STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

July 11, 2008

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

Attention: Mr. Richard Spencer
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23, 33 and Section 401 Water Quality Certification,** for the proposed replacement of Bridge No. 363 over Big Creek and Bridge No. 364 over Friar Swamp on SR 1947 in Columbus County. State Project No. 8.2430701, Federal Project No. BRZ-1947(1); Division 6, TIP No. B-3830. Debit $240.00 from WBS Element 33281.1.1,

Please find enclosed the permit drawings, Preconstruction Notification (PCN), and half-size plans. A Categorical Exclusion (CE) was completed for this project in March 2005, and distributed shortly thereafter. Additional copies will be made available upon request. The North Carolina Department of Transportation (NCDOT) proposes to replace existing Bridge Nos. 363 & 364 over Big Creek and Friar Swamp on SR 1947 in Columbus County. The project involves replacement of the existing Bridge No. 363 91-foot structure with a 115-foot single span bridge and Bridge No. 364 91-foot structure with a 105-foot single span bridge in approximately the same location and roadway elevation of the existing structures using top-down construction. Construction of the new structure will be staged so that traffic can be maintained on the existing structure during construction. Permanent riparian wetland impacts resulting from the proposed construction will be 0.13 acre.

Impacts to Waters of the United States

General Description: The project is located within subbasin 03-07-56 of the Lumber River Basin (Hydrologic Unit 03040206). Big Creek and Friar Swamp have been assigned Stream Index Number [DWQ Index # 15-2-6] with a Best Usage Classification of "**C Sw**". Neither Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped

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

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

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

watersheds occur within one mile of project study area. Lake Waccamaw is designated as an Outstanding Resource Water (ORW) and is less than one half of a mile downstream of the project study area for both Big Creek and Friar Swamp Big Creek and Friar Swamp are not designated as North Carolina Natural or Scenic Rivers, or as a National Wild and Scenic Rivers. Additionally, these creeks are not listed on the Final 2006 303(d) list of impaired waters due to sedimentation for the Lumber River Basin, nor do they drain into any Section 303 (d) waters within 1.0 mile of the project study area.

Permanent Impacts: Big Creek, Friar Swamp and adjacent riparian wetlands will be impacted by the proposed project. Construction of the proposed project will result in a permanent impact of 0.13 acre from roadway fill in wetlands at Bridge No. 364. In addition, there will be 0.08 acre of surface water impacted by the proposed construction. (see permit drawings).

Temporary Impacts: Temporary Impacts: Proposed temporary wetland impacts to 0.02 acre, from Temporary Fill in Wetlands in the Hand Clearing areas for the installation of erosion control measures, include some or all of the following: Temporary Silt Fence, Special Sediment Control fence, and Temporary Rock Silt Checks.

Hand Clearing: There will be 0.02 acre of hand clearing in wetlands.

Bridge Demolition: The existing bridges consist of a reinforced concrete deck on timber joists with concrete-wearing surfaces. The substructures are composed of timber end bents and interior bents consisting of timber caps on timber piles. The bridges can be removed without dropping components into Waters of the United States during construction. Best Management Practices for Bridge Demolition and Removal will be followed to avoid any temporary fill from entering Waters of the United States.

In-water Work Moratorium

No in-water construction of the project will occur during the spawning season for the Waccamaw silverside from April 1 – June 30.

Federally Protected Species

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 31, 2008 the U.S. Fish and Wildlife Service (FWS) lists seven federally protected species for Columbus County (Table 1). The wood stork has been added to the list since the completion of the CE. The biological conclusion for this species is "No Effect" due to lack of habitat. The Waccamaw silverside, which received an "unresolved" biological conclusion. On October 22, 2003 the United States Fish and Wildlife Service (USFWS) concurred with the North Carolina Department of Transportation's (NCDOT) biological evaluation (BE) which concluded that the bridge replacements may affect, but are not likely to adversely affect the Waccamaw silverside. In addition, the USFWS concurred that there will be no adverse modification to the primary constituent elements of critical habitat for the Waccamaw silverside as long as the NCDOT

follows the Special Project Commitments, which were discussed at the on-site meeting on April 16, 2003. These commitments are as follows:

- NCDOT's High Quality Waters Standards will be enforced throughout project construction
- Using turbidity curtains
- Not using wetlands as equipment staging areas where practicable
- Minimizing heavy equipment operations within the stream channel
- Not placing live concrete in the water
- Both bridges will be designed to exclude any deck drains
- No in-water construction will occur during the spawning for the Waccamaw silverside (April-June)

Federally-protected species for Columbus County

Common Name	***Scientific Name***	**Federal Status**	**Habitat or Survey Information**	**Biological Conclusion**
American alligator	*Alligator mississippiensis*	T (S/A)	N/A	N/A
Red-cockaded woodpecker	*Picoides borealis*	E	No Habitat	No Effect
Shortnose sturgeon	*Acipenser brevirostrum*	E	No Habitat	No Effect
Waccamaw silverside	*Menidia extensa*	T	Yes	MANLAA
Cooley's meadowrue	*Thalictrum cooleyi*	E	No Habitat	No Effect
Wood stork	*Mycteria americana*	E	No Habitat	No Effect
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	No Habitat	No Effect

-MANLAA – May Affect, Not Likely To Adversely Affect

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:

- NCDOT is utilizing longer spans with fewer bents than the existing bridge
- Slope stakes ranging from 1.5:1 to 3:1 in jurisdictional areas
- There will be no deck drains on the proposed bridge

- No in-water work will occur from April 1 through June 30, as requested by the United States Fish and Wildlife Service, during the spawning season for the Waccamaw silverside
- Design Standards in Sensitive Watersheds will be utilized during demolition of the existing bridge and construction of the new bridge due to the designation of Lake Waccamaw as an Outstanding Resource Water

Mitigation

There are no available wetland mitigation credits within HU 03040206. NCDOT proposed debiting the Juniper Bay Mitigation site (JBMS) at a 2:1 ratio for the 0.13 acres of unavoidable impacts due to B-3830. The JBMS is in the adjacent HU within the Lumber River Basin and has been in the ground for 2 years, as described below. . This was agreed upon between Leilani Paugh (NCDOT) and Richard Spencer (US Army Corps of Engineering) by phone on July 10, 2008.

The JBMS is a Carolina bay located in Robeson County, North Carolina comprising 728.5 acres. The site, located in HU 03040203, was constructed by the North Carolina Department of Transportation in 2005.

The JBMS previously was used for agricultural production with a drainage ditch network constructed to drain the site. The hydrologic restoration plan involves systematically plugging and backfilling the interior ditch network to increase surface and subsurface water storage capacity and to increase the retention of water onsite. The wetland vegetation restoration plan is to establish two natural community types: Peatland Atlantic White Cedar Forest/Bay Forest and Pond Pine Woodland/Bay Forest.

The JBMS has met the hydrologic and vegetative success criteria over the majority of the site. The monitoring report is posted on the EEP webpage at the following link: http://www.nceep.net/business/monitoring/Monitoring_report_web/2006pdfs/JUNIPER_BAY_2006/Juniper_Bay_Summary_thru_Results.pdf

Site Name	River Basin	HUC	Mitigation Type	Transfer from EEP	Available	TIP Debit	TIP Debit	TIP Debit
Juniper Bay	Lumber	3040203				**B-4077**	**W-4704**	**B-3830**
			Non Riverine Wetland Restoration	2	1.01	0.48	0.38	0.13

Project Schedule

The review date for this project is September 2, 2008 and the Let Date is October 21, 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 a Nationwide Permit 23 authorize these activities. We are also requesting the issuance of a Nationwide Permit 33 for the temporary fill due to the installation of erosion control measures. (72 CFR; 11092-11198, March 12, 2007). NCDOT does not request the Corps to evaluate our site using the Rapanos guidance. Instead, we are satisfied with the delineation as reviewed and approved prior to 6/5/2007, and ask that you evaluate this permit verification based on that review.

Section 401 Permit: We anticipate 401 General Certification numbers 3701 and 3688 will apply to this project. NCDOT is providing five copies of this application to the North Carolina Department of Environmental and Natural Resources, Division of Water Quality, for their approval.

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

Thank you for your time and assistance with this project. Please contact John Merritt at jsmerritt@ncdot.gov or (919) 715-5536 if you have any questions or need additional information.

Sincerely,

E. L. Lusk

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

CC: w/attachment
Mr. Brian Wrenn, NCDWQ (5 Copies)

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. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Ms. Anne Deaton, NCDMF
Mr. Ron Sechler, NMFS
Mr. Derrick Weaver, P.E., PDEA 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: Nationwide 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
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: _____

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

III. Project Information

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

1. Name of project: _____

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-3830

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

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

5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)
   Decimal Degrees (6 digits minimum): 34.2940 °N 78.4736 °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: Lake Waccamaw

8. River Basin: Lumbar
   (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: Rural with forested areas and scattered residential.
   _____
   _____

10. Describe the overall project in detail, including the type of equipment to be used: Replacement of the existing Bridge No. 363 structures with a 115-foot bridge, and bridge 364 with a 105-foot at approximately the same location and roadway elevation of the existing structures using top-down construction.

11. Explain the purpose of the proposed work: The bridges are considered to be structurally deficient and functionally obsolete and the replacement will result in safer traffic operations.

IV. Prior Project History

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

V. Future Project Plans

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

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

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

1. Provide a written description of the proposed impacts: approach fill, hand clearing, mechanized clearing

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	Mechanized clearing	Herbaceous	Yes	3ft.	0.01
Site 2	Mechanized clearing	Herbaceous	Yes	3ft.	0.011
Site 3	Permanent fill	Herbaceous	Yes	3ft.	0.13
				Total Wetland Impact (acres)	0.151

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

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

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
1	Big Creek	Permanent SW	Perennial	60ft.	N/A	0.018
1	Big Creek	Temporary SW	Perennial	60ft.	N/A	0.015
2	Friar Swamp	Permanent SW	Perennial	25ft.	21	0.03
2	Friar Swamp	Temporary SW	Perennial	25ft.	26	0.024
3	Friar Swamp	Permanent SW	Perennial	25ft.	181	0.033
Total Stream Impact (by length and acreage)					228	0.12

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):	0.12
Wetland Impact (acres):	0.151
Open Water Impact (acres):	0.0
Total Impact to Waters of the U.S. (acres)	0.151
Total Stream Impact (linear feet):	228

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

8. Pond Creation
If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): 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: N/A Expected pond surface area: N/A

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. Construction of a 14-foot and 24-foot longer bridge. Design Standards in Sensitive Watersheds will be utilized during demolition of the existing bridge and construction of the new bridge. No in-water work will occur from April 1 through June 30, as requested by the United States Fish and Wildlife Service, during the spawning season for the Waccamaw silverside

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.
   CHECKING ON THIS

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): 0.13
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 Lumbar)? 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
Total			

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

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

XI. Stormwater (required by DWQ)

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

XII. Sewage Disposal (required by DWQ)

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

XIII. Violations (required by DWQ)

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

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

XIV. Cumulative Impacts (required by DWQ)

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

XV. Other Circumstances (Optional):

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on

work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).

E. L. Lusk 7.11-08

Applicant/Agent's Signature **Date**

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

Columbus County
SR 1947
Bridges No. 363 and 364 Over Friar Swamp and Big Creek
Federal-Aid Project No. BRZ-1947(1)
State Project No. 8.2430701
T.I.P. No. B-3830

Categorical Exclusion
US Department of Transportation
Federal Highway Administration
and
NC Department of Transportation
Division of Highways

Approved

3/31/05
Date

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

3/31/05
Date

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

Columbus County
SR 1947
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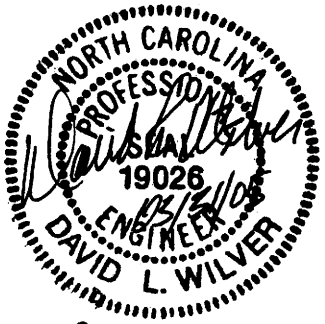
Categorical Exclusion
US Department of Transportation
Federal Highway Administration
and
NC Department of Transportation
Division of Highways



March 2005

Document Prepared by

Wilbur Smith Associates, Inc.

David L. Wilver, P.E.
Project Manager

for the

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

John M. Penney, P.E.
Project Development Engineer

PROJECT COMMITMENTS

Columbus County
SR 1947
Bridges No. 363 and 364 Over Friar Swamp
Federal-Aid Project No. BRZ-1947(1)
State Project No. 8.2430701
T.I.P. No. B-3830

In addition to the standard Nationwide Permit #33 and #23 Conditions, the General Nationwide Permit Conditions, Section 404 Individual Permit (IP) Special Conditions, Section 401 Water Quality Certification (WQC) Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for Protection of Surface Waters, NCDOT's Guidelines for Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

Commitments Developed Through Project Development and Design

All commitments developed during the project development and design phase have been incorporated into the design and were standard commitments. Current status, changes, or additions to the project commitments as shown in the environmental document for the project are printed in *italic* font.

Project Services/Roadside Environmental/Division 6 Construction
Ensure that sediment and erosion control measures are not placed in wetlands.

This commitment will be implemented during construction to the best ability of the Department in coordination with existing standards and laws.

To avoid and/or minimize non-profit source discharges of toxic substances and harmful materials, NCDOT intends to enforce the High Quality Waters Standards throughout the project construction.

This commitment will be implemented during construction of the project.

Where practicable, wetlands will not be used as equipment staging areas.

This commitment will be implemented during the construction to the best ability of the Department in coordination with existing standards and laws.

Project Services/Division 6 Construction
Borrow/waste areas should avoid wetlands to the maximum extent practicable. Prior to the approval of any borrow/waste site in a wetland, the contractor must obtain all necessary permits.

This commitment will be used during design and will be implemented during construction of the project.

Project Services, Hydraulics, Structures Design
Both bridges will be designed to exclude any deck drains.

This commitment will be implemented during the design of the project.

