STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 18, 2008

U.S. Army Corps of Engineers
Regulatory Field Office
Post Office Box 1890
Wilmington, NC 28402-1890

ATTENTION: Mr. Richard Spencer
NCDOT Coordinator

Dear Sir,

Subject: **Application for Section 404 Nationwide Permits 23 and 33 and Section 401 Water Quality Certification** for the Replacement of Bridge No. 8 over a canal on NC 210; Bladen County; TIP Project B-4029; Federal Aid Project No. BRSTP-210(5); State Project No. 8.1421501; WBS 33396.1.1.

Please find enclosed a site map, permit drawings, and half size plan sheets for the above mentioned project. A Categorical Exclusion (CE) was completed for this project on April 11, 2006, and distributed shortly thereafter. Additional copies are available upon request. The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 8 over an unnamed canal on the existing alignment, while using a temporary on-site detour to the west of the existing 61-foot long bridge to maintain traffic during construction. The proposed structure will be a 90-foot long bridge with a clear roadway width of 32 feet, providing two 12-foot travel lanes with 4-foot offsets. The roadway approaches will consist of two 12-foot travel lanes with 6-foot unpaved shoulders. There are 32 linear feet of proposed permanent impacts to surface waters as well as 198 linear feet (0.10 acre) of temporary surface water impacts and 0.07 acre of temporary riverine wetland impacts.

Impacts to Waters of the United States

General Description: This project is located in the Cape Fear River Basin (Hydrologic Cataloging Unit 03030006) over a man-made, unnamed diversion canal. Since the canal is unnamed, it is not assigned a Stream Index Number by the Division of Water Quality (DWQ); therefore Colly Creek (DWQ Index No. 18-68-17), of which the canal is a tributary, is the main water body with potential for impact. Colly Creek is a DWQ Class "C Sw" Water of the State. In addition to the canal, there are two jurisdictional wetlands

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

TELEPHONE: 919-715-1334
FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD
SUITE 240
RALEIGH NC 27604

and another unnamed tributary to Colly Creek that will be impacted within the project area.

The canal, unnamed tributary, and Colly Creek are not designated as North Carolina Natural or Scenic Rivers, or as national Wild and Scenic Rivers. No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), or Water Supply II (WS-II) waters occur within 1.0 mile of the project study area. Additionally, the canal is not listed on the Final 2006 303(d) list of impaired waters due to sedimentation for the Cape Fear River Basin, nor does it drain into any Section 303(d) waters within 1.0 mile of the project study area.

Permanent Impacts: There are 32 linear feet of permanent surface water impacts to the unnamed tributary to Colly Creek that runs parallel to the canal due to a pipe extension.

Temporary Impacts: Proposed temporary surface water impacts include 85 linear feet (0.02 acre) to the unnamed tributary to Colly Creek and 97 linear feet (0.08 acre) to the unnamed canal. There is also 0.07 acre of proposed temporary wetland fill, including less than 0.01 acre of temporary wetland fill for the installation of erosion control measures. These include some or all of the following: Temporary Silt Fence, Special Sediment Control Fence, and Temporary Rock Silt Checks.

Though there are impacts resulting from temporary pipes in the canal, no dewatering will be required for this project due to low or absent flow conditions (per correspondence from Ken Averitte, DWQ, dated January 16, 2008).

Hand Clearing: There will be 0.04 acre of hand clearing in jurisdictional areas.

Utility Impacts: No impacts to jurisdictional resources will occur due to relocation of utilities in the project area.

Bridge Demolition: Bridge No. 8 has a pre-stressed concrete channel superstructure supported by a substructure composed of concrete caps on timber piles. Best Management Practices for Bridge Demolition and Removal will be followed to prevent any temporary fill from entering Waters of the United States.

Avoidance and Minimization

Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States". Due to the presence of surface waters and wetlands within the project study area, avoidance of all impacts is not possible. The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts. Minimization measures were incorporated as part of the project design. These included:

- The proposed bridge will be 29 feet longer than the existing bridge, increasing the floodplain under the bridge.
- One preformed scour hole will be constructed to filter storm-water runoff.

- The roadway grade was kept as close as possible to the existing, minimizing fill height.
- Hand-clearing will be used in jurisdictional areas to reduce permanent impacts.
- A turbidity curtain will be used downstream (and upstream, as conditions warrant) of the temporary pipe placement area in lieu of de-watering.

Mitigation

Due to the minimal permanent surface water impacts proposed for this project, no compensatory mitigation is proposed.

Federally Protected Species

As of January 31, 2008, the US Fish and Wildlife Service (USFWS) lists six federally protected species for Bladen County. Table 1 lists the species and their federal status.

Table 1. Species under federal protection in Bladen County

Common Name	Scientific Name	Federal Status	Habitat	Biological Conclusion
American alligator	*Alligator mississippiensis*	T (S/A)	Yes	N/A
Red-cockaded woodpecker	*Picoides borealis*	E	No	No Effect
Shortnose sturgeon	*Acipenser brevirostrum*	E	No	No Effect
American chaffseed	*Schwalbea americana*	E	No	No Effect
Pondberry	*Lindera melissifolia*	E	No	No Effect
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	Yes	No Effect

Bald and Golden Eagle Protection Act

Bald Eagle (*Haliaeetus leucocephalus*) is included in the environmental document for this project and given a biological conclusion of 'No Effect'. However, the Bald Eagle was de-listed on August 8, 2007 and no longer requires a biological conclusion, though it is still protected under the Bald and Golden Eagle Protection Act. Suitable habitat in the form of large, open water bodies that provide nesting and foraging habitat for the bald eagle is not found within 660 feet of the project area. In addition, a search of the NC Natural Heritage Program database (updated February 2008) did not reveal any records of the Bald Eagle within one mile of the project area.

Project Schedule

The project has a scheduled let of September 16, 2008 with a review date of July 29, 2008.

Regulatory Approvals

Section 404 Permit: All 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 (72 CFR; 11092-11198, March 12, 2007). We are also requesting the issuance

of a Nationwide Permit 33 for the temporary fill due to the installation of a temporary detour bridge (72 CFR; 11092-11198, March 12, 2007).

Section 401 Permit: We anticipate 401 General Certification numbers 3701 and 3688 will apply to this project. All general conditions of the Water Quality Certifications will be met. Therefore, we are not asking for written concurrence. In accordance with 15A NCAC 2H, Section .0500(a), we are providing two copies of this application to the NCDWQ for their records.

A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html.

If you have any questions or need additional information, please contact Amy James at (919) 715-7216.

Sincerely,

E. L. Lusk

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

W/attachment
Mr. Brian Wrenn, NCDWQ (2 copies)
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Ms. Jeanne Hardy, NCDMF

W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Mark Staley, Roadside Environmental
Mr. Terry Gibson, P.E, Division 6 Engineer
Mr. Jim Rerko, Division 6 Environmental Officer
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. Vincent Rhea, 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: NWP 23 and 33

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

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

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

II. Applicant Information

1. Owner/Applicant Information
   Name: Gregory J. Thorpe, Ph.D., Environmental Management Director
   Mailing Address: 1598 Mail Service Center
   Raleigh, NC 27699-1548
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address:

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

III. Project Information

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

1. Name of project: Replacement of Bridge No. 8 over a canal on NC 210

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4029

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

4. Location
   County: Bladen Nearest Town: Kelly
   Subdivision name (include phase/lot number):
   Directions to site (include road numbers/names, landmarks, etc.): see vicinity map

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): -78.27335 °N 34.4737 °W

6. Property size (acres): N/A

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

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

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The project is located in a rural area consisting of low density residential and forested areas as well as pasture and timber land.

10. Describe the overall project in detail, including the type of equipment to be used:

Bridge No. 8 will be replaced on the existing alignment with an on-site detour. Heavy duty excavation equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction.

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

IV. Prior Project History

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

V. Future Project Plans

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

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

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

1. Provide a written description of the proposed impacts: There is 0.01 acre (32 linear feet) of proposed permanent surface water impacts on this project, as well as 0.10 acre (198 linear feet) of temporary surface water impacts and 0.07 acre of temporary riverine wetland impacts.

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

Wetland Impact Site Number (indicate on map)	Type of Impact	Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Area of Impact (acres)
Site 1	Temporary Fill	Forested	Yes	200	<0.01
Site 2	Temporary Fill	Forested	Yes	100	0.07
Total Wetland Impact (acres)					0.07

3. List the total acreage (estimated) of all existing wetlands on the property: 1.5 acres

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	Unnamed tributary	Permanent fill	Perennial	10	48	>.01
Site 2	Unnamed canal	Temporary fill	Perennial	10	85	.02
Site 3	Unnamed canal	Temporary fill	Perennial	30	97	.08
Total Stream Impact (by length and acreage)					230	.11

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)
N/A				
Total Open Water Impact (acres)				

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

Stream Impact (acres):	0.11
Wetland Impact (acres):	0.07
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	0
Total Stream Impact (linear feet):	230

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

_____

_____

8. Pond Creation
If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): N/A
Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): N/A
Current land use in the vicinity of the pond: N/A
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 proposed bridge will be 29 feet longer than the existing bridge, increasing the floodplain under the bridge.
- One preformed scour hole will be constructed to filter storm-water runoff.
- The roadway grade was kept as close as possible to the existing, minimizing fill height.
- Hand-clearing will be used in jurisdictional areas to reduce permanent impacts.
- A turbidity curtain will be used downstream (and upstream, as conditions warrant) of the temporary pipe placement area in lieu of de-watering.

VIII. Mitigation

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

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

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

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

2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

   Amount of stream mitigation requested (linear feet): 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.

XI. 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

XII. Stormwater (required by DWQ)

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

XIII. 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

XIV. 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 ☒

XV. Cumulative Impacts (required by DWQ)

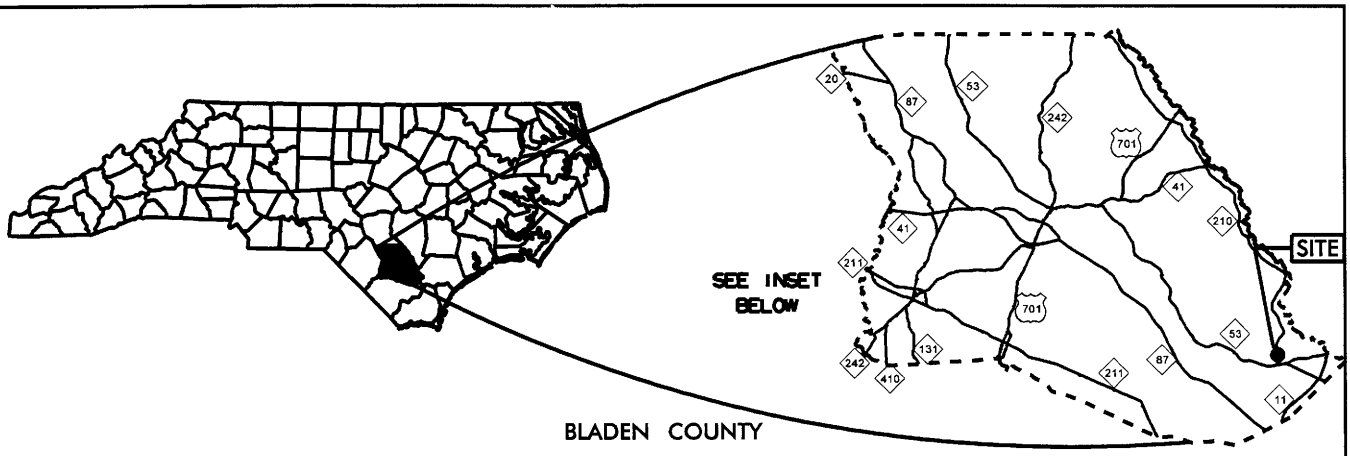
Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina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

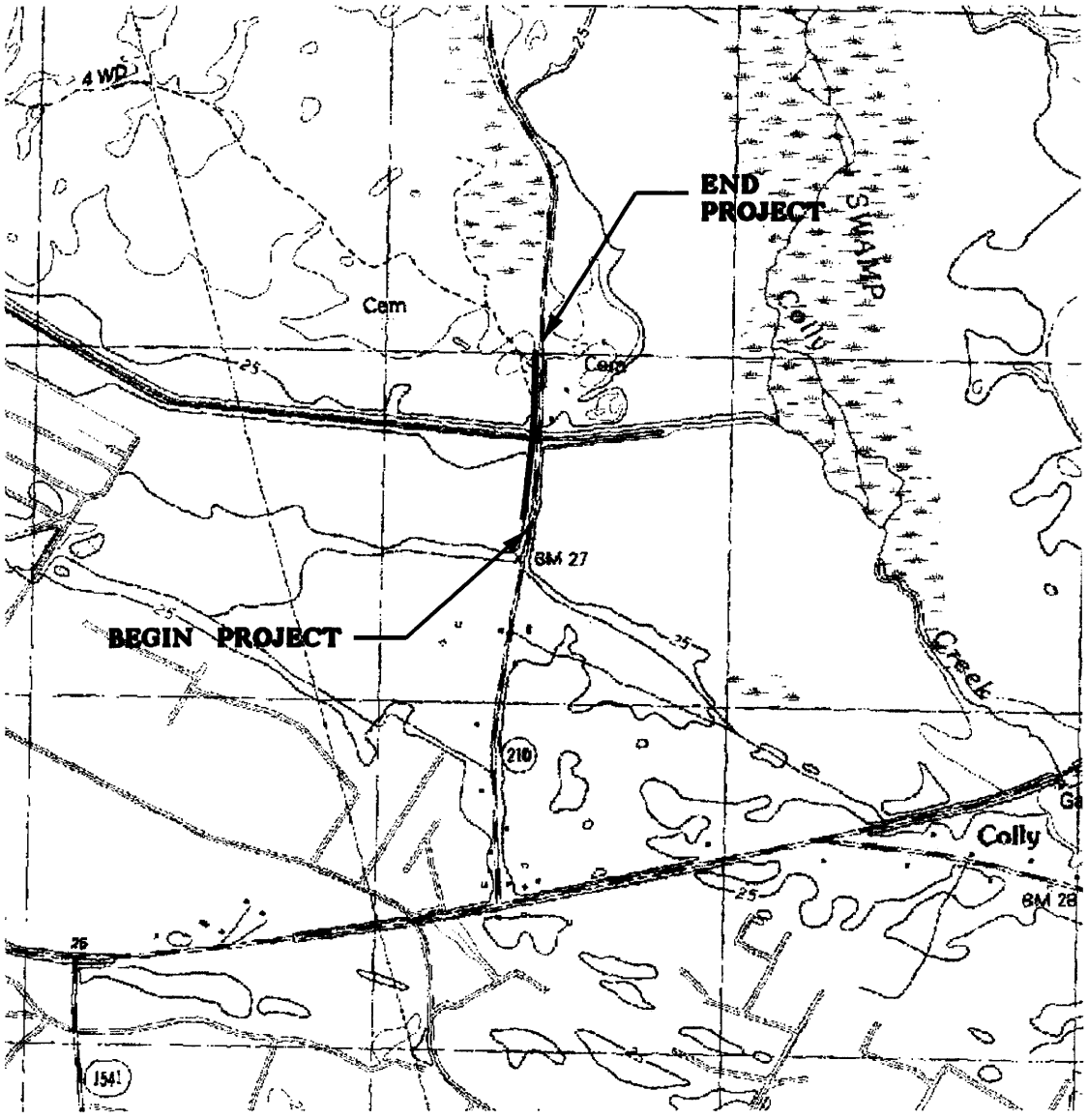
XVI. Other Circumstances (Optional):

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).
None

E. L. Luck 3.19.08

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





WETLAND IMPACTS
VICINITY MAP

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

BLADEN COUNTY
PROJECT: 33396.1.1 (B-4029)
BRIDGE NO. 8 ON NC 210
OVER DIVERSON CANEL

SHEET ___ OF ___ **11/20/07**

Permit Drawing

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	13+50 -L-	42" PIPE					0.04	0.01	<0.01	32	16	
2	DET-	42" CSP PIPE		0.07					0.02		85	
3	19+50 -DET-	2 AT 72" CSP PIPE							0.08		97	
TOTALS:			0.00	0.07	0.00	0.00	0.04	0.01	0.10	32	198	

10 SQ FT OF IMPACTS FOR PROPOSED PIERS

< 0.01 acres of Temporary Fill in Wetlands in the Hand Clearing area for erosion control measures.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BLADEN COUNTY
PROJECT: 33396.1.1 (B-4029)

SHEET January-08

ATN Revised 3/31/05

Permit Drawing
Sheet 2 of 10

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	JAMES R. ROOKS ET UX	24461 E.NC 210 HWY KELLY, NC 28448-0151
2	ETHEL M. SQUIRES	19029 NC 53E KELLY, NC 28448

NCDOT

DIVISION OF HIGHWAYS

BLADEN COUNTY

PROJECT: 53196.1.1 (B-4029)

CONCORD-KANNAPOLIS

BRIDGE NO.8 ON NC 210

OVER DIVERSON CANAL

SHEET OF 11/20/07

Permit Drawing
Sheet 3 of 10

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BLADEN COUNTY

LOCATION: BRIDGE NO. 8 ON NC 210 OVER DIVERSON CANAL

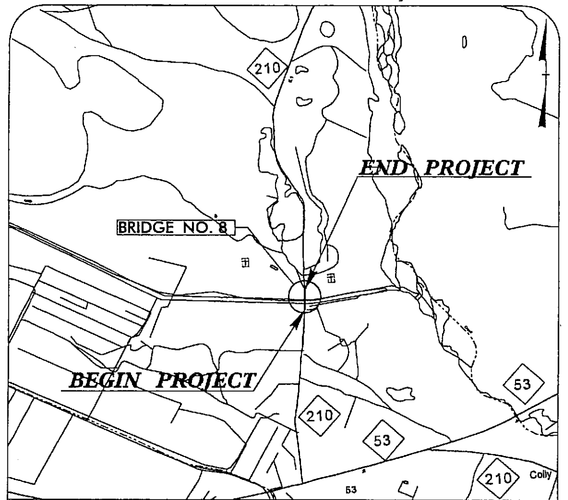
TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4029	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33396.1.1	BRSTP-210 (6)	PE
33396.2.1	BRSTP-210 (6)	R/W & UTIL.

R/W PLANS

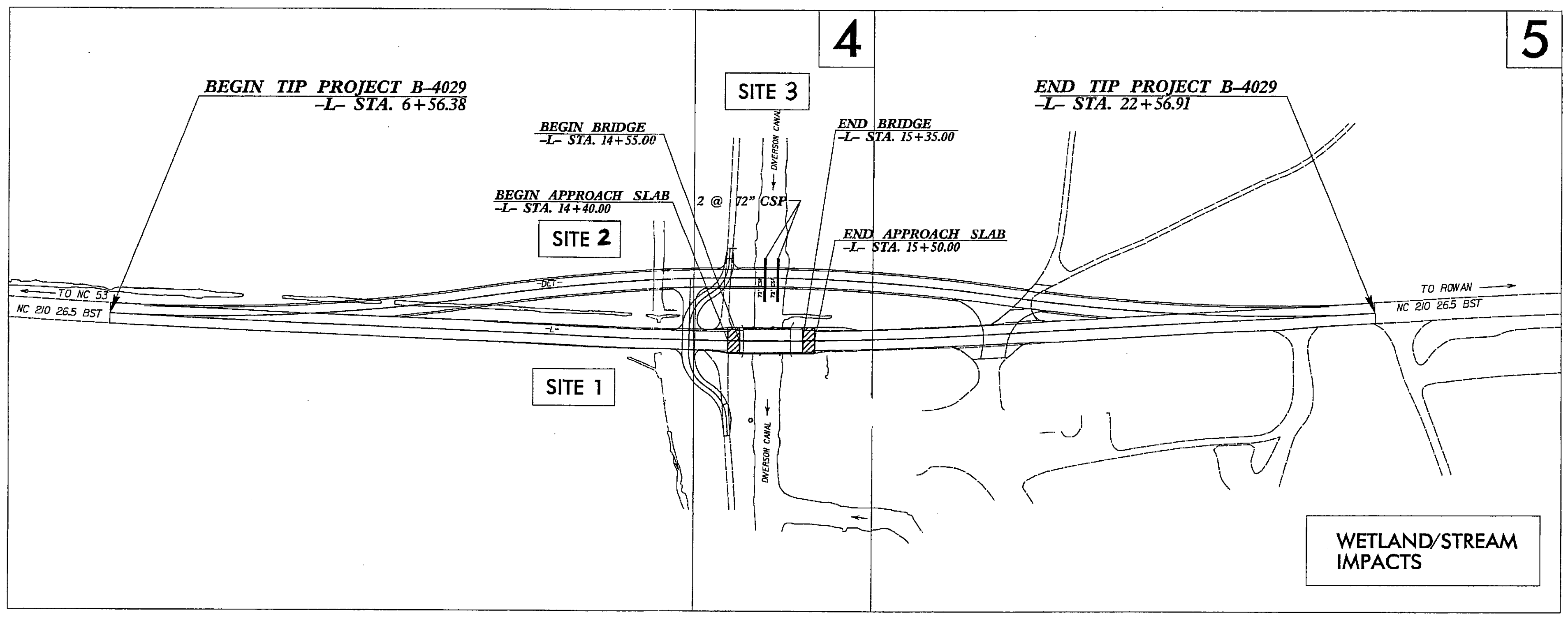
TIP PROJECT: B-4029



VICINITY MAP

(THIS PROJECT IS NOT INCLUDED WITHIN ANY MUNICIPAL BOUNDARIES)

NAD 83/95



NCDOT CONTACT : CATHY HOUSER, P.E.
ROADWAY DESIGN-ENGINEERING COORDINATION

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 1083
ADT 2028 = 1691
DHV = 10%
D = 60%
T = 20% *
V = 60 MPH
* TTST 15% DUAL 5%
FUNC. CLASS = RURAL MAJOR COLLECTOR

PROJECT LENGTH

Length Roadway TIP Project B-4029 = 0.288 Miles
Length Structure TIP Project B-4029 = 0.015 Miles
Total Length TIP Project B-4029 = 0.303 Miles

Prepared In the Office of:
THE LPA GROUP TRANSPORTATION CONSULTANTS
THE LPA GROUP of North Carolina, p.a.
5000 Falls of Neuse Rd., Suite 304
Raleigh, North Carolina 27609

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 21, 2007

LETTING DATE: SEPTEMBER 16, 2008

JEANNE K. RICHTER, P.E.
PROJECT ENGINEER

JODY L. COLE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

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

09/08/99

Permit Drawing
Sheet 4 of 10

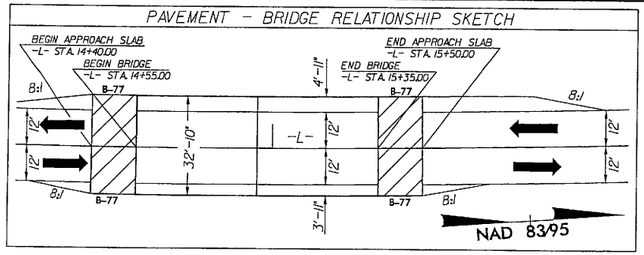
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-4029	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

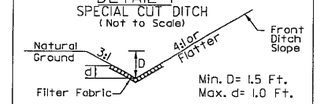
ENGLISH

PAVEMENT - BRIDGE RELATIONSHIP SKETCH



PI Sta 15+21.02
Δ = 5° 46' 06.9" (LT)
D = 1° 13' 41.7"
L = 469.66'
T = 235.03'
R = 4,664.88'
DS= 60 MPH
e(max)= .03

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)

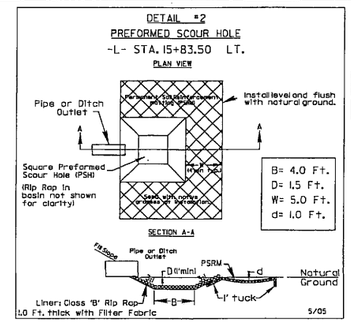


Type of Liner= Class 'B' Rip-Rap

FROM STA. 14+00.00 TO STA.14+68.00 -L- LT.

(2) SQUIRES, ETHEL M.

DETAIL #2
PREFORMED SCOUR HOLE
-L- STA. 15+83.50 LT.



-L-
PI Sta 7+72.48
Δ = 6° 42' 48.1" (LT)
D = 0° 18' 26.0"
L = 232.19'
T = 116.10'
R = 18,649.70'
DS= 60 MPH
e(max)= .03

NAD 83/95

BM# 2

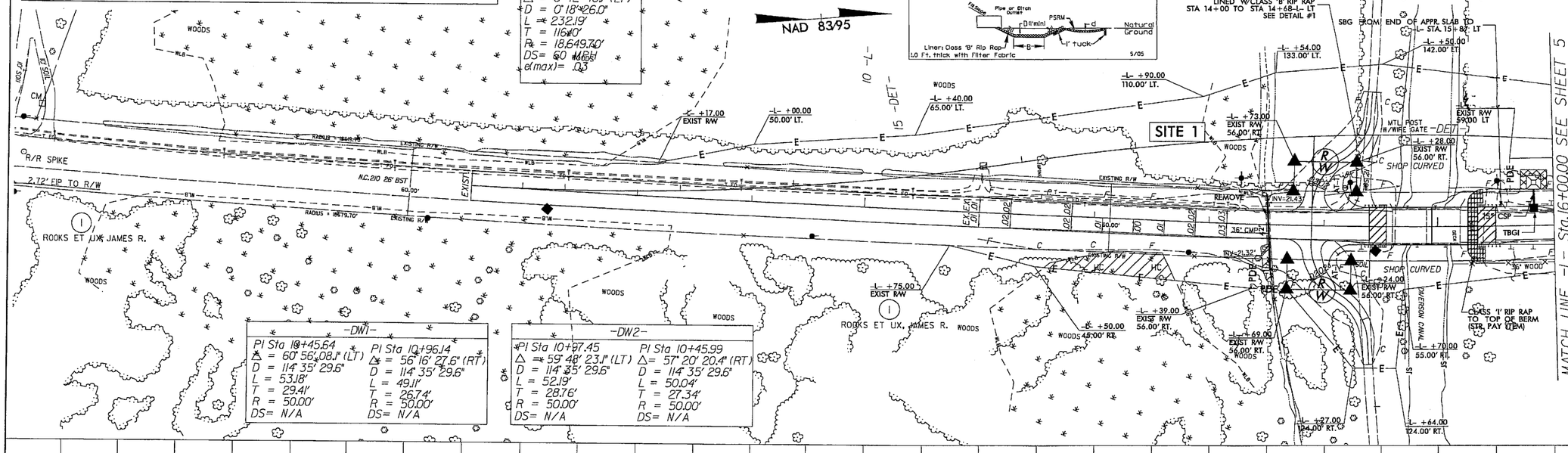
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

HC HC DENOTES HAND CLEARING

SPECIAL CUT DITCH LINED W/CLASS 'B' RIP RAP STA 14+00 TO STA. 14+68-L- LT SEE DETAIL #1

SBG FROM END OF APPR. SLAB TO -L- STA. 15+82 LT



-DW1-

PI Sta 18+45.64	PI Sta 10+96.14
Δ = 60° 56' 08.1" (LT)	Δ = 56° 16' 27.6" (RT)
D = 114° 35' 29.6"	D = 114° 35' 29.6"
L = 53.18'	L = 49.11'
T = 29.41'	T = 26.74'
R = 50.00'	R = 50.00'
DS= N/A	DS= N/A

-DW2-

PI Sta 10+97.45	PI Sta 10+45.99
Δ = 59° 48' 23.1" (LT)	Δ = 57° 20' 20.4" (RT)
D = 114° 35' 29.6"	D = 114° 35' 29.6"
L = 52.19'	L = 50.04'
T = 28.76'	T = 27.34'
R = 50.00'	R = 50.00'
DS= N/A	DS= N/A

BM# 1 ELEV. 31.22'
N 262,720.1421 E 2,218,967.4783
R/R SPIKE SET IN 18" PINE
-BL- STA 6+18.43 320' LT

NOTE: BENCH MARK #1 IS LOCATED OUTSIDE OF THE PROJECT LIMITS.

-L-

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= HISTORICAL	
DESIGN FREQUENCY	= N/A	YRS
DESIGN HW ELEVATION	= 25.4	FT
BASE DISCHARGE	= N/A	CFS
BASE FREQUENCY	= N/A	YRS
BASE HW ELEVATION	= N/A	FT
OVERTOPPING DISCHARGE	= + 1,200	CFS
OVERTOPPING FREQUENCY	= + 500	YRS
OVERTOPPING ELEVATION	= 27	FT

BM# 2 ELEV. 26.46'
N 263,945.8062 E 2,218,726.1657
R/R SPIKE SET IN 12" PINE
-BL- STA 18+04.38 368.68 LT
-L- STA 14+32.25 348.25 LT
-DET- STA 19+03.96 268.36 LT

BEGIN TIP PROJECT B-4029
-L- Sta. 6+56.38
BEGIN OVERLAY

END OVERLAY
BEGIN GRADE
-L- Sta. 11+00.00
ELEV. = 26.35'

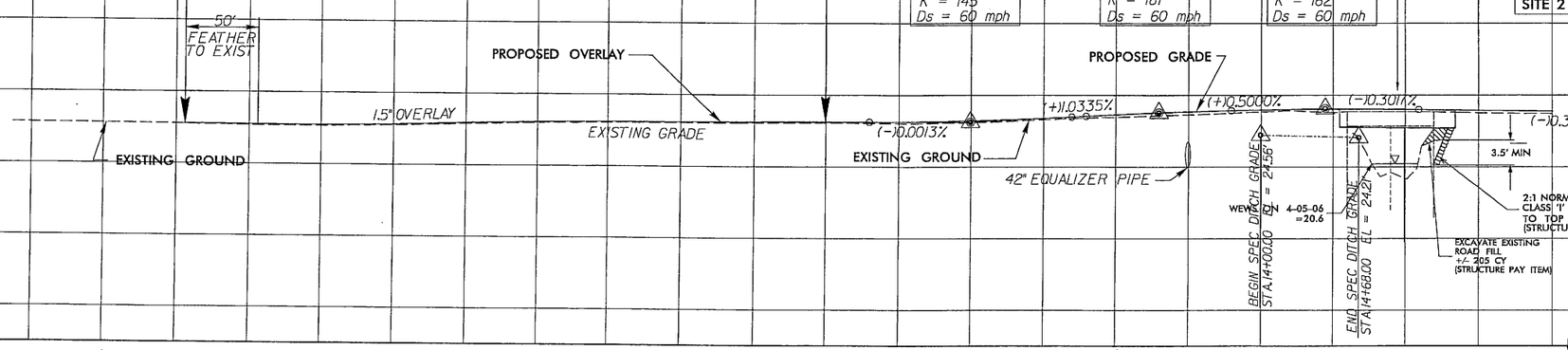
CL STA 14+95.0
80' OAL 21" CORED SLAB
1@45', 1@35'
GP= 26.1

SITE 2

PI = 12+00.00
EL = 26.35'
VC = 150'
K = 145
Ds = 60 mph

PI = 13+30.00
EL = 27.70'
VC = 100'
K = 187
Ds = 60 mph

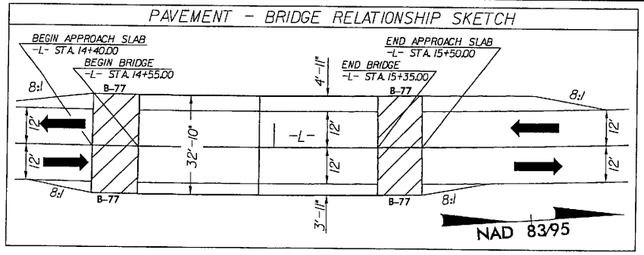
PI = 14+45.00
EL = 28.27'
VC = 130'
K = 162
Ds = 60 mph



Permit Drawing
Sheet 5 of 10

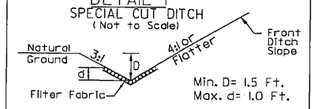
8/17/99

PAVEMENT - BRIDGE RELATIONSHIP SKETCH



PI Sta 15+21.02
Δ = 5° 46' 06.9" (LT)
D = 1° 13' 41.7"
L = 469.66'
T = 235.03'
R = 4,664.88'
DS = 60 MPH
e(max) = .03

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)

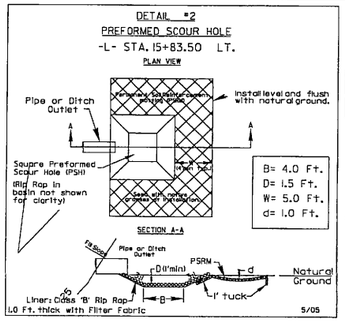


Type of Liner= Class 'B' Rip-Rap

FROM STA. 14+00.00 TO STA. 14+68.00 -L- LT.

(2) SQUIRES, ETHEL M.

DETAIL #2
PREFORMED SCOUR HOLE
-L- STA. 15+83.50 LT.



