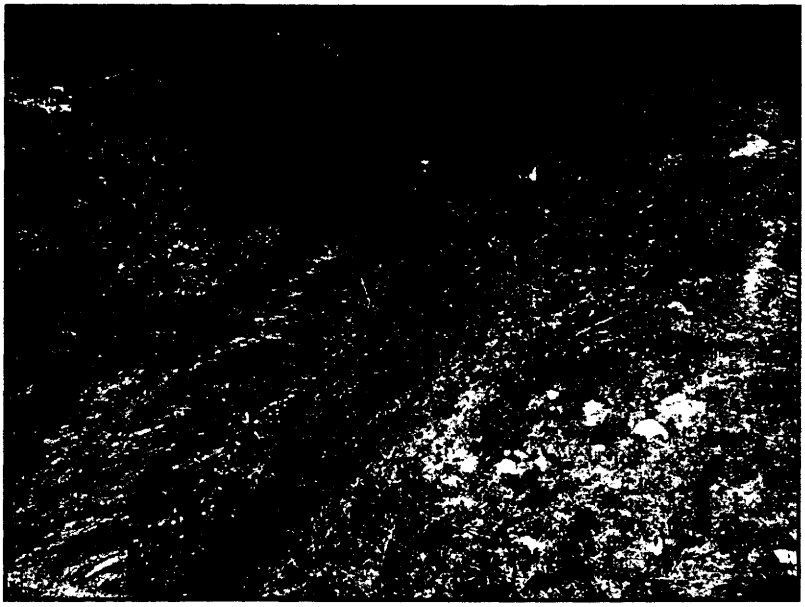
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS

McDOWELL COUNTY TIP NO. B-4189

REPLACEMENT BRIDGE NO. 49 OVER SOUTH MUDDY CREEK ON NC 226

PHOTOGRAPHS

Figure 2-1



VIEW OF UPSTREAM (LOOKING SOUTH-WEST)

VIEW DOWNSTREAM (LOOKING NORTH-EAST)

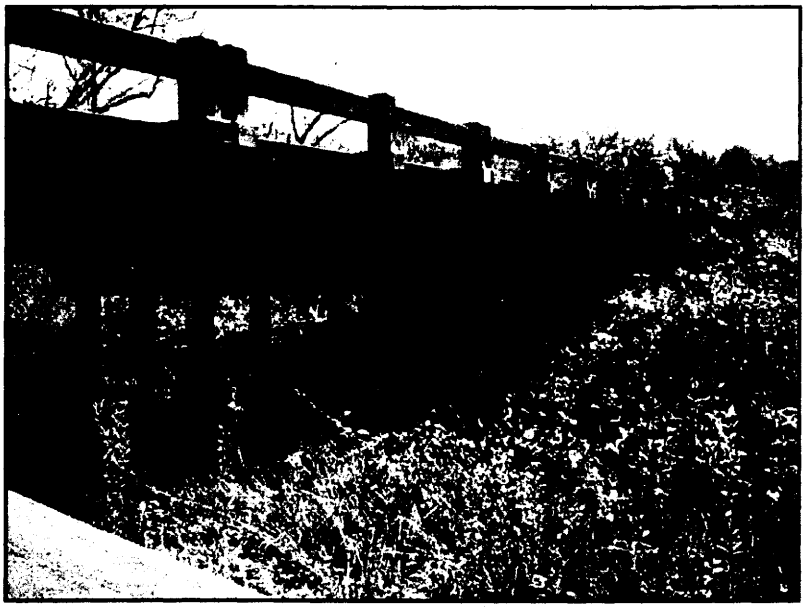
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS

McDOWELL COUNTY TIP NO. B-4189

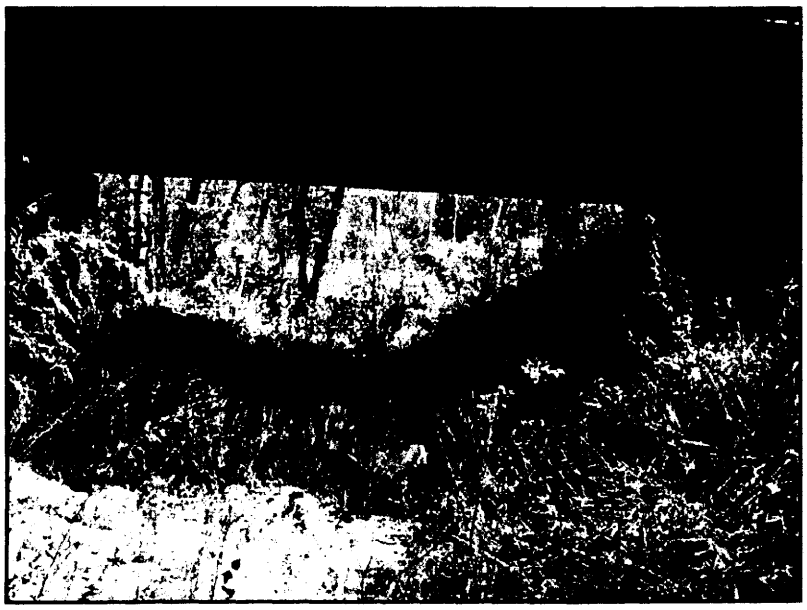
REPLACEMENT BRIDGE NO. 49 OVER SOUTH MUDDY CREEK ON NC 226

PHOTOGRAPHS

Figure 2-2



VIEW OF UPSTREAM FACE (LOOKING NORTH-EAST)



VIEW OF DOWN-STREAM FACE (LOOKING SOUTH-WEST)

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS

McDOWELL COUNTY TIP NO. B-4189

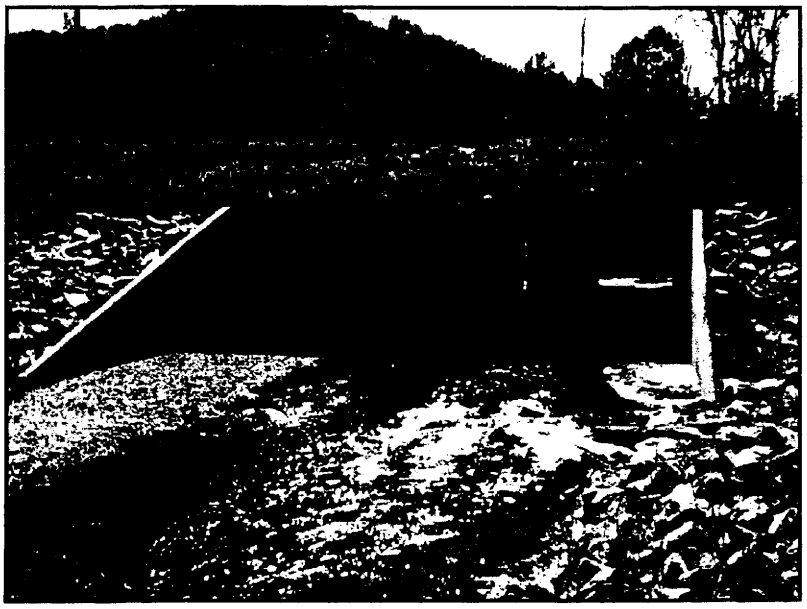
REPLACEMENT BRIDGE NO. 49 OVER SOUTH MUDDY CREEK ON NC 226

PHOTOGRAPHS

Figure 2-3

VIEW OF DOWN-STREAM STRUCTURE

Bridge #272



VIEW OF UPSTREAM STRUCTURE

Bridge #3

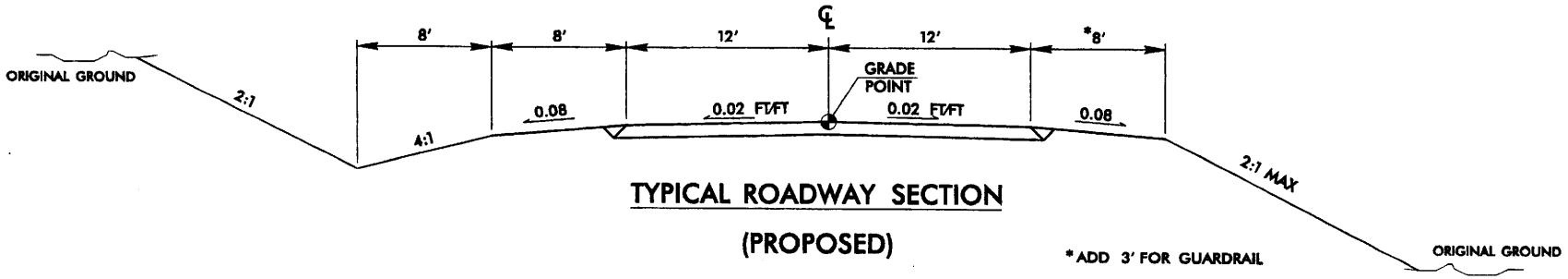
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS

McDOWELL COUNTY TIP NO. B-4189

REPLACEMENT BRIDGE NO. 49 OVER SOUTH MUDDY CREEK ON NC 226

PHOTOGRAPHS

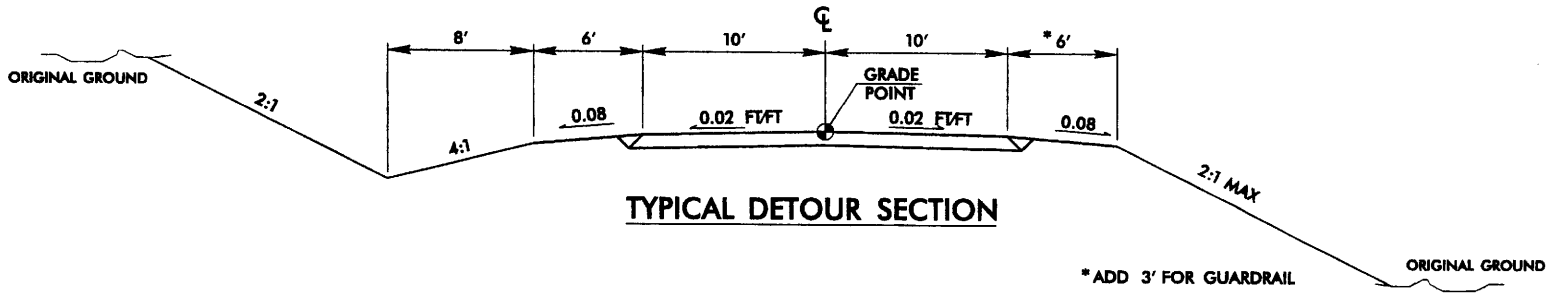
Figure 2-4



TYPICAL ROADWAY SECTION

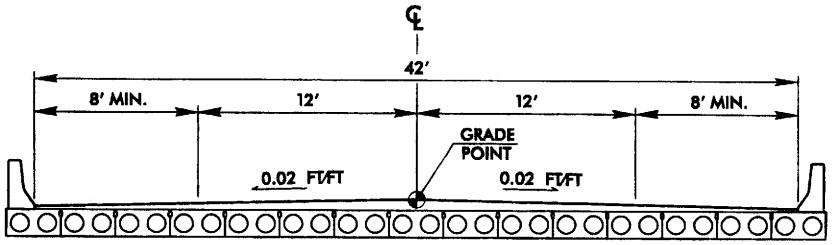
(PROPOSED)

*ADD 3' FOR GUARDRAIL



TYPICAL DETOUR SECTION

*ADD 3' FOR GUARDRAIL



TYPICAL SECTION ON BRIDGE

TRAFFIC DATA

ADT 2002 = 2500
ADT 2025 = 3900
DUAL 5%
TTST 3%
FUNCTIONAL CLASSIFICATION: RURAL MAJOR COLLECTOR
LOS = A

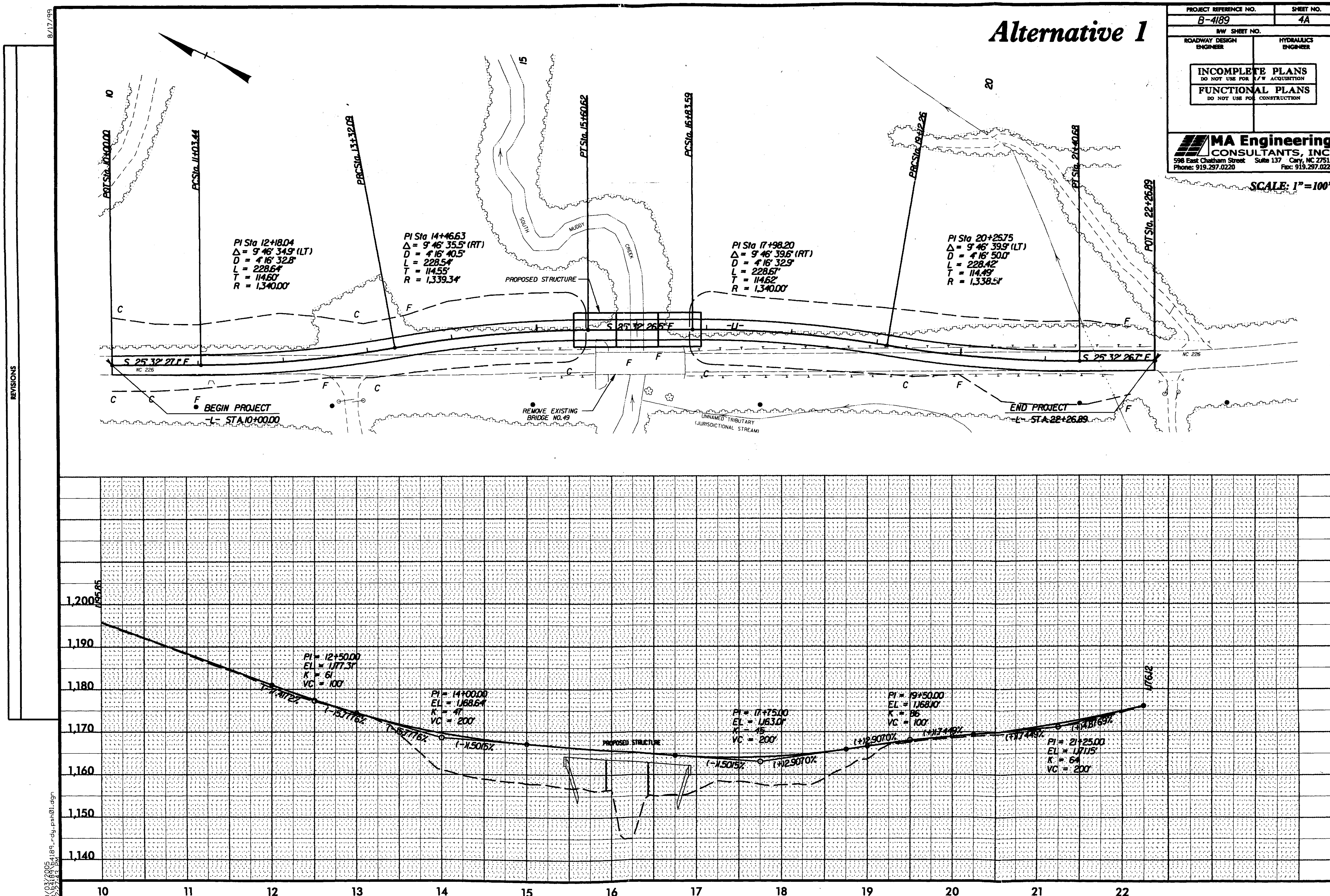
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