PROJECT COMMITMENTS

Division

Turbidity curtains will be used during the construction phase of both bridge projects.
This commitment will be implemented during construction of the project.

Heavy equipment operations within the stream channel will be minimized.
This commitment will be implemented during construction of the project.

Live concrete will NOT be placed in the water.
This commitment will be implemented during construction of the project.

No in-water construction of the project will occur during the spawning season for the Waccamaw silverside between April 1 – June 30.
This commitment will be implemented during construction of the project.

Columbus County
SR 1947
Bridges No. 363 and 364 Over Friar Swamp and Big Creek
Federal-Aid Project No. BRZ-1947(1)
State Project No. 8.2430701
T.I.P. No. B-3830

Bridges No. 363 and 364 are included in the 2004-2010 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program and in the Federal-Aid Bridge Replacement Program. The locations of these Bridges are shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. PURPOSE AND NEED

NCDOT Bridge Maintenance Unit records indicated the Bridges No. 363 and No. 364 have sufficiency ratings of 11 and nine and one half (9.5), respectively, out of a possible 100 for a new structure. A review of the bridge reports deficiency criteria shows that both bridges are structurally deficient and functionally obsolete. Replacement of these inadequate structures will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Columbus County is located in the southeast section of the state. Its relatively close proximity to the Atlantic Ocean places the county in the fertile lowlands of the Coastal Plain. SR 1947, Bella Coola Road is classified as a rural local road.

Bridge No. 363 was constructed in 1964. The existing structure is 91 feet six (6) inches in length, consisting of three (3) spans with one width at 30 feet eight (8) inches, one at 30 feet, and one at 30 feet ten (10) inches. The clear roadway width is 24 feet, providing two 10-foot travel lanes with two (2) foot shoulders. The superstructure is made of prestressed concrete channels. The substructure consists of end and interior bents using precast prestressed concrete (PPC) Cap \ Timber piles at various centers. The posted weight limit is 23 tons for single vehicles (SV) and 26 tons for truck tractors semi-trailers (TTST). The bed to crown height is 19.8 feet and the normal depth of flow is 12.5 feet. According to NCDOT Bridge Maintenance, no flooding has been recorded. A North Carolina Park Ranger whose office is east of the bridge and has been a local resident for 47 years reported that during Hurricane Floyd the water was approximately 1-foot over the approaches. There was no debris accumulation or scour observed. Bridge scour information for the existing bridge is not available, as it has not been assessed due to insufficient substructure data. The channel banks appear to be stable with trees and small bushes. There are wetlands in all four quadrants of the bridge.

Bridge No. 364 was also constructed in 1964. The existing structure is 90 feet in length, consisting of three (3) thirty (30) foot spans. The clear roadway width is 24 feet, providing two 10-foot travel lanes with 2-foot shoulders. The superstructure is made of prestressed concrete channels. The substructure consists of end and interior bents using PPC Cap \ Timber piles at various centers. The posted weight limit is 24 tons for SV and 28 tons for TTST. The bed to crown height is 12.3 feet and the normal depth of flow is 5.9 feet. A North Carolina Park Ranger whose office is east of the bridge and has been a local resident for 47 years reported that during Hurricane Floyd the water was approximately 1-foot over the approaches. There was no debris accumulation or scour observed. Bridge scour information for the existing bridge is not available, as it has not been assessed due to insufficient substructure data. The channel banks appear to be stable with trees and small bushes. There are wetlands in all four quadrants of the bridge.

The approach roadway for both bridges includes 20 feet of pavement with 4-foot unstable shoulders. The bridges' width accommodates a 20-foot travelway with 2-foot shoulders.

The posted speed limit is 45 MPH.

The 2001 average daily traffic volume is 600 vehicles per day (vpd). The projected traffic volume is expected to increase to 1400 vpd by the design year 2025.

No accidents were reported in the vicinity of the bridge during the period from a recent three year period between January 1997 and January 2000. There are currently two (2) school buses (one (1) in AM and one (1) in PM) utilizing this bridge daily.

III. ALTERNATIVES

A. Project Description

The project study area for Bridge No. 363 is located on SR 1947 over Friar Swamp, in Columbus County, North Carolina (Figure 1). Bridge No. 363 is located approximately one and a third (1.3) miles (mi) southeast of the intersection of SR 1757 and SR 1947. The project study area for Bridge No. 363 comprises an area approximately 2000 ft in length and approximately 400 ft in width. The project study area for Bridge No. 364 is located on SR 1947 over Big Creek, in Columbus County, North Carolina (Figure 1). Bridge No. 364 is located approximately one and a half (1.5) mi southeast of the intersection of SR 1757 and SR 1947. The project study area for Bridge No. 364 comprises an area approximately 1800 ft in length and approximately 250 ft in width. The project study areas for both bridges are rural in nature and are dominated by forested natural areas with smaller areas of agricultural and residential development.

The recommended bridge lengths are based on a preliminary hydraulic analysis in conjunction with a field reconnaissance of the site. The length of the proposed bridges

and the recommended roadway elevations may be adjusted (increased or decreased) during final design based on the final hydrologic studies and hydraulic design.

Bridge No. 363 - The existing bridge is in a horizontal tangent and is skewed 90 degrees to the roadway. The vertical grade on the bridge falls slightly from north to south with both roadway approaches on slight downgrades away from each end of the bridge. The south approach is in a horizontal tangent. The alignment on the north approach is slightly curved. Both approaches have good sight distances. There are no utilities attached to the bridge. An overhead power and telephone line run parallel to the downstream side of the bridge. There may be an underground waterline located on the downstream side of the bridge based on fire hydrants observed within the surrounding development. For Bridge No. 363, the proposed replacement structure is a bridge approximately 115 feet long. The grade of the roadway should approximately match the elevation of the existing road. The minimum deck grade should be 0.3%. Downstream alignment will impact overhead power and telephone lines and the waterline. Upstream relocation is not recommended since it would worsen the horizontal alignment and would require significant rechannelization of a roadside tributary.

Bridge No. 364 – The existing bridge is in a horizontal tangent and is skewed 90 degrees to the roadway. The vertical grade on the bridge falls slightly from north to south with both roadway approaches on slight downgrades away from each end of the bridge. The south approach is in a horizontal tangent with good sight distance. There is a sharp curve in the south approach 600 ft from the bridge. The north approach is located in a sharp curve with very limited sight distance. For Bridge No. 364 the proposed replacement structure is a bridge approximately 105 feet long. The grade of the roadway should approximately match the elevation of the existing road. The minimum deck grade should be 0.3%. Replacement downstream would require extensive fill in wetlands and rechannelization of a roadside tributary and also impact overhead power lines. Upstream relocation would worsen the horizontal alignment and require significant rechannelization of the upstream roadside tributary. Additionally, upstream relocation would increase the required length of the structure due to the channel topography.

B. Build Alternative (Figure 2A and 2B)

The alternatives for replacing Bridges No. 363 and 364 are described below.

Bridge No. 363 Alternative 2 (Preferred)

Alternative 2 includes replacement of the existing 91.5-ft structure with a new structure in approximately the same location as the existing structure, with slight realignment downstream (southwest) of the existing structure (Figure 2A). The new structure will be approximately 115 ft in length. The approach work will extend from approximately 640 ft northwest to approximately 520 ft southeast of the existing structure. Approach work

includes minor realignment, grade alterations and construction of retaining walls on the east and west side of SR 1947 south of the bridge and on the east side north of the bridge. The placement of retaining walls at these locations was discussed during field reviews with the permitting agencies, and accepted, as a means of avoiding excessive placement of fill material into the existing waterway channels along SR 1947. The retaining wall lengths south of the bridge are 485 ft and 420 ft on the east and west sides respectively; north of the bridge the retaining wall is 180 ft long. Construction of the new structure will be staged so that traffic can be maintained on the existing structure during construction. The south bound lane of the existing bridge will be demolished while maintaining one-lane, two way traffic with two traffic signals on a minimum of 14 feet of the remaining portion of the existing bridge. Once the new structure is partially constructed to allow one-lane, two-way traffic with two traffic signals, the remainder of the existing structure will be removed and the remainder of the new structure constructed. A temporary traffic control signal will be required at the northern approach to the bridge, in conjunction with a signal south of Bridge No. 364, to control the one-lane, two-way traffic during construction. The total project length is approximately 1275 ft.

Bridge No. 364 Alternative 1 (Preferred)

Alternative 1 includes replacement of the existing 90-ft structure with a new structure shifted approximately 20 ft downstream (west) of the existing structure (Figure 2B). The alignment shift improves the horizontal alignment and constructability; it also will increase the length of the new structure to approximately 105 ft. The approach work will extend from approximately 430 ft north to approximately 210 ft south of the existing structure. Approach work will be limited to minor grade alterations and widening with construction of a 130 foot long retaining wall south of bridge on the west side of SR 1947. The placement of a retaining wall at this location was discussed during field reviews with the permitting agencies, and accepted, as a means of avoiding excessive placement of fill material into the existing waterway channel along SR 1947. Construction of the new structure will be staged so that traffic can be maintained on the existing structure during construction. The south bound lane of the existing bridge will be demolished while maintaining one-lane, two way traffic with two traffic signals on a minimum of 14 feet of the remaining portion of the existing bridge. Once the new structure is partially constructed to allow one-lane, two-way traffic with two traffic signals, the remainder of the existing structure will be removed and the remainder of the new structure constructed. A temporary traffic control signal will be required at the southern approach to the bridge, in conjunction with a signal north of Bridge 363, to control the one-lane, two-way traffic during construction. The total project length is approximately 745 ft.

C. Alternatives Eliminated From Further Study

Bridge No. 363 Alternative 1

Alternative 1 includes replacement of the existing 91.5-foot (ft) structure with a new structure in approximately the same location as the existing structure (Figure 2A). The new structure will be approximately 115 ft in length. The approach work will extend from approximately 640 ft northwest to approximately 520 ft southeast of the existing structure. Approach work will be limited to minor grade alterations and widening. Traffic will be maintained on a temporary on-site detour located approximately 30 ft downstream (southwest) of the existing structure during construction. The length of the detour bridge will be approximately 105 ft. Approach work for the temporary on-site detour will extend from approximately 210 ft northwest to approximately 200 ft southeast of the existing structure. The total project length is approximately 1275 ft. This alternative was not selected due to increased impacts on the natural environment and additional construction cost for a detour bridge.

Bridge No. 364 Alternative 2

Alternative 2 includes replacement of the existing 90-ft structure with a new structure in approximately the same location as the existing structure (Figure 2B). The new structure will be approximately 105 ft in length. The approach work will extend from approximately 220 ft north to approximately 220 ft south of the existing structure. Approach work will be limited to minor grade alterations and widening. Traffic will be maintained on a single-lane temporary on-site detour located approximately 20 ft downstream (south) of the existing structure during construction. The detour bridge will be approximately 95 ft in length. Approach work for the temporary on-site detour will extend from approximately 220 ft north to approximately 220 ft south of the existing structure. The total project length is approximately 545 ft. This alternative was not selected due to increased impacts on the natural environment and additional construction cost for a detour bridge.

Bridge No. 364 Alternative 3

Alternative 3 includes replacement of the existing 90-ft structure with a new structure located approximately 40 ft downstream (west) of the existing structure (Figure 2B). The new structure will be approximately 105 ft in length. The approach work will extend from approximately 530 ft north to approximately 470 ft south of the existing structure. Approach work will be limited to minor grade alterations and widening. Traffic will be maintained on the existing structure during construction. The total project length is approximately 1105 ft. This alternative was not selected due to increased impacts on the natural environment.

No Action Alternate The "do-nothing" alternative would eventually necessitate removal of the bridge effectively removing SR 1947 from traffic service. Investigation of the existing structure by the Bridge Maintenance Unit indicates the rehabilitation of the old bridge is not feasible due to its age and deteriorated condition.

D. Preferred Alternatives

Alternative 2 for Bridge No. 363 is the preferred alternative. It proposes to replace the existing structure with a new bridge in approximately the same location. Construction of the new structure will be staged so that single lane, two-way traffic can be maintained on the existing structure during construction. Staged construction allows the impacts associated with the temporary detour to be avoided. Based on lower environmental impacts (vegetation communities, wetland and stream) Alternative 2 was selected as the preferred alternative.

Alternative 1 for Bridge No. 364 is the preferred alternative. It proposes to replace the existing structure with a new structure shifted slightly downstream (west) of the existing structure. Construction of the new structure will be staged so that single lane, two-way traffic can be maintained on the existing structure during construction. Based on this alternative generally following the existing alignment and minimizing environmental (vegetation communities, wetlands and stream) impacts and it was selected as the preferred alternative.

The NCDOT Division 6 Engineer concurs with the preferred alternatives and the one lane on-site detours with temporary traffic control signals.

IV. ESTIMATED COST

TABLE 1: Estimated Cost

	Bridge No. 363		Bridge No. 364		
	Alternative 1	Alternative 2 (Preferred)	Alternative 1 (Preferred)	Alternative 2	Alternative 3
Structure Removal (Existing)	$18,560	$18,560	$18,640	$18,640	$18,640
Structure (Proposed)	$265,650	$388,620	$322,575	$351,900	$265,650
Detour and Approaches	$159,720	$25,000	$25,000	$101,000	$25,000
Roadway Approaches	$224,260	$235,800	$183,310	$209,160	$324,800
Miscellaneous and Mobilization	$161,810	$132,020	$105,475	$129,300	$150,910
Engineering and Contingencies	$120,000	$125,000	$95,000	$115,000	$115,000
Signals	-	$85,000	$85,000	-	-
Retaining Walls	-	$219,000	$52,000	-	-
ROW/Const. Easement/Utilities					
Total	$950,000	$1,229,000	$887,000	$925,000	$900,000

V. NATURAL RESOURCES

A. Methodology

The purpose of this study is to provide an evaluation of natural resources in the project study area. Specifically, the tasks performed for this study include: 1) a delineation of jurisdictional wetlands and/or surface waters and preparation of a map depicting the jurisdictional areas based on Global Positioning System (GPS) data, 2) an assessment of natural resource features within the project study area including descriptions of vegetation, wildlife, protected species, streams, wetlands, and water quality; 3)evaluation of probable impacts resulting from construction and alternatives; and 4) a preliminary determination of permit needs.