BM# 2

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
B-4029	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

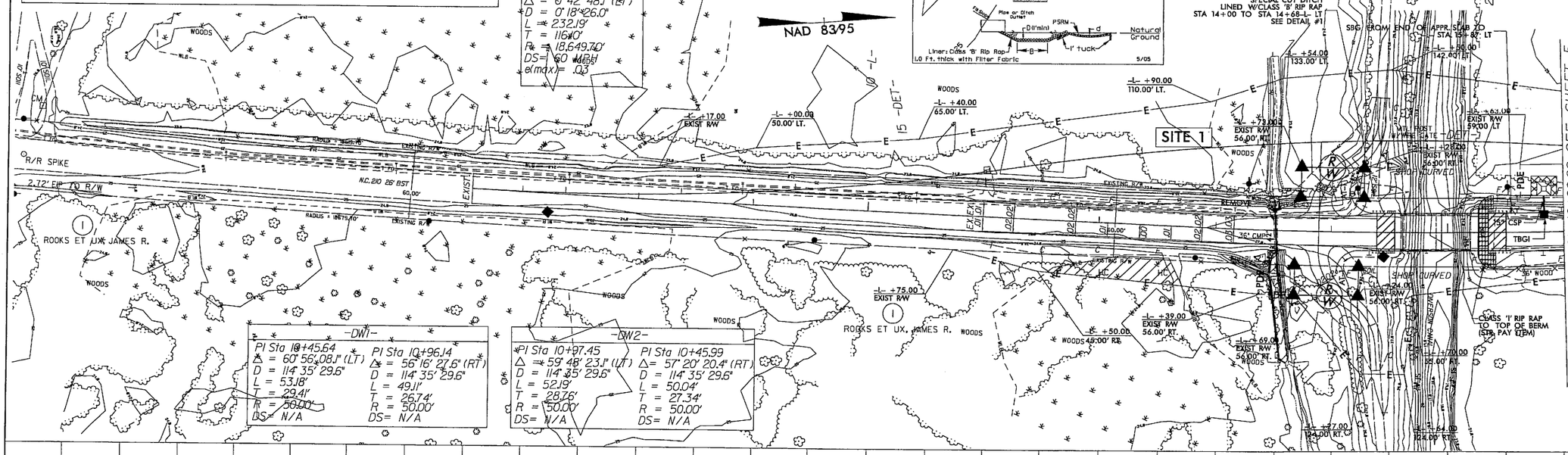
HC HC DENOTES HAND CLEARING

SPECIAL CUT DITCH LINED W/CLASS 'B' RIP RAP STA 14+00 TO STA 14+68 -L- LT SEE DETAIL #1

SBG FROM END OF APPR. SLAB TO STA. 15+87 LT

PI Sta 7+72.48
Δ = 0° 42' 48.1" (LT)
D = 0° 18' 26.0"
L = 232.19'
T = 116.10'
R = 18,649.70'
DS = 60 MPH
e(max) = .03

NAD 83/95



-DW1-

PI Sta 10+45.64
Δ = 60° 56' 08.1" (LT)
D = 114° 35' 29.6"
L = 53.18'
T = 29.41'
R = 50.00'
DS = N/A

PI Sta 10+96.14
Δ = 56° 16' 27.6" (RT)
D = 114° 35' 29.6"
L = 49.11'
T = 26.74'
R = 50.00'
DS = N/A

-DW2-

PI Sta 10+97.45
Δ = 59° 48' 23.1" (LT)
D = 114° 35' 29.6"
L = 52.19'
T = 28.76'
R = 50.00'
DS = N/A

PI Sta 10+45.99
Δ = 57° 20' 20.4" (RT)
D = 114° 35' 29.6"
L = 50.04'
T = 27.34'
R = 50.00'
DS = N/A

BM# 1 ELEV. 31.22'
N 262,720.1421 E 2,218,967.4783
R/R SPIKE SET IN 18" PINE
-BL- STA 6+18.43 320' LT

NOTE: BENCH MARK #1 IS LOCATED OUTSIDE OF THE PROJECT LIMITS.

-L-

BEGIN TIP PROJECT B-4029
-L- Sta. 6+56.38
BEGIN OVERLAY

END OVERLAY
BEGIN GRADE
-L- Sta. 11+00.00
ELEV. = 26.35'

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= HISTORICAL	
DESIGN FREQUENCY	= N/A	YRS
DESIGN HW ELEVATION	= 25.4	FT
BASE DISCHARGE	= N/A	CFS
BASE FREQUENCY	= N/A	YRS
BASE HW ELEVATION	= N/A	FT
OVERTOPPING DISCHARGE	= + 1,200	CFS
OVERTOPPING FREQUENCY	= + 500	YRS
OVERTOPPING ELEVATION	= 27	FT

BM# 2 ELEV. 26.46'
N 263,945.8062 E 2,218,726.1657
R/R SPIKE SET IN 12" PINE
-BL- STA 18+04.38 368.68 LT
-L- STA 14+32.25 348.25 LT
-DET- STA 19+03.96 268.36 LT

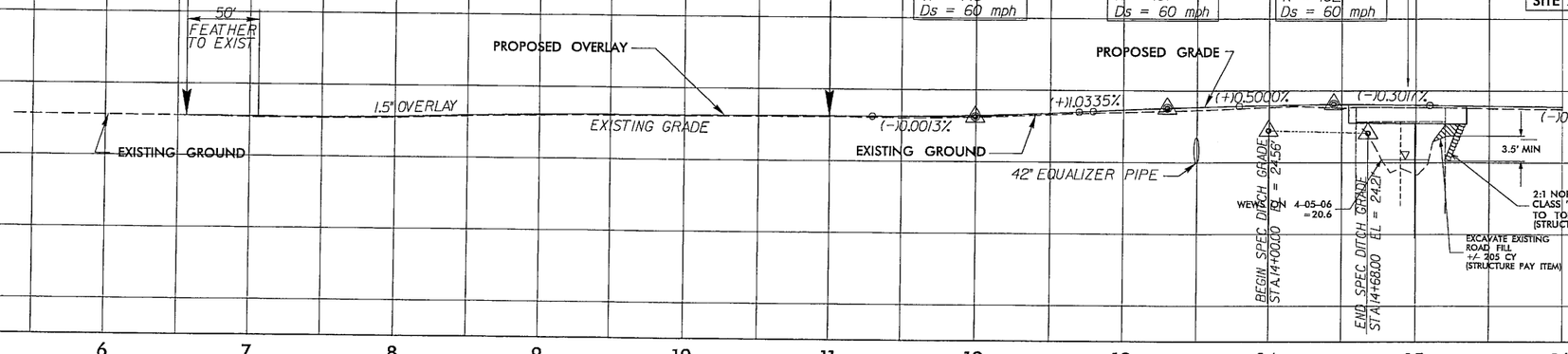
CL STA 14+95.0
80' OAL 21" CORED SLAB
1@45', 1@35'
GP = 28.1

SITE 2

PI = 12+00.00
EL = 26.35'
VC = 150'
K = 145
Ds = 60 mph

PI = 13+30.00
EL = 27.70'
VC = 100'
K = 187
Ds = 60 mph

PI = 14+45.00
EL = 28.27'
VC = 130'
K = 162
Ds = 60 mph



Permit Drawing
Sheet 6 of 10

8/17/99

ENGLISH

NAD 83/95

SEE SHEETS 4-5 FOR -L- ALIGNMENT AND PROFILE

PROJECT REFERENCE NO.	SHEET NO.
B-4029	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES TEMPORARY FILL IN WETLAND

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-DET-
PI Sta 19+26.88
Δ = 16° 49' 21.8" (RT)
D = 2° 30' 07.2"
L = 672.37'
T = 338.62'
R = 2,290.00'
DS= 50 MPH
e(max)= .03

-DET-
PI Sta 13+54.47
Δ = 11° 44' 24.2" (LT)
D = 2° 30' 07.2"
L = 469.23'
T = 235.44'
R = 2,290.00'
DS= 50 MPH
e(max)= .03

BM# 2

SITE 3

SITE 2

(2) SQUIRES, ETHEL M.

(1) ROOKS ET UX, JAMES R.

(1) ROOKS ET UX JAMES R.

WOODS

R/R SPIKE

2.72' EIP TO R/W

N.C.210 26' BST

60.00'

EXISTING R/W

C
N 6° 52' 21.0" E

-DWI DET-
PI Sta 10+45.63
Δ = 60° 56' 08.1" (LT)
D = 114° 35' 29.6"
L = 53.18'
T = 29.41'
R = 50.00'

PI Sta 10+96.14
Δ = 56° 16' 27.6" (RT)
D = 114° 35' 29.6"
L = 49.11'
T = 26.74'
R = 50.00'

HEADWALL

2@72" CSP
SKEW=90°
CL STA 19+60-DET-

TEMP 42" CSP

W/WIRE FENCE

GRADE TO DRAIN

INV=21.43

36" CMP

INV=21.32'

RIP RAP

MATCHLINE -DET- STA.20+00.00 SEE SHEET 2C -DET-

CULVERT HYDRAULIC DATA
2 @ 72" CSP

DESIGN DISCHARGE	= 220	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 22.2	FT
BASE DISCHARGE	= N/A	CFS
BASE FREQUENCY	= N/A	YRS
BASE HW ELEVATION	= N/A	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= N/A	YRS
OVERTOPPING ELEVATION	= N/A	FT

BM# 2 ELEV. 26.46'
N 263,945.8062 E 2,218,726.1657
R/R SPIKE SET IN 12" PINE
-BL- STA 18+04.38 368.68 LT
-L- STA 14+32.25 348.25 LT
-DET- STA 19+03.96 268.36 LT

BM# 1 ELEV. 31.22'
N 262,720.1421 E 2,218,967.4783
R/R SPIKE SET IN 18" PINE
-BL- STA 6+18.43 320' LT

NOTE: BENCH MARK #1 IS LOCATED OUTSIDE OF THE PROJECT LIMITS.

-DET-

BEGIN GRADE
-DET- Sta.13+74.34 =
-L- Sta.9+11.33
ELEV. = 26.06

PI = 16+00.00
EL = 25.67'
VC = 200'
K = 407
Ds = 50mph

PROPOSED GRADE
EXISTING GRADE
EXISTING GROUND
(-)0.7179%
(+)0.3200%

SITE 3
TEMP FILL IN WETLAND
PROPOSED GRADE
TEMP IMPACT IN SURFACE WATER
42" EQUALIZER PIPE
TEMP 42" CSP
18+15.86-DET-
INV IN=20.38
2 @ 72" CSP
CL EL=17.4
STA 19+60-DET-
SITE 4
TEMP IMPACT IN SURFACE WATER

-DWI DET-

BEGIN -DWI DET- GRADE
-DWI DET- 9+32.99
ELEV. = 26.16'

PI = 9+48.67
EL = 25.69'
VC = 30

PI = 10+96.33
EL = 29.25'
VC = 60

PI = 10+38.26
EL = 26.71'
VC = 50

END -DWI DET- GRADE
-DWI DET- 11+39.56
ELEV. = 28.32'

(+)4.1617%
(-)5.0000%
(+)4.3778%
(-)2.1604%
(-)2.5121%
EXIST. EOP
EXIST. EOP

Permit Drawing
Sheet 7 of 10

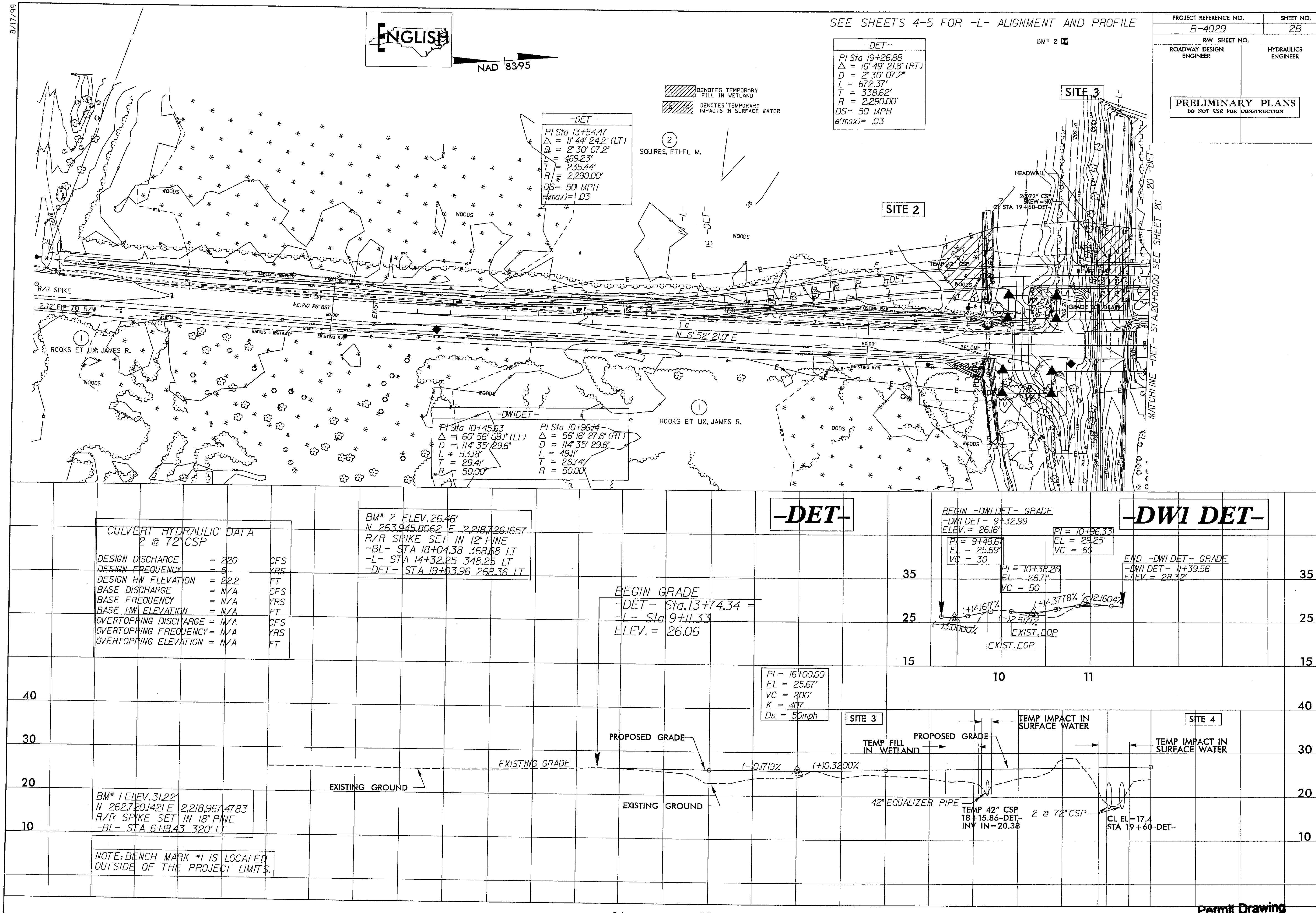
PROJECT REFERENCE NO.	SHEET NO.
B-4029	2B

RW SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99



ENGLISH
NAD 83/95
SEE SHEETS 4-5 FOR -L- ALIGNMENT AND PROFILE
BM# 2
DENOTES TEMPORARY FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
-DET-
PI Sta 19+26.88
Δ = 16° 49' 21.8" (RT)
D = 2° 30' 07.2"
L = 672.37'
T = 338.62'
R = 2,290.00'
DS= 50 MPH
e(max)= .03
-DET-
PI Sta 13+54.47
Δ = 11° 44' 24.2" (LT)
D = 2° 30' 07.2"
L = 469.23'
T = 235.44'
R = 2,290.00'
DS= 50 MPH
e(max)=1.03
SQUIRES, ETHEL M.
SITE 2
SITE 3
HEADWALL
2 @ 72" CSP SKEW = 90°
CL STA 19+60-DET-
WOODS
R/R SPIKE
2.72' EIP TO R/W
ROOKS ET UX, JAMES R.
N 6° 52' 21.0" E
TEMP 42" CSP
36" CMP
GRADE TO DRAIN
MATCHLINE -DET- STA 20+00.00 SEE SHEET 2C
-DW1DET-
PI Sta 10+45.63
Δ = 60° 56' 08.1" (LT)
D = 114° 35' 29.6"
L = 53.18'
T = 29.41'
R = 50.00'
PI Sta 10+96.14
Δ = 56° 16' 27.6" (RT)
D = 114° 35' 29.6"
L = 49.11'
T = 26.74'
R = 50.00'
-DET-
-DW1 DET-
BM# 2 ELEV. 26.46'
N 263,945.8062 E 2,218,726.1657
R/R SPIKE SET IN 12" PINE
-BL- STA 18+04.38 368.68 LT
-L- STA 14+32.25 348.25 LT
-DET- STA 19+03.96 268.36 LT
BEGIN GRADE
-DET- Sta.13+74.34 =
-L- Sta 9+11.33
ELEV. = 26.06
BEGIN -DW1 DET- GRADE
-DW1 DET- 9+32.99
ELEV. = 26.16'
PI = 9+48.67
EL = 25.69'
VC = 30
PI = 10+38.26
EL = 26.71'
VC = 50
PI = 10+96.33
EL = 29.25'
VC = 60
END -DW1 DET- GRADE
-DW1 DET- 11+39.56
ELEV. = 28.32'
(+)4.1617%
(-)3.0000%
(-)2.5171%
(+)4.3778%
(-)2.1604%
EXIST. EOP
PI = 16+00.00
EL = 25.67'
VC = 200'
K = 407
Ds = 50mph
SITE 3
SITE 4
TEMP FILL IN WETLAND
PROPOSED GRADE
TEMP IMPACT IN SURFACE WATER
EXISTING GRADE
EXISTING GROUND
(-)0.1719%
(+)0.3200%
42" EQUALIZER PIPE
TEMP 42" CSP 18+15.86-DET- INV IN=20.38
2 @ 72" CSP
CL EL=17.4 STA 19+60-DET-
BM# 1 ELEV. 31.22'
N 262,720.1421 E 2,218,967.4783
R/R SPIKE SET IN 18" PINE
-BL- STA 6+18.43 320' LT
NOTE: BENCH MARK #1 IS LOCATED OUTSIDE OF THE PROJECT LIMITS.
14
15
16
17
18
19
20

CULVERT HYDRAULIC DATA
2 @ 72" CSP

DESIGN DISCHARGE	= 220	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 22.2	FT
BASE DISCHARGE	= N/A	CFS
BASE FREQUENCY	= N/A	YRS
BASE HW ELEVATION	= N/A	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= N/A	YRS
OVERTOPPING ELEVATION	= N/A	FT

Permit Drawing
Sheet 8 of 10

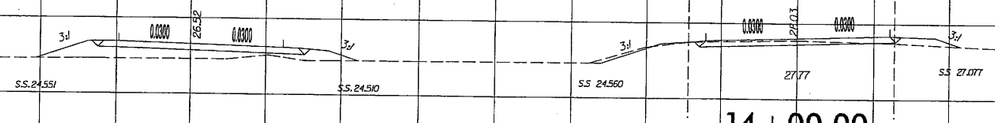
8/23/99

PROJ. REFERENCE NO. B-4029 | SHEET NO. X-6

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 2

–DET– 18+65.49
78.64' LT



14+00.00

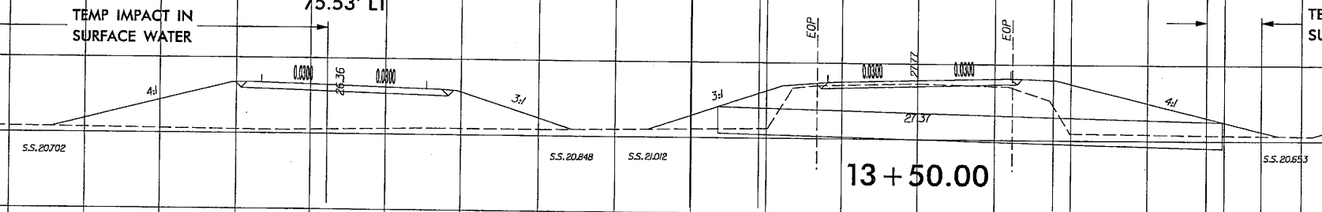
SITE 1

IMPACT IN SURFACE WATER

IMPACTS IN SURFACE WATER

–DET– 18+15.86
75.53' LT

TEMP IMPACT IN SURFACE WATER



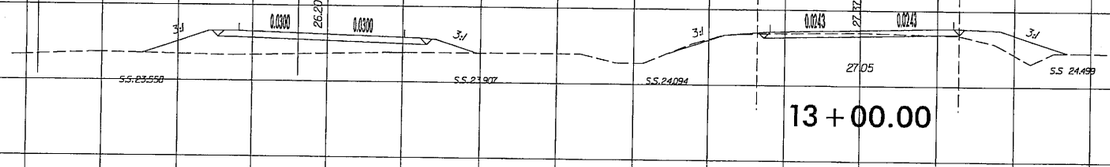
13+50.00

TEMP IMPACT IN SURFACE WATER

SITE 2

–DET– 17+66.06
70.80' LT

TEMP FILL IN WETLAND



13+00.00

Permit Drawing Sheet 9 of 10

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

8/23/99

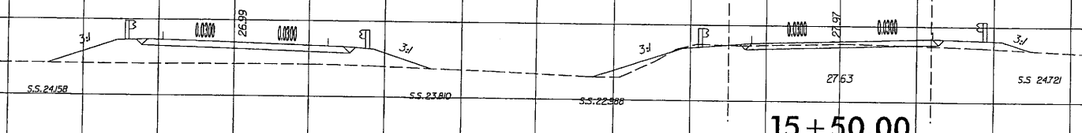
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4029	X-7

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 3

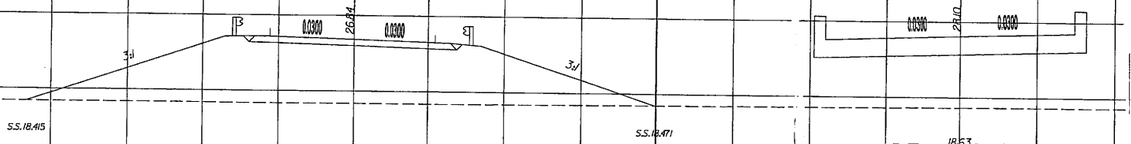
TEMP IMPACT IN SURFACE WATER

–DET– 20+14.05
78.41' LT



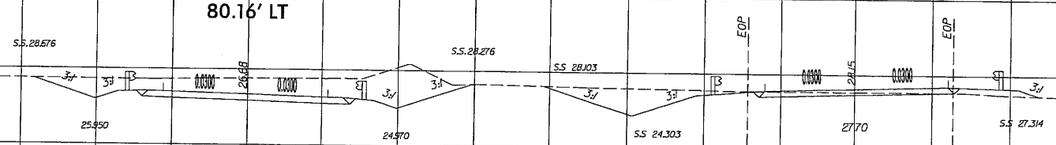
15+50.00

–DET– 19+64.51
80.08' LT



15+00.00

–DET– 19+15.02
80.16' LT



14+50.00

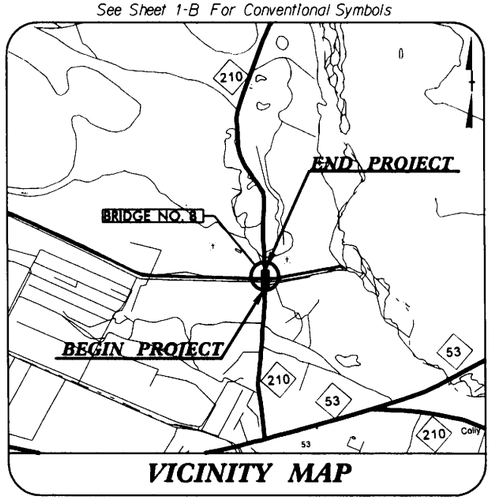
Permit Drawing
Sheet 10 of 10

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

05/08/56

TIP PROJECT: B-4029

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



VICINITY MAP

(THIS PROJECT IS NOT INCLUDED WITHIN ANY MUNICIPAL BOUNDARIES)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BLADEN COUNTY

LOCATION: BRIDGE NO. 8 OVER DIVERSON CANAL ON NC 210

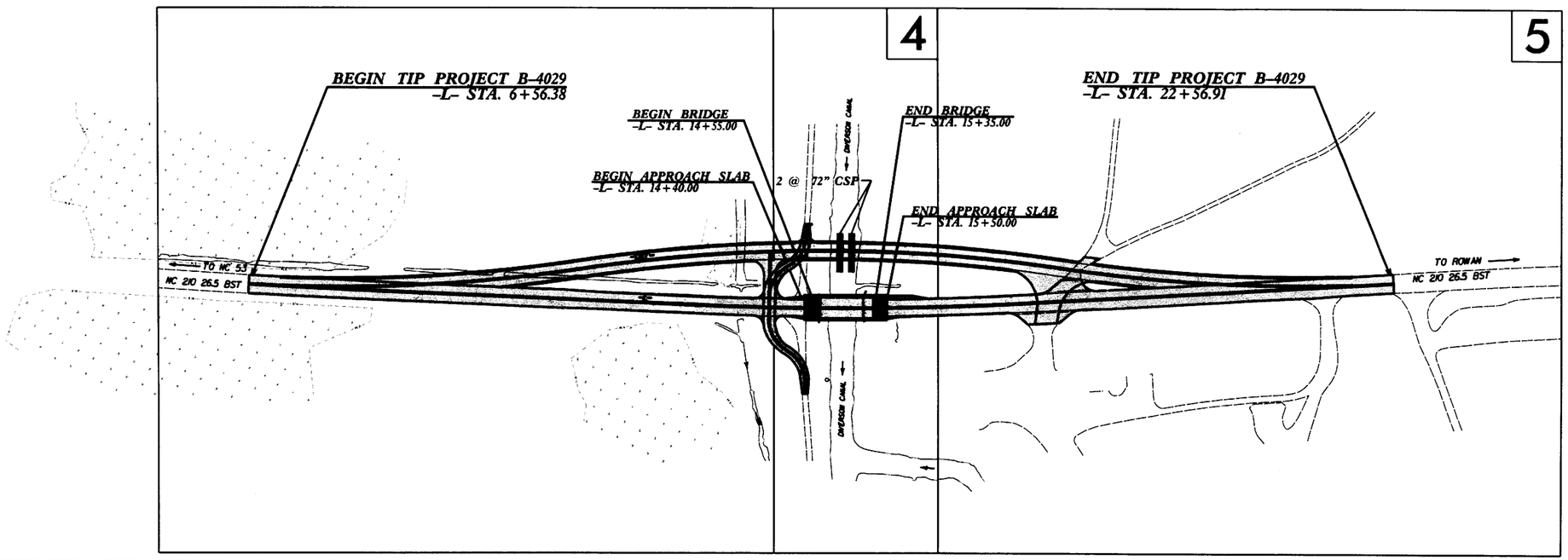
TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4029	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33396.1.1	BRSTP-210 (6)	PE
33396.2.1	BRSTP-210 (6)	R/W & UTIL.

R/W PLANS

NAD 83/95



NCDOT CONTACT : CATHY HOUSER, P.E.
ROADWAY DESIGN-ENGINEERING COORDINATION

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2008 = 1083
ADT 2028 = 1691
DHV = 10 %
D = 60%
T = 20% *
V = 60 MPH
* TTST 15% DUAL 5%
FUNC. CLASS = RURAL MAJOR COLLECTOR

PROJECT LENGTH

Length Roadway TIP Project B-4029 = 0.288 Miles
Length Structure TIP Project B-4029 = 0.015 Miles
Total Length TIP Project B-4029 = 0.303 Miles

Prepared in the Office of:
THE LPA GROUP TRANSPORTATION CONSULTANTS
THE LPA GROUP of North Carolina, p.a.
5000 Falls of Neuse Rd., Suite 304
Raleigh, North Carolina 27609

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 21, 2007

LETTING DATE: SEPTEMBER 16, 2008

JEANNE K. RICHTER, P.E.
PROJECT ENGINEER

JODY L. COLE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

20-NOV-2007 10:48
I:\Projects\NCDOT\Bridge Group 46 FinalDesign\B4029\Roadway\Proj\b4029_rdy_tsh.dgn
jlcole
LPA20625

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4029	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — CP
- Property Corner
- Property Monument — CM
- Parcel/Sequence Number — 23
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4029	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4029

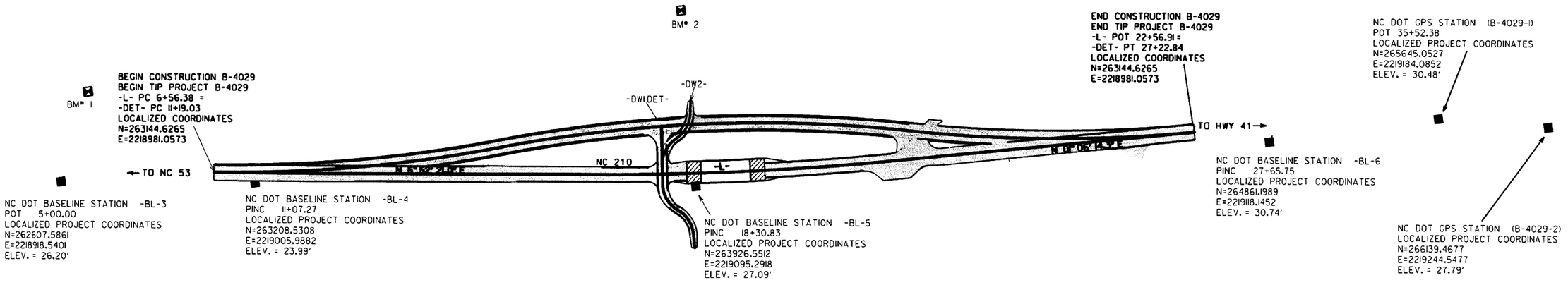
NC GRID NAD 83/95

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
3	BL-3	262607.5861	2218918.5401	26.20	OUTSIDE PROJECT LIMITS	
4	BL-4	263208.5308	2219005.9882	23.99	7+22.96	16.40 RT
5	BL-5	263926.5512	2219095.2918	27.09	14+45.67	21.15 RT
6	BL-6	264861.1989	2219118.1452	30.74	OUTSIDE PROJECT LIMITS	
1	GPS B-4029-1	265645.0527	2219184.0852	30.48	OUTSIDE PROJECT LIMITS	

BM1 ELEVATION = 31.22
N 262771 E 2218619
L STATION 6+56
S 44° 03' 34.3" W DIST 520.20
R/R SPIKE SET IN 18 INCH PINE

BM2 ELEVATION = 26.46
N 263946 E 2218726
L STATION 14+32 348 LEFT
R/R SPIKE SET IN 12 INCH PINE



DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "78 MEA"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF
NORTHING: 284257.4794(ft) EASTING: 2249859.4242(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99993925
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "78 MEA" TO -L- STATION 6+56.38 IS 37,406.23' BEARING S 55°38'17" W
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

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

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B4029_LS_CONTROL_060912.TXT

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

INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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P:\Projects\NCDOT_Bridge Group 46 Final Design\B4029\Roadway\Proj\b4029_ls_1c.dgn

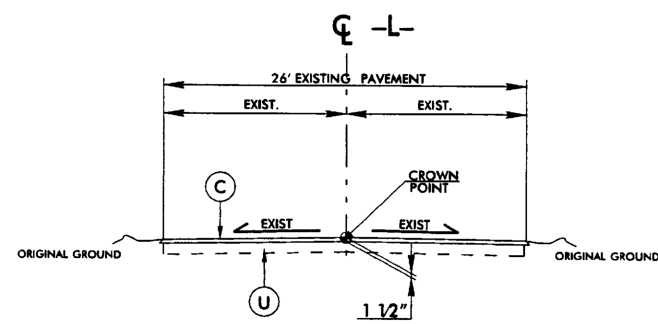
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4029	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

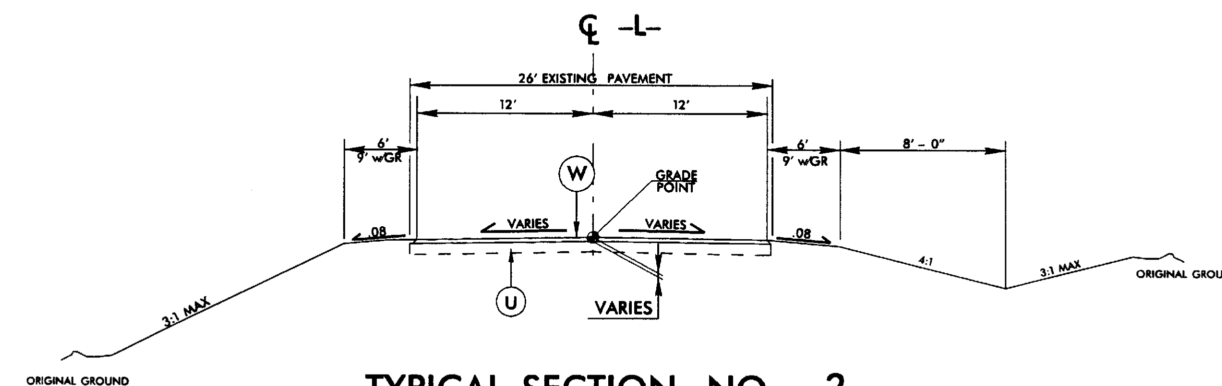
A	5" PORTLAND CEMENT CONCRETE PAVEMENT.	D1	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
C	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.	T	EARTH MATERIAL.
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. IN ONE LAYER.	E1	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.	U	EXISTING PAVEMENT.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	J	PROP. 8" AGGREGATE BASE COURSE.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL BELOW)
D	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	J1	PROP. 6" AGGREGATE BASE COURSE		