McDOWELL COUNTY TIP NO. B-4189

BRIDGE NO. 49 ON NC 226
OVER SOUTH MUDDY CREEK

TYPICAL SECTION

FIGURE 3



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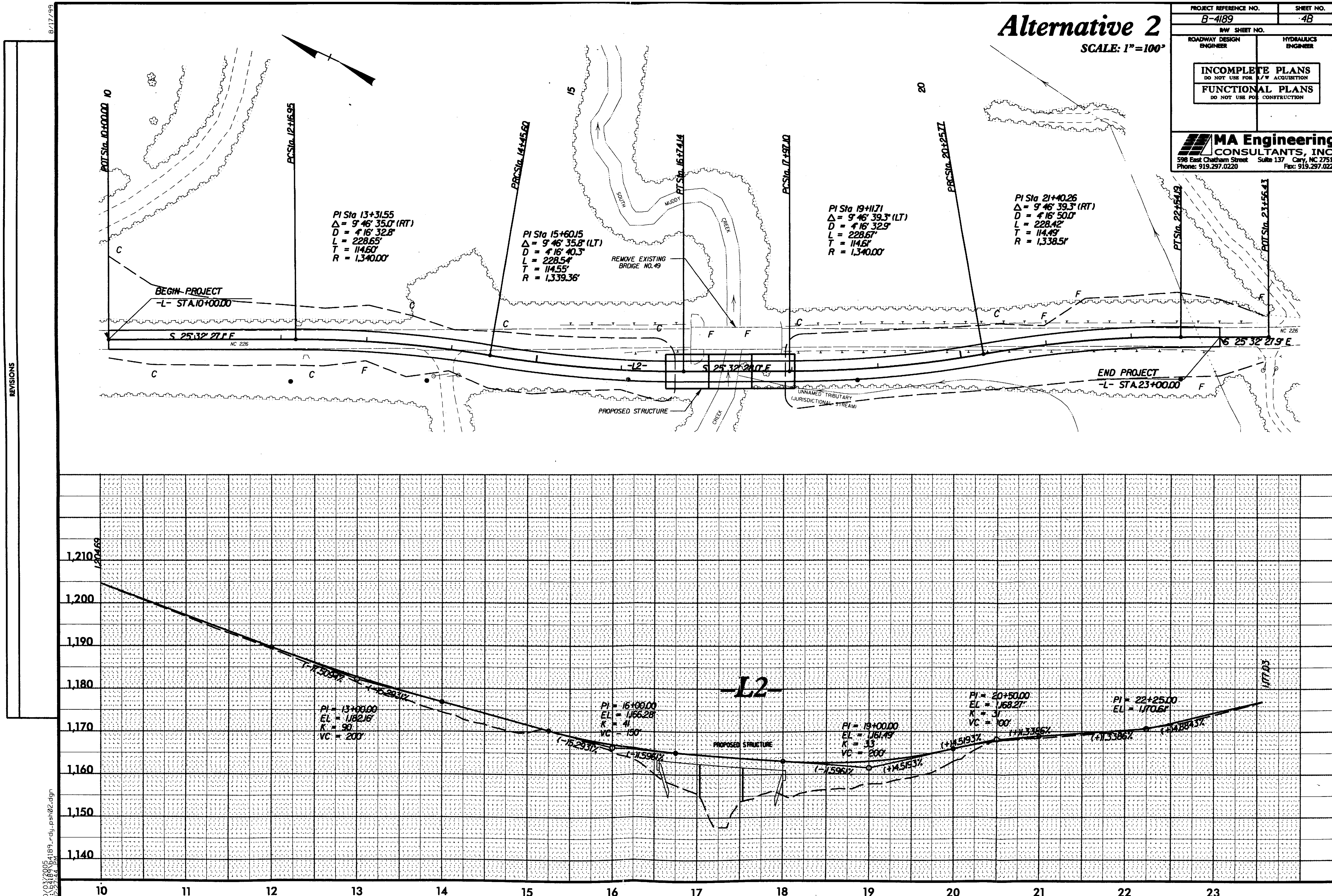


PROJECT REFERENCE NO. B-4189
SHEET NO. 4B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
FUNCTIONAL PLANS DO NOT USE FOR CONSTRUCTION
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
Alternative 2
SCALE: 1"=100'
POT Sta. 10+00.00
PC Sta. 12+16.95
PRC Sta. 14+45.60
PT Sta. 16+74.14
PC Sta. 17+97.10
PRC Sta. 20+25.77
PT Sta. 22+54.19
POT Sta. 23+56.43
PI Sta 13+31.55
Δ = 9° 46' 35.0" (RT)
D = 4° 16' 32.8"
L = 228.65'
T = 114.60'
R = 1,340.00'
PI Sta 15+60.15
Δ = 9° 46' 35.8" (LT)
D = 4° 16' 40.3"
L = 228.54'
T = 114.55'
R = 1,339.36'
PI Sta 19+11.71
Δ = 9° 46' 39.3" (LT)
D = 4° 16' 32.9"
L = 228.67'
T = 114.61'
R = 1,340.00'
PI Sta 21+40.26
Δ = 9° 46' 39.3" (RT)
D = 4° 16' 50.0"
L = 228.42'
T = 114.49'
R = 1,338.51'
BEGIN PROJECT -L- STA. 10+00.00
END PROJECT -L- STA. 23+00.00
S 25° 32' 27.7" E
S 25° 32' 28.0" E
S 25° 32' 27.9" E
NC 226
-L2-
REMOVE EXISTING BRIDGE NO. 49
SOUTH MUDDY CREEK
PROPOSED STRUCTURE
UNNAMED TRIBUTARY (JURISDICTIONAL STREAM)
CREEK
1,204.69
1,177.03
-L2-
PI = 13+00.00
EL = 1,182.16'
K = 90
VC = 200'
PI = 16+00.00
EL = 1,166.28'
K = 41
VC = 150'
PI = 19+00.00
EL = 1,161.49'
K = 33
VC = 200'
PI = 20+50.00
EL = 1,168.27'
K = 31
VC = 100'
PI = 22+25.00
EL = 1,170.61'
(-11.5099%)
(-15.2931%)
(-1.1596%)
(+14.5193%)
(+1.3386%)
(+4.8843%)
PROPOSED STRUCTURE
1,210
1,200
1,190
1,180
1,170
1,160
1,150
1,140
10
11
12
13
14
15
16
17
18
19
20
21
22
23
REVISIONS
8/17/99
10/03/2005
r:\b4189\b4189_rdy_psh02.dgn

Alternative 3

PROJECT REFERENCE NO.	SHEET NO.
B-4189	4C

R/W SHEET NO.

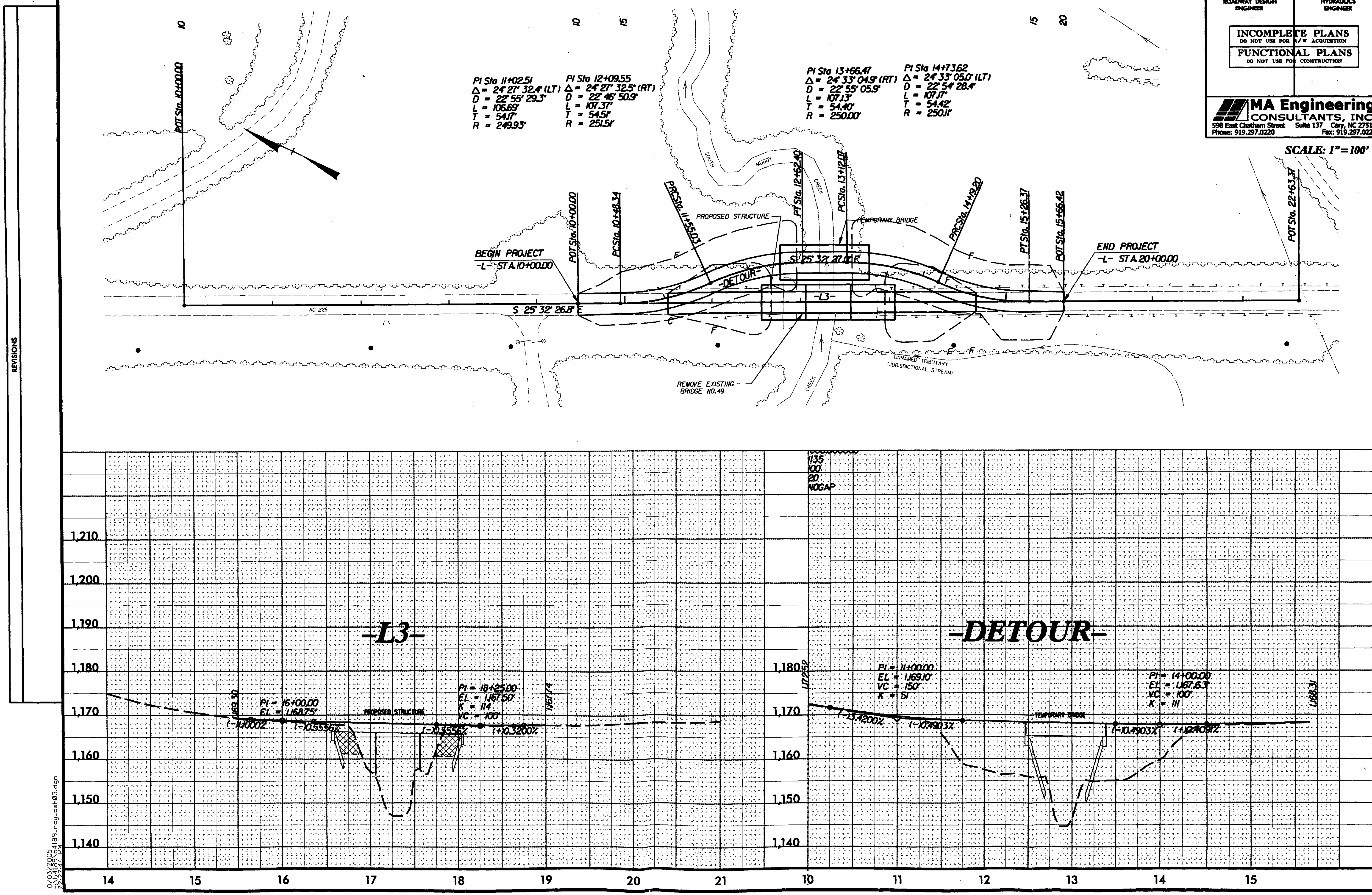
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