The project study area for B-3830 is located on SR 1947 over Big Creek, in Columbus County, North Carolina (Figure 1). Bridge No. 363 is located approximately one and three tenths (1.3) of a mile southeast of the intersection of SR 1757 and SR 1947. The project study area for Bridge No. 363 comprises an area approximately 2000 ft in length and approximately 400 ft in width. The project study area for Bridge No. 364 is located on SR 1947 over an unnamed tributary to Big Creek, in Columbus County, North Carolina (Figure 1). Bridge No. 364 is located approximately one and one half (1.5) of a mile southeast of the intersection of SR 1757 and SR 1947. The project study area for Bridge No. 364 comprises an area approximately 1800 ft in length and approximately 250 ft in width. The project study areas for both bridges are rural in nature and are dominated by forested natural areas with smaller areas of agricultural and residential development.

Jurisdictional wetlands were identified using the three parameter approach (hydrophytic vegetation, hydric soils, wetland hydrology) following U.S. Army Corps of Engineers (COE) delineation guidelines (DOA 1987). Jurisdictional areas were characterized according to a classification scheme established by Cowardin *et al.* (1979). Jurisdictional surface waters (*i.e.*, streams) were delineated pursuant to current COE and North Carolina Division of Water Quality (DWQ) protocol. All jurisdictional areas were mapped using Trimble™ GPS units and the collected data were differentially corrected and plotted in order to produce working maps and site plans.

Water quality information for area streams and tributaries was obtained from the *Basinwide Assessment Report: Lumber River Basin* (DWQ 1998), the North Carolina Department of Environment and Natural Resources (DENR), and the North Carolina Division of Environmental Management (DEM). Quantitative sampling was not undertaken to support existing data. Benthic macroinvertebrates were collected using current DWQ protocol. The project study area is located within the proposed critical

habitat for the Waccamaw silverside (*Menidia extensa*), therefore fish populations were not sampled.

Additional resources utilized for this natural systems investigation include the most recent list (March 7, 2002) of threatened and endangered species by county published by FWS. Records kept by the North Carolina Natural Heritage Program (NHP) were also reviewed on June 4, 2001 and periodically updated to determine if there are any documented cases of listed species occurring within the project study area or within a 3.0 mile (mi) radius of the project study area. When appropriate, plant community descriptions were based on a classification system utilized by NHP and developed by Schafale and Weakley (1990). Community classifications were modified to better reflect field observations when community characteristics did not fit an Schafale and Weakley community type. Vascular plant names generally follow nomenclature found in Radford *et al.* (1968). Habitat used by terrestrial wildlife and aquatic organisms, as well as expected population distributions, were determined through field observations, evaluation of available habitat, and supportive documentation (Conant and Collins 1998, Webster *et al.* 1985, Menhinick 1991, Hamel 1992, Rohde *et al.* 1994, Palmer and Braswell 1995).

B. Physiography and Soils

The project study area is located in the Coastal Plain physiographic province. The topography in the project study area is generally characterized as nearly level to gently sloping. Elevations in the project study area range from 45 to 50 ft above mean sea level (USGS 1986).

The project study area crosses two soil-mapping units (USDA 1990). These mapping units area the Dorovan muck (*Typic Medisaprists*) and Pender fine sandy loam (*Abaquic Hapludulfs*). The Dorovan muck soil-mapping unit is the most prevalent mapping unit in both project study areas and is classified as a hydric soil-mapping unit. Pender fine sandy loam is classified as a nonhydric soil.

C. Water Resources

1. Waters Impacted

The project study area is located within sub-basin 03-07-56 of the Lumber River Basin (DWQ 1999) and are part of USGS hydrologic unit 03040206 (USGS 1974). Big Creek originates six tenths (0.6) of a mile north of the project study area at the confluence of two smaller unnamed streams that drain from Friar Swamp and the Green Swamp. Big Creek flows in a southerly direction through the project study area to its confluence with Lake Waccamaw. Big Creek, from its source to its

confluence with Lake Waccamaw, has been assigned Stream Index Number (SIN) 15-2-6 by the DWQ.

- In addition to Big Creek, three man-made canals (four separate segments identified as C1, C2, C3, and C4) flow into Big Creek in the vicinity of Bridge No. 363. These canals have not been assigned a separate SIN by the DWQ.
- In addition to Big Creek, two unnamed tributaries to Big Creek (UT1 and UT2), four canals (five separate segments identified as C4, C5, C6, C7, and C8), and an excavated boat basin (Boat Basin) flow into Big Creek in the vicinity of Bridge No. 364. These unnamed tributaries and canals have not been assigned a separate SIN by the DWQ.

2. Water Resource Characteristic

A Best Usage Classification is assigned to waters of the State of North Carolina based on the existing or contemplated best usage of various streams or segments of streams in the basin. Big Creek has been assigned a Best Usage Classification of **C Sw** (DEM 1993, DENR 2002a). The **C** designation indicates waters that support aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation is any activity involving human body contact with water on an infrequent or incidental basis. The **Sw** designation is a supplemental classification used for swamp waters characterized by low velocities, low pH, low dissolved oxygen levels, high organic content, and other natural characteristics which are different from adjacent streams. The canals have not been assigned a separate Best Usage Classification and therefore share the Best Usage Classification of their receiving waters, **C Sw.**

No High Quality Waters (**HQW**), **WS-I**, or **WS-II** Waters occur within three (3.0) miles upstream or downstream of the project study area (DEM 1993, DENR 2002a). Lake Waccamaw is designated as an Outstanding Resource Water (**ORW**) less than one half (0.5) of a mile downstream of the project study area for both bridges. Big Creek downstream of both bridges has been federally designated as Critical Habitat for Waccamaw Silverside. Neither Big Creek nor its tributaries are designated as a North Carolina Natural and Scenic River, or as a national Wild and Scenic River. Neither Big Creek nor its tributaries are listed are impaired waters on the 2002 North Carolina subsection 303(d) list of impaired waters.

The National Pollutant Discharge Elimination System (NPDES) regulates permits for projects involving the construction, alteration, and/or operation of any sewer system, treatment works or disposal system and certain stormwater runoff which would result in a discharge into surface waters (DPA 1991). There are no permitted discharges to Big Creek or its tributaries.

The Benthic Macroinvertebrate Ambient Network (BMAN) addresses long-term trends in water quality at monitoring sites by sampling for selected benthic macroinvertebrates (DEM 1989). This program has been replaced by the benthic macroinvertebrate monitoring program associated with the basinwide assessment for the Cape Fear River Basin (DWQ 1998). DWQ assigns bioclassifications to streams and portions of streams based on species richness and overall biomass, which are considered reflections of water quality. There are no monitoring stations located on Big Creek or its tributaries.

Another measure of water quality being used by the DWQ is the North Carolina Index of Biotic Integrity (NCIBI), which assesses biological integrity using the structure and health of the fish community. Neither Big Creek nor its tributaries have been sampled to determine a NCIBI score as of the most recent Water Quality Management Plan (DWQ 1998).

3. Potential Impacts to Water Resources

Big Creek and its tributaries are not designated as an Anadromous Fish Spawning Area. However, the portion of Big Creek downstream from Bridge No. 363 is designated as Critical Habitat for the Waccamaw silverside. Due to the presence of Designated Critical Habitat for a federally endangered species this project (B-3830) can be classified as a **Case 1** bridge replacement by the BMPs for Bridge Demolition and Removal (NCDOT 1999). All work must be carefully coordinated with the responsible agency to protect the special resource water. For this project, coordination with the US Fish and Wildlife Service (FWS) will be required.

4. Impacts Related to Bridge Demolition and Removal

Section 402-2 of NCDOT's Standard Specifications for Roads and Structures is labeled **Removal of Existing Structure**. This section outlines restrictions and Best Management Practices for Bridge Demolition and Removal (BMP-BDRs), as well as guidelines for calculating maximum potential fill in the creek resulting from demolition.

Bridge No. 363

The superstructure consists of prestressed concrete channels. Although these components are slated for removal in a manner that will avoid dropping any components into Big Creek, the potential exists for temporary fill of up to 80 cubic yards.

The substructure consists of two interior bents located within the stream channel. These bents are creosote timbers with concrete caps. Although these components

are slated for removal in a manner that will avoid dropping any components into Big Creek, the potential exists for temporary fill up to 15 cubic yards.

Bridge components are slated for removal in a manner that will avoid dropping any bridge components into Big Creek. However, due to the presence of reinforced concrete in the superstructure of the bridge and piles encased in concrete, the potential exists for up to approximately 95 cubic yards of temporary fill being excavated from Big Creek as a result of demolition activities.

Bridge No. 364

The superstructure consists of prestressed concrete channels. Although these components are slated for removal in a manner that will avoid dropping any components into UT2 Big Creek, the potential exists for temporary fill of up to 80 cubic yards.

The substructure consists of two interior bents located within the stream channel. These bents are creosote timbers with concrete caps. Although these components are slated for removal in a manner that will avoid dropping any components into UT2 Big Creek, the potential exists for temporary fill up to 15 cubic yards.

Bridge components are slated for removal in a manner that will avoid dropping any bridge components into UT2 Big Creek. However, due to the presence of reinforced concrete in the superstructure of the bridge and piles encased in concrete, the potential exists for up to approximately 95 cubic yards of temporary fill being excavated from UT2 Big Creek as a result of demolition activities.

Short-term impacts to water quality, such as sedimentation and turbidity, may result from construction-related activities. BMPs can minimize impacts during construction, including implementation of stringent erosion and sedimentation control measures, and avoidance of using wetlands as staging areas. Additional measures which can be taken to minimize water quality impacts include avoiding the placement of live concrete directly into the stream channel and preventing heavy equipment operations from being conducted in the stream channel. If in-stream work is necessary, the use of a turbidity curtain is recommended to minimize impacts to water resources downstream of the project study area.

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

amount of overall change in the surrounding areas, impacts are expected to be minimal in nature. No adverse long-term impacts to water resources are expected to result from the alternatives being considered.

D. Biotic Resources

1. Existing Vegetation Patterns

Terrestrial distribution and composition of vegetation communities throughout the project study areas reflect landscape-level variations in topography, soils, hydrology, and past and present land use practices. When appropriate, the vegetation community names have been adopted and modified from the NHP classification system (Schafale and Weakley 1990) and the descriptions written to reflect local variations within the project study areas. Two natural communities were identified within the project study areas for B-3830A and B-3830B: Mesic Pine Flatwoods and Cypress-Gum Swamp (blackwater subtype). In addition to these natural communities, there are also areas of maintained/disturbed land.

Mesic Pine Flatwoods – This community type is limited to the forested upland areas in the project study areas, which occur on the sand rim of Lake Waccamaw. Under pristine conditions this community contains a nearly closed canopy of loblolly pine (*Pinus taeda*) and occupies large areas. Two small isolated stands occur in the project study areas that have a canopy dominated by loblolly pine, with water oak (*Quercus nigra*), laurel oak (*Q. laurifolia*), mockernut hickory (*Carya tomentosa*), and sweet gum (*Liquidambar styraciflua*) also present in the canopy. The understory includes individuals of canopy species, wild olive (*Osmanthus americana*), and red bay (*Persea palustris*). Shrubs observed in this community included wax myrtle (*Myrica cerifera*), winged sumac (*Rhus copallina*), blueberry (*Vaccinium* sp.), and sweet pepper bush (*Clethra alnifolia*). Herbaceous vegetation included St. Peter's-wort (*Hypericum stans*), muscadine (*Vitis rotundifolia*), and sensitive fern (*Onoclea sensibilis*).

Cypress-Gum Swamp (blackwater subtype) – This community type occurs along the banks of Big Creek and its tributaries and is contiguous with larger areas of this community type outside of the project study areas. The canopy for this community is dominated by bald cypress (*Taxodium distichum*) but also includes water tupelo (*Nyssa aquatica*), red maple (*Acer rubrum*), and sweet gum in small numbers. A well developed understory is present in this community that includes titi (*Cyrilla racemiflora*), sweet bay (*Magnolia virginiana*), and laurel oak. Herbaceous vegetation was observed infrequently in this community and includes cat brier (*Smilax laurifolia*), yellow jessamine (*Gelsemium sempervirens*), royal fern (*Osmunda regalis*), and buttonbush (*Cephalanthus occidentalis*).

Maintained/Disturbed Land – The maintained/disturbed land within the project study areas includes roadside shoulders, residential yards, fallow fields, and other areas where human related activities dominate. The fallow fields included in this community appear to be maintained frequently enough to prevent woody vegetation from becoming established. Frequently maintained portions of this community typically include fescue (*Festuca* sp.), Bermuda grass (*Cynodon dactylon*), centipede grass (*Eremochloa ophiuroides*), and bahia grass (*Paspalum notatum*). Areas that are maintained less frequently have a greater number of perennial herbs and shrubs such as ragweed (*Ambrosia artemisiifolia*), black berry (*Rubus argutus*), winged sumac, silverling (*Baccharis halimifolia*), and Chinese privet (*Ligustrum sinense*). Also, included in this community are scattered individual trees including red maple, tag alder (*Alnus serrulata*), and Carolina willow (*Salix caroliniana*).

2. Potential Impacts to Vegetation Communities

Impacts to vegetation communities are estimated based on the area of each community present within the proposed construction. Potential temporary impacts include those areas located within the clearing limits but outside of the construction limits, which may be utilized as staging areas, equipment access, or other construction related activities. Proposed clearing limits are not available for this project at this time. Vegetation communities present within the project study area for Bridge No. 363 are presented in Table 2A and vegetation communities present within the project study area for Bridge No. 364 are presented in Table 2B.

Table 2A. Summary of Vegetation Communities for Bridge No. 363.