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



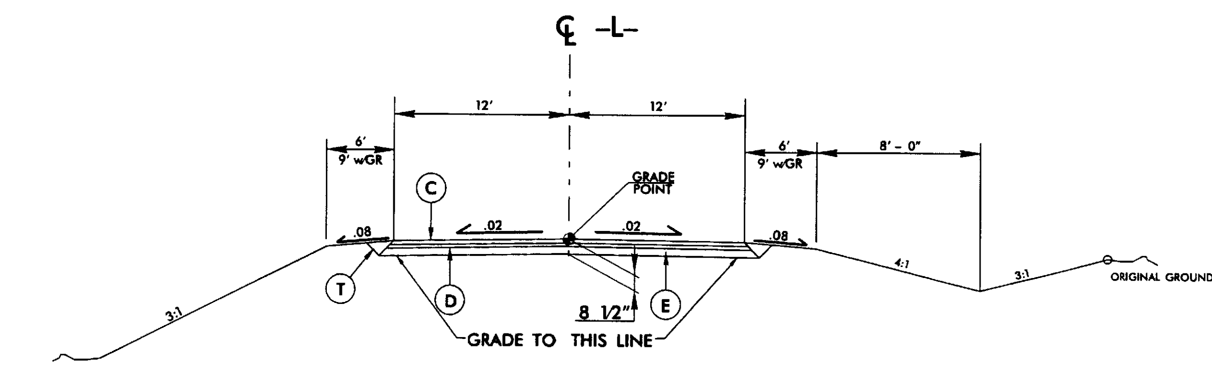
TYPICAL SECTION NO. 1

** -L- STA. 6+56.38 TO STA. 11+00.00
** -L- STA. 18+80.00 TO STA. 22+56.91
** OVERLAY EXISTING PAVEMENT ONLY



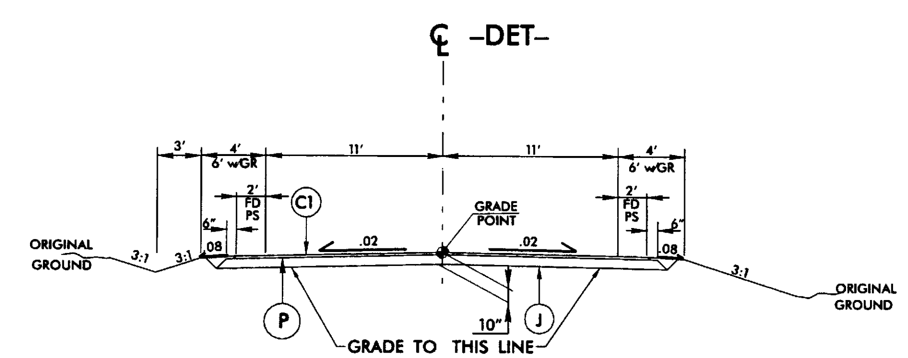
TYPICAL SECTION NO. 2

* -L- STA. 11+00.00 TO STA. 13+00.00
* -L- STA. 16+60.00 TO STA. 18+80.00
* RESURFACING ONLY



TYPICAL SECTION NO. 3

-L- STA. 13+00.00 TO STA. 14+55.00 (BEGIN BRIDGE)
-L- STA. 15+35.00 (END BRIDGE) TO STA. 16+60.00



TYPICAL SECTION NO. 4

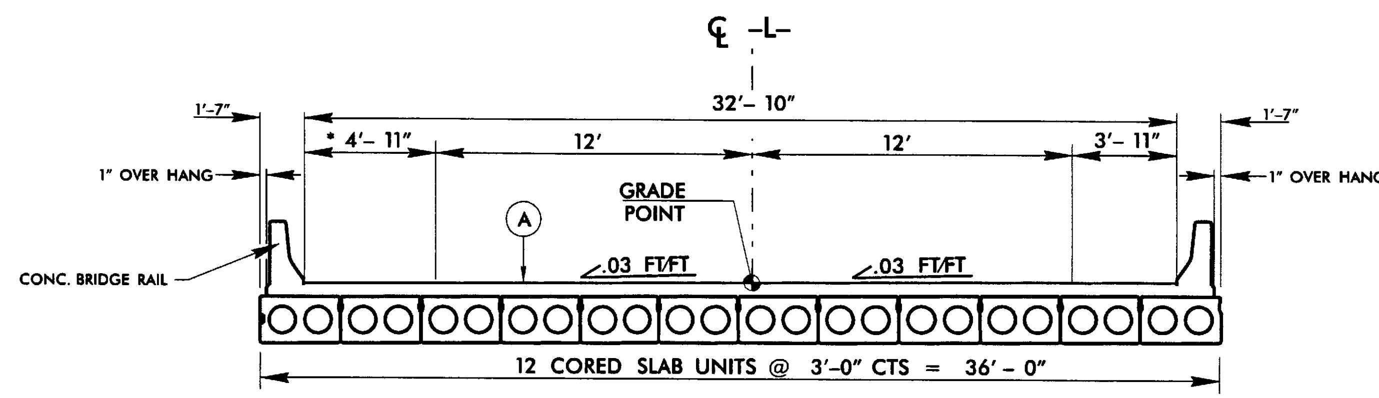
-DET- STA. 13+74.34 TO STA. 24+81.71

PROJECT REFERENCE NO.	SHEET NO.
B-4029	2A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

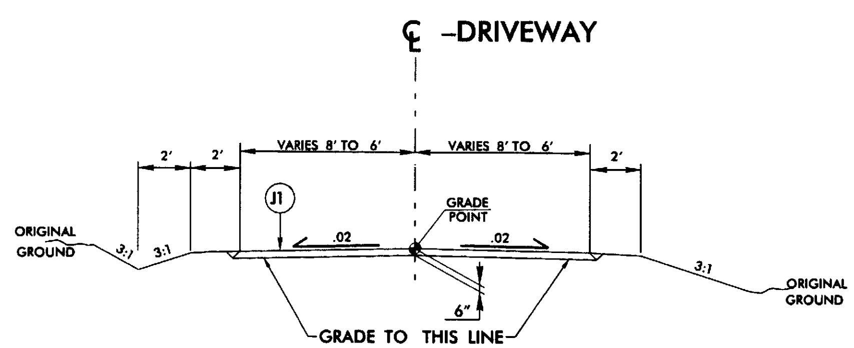
A	5" PORTLAND CEMENT CONCRETE PAVEMENT.	D1	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
C	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.	T	EARTH MATERIAL.
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. IN ONE LAYER.	E1	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.	U	EXISTING PAVEMENT.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	J	PROP. 8" AGGREGATE BASE COURSE.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL BELOW)
D	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	J1	PROP. 6" AGGREGATE BASE COURSE		

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



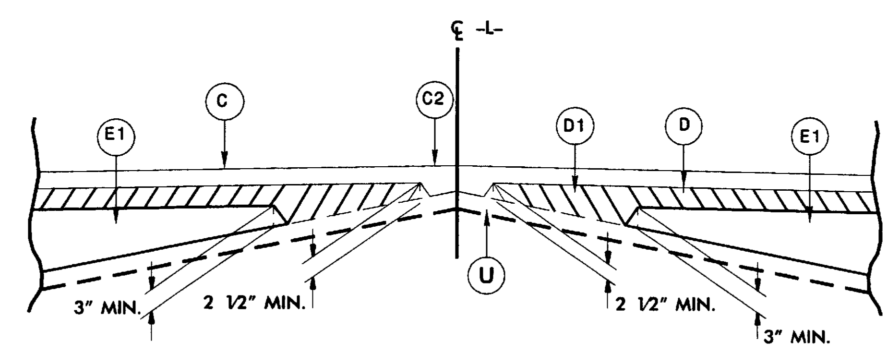
TYPICAL BRIDGE SECTION NO.5

-L- STA. 14+55.00 (BEGIN BRIDGE) TO STA. 15+35.00 (END BRIDGE)
* WIDENED SHOULDER DUE TO HYDRAULIC SPREAD



TYPICAL SECTION NO. 6

-DWIDET- STA. 9+32.97 TO STA. 11+39.56
-DW1- STA. 10+12.61 TO STA. 11+39.55
-DW2- STA. 10+00.00 TO STA. 11+23.93



Detail Showing Method of Wedging

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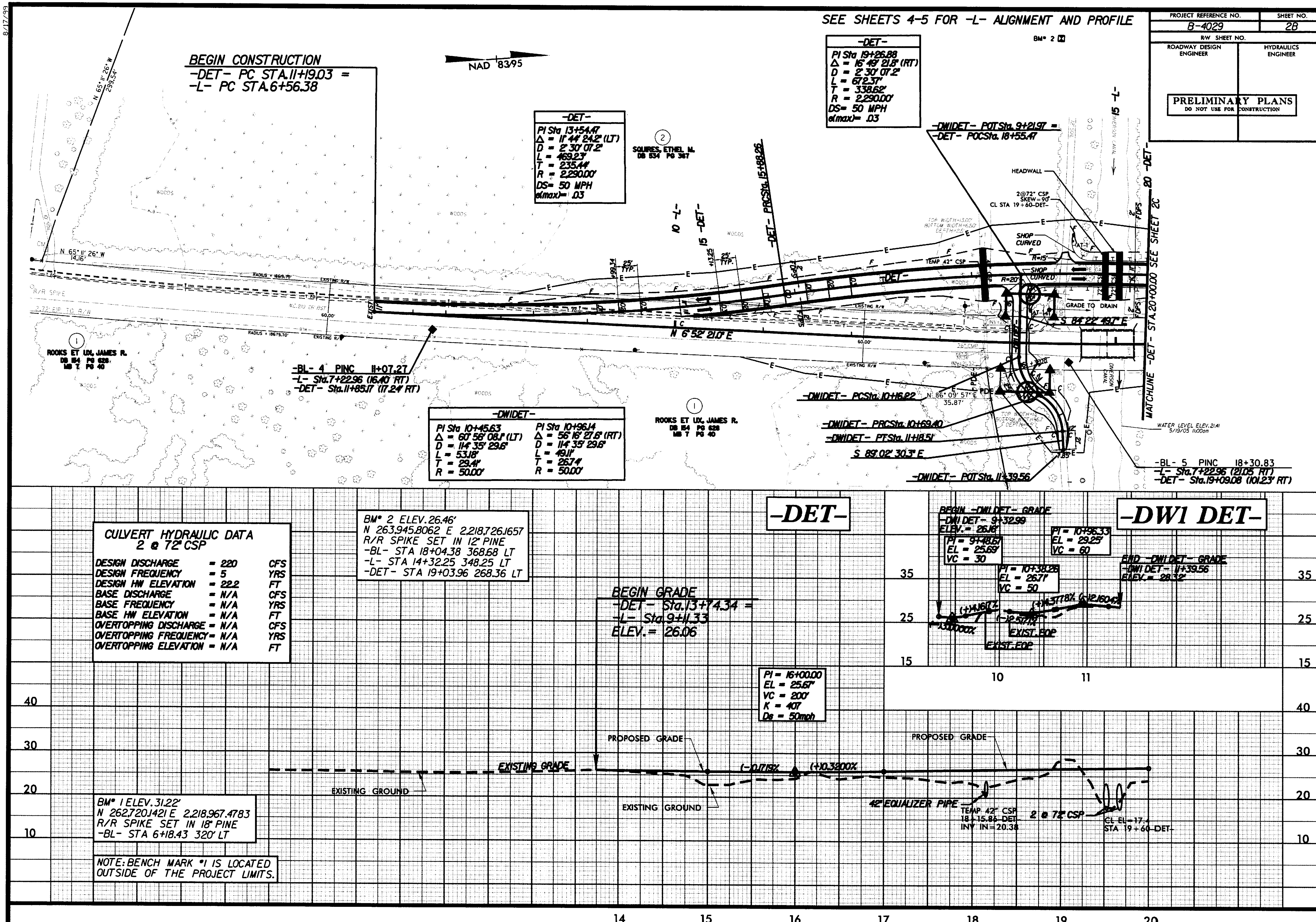

8/17/99
PROJECT REFERENCE NO.
B-4029
SHEET NO.
2B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SEE SHEETS 4-5 FOR -L- ALIGNMENT AND PROFILE
BM# 2
NAD 83/95
BEGIN CONSTRUCTION
-DET- PC STA.11+19.03 =
-L- PC STA.6+56.38
N 65°11' 26" W 299.54'
N 65°11' 26" W 14.16'
-DET-
PI Sta 13+54.47
Δ = 11° 44' 24.2" (LT)
D = 2° 30' 07.2"
L = 469.23'
T = 235.44'
R = 2,290.00'
DS= 50 MPH
e(max)= .03
-DET-
PI Sta 19+26.88
Δ = 16° 49' 21.8" (RT)
D = 2° 30' 07.2"
L = 672.37'
T = 338.62'
R = 2,290.00'
DS= 50 MPH
e(max)= .03
SQUIRES, ETHEL M.
DB 534 PG 367
ROOKS ET UX, JAMES R.
DB 154 PG 628
MB T PG 40
-DET- PRCSta. 15+88.26
-DWIDET- POTSta. 9+21.97 =
-DET- POCSta. 18+55.47
HEADWALL
2@72" CSP SKEW=90°
CL STA 19+60-DET-
TEMP 42" CSP
SHOP CURVED
GRADE TO DRAIN
S 84°22' 49.7" E
N 6°52' 21.0" E
N 86°09' 57" E 35.87'
-BL- 4 PINC 11+07.27
-L- Sta.7+22.96 (16.40' RT)
-DET- Sta.11+85.17 (17.24' RT)
-DWIDET-
PI Sta 10+45.63
Δ = 60° 56' 08.1" (LT)
D = 114° 35' 29.6"
L = 53.18'
T = 29.41'
R = 50.00'
PI Sta 10+96.14
Δ = 56° 16' 27.6" (RT)
D = 114° 35' 29.6"
L = 49.11'
T = 26.74'
R = 50.00'
-DWIDET- PCSta. 10+16.22
-DWIDET- PRCSta. 10+69.40
-DWIDET- PTSta. 11+18.51
S 89°02' 30.3" E
-DWIDET- POTSta. 11+39.56
-BL- 5 PINC 18+30.83
-L- Sta.7+22.96 (21.05' RT)
-DET- Sta.19+09.08 (101.23' RT)
WATER LEVEL ELEV. 21.41 5/19/05 11:00am
MATCHLINE -DET- STA.20+00.00 SEE SHEET 2C
-DET-
-DW1 DET-
CULVERT HYDRAULIC DATA
2 @ 72" CSP
DESIGN DISCHARGE = 220 CFS
DESIGN FREQUENCY = 5 YRS
DESIGN HW ELEVATION = 22.2 FT
BASE DISCHARGE = N/A CFS
BASE FREQUENCY = N/A YRS
BASE HW ELEVATION = N/A FT
OVERTOPPING DISCHARGE = N/A CFS
OVERTOPPING FREQUENCY = N/A YRS
OVERTOPPING ELEVATION = N/A FT
BM# 2 ELEV. 26.46'
N 263,945.8062 E 2,218,726.1657
R/R SPIKE SET IN 12" PINE
-BL- STA 18+04.38 368.68 LT
-L- STA 14+32.25 348.25 LT
-DET- STA 19+03.96 268.36 LT
BEGIN GRADE
-DET- Sta.13+74.34 =
-L- Sta.9+11.33
ELEV.= 26.06
BEGIN -DW1 DET- GRADE
-DW1 DET- 9+32.99
ELEV.= 26.16'
PI = 9+48.67
EL = 25.69'
VC = 30
PI = 10+38.26
EL = 26.77'
VC = 50
PI = 10+96.33
EL = 29.25'
VC = 60
END -DW1 DET- GRADE
-DW1 DET- 11+39.56
ELEV.= 28.32'
EXIST. EOP
PI = 16+00.00
EL = 25.67'
VC = 200'
K = 407
Ds = 50mph
PROPOSED GRADE
EXISTING GRADE
EXISTING GROUND
(-)0.1715%
(+)0.3200%
42" EQUALIZER PIPE
TEMP 42" CSP 18+15.86 DET INV IN=20.38
2 @ 72" CSP
CL EL=17.4 STA 19+60-DET-
BM# 1 ELEV. 31.22'
N 262,720.1421 E 2,218,967.4783
R/R SPIKE SET IN 18" PINE
-BL- STA 6+18.43 320' LT
NOTE: BENCH MARK #1 IS LOCATED OUTSIDE OF THE PROJECT LIMITS.
14
15
16
17
18
19
20

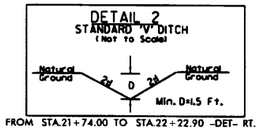
8/17/99

SEE SHEETS 4-5 FOR -L- ALIGNMENT AND PROFILE

PROJECT REFERENCE NO.	SHEET NO.
B-4029	2C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 2
STANDARD "V" DITCH
(Not To Scale)

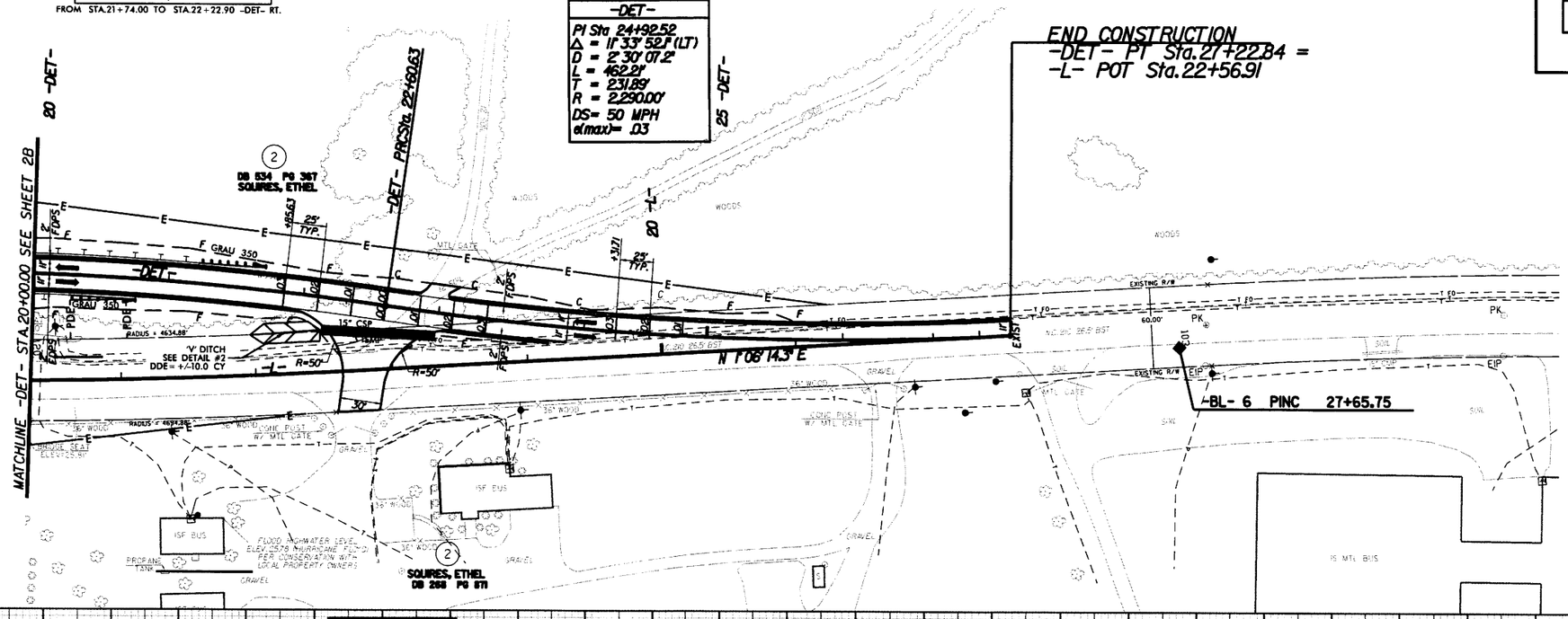


FROM STA.21+74.00 TO STA.22+22.90 -DET- RT.

NAD 83/95

-DET-
PI Sta 24+92.52
Δ = 11° 33' 52.8" (LT)
D = 2° 30' 07.2"
L = 462.21'
T = 231.89'
R = 2290.00'
DS= 50 MPH
e(max)= .03

END CONSTRUCTION
-DET- PT Sta. 27+22.84 =
-L- POT Sta. 22+56.91

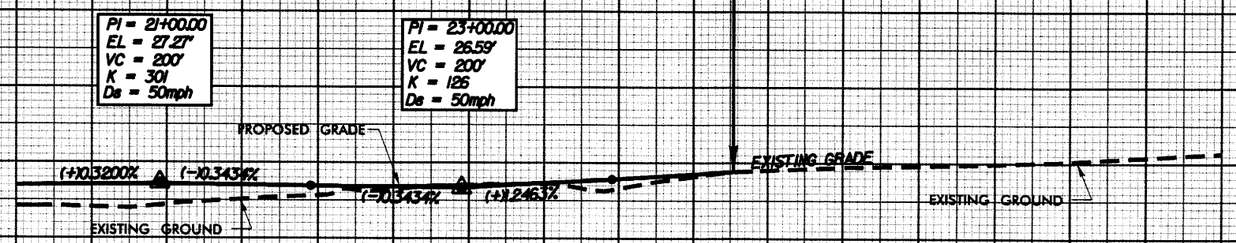


-DET-

END GRADE
-DET- Sta. 24+81.71 =
-L- Sta. 20+16.23
ELEV. = 28.85

PI = 21+00.00
EL = 27.27'
VC = 200'
K = 301
Ds = 50mph

PI = 23+00.00
EL = 26.59'
VC = 200'
K = 126
Ds = 50mph



5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4029	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

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COMPUTED BY: J.Cole DATE: 04/2007
CHECKED BY: P.Auclair DATE: 07/1507

PROJECT REFERENCE NO.	SHEET NO.
B-4029	3A

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + 25%	BORROW	WASTE
PHASE I					
–DET– 11+19.03 TO 27+22.84	516		3,149	2,633	
SUBTOTAL	516		3,149	2,633	
PHASE II					
–L– 11+00.00 TO					
14+55.00 (BEGIN BRIDGE)	178		519	341	
–L– 15+35.00 (END BRIDGE) TO					
18+80.00	82		182	100	
SUBTOTAL	260		701	441	
PHASE III (–L– /W–DET– REMOVAL)					
–L– 8+92.46 TO 20+99.37	2,434		569		1,865
SUBTOTAL	2,434		569		1,865
TOTALS	3,210		4,419	3,074	1,865
PROJECT TOTALS	3,210		4,419	3,074	1,865
EST. 5% FOR REPLACING					
TOPSOIL ON ON BORROW PIT				154	
GRAND TOTALS	3,210			3,228	
SAY	3,250			3,250	

EST. DDE = 10 C.Y.
EST. SELECT GRANULAR MATERIAL = 200 C.Y.
EST. UNDERCUT EXCAVATION = 1000 C.Y.

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

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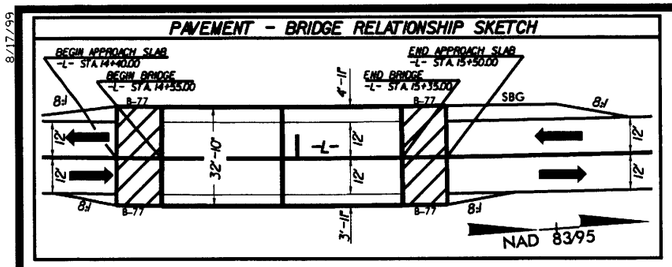
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-4029	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

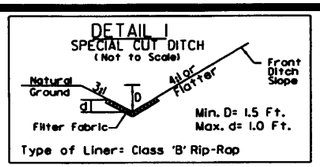
PAVEMENT - BRIDGE RELATIONSHIP SKETCH



-L-
PI Sta 15+21.02
Δ = 5°46'06.9" (LT)
D = 1°13'41.7"
L = 469.68'
T = 235.03'
R = 4,664.88'
DS = 60 MPH
e(max) = .03

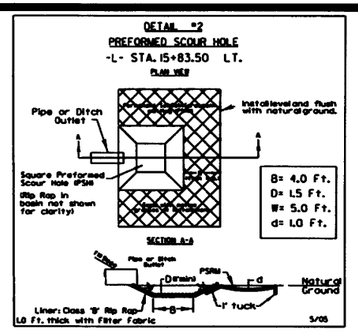
-L-
PI Sta 7+72.48
Δ = 0°42'48.1" (LT)
D = 0°18'26.0"
L = 232.19'
T = 116.10'
R = 18,649.70'
DS = 60 MPH
e(max) = .03

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap
FROM STA. 14+00.00 TO STA.14+68.00 -L- LT.

DETAIL #2
PREFORMED SCOUR HOLE
-L- STA. 15+83.50 LT.



BM# 2

(2) SQUIRES, ETHEL M.
DB 834 PG 387

NAD 83/95

BEGIN TIP PROJECT B-4029
-L- PC STA.6+56.38
BEGIN OVERLAY

-BL- 4 PINC 11+07.27
-L- Sta.7+22.96 (16.40' RT) =
-DET- Sta.11+85.17 (17.24' RT)

(1) ROOKS ET UX, JAMES R.
DB 154 PG 628
MB 7 PG 40

-L- PTSta. 8+88.57

END OVERLAY
BEGIN RESURFACING
-L- STA.11+00.00

END RESURFACING
-L- STA.13+00.00

-DW2- POTSta. 10+00.00
S 8° 54' 47.0" E
-DW2- PCSta. 10+18.65
-DW2- PRCSta. 10+68.69
-L- PCSta. 12+85.99
-DW2- PTSta. 11+20.88
S 84° 22' 49.8" E
-DET- 1
-L- 15 -DET- 20
SHOP CURVED
SPECIAL CUT DITCH LINED W/CLASS 'B' RIP RAP STA 14+00 TO STA. 14+68-L- LT SEE DETAIL #1
TOP WIDTH=13.00'
BOTTOM WIDTH=6.50'
DEPTH=2.5'
SBG FROM END OF APPR. SLAB TO -L- STA. 15+87 LT
MATCH LINE -L- Sta.16+00.00 SEE SHEET 5

-DW-1 POT Sta. 10+00.00 =
-DW2- POT Sta. 11+35.74=
-L- POC Sta. 13+89.27
-DW1- PCSta. 10+16.22
-DW1- PRCSta. 10+69.40
-DW1- PTSta. 11+18.51
S 89° 02' 30.7" E
-DW1- POTSta. 11+39.56

-BL- 5 PINC 18+30.83
-L- Sta.7+22.96 (21.05 RT)
-DET- Sta.19+09.08 (10.23 RT)

N 65° 11' 26" W 14.16'
N 6° 52' 21.0" E
N 86° 09' 37" E 35.87'
RADIUS = 18649.70'
RADIUS = 18679.70'
EXISTING R/W
EXIST 13
EXIST 15
60.00'
TBGI
CSP
SHOP CURVED
CLASS 'I' RIP RAP TO TOP OF BERM (STR. PAY ITEM)
REMOVE
R=15'
+00.00 50.00' LT.
+17.00 EXIST R/W
+40.00 65.00' LT.
+90.00 110.00' LT.
+54.00 133.00' LT.
+50.00 142.00' LT.
+73.00 EXIST R/W 56.00' RT.
+63.00 EXIST R/W 59.00' LT
+28.00 EXIST R/W 56.00' RT.
+75.00 EXIST R/W
+39.00 EXIST R/W 56.00' RT.
+24.00 EXIST R/W 56.00' RT.
+50.00 45.00' RT.
+69.00 EXIST R/W 56.00' RT.
+70.00 55.00' RT.
+64.00 124.00' RT.
+27.00 124.00' RT.
50' TYP.
50' TAPER
107.24' TYP.
7.85
WOODS
WOOD

-DW1-

PI Sta 10+45.64	PI Sta 10+96.14
Δ = 60°56'08.1" (LT)	Δ = 56°16'27.8" (RT)
D = 114°35'29.6"	D = 114°35'29.6"
L = 53.18'	L = 49.11'
T = 29.41'	T = 26.74'
R = 50.00'	R = 50.00'
DS = N/A	DS = N/A

-DW2-

PI Sta 10+97.45	PI Sta 10+45.99
Δ = 59°48'23.1" (LT)	Δ = 57°20'20.4" (RT)
D = 114°35'29.6"	D = 114°35'29.6"
L = 52.19'	L = 50.04'
T = 28.76'	T = 27.34'
R = 50.00'	R = 50.00'
DS = N/A	DS = N/A

SEE SHEETS 2B-2C FOR -DET- ALIGNMENT AND PROFILE
SEE SHEET 5 FOR DRIVEWAY PROFILES

BM# 1 ELEV. 31.22'
N 262,720.1421 E 2,218,967.4783
R/R SPIKE SET IN 18" PINE
-BL- STA 6+18.43 320' LT

NOTE: BENCH MARK #1 IS LOCATED OUTSIDE OF THE PROJECT LIMITS.

-L-

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= HISTORICAL	
DESIGN FREQUENCY	= N/A	YRS
DESIGN HW ELEVATION	= 25.4	FT
BASE DISCHARGE	= N/A	CFS
BASE FREQUENCY	= N/A	YRS
BASE HW ELEVATION	= N/A	FT
OVERTOPPING DISCHARGE	= + 1,200	CFS
OVERTOPPING FREQUENCY	= + 500	YRS
OVERTOPPING ELEVATION	= 27	FT

BM# 2 ELEV. 26.46'
N 263,945.8062 E 2,218,726.1657
R/R SPIKE SET IN 12" PINE
-BL- STA 18+04.38 368.68 LT
-L- STA 14+32.25 348.25 LT
-DET- STA 19+03.96 268.36 LT

BEGIN TIP PROJECT B-4029
-L- Sta.6+56.38
BEGIN OVERLAY

END OVERLAY
BEGIN GRADE
-L- Sta.11+00.00
ELEV. = 26.35'

PI = 12+00.00
EL = 26.35'
VC = 150'
K = 145
Ds = 60 mph

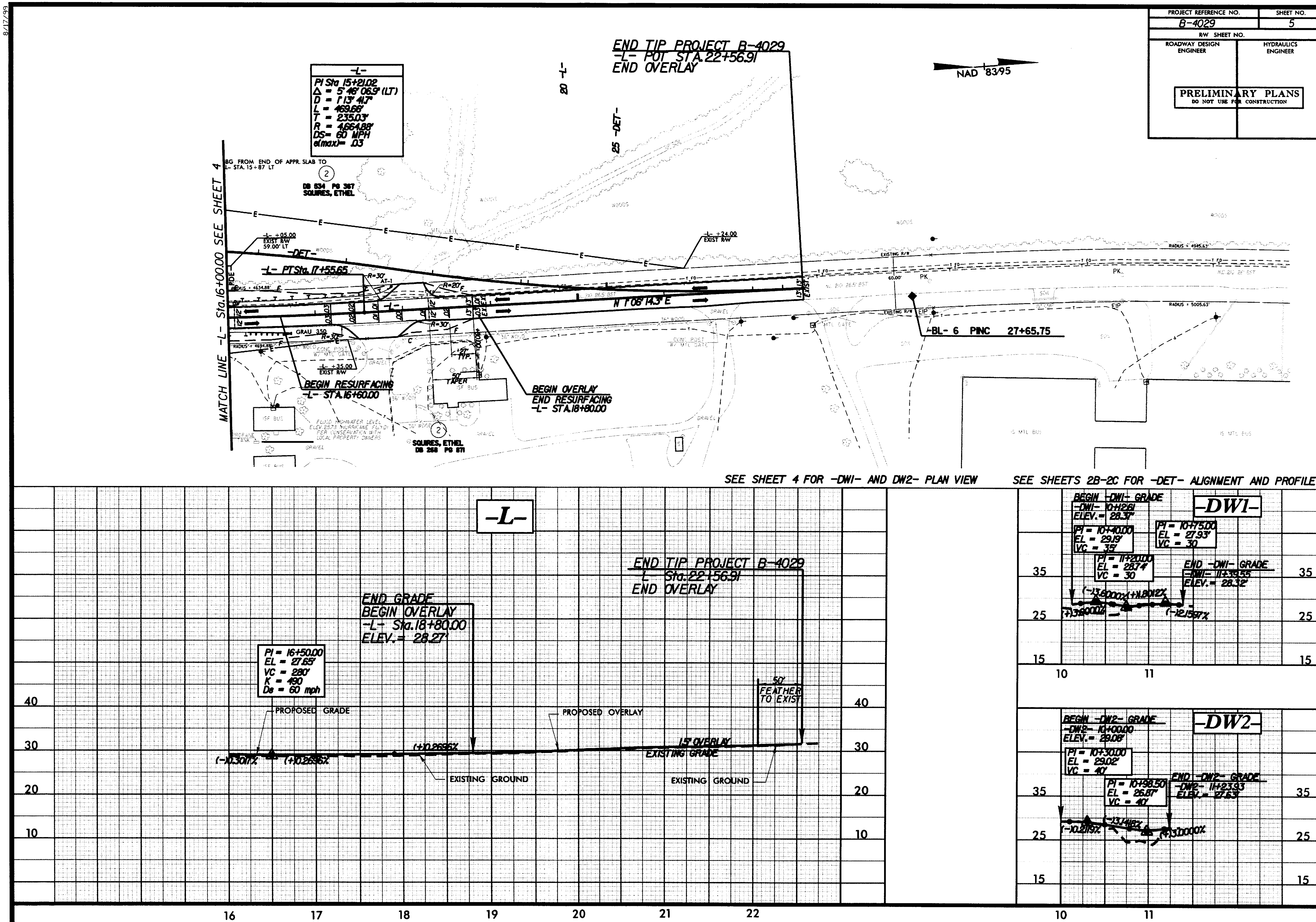
PI = 13+30.00
EL = 27.70'
VC = 100'
K = 181
Ds = 60 mph

PI = 14+45.00
EL = 28.27'
VC = 130'
K = 162
Ds = 60 mph

℄ STA 14+95.0
80' OAL 21" CORED SLAB
16@45", @35"
GP = 28.1

50' FEATHER TO EXIST
1.5' OVERLAY
PROPOSED OVERLAY
EXISTING GRADE
EXISTING GROUND
PROPOSED GRADE
(+)0.335%
(-)0.083%
(+)0.500%
(-)0.301%
(-)0.301%
42" EQUALIZER PIPE
BEGIN SPEC DITCH GRADE STA.11+00.00 EL = 25.85'
END SPEC DITCH GRADE STA.15+50.00 EL = 26.85'
3.5' MIN
2:1 NORMAL
CLASS 'I' RIP RAP
TO TOP OF BERM
(STRUCTURE PAY ITEM)
EXCAVATE EXISTING ROAD FILL
+/- 205 CY
(STRUCTURE PAY ITEM)

6 7 8 9 10 11 12 13 14 15 16
40 30 20 10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PROJECT REFERENCE NO.
B-4029
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NAD 83/95
END TIP PROJECT B-4029
-L- POT STA. 22+56.91
END OVERLAY
-L-
PI Sta 15+21.02
Δ = 5° 46' 06.9" (LT)
D = 1° 13' 41.7"
L = 469.66'
T = 235.03'
R = 4,664.88'
DS = 60 MPH
e(max) = .03
20 -L-
25 -DET-
MATCH LINE -L- Sta. 16+00.00 SEE SHEET 4
BG FROM END OF APPR. SLAB TO -L- STA. 15+87 LT
DB 534 PG 367
SQUIRES, ETHEL
-L- PT Sta. 17+55.65
-L- +05.00 EXIST R/W 59.00' LT
-L- +24.00 EXIST R/W
-L- +35.00 EXIST R/W
N 1° 06' 14.3" E
BEGIN RESURFACING
-L- STA. 16+60.00
BEGIN OVERLAY
END RESURFACING
-L- STA. 18+80.00
50' TAPER
SQUIRES, ETHEL
DB 268 PG 871
-BL- 6 PINC 27+65.75
SEE SHEET 4 FOR -DW1- AND DW2- PLAN VIEW
SEE SHEETS 2B-2C FOR -DET- ALIGNMENT AND PROFILE
-L-
END TIP PROJECT B-4029
-L- Sta. 22+56.91
END OVERLAY
END GRADE
BEGIN OVERLAY
-L- Sta. 18+80.00
ELEV. = 28.27'
PI = 16+50.00
EL = 27.65'
VC = 280'
K = 490
Ds = 60 mph
PROPOSED GRADE
PROPOSED OVERLAY
50' FEATHER TO EXIST
1.5" OVERLAY
EXISTING GRADE
EXISTING GROUND
EXISTING GROUND
(-)0.3017%
(+)0.2696%
(+)0.2696%
-DW1-
BEGIN -DW1- GRADE
-DW1- 10+11.261
ELEV. = 28.37'
PI = 10+40.00
EL = 29.19'
VC = 35'
PI = 10+75.00
EL = 27.93'
VC = 30
PI = 11+20.00
EL = 28.74'
VC = 30
END -DW1- GRADE
-DW1- 11+39.55
ELEV. = 28.32'
-DW2-
BEGIN -DW2- GRADE
-DW2- 10+00.00
ELEV. = 29.06'
PI = 10+30.00
EL = 29.02'
VC = 40'
PI = 10+98.50
EL = 26.87'
VC = 40'
END -DW2- GRADE
-DW2- 11+23.93
ELEV. = 27.63'
(-)0.2119%
(+)3.0000%
16
17
18
19
20
21
22
10
11

Approximate quantities only. Unclassified excavation, fine grading clearing and grubbing, and removal of existing pavement will be paid for at the lump sum price for "Grading".