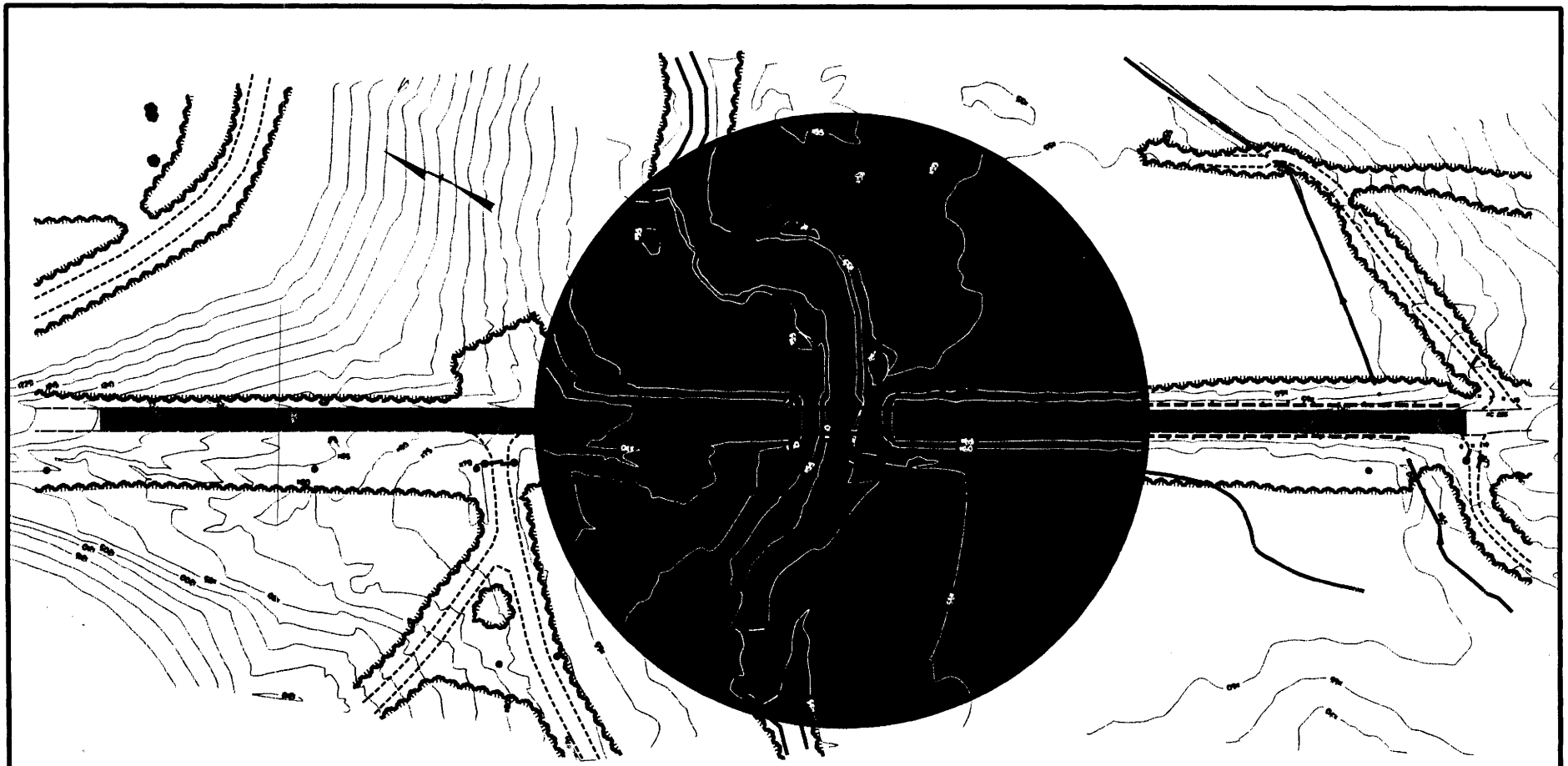
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

FUNCTIONAL PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

SCALE: 1"=100'





LEGEND

- Surface Water
- Biotic Communities: White Pine Forest
- Biotic Communities: Mesic Mixed Hardwoods
- Road and Bridge

NOT TO SCALE

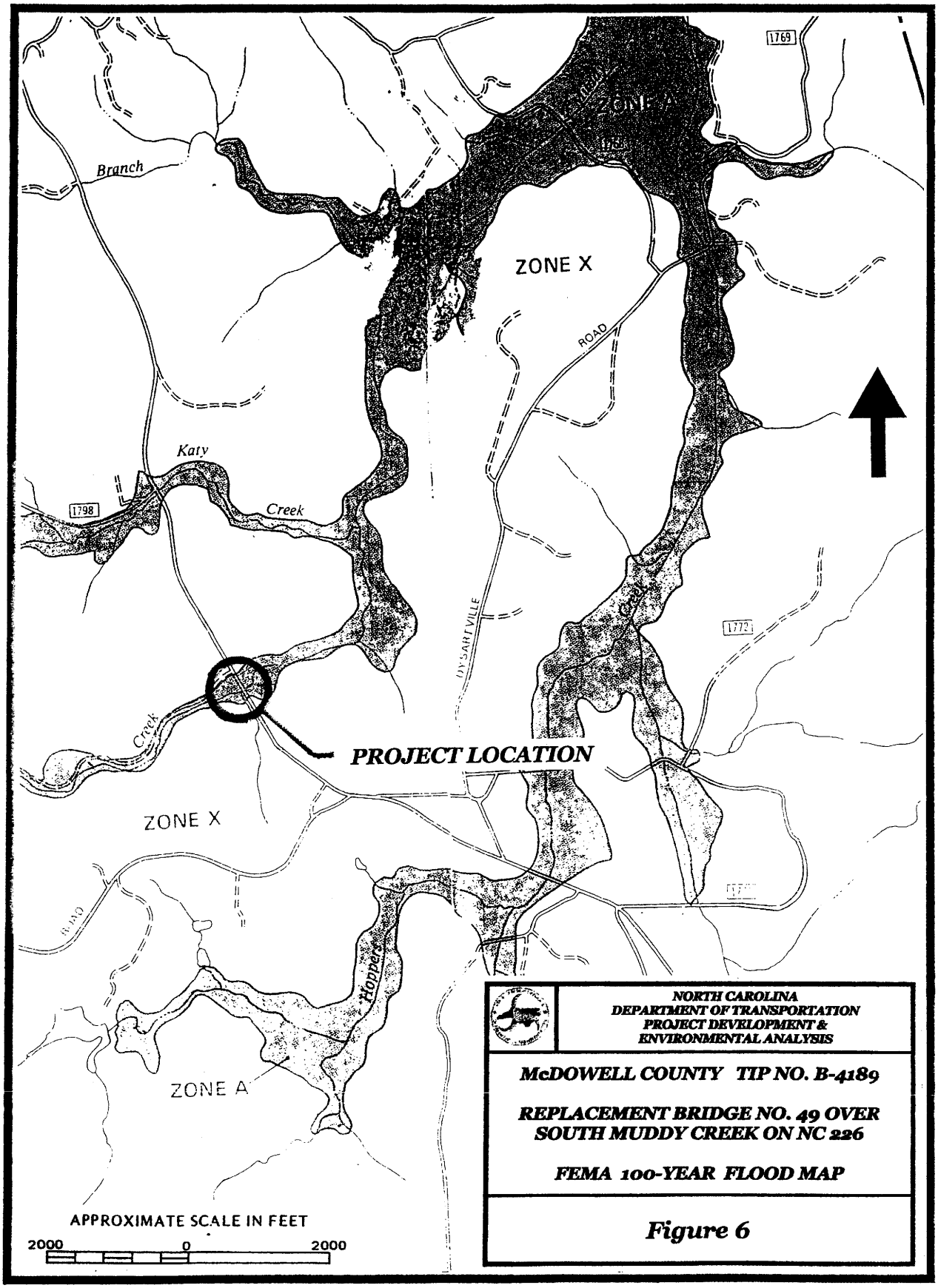
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