VEGETATION COMMUNITY	Project Study Area	Potential Impacts in Acres			
		Alternative 1		Alternative 2 (Preferred)	
		Impacts	Potential Temporary Impacts	Impacts	Potential Temporary Impacts
Mesic Pine Flatwoods	1.62	0.17	0	0.07	0
Cypress-Gum Swamp	5.00	0.32	0	0.25	0
Maintained/Disturbed Land	7.80	0.42	0	0.50	0
Total[a]:	14.42	0.91	0	0.82	0

Note: [a] Totals for vegetation communities do not include the open water area attributed to Big Creek, the three canals, or impervious road surface.

Both alternatives presented for Bridge No. 363 utilize the existing alignment in its entirety and confine impacts to the areas located adjacent to the existing roadway. Bridge No. 363 Alternative 1 calls for an on-site detour located on the downstream

side of the existing structure. Alternative 2 calls for "staged construction" that will allow traffic to be maintained on the existing structure during construction of a new structure at the existing location. Staged construction allows the impacts associated with the temporary detour to be avoided. In order to minimize impacts to Vegetation Communities, Alternative 2 would be preferable if staged construction is feasible.

Table 2B. Summary of Vegetation Communities for Bridge No. 364.

VEGETATION COMMUNITY	Project Study Area	Potential Impacts in Acres					
		Alternative 1 (Preferred)		Alternative 2		Alternative 3	
		Impacts	Potential Temporary Impacts	Impacts	Potential Temporary Impacts	Impacts	Potential Temporary Impacts
Mesic Pine Flatwoods	2.93	0.02	0	0.12	0	0.23	0
Cypress-Gum Swamp	1.20	0.31	0	0.31	0	0.41	0
Maintained/ Disturbed Land	2.81	0.33	0	0.34	0	0.62	0
Total[a]:	6.94	0.66	0	0.77	0	1.26	0

Note: [a] Totals for vegetation communities do not include the open water area attributed to Big Creek, unnamed tributaries, canals, or impervious road surface.

Both Bridge No. 364 Alternative 1 and Alternative 2 generally follow the existing alignment and therefore minimize impacts to vegetative communities. Bridge No. 364 Alternative 3 presents the greatest departure from the existing alignment and therefore has the highest potential impacts to vegetative communities. Either Bridge No. 364 Alternative 1 or Alternative 2 is acceptable to show minimization to vegetative communities.

3. Wildlife

The project study areas were visually surveyed for signs of terrestrial and aquatic wildlife. Little evidence of wildlife was observed during the field effort. The stream corridor along Big Creek and its tributaries provides cover and food linking areas of more optimal habitats. Resident wildlife species are expected to be those adapted to ecotones between the maintained roadsides and adjacent natural communities.

a. Terrestrial

A number of bird species were observed within or adjacent to the project study areas. Bird species observed include American crow (*Corvus brachyrhynchos*), chimney swift (*Chaetura pelagica*), blue-gray gnatcatcher (*Polioptila caerulea*),

Carolina chickadee (*Poecile carolinensis*), northern parula (*Parula americana*), and Carolina wren (*Thryothorus ludovicianus*).

Mammals observed within the project study areas were hispid cotton rat (*Sigmodon hispidus*) and gray squirrel (*Sciurus carolinensis*). Other species expected to be found in or adjacent to the project study area include raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), gray fox (*Urocyon cinereoargenteus*), white-tailed deer (*Odocoileus virginiana*), and eastern cottontail (*Sylvilagus floridanus*).

Terrestrial reptiles observed within the project study areas were rat snake (*Elaphe obsoleta*) and broadhead skink (*Eumeces laticeps*). Other species expected to occur within or adjacent to the project study area include eastern box turtle (*Terrapene carolina*), green anole (*Anolis carolinensis*), eastern garter snake (*Thamnophis sirtalis*), ringneck snake (*Diadophis punctatus*), and copperhead (*Agkistrodon contortrix*).

Terrestrial amphibians observed within the project study areas were limited to southern toad (*Bufo terrestris*). Other species expected to occur within the project study area include Atlantic coast slimy salamander (*Plethodon chlorobryonis*), squirrel treefrog (*Hyla squirella),* green treefrog (*Hyla cinerea*), spring peeper (*Pseudacris crucifer*), and southern cricket frog (*Acris gryllus*).

b. Aquatic

The aquatic habitat located within the project study area for Bridge No. 363 includes Big Creek, C1, C2, C3, and C4. The aquatic habitat within the project study area for Bridge No. 364 includes Big Creek, UT1, UT2, C4, C5, C6, C7, C8, and a portion of the boat basin. The water depth greatly limited the amount of benthic sampling that could be conducted. Samples were collected from the edges of the deeper channels along mud banks and sandbars.

Benthic invertebrate organisms collected within Big Creek were identified to at least Order and Family if possible and include mayflies (Ephemeroptera), flies (Diptera: Chironomidae, Culicidae, Exuviae), water bugs (Hemiptera: Corixidae), dragonflies (Odonata: Libellulidae), beetles (Coleoptera: Haliplidae), snails (Gastropoda), fingernail clams (Sphaeridae), scuds (Amphipoda), and crayfish (Decapoda) (McCafferty 1998).

The designation of Big Creek in the project study area for B-3830A and B-3830B as critical habitat for the Waccamaw silverside did not allow for electro-shocking to be used to sample the resident fish populations. The following species have been documented from Big Creek in the project study areas: redfin pickerel

(*Esox americanus*), chain pickerel (*E. niger*), eastern mudminnow (*Umbra pygmaea*), pirate perch (*Aphredoderus sayanus*), eastern mosquitofish (*Gambusia holbrooki*), bluespotted sunfish (*Enneacanthus gloriosus*), banded sunfish (*E. obesus*), warmouth (*Lepomis gulosus*), and bluegill (*L. macrochirus*) (Shute *et al.* 2000). No sampling has been conducted in the roadside canals; however, since habitats are similar, species composition would also be expected to be similar.

Four aquatic reptiles were observed within the project study areas including Florida cooter (*Pseudemys floridana*), redbelly turtle (*Pseudemys rubriventris*), American alligator (*Alligator mississippiensis*), and brown water snake (*Nerodia taxispilota*). Other species expected to occur within the project study area are snapping turtle (*Chelydra serpentina*) and yellowbelly slider (*Trachemys scripta*).

One aquatic amphibian was observed within the project study areas, two-toed amphiuma (*Amphiuma means*). Other species expected to occur within the project study area include such species as bullfrog (*Rana catesbeiana*), Southern leopard frog (*Rana utricularia*), and pickerel frog (*Rana palustris*).

4. Potential Impacts to Wildlife

Due to the limited infringement on natural communities, the proposed bridge replacement will not result in significant loss or displacement of known animal populations. Wildlife movement corridors are not expected to be significantly altered by the proposed project. Potential down-stream impacts to aquatic habitat will be avoided by bridging Big Creek (Bridge No. 363) and UT2 (Bridge No. 364) to maintain regular flow and stream integrity. In addition, temporary impacts to downstream habitat from increased sediment during construction are expected to be reduced by limiting in-stream work to an absolute minimum and use of a turbidity curtain during construction, except for the removal of the portion of the sub-structure below the water. BMP-BDRs will be followed to minimize impacts due to anticipated bridge demolition. BMPs for the protection of surface should be strictly enforced to reduce impacts.

E. Special Topics

1. Waters of the United States

Surface waters within the embankments of Big Creek, its unnamed tributaries (UT1 and UT2), C1, C2, C3, C4, C5, C6, C7, C8, and the Boat Basin are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "waters of the United States" (33 CFR 328.3). The waters in Big Creek, UT1, and UT2 within the project study areas exhibit characteristics of riverine, lower perennial,

unconsolidated bottom, permanently flooded (R2UBH) waters (Cowardin *et al.* 1979). The waters in the unnamed canals (C1, C2, C3, C4, C5, C6, C7, and C8) and the Boat Basin within the project study areas exhibit characteristics of palustrine, unconsolidated bottom, permanently flooded, excavated (PUBHx) waters (Cowardin *et al.* 1979).

Big Creek is a perennial stream with slow flow over substrate consisting of silt and sand. The main channel is approximately 75 ft wide with an average depth of 10 ft. UT1 is a perennial stream with slow flow over substrate consisting of sand and silt. The channel is approximately 30 ft wide and an average of greater than 6 ft deep. UT2 is a perennial stream with slow flow over substrate consisting of sand and silt. The channel is approximately 40 ft wide and an average of greater than 6 ft deep. A geomorphic characterization of the stream reaches within the project study area indicates that the delineated portions of Big Creek, UT1, and UT2 are "E' stream types (Rosgen 1996). These stream types occur in broad valleys and have fluvial materials with floodplains. "E" channels tend to be highly sinuous with stable, well-vegetated banks. The "E" designation indicates that the stream is slightly entrenched with a very low width/depth ratio (Rosgen 1996).

C1 is an excavated drainage canal that is functioning as a stream. This canal has a uniform width of 40 ft and a uniform depth of seven (7) ft and lacks sinuosity. Permanently flooded borrow pits located within the canal are included as part of C1.

C2 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 35 ft and a uniform depth of four (4) ft and lacks sinuosity.

C3 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 35 ft and a uniform depth of six (6) ft and lacks sinuosity. Permanently flooded borrow pits located within the canal are included as part of C3.

C4 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 35 ft and a uniform depth of six (6) ft and lacks sinuosity. Permanently flooded borrow pits located within the canal are included as part of C3.

C5 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 35 ft and a uniform depth of six (6) ft and lacks sinuosity.

C6 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 35 ft and a uniform depth of six (6) ft and lacks sinuosity.

C7 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 35 ft and a uniform depth of six (6) ft and lacks sinuosity. C7 connects C6 to Big Creek.

C8 is an excavated roadside drainage canal that is functioning as a stream. This canal has a uniform width of 40 ft and a uniform depth of six ft and lacks sinuosity.

Wetlands subject to review under Section 404 of the Clean Water Act (33 U.S.C. 1344) are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology within 12 inches the surface for a portion (12.5 percent) of the growing season (DOA 1987). Based on this three-parameter approach, eleven (11) jurisdictional wetlands are located within the project study area. These wetland areas are all part of the Cypress-Gum Swamp Community and are inter-connected by the surface waters present in the project study areas.

Vegetation within the Cypress-Gum Swamp (including wetlands identified as W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, and W11) is hydrophytic in nature and includes bald cypress, water tupelo, titi, and royal fern. Soils exhibit hydric characteristics (Munsell color 10YR 2/1). Hydrological indicators observed include the presence of saturation within 12 inches of the soil surface, inundation in depressions, and water stained leaves. The Cypress-Gum Swamp exhibits characteristics of a palustrine, deciduous, semipermanently flooded (PFO6F) wetland (Cowardin *et al.* 1979).

2. Potential Impacts to Waters of the United States

Permanent impacts to jurisdictional areas are estimated based on the amount of each jurisdictional area within the proposed construction limits. [Figure 2 (Bridge No. 363) and Figure 3 (Bridge No. 364)]). Since staging areas and access roads will not be placed in jurisdictional areas, no temporary impacts will occur. Temporary impacts to surface waters are anticipated and will be off-set by on-site mitigation opportunities.

Stage construction of the bridges is proposed as a means of minimizing environmental impacts. This will be accomplished by partially removing a section of the existing bridges to provide a one lane bridge to be used for maintaining traffic during construction. The proposed replacement bridges will also be stage constructed to accommodate one lane of traffic. This will allow shifting of traffic to

the new bridge sections in order to remove remaining portions of the existing bridges and complete construction of the proposed bridges. The grade of proposed bridge will have to match closely that of the existing bridge to allow for stage construction. As a result, new bridge bents will be constructed in the existing channel to reduce the required bridge depth and eliminate excessive fill into the stream. These bents will be pulled back as close to the existing banks as possible to provide the maximum allowable span and increase the bridge opening above that which currently exists. This approach was discussed during field reviews with the permitting agencies and accepted as the best option to minimizing overall impact to the stream and roadway channels. A summary of potential jurisdictional impacts for both bridges is presented in Table 3 and a more detailed description of potential jurisdictional impacts is presented in the Natural Systems Report.

Table 3. Summary of Potential Jurisdictional Impacts.

Impacts	Bridge No. 363		Bridge No. 364		
	Alternative 1	Alternative 2 (Preferred)	Alternative 1 (Preferred)	Alternative 2	Alternative 3
Permanent Wetlands (Acres)	0.26	0.22	0.17	0.32	0.43
Temporary Wetlands (Acres)	0	0	0	0	0
Permanent Surface Waters (Acres)	0	0	0.03	0	0.05
Temporary Surface Waters (Acres)	0.17	0.23	0.08	0.17	0.38
Permanent Surface Waters (Linear Feet)	0	0	30	0	40
Temporary Surface Waters (Linear Feet)	543	655	280	470	580

Bridge No. 363

Both alternatives (Alternative 1 and Alternative 2) presented utilize the existing alignment in its entirety and confine impacts to the areas located adjacent to the existing roadway. Both alternatives avoid impacts to W2, W4, C1, and C4. Alternative 2 calls for an on-site detour located on the downstream side of the existing structure. Alternative 2 calls for "staged construction" that will allow traffic to be maintained on the existing structure during construction of a new structure at the existing location. Staged construction allows the impacts associated with the temporary detour to be avoided. Alternative 2 would be preferable, if staged construction is feasible, in order to minimize impacts to jurisdictional areas. Impacts to surface waters (Big Creek, C2, and C3) are anticipated to be temporary in nature since fill placed along one bank will be offset by material excavated from the opposite bank. Project construction will not result in alterations to the dimension, pattern, or profile of surface waters in the project study area. Potential wetland

impacts may be offset by utilizing on-site wetland mitigation opportunities in the northwest and southeast quadrants of the project study area.