PROJ. REFERENCE NO.	SHEET NO.
B-4029	X-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

CROSS-SECTION SUMMARY

Stations DET	Uncl. Exc. (cu.yd.)	Embt (cu.yd)
11+19.03	0	0
11+50.00	0	0
12+00.00	0	0
12+50.00	0	0
13+00.00	9	1
13+50.00	12	12
14+00.00	11	34
14+50.00	10	44
15+00.00	8	55
15+50.00	3	78
16+00.00	7	68
16+50.00	7	50
17+00.00	0	59
17+50.00	0	116
18+00.00	0	385
18+50.00	0	354
19+00.00	142	52
19+50.00	142	540
20+00.00	0	649
20+50.00	0	223
21+00.00	0	198
21+50.00	0	127
22+00.00	2	54
22+50.00	28	11
23+00.00	52	1
23+50.00	39	3
24+00.00	19	6
24+50.00	11	8
25+00.00	8	11
25+50.00	6	10
26+00.00	0	0
26+50.00	0	0
27+00.00	0	0
27+22.84	0	0

Stations L	Uncl. Exc. (cu.yd.)	Embt (cu.yd)
11+00.00	0	0
11+50.00	30	14
12+00.00	43	21
12+50.00	13	40
13+00.00	2	64
13+50.00	7	195
14+00.00	18	166
14+50.00	58	17
14+55.00	7	2

Stations L	Uncl. Exc. (cu.yd.)	Embt (cu.yd)
15+35.00	0	0
15+50.00	6	10
16+00.00	17	48
16+50.00	15	51
17+00.00	8	32
17+50.00	0	19
18+00.00	18	14
18+50.00	18	8
18+80.00	0	0

Stations DET REM	Uncl. Exc. (cu.yd.)	Embt (cu.yd)
8+92.46	0	0
9+00.00	0	0
9+50.00	12	0
10+00.00	41	0
10+50.00	87	0
11+00.00	125	1
11+50.00	98	1
12+00.00	63	0
12+50.00	67	1
13+00.00	90	1
13+50.00	238	0
14+00.00	202	4
14+50.00	21	267
15+00.00	332	263
15+50.00	381	0
16+00.00	113	0
16+50.00	115	0
17+00.00	91	1
17+50.00	74	4
18+00.00	54	7
18+50.00	39	7
19+00.00	67	6
19+50.00	72	4
20+00.00	35	1
20+50.00	17	1
20+99.37	0	0

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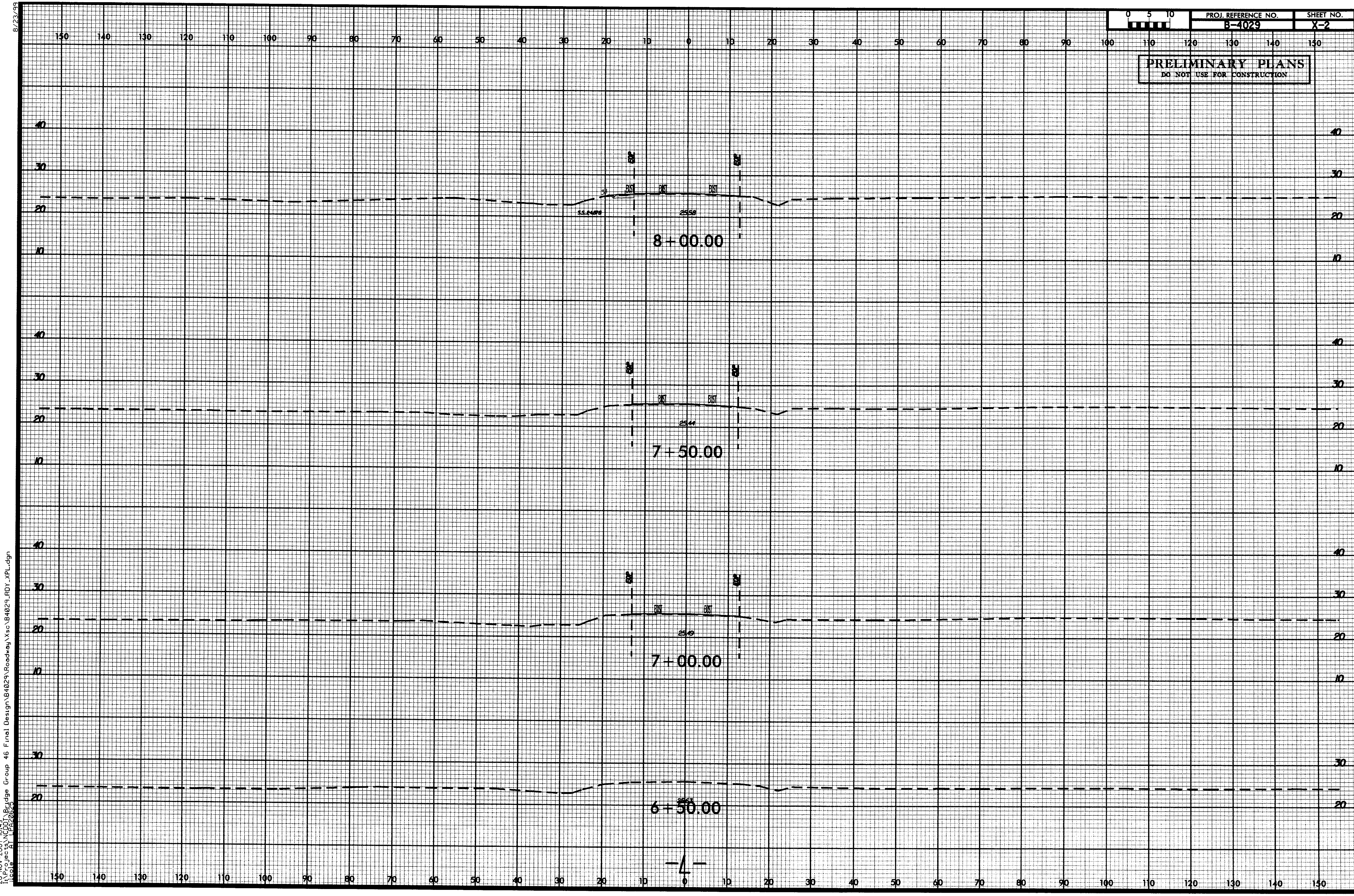

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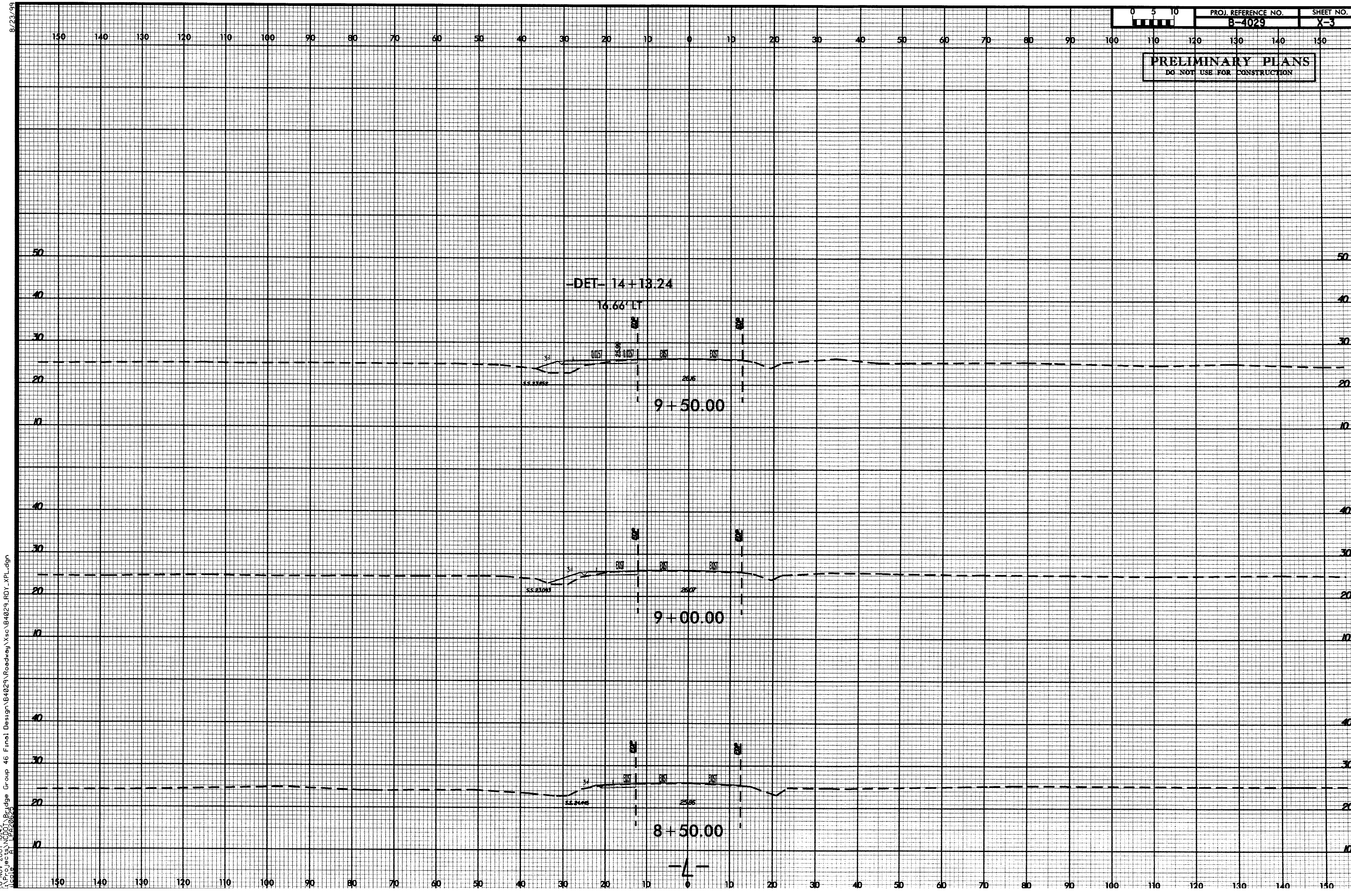
jlcole AT LPA20625

PROJ. REFERENCE NO. B-4029 | SHEET NO. X-3

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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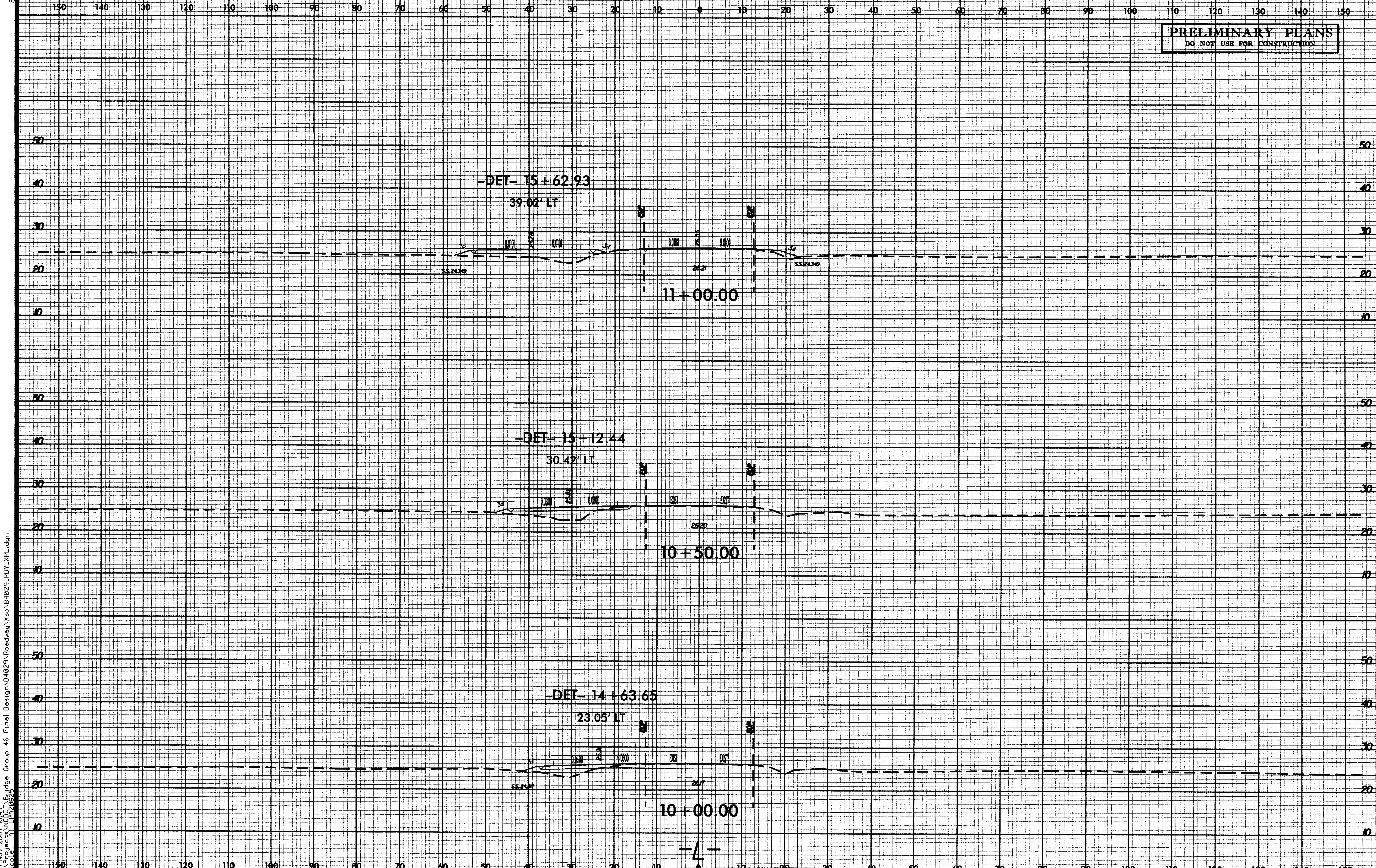
PROJ. REFERENCE NO.	SHEET NO.
B-4029	X-4

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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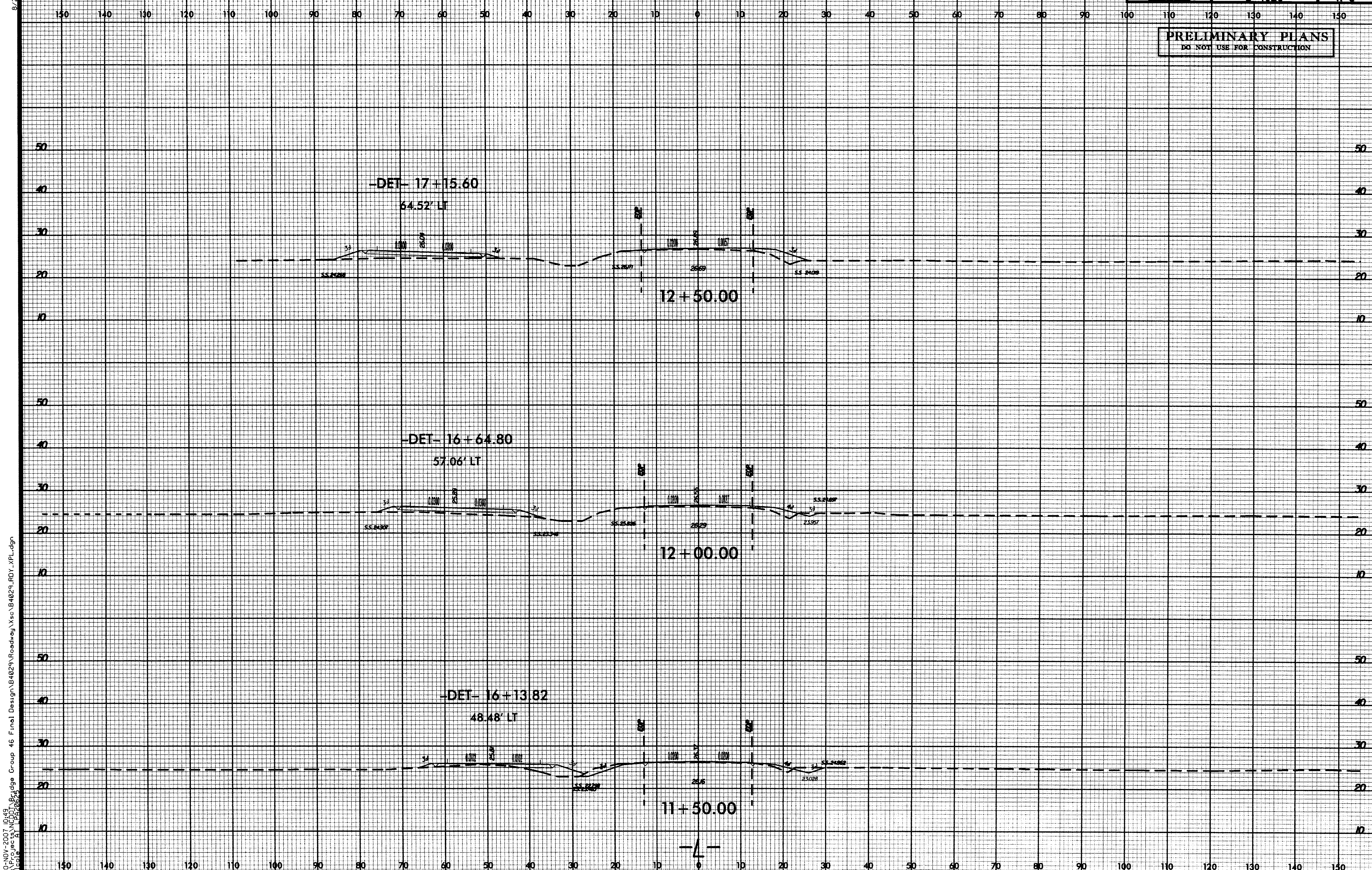
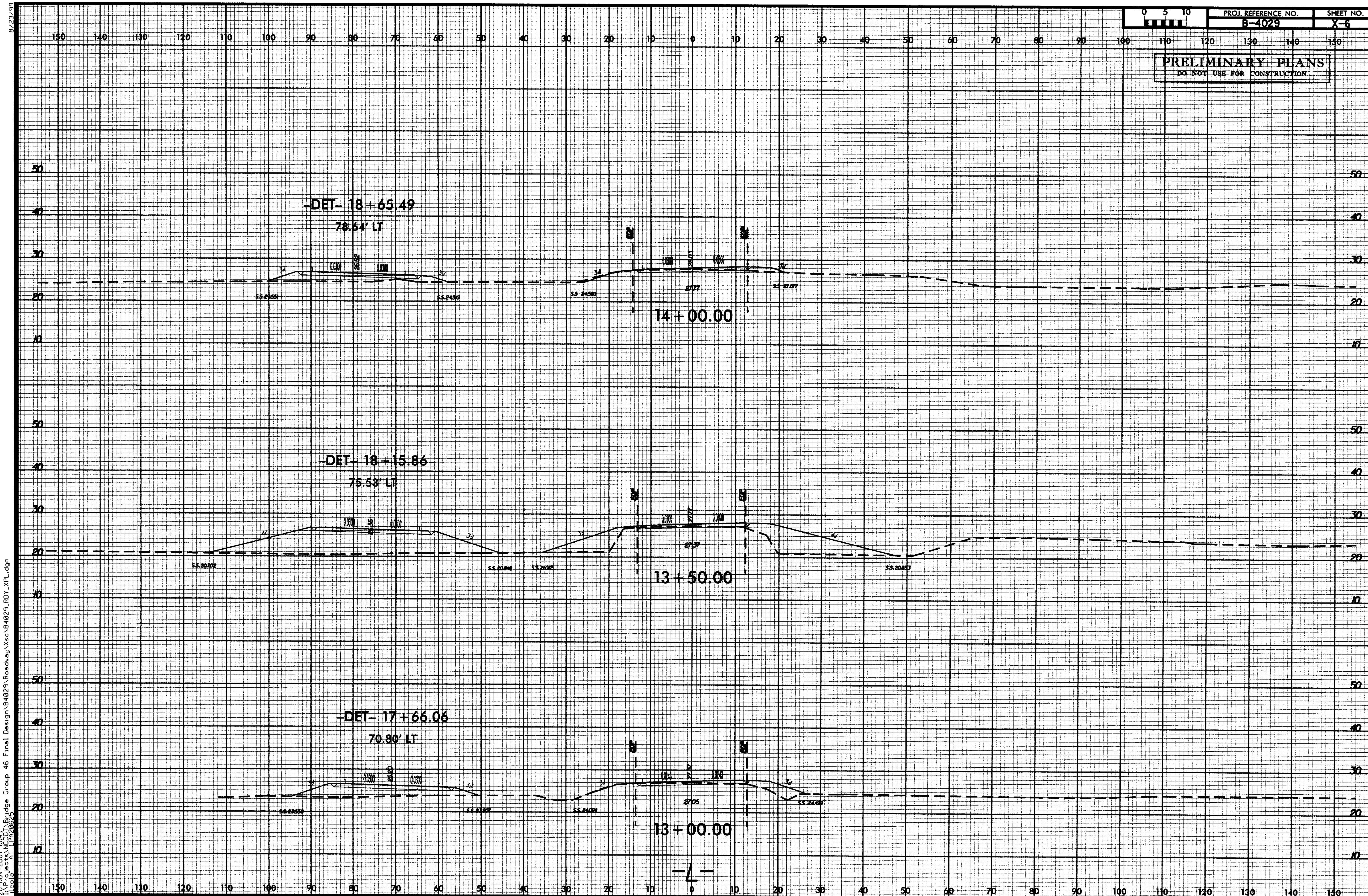
PROJ. REFERENCE NO.	SHEET NO.
B-4029	X-5

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

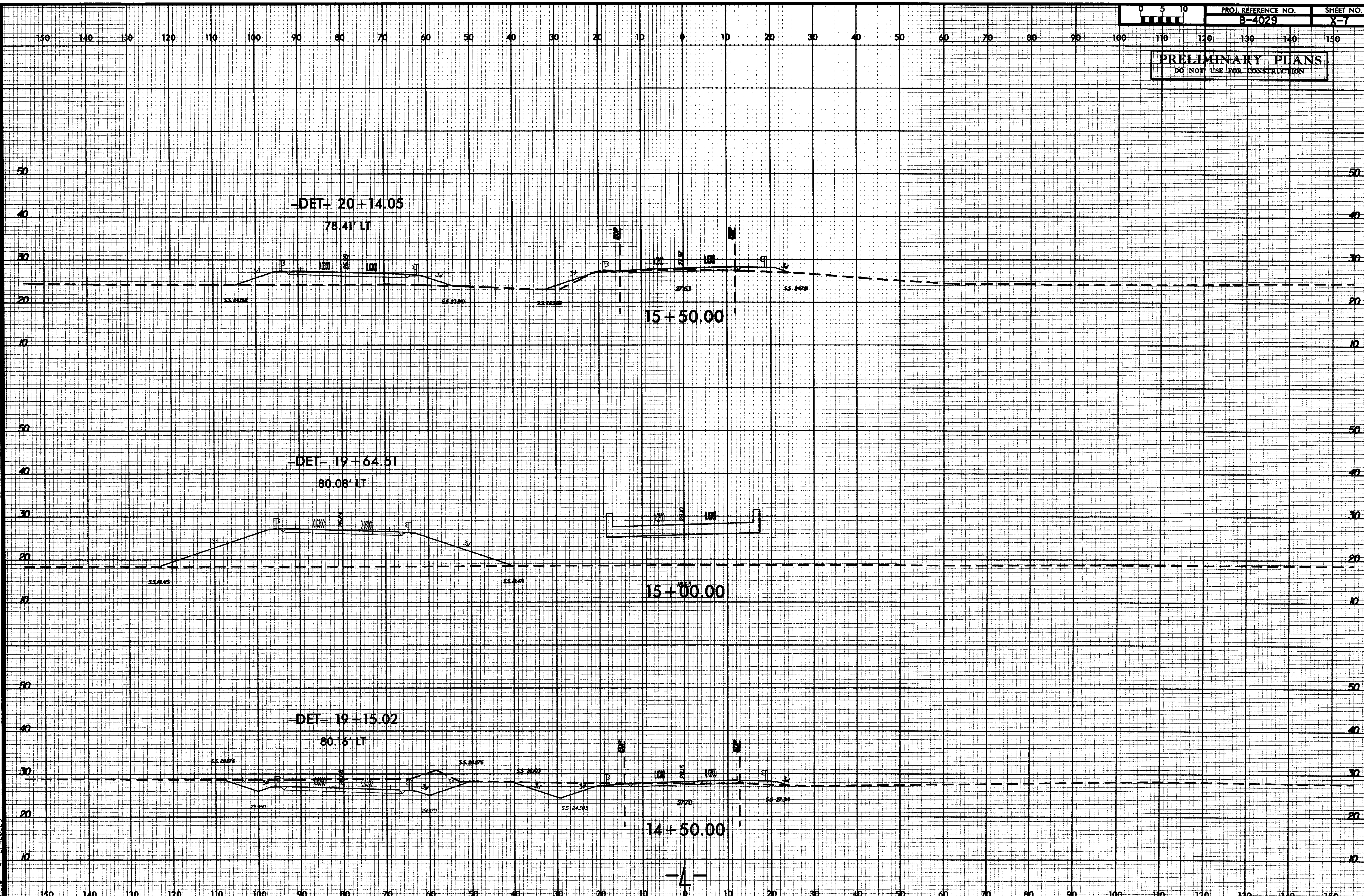




PROJ. REFERENCE NO.
B-4029
SHEET NO.
X-6
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-DET- 18+65.49
78.54' LT
14+00.00
-DET- 18+15.86
75.53' LT
13+50.00
-DET- 17+66.06
70.80' LT
13+00.00

PROJ. REFERENCE NO.	SHEET NO.
B-4029	X-7

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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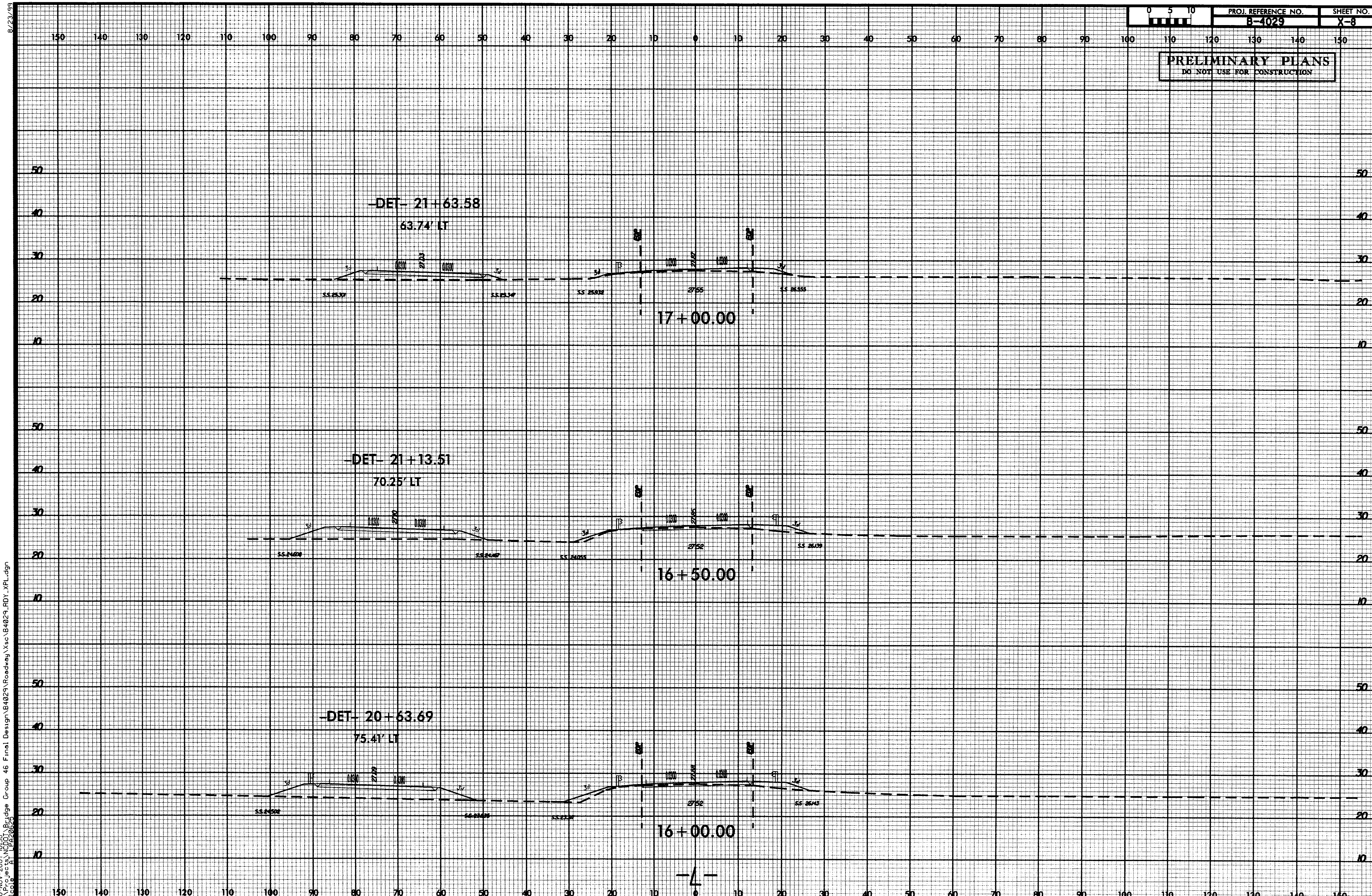
8/23/99