McDOWELL COUNTY TIP NO. B-4189

BRIDGE NO. 49 ON NC 226
OVER SOUTH MUDDY CREEK

NATURAL COMMUNITIES
AND SURFACE WATERS

FIGURE 5



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS

McDOWELL COUNTY TIP NO. B-4189

REPLACEMENT BRIDGE NO. 49 OVER SOUTH MUDDY CREEK ON NC 226

FEMA 100-YEAR FLOOD MAP

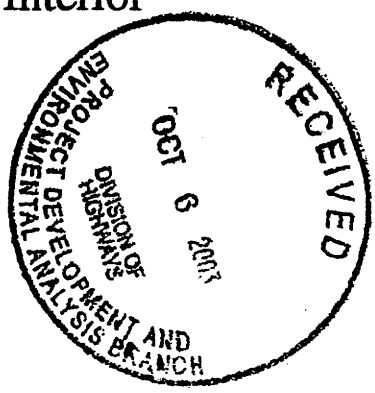
Figure 6

APPENDIX

United States Department of the Interior

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

October 3, 2003



Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: Proposed Bridge Replacement Projects in Alexander, Alleghany, Avery, Burke, Caldwell, McDowell, Watauga, and Wilkes Counties, North Carolina

We have reviewed the subject projects and are providing the following comments in accordance with the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667e), and section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

The information we received for these projects includes brief descriptions of the proposed alternatives, but not the structures that will replace the existing bridges, nor does it include any environmental information regarding the streams or whether habitat assessments or surveys for rare species have been conducted for any of these projects. Therefore, our comments are limited primarily to the known locations of listed species and federal species of concern. When the categorical exclusions are prepared and more information is available regarding environmental effects, we can offer more substantive comments.

Enclosed are species lists from the eight counties included in this package. These lists provide the names of species on the *Federal List of Endangered and Threatened Wildlife and Plants* and federal species of concern. Federal species of concern are not legally protected under the Act and are not subject to any of its provisions, including section 7, unless they are formally proposed or listed as endangered or threatened. We are including these species in our response to give you advance notification and to request your assistance in protecting them if any are found in the vicinity of your projects. Our records indicate the following:

McDowell County - Projects B-4190 (Log No. 4-2-03-449), B-4191 (Log No. 4-2-03-451), and B-4189 (Log No. 4-2-03-452); **Alexander County** - Project B-4005 (Log No. 4-2-03-453); and **Caldwell County** - Project B-4054 (Log No. 4-2-03-454). Our records for these counties and project areas indicate no known locations of listed species in the project areas. However, we recommend conducting habitat assessments and surveying any suitable habitat in the project areas for these species prior to any further planning or on-the-ground activities to ensure that no adverse impacts occur to them.

Avery County - Project B-3608 (Log No. 4-2-03-455) and **Wilkes County** - Project B-4325 (Log No. 4-2-03-456). Our records indicate known locations for the threatened (due to similarity of appearance) bog turtle (*Clemmys muhlenbergii*) near these projects. Habitat assessments and surveys of suitable habitat should be conducted in the project areas for this species. If the bog turtle occurs in the project areas, it should be protected from impacts.

Alleghany County - Project B-4008 (Log No. 4-2-03-457). Our records indicate known locations of the threatened (due to similarity of appearance) bog turtle (*Clemmys muhlenbergii*) and a federal species of concern--gray's lily (*Lillium grayi*)--near this project. Habitat assessments and surveys of suitable habitat should be conducted in the project area for these species. If they occur in the project area, they should be protected from impacts.

Watauga County - Project B-4315 (Log No. 4-2-03-458). Our records indicate known locations for the green floater mussel (*Lasmigona subviridis*) and Diana fritillary butterfly (*Speyeria diana*) (both of which are federal species of concern) near the project area. Habitat assessments and surveys of suitable habitat should be conducted in the project area for these species. If they occur in the project area, they should be protected from impacts.

Burke County - Project B-4042 (Log. No. 4-2-03-459). Our records indicate known locations of the brook floater mussel (*Alasmidonta varicosa*) (a federal species of concern) near the project area. Habitat assessments and surveys of suitable habitat should be conducted in the project area for this species and other native freshwater mussels. If native freshwater mussels are found to occur in the project area, they should be protected from impacts.

We are interested in the types of structures that will replace these existing bridges and would recommend spanning structures, preferably bridges, in all cases. In addition, off-site detours are preferable to temporary on-site crossings to reduce stream-bank disturbance. We look forward to reviewing the completed categorical exclusion documents.

If you have questions about these comments, please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237. In any future correspondence concerning these projects, please reference our log numbers assigned above to each project with our comments.

Sincerely,

Brian P. Cole
Field Supervisor

Enclosure

cc:

Mr. Steve Lund, U.S. Army Corps of Engineers, Asheville Regulatory Field Office, 151 Patton Avenue, Room 208, Asheville, NC 28801-5006

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

Ms. Cynthia Van Der Wiele, North Carolina Department of Environment and Natural Resources, Division of Water Quality, Wetlands Section, 1621 Mail Service Center, Raleigh, NC 27699-1621

ENDANGERED, THREATENED, AND CANDIDATE SPECIES AND FEDERAL SPECIES OF CONCERN, ALEXANDER, ALLEGHANY, AVERY, BURKE, CALDWELL, McDOWELL, WATAUGA, AND WILKES COUNTIES, NORTH CAROLINA

This list was adapted from the North Carolina Natural Heritage Program's County Species List. It is a listing, for Alexander, Alleghany, Avery, Burke, Caldwell, McDowell, Watauga, and Wilkes Counties, of North Carolina's federally listed and proposed endangered, threatened, and candidate species and Federal species of concern (for a complete list of rare species in the state, please contact the North Carolina Natural Heritage Program). The information in this list is compiled from a variety of sources, including field surveys, museums and herbaria, literature, and personal communications. The North Carolina Natural Heritage Program's database is dynamic, with new records being added and old records being revised as new information is received. Please note that this list cannot be considered a definitive record of listed species and Federal species of concern, and it should not be considered a substitute for field surveys.

Critical habitat: Critical habitat is noted, with a description, for the counties where it is designated or proposed.

Aquatic species: Fishes and aquatic invertebrates are noted for counties where they are known to occur. However, projects may have effects on downstream aquatic systems in adjacent counties.

COMMON NAME	SCIENTIFIC NAME	STATUS
ALEXANDER COUNTY		
Vertebrates		
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	FSC*
Vascular Plants		
Torrey's mountain-mint	*Pycnanthemum torrei*	FSC*
Nonvascular Plants		
Keever's bristle-moss	*Orthotrichum keeverae*	FSC
ALLEGHANY COUNTY		
Vertebrates		
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Hellbender	*Cryptobranchus alleganiensis*	FSC
Eastern small-footed myotis	*Myotis (=subulatus) leibii*	FSC
Kanawha minnow	*Phenacobius teretulus*	FSC
Invertebrates		
Grayson crayfish ostracod	*Ascetocythere cosmeta*	FSC
Pygmy snaketail	*Ophiogomphus howei*	FSC
Diana fritillary butterfly	*Speyeria diana*	FSC
Regal fritillary butterfly	*Speyeria idalia*	FSC

COMMON NAME	SCIENTIFIC NAME	STATUS
Vascular Plants		
"Fen" sedge	*Carex* sp. 2	FSC
Cuthbert's turtlehead	*Chelone cuthbertii*	FSC
Tall larkspur	*Delphinium exaltatum*	FSC*
Gray's lily	*Lilium grayi*	FSC
Sweet pinesap	*Monotropsis odorata*	FSC*
Carolina saxifrage	*Saxifraga caroliniana*	FSC
Nonvascular Plants		
Keever's bristle-moss	*Orthotrichum keeverae*	FSC

AVERY COUNTY

Critical Habitat Designation: Spruce-fir moss spider, *Microhexura montivaga* - Critical habitat designated (see the July 6, 2001, *Federal Register*, 66:35547-35566).