Bridge No. 364

Alternative 1 has the lowest amount of impacts to jurisdictional areas and utilizes much of the existing alignment. Alternative 1 calls for a slight realignment south of the existing structure in order to utilize the existing structure as an on-site detour. Alternative 2 utilizes the existing alignment in its entirety and confines impacts to the areas located adjacent to the existing roadway, increased impacts associated with this alternative are the result of a temporary on-site detour. Alternative 3 presents the greatest departure from the existing alignment and therefore has the highest number of impacts to jurisdictional areas. Alternative 1 is preferable since it has the lowest amount of impacts to jurisdictional areas. Permanent impacts to surface waters for Alternatives 1 and 3 are the result of the existing culvert at UT1 being extended. Other impacts to surface waters are anticipated to be temporary in nature since fill placed along one bank will be offset by material excavated from the opposite bank. Project construction will not result in alterations to the dimension, pattern, or profile of surface waters in the project study area. Potential wetland impacts may be offset by utilizing on-site wetland mitigation opportunities in the southwest and southeast quadrants of the project study area.

a. Permits

This project is being processed as a Categorical Exclusion (CE) under Federal Highway Administration (FHWA) guidelines. Nationwide Permit (NWP) #23 (67 FR 2020, 2082; January 15, 2002) has been issued by the COE for projects expected to have minimal impacts. DWQ has issued a General 401 Water Quality Certification for NWP #23. However, use of this permit requires written notice to DWQ. In accordance with *Draft Internal Policy: Cumulative Impacts and the 401 Water Quality Certification and Isolated Wetland Programs, Version 1.3* (NC Division of Water Quality, May 3, 2002), bridge replacements normally have low potential for cumulative impacts since little (if any) new impervious surface is added and the projects are usually in already developed locales.

4. Mitigation Evaluation

Avoidance – Due to the presence of wetlands and surface waters within the project study area, avoidance of all impacts may not possible. Wetland and stream impacts are previously discussed in Section V.C.4.

Minimization – The alternatives presented were developed in part to demonstrate minimization of wetland and stream impacts. Use of a channel spanning structure

would help minimize permanent impacts to jurisdictional streams as part of either alternative. Impacts to the stream will be minimized during demolition by removing bridge components in a manner which will avoid dropping any components into the creek channel. Bridge demolition impacts have been previously discussed in Section 2.2.

- For Bridge No. 363 Alternative 2 best demonstrates minimization of jurisdictional impacts by utilizing "staged construction" in lieu of an on-site detour.
- For Bridge No. 364 Alternative 1 best demonstrates minimization of jurisdictional impacts by utilizing the existing alignment in its entirety.

Mitigation - Mitigation may be required for wetland impacts greater than one tenth (0.10) of an acre and stream impacts greater than 150 ft. Utilization of BMPs is recommended in an effort to minimize secondary impacts, including avoiding in-stream work and use of a channel spanning structure. Temporary impacts associated with the construction activities could be mitigated by replanting disturbed areas with native species and removal of any temporary fill material within the floodplain upon project completion. Final mitigation requirements rest with the COE.

Bridge No. 363

On-site wetland mitigation opportunities exist in the northwest and southeast quadrants of the project study area. Restoration of converted wetlands in these areas could be utilized as mitigation for unavoidable construction related impacts to jurisdictional wetlands. On-site stream/surface water mitigation is available for unavoidable impacts to the man-made canals located adjacent to the existing roadway. Fill will be required along one bank of these canals and a similar amount of fill is proposed to be excavated from the opposite bank of the canal thus resulting in no changes to the dimension, pattern, or profile of these canals.

Bridge No. 364

On-site wetland mitigation opportunities exist in the southwest and southeast quadrants of the project study area. Restoration of converted wetlands in these areas could be utilized as mitigation for unavoidable construction related impacts to jurisdictional wetlands. On-site stream/surface water mitigation is available for unavoidable impacts to the man-made canals located adjacent to the existing roadway. Fill will be required along one bank of these canals and a similar amount of fill is proposed to be excavated from the opposite bank of the canal thus resulting in no changes to the dimension, pattern, or profile of these canals.

F. Protected Species

1. Federal Protected Species

Species with the federal classification of Endangered (E) or 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.*). The following federal protected species are listed for Columbus County (FWS list dated January 29, 2003).

Table 4. Federally Protected Species listed for Columbus County, North Carolina.

Common Name	Scientific Name	Status[a]	Biological Conclusion
Shortnose sturgeon	***Acipenser brevirostrum***	E	No Effect
American alligator	Alligator mississippiensis	T(S/A)	None Required
Waccamaw silverside	***Menidia extensa***	T	May Effect but not likely to adversely Effect
Red-cockaded woodpecker	***Picoides borealis***	E	No Effect
Rough-leaved loosestrife	***Lysimachia asperulaefolia***	E[b]	No Effect
Cooley's meadowrue	***Thalictrum cooleyi***	E	No Effect

Note: [a] *Officially proposed for delisting.*

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

T- Threatened: A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

Shortnose sturgeon - The shortnose sturgeon is an anadromous, bottom-feeding fish that spends most of the year in estuarine environments and moves into fresh water only when spawning (NMFS 1998). Sturgeons are unmistakable in appearance; size, snout characteristics, and the absence of scutes between the anal fin and lateral row of scutes distinguish shortnose sturgeon from Atlantic sturgeon (*A. oxyrhynchus*) which occurs within the same range (NMFS 1998). Adult shortnose sturgeon range in size from approximately one and four tenths (1.4) to three and six tenths (3.6) of a foot and have a short snout and wide mouth (NMFS 1998). This species occurs in Atlantic seaboard rivers from the St. Johns River, Florida, to eastern Canada.

Shortnose sturgeon occupy different habitats and occur at different depths at different times of the year (NMFS 1998). In the fall and winter shortnose sturgeon are typically found in estuaries and lower sections of large rivers at depths of 33 to 100 ft; some adults reportedly move into the Atlantic as well. In the summer, adults are found in waters six (6) to 33 ft in depth. Shortnose sturgeon migrate upstream to spawn near the Fall Line at sites having swift water flow over gravel and rubble. Juveniles reportedly remain in deep portions of the lower reaches of rivers in areas just above the salt wedge.

BIOLOGICAL CONCLUSION: No Effect

NHP records do not document any occurrences of shortnose sturgeon in Lake Waccamaw or Big Creek. The dam located on the Waccamaw River downstream of the project study area functions to exclude migratory aquatic species from Lake Waccamaw and its tributaries, including the project study area. Therefore, potentially suitable habitat for this species does not occur in the project study area and construction of the proposed project will not affect this species.

American alligator - American alligator is listed as threatened based on the similarity in appearance to other Federally-listed crocodilians; however, there are no other crocodilians within North Carolina. American alligators can be found in a variety of freshwater to estuarine aquatic habitats including swamp forests, marshes, large streams and canals, and ponds and lakes.

BIOLOGICAL CONCLUSION: None Required

Potential habitat for American alligator exists within the project study areas and several individuals were observed during the field investigation. Construction activities may temporarily displace American alligators in the vicinity; however, no long-term impact to American alligator is anticipated as a result of this project. A biological conclusion is not required since this species is listed as T(S/A) by FWS.

Waccamaw Silverside - The Waccamaw silverside is a small, two (2) inch long, very slender, semitransparent fish with a silvery stripe on the side and a dusky back (FWS 1993). Its body is laterally compressed, the eyes are large, and the jaw is sharply angled upwards (FWS 1993). Adults resemble minnows (Family Cyprinidae), but Cyprinidae have only one dorsal fin, and silversides have two (FWS 1993). This species is mostly pelagic and are almost never found outside of the confines of Lake Waccamaw proper. Specimens have occasionally been collected just below the dam in the Waccamaw River but never more than a few dozen meters below the dam (Shute *et al.* 2000). The fish spawns from April through June, but reaches its peak between 68 and 72 Fahrenheit; both sexes mature after

their first winter, and most individuals die after their first spawning season. Fully developed larvae form small isolated schools by early May. No Parental Care of the young has been noted. The Waccamaw silverside feeds on zooplankton. This species is endemic to Lake Waccamaw, where it serves as an important prey item for larger fishes (FWS 1993).

BIOLOGICAL CONCLUSION: May Effect, but not likely to adversely Effect
For Bridge No. 363 the portion of Big Creek that crossed by the bridge provides poor habitat for the Waccamaw Silverside. Likewise, the portion of the unnamed tributary that is crossed by Bridge No. 364 also provides poor habitat for the Waccamaw Silverside. For both bridge locations the majority of the constituent elements, including high quality water, clear water with a sandy substrate, are present. However, open and neutral waters are not present within this portion of the project area. It is possible that some individuals of the silverside may be found in the project area during periods of high water. Impacts to water quality, such as sedimentation and turbidity, may result from construction related activities and may affect the silverside downstream. If all environmental commitments mentioned previously are followed downstream impacts to the Waccamaw Silverside should be minimized.

Red-cockaded woodpecker – This small woodpecker, seven (7) to eight and one half (8.5) inches long, has a black head, prominent white cheek patch, and black-and-white barred back. Males often have red markings (cockades) behind the eye, but the cockades may be absent or difficult to see (FWS 1985). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf, slash (*P. elliotii*), and pond (*P. serotina*) pines (FWS 1985). Primary nest sites for RCWs include open pine stands greater than 60 years of age with little or no mid-story development. Nest cavity trees tend to occur in clusters, which are referred to as colonies (FWS 1985). Foraging habitat is comprised of open pine or pine/mixed hardwood stands 30 years of age or older. Pine flatwoods or pine-dominated savannas which have been maintained by frequent natural fires serve as ideal nesting and foraging sites for this woodpecker. Development of a thick understory may result in abandonment of cavity trees. The woodpecker drills holes into the bark around the cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees (FWS 1985).

BIOLOGICAL CONCLUSION: No Effect
NHP records do not document any occurrences of RCW within three (3.0) mi of the project study areas. Two small stands located in the project study area for Bridge No. 363 are composed of a canopy dominated by pine species greater than 30 years old. No individual trees greater than 60 years old were documented within these stands. These stands are located on the sand-rim adjacent to Lake Waccamaw and are bordered by Lake Waccamaw to the south

and Cypress-Gum Forest to the north thus isolating these stands from other pine stands. No evidence of cavity trees or foraging was observed during the field survey. These two small pine stands do not provide potential suitable nesting habitat for this species, are not considered as available foraging habitat due to isolation by unsuitable habitat, and therefore construction of the proposed project will not affect this species. No potentially suitable habitat is located in the project study area for Bridge No. 364.

Rough-leaved Loosestrife - The rough-leaved loosestrife is a rhizomatous perennial that often reaches the height of two (2) ft; its leaves are sessile and entire, in whorls of three (3) to four (4). Five-petaled yellow flowers, approximately one half (0.5) inch across, are produced on a loose terminal raceme from late May to June; seeds are formed by August, but the small, rounded capsules do not dehisce until October. Preferred habitat of the rough-leaved loosestrife consists of the ecotone between longleaf pine savannas and wetter, shrubby areas, where lack of canopy vegetation allows abundant sunlight into the herb layer (FWS 1995). The loosestrife is endemic to Coastal Plain and Sandhill regions of the Carolinas (FWS 1995). This species is fire maintained; suppression of naturally occurring fires has contributed to the loss of habitat in our state. Drainage of habitat may also have adverse effects on the plant (FWS 1995).

BIOLOGICAL CONCLUSION: No Effect
NHP records do not document any occurrences of this species within three (3.0) mi of the project study areas. Potentially suitable habitat for this species in the form of pocosins or savanna ecotones does not occur in the project study areas. Therefore, construction of the proposed project will not affect rough-leaved loosestrife.

Cooley's Meadowrue - Cooley's meadowrue is a rhizomatous, perennial herb with a smooth stem; the three (3) ft high plant is normally erect in full sun but lax in the shade. Leaves are ternately divided; the leaflets, less than one (1) inch long, are narrow, with untoothed margins. The small, petal-less, unisexual flowers appear on an open panicle in June and the fruits, small ellipsoidal achenes, mature in August and September. Moist bogs and savannas are the preferred habitat of Cooley's meadowrue. This species is endemic to the southeastern Coastal Plain of North Carolina and one location in Florida. Some form of disturbance is usually needed to sustain the open quality of the meadowrue's habitat. Consequently, Cooley's meadowrue is sometimes found along utility corridors, roadside margins, or other maintained areas. Cooley's meadowrue is threatened by fire suppression and land disturbing practices such as silviculture or agriculture (FWS 1994).

BIOLOGICAL CONCLUSION: No Effect
NHP records do not document any occurrences of this species within three (3.0) mi of the project study areas. Potentially suitable habitat for this species in the

form of wet pine savannas does not occur in the project study areas. Therefore, construction of the proposed project will not affect Cooley's meadowrue.

2. Federal Species of Concern

The January 29, 2003 FWS list also includes a category of species designated as "Federal species of concern" (FSC). The FSC designation provides no federal protection under the ESA for the species listed. The presence of potential suitable habitat (Amoroso and Finnegan 2002, LeGrand *et al.* 2001) within the project study areas has been evaluated for the following FSC species listed for Columbus County (Table 5).

Table 5. Federal Species of Concern (FSC).