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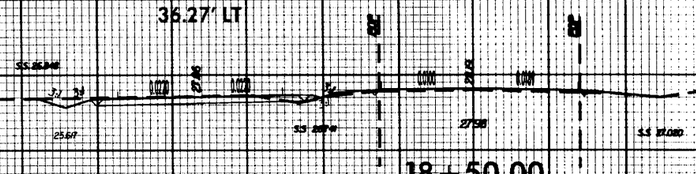
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4029	X-9

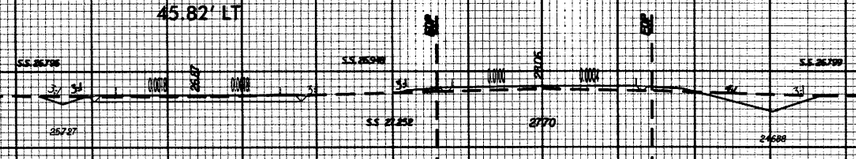
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET- 23+15.73
36.27' LT



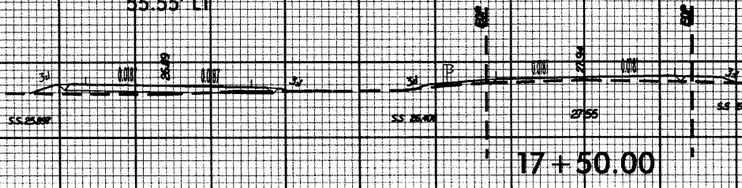
18+50.00

-DET- 22+65.07
45.82' LT



18+00.00

-DET- 22+13.98
55.55' LT



17+50.00

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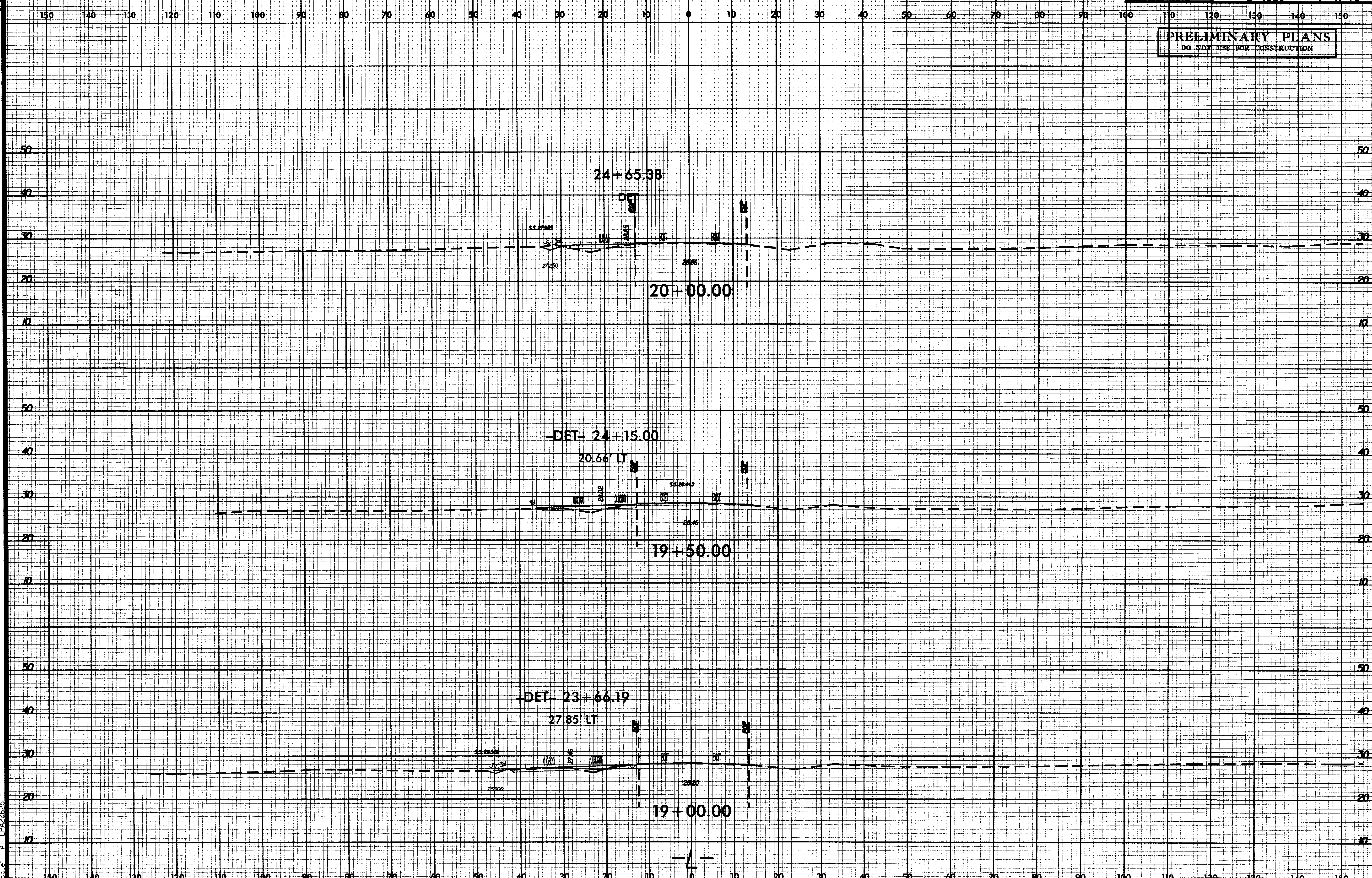

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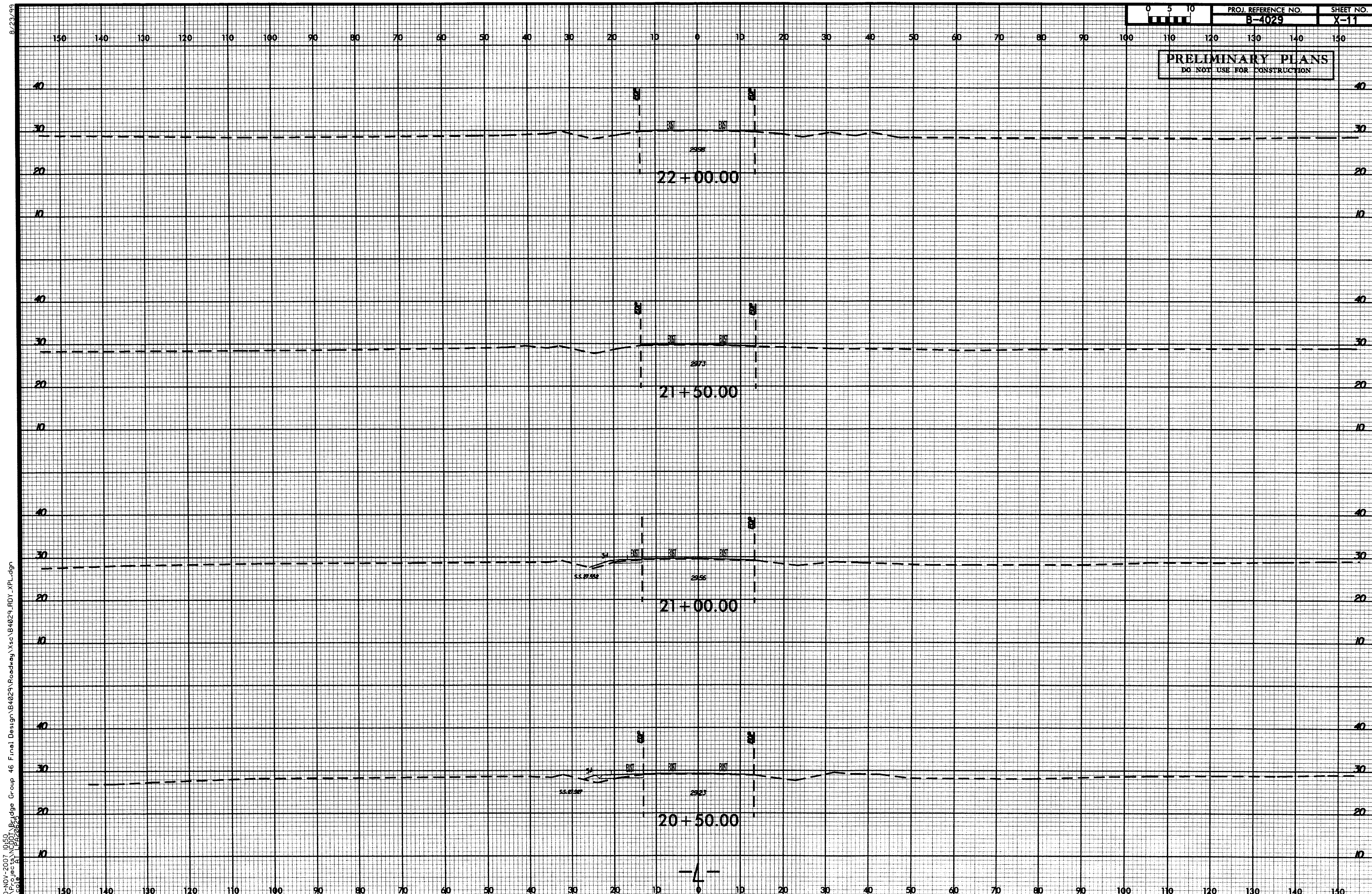

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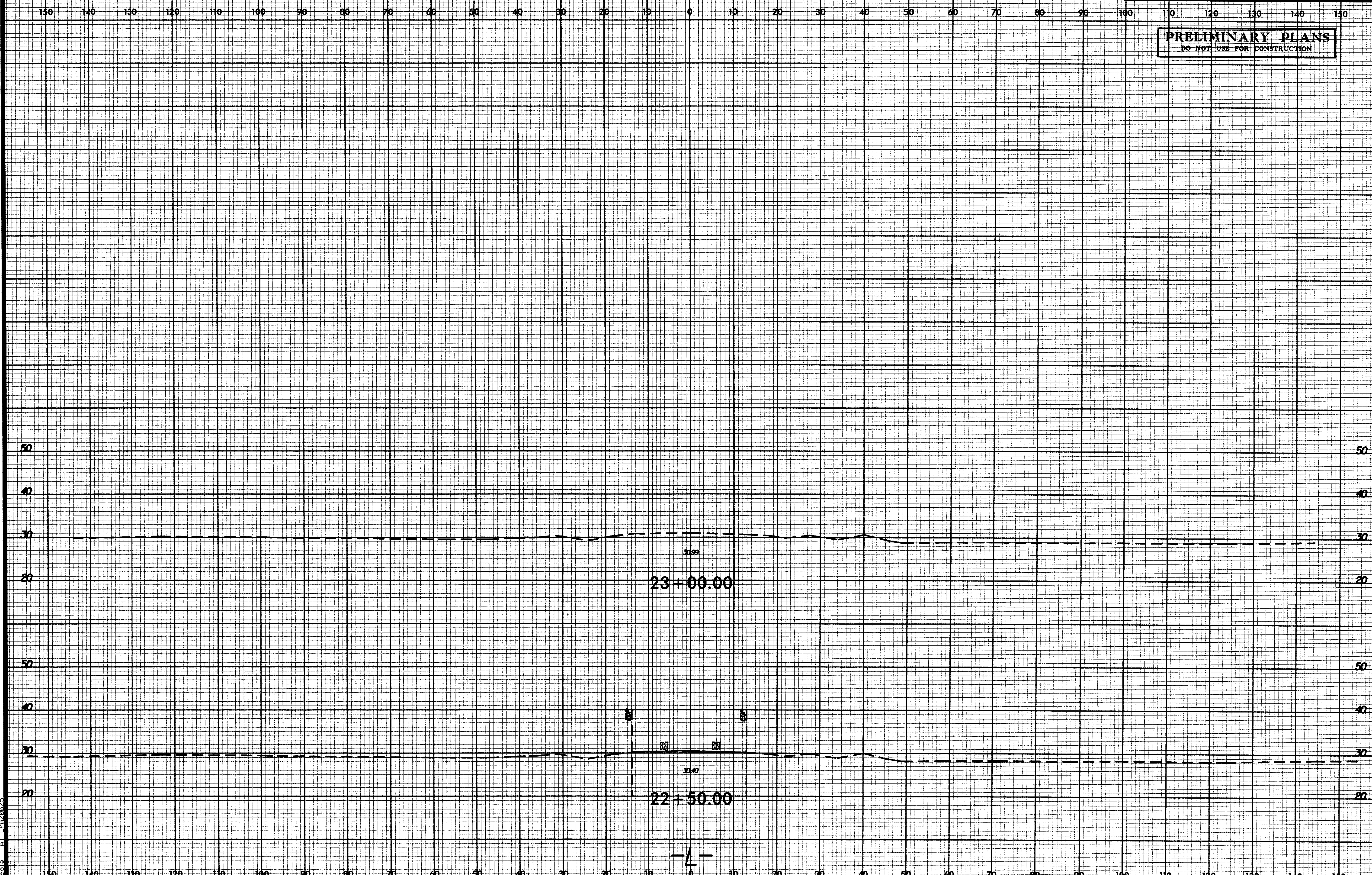

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NC 210
Bridge No. 8 Over a Canal
Bladen County
Federal-Aid Project No. BRSTP-210(6)
State Project No. 8.1421501
WBS No. 33396.1.1
TIP No. B-4029

Categorical Exclusion
United States Department of Transportation
Federal Highway Administration
And
North Carolina Department of Transportation

Approved:

4/11/06
Date

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

4/11/06
Date

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

NC 210
Bridge No. 8 Over a Canal
Bladen County
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Categorical Exclusion

April 2006

Document Prepared by:

THE LPA GROUP OF NORTH CAROLINA, P.A.

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Project Development Engineer

PROJECT COMMITMENTS

NC 210
Bridge No. 8 Over a Canal
Bladen County
Federal-Aid Project No. BRSTP-210(6)
State Project No. 8.1421501
WBS No. 33396.1.1
TIP No. B-4029

In addition to the standard Nationwide Permit #23 and #33 Conditions, the General Nationwide Permit Conditions, Section 404 Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices (BMPs) for the Protection of Surface Waters, the North Carolina Department of Transportation's (NCDOT) Guidelines for Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification, would all apply to the proposed bridge replacement project. There are no special commitments associated with the proposed replacement of Bridge No. 8.

NC 210
Bridge No. 8 Over a Canal
Bladen County
Federal-Aid Project No. BRSTP-210(5)
State Project No. 8.1421501
WBS No. 33396.1.1
TIP No. B-4029

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NC 210
Bridge No. 8 Over a Canal
Bladen County
Federal-Aid Project No. BRSTP-210(5)
State Project No. 8.1421501
WBS No. 33396.1.1
TIP No. B-4029

INTRODUCTION: The replacement of Bridge No. 8 is included in the North Carolina Department of Transportation (NCDOT) 2006-2012 Transportation Improvement Program and in the Federal-Aid Bridge Replacement Program. The location is shown on Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

The NCDOT Bridge Maintenance Unit records indicate the bridge has a sufficiency rating of 37.8 out of a possible 100 for a new structure. The bridge is considered to be structurally deficient. The replacement of this inadequate structure would result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

The project is located in Bladen County on NC 210 approximately 1.0 mile north of the junction of NC 53 (Figure 1). The surrounding land use in the study area consists of forested areas, residential properties, industrial property (Squires Hardwood), and wetlands.

Bridge No. 8 was constructed in 1966 and currently has a posted weight limit of 23 tons for single vehicles and 27 tons for truck tractors with semi trailers (TTST). The overall length of the two span bridge is 61.0 feet, with a bed to crown height of 10.0 feet. It has a clear roadway width of 29.5 feet carrying two travel lanes. Bridge No. 8 has a prestressed concrete channel superstructure supported by a substructure consisting of timber piles with concrete caps.

In the vicinity of the bridge, NC 210 is a 22-foot, two-lane roadway with 2-foot paved shoulders and a total shoulder width of eight feet. The existing bridge is in a horizontal tangent and is skewed 90 degrees to the roadway. The north approach alignment has a slight curve beginning at the end of the bridge and then becomes tangent. The south approach alignment has a small 100-foot tangent section beginning at the end of the bridge which transitions into a slight curve. Both approaches have good sight distances. The north vertical grade falls away from the bridge with a sag located approximately 100

feet from the north end of the bridge. The south vertical grade also falls away from the bridge with a sag located approximately 300 feet from the south end of the bridge.

The speed limit is posted at 55 miles per hour (mph), and NC 210 is classified as a Rural Major Collector in the Statewide Functional Classification System.

The current (2006) traffic volume of 1000 vehicles per day (vpd) is expected to increase to 1600 vpd by the year 2025. These volumes include 5 percent dual tired vehicles and 15 percent TTSTs.

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

There are no utilities attached directly to the structure; however, there are overhead power lines along the east side of NC 210, and overhead telephone, cable, and fiber optic lines along the west side of NC 210.

There are two school bus crossings of the bridge daily. In a letter dated March 24, 2003 (see letter in Appendix), Mr. Richard Dunham of the Bladen County Schools stated that there are no suitable detours available if road closure were necessary.

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.

A letter dated August 31, 2004 was sent to Bladen County Emergency Management soliciting comments on the possible alternatives for the proposed bridge replacement. No response was received regarding which alternative Emergency Management would prefer.

III. ALTERNATIVES

A. Project Description

The proposed project would consist of replacing Bridge No.8 on NC 210 over an unnamed canal, with a wider and safer structure that would lead to safer and more efficient traffic operations.

Based on a preliminary hydraulic analysis that was conducted in conjunction with a field reconnaissance of the site, the proposed replacement structure for Bridge No. 8 would be a 90-foot long bridge. The replacement bridge would provide a clear roadway width of 32 feet, carrying two 12-foot wide travel lanes with two 4-foot offsets (Figure 3B).

The roadway approaches would provide two 12-foot travel lanes with 6-foot unpaved shoulders (Figure 3A). The roadway grade would be approximately the same as the

existing roadway. The design speed of the roadway approaches is 60 mph, with a posted speed of 55 mph.

B. Build Alternatives

There were three Alternatives considered for the replacement of Bridge No. 8. These Alternatives are outlined in detail below:

Alternative 1

Alternative 1 would replace the existing bridge with a new structure constructed in the same location as the existing bridge (Figure 2A). Alternative 1 would utilize an on-site detour on the east side of the existing bridge to maintain traffic during construction. Permanent approach work would extend approximately 450 feet south of the bridge and approximately 435 feet north of the bridge for a total length (including the bridge) of 975 feet. The detour structure would consist of two 84-inch diameter corrugated steel pipes and would be located approximately 45 feet, centerline to centerline, east of the existing bridge. The detour roadway would provide two 12-foot travel lanes with 2-foot paved shoulders and a total shoulder width of 6 feet (Figure 3A). The total length of the temporary detour is approximately 1,100 feet.

Alternative 2

Alternative 2 would replace the existing bridge with a new structure constructed in the same location as the existing bridge (Figures 2A, 2B, 2C, and 2D). Alternative 2 would utilize an on-site detour on the west side of the existing bridge to maintain traffic during construction. The permanent approach work would extend approximately 450 feet south of the bridge and approximately 435 feet north of the bridge for a total length (including the bridge) of 975 feet. The detour structure would consist of two 84-inch diameter corrugated steel pipes and would be located 45 feet, centerline to centerline, west of the existing bridge. The detour roadway would provide two 12-foot travel lanes with 2-foot paved shoulders and a total shoulder width of 6 feet (Figure 3A). The total length of the temporary detour is approximately 700 feet.

Alternative 3

Alternative 3 permanently realigns NC 210 approximately 45 feet centerline to centerline west of the existing bridge, utilizing the existing bridge to detour traffic during construction (Figure 2A). Approach work would extend approximately 1,300 feet south of the bridge and approximately 1,300 feet north of the bridge for a total length of 2,600 feet.

C. Alternatives Eliminated from Further Study

The "Do-Nothing" Alternative was eliminated from further study because the existing bridge is considered functionally obsolete and structurally deficient. Over time the

bridge would continue to deteriorate and would eventually need to be closed completely. Due to daily traffic flow considerations and lack of a usable alternate route this alternative is not an option.

The option of utilizing an off-site detour to maintain traffic during construction was considered (Figure 1). The off-site detour would utilize SR 1550 (Beatty's Bridge Road), SR 1201 (Beatty's Bridge Road), and NC 11/53 as a detour route. This off-site detour is approximately 21.6 miles long and crosses five bridges and one culvert. Bridge Numbers 43, 67, 83, and 85 are in Bladen County, and Bridge Number 8 is in Pender County. None of these five bridges have posted weight limits. The secondary roads utilized by this detour would require upgrading to handle the truck volume now using NC 210. With an additional travel time of 22 minutes over the expected detour period of six to eight months, the delay for this off-site detour is considered to be unacceptable under NCDOT guidelines.

D. Preferred Alternative

Alternative 2, replacing the bridge in its existing location and using a temporary on-site detour to the west was selected as the Preferred Alternative. Alternative 2 was selected in order to minimize impacts to the adjacent timber business and natural resources. The plan sheets for the Preferred Alternative are included in Figures 2B, 2C, and 2D.

IV. ESTIMATED COSTS

Table 1. Estimated Costs per Alternative

	ALT 1	ALT 2 (Preferred Alternative)	ALT 3
Roadway Approaches	$205,200	$280,450	$408,880
Proposed New Bridge	$229,500	$229,500	$229,500
Temporary Structure	$60,000	$60,000	$0
Structure Removal	$21,600	$21,600	$21,600
Misc. & Mobilization	$138,700	$172,450	$522,020
Engineering & Contingencies	$95,000	$111,000	$168,000
Total Construction Costs	**$750,000**	**$875,000**	**$1,350,000**
Right of Way and Utilities	$23,200	$18,650	$23,800
Total Project Cost	**$773,200**	**$893,650**	**$1,373,800**

The estimated cost of the project as shown in the 2006-2012 NCDOT Transportation Improvement Program is $1,100,000 including $100,000 spent in prior years, $25,000 for right-of-way, and $975,000 for construction.

V. NATURAL RESOURCES

A. Methodology

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

- United States Geological Survey (USGS) 7.5 minute quadrangle maps (Kelly, NC 1988)
- NCDOT aerial photograph of the project area (2000)
- Soil maps and descriptions of the soils found in the project area (Bladen County Soil Survey, Natural Resources Conservation Service [NRCS] 1990)
- North Carolina Division of Water Quality (DWQ) basin-wide assessment information (DWQ 2002)
- United States Fish and Wildlife Service (USFWS) list of protected and candidate species (USFWS 2003)
- North Carolina Natural Heritage Program (NHP 2004) files of rare species and unique habitats

Water resources information was obtained from publications posted on the Internet by North Carolina Department of Environment and Natural Resources (NCDENR), Division of Water Quality.

The USFWS provided a list of threatened and endangered species known to occur in Bladen County on December 30, 2003 (updated March 14, 2006), prior to the field investigation. Information concerning species under state protection was obtained from the NHP database of rare species and unique habitats. NHP files were reviewed for known locations of species on state or federal lists and locations of significant natural areas on March 29, 2004.

A field investigation was conducted within the project study area by THE LPA GROUP of North Carolina, p.a. (LPA) biologists on June 10, 2004. The project vicinity is an area extending 0.5-mile from the study area. The study area for B-4029 extends approximately 1,100 feet north of the existing bridge and approximately 1,200 feet south of the existing bridge (approximately 0.4 miles), and encompasses a 200-foot wide corridor centered along the existing centerline of NC 210.

Water resources were identified, and their physical characteristics were recorded. For the purposes of this study, a habitat assessment was performed within the project study area. Plant communities and their associated wildlife were identified using a variety of observation techniques, including active searching, visual observations, and identifying characteristic signs of wildlife (sounds, tracks, scats, and burrows). Terrestrial community classifications generally follow Schafale and Weakley (1990), where appropriate, and plant nomenclature follows Radford *et al.* (1968). Biotic communities

were mapped using sub-meter accuracy Global Positioning System (GPS) equipment and aerial photography of the project site. Vertebrate nomenclature follows Potter *et al.* (1980), Martof *et al.* (1980), Rhode *et al.* (1994), the American Ornithologists' Union (2001), and Webster *et al.* (1991).

Jurisdictional areas were identified using the three-parameter approach (hydrophytic vegetation, hydric soils, wetland hydrology) established in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). The boundaries of the jurisdictional areas were flagged and mapped in the field using sub-meter accuracy GPS equipment. Jurisdictional wetland areas were characterized according to a classification scheme established by Cowardin *et al.* (1979).

B. Physiography and Soils

The project study area is located within the Coastal Plain physiographic province of North Carolina. The topography is characterized as nearly level to gently sloping. Elevations range from approximately 25 to 30 feet above mean sea level (USGS 1988). Surrounding land uses include agricultural, residential, commercial (a timber company), and forested lands.

According to the Bladen County Soil Survey, the project study area is located within the Wasda-Torhunta-Croatan soil association (NRCS 1990). Soil associations contain one or more mapping units occupying a unique natural landscape. Mapping units are named for the major soil series within the unit, but may contain minor inclusions of other soil series. The soil survey describes Wasda-Torhunta-Croatan as nearly level, very poorly drained soils that have a muck surface layer and a loamy subsoil or underlying material, or have a loamy surface layer underlain by a loamy and sandy subsoil; rarely to frequently flooded. These soils occur on broad flats, in depressions, and on low terraces in the eastern part of the county.

There are seven soil series mapped within the project study area which include:

- Lynn Haven and Torhunta soils (*Typic Haplaquods* and *Typic Humaquepts*);
- Leon sand (*Aeric Haplaquods*), 0 to 3% slopes;
- Croatan muck (*Terric Medisaprists*), rarely flooded;
- Wasda muck (*Histic Humaquepts*);
- Croatan muck (*Terric Medisaprists*), frequently flooded;
- Centenary sand (*Entic Haplohumods*); and,
- Lakeland sand (*Typic Quartzipsamments*), 1 to 7% slopes.

Lynn Haven, Torhunta soils, Leon sand, Croatan muck (rarely flooded), Croatan muck (frequently flooded), and Wasda muck are all listed as hydric soils for Bladen County by the NRCS (1991). Centenary sand and Lakeland sand both have hydric inclusions of Leon in lower positions.

C. Water Resources

1.0 Waters Impacted

The project study area is located in the 03-06-20 sub-basin of the Cape Fear River Basin (DWQ 2004a), and is part of the USGS hydrologic unit 03030006 (EPA 2004). The project study area includes of one body of water, an unnamed, man-made canal. According to USGS topographic maps the canal connects Colly Creek to Frenches Creek. Since the canal is unnamed it is not assigned a Stream Index Number (SIN) by the North Carolina Department of Environmental and Natural Resources Division of Water Quality (DWQ 2004b). Given that this canal connects to Colly Creek less than one mile from the site, Colly Creek would be considered the water body that has the main potential to be impacted. Colly Creek has been assigned the SIN 18-68-17 by DWQ (DWQ 2004b).

2.0 Water Resource Characteristics

The canal (unnamed tributary to Colly Creek) is a manmade canal that exhibits features of perennial flow. At the time of field observations the flow was very slow over a substrate with a very high organic content. The unnamed canal would provide a warm water habitat. There was no scour observed at the bridge and water depth at the bridge is estimated at three to four feet. The channel width of the man-made canal is approximately 30 feet, with a bankfull width of approximately 35 feet. The banks are steep (near vertical in places) and are approximately four to six feet in height from the bed to the top of the bank. The canal is very straight and the study area encompasses a slow moving run approximately three to four feet deep. Because the canal is man-made, it cannot be assigned to a particular Rosgen stream type (based on visual observations) (SRI 2005).

2.1 Best Usage Classification and Water Quality

Colly Creek has been assigned a Best Usage Classification of C Sw (DWQ 2004b). The C indicates fresh waters that support aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation would include, wading, boating, and other uses involving human body contact with the water where such activities take place in an infrequent, unorganized, or incidental matter. There are no restrictions on watershed development or types of discharges (DWQ 2004c). Point source discharges of treated wastewater are permitted in these waters, pursuant to Rules .0104 and.0211 of 15A North Carolina Administrative Code (NCAC) 2B; local programs to control non-point source and stormwater discharge of pollution are required. The supplemental classification "Sw" designation refers to Swamp Waters, which have low velocities, low pH, and low dissolved oxygen (DWQ 2004c).

There are no Outstanding Resource Waters (ORW), High Quality Waters (HQW), or Sensitive Water Supply Watersheds (WS-I or WS-II) waters within three miles up or downstream of the study area (DWQ 2004b). Colly Creek and the unnamed canal are

not listed as North Carolina Natural and Scenic Rivers, nor as National Wild and Scenic Rivers (NPS 2004).

2.2 Macroinvertebrate Monitoring

There is a basinwide monitoring station approximately four miles southeast of the study area on the Lyons Swamp Canal at NC 11 (DWQ 2000a). This site was sampled by DWQ in March of 1998 and received a rating of Fair (DWQ 2000a).

2.3 North Carolina Index of Biotic Integrity

There is a DWQ Fish Monitoring Station located approximately 20 miles northwest of the study area on Colly Creek at US 701 (DWQ 2000b). This site was sampled on May 19, 1998 by DWQ and received a rating of Good-Fair (DWQ 2000b).

2.4 Section 303(d) Waters

None of the water resources within the project study area are designated as biologically impaired water bodies regulated under the provisions of the Clean Water Act (CWA) §303(d) (DWQ 2002b).

2.5 Permitted Dischargers

There are no permitted discharges within a five-mile radius of the project area (DWQ 2000a).

2.6 Non-Point Source Discharges

LPA biologists reviewed aerial photography and conducted a limited visual observation of potential non-point source (NPS) discharges located within and near the study area. Atmospheric deposition from passing vehicles and run off from a timber company facility adjacent to the canal were identified as potential sources of NPS pollution near the project study area.

3.0 Summary of Anticipated Impacts to Water Resources

Short-term impacts to water quality such as sedimentation and turbidity may occur during construction related activities. Impacts from sedimentation and erosion would be minimized during construction by the use of a stringent erosion control schedule and by the use of BMPs. The contractor would follow contract specifications pertaining to erosion control measures as outlined in 23 CFR 650 Subpart B and Article 107-13 entitled "Control of Erosion, Siltation, and Pollution pursuant to NCDOT's *Standard Specifications for Roads and Structures*." These measures include: the use of dikes, berms, silt basins, and other containment measures to control runoff and the elimination of construction staging areas in floodplains and adjacent waterways. Additional measures that could be taken to avoid water quality impacts would include keeping heavy

equipment out of the channel, keeping staging areas out of wetlands, and also keeping live concrete out of the channel. After construction activities were completed, abandoned approaches associated with the existing structure and/or temporary detours would be removed and re-vegetated in accordance with NCDOT guidelines.

Other impacts to water quality that would be anticipated as a result of this project include: changes in water temperature due to more exposure to sunlight (from the removal of vegetation beside the canal), increased shade due to construction of new structures, and changes in stormwater flows due to changes in the amount of impervious surface adjacent to the channel. However, due to the limited amount of overall change in the surrounding areas, impacts would be expected to be minimal and temporary in nature.

The Division of Water Quality, NCDENR, has not classified the waters of the Canal (unnamed tributary to Colly Creek), but other water bodies that drain into Colly Creek and including Colly Creek, have been classified as C Sw. Waters with the Best Usage Classification of C Sw fall into the category of a Case III stream according to Best Management Practices for Bridge Demolition and Removal (BMP-BDRs). A Case III stream has no special restrictions other than those outlined in the BMPs for Protection of Surface Waters.

3.1 Impacts Related to Bridge Demolition and Removal

Section 404-2 of NCDOT's *Standard Specifications for Roads and Structures* is labeled **Removal of Existing Structures**. This section outlines restrictions and BMP-BDRs, as well as guidelines for calculating maximum potential fill in the creek that would result from demolition. These standards would be followed during the replacement of Bridge No. 8.

There is the potential that the superstructure could be dropped into Waters of the United States during the demolition and removal of Bridge No. 8. The superstructure consists of prestressed concrete channels with a weather surface. The maximum (worst case) potential fill resulting from demolition activities would be approximately 46 cubic yards.

D. Biotic Resources

Terrestrial and aquatic communities are included in the description of biotic resources. Systems described in the following sections refer to the dominant flora and fauna observed in each community during the field investigation. Descriptions of the terrestrial systems are presented in the context of plant community classifications. These classifications follow Schafale and Weakly (1990) where possible. Representative faunal species that are likely to occur in these habitats (based on published range distributions) are also cited. Scientific nomenclature and common names are used for the floral and faunal species described. Subsequent references to the same species are by the common name only. Fauna observed and/or heard (in the case of bird species) during field investigations are denoted with an asterisk (*).

1.0 Plant Communities

Distribution and composition of plant communities throughout the project study area reflect landscape-level variations in topography, soils, hydrology, and past and present land use practices. The presence of NC 210, agriculture, development, and forestry practices have resulted in the present vegetation patterns. Four terrestrial plant communities occur within the study area: disturbed-maintained communities, mesic pine flatwoods, pine plantation, and wetland communities. A description of each community type follows.

1.1 Disturbed-Maintained Communities

Disturbed areas within the project study area have been combined into one general community type, described as a "disturbed-maintained community". This community includes types of habitat that have recently been or are currently impacted by human disturbance including regularly maintained road shoulders and commercial property (timber company). Photographs of these communities can be found in Appendix A. The majority of these habitats are kept in a low-growing or early successional state.

The road shoulder is dominated by passion flower (*Passiflora incarnata*), dog fennel (*Eupatorium capillifolium*), *Solidago altissima*, pokeweed (*Phytolacca americana*), grasses, and plantain (*Plantago* sp.).