Vertebrates		
Southern Appalachian saw-whet owl	*Aegolius acadicus*	FSC
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Virginia big-eared bat	*Corynorhinus townsendii virginianus*	Endangered
Hellbender	*Cryptobranchus alleganiensis*	FSC
Blotched chub	*Erimystax insignis*	FSC
Carolina northern flying squirrel	*Glaucomys sabrinus coloratus*	Endangered
Southern Appalachian red crossbill	*Loxia curvirostra*	FSC
Southern rock vole	*Microtus chrotorrhinus carolinensis*	FSC
Eastern small-footed bat	*Myotis leibii*	FSC
Alleghany woodrat	*Neotoma magister*	FSC
Southern Appalachian black-capped chickadee	*Poecile atricapillus practicus*	FSC
Southern water shrew	*Sorex palustris punctulatus*	FSC
Southern Appalachian yellow-bellied sapsucker	*Sphyrapicus varius appalaciensis*	FSC
Appalachian cottontail	*Sylvilagus obscurus*	FSC
Appalachian Bewick's wren	*Thryomanes bewickii altus*	FSC
Invertebrates		
Grayson crayfish ostracod	*Ascetocythere cosmeta*	FSC
Spruce-fir moss spider	*Microhexura montivaga*	Endangered
Diana fritillary butterfly	*Speyeria diana*	FSC
Regal fritillary butterfly	*Speyeria idalia*	FSC
Vascular Plants		
Fraser fir	*Abies fraseri*	FSC
Mountain bittercress	*Cardamine clematitis*	FSC
Cuthbert's turtlehead	*Chelone cuthbertii*	FSC
Tall larkspur	*Delphinium exaltatum*	FSC*
Bent avens	*Geum geniculatum*	FSC
Spreading avens	*Geum radiatum*	Endangered

COMMON NAME	SCIENTIFIC NAME	STATUS
Roan Mountain bluet	*Houstonia montana*	Endangered
Butternut	*Juglans cinerea*	FSC
Heller's blazing star	*Liatris helleri*	Threatened
Gray's lily	*Lilium grayi*	FSC
Bog bluegrass	*Poa paludigena*	FSC
Carolina saxifrage	*Saxifraga caroliniana*	FSC
Blue Ridge goldenrod	*Solidago spithamaea*	Threatened
Nonvascular Plants		
Rock gnome lichen	*Gymnoderma lineare*	Endangered
A liverwort	*Plagiochila sullivantii* var. *sullivantii*	FSC
A liverwort	*Plagiochila virginica* var. *caroliniana*	FSC
A liverwort	*Sphenolobopsis pearsonii*	FSC

BURKE COUNTY

Critical Habitat Designation: Mountain golden heather, *Hudsonia montana* - The area bounded by the following: on the west by the 2200' contour; on the east by the Linville Gorge Wilderness Boundary north from the intersection of the 2200' contour and the Shortoff Mountain Trail to where it intersects the 3400' contour at "The Chimneys"--then follow the 3400' contour north until it reintersects the Wilderness Boundary--then follow the Wilderness Boundary again northward until it intersects the 3200' contour extending west from its intersection with the Wilderness Boundary until it begins to turn south--at this point the Boundary extends due east until it intersects the 2200' contour.

Vertebrates		
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	FSC
Bald eagle	*Haliaeetus leucocephalus*	Threatened (proposed for delisting)
Southern Appalachian woodrat	*Neotoma floridana haematoreia*	FSC
Alleghany woodrat	*Neotoma magister*	FSC
Invertebrates		
Brook floater	*Alasmidonta varicosa*	FSC
Edmund's snaketail dragonfly	*Ophiogomphus edmundo*	FSC*
Pygmy snaketail dragonfly	*Ophiogomphus howei*	FSC
Diana fritillary butterfly	*Speyeria diana*	FSC
Vascular Plants		
Cuthbert's turtlehead	*Chelone cuthbertii*	FSC
Spreading avens	*Geum radiatum*	Endangered
Dwarf-flowered heartleaf	*Hexastylis naniflora*	Threatened
Mountain golden heather	*Hudsonia montana*	Threatened
Small whorled pogonia	*Isotria medeoloides*	Threatened
Butternut	*Juglans cinerea*	FSC
Heller's blazing star	*Liatris helleri*	Threatened
Sweet pinesap	*Monotropsis odorata*	FSC
Carolina saxifrage	*Saxifraga caroliniana*	FSC

COMMON NAME	SCIENTIFIC NAME	STATUS
Nonvascular Plants		
A liverwort	*Cephaloziella obtusilobula*	FSC*
A liverwort	*Plagiochila sullivantii* var. *spinigera*	FSC
A liverwort	*Plagiochila sullivantii* var. *sullivantii*	FSC
A liverwort	*Porella wataugensis*	FSC*
McDOWELL COUNTY		
Vertebrates		
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Olive-sided flycatcher	*Contopus borealis*	FSC
Cerulean warbler	*Dendroica cerulea*	FSC
Bald eagle	*Haliaeetus leucocephalus*	Threatened (proposed for delisting)
Southern Appalachian woodrat	*Neotoma floridana haematoreia*	FSC*
Alleghany woodrat	*Neotoma magister*	FSC
Invertebrates		
Bennett's Mill Cave water slater	*Caecidotea carolinensis*	FSC
Diana fritillary butterfly	*Speyeria diana*	FSC
Vascular Plants		
Roan sedge	*Carex roanenis*	FSC
Cuthbert's turtlehead	*Chelone cuthbertii*	FSC
Tall larkspur	*Delphinium exaltatum*	FSC**
Mountain golden heather	*Hudsonia montana*	Threatened
Rocky shoal spider lily	*Hymenocallis coronaria*	FSC
Small whorled pogonia	*Isotria medeoloides*	Threatened
Butternut	*Juglans cinerea*	FSC
Gray's lily	*Lilium grayi*	FSC
Sweet pinesap	*Monotropsis odorata*	FSC
Northern oconee-bells	*Shortia galacifolia* var. *brevistyla*	FSC
WATAUGA COUNTY		
Critical Habitat Designation: Spruce-fir moss spider, *Microhexura montivaga* - Critical habitat designated (see the July 6, 2001, *Federal Register*, 66:35547-35566).		
Vertebrates		
Southern Appalachian saw-whet owl	*Aegolius acadicus*	FSC
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Hellbender	*Cryptobranchus alleganiensis*	FSC
Cerulean warbler	*Dendroica cerulea*	FSC
Carolina northern flying squirrel	*Glaucomys sabrinus coloratus*	Endangered
Southern Appalachian red crossbill	*Loxia curvirostra*	FSC
Alleghany woodrat	*Neotoma magister*	FSC*
Southern Appalachian black-capped chickadee	*Poecile atricapillus practicus*	FSC
Kanawha minnow	*Phenacobius teretulus*	FSC
Southern water shrew	*Sorex palustris punctulatus*	FSC*

COMMON NAME	SCIENTIFIC NAME	STATUS
Southern Appalachian yellow-bellied sapsucker	*Sphyrapicus varius appalaciensis*	FSC
Appalachian cottontail	*Sylvilagus obscurus*	FSC*
Invertebrates		
Green floater	*Lasmigona subviridis*	FSC
Spruce-fir moss spider	*Microhexura montivaga*	Endangered
Diana fritillary butterfly	*Speyeria diana*	FSC
Vascular Plants		
Fraser fir	*Abies fraseri*	FSC
Mountain bittercress	*Cardamine clematitis*	FSC
Tall larkspur	*Delphinium exaltatum*	FSC
Glade spurge	*Euphorbia purpurea*	FSC**
Bent avens	*Geum geniculatum*	FSC
Spreading avens	*Geum radiatum*	Endangered
Roan Mountain bluet	*Houstonia montana*	Endangered
Butternut	*Juglans cinerea*	FSC
Heller's blazing star	*Liatris helleri*	Threatened
Gray's lily	*Lilium grayi*	FSC
Bog bluegrass	*Poa paludigena*	FSC*
Nonvascular Plants		
A liverwort	*Porella wataugensis*	FSC*
WILKES COUNTY		
Vertebrates		
Bog turtle	*Clemmys muhlenbergii*	T(S/A)[1]
Cerulean warbler	*Dendroica cerulea*	FSC
Invertebrates		
Diana fritillary butterfly	*Speyeria diana*	FSC
Regal fritillary butterfly	*Speyeria idalia*	FSC
Vascular Plants		
Butternut	*Juglans cinerea*	FSC
Torrey's mountain-mint	*Pycnanthemum torrei*	FSC*
Nonvascular Plants		
Keever's bristle-moss	*Orthotrichum keeverae*	FSC

KEY:

Status	Definition
Endangered	A taxon "in danger of extinction throughout all or a significant portion of its range."
Threatened	A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

FSC	A Federal species of concern--a species that may or may not be listed in the future (formerly C2 candidate species or species under consideration for listing for which there is insufficient information to support listing).
T(S/A)	Threatened due to similarity of appearance (e.g., American alligator)--a species that is threatened due to similarity of appearance with other rare species and is listed for its protection. These species are not biologically endangered or threatened and are not subject to Section 7 consultation.