Common Name	Scientific Name	Potential Habitat	State Status[a]
Bachman's sparrow	*Aimophila aestivalis*	Y	SC
Henslow's sparrow	*Ammodramus henslowii*	Y	SR
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	Y	T
Carolina pygmy sunfish	*Elassoma boehlkei*	Y	T
Waccamaw darter	*Etheostoma perlongum*	Y	T
Waccamaw killifish	*Fundulus waccamensis*	Y	SC
"Broadtail" madtom	*Noturus* sp. 1	Y	SC
Mimic glass lizard	*Ophisaurus mimicus*	Y	SC[b]
Waccamaw lance pearlymussel	*Elliptio sp. 5*	Y	n/a
Waccamaw spike	*Elliptio waccamawensis*	Y	T
Waccamaw fatmucket	*Lampsilis fullerkati*	Y	T
Pee Dee lotic crayfish	*Procambarus lepidodactylus*	Y	SC
Savannah lilliput	*Toxolasma pullus*	Y	E
Cape Fear threetooth	*Triodopsis soelneri*	Y	T
Savanna indigo-bush	*Amorpha georgiana var. confusa*	N	T
Chapman's three-awn	*Aristida simpliciflora*	N	SR-T
Venus flytrap	*Dionaea muscipula*	N	C-SC
Harper's fimbry	*Fimbristylis perpusilla*	N	T
Long Beach seedbox	*Ludwigia brevipes*	N	----
Raven's seedbox	*Ludwigia ravenii*	N	SR-T
Carolina bogmint	*Macbridea caroliniana*	Y	T
Pineland plantain	*Plantago sparsiflora*	N	E
Swamp forest beaksedge	*Rhynchospora decurrens*	Y	C[b]
Spring-flowering goldenrod	*Solidago verna*	Y	T
Wireleaf dropseed	*Sporobolus teretifolius sensu stricto*	N	T
Carolina asphodel	*Tofieldia glabra*	N	C

[a] ***E-Endangered:*** *"Any species or higher taxon of plant whose continued existence as a viable component of the State's flora is determined to be in jeopardy" (GS 19B 106: 202.12)*

(Endangered species may not be removed from the wild except when a permit is obtained for research, propagation, or rescue which will enhance the survival of the species.

***T-Threatened**: "Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106: 202.12) (Regulations are the same as for Endangered species).*

***SC- Special Concern**: "Any species of plant in North Carolina which requires monitoring but which may be collected and sold under regulations adopted under the provisions of [the Plant Protection and Conservation Act]" (GS 19B 106: 202.12) (Special Concern species which are not also listed as Endangered or Threatened may be collected from the wild and sold under specific regulations. Propagated material only of Special Concern species which are also listed as Endangered or Threatened may be traded or sold under specific regulations*

***C -Candidate:** "Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are also either rare throughout their ranges (fewer than 100 populations total) or disjunct in North Carolina from a main range in a different part of the country or world. Also included are species which may have 20-50 populations in North Carolina, but fewer than 50 populations rangewide. These are species which have the preponderance of their distribution in North Carolina and whose fate depends largely on their conservation here. Also included are many species known to have once occurred in North Carolina but with no known extant occurrences in the state (historical or extirpated species); if these species are relocated in the state, they are likely to be listed as Endangered or Threatened. If present land use trends continue, candidate species are likely to merit listing as Endangered or Threatened.*

***SR- Significantly Rare**: "Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina. Also included are some species with 20-100 populations in North Carolina, if they also have only 50-100 populations rangewide and are declining.*

***W- Watch List**: "Any other species believed to be rare and of conservation concern in the sate but nor warranting active monitoring at this time (see the Watch List section in the Supplement for a more complete discussion).*

***P – Proposed**: "Any species which has been formally proposed for listing as Endangered, Threatened, or Special Concern, but has not yet completed the legally mandated listing process.*

Many rare and endemic aquatic species, federally listed as FSC, are known to occur in Lake Waccamaw and its associated stream systems. Carolina pygmy sunfish and Waccamaw killifish have been documented in Big Creek approximately 0.3 mi downstream of the project study areas (Shute *et al.* 2000). In addition to these occurrences in Big Creek, Waccamaw killifish, Savannah lilliput, Waccamaw spike, and Waccamaw fatmucket have been documented from the confines of Lake Waccamaw within three 3.0 mi of the project study areas.

No direct impacts to FSC species are anticipated since the proposed project calls for the use of a channel spanning structure at both bridges. Potential impacts to aquatic FSC species will be minimized by strictly adhering to BMP's during the construction phase of the project.

3. State Protected Species

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

Those state listed species that occur within three (3) mi of the project study areas and carry Federal designations have been covered above. Additional state listed species without Federal designations are covered here. The southeastern bat (*Myotis austroriparius*) (SC) has been documented approximately one half (0.5) of a mile northeast of the project study areas. The yellow lampmussel (*Lampsilis cariosa*) (T/PE) has been documented from Lake Waccamaw and is found throughout most of the lake. The Waccamaw snail (*Amnicola* sp. 1) (SC) has been documented from most of Lake Waccamaw and adjacent Big Creek. The Waccamaw siltsnail (*Cinncinatia* sp. 1) (SC) has been documented from most of Lake Waccamaw and adjacent Big Creek. The pod lance (*Elliptio folliculata*) (SC) has been documented from Lake Waccamaw. The Waccamaw darter (*Etheostoma perlongum*) (T) has been documented from Lake Waccamaw. The Venus hair fern (*Adiantum capillus*) (E) has been documented two and one tenth (2.1) mi northwest of the project study areas.

No direct impacts to state listed species are anticipated since the proposed project calls for the use of a channel spanning structure at both B-3830A and B-3830B. Potential impacts to aquatic state listed species will be minimized by strictly adhering to BMP's during the construction phase of the project.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

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

Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.

B. Historic Architecture

On April 12, 2002 representatives of the NCDOT and HPO reviewed project areas for Bridges No. 363 and 364. Although there are properties within the project area that are over fifty (50) years old none are considered eligible for the NRHP and no further evaluation is necessary. The HPO concurred with this finding on April 16, 2002. A concurrence form was signed which documents these findings and is found in the appendix.

C. Archaeology

Based on the May 12, 2002 memorandum from HPO, see attached denoting "We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project." Based on this finding and a review by NCDOT Archaeological Staff it was determined that the proposed project will not impact any archaeological sites that are eligible for NRHP.

VII. ENVIRONMENTAL EFFECTS

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

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

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

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

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

No adverse effect on public facilities or services is anticipated. The project is not expected to adversely affect social, economic, or religious opportunities in the area.
The are no publicly owned recreational facilities, or wildlife and waterfowl refuges of national, state, or local significance in the vicinity of the project.

No North Carolina Geodetic Survey control monuments will be impacted during construction of this project.

The Farmland Protection Policy Act requires all federal agencies or the representatives to consider potential impacts to prime and important farmland soils be all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service (NRCS). Since there are no prime or important farmlands in the immediate vicinity of the proposed bridge the Farmland Protection Policy does not apply.

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

This project is located in Columbus County, which has been determined to be in compliance with the National Ambient Air Quality Standards. 40 CFR Part 51 is not applicable, because the proposed project is located in an attainment area. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

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

Any noise level increased during construction will be temporary. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520. This evaluation completes the assessment requirements for highway traffic noise (23 CFR Part 722) and for air quality (1990 CAAA and NEPA) and no additional reports are required.

As Examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no hazardous waste sites in the project area.

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

VIII. PUBLIC INVOLVEMENT

Efforts were taken early in the planning process to contact local officials to involve them in the project development with a scoping letter. Additionally, 70 newsletters detailing the alternatives considered were mailed to citizens in the vicinity of the project and to local officials. An open house was held on December 12, 2002 to present information to the

public regarding this project. The open house was attended by eight (8) citizens. Most comments concerned the ability to maintain traffic on this one-way road during construction.

IX. AGENCY COMMENTS

Comments were received from US Fish and Wildlife Service, US Coast Guard, North Carolina Department of Crime Control and Public Safety, State Historic Preservation Office, the Columbus County Commissioners, the Columbus County Fire Marshal, and the Columbus County Emergency Services.

X. REFERENCES

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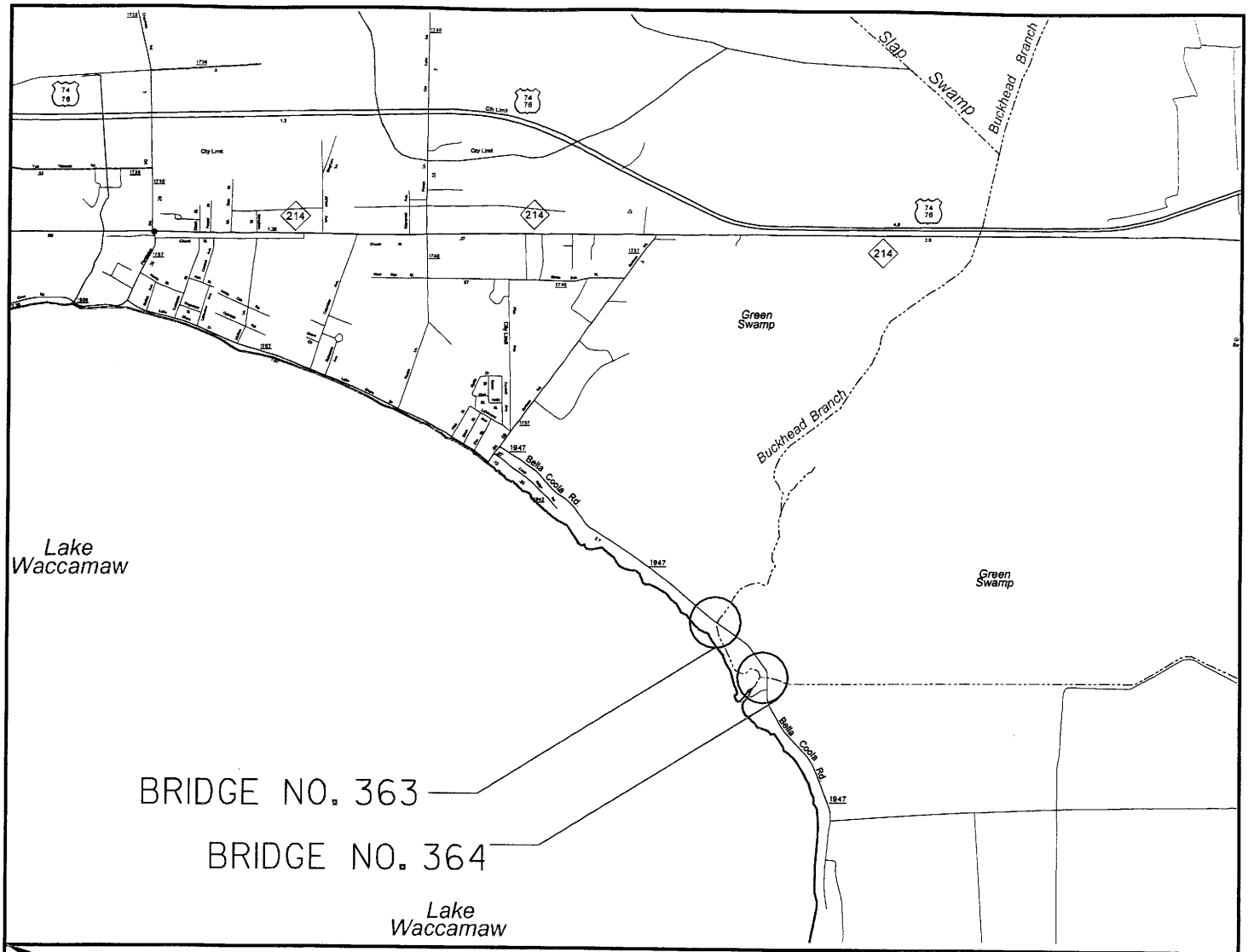
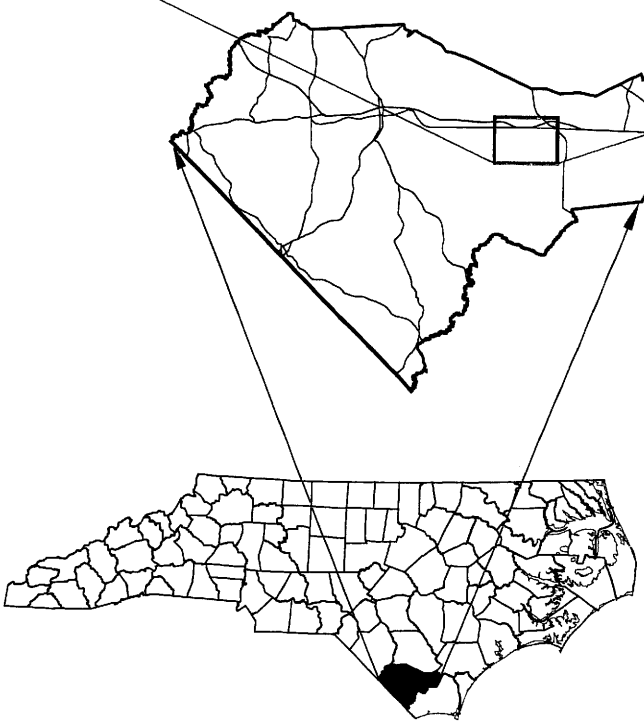
Figures