1.2 Mesic Pine Flatwoods

Mesic pine flatwoods are located throughout the Coastal Plain and Sandhills. Mesic pine flatwoods occur on mesic (non-wetland) sites, either flat or with rolling coastal plain sediments, neither excessively drained nor with a significant seasonal high water table. This forest type is on the south side of the existing bridge and is divided by NC 210. It is a relatively flat area that borders wetlands within the study area. The study area appears to have been logged and ditched. Therefore, some upland areas appear to be relic wetlands drained by ditching. The dominant tree species in the canopy of the upland south of the existing bridge area includes: loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*) and persimmon (*Diospyros virginiana*). Dominant understory/shrub species observed include winged sumac (*Rhus copallina*). The dominant species observed in the herbaceous layer is bracken fern (*Pteridium aquilinum*).

1.3 Pine Plantation

There is a large pine plantation located northwest of the existing bridge along NC 210. The dominant tree species in the pine plantation is loblolly pine. The pine creates a dense overstory, blocking sunlight and allowing a sparse or absent understory and herbaceous layer. Understory species may include red maple, tulip poplar (*Liriodendron tulipifera*), and sweet gum. Woody vines such as poison ivy (*Toxicodendron radicans*) and green

briar (*Smilax* sp.) may also be present. Additional species observed in the community include reindeer moss (*Cladonia* sp.) and prickly pear cactus (*Opuntia* sp.).

1.4 Wetland Communities

Four wetland areas are present in the study area: Wetlands A, B, C, and D. All four wetlands are floodplain wetlands, but ditching seems to be in the process of altering hydrology. This is evident by the presence of man-made lateral ditches and strong evidence of hydric soils. While these areas still display wetland characteristics, the hydrology has been altered. Wetlands A, C, and D are predominately forested and no evidence of inundation was observed.

The dominant tree species in the canopies of Wetland A, C, and D include: sweet gum, water oak (*Quercus nigra*), red maple, and pond pine (*Pinus serotina*). Dominant understory/shrub species observed include: sweet bay (*Magnolia virginiana*), blueberry (*Vaccinium* sp.), and gallberry (*Ilex* sp.). The dominant species observed in the herbaceous layer was cinnamon fern (*Osmunda cinnamomea*). The dominant woody vine species observed in the study area was wild grape (*Vitis* sp.).

Wetland B also consists of some forested areas, but the majority of the wetland is in a low growing open area (possibly a relic clear cut) with a very dense herbaceous/woody vine layer dominated by green briar (*Smilax glauca*), red maple saplings, Virginia willow (*Itea virginica*), sweet bay, sweet pepperbush (*Clethra alnifolia*), and cinnamon fern.

Wetlands in the study area cannot be given a Schafale and Weakly classification due to the disturbance of vegetation and hydrology.

2.0 Wildlife

The study area was visually surveyed for signs of terrestrial and aquatic wildlife. Little wildlife was observed during the field investigation. Fauna likely to occur in the study area based on published ranges are also included.

2.1 Terrestrial Wildlife

Bird species observed or likely to occur in the study area include such species as American robin (*Turdus migratorius*), rough-winged swallow* (*Stelgidopteryx ruficollis*) (found nesting under bridge), blue gross beak* (*Guiraca caerulea*), yellow-billed cuckoo* (*Coccyzus americanus*), American crow (*Corvus brachyrhynchos*), Carolina chickadee (*Parus carolinensis*), brown thrasher (*Toxostoma rufum*), catbird (*Dumetella carolinensis*), rufous-sided towhee (*Pipilo erythrophthalmus*), pileated woodpecker (*Dryocopus pileatus*), yellow-bellied sapsucker (*Sphyrapicus varius*), blue jay (*Cyanocitta cristata*), tufted titmouse (*Parus bicolor*), and golden crowned kinglet (*Regulus satrapa*).

Mammals observed or likely to occur within the study area include such species as eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), and white-tailed deer* (*Odocoileus virginianus*).

Terrestrial reptiles observed or likely to occur in the study are include garter snake* (*Thamnophis sirtalis*), green anole* (*Anolis carolinensis*), black rat snake (*Elaphe obsoleta*), milk snake (*Lampropeltis triangulum*), common king snake (*Lampropeltis getulas*), and Eastern box turtle (*Terrapene carolina*).

Terrestrial amphibians likely to occur in the study area include such species as American toad (*Bufo americanus*), Fowler's toad (*Bufo woodhousei*), mud salamander (*Pseudotriton montamus*), northern cricket frog (*Acris crepitans*), and the four-toed salamander (*Hemidactylum scutatum*).

3.0 Aquatic Community

The aquatic communities consist of organisms within the man-made canal. A visual survey of the canal was conducted to document the aquatic communities. No aquatic vegetation was observed in the canal during the field assessment. Vegetation found in the wetland communities is described in Section 1.4.

3.1 Aquatic Wildlife

Fish species expected to occur in drainages within the project vicinity include mosquito fish (*Gambusia affinis*), creek chub (*Semotilus atromaculatus*), and the redbreast sunfish (*Lepomis auritus*).

Aquatic reptiles observed or expected to occur in the study area include such species as snapping turtle (*Chelydra serpintina*), yellowbelly slider (*Trachemys scripta*), mud snake* (*Farancia abacura*), and banded water snake (*Nerodia fasciata*).

No aquatic amphibians were observed in the study area. Species expected to occur in the study area include dwarf mudpuppy (*Necturus punctatus*), bull frog (*Rana catesbeiana*), and pickerel frog (*Rana palustris*).

Suitable habitat exists in the study area to support wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), and great blue heron* (*Ardea herodias*).

4.0 Anticipated Impacts to Biotic Communities

Impacts to terrestrial and aquatic communities associated with the replacement of the existing bridge and related detours are discussed in the following sections.

4.1 Terrestrial Communities

Plant communities located within the study area total 10.57 acres (Table 2). These areas are based on a 2,330-foot long study area with a width of approximately 200 feet, situated on the centerline of existing NC 210.

Table 2. Terrestrial Communities Occurring within the B-4029 Study Area

Plant Community	Area (acres)	Potential Impacts (acres)					
		ALT 1		ALT 2 (Preferred Alternative)		ALT 3	
		Perm.	Temp.	Perm.	Temp.	Perm.	Temp.
Wetlands	1.51	0.03	0.10	0.03	0.13	0.16	No
Mesic Pine Flatwoods	1.70	No	0.21	No	0.03	0.03	No
Pine Plantation	1.19	No	No	No	0.11	0.15	No
Man Dominated	6.17	0.09	1.09	0.09	1.05	1.54	No
Total (acres)	**10.57**	0.12	1.40	0.12	1.32	1.88	No
Total for ALT (acres)		**1.52**		**1.44**		**1.88**	

Perm. - Permanent Impacts
Temp. - Temporary Impacts

Impacts to wildlife resulting from the proposed project would be minimal due to the limited amount of habitat that would be impacted. Permanent impacts would be confined to the existing road shoulders and minimal fill in the adjacent wetlands. Although some loss of habitat immediately adjacent to existing road shoulders would result, these areas are of limited value to wildlife that may utilize them.

4.2 Wetland Communities

Temporary impacts include those impacts that would result from the demolition of the existing bridge and construction of the replacement bridge and/or temporary on site detour (Table 3). Alternative 1 (temporary on-site detour to the west) would result in a total of 0.10-acre of temporary impacts to Waters of the United States. The Preferred Alternative, Alternative 2 (temporary on-site detour to the east) would result in a total of 0.13-acre of temporary impacts to Waters of the United States. Alternative 3

(realignment) would result in no temporary impacts to Waters of the United States. There is also a jurisdictional ditch within the study area which provides a hydrologic connection between otherwise isolated wetlands. This ditch serves as a hydrologic connection only, and does not exhibit wetland characteristics. Impacts to this ditch would be minimal, and the ditch would be relocated to prevent permanent impacts from construction. The moving of the ditch would maintain the hydrologic connection between otherwise isolated wetlands. BMPs would be employed by the construction contractor to first avoid and then minimize impacts to Waters of the United States. Erosion and sedimentation would be controlled by implementation of a Sediment and Erosion Control Plan during construction. Any areas of Waters of the United States that are temporarily impacted would be restored to their original condition following completion of the disturbance activity.

Permanent impacts to Waters of the United States are those impacts that occur in areas within the construction limits where clearing would occur or areas would be permanently filled or excavated (Table 3). Permanent impacts to water resources associated with the replacement of the Bridge No. 8 in its current location (Alternates 1 and 2 [Preferred]) would be limited to 0.03-acre. The realignment of the bridge to the west (Alternative 3) would permanently impact 0.16-acre of water resources. Fill would be placed in wetlands adjacent to the existing roadway for improvements to the bridge approaches. The existing bridge is 60 feet long and sits on timber piles. The replacement structure is a 90-foot long bridge.

Table 3. Anticipated Impacts to Waters of the United States

Jurisdictional Areas	ALT. 1		ALT. 2 (Preferred Alternative)		ALT. 3	
	Perm.	**Temp.**	**Perm.**	**Temp.**	**Perm.**	**Temp.**
Wetland A	0.01	0.10	0.01	None	None	None
Wetland B	None	None	None	None	0.02	None
Wetland C	None	None	None	0.01	0.04	None
Wetland D	0.02	None	0.02	0.12	0.10	None
Total (acres)	0.03	0.10	0.03	0.13	0.16	None
Total Wetland Impacts (acres)	**0.13**		**0.16**		**0.16**	
Jurisdictional Ditch Impacts (acres)	None	0.02	None	0.03	0.04	None
Stream Impacts (acres)	None	None	None	None	None	None
Stream Impacts (linear feet)	None	None	None	None	None	None
Total Stream Impacts (linear feet)	**No Impact**		**No Impact**		**No Impact**	

Perm. - Permanent Impacts
Temp. -Temporary Impacts

4.3 Aquatic Communities

Permanent impacts to water resources would be limited to 0.03-acre of fill material placed in wetlands adjacent to the existing roadway for a temporary onsite detour, and 0.16-acre of fill for realignment. Fill would be placed in floodplain wetlands adjacent to the existing roadway for improvements to the bridge approaches. Therefore, impacts to aquatic communities would be minimal.

Temporary impacts to aquatic organisms could result from increased sedimentation during construction. Aquatic invertebrates would likely drift downstream during construction and recolonize the disturbed area once it has been stabilized. Sediments have the potential to affect fish and other aquatic life in several ways, including the clogging and abrading of gills and other respiratory surfaces, reducing the amount of available habitat due to the filling of wetlands, and altering water chemistry. Increased sedimentation may also cause decreased light penetration through an increase in turbidity.

NCDOT's BMPs for the protection of surface waters would be enforced to reduce impacts during demolition and construction phases.

E. Special Topics

1.0 Waters of the United States

1.1 Wetlands

Jurisdictional wetlands in the project study area are palustrine in nature, as defined in Cowardin et al. (1979). Palustrine systems include all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses and all wetlands where salinity due to ocean-derived salts is below 0.5% (Cowardin et al. 1979). Wetlands A, C and D are dominated by broad-leaved deciduous vegetation and are saturated, giving them a Cowardin classification of PFO1B. Wetland B is dominated by low growing broad-leaved deciduous vegetation and is saturated, giving it a Cowardin classification of PSS1.

1.2 Jurisdictional Streams

An unnamed, man-made canal is located within the study area. This unnamed canal exhibits a perennial flow, and by definition is classified as Waters of the United States. Based on review of the USGS topographic map, the soil survey, and an on-site GPS survey there are approximately 200 linear feet of canal within the project study corridor.

2.0 Permits and Certifications

The following federal permits, state permits, and certifications would be required prior to beginning construction.

2.1 Section 404

In accordance with provisions of Section 404 of the CWA (33 United States Code [USC] 1344), a permit would be required from the USACE for the discharge of dredged or fill material into Waters of the United States. Because of the project is being documented as a Categorical Exclusion, it is expected that the project would qualify for a Nationwide Permit 23, which applies to approved Categorical Exclusions. In addition, a Nationwide Permit 33, which applies to temporary construction, access, and dewatering would be required if temporary construction is required that is not described in the Categorical Exclusion. The realignment of the road (Alternative 3) could require the use of Nationwide Permit #14 for linear transportation projects.

2.2 Water Quality Certification

Section 401 of the CWA requires that the state issue or deny a Water Quality Certification (WQC) for any federally permitted or licensed activity that may result in a discharge into Waters of the United States. Section 401 Certification allows surface

waters to be temporarily impacted for the duration of the construction or other land manipulation. Issuance of a 401 Certification from the DWQ is a prerequisite to the issuance of a Section 404 permit. If the general conditions of the corresponding WQC will be met, written concurrence from the DWQ will not be required.

3.0 Mitigation

Mitigation has been defined in NEPA regulations to include efforts which: a) avoid; b) minimize; c) rectify; d) reduce or eliminate; or e) compensate for adverse impacts to the environment (40 Code of Federal Regulations [CFR] 1508.20 [a-e]).

Federal Highway Administration policy stresses that all practicable measures should be taken to avoid or minimize impacts to wetlands, which would be affected by federally funded highway construction. A sequencing (step-down) procedure is recommended in the event that avoidance is impossible. Mitigation employed outside of the highway right-of-way must be reviewed and approved on a case-by-case basis.

Avoidance – Wetlands and Waters of the United States are present along both sides of the proposed project. Because the project involves replacement of an existing structure, it may not be possible to avoid all impacts to adjacent wetlands caused by improvements to the existing bridge approaches and replacement of bridge piers. Impacts can be avoided to streams and wetlands with the incorporation of an environmentally sensitive design. Impacts to jurisdictional surface waters can be avoided by bridging the stream channel, avoiding construction in the stream channel, and avoiding deposition of fill material in the stream channel during construction. Wetland impacts can be avoided by selecting an alignment, or temporary detour to avoid impacts when possible.

Minimization – Impacts to the adjacent wetlands would be minimized by using 3:1 fill slopes through wetlands on temporary construction, and no lateral ditches would be constructed in wetlands. Selecting an alignment or temporary detour that avoids wetlands to the greatest extent possible can also be used to minimize wetland impacts. The selection of Alternative 2 as the Preferred Alternative minimizes impacts due to temporary construction. Stream impacts can be minimized by designing support structures that avoid open water habitats whenever possible. Utilization of BMPs would be required of the contractor to further minimize wetland impacts.

Compensatory mitigation – According to the conditions of the Nationwide Permit, the USACE would determine if the impacts are minimal and would at the same time determine if compensatory mitigation is required. Temporary impacts to Waters of the United States would be considered permanent by the USACE until areas are restored to their original condition. The restoration is subject to approval by the USACE. Per the conditions of the Nationwide Permit, if the roadway is realigned, the abandoned bridge approaches must be removed and area must be reestablished as wetland. Alternatives 1, 2 (Preferred), and 3 would impact approximately 0.1-acres or more of wetlands; therefore, wetland mitigation may be required by the USACE if one of these three alternatives are selected. None of the alternatives would impact streams in the project area; therefore,

stream mitigation would not be required. Final mitigation decision rests with the USACE.

F. Protected Species

Rare and protected species listed for Bladen County, and potential impacts to these species as a result of the proposed project are discussed in the following sections.

1.0 Species Under Federal Protection

Species with the federal classification of Endangered (E), Threatened (T), or officially proposed (P) for such listing, are protected under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Seven federally protected species are listed for Bladen County (USFWS database dated March 7, 2002, Bladen County List updated March 14, 2006) (Table 4). A field investigation for potential habitat was conducted within the project study area by THE LPA GROUP of North Carolina, p.a. (LPA) biologists on June 10, 2004. Approximately six hours were spent performing the investigation, which included searching a 0.5-mile radius for red-cockaded woodpecker cavities.

Table 4. Federally Protected Species Listed for Bladen County, NC

Common Name	Scientific Name	Status*	Biological Conclusion
Vertebrates			
American alligator	*Alligator mississippiensis*	T (S/A)	Not Applicable
Bald eagle	*Haliaeetus leucocephalus*	T (PD)	No Effect
Red-cockaded woodpecker	*Picoides borealis*	E	No Effect
Shortnose sturgeon	*Acipenser brevirostrum*	E	No Effect
Vascular Plants			
Southern spicebush	*Lindera melissifolia*	E	No Effect
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	No Effect
American Chaffseed	*Schwalbea americana*	E	No Effect

*E - Endangered, T(S/A) - Threatened due to similarity of appearance, T(PD) - Threatened, proposed delisting
Source: USFWS database dated March 7, 2002, updated March 14, 2006. Web Address: http://nc-es.fws.gov/es/countyfr.html

American Alligator (*Alligator mississippiensis*)
The American alligator is listed as Threatened due to its similarity in appearance to other protected crocodilians. However, no other crocodilians occur within the state of North Carolina. Adult males typically reach 13 to 15 feet in length, and females reach lengths of just under 10 feet (FLMNH 2002).

American alligators can be found in a variety of estuarine aquatic habitats including swamp forests, marshes, large streams, canals, ponds, and lakes (Martof *et al.* 1980). Juveniles prey upon a wide variety of small invertebrates, particularly insects, and small fish and frogs. As they grow larger, their dietary range increases to include consequently larger prey. Eventually, large adults can overcome nearly all aquatic and terrestrial prey that comes within range, but their diet primarily consists of fish, turtles, relatively small mammals, birds, and other reptiles including small alligators (FLMNH 2002).

Based on a review of NHP records, there are no documented occurrences of American alligator within a three-mile radius of the project area.

BIOLOGICAL CONCLUSION: Not Applicable

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the American alligator was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

Bald Eagle (*Haliaeetus leucocephalus*)
Adult bald eagles have a white head, white tail, and a large yellow bill, with the rest of its plumage being dark in color. Immatures are dark with light splotching on the body, underwing coverts, flight feathers, and tail base. The bird averages 31 to 37 inches in length with a 70 to 90 inch wingspan (NatureServe 2003b).

Breeding areas are normally within 2.5 miles of coastal areas, bays, rivers, lakes, or other bodies of water that can provide them with their main food sources; fish, waterfowl, and seabirds (NatureServe 2003b). Manmade reservoirs provide an excellent habitat for bald eagles (TPW 2004). The bald eagle preferably roosts in conifers or other sheltered sites in the winter, and it will typically select large accessible trees for roosting areas. However, in some areas it is common to see eagles roosting in both coniferous and deciduous trees. Eagles avoid areas with human activity nearby (boat traffic, pedestrians) and development (buildings). Nest sites are usually in tall trees or on cliffs near water. The bald eagle will nest in a variety of trees including, pines, spruce, firs, cottonwoods, oaks, poplars, and beech. Ground nesting has been reported on the Aleutian Islands in Alaska, in Canada's Northwest Territories, and in Ohio, Michigan, and Texas. Nests located on cliffs and rock pinnacles have been reported historically in California, Kansas, Nevada, New Mexico, and Utah, but currently are known to occur only in Alaska and Arizona (NatureServe 2003b). Nests are usually re-used and enlarged every year. They can reach 20 feet in diameter and weigh up to 4,000 pounds (FWS 1999).

Based on a review of NHP records, there are no documented occurrences of bald eagle within a three-mile radius of the project study area.

BIOLOGICAL CONCLUSION: No Effect
According to the NHP element occurrence database records, there are no known occurrences of bald eagle in the project vicinity. There are no large open waters near the project study area that could be used for nesting, or foraging habitat by the bald eagle. The proposed project would have No Effect on this federally threatened (proposed for delisting) species.

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the bald eagle was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

Red-cockaded woodpecker (RCW) (*Picoides borealis*)
The RCW is a cardinal sized seven to eight inch long, black and white woodpecker with a black cap on its head. It has a ladder pattern on the back and large white cheeks, which are unique among woodpeckers in its range (Audubon 2004). It is distinguished by two red streaks on each side of the black cap, which are referred to as cockades. There are normally only visible on adult males (NWF 2004).

Nesting habitat for the RCW is made up of large open pine stands (pine flatwoods and pine dominated savannas) that are typically at least 80 years of age with little or no mid-story. Fires that occur as a result of lighting strikes often naturally maintain this habitat. Foraging habitat is comprised of open pine or mixed pine/hardwood stands 30 years of age or older (Henry 1989). Nests are typically constructed 33 to 43 feet off of the ground in live pines that have been infected with red-heart disease. These nests can sometimes take several years to construct and are often reused. The RCW constructs resin wells below the opening to the nest to create a sticky coating on the bark of the tree; this coating protects the nest from predators such as rat snakes. The sticky coating has a shiny appearance, which allows the nest cavities to be easily seen from the ground. Red-cockaded woodpeckers forage in a wide variety of pine species and especially favor areas that contain large trees due to the large surface area of loose bark. They feed on adults, larvae, and eggs of arthropods, especially ants and termites that they find by flaking bark from the tree (Audubon 2004).

NHP records document two occurrences of red-cockaded woodpecker within a three-mile radius of the project study area. Red-cockaded woodpecker occurred approximately 1.25 miles north and less than 1.0 miles southeast. These occurrences are listed as historic by the NHP, meaning that they occurred more than 20 years ago.

BIOLOGICAL CONCLUSION: No Effect
The NHP has documented RCW occurrences within the project vicinity, however these occurrences were documented more than 20 years ago and the RCW has not been documented since. There are no mature pine-dominated stands that could be used for nesting, or foraging habitat by the red-cockaded woodpecker. Also, no

cavity trees were observed within a 0.5-mile radius of the study area. Therefore, the proposed project would have No Effect on this federally endangered species.

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the red-cockaded woodpecker was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

Shortnose Sturgeon (*Acipenser brevirostrum*)
The shortnose sturgeon is a large fish, which can weigh up to 50 pounds and reach lengths of 43 inches (FishBase 2004). It has a heterocercal tail, short shovel-shaped (bluntly V-shaped) snout (not upturned at tip), with large fleshy barbels. It has a ventral mouth, with large bony scutes on the head, back, and sides (paler than adjacent skin). The anal fin origin is beneath the dorsal fin origin. The color of the back is dark brown to black, with light brown to yellow lower sides, and white a stomach (NatureServe 2003a).

The shortnose sturgeon inhabits rivers, lakes, estuaries (usually most abundant in estuaries), and bays; occasionally enters the open sea (FishBase 2004), and will usually stay within a few miles of land while at sea (NatureServe 2003a). The shortnose sturgeon may spend most of the year in brackish or saltwater moving into freshwater to spawn (FWS 2003d). These fishes reportedly prefer deep pools with soft substrates and vegetated bottoms, but individuals may vary in preference for various water depths and substrate types (NatureServe 2003a).

Based on a review of NHP records, there are no documented occurrences of Shortnose Sturgeon within a three-mile radius of the project study area.

BIOLOGICAL CONCLUSION: No Effect
According to the NHP element occurrence database records, there are no known occurrences of the shortnose sturgeon in the project vicinity. Brackish or salt water used by the shortnose sturgeon for foraging is not present within the project study area. Also, the deep freshwater pools utilized by the shortnose sturgeon for spawning, are not present within the project study area. The proposed project would have No Effect on this federally endangered species.

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the shortnose sturgeon was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

Southern Spicebush (*Lindera melissifolia*)
Southern spicebush is also known as pondberry and is a stoloniferous, deciduous, aromatic shrub that can grow up to 13 feet tall. Southern spicebush usually occurs in

clones of numerous stems with erect or ascending shoots and few branches. The alternate drooping leaves are subcordate with prominate venation and pubescence on the lower surface (USDA 2004). The leaves smell like lemony-sassafras when crushed. Small pale yellow flowers bloom in early spring before the leaves have developed, and the bright red fruits often persist on the plants after the leaves have died in the Fall (NatureServe 2003c).

The species occurs in lowland habitats with hydric soils, that are usually flooded in winter (USDA 2004). These lowland habitats include seasonally flooded wetlands, such as floodplain hardwood forests, forested swales, along the margins of sinks, ponds, and depressions in pinelands in coastal areas of the Carolinas (NatureServe 2003c). Southern spicebush grows in shaded areas, but has been known to grow in full sun (FWS 2003b).

Based on a review of NHP records, there are no documented occurrences of southern spicebush within a three-mile radius of the project area.

BIOLOGICAL CONCLUSION: No Effect
According to the NHP element occurrence database records, there are no known occurrences of southern spicebush in the project vicinity. Due to ditching within the project study area, the hydrology necessary to support southern spicebush is not present within the project study area. The proposed project would have No Effect on this federally endangered species.

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the southern spicebush was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

Rough-leaved Loosestrife (*Lysimachia asperulaefolia*)
Rough-leaved loosestrife is an erect, rhizomatous, perennial herb that grows to one to two feet in height, with whorls of three to four leaves that encircle the stem at intervals, below a yellow inflorescence. Blooming occurs from mid-May through June. Fruiting occurs from July to October (FWS 2003c).

Rough-leaved loosestrife generally occurs on acidic, moist to seasonally saturated sands and on acidic, shallow, organic soils overlaying sand. It also grows on shallow, poorly drained, deep peat soils of low pocosins and Carolina bays (US Army 2003b). Rough-leaved loosestrife occurs most often along the ecotone between longleaf pine uplands and pond pine pocosins (areas of areas of dense shrub and vine growth usually on a wet, peaty, poorly drained soil) (FWS 2003c). Rough-leaved loosestrife has also been found in ecotones between pocosins and longleaf pine savanna, longleaf pine flatwoods, sandhills seeps, and pond and lake margins (US Army 2003b).

Based on a review of NHP records, there are no documented occurrences of rough-leaved loosestrife within a three-mile radius of the project area.

BIOLOGICAL CONCLUSION: No Effect
According to the NHP element occurrence database records, there are no known occurrences of rough-leaved loosestrife in the project vicinity. There are no Carolina bays or pocosins that could support rough-leaved loosestrife within the project study area. The proposed project would have No Effect on this federally endangered species.

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the rough-leaved loosestrife was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

American Chaffseed (*Schwalbea americana*)
American chaffseed is a perennial herb with mostly unbranched stems, usually one to two feet tall. Leaves are largest at the base of the plant and gradually diminish in size towards the top of the stem. The two-lipped tubular flowers are yellow, suffused with purple. American chaffseed blooms from April through June in the South and from June to late July in the North (NatureServe 2003d). The leaves are alternate, lance shaped to elliptic, stalkless, and are one to two inches in length. The fruits are long and narrow and enclosed in a sac like structure, fruits mature from early summer in the south, to October in the north (FWS 2003a). This species is parasitic on the roots of a wide variety of woody and herbaceous plants (NatureServe 2003d).

American chaffseed typically grows in sandy (sandy peat, sandy loam), acidic, and seasonally moist to dry soils. It is generally found in habitats described as open, moist pine flatwoods, pine/wiregrass savannas, and ecotonal areas between peaty wetlands and xeric sandy soils (US Army 2003a). All of these habitats were historically maintained by human or lightning-caused wildfires. American chaffseed is dependent on factors such as fire, mowing, or fluctuating water tables to maintain the crucial open to partly-open conditions that it requires (FWS 2003a). These habitats are species-rich with grasses, sedges, and savanna dicots being especially numerous (US Army 2003a). Natural communities that could include American chaffseed are; open pine flatwoods, pitch pine lowland forests, seepage bogs, palustrine pine savannahs, and other grass and sedge-dominated plant communities (NatureServe 2003d).

Based on a review of NHP records, there are no documented occurrences of American chaffseed within a three-mile radius of the project study area.

BIOLOGICAL CONCLUSION: No Effect
According to the NHP element occurrence database records, there are no known occurrences of American chaffseed in the project vicinity. There are no open, moist pine flatwoods, pine/wiregrass savannas, or ecotonal areas between peaty wetlands and xeric sandy soils that could support American chaffseed present

within the project study area. The proposed project would have No Effect on this federally endangered species.

Analysis Details –
Methodology: Analysis of the possible presence of and potential impacts to the American chaffseed was conducted through an evaluation of existing information, and assessment of the habitat requirements. Additionally, the NHP element occurrence database was consulted on March 29, 2004.

2.0 Federal Species of Concern

The March 14, 2006 FWS list for Bladen County also includes a category of species designated as "Federal Species of Concern" (FSC). The FSC designation provides no federal protection under the ESA for the species listed. The presence of potential suitable habitat within the project study area has been evaluated for the following FSC species listed for Bladen County shown in Table 5.

Table 5: Federal Species of Concern (FSC) Listed for Bladen County, NC

Common Name	Scientific Name	State Status*	Potential Habitat
Vertebrates			
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	T	Yes
Southeastern myotis	*Myotis austroriparius*	SC**	Yes
Bachman's sparrow	*Aimophila aestivalis*	SC	No
American eel	*Anguilla rostrata*	SC	Yes
Black throated green warbler	*Dendroica virens waynei*	SR	Yes
Southern hognose snake	*Heterodon simus*	SC~	Yes
Mimic glass lizard	*Ophisaurus mimicus*	SC	Yes
Broadtail madtom	*Noturus sp. 1*		Yes
Carolina gopher frog	*Rana capito*	T	No
Invertebrates			
Atlantic pigtoe	*Fusconaia masoni*	E	No
Yellow lampmussel	*Lampsilis cariosa*	E	No
Buchholz's dart moth	*Agrotis sp. 1 nr buchholzi*	SR**	No
Venus flytrap cutworm moth	*Hemipachnobia subporphyrea*	SR	No
Belle's sanddragon	*Progomphus bellei*	SR	No
Carter's noctuid moth	*Spartiniphaga carterae*	SR**	No
Hessel's hairstreak	*Callophyrs hesseli*	#	Yes
Veriegated clubtail	*Progomphus bellei*	SR	Yes
Vascular Plants			
Savanna indigo-bush	*Amorpha georgiana var confusa*	T	Yes
Carolina spleen wort	*Asplenium heteroresiliens*	E	No
Sandhills milk-vetch	*Astragalus michauxii*	T	Yes
Chapman's sedge	*Carex chapmanii*	#	Yes
Venus flytrap	*Dionaea muscipula*	SR-L, SC	No
White wicky	*Kalmia cuneata*	#	No
Pondspice	*Litsea aestivalis*	SR-T	No
Boykin's lobelia	*Lobelia boykinii*	T	No
Carolina bogmint	*Macbridea caroliniana*	T	No
Carolina grass of parnassus	*Parnassia caroliniana*	E	No
Pineland plantain	*Plantago sparsiflora*	E	Yes
Spiked Medusa (=Eulophia)	*Pteroglossaspis ecristata*	E	Yes
Awned meadow beauty	*Rhexia aristosa*	T	No
Grassleaf arrowhead	*Sagittaria weatherbana*	SR-T	No
Spring-flowering goldenrod	*Solidago verna*	SR-L	No
Pickering's dawnflower	*Stylisma pickeringii ver pickeringii*	E**	Yes
Carolina asphodel	*Tofieldia glabra*	#*	No

E - Endangered, T - Threatened, SR - Significantly Rare, SC - Special Concern, SR-T - Rare throughout its range, SR-L – Range is limited to NC and adjacent states, SR-P – Periphery of its range in NC
*** - No longer tracked by NHP, ** - Occurs on NHP list but not on USFWS list, # - Not listed as a FSC on NHP list, ^ - Obscure record, ~ - Historic record (last observed over 50 years ago)**

NHP records were reviewed to determine the known locations of FSC within the project vicinity. NHP records document four occurrences of FSC within a three-mile radius of the project study area. The Venus flytrap occurred less than one mile north of the project area, and is listed as historic by the NHP (occurrence greater than 20 years old). A southern hognose snake occurred approximately one mile southeast of the project study area, and is listed as obscure by the NHP (data of occurrence unknown). The Atlantic pigtoe occurred twice, approximately three miles northeast and three miles north of the project study area, and is listed as current by the NHP (occurred in the last 20 years). The yellow lampmussel occurred approximately three miles northeast, and is listed as current by the NHP.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires that for federally funded, licensed, or permitted projects having effects on properties listed in or eligible for the National Register of Historic Places, the Advisory Council on Historic Preservation be given the opportunity to comment.

B Historic Architecture

In a memorandum dated June 23, 2004 the State Historic Preservation Office (SHPO) concurred that no historic resources would be affected by the proposed project. A copy of the memorandum is included in the Appendix.

C. Archaeology

The SHPO, in a memorandum dated June 23, 2004 states, "We have conducted a review of the project and are aware of no historic resources which would be affected by the project." A copy of the SHPO memorandum is included in the Appendix.

VII. SECTION 4(f) RESOURCES

Section 4(f) of the Department of Transportation Act of 1966, as amended, states in part "The Secretary may approve a transportation project or program requiring the use of publicly owned land of a park, recreation area, or wildlife and waterfowl refuge, or land of a historic site of national, state, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, recreation area, refuge, or site) only if:

(1) there is no prudent or feasible alternative to using that land; and

(2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use."

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

VIII. ENVIRONMENTAL EFFECTS

The project is expected to have a positive affect on transportation and the surrounding community. The replacement of the inadequate bridge would result in safer and more efficient traffic operations.

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

Replacement of Bridge No. 8 would not have a negative effect on the quality of the human or the natural environment.

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

No adverse impact on families or the community is expected. Right-of-way acquisition would be limited; no relocations are expected with the implementation of the proposed alternative.

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations) a review was conducted to determine whether minority or low-income populations would receive disproportionately high and adverse human health and environmental impacts as a result of this project. The investigation determined the project would not disproportionately impact any minority or low-income populations.

No adverse effect to public facilities or services is expected. The project is not expected to adversely affect social, economic, or religious opportunities in the area. There would be some inconvenience to local travel due to construction activities on NC 210.