Species with 1, 2, 3, or 4 asterisks behind them indicate historic, obscure, or incidental records.

*Historic record - the species was last observed in the county more than 50 years ago.

**Obscure record - the date and/or location of observation is uncertain.

***Incidental/migrant record - the species was observed outside of its normal range or habitat.

****Historic record - obscure and incidental record.

[1]In the November 4, 1997, *Federal Register* (55822-55825), the northern population of the bog turtle (from New York south to Maryland) was listed as T (threatened), and the southern population (from Virginia south to Georgia) was listed as T(S/A) (threatened due to similarity of appearance). The T(S/A) designation bans the collection and interstate and international commercial trade of bog turtles from the southern population. The T(S/A) designation has no effect on land-management activities by private landowners in North Carolina, part of the southern population of the species. In addition to its official status as T(S/A), the U.S. Fish and Wildlife Service considers the southern population of the bog turtle as a Federal species of concern due to habitat loss.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 9/25/03
Name Of Project Replacement of Bridge No. 49 on NC226	Federal Agency Involved FHWA-NCDOT
Proposed Land Use Roadway	County And State McDowell County, NC
PART II *(To be completed by SCS)*	Date Request Received By SCS 9/26/03

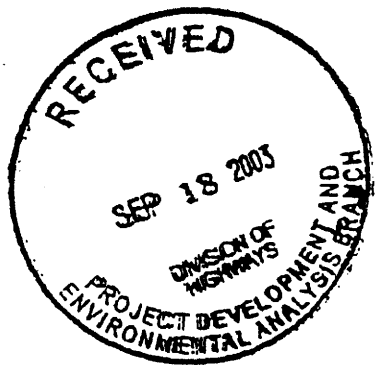
Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form).*	Yes ☐	No ☒	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System		Date Land Evaluation Returned By SCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site				
PART IV *(To be completed by SCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0			
B. Total Acres Statewide And Local Important Farmland	0			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	50			
PART V *(To be completed by SCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	50			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160				
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100				
Total Site Assessment *(From Part VI above or a local site assessment)*	160				
TOTAL POINTS *(Total of above 2 lines)*	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1499

September 12, 2003

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

Dear Dr. Thorpe:

REQUEST FOR COMMENTS ON BRIDGE REPLACEMENT PROJECTS B-4042, B-4054, B-4189, B-4190, AND B-4191, YADKIN AND CATAWBA RIVER WATERSHEDS, BURKE, CALDWELL, AND MCDOWELL COUNTIES, NORTH CAROLINA

TVA has reviewed the project descriptions provided in your letters of August 18, 2003, on the proposed bridge replacements in Burke, Caldwell, and McDowell Counties. It appears that there is no TVA permit or other TVA involvement associated with these projects:

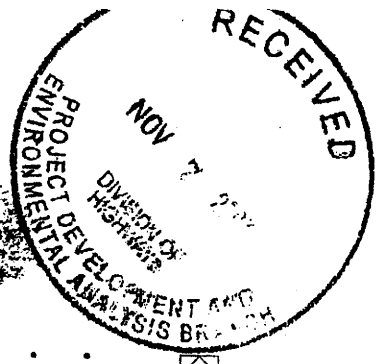
- B-4042, Bridge #274 on SR 1248 over Canoe Creek, Burke County
- B-4054, Bridge #334 on SR 1517 over Yadkin River, Caldwell County
- B-4189, Bridge #49 on NC 226 over South Muddy Creek, McDowell County
- B-4190, Bridge #37 on NC 226 over Hopper Creek, McDowell County
- B-4191, Bridge #82 on NC 226 over Jacktown Creek, McDowell County

Should you have any questions, please contact Harold M. Draper at (865) 632-6889 or hmdraper@tva.gov.

Sincerely,

Jon M. Loney, Manager
NEPA Administration
Environmental Policy and Planning

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



North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

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

FROM: Marla Chambers, Highway Projects Coordinator
Habitat Conservation Program, NCWRC

DATE: November 5, 2003

SUBJECT: Scoping review of NCDOT's proposed bridge replacement projects B-4008, B-3608, B-4054, B-4315, B-4325, B-4189, B-4190, B-4191, B-4042, and B-4005 in Alexander, Alleghany, Avery, Caldwell, Burke, McDowell, Watauga, and Wilkes, Counties.

North Carolina Department of Transportation (NCDOT) has requested comments from the North Carolina Wildlife Resources Commission (NCWRC) regarding impacts to fish and wildlife resources resulting from the subject projects. Staff biologists have reviewed the information provided and have the following preliminary comments. These comments are provided in accordance with the provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be used as wetland mitigation for the subject project or other projects in the watershed.

Project specific comments:

1. B-4005, Alexander Co., Bridge No.70 over Grassy Creek on SR 1331. Grassy Creek is Class C waters. Santee chub (*Cyprinella zanema*), state Significantly Rare (SR), and brook floater (*Alasmidonta varicosa*), Federal Species of Concern (FSC) and state Threatened (T), may be present downstream in the Lower Little River. No special concerns indicated at this time in the project vicinity. Standard requirements should apply.

2. B-4008, Alleghany Co., Bridge No. 39 over Little River on SR 1193. Little River is classified as C Trout and is Hatchery Supported (HS) Designated Public Mountain Trout Waters (DPMTW). The Kanawha minnow (*Phenacobius teretulus*), FSC and state Special Concern (SC); Kanawha darter (*Etheostoma kanawhae*), state SR; tonguetied minnow (*Exoglossum laurae*), state SR; and bog turtle (*Glyptemys muhlenbergii*), state T and federal Threatened due to Similarity of Appearance, may occur in the project area or downstream. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure.

3. B-3608, Avery Co., Bridge No. 44 over North Toe River on US 19E. The North Toe River is classified as WS-III Trout and is HS DPMTW with excellent rainbow and brown trout habitat. The blotched chub (*Erimystax insignis*), FSC and state SR, occurs in the project area. Appalachian elktoe (*Alasmidonta raveneliana*), federal and state Endangered (E), and wavy-rayed lampmussel (*Lampsilis fasciola*), state SC, occur in the North Toe River downstream of Spruce Pine, NC. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure.

4. B-4042, Burke Co., Bridge No. 274 over Canoe Creek on SR 1248. Canoe Creek is Class C water. No special concerns indicated. Standard requirements should apply.

5. B-4054, Caldwell Co., Bridge No. 334 over the Yadkin River on SR 1517 (Whisnant Road). The Yadkin River, although classified as C Trout, supports smallmouth bass in the project area. A moratorium prohibiting in-stream work is recommended from May 1 to July 15 to protect the egg & fry stages of smallmouth bass.

6. B-4189, McDowell Co., Bridge No. 49 over South Muddy Creek on NC 226. South Muddy Creek is Class C waters and is within the Muddy Creek drainage. Sediment and erosion control is a major concern, as a watershed restoration project is under way to reduce negative impacts to downstream resources, particularly in the Catawba River. Downstream of the project area, South Muddy Creek, Muddy Creek and the Catawba River have the WS-IV

classification. Catawba River resources of concern include brown and rainbow trout tailwater fisheries and state listed mussels, the notched rainbow (*Villosa constricta*), state SC, and the creeper (*Strophitus undulatus*), state T, which are present near the mouth of Muddy Creek. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds.