COLUMBUS COUNTY

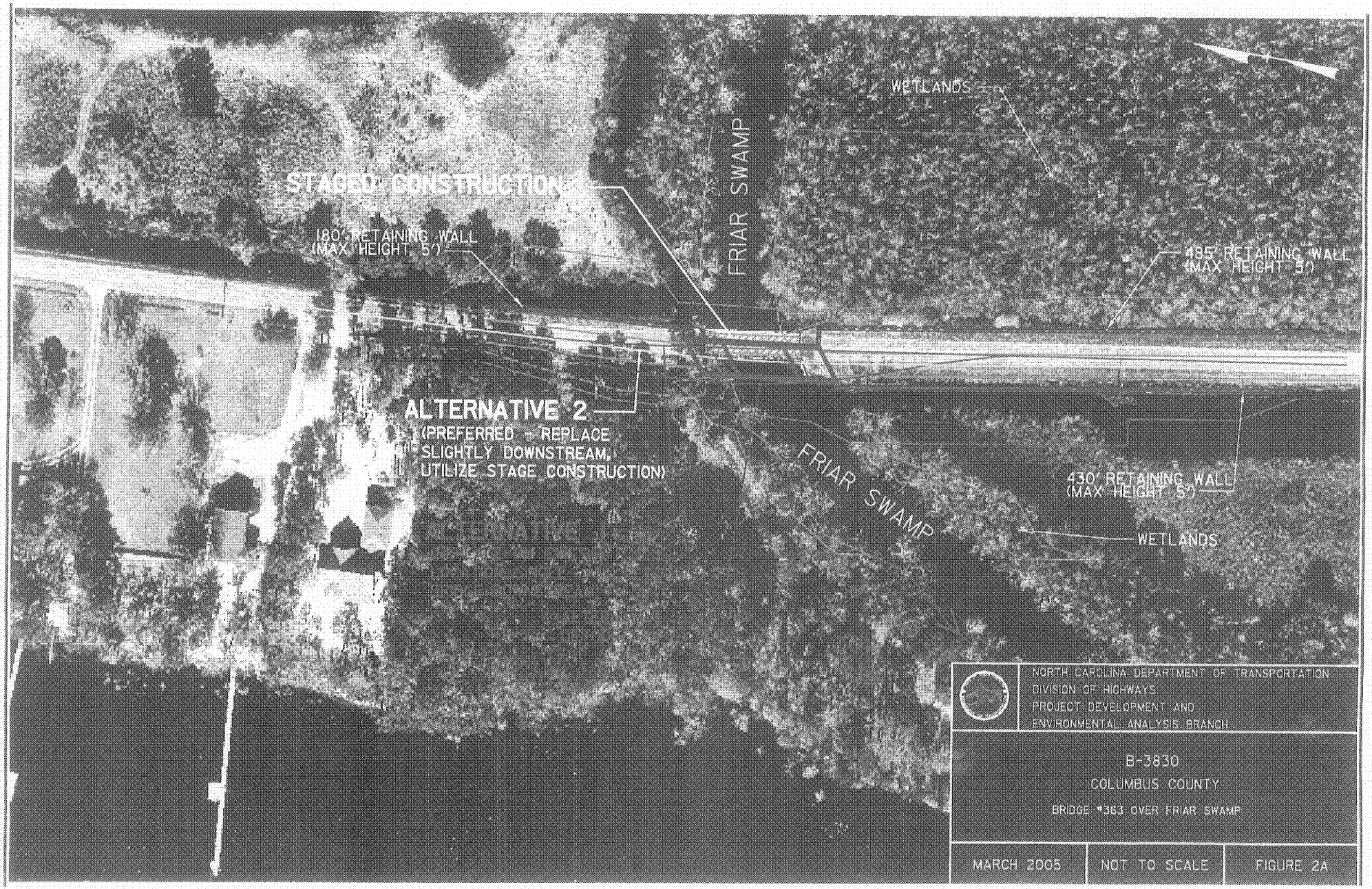
N

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

B-3830
REPLACEMENT OF BRIDGES
NO. 363 AND 364
COLUMBUS COUNTY

VICINITY MAP

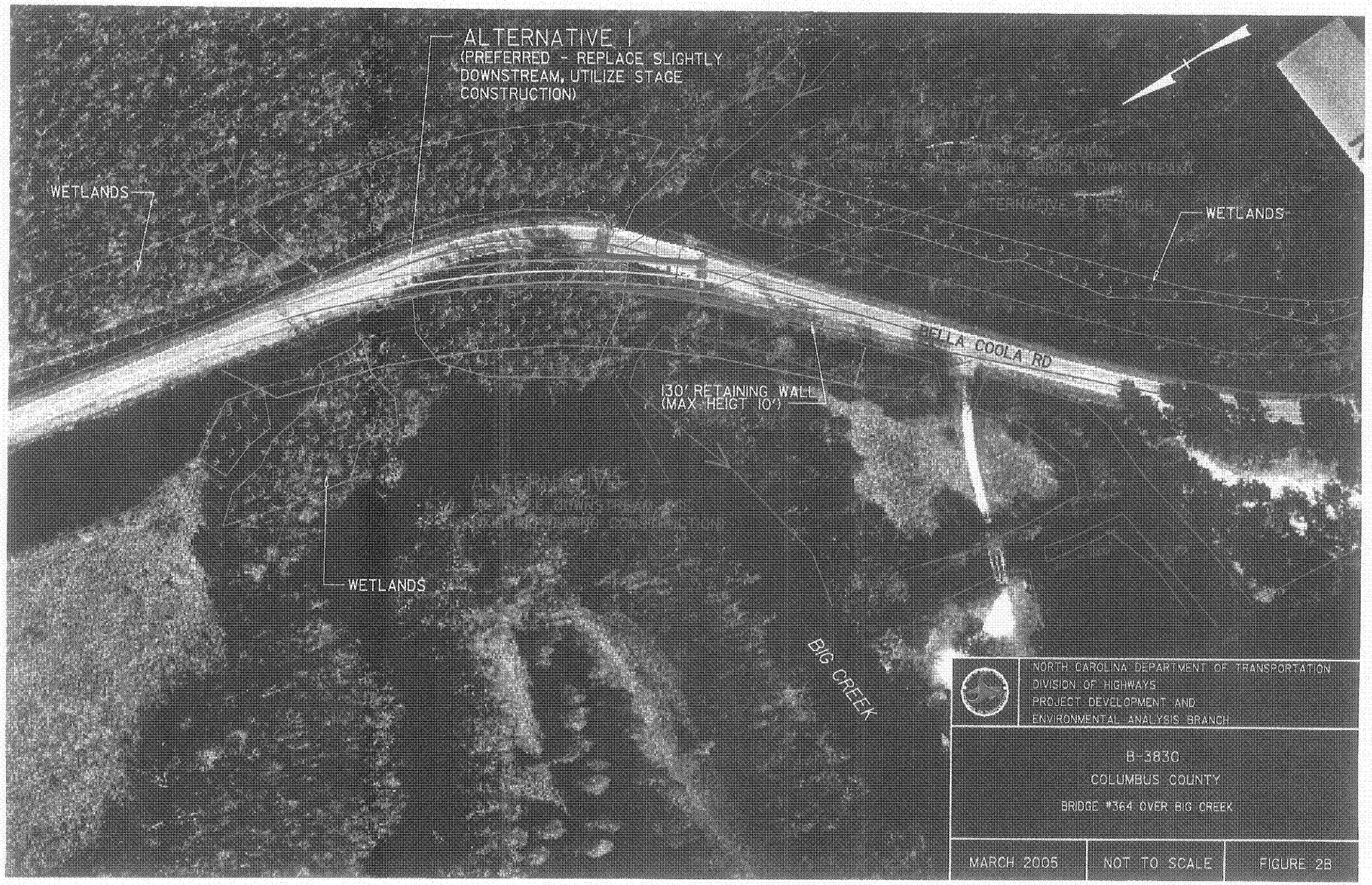
MARCH 2005	*NOT TO SCALE*	*FIGURE 1*



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

B-3830
COLUMBUS COUNTY
BRIDGE #363 OVER FRIAR SWAMP

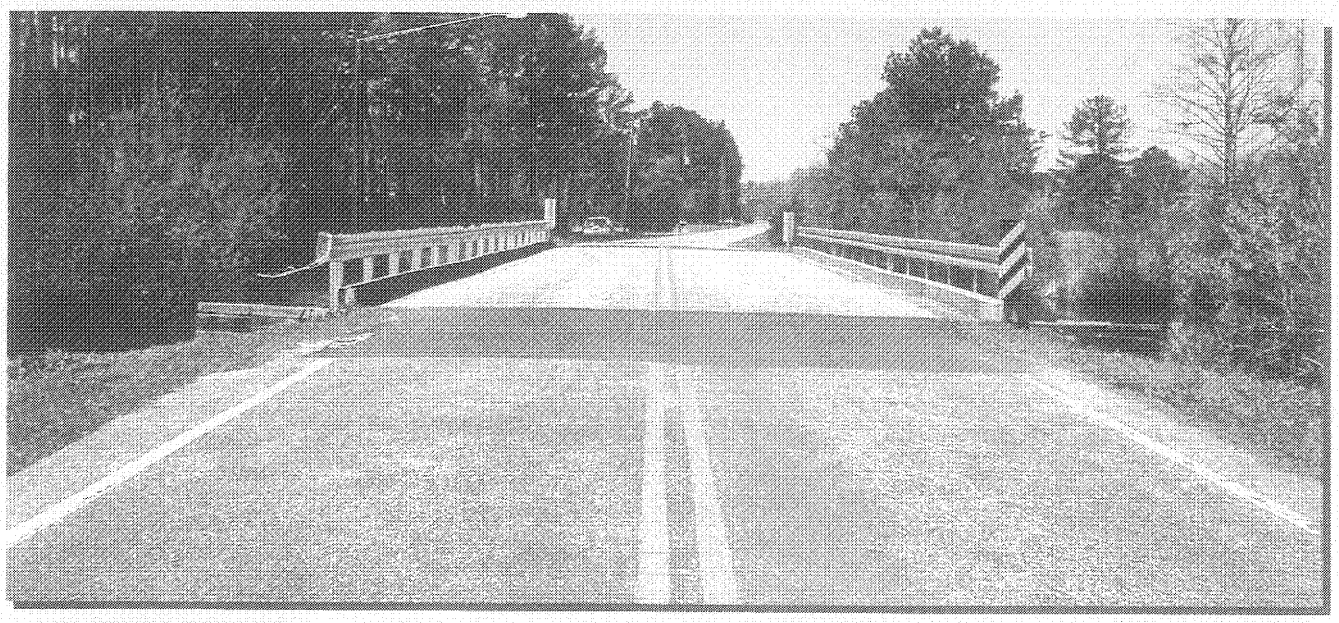
MARCH 2005	NOT TO SCALE	FIGURE 2A

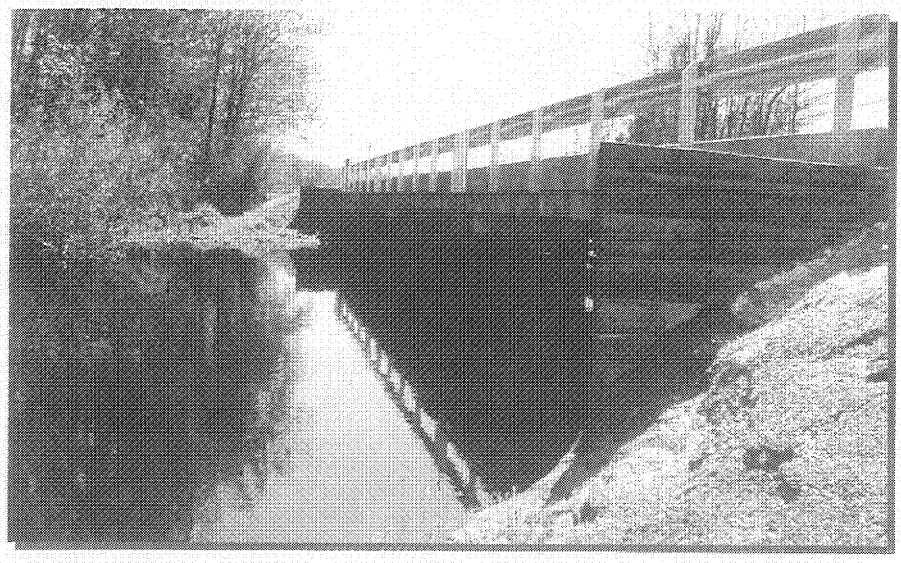


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

B-3830
COLUMBUS COUNTY
BRIDGE #364 OVER BIG CREEK

MARCH 2005	NOT TO SCALE	FIGURE 2B

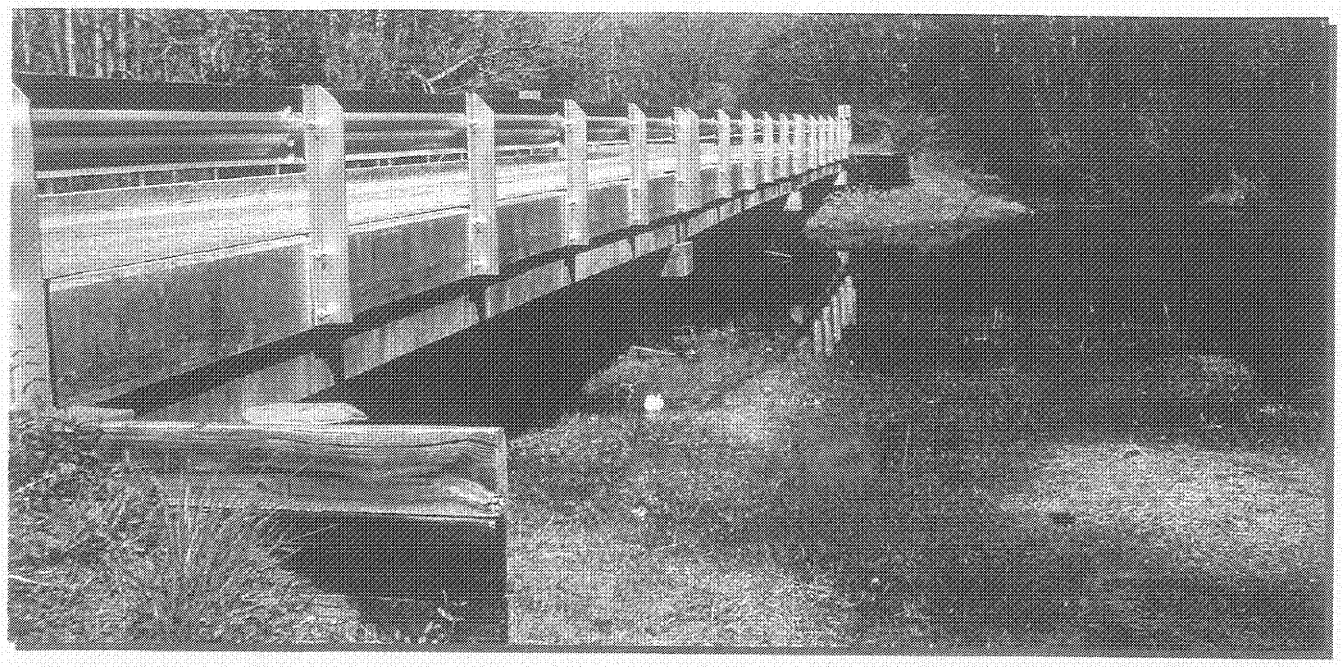


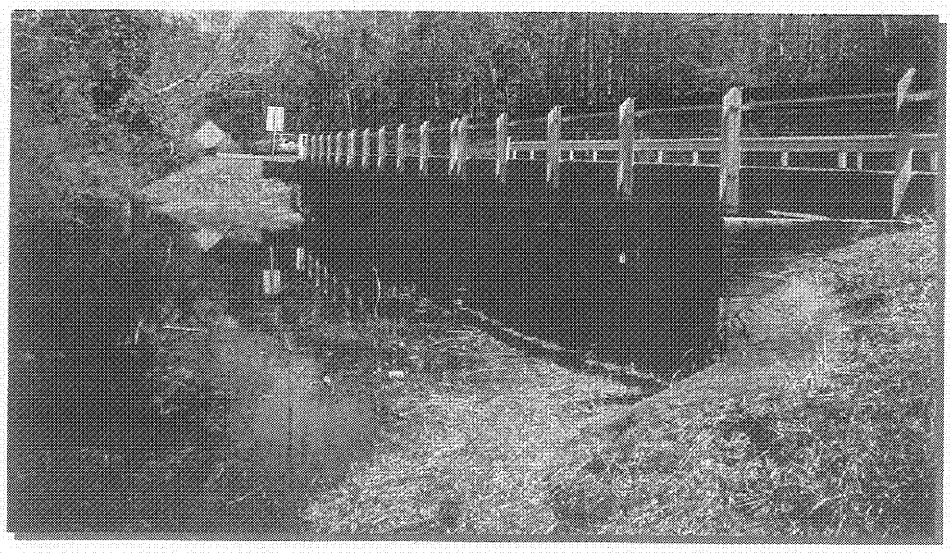


B-3830
Replacement of Bridge
Bridge No. 363
SR 1947 over
Friar Swamp
Columbus County