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

This project has been coordinated with the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impact to prime farmland for all land acquisition and construction projects. Soils were identified within a 0.5-mile radius of the project area, and checked to see if they were classified as prime, unique, or have state or local importance. Four of the soils identified were on the NRCS list, *Important Farmlands of North Carolina, May 1998*. Soils in which only drained areas are considered prime farmland included, Wasda Muck (Wh), and Torhunta Mucky Sandy Loam (Tr). Soils in which only drained areas are considered unique farmland included, Leon Sand, 0 to 3 percent slopes (LeA), and Lynn Haven and Torhunta soils (Ly). If Impacts to these soils occur as a result of the proposed project, they are expected to be limited in nature.

No adverse effects to air quality are anticipated from this project. This project is an air quality "neutral" project; therefore, it is not required to be included in the regional emissions analysis, and a project level CO analysis is not required.

The project is located in Bladen County, which has been determined to comply with the National Ambient Air Quality Standards. The proposed project is located in an attainment area; therefore, 40 CFR Parts 51 and 93 are not applicable. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

If vegetation or wood debris are disposed of by open burning, it shall be done in accordance with applicable local laws and regulations of the North Carolina Implementation Plan (SIP) for air quality in compliance with 15 NCAC 2D.0520 and the 1990 Clean Air Act Amendments and the National Environmental Policy Act. This evaluation completes the assessments for air quality, and no additional reports are required.

Ambient noise levels may increase during the construction of this project; however, this increase would be only temporary and usually confined to daylight hours. There should be no notable change in traffic volumes after the project is complete. Therefore, this project would have no adverse effect on existing noise levels. Noise receptors in the project area would not be impacted by this project. This evaluation completes the assessment requirements for highway noise set forth in 23 CFR Part 722. No additional reports are required.

A "Geo-Environmental Impact Evaluation" was conducted by the NCDOT at the project site to identify any properties that may contain hazardous waste materials and result in future environmental liability if acquired. These hazards include: underground storage tanks (USTs), hazardous waste sites, regulated landfills, unregulated dumpsites, and any other site or materials that are considered hazardous. A field reconnaissance survey, a file search of appropriate environmental agencies, and a Geographical Information System (GIS) were used to identify any known problem sites along the proposed project alignment. The field reconnaissance survey yielded no anticipated UST sites within the

project area. A GIS analysis of the project corridor showed no regulated landfills, or unregulated dumpsites were within the project limits. GIS analysis and field reconnaissance found no potential RCRA or CERCLA sites within the project limits. Based on field reconnaissance and a records search there should be no contamination issues for the B-4029 project.

Bladen County is a participant in the Federal Flood Insurance Program. The bridge is not within a Detailed Study Area. The new structure should be designed to match or lower the existing 100-year storm elevation upstream of the roadway. Since the proposed replacement for Bridge No. 8 would be a structure similar in waterway opening size, it is not anticipated that it would have any significant adverse impact on the existing floodplain and floodway, and would not raise the floodplain levels. The Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) for the project study area is attached.

Based on the above discussion, it is concluded that no substantial or long-term environmental impacts would result from the replacement of Bridge No. 8.

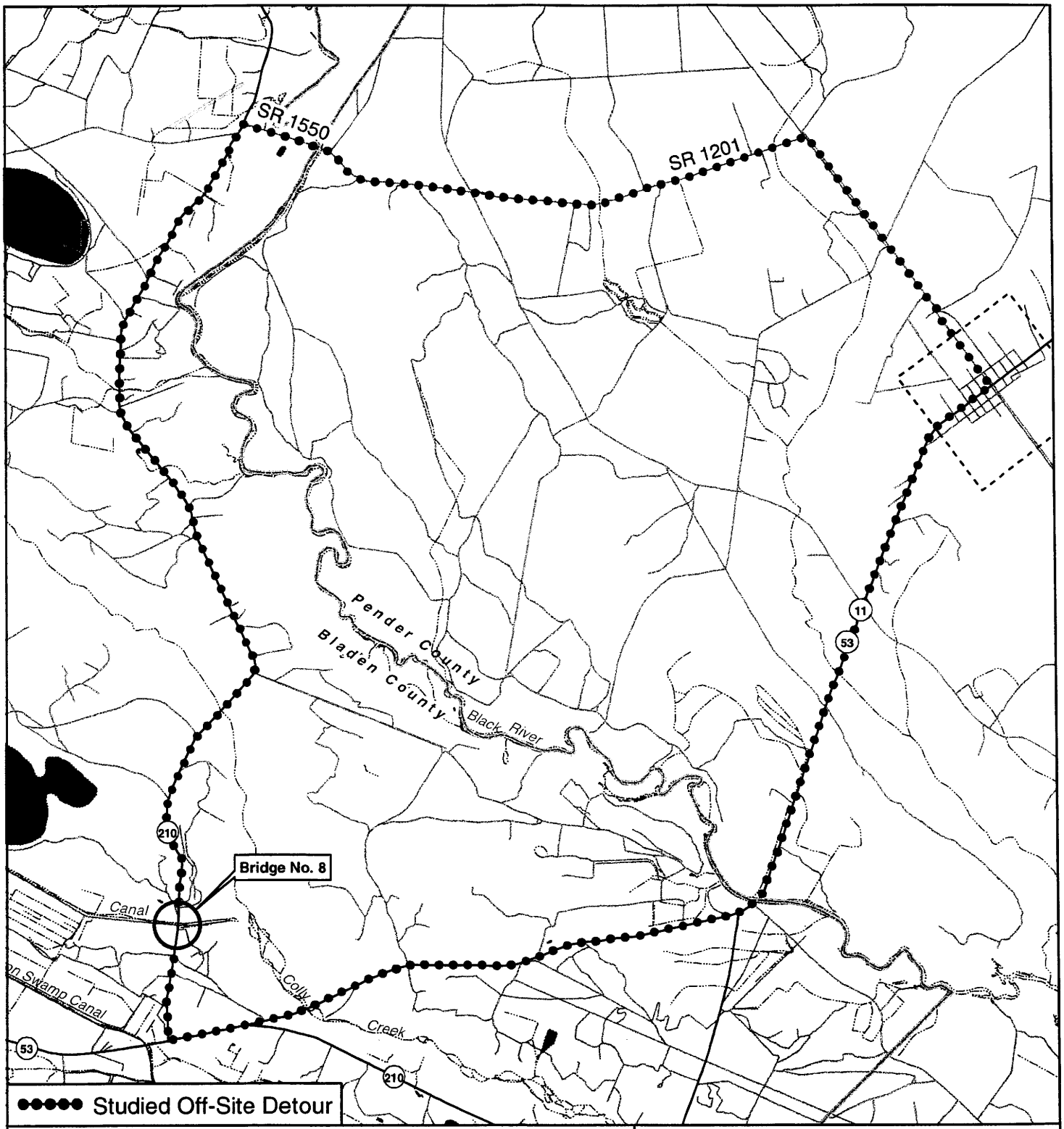
IX. PUBLIC INVOLVEMENT

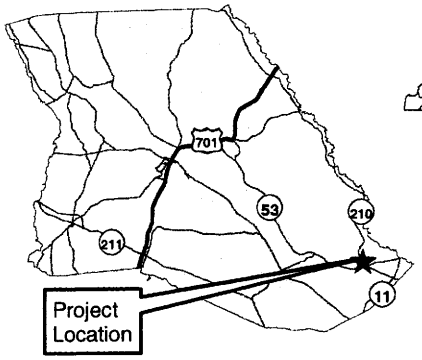
Newsletters describing the proposed bridge replacement project were sent to local residents. The newsletters give the public an opportunity to comment on the possible alternatives for the proposed bridge replacement. A copy of the newsletter is included in the Appendix. No comments were received.

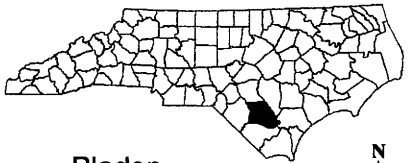
X. AGENCY COMMENTS

Comments on the proposed project were requested from federal, state, and local agencies. Several agencies have commented upon the proposed bridge alignment. These comments have been considered during the environmental and design process and are included in the Appendix.

FIGURES







Bladen
County, NC

N
W E
S

0 5,280
Feet

North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

NC 210
Replace Bridge No. 8 Over Canal
Bladen County
B-4029

PROJECT VICINITY MAP | Figure 1

North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

N.C. 210
Replace Bridge No. 8 Over Canal
Bladen County
B-4029

SCALE: 1" = 150'

Figure 2A

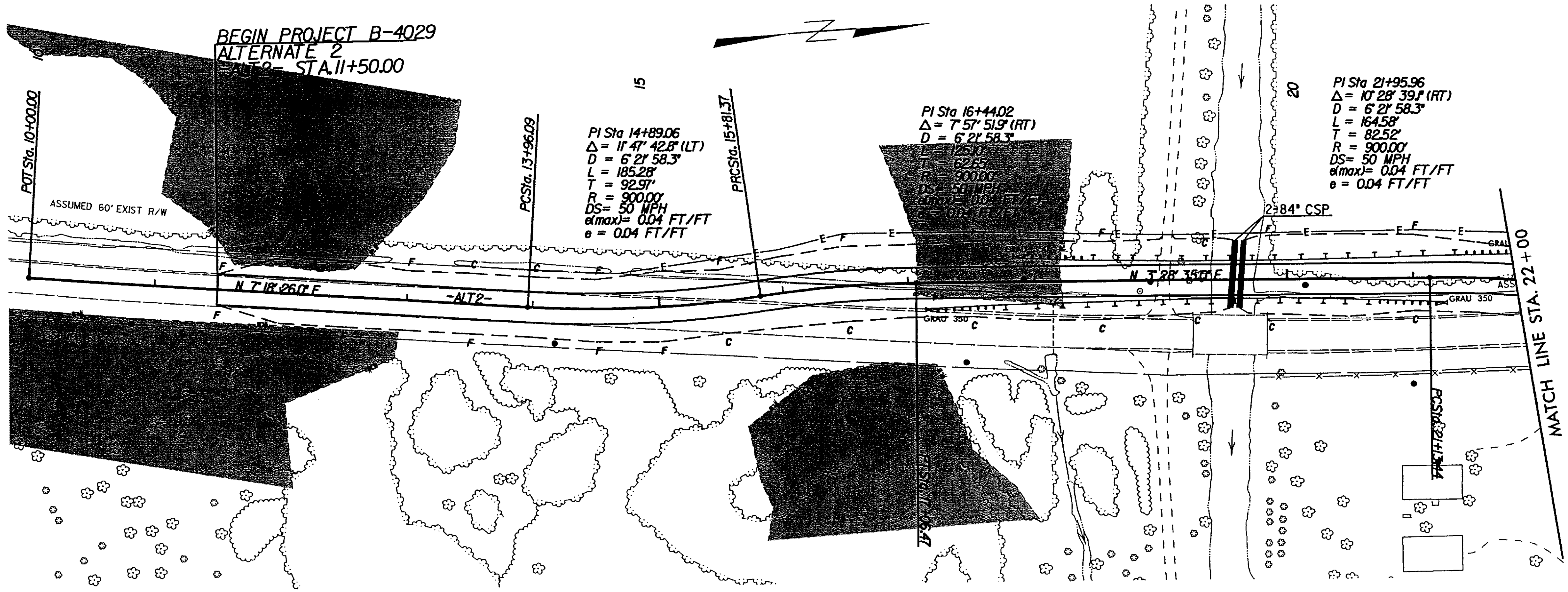
PROJECT REFERENCE NO.	SHEET NO.
B-4029	1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



B4029 (ALTERNATE 2)

(TEMPORARY DETOUR)

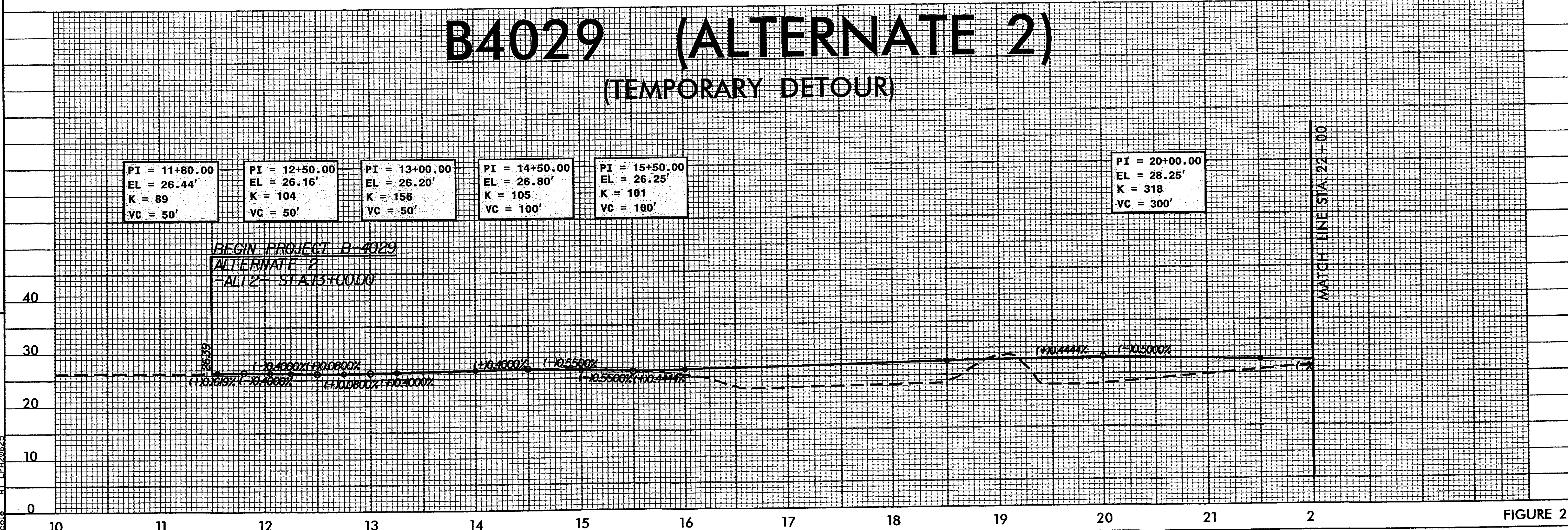


FIGURE 2B

27-MAR-2006 13:34 ...\B4029\pro\b4029_rdy_alt2_psh1.dgn

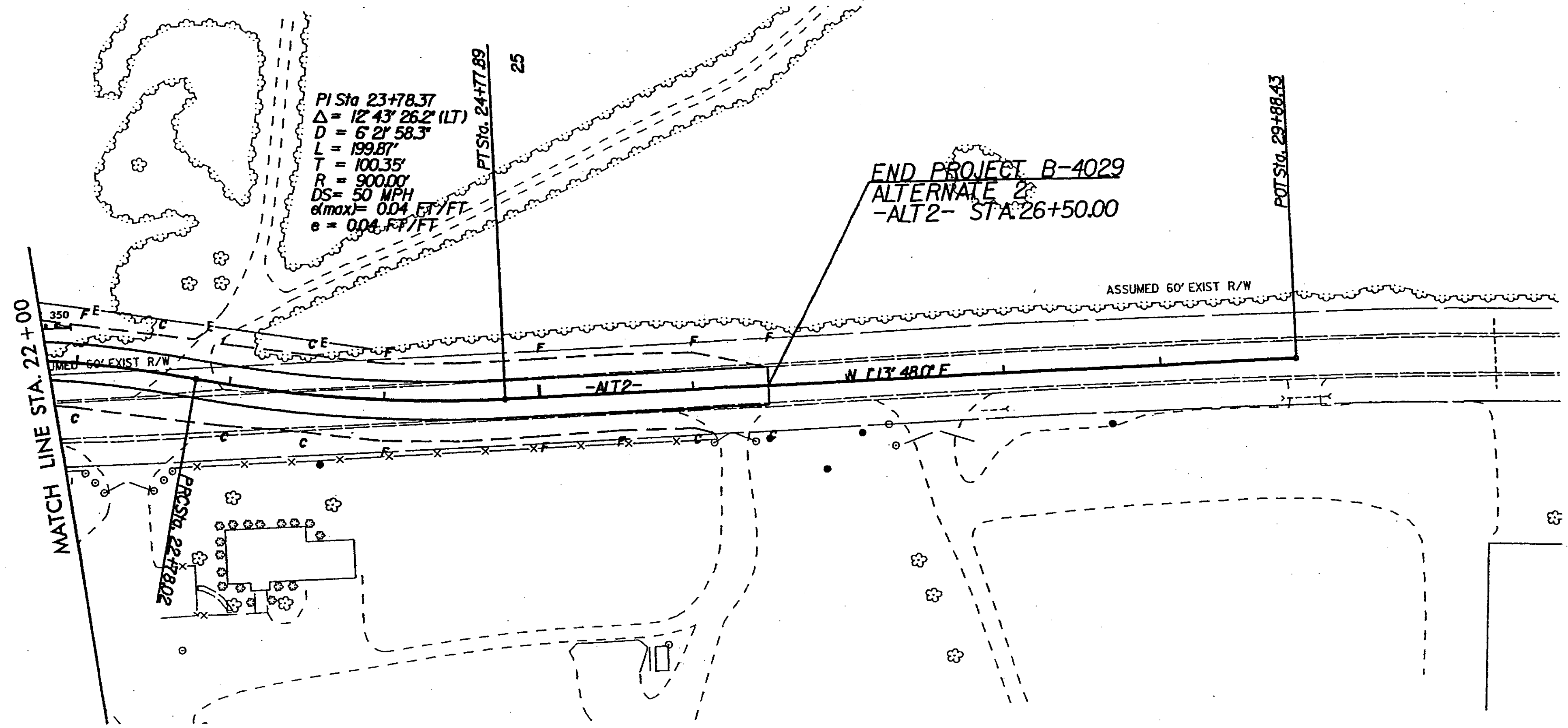
B-4029	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

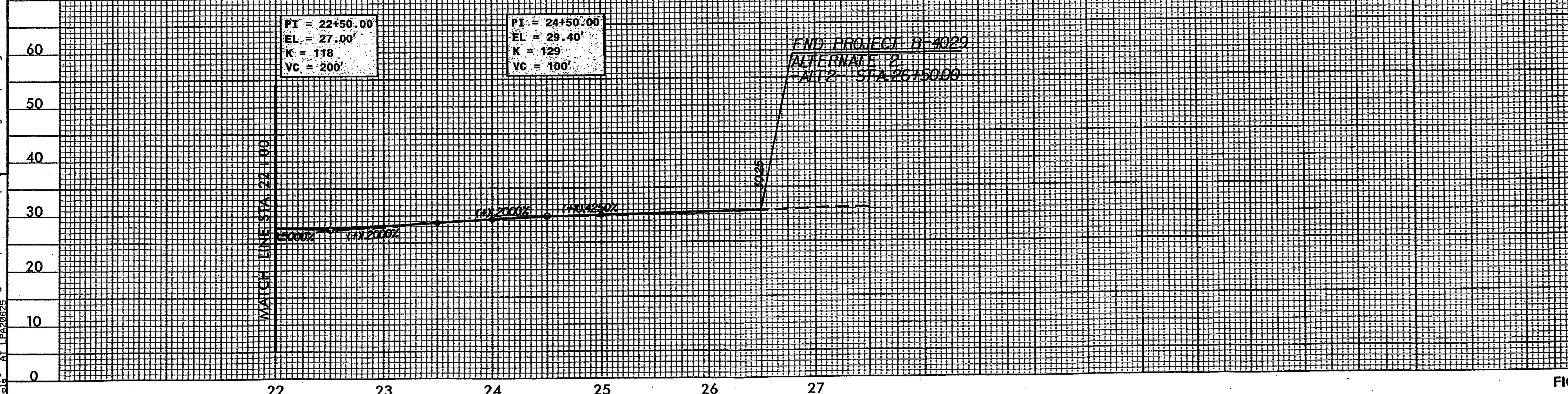
8/17/99

REVISIONS



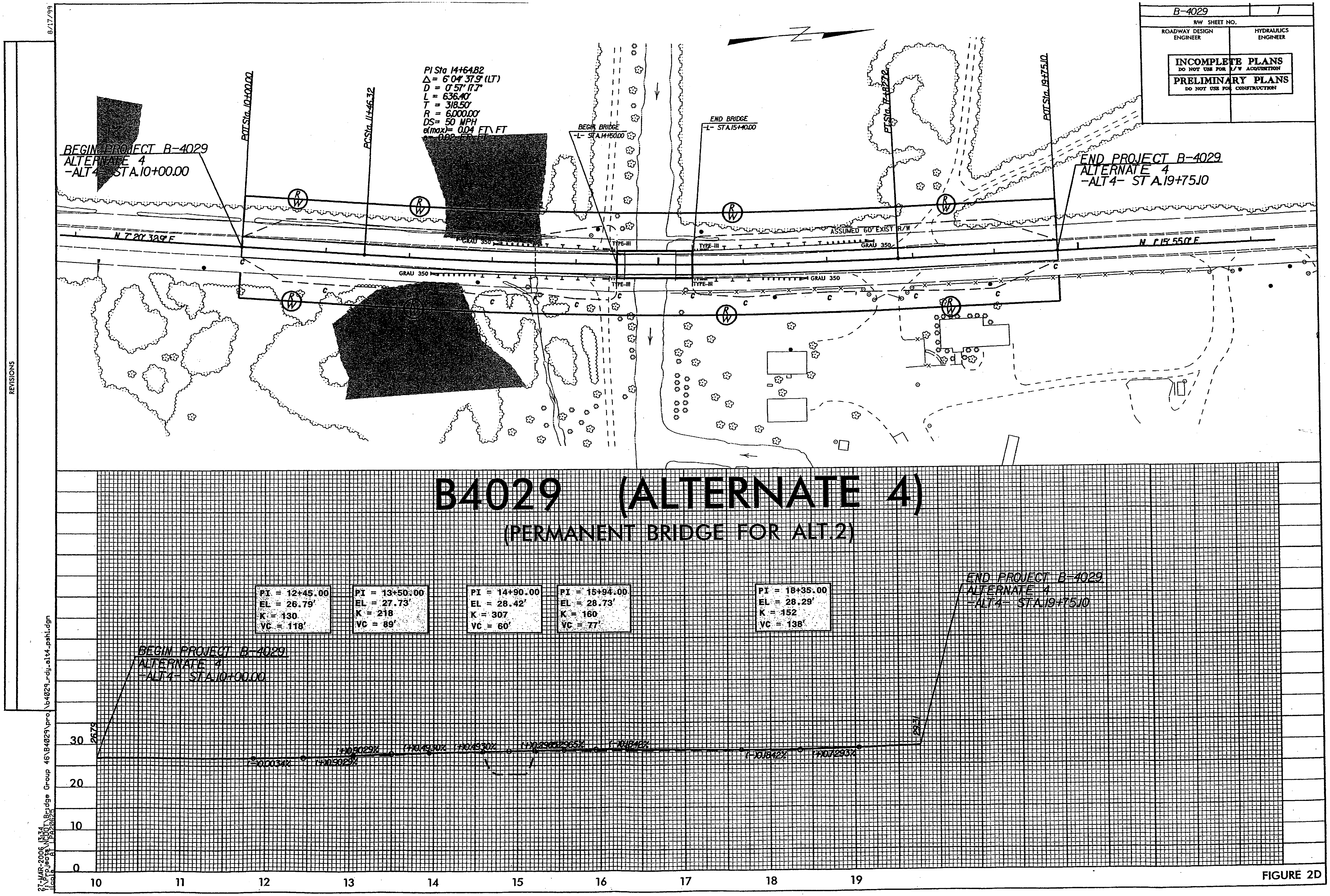
B4029 (ALTERNATE 2)

(TEMPORARY DETOUR)



27-MAR-2006 13:34
r:\Projects\NCDOT Bridge Group 4B\B4029\pro\b4029_rdy_alt2_psh2.dgn

FIGURE 2C



B-4029
1
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
REVISIONS
8/17/99
PI Sta 14+64.82
Δ = 6°04' 37.9" (LT)
D = 0°57' 17.7"
L = 636.40'
T = 318.50'
R = 6,000.00'
DS= 50 MPH
e(max)= 0.04 [redacted] FT
[redacted]
BEGIN PROJECT B-4029
ALTERNATE 4
-ALT4- [redacted] STA.10+00.00
POT Sta. 10+00.00
PC Sta. 11+46.32
BEGIN BRIDGE
-L- STA.14+50.00
END BRIDGE
-L- STA.15+40.00
PT Sta. 17+82.79
POT Sta. 19+75.10
END PROJECT B-4029
ALTERNATE 4
-ALT4- STA.19+75.10
N 7°20' 32.9" E
N 1°15' 55.0" E
ASSUMED 60' EXIST R/W
GRAU 350
TYPE-III
B4029 (ALTERNATE 4)
(PERMANENT BRIDGE FOR ALT.2)
PI = 12+45.00
EL = 26.79'
K = 130
VC = 118'
PI = 13+50.00
EL = 27.73'
K = 218
VC = 89'
PI = 14+90.00
EL = 28.42'
K = 307
VC = 60'
PI = 15+94.00
EL = 28.73'
K = 160
VC = 77'
PI = 18+35.00
EL = 28.29'
K = 152
VC = 138'
BEGIN PROJECT B-4029
ALTERNATE 4
-ALT4- STA.10+00.00
END PROJECT B-4029
ALTERNATE 4
-ALT4- STA.19+75.10
26.79
29.31
(+)0.9029%
(+)0.4930%
(-)0.1842%
(+)0.7293%
0
10
20
30
10
11
12
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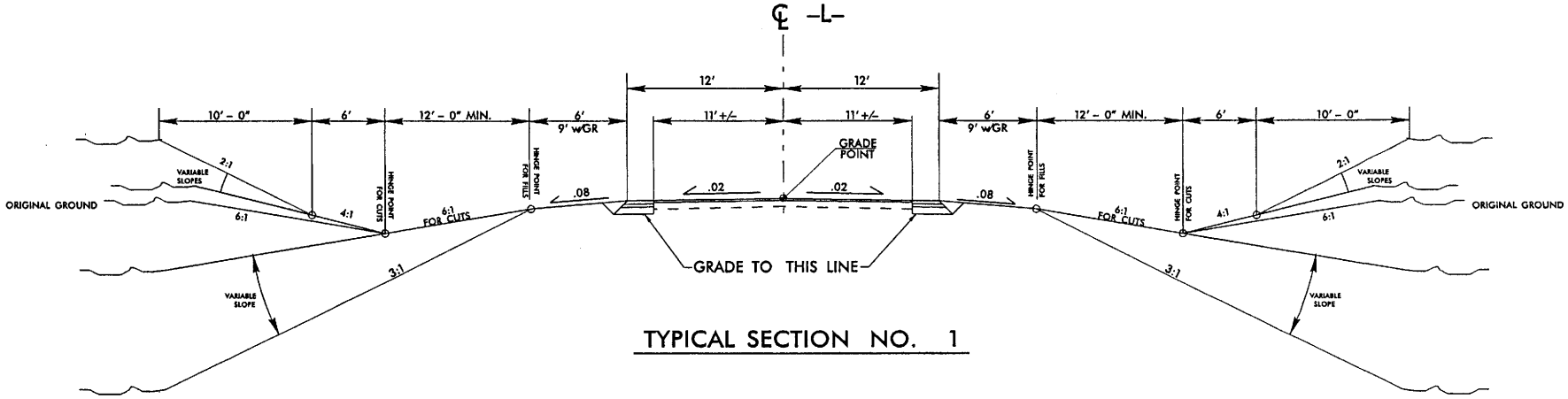
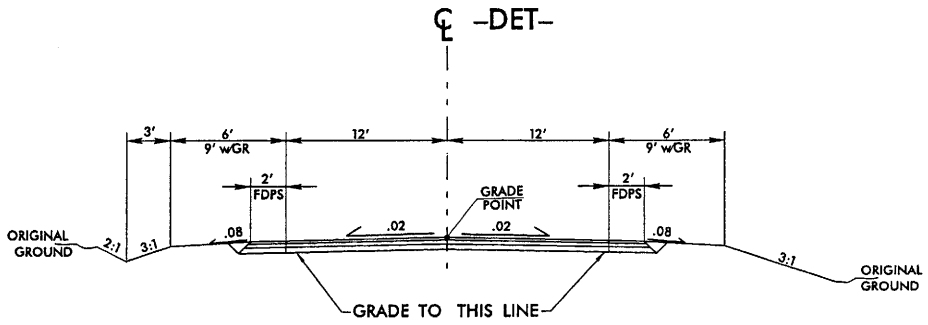
27-MAR-2006 13:34
b4029_rdy_alt4_psh1.dgn
FIGURE 2D