7. B-4190, McDowell Co., Bridge No. 37 over Hoppers Creek on NC 226. Hoppers Creek is Class C waters and is within the Muddy Creek drainage. Sediment and erosion control is a major concern, as a watershed restoration project is under way to reduce negative impacts to downstream resources, particularly in the Catawba River. Downstream of the project area, Hoppers Creek, South Muddy Creek, Muddy Creek and the Catawba River have the WS-IV classification. Catawba River resources of concern include brown and rainbow trout tailwater fisheries and state listed mussels, the notched rainbow (*Villosa constricta*), state SC, and the creeper (*Strophitus undulatus*), state T, which are present near the mouth of Muddy Creek. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds.

8. B-4191, McDowell Co., Bridge No. 82 over Jacktown Creek on NC 226. Jacktown Creek is Class C waters and is within the Muddy Creek drainage. Sediment and erosion control is a major concern, as a watershed restoration project is under way to reduce negative impacts to downstream resources, particularly in the Catawba River. Downstream of the project area, North Muddy Creek, Muddy Creek and the Catawba River have the WS-IV classification. Catawba River resources of concern include brown and rainbow trout tailwater fisheries and state listed mussels, the notched rainbow (*Villosa constricta*), state SC, and the creeper (*Strophitus undulatus*), state T, which are present near the mouth of Muddy Creek. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds.

9. B-4315, Watauga Co., Bridge No. 62 over Bairds Creek on NC 194. Bairds Creek is Class C waters and flows into the Watauga River, classified as B Trout HQW, not far from the project site. Trout may occur in the project area. The green floater (*Lasmigona subviridis*), FSC and state E, is present in the Watauga River downstream of the project. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds.

10. B-4325, Wilkes Co., Bridge No. 718 over Middle Fork Reddies River on SR 1580. Middle Fork Reddies River is classified WS-II Trout and is HS DPMTW from the project site upstream. Both trout and smallmouth bass are present. At this time, a moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is anticipated from October 15 to April 15 to protect the egg and fry stages of trout. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure.

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 (704) 485-2384. Thank you for the opportunity to review and comment on these projects.

cc: Cynthia Van Der Wiele, NC DWQ
Marella Buncick, USFWS
Sarah McRae, NC NHP

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

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

October 15, 2003

MEMORANDUM

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

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

THROUGH: John R. Domey, Supervisor, DWQ 401 Unit

SUBJECT: Scoping Review of NCDOT's proposed bridge replacement projects: B-4008, B-3608, B-4054, B-4315, B-4325, B-4190, B-4189, B-4191, B-4042, and B-4005.

In reply to your correspondence dated August 18, 2003 (received August 28, 2003) to Cynthia Van der Wiele, in which you requested comments for the referenced projects, the NC Division of Water Quality has the following comments:

I. General Comments Regarding Bridge Replacement Projects

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

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

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

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

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

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

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

N. C. Division of Water Quality, 401 Wetlands Certification Unit,
1650 Mail Service Center, Raleigh, NC 27699-1650 (Mailing Address)
2321 Crabtree Blvd., Raleigh, NC 27604-2260 (Location)
(919) 733-1786 (phone), 919-733-6893 (fax), (http://h2o.enr.state.nc.us/ncwetlands)
Customer Service # 1-877-623-6748

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

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

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

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

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

II. General Comments if Replacing the Bridge with a Culvert

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

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

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

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

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

III. Project-Specific Comments

B-4008, Bridge 39, Little River, Alleghany County

The Little River is classified as C Trout. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. DWQ would prefer this bridge to be replaced with a bridge and the use of BMPs (particularly for sediment and erosion control) to be maximized.

B-3608, Bridge 44, North Toe River, Avery County

The North Toe River is classified as WS-IV Trout. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. DWQ would prefer this bridge to be replaced with a bridge and the use of BMPs (particularly for sediment and erosion control) to be maximized. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G).

B-4054, Bridge 334, Yadkin River, Caldwell County

This part of the Yadkin River is classified as WS-IV Trout. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. DWQ would prefer this bridge to be replaced with a bridge and the use of BMPs (particularly for sediment and erosion control) to be maximized. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G).

B-4315, Bridge 62, Bairds Creek, Watauga County

Bairds Creek is classified as C. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4325, Bridge 718, Middle Fork Reddies River, Wilkes County

The Middle Fork of Reddies River is classified as WS-II, HQW, Trout. As this is a High Quality Water classification, DWQ would hope that a spanning structure is planned for this crossing. In addition, we would stress that NCDOT should use the highest possible BMPs for protecting this resource. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G). A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. DWQ would prefer this bridge to be replaced with a bridge and the use of BMPs (particularly for sediment and erosion control) to be maximized.

B-4190, Bridge 37, Hopper Creek, McDowell County

Hopper Creek is classified as C. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4189, Bridge 49, South Muddy Creek, McDowell County

South Muddy Creek is classified as C. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4191, Bridge 82, Jacktown Creek, McDowell County

Jacktown Creek is classified as C. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4042, Bridge 274, Canoe Creek, Burke County

Canoe Creek is classified as WS-IV. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G).

B-4005, Bridge 70, Grassy Creek, Alexander County

Grassy Creek is classified as C. DWQ does not have any special concerns. Please refer to general recommendations listed above.

Thank you for requesting our input at this time. The DOT is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost. If you have any questions or require additional information, please contact Robert Ridings at (919) 733-9817 or Cynthia Van Der Wiele at (919) 733.5715.

pc: John Hendrix, USACE Asheville Field Office
File Copy

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

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

Division of Historical Resources

October 22, 2003

MEMORANDUM

TO: Greg Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook Deputy David Brook

SUBJECT: Replace Bridge No. 49 on NC 226 over South Muddy Creek, B-4189, McDowell County, ER03-2342

Thank you for your memorandum of August 18, 2003, concerning the above project.

We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

There are no known recorded archaeological sites within the project boundaries. However, the project area has never been systematically surveyed to determine the location or significance of archaeological resources. Based on the topographic and hydrological situation, there is a high probability for the presence of prehistoric or historic archaeological sites.

We recommend that a comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project. Potential effects on unknown resources must be assessed prior to the initiation of construction activities.

Two copies of the resulting archaeological survey report, as well as one copy of the appropriate site forms, should be forwarded to us for review and comment as soon as they are available and well in advance of any construction activities.

A list of archaeological consultants who have conducted or expressed an interest in contract work in North Carolina is available at www.arch.dcr.state.nc.us/consults. The archaeologists listed, or any other experienced archaeologist, may be contacted to conduct the recommended survey.

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

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

cc: Mary Pope Furr, NCDOT
Matt Williamson, NCDOT

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

June 6, 2005

MEMORANDUM

TO: Matt Wilkerson, Archaeology Supervisor
Division of Highways
Department of Transportation

FROM: Peter Sandbeck BSE for Peter Sandbeck

SUBJECT: Bridge 49 on NC 226 over South Muddy Creek, B-4189, McDowell County, ER 03-2342

Thank you for your letter of February 16, 2005, forwarding the archaeological survey report by Scott Seibel and Terri Russ for the above project.

During the course of the survey, no sites were located within the project area. The report authors have recommended that no further archaeological investigation be conducted in connection with this project. We concur with this recommendation since the project will not involve significant archaeological resources.

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

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

cc: Scott Seibel and Terri Russ, Environmental Services, Inc.

McDOWELL COUNTY

EMERGENCY SERVICES

EMERGENCY MANAGEMENT AGENCY

60 East Court Street
Marion, North Carolina 28752
828-652-3982
Fax: 828-659-2782
E-Mail: mcdems@wnclink.com

EMERGENCY MEDICAL SERVICES

July 19, 2003

MA Engineering Consultants, Inc.
598 E. Chatham Street, Suite 137
Cary, NC 27511

Re: NCDOT Bridge Replacement Project in McDowell County

Dear Sir:

McDowell County Emergency Services will cooperate with NCDOT in the replacement of references bridges by determining alternate routes to emergency response in the area's.

Please keep this office advised of detours and delays.

Thank you for your consideration of emergency response.

Respectfully,

Carroll W. Hemphill

Carroll W. Hemphill, Director