TYPICAL SECTION NO. 1



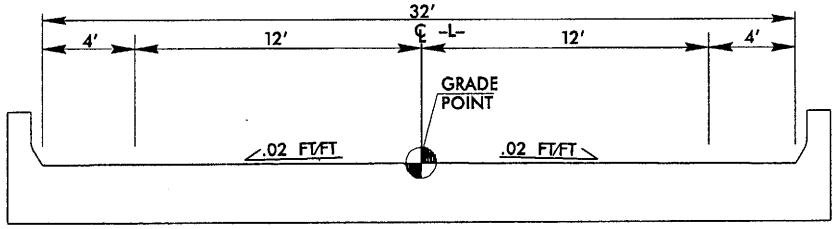
TYPICAL SECTION NO. 2

North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

N.C. 210
Replace Bridge No. 8 Over Canal
Bladen County
B-4029

NOT TO SCALE

Figure 3A



TYPICAL BRIDGE SECTION

North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

N.C. 210
Replace Bridge No. 8 Over Canal
Bladen County
B-4029

NOT TO SCALE

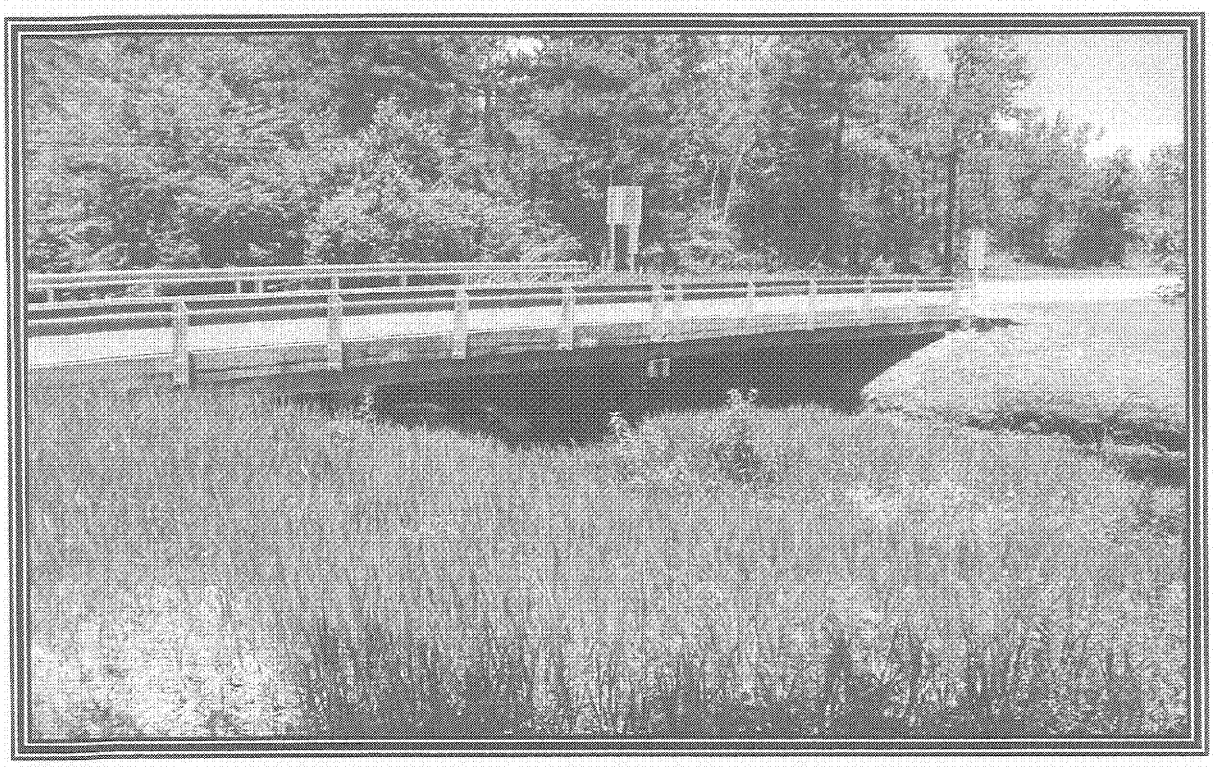
Figure 3B

BLADEN COUNTY BRIDGE No. 8 B-4029

Looking North on NC 210

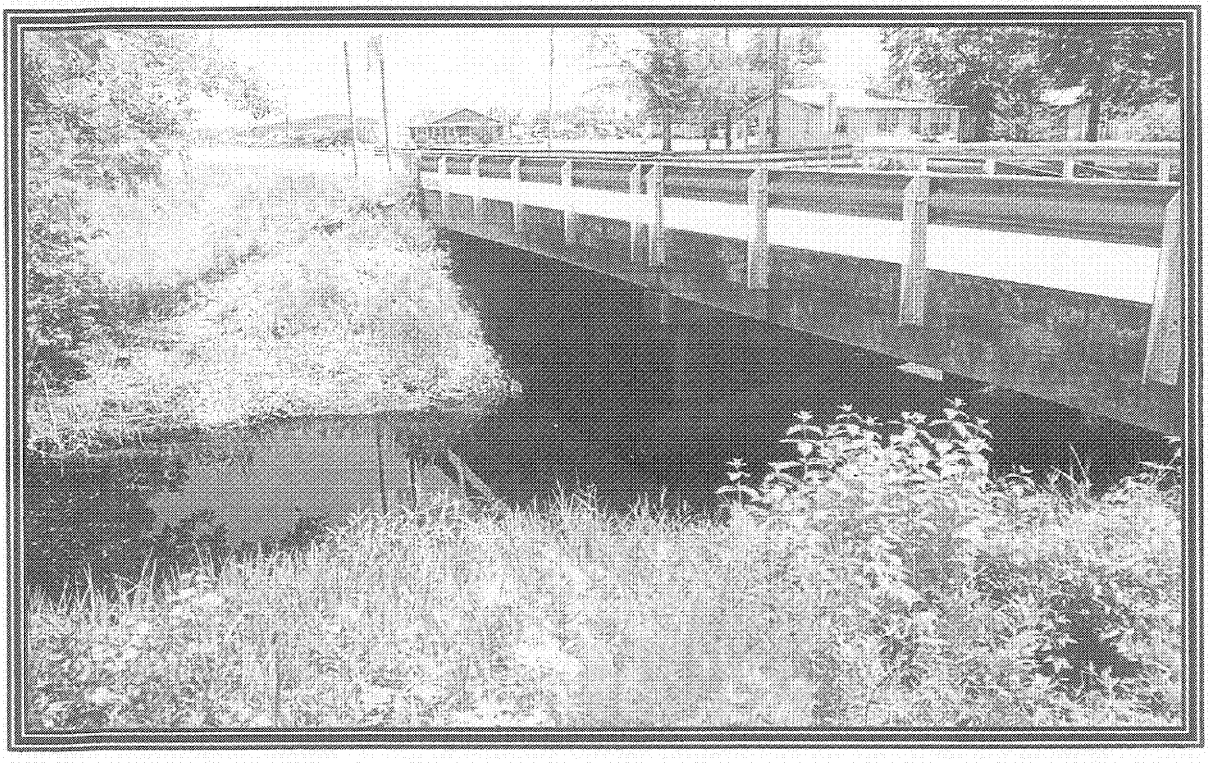
Looking South on NC 210

FIGURE 4A



BLADEN
COUNTY
BRIDGE No. 8
B-4029

Looking at the
East Side of
Bridge No. 8

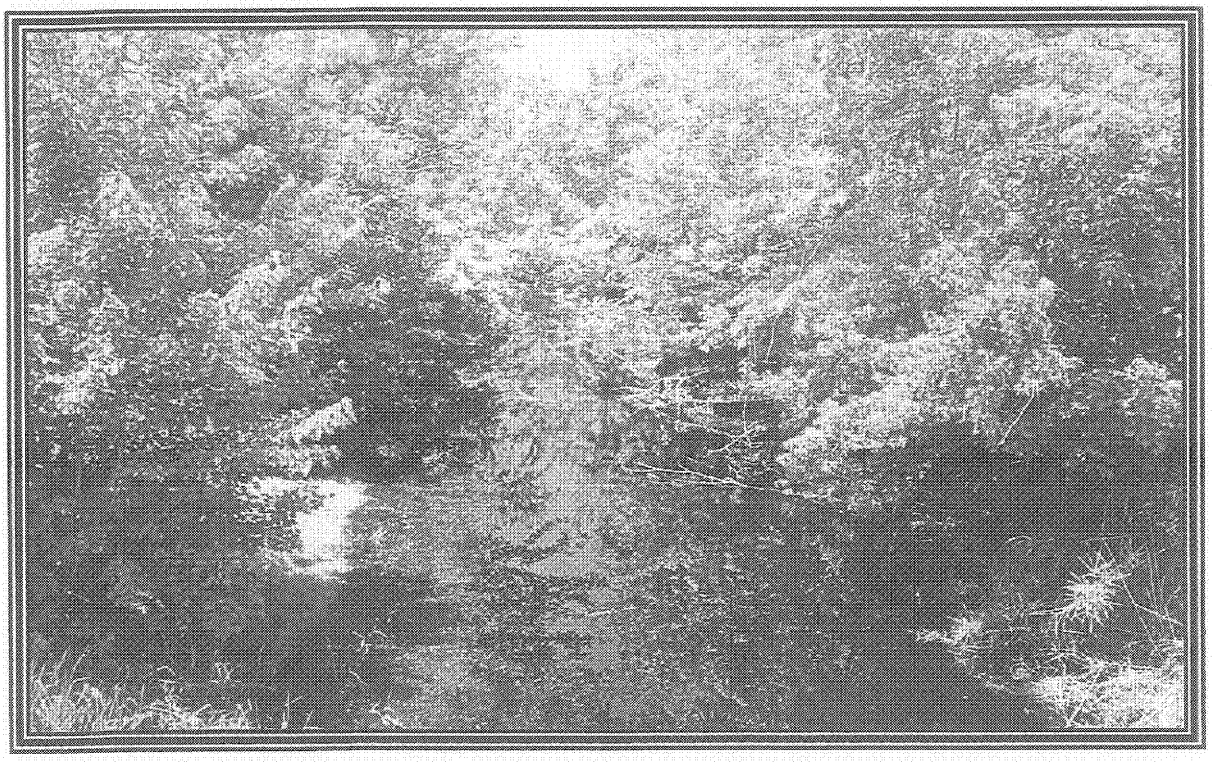


Looking at the
West Side of
Bridge No. 8

FIGURE 4B

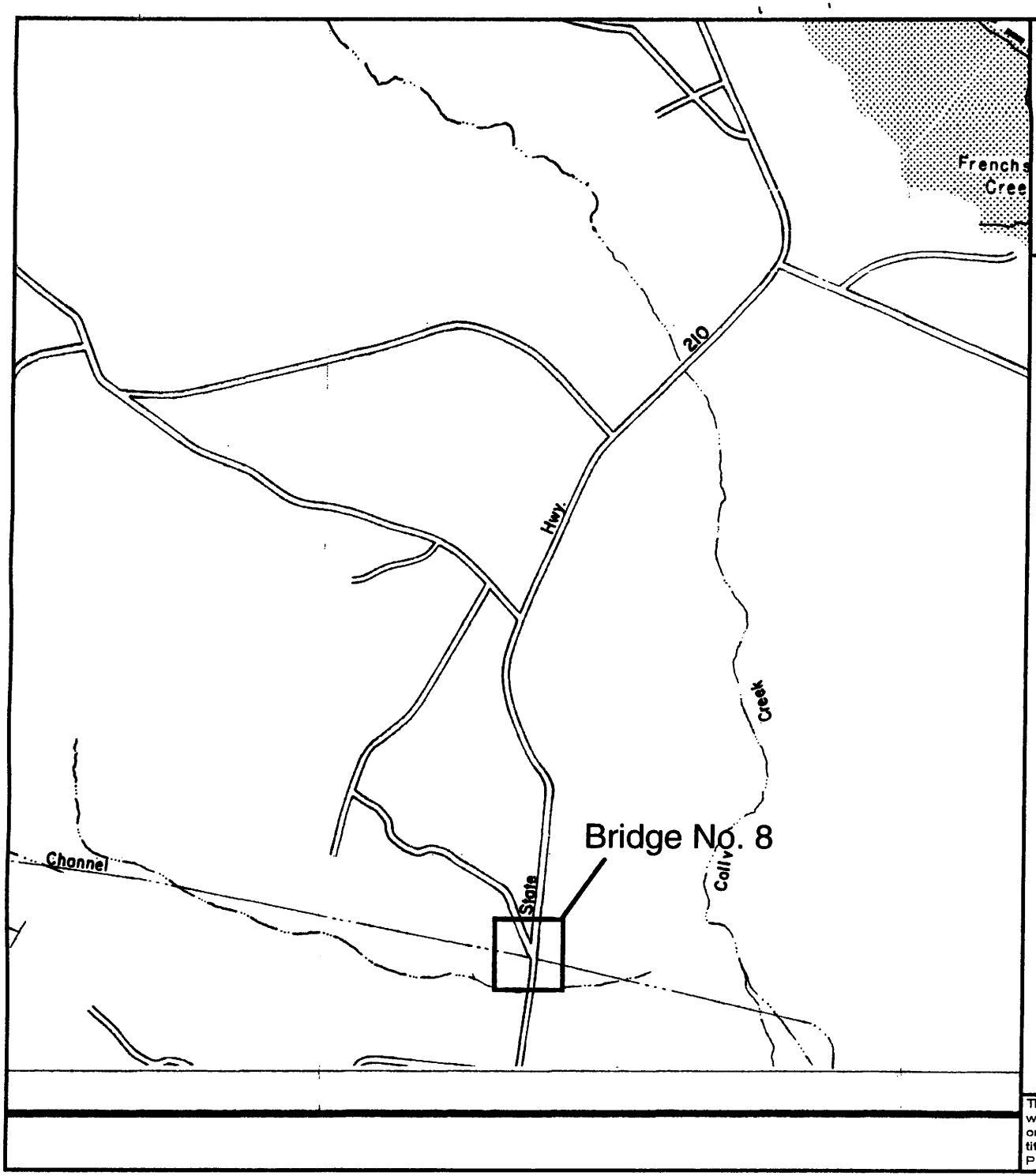
BLADEN
COUNTY
BRIDGE No. 8
B-4029

Looking
Downstream at
Unnamed Canal



Looking
Upstream at
Unnamed Canal

FIGURE 4C



APPROXIMATE SCALE IN FEET:

2000 0 2000

FLOOD HAZARD BOUNDARY MAP

BLADEN COUNTY
NORTH CAROLINA
UNINC. AREAS

PAGE 10 OF 13
(SEE MAP INDEX FOR PAGES NOT PRINTED)

EFFECTIVE DATE:
JANUARY 20, 1978

CONVERTED BY LETTER
EFFECTIVE 9/1/89

COMMUNITY–PANEL NUMBER
370293 0010 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 5

APPENDIX

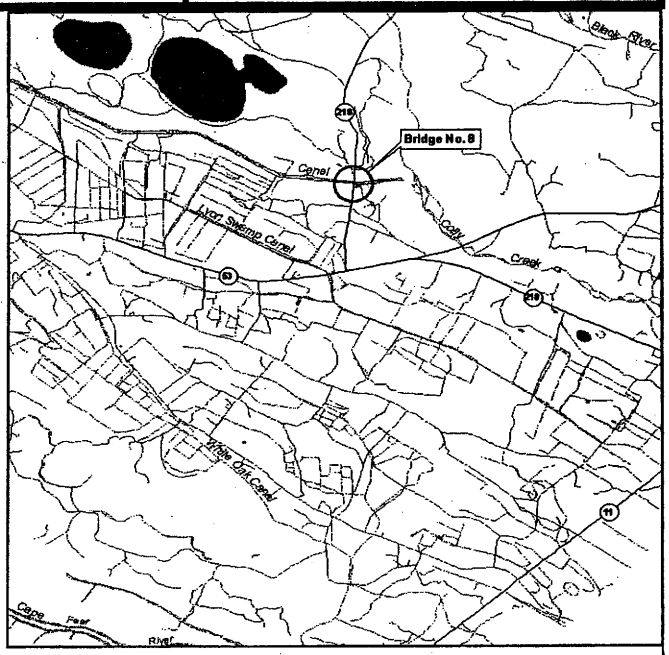
Newsletter

NCDOT
T.I.P. B-4029

Volume I, Issue I

Proposed Replacement of Bridge No. 8 over a Canal on NC 210

This newsletter is published by the North Carolina Department of Transportation to provide information on the status of the proposed replacement of the bridge over an unnamed Canal on NC 210 illustrated in the vicinity map to the right. The proposed project is needed to improve safety due to the deteriorated condition of the existing bridge.



PROJECT SCHEDULE

The acquisition of right-of-way is scheduled for federal fiscal year (FFY) 2006, with construction in FFY 2007.

PROJECT DESCRIPTION

Three (3) alternatives have been studied for the proposed bridge replacement project. Alternative 1 proposes to replace the bridge in its existing location. Alternative 1 would maintain traffic with an on-site detour on the downstream (east) side of the bridge during construction. Alternative 2 also proposes to replace the bridge in its existing location. Alternative 2 would maintain traffic with an on-site detour on the upstream (west) side of the bridge during construction. Alternative 3 proposes to realign NC 210 and construct a new bridge on the upstream (west) side of the existing bridge. Alternative 3 would utilize the existing bridge to maintain traffic during construction. Please see the figures shown on the back of this newsletter. Alternative 2 has been recommended as the preferred alternative because it minimizes impacts to existing development and the environment.

NCDOT WELCOMES CITIZEN INPUT

Public involvement is an important part of the planning process. The North Carolina Department of Transportation is committed to ensuring all issues of concern to the public are addressed and considered before any final decisions are made. If you have any questions or comments concerning the project, please feel free to contact the study team members below:

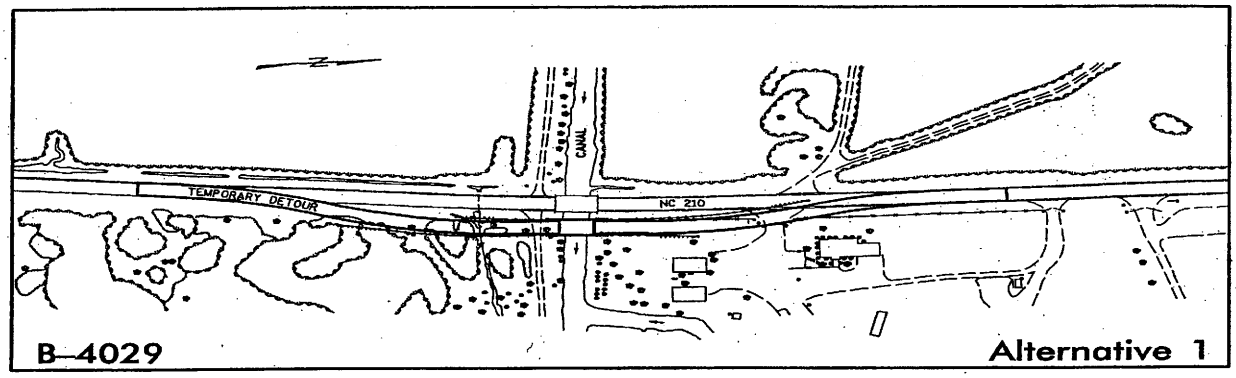
Mr. Vincent J. Rhea, PE
Project Manager
NCDOT-PDEA
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-7844 ext. 261
vrhea@dot.state.nc.us

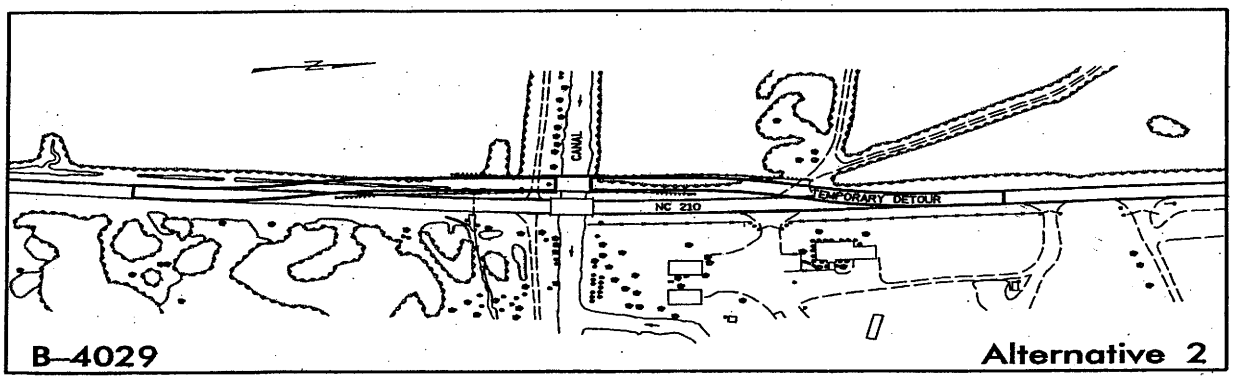
Mr. Richard Davis
Project Manager
The LPA GROUP of North Carolina, P.A.
4904 Professional Ct., Suite 201
Raleigh, NC 27609
(919) 954-1244
rdavis@lpagroup.com

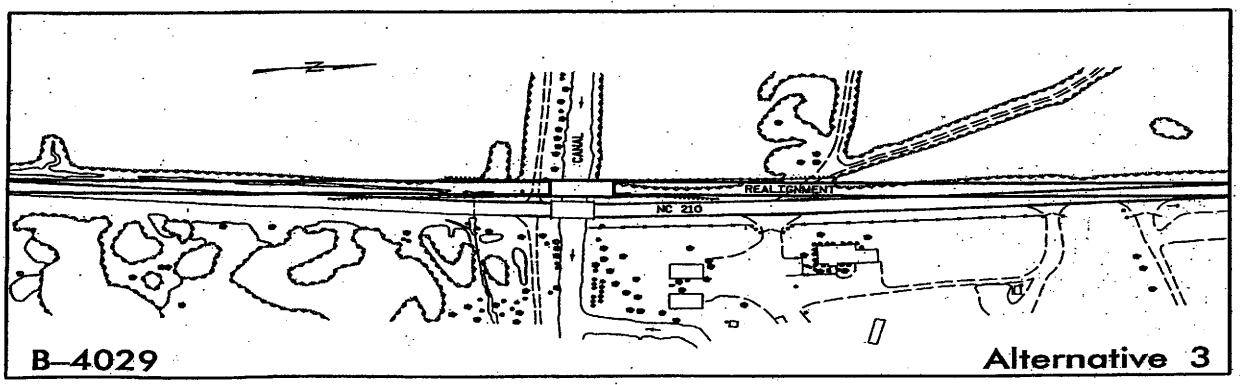
NCDOT
T.I.P. B-4029

North Carolina Department of Transportation
Project Development & Environmental Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Postal Customer







United States Department of the Interior

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

RECEIVED
DEC 31 2003
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

December 30, 2003

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

Dear Dr. Thorpe:

This letter is in response to your request for comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of the proposed replacement of Bridge No. 8 on NC 210 over an unnamed canal, Bladen County, North Carolina (TIP No. B-4029). These comments provide scoping information in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

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

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

2. If unavoidable wetland impacts are proposed, every effort should be made to identify compensatory mitigation sites in advance. Project planning should include a detailed compensatory mitigation plan for offsetting unavoidable wetland impacts. Opportunities to protect mitigation areas in perpetuity via conservation easements, land trusts or by other means should be explored at the outset;

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

4. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons. In waterways that may serve as travel corridors for

fish, in-water work should be avoided during moratorium periods associated with migration, spawning and sensitive pre-adult life stages. The general moratorium period for anadromous fish is February 15 - June 30;

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

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

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

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

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

There are five federally protected species listed for Bladen County: the shortnose sturgeon (*Acipenser brevirostrum*), red-cockaded woodpecker *(Picoides borealis*), American chaffseed (*Schwalbea americana*), southern spicebush (*Lindera melissifolia*) and rough-leaved loosestrife (*Lysimachia asperulaefolia*). The North Carolina Natural Heritage Program (NCNHP) database indicates two occurrences of the red-cockaded woodpecker from the 1970s approximately 0.8 miles and 1.3 miles, respectively, from the proposed project site. Although the NCNHP does not indicate any known occurrences of the other species near the project vicinity, use of the NCNHP data should not be substituted for actual field surveys if suitable habitat occurs near the project site. The NCNHP database only indicates the presence of known occurrences of federally protected species and does not necessarily mean that such species are not present. It may simply mean that the area has not been surveyed. Information about the habitats in which these species are often found is provided on our web site, http://endangered.fws.gov/ . If suitable habitat occurs within the project vicinity for any of the listed species, surveys should be conducted to determine presence or absence of the species. All survey documentation must include survey methodologies and results.

We reserve the right to review any federal permits that may be required for this project, at the public notice stage. Therefore, it is important that resource agency coordination occur early in the planning process in order to resolve any conflicts that may arise and minimize delays in project implementation. In addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to

facilitate a thorough review of the action:

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

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

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

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

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

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

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

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

Sincerely,

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

cc: Richard Spencer, USACE, Wilmington, NC
David Franklin, USACE, Wilmington, NC
Beth Barnes, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON. NORTH CAROLINA 28402-1890

REPLY TO
ATTENTION OF:

January 28, 2004

Regulatory Division

Subject: Action ID No. 200400345

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

Dear Dr. Thorpe:

I am responding to your letter to Mr. Mike Bell dated December 8, 2003 requesting scoping comments on TIP Projects B-4029, Bridge number 8 on NC 210 over an unnamed tributary, State Project Number 8.1421501, Bladen County, NCDOT Division 6. Based on the information provided for this project in the referenced letter, it appears that jurisdictional areas as defined at 33 CFR 328.3(a) are located within the proposed project scoping area. In accordance with Section 404 of the Clean Water Act of 1977, as amended, Department of the Army (DA) authorization will be required for the discharge of dredged, excavated or fill material into waters of the United States, including wetlands that are identified in association with this project.

Although this project may qualify as a FHWA Categorical Exclusion, to qualify for nationwide permit authorization under Nationwide Permit #23 or any other form of general permit, the application and/or project planning report should contain sufficient information to document that all proposed activities associated with the project do not have more than a minimal individual or cumulative impact on the aquatic environment. All activities, including temporary construction, demolition, access, and dewatering activities, should be included in the application and/or project planning report. A copy of the project planning report should be included with the application submittal. The report should contain an adequate description of all proposed activities, both permanent and temporary. The amount of permanent and temporary impacts to waters and wetlands as well as a description of the type of habitat that will be affected by the proposed project should also be included in the report. In addition, the report should provide a reasonable estimate of the linear feet of adverse impacts to streams and acreage impacts to verified wetlands. The type of DA authorization and any specific permit requirements will depend on the crossing design, extent of the fill work within jurisdictional areas, construction methods and other public interest and environmental factors.

Our experience has shown that replacing bridges with culverts often results in more than minimal impacts on the aquatic environment and the proposed project would therefore not be

eligible for authorization under a general permit. These impacts are generally associated with alteration of hydrologic pathways and hydraulics, disruption of the free movement of aquatic and terrestrial organisms indigenous to the area, and increased impacts to aquatic habitat. If a bridge is proposed for replacement with a culvert, NCDOT must demonstrate that the work will not result in more than minimal impacts on the aquatic environment, specifically addressing the passage of aquatic life including anadromous fish, if applicable. The work must also not alter the stream hydraulics and create flooding of adjacent properties or result in unstable stream banks. In some cases, a hydraulic analysis (HECRAS) may be required and should be included with the application. In addition, the report should address the impacts that the culvert would have on recreational navigation and natural wildlife corridors, if applicable.

Lengthening existing bridges can often benefit the ecological and hydrological functions of the associated wetlands and streams. In addition, longer bridges were there are large adjacent contiguous forested floodplains could enhance existing wildlife passage thereby creating a safer roadway. Most bridge approaches are connected to earthen causeways that were built in floodplain wetlands and streams. Replacing these causeways with longer bridges would allow previously impacted wetlands to be restored. In an effort to encourage this type of restoration effort, mitigation credit for wetland restoration activities can be provided to offset the added costs of lengthening an existing bridge.

Off-site temporary construction detours should be fully explored in lieu of on-site detours constructed in wetlands. If an on-site detour is the requested action, justification should be provided that demonstrates that alternatives, including an off-site alternative, with lower aquatic resource impacts are not practicable. On-site detours, unless constructed on a spanning structure or on a previous detour that was used in a past construction activity, can cause permanent wetland impacts due to soil compression resulting from the on-site detour fill placed on compressible soils and associated heavy equipment compaction. Substantial soil compression in wetland systems may in turn cause a subsurface hydrologic barrier in the wetland, which would alter the hydrologic regime of the wetland and impair its ecological and hydrologic functions. For proposed projects and associated on-site detours that cause minimal losses of wetlands, an approved wetland restoration and monitoring plan will be required prior to issuance of a DA Nationwide or Regional general permit. For proposed projects and associated on-site detours that cause substantial wetland losses, an individual DA permit and a compensatory mitigation proposal for the unavoidable wetland impacts may be required.

Endangered Species Act (ESA) federally listed species may be found within close proximity to the bridge project. All work related to federally listed ESA species as required by Section 7 of the ESA including copies of all correspondence and meeting minutes with the U.S. Fish and Wildlife Service and/or the NOAA Marine Fisheries Service associated with the subject projects should be coordinated with this office.

If concrete structures, such as bridge piers and footers, are a component of these projects, methods must be employed to avoid any contact of "live" concrete with surface waters and all instream construction should be conducted in the "dry" by use of stream diversion methods. If temporary stream diversions are to be utilized, a plan and description should be provided showing the proposed structure and method of diversion. A restoration plan will be required showing how the diversion area will be returned to pre-construction conditions following the

completion of the project. If restoration involves revegatation of the disturbed area, the plan should include a planting scheme using only endemic vegetation. Bridge piers and footers should be located outside of the waterway whenever possible and where not practicable should be keep to a minimum.

Based on the information provided for the referenced project site, the apparent level of wetland impacts, and scope of the project, the referenced project does not appear to warrant coordination pursuant to the integrated Section 404/NEPA-merger agreement.

We appreciate this opportunity to provide you with our scoping comments. Should you have any questions or wish to discuss our comments further, please call me at the Wilmington Field Office at 910-251-4172.

Sincerely,

Richard K. Spencer
NCDOT Project Manager

CF:

Mr. Vincent J. Rhea, P.E.
Project Development Engineer
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Mr. John Dorney
NCDENR-DWQ
Wetlands Section
1621 Mail Service Center
Raleigh, NC 27699-1621

Mr. Travis Wilson
Highway Coordinator
North Carolina Wildlife Resources Commission
1141 I-85 Service Road
Creedmoor, North Carolina 27522

Mr. Gary Jordan
United States Fish & Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Chris Militscher
U.S. EPA
Raleigh Office
310 New Bern Avenue, Room 206
Raleigh, North Carolina 27601

Mr. James J. Rerko
North Carolina Department of Transportation
Division 6
P.O. Box 1150
Fayetteville, North Carolina 28302

Mr. Art King, DEO
North Carolina Department of Transportation
Division 8
P.O. Box 1067
Aberdeen, North Carolina 28315

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

MEMORANDUM

TO: Vincent J. Rhea
Project Development and Environmental Analysis Branch, NCDOT

FROM: Travis Wilson, Highway Project Coordinator
Habitat Conservation Program

DATE: February 5, 2004

SUBJECT: NCDOT Bridge Replacements in Johnston, Moore, Montgomery, Brunswick, Bladen, Cumberland, Scotland, and Columbus counties. TIP Nos. B-4165, B-4207, B-4204, B-4030, B-4029, B-4092, B-4274, B-4080, and B-4078.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Project specific comments:

1. B-4165, Johnston County, Bridge No. 89 over Sassarixa Swamp on SR 1162. We recommend replacing this bridge with a bridge. Standard recommendations apply.

2. B-4207, Moore County, Bridge No. 43 over McLendons Creek on NC 22-24-27. We recommend replacing this bridge with a bridge. McLendons Creek contains habitat suitable for the federally endangered Cape Fear shiner, a survey should be conducted to determine the presence or absence of this species. Standard recommendations apply.

3. B-4204, Montgomery County, Bridge No. 28 over Rock Creek on NC 109. We recommend replacing this bridge with a bridge. Standard recommendations apply.

4. B-4030, Brunswick County, Bridge No. 9 over Bear Branch on NC 103. We recommend replacing this bridge with a bridge. Standard recommendations apply.

5. B-4029, Bladen County, Bridge No. 8 over canal on NC 210. We recommend replacing this bridge with a bridge. Standard recommendations apply.

6. B-4092, Cumberland County, Bridge No. 80 over Little Rockfish Creek on SR 1108. We recommend replacing this bridge with a bridge. A significant fishery for sunfish exists at this site, therefore we request in in-water work moratorium for sunfish from April 1 to June 30. Standard recommendations apply.

7. B-4274, Scotland County, Bridge No. 14 over Big Shoe Heel Creek on NC 144. We recommend replacing this bridge with a bridge. A significant fishery for sunfish exists at this site, therefore we request in in-water work moratorium for sunfish from April 1 to June 30. Standard recommendations apply.

8. B-4080, Columbus County, Bridge No. 148 over Pine Log Swamp on SR 1437. We recommend replacing this bridge with a bridge. Standard recommendations apply.

9. B-4078, Columbus County, Bridge No. 10 over Waccamaw River Overflow on NC 130. We recommend replacing this bridge with a bridge. Standard recommendations apply.

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

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

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

NCDENR

North Carolina Department of Environment and Natural Resources
Division of Parks and Recreation

Michael F. Easley, Governor William G. Ross, Jr., Secretary Philip K. McKnelly, Director

MEMORANDUM

TO: William T. Goodwin, Jr., PE, Bridge Replacement Unit
Department of Transportation

FROM: Brian Strong, Environmental Review Coordinator 1321
DENR, Division of Parks and Recreation

DATE: September 6, 2002

SUBJECT: Review of Department of Transportation Bridge Replacement Projects

The purpose of this memorandum is to transmit comments prepared by the Division of Parks and Recreation (Division) on a number of proposed bridge replacement projects. These projects were received from Mr. William T. Goodwin (dated April 24, 2002) and John Williams (received June 25, 2002).

Prior to discussing individual comments on specific projects I would like to make one general comment. A number of projects are listed as replacement of bridges with culverts. The Division would like to express concern with this type of replacement. As you know, culverts are often beset by a number of persistent problems associated with their installation and maintenance. Culverts are frequently the focus of restoration projects as either culvert removal or mitigation efforts designed to remediate their destabilizing influence. Since culverts are often used in lieu of bridges as a cost savings alternative, the proper design of the culvert is often not factored into the cost of the project. Impacts of improper design and installation include the angle of insertion (too high or too low), sizing of culverts, culvert placement (too low or too high), and lack of culvert maintenance resulting in degradation of streams. In addition, culvert are often insufficiently designed to handle fish passage due to inadequate depth of water at time of passage, inappropriate water velocity, inadequate resting places above and below the stream structure, and physical obstructions to passage. Culverts have been identified as one of the greatest sources of stream morphology change in the United States. In general, the Division recommends that bridges be used in all instances where practical.

Enclosure 1 presents the bridge replacement projects were potential environmental impacts were identified. The majority of the impacts involve impacts to significant natural heritage areas, rare plant and animal species. Other impacts include proximity to state trails, state parks, and natural heritage aquatic habitats. Enclosure 2 presents the accompanying maps discussed in Enclosure 1.

Please let me know if there is any further information you need or if you have any questions regarding the enclosed material, my telephone number is (919) 715-8711.

Bridge Replacement Project	Potential Impact
Granville County Replace Bridge No. 84 on SR 1141 over Tar River B-4124 Capps	Impacts to SNHA: Tar River
Pitt County Replace Bridge No. 98 on SR 1407 over Conetoe Creek B-4234 Williams	Impacts to rare fish and mussels
Vance County Replace Bridge No. 3 on SR 1107 over Ruin Creek B-42-98 Capps	Impacts to SNHA: State significance, rare mollusks and plants
Jones County Replace Bridge No. 7 on SR 1129 over Big Chinquapin Branch B-4169 Williams	Impacts to rare amphibian, crustaceans
Wilson County Replace Bridge No. 52 on SR 1131 over Turkey Creek B-4327 Capps	Impacts to SNHA: Regional significance, rare mollusks, rare amphibian, rare crustacean
Alleghany County Replace Bridge No. 39 on SR 1193 over the Little River B-4008 PEF	Impacts to SNHA: Regional significance, rare plant, bog turtle, potential addition to State Park System
Bladen County Replace Bridge No. 8 on NC 210 over Canal B-4029 PEF	Impacts potential State Park expansion site
Chowan County Repalce Bridge No. 13 on SR 1226 over Dillard Creek B-4073 Capps	Impacts to SNHA: Regional significance, rare plants
Cumberland County Replace Bridge No. 80 on SR 1108 over Little Rockfish Creek B-4092 PEF	Impacts to rare fish species
Davie County Replace Bridge No. 21 on NC 801 over Carter Creek B-4104 PEF	Impacts to State Trail: Yadkin River trail

North Carolina Department of Cultural Resources
State Historic Preservation Office

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

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

June 23, 2004

MEMORANDUM

TO: Gregory J. Thorpe
Project Development and Environmental Analysis Branch
Division of Highways
Department of Transportation

FROM: David Brook for David Brook

SUBJECT: Bridge No. 8 on NC 210 over Canal, B-4029, Bladen County, ER03-3640

Thank you for your letter of December 15, 2003, concerning the above project.

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

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

Thank you for your cooperation and consideration. If you have questions concerning the above comment, 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: Richard Davis, LPA Group
Mary Pope Furr

BLADEN COUNTY SCHOOLS

Post Office Box 37
Elizabethtown, North Carolina 28337
Telephone (910) 862-4136 Fax (910) 862-4277
BYRON R. LAWSON, ED. D., SUPERINTENDENT

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ROGER CARROLL

JOHN CLARK, III
EUGENIA A. CROSS
BERLINE P. GRAHAM
ESTHER S. McNEILL
VINSTON ROZIER

March 24, 2003

Memorandum

To: Davis Moore

From: Richard Dunham

Re: Replacement of Bridge #8

At the present time we have two (2) crossings per day. No suitable detours offer a solution to road closure.