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

FIGURE 3A





B-3830
Replacement of Bridge
Bridge No. 364
SR 1947 over
Big Creek
Columbus County

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

FIGURE 3B

NATIONAL FLOOD INSURANCE PROGRAM

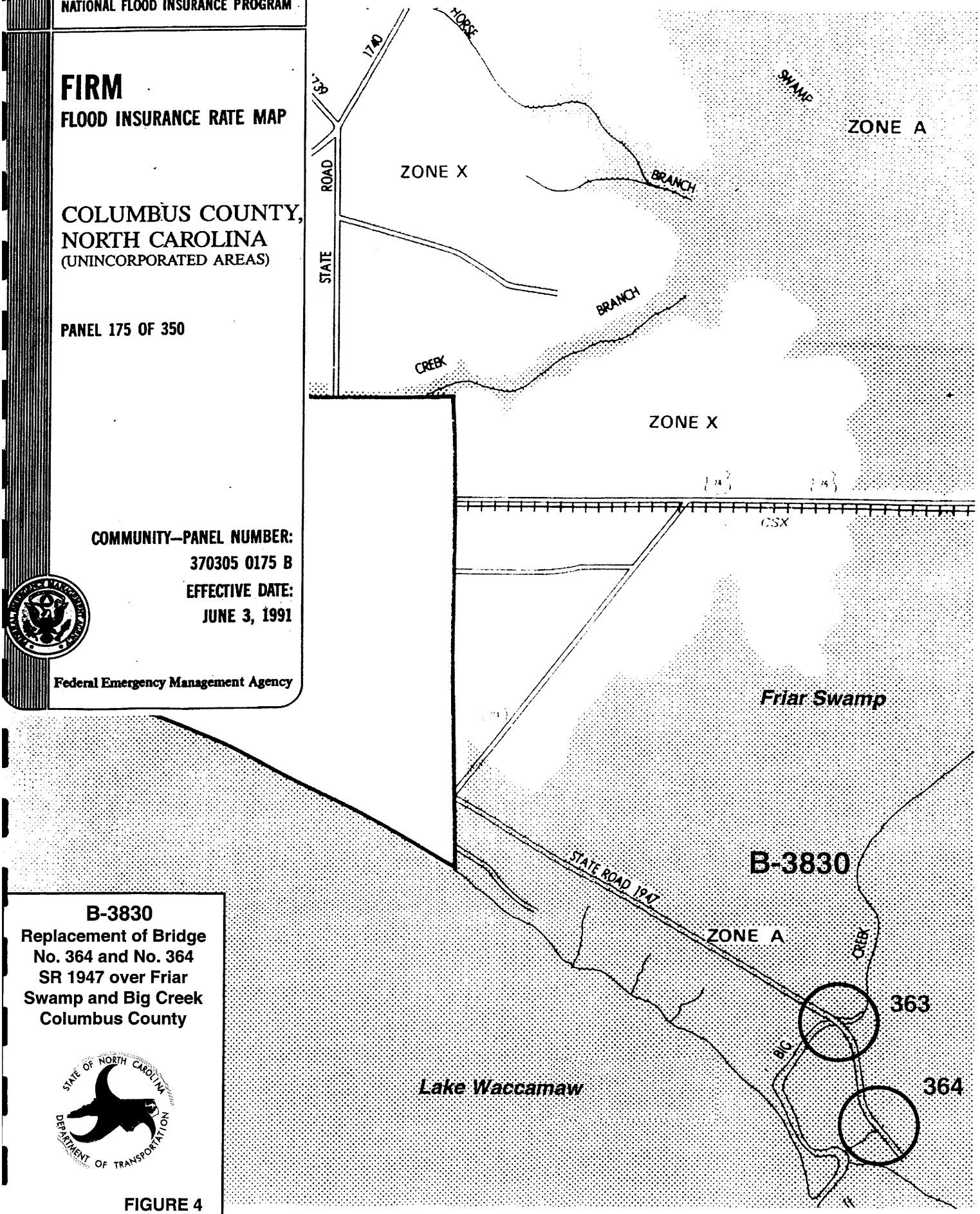
FIRM
FLOOD INSURANCE RATE MAP

COLUMBUS COUNTY,
NORTH CAROLINA
(UNINCORPORATED AREAS)

PANEL 175 OF 350

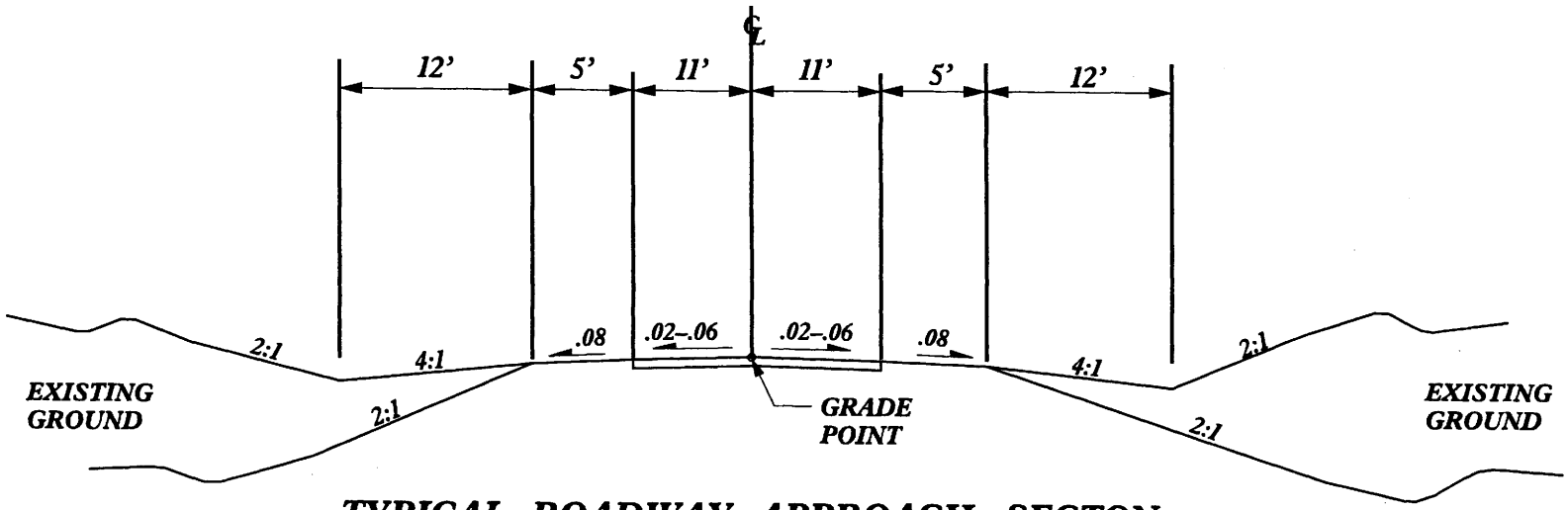
COMMUNITY–PANEL NUMBER:
370305 0175 B
EFFECTIVE DATE:
JUNE 3, 1991

Federal Emergency Management Agency

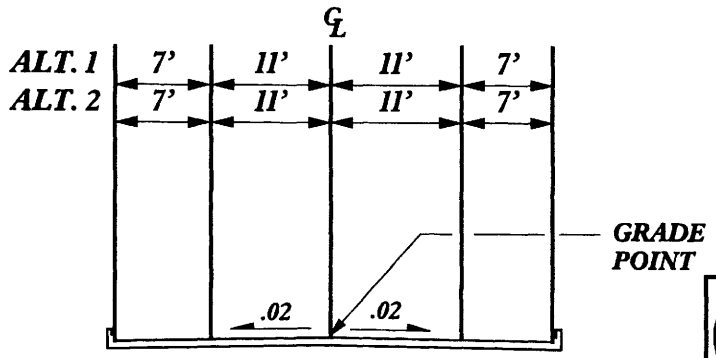


B-3830
Replacement of Bridge No. 364 and No. 364 SR 1947 over Friar Swamp and Big Creek Columbus County

FIGURE 4



TYPICAL ROADWAY APPROACH SECTON



TYPICAL BRIDGE SECTION

TRAFFIC DATA

ADT 2001	600
ADT 2025	1400
DUAL	2%
TTST	1%

FUNCTIONAL CLASSIFICATION: LOCAL (RURAL)

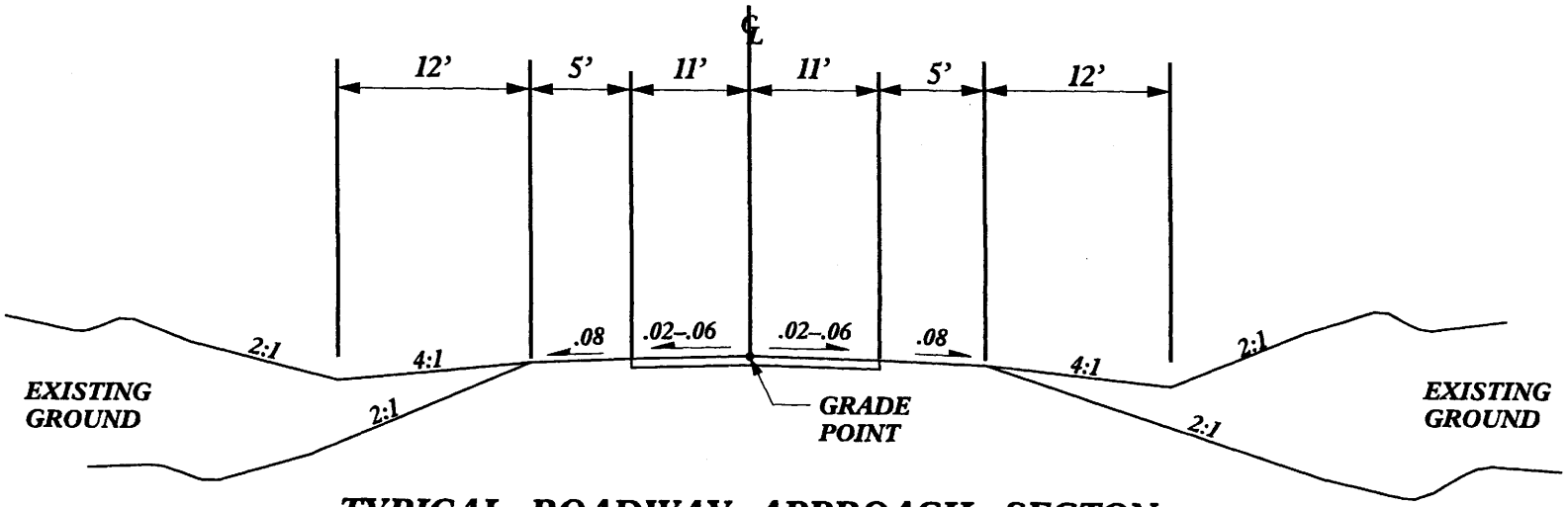
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY

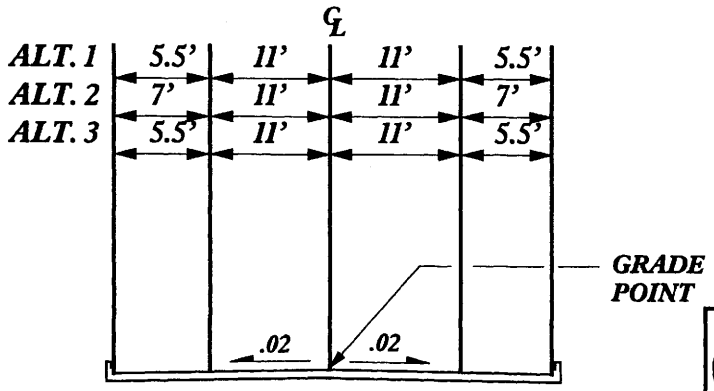
BRIDGE NO. 363 ON SR 1947
OVER FRIAR SWAMP

B-3830

MARCH 2005	NOT TO SCALE	FIGURE 5A



TYPICAL ROADWAY APPROACH SECTON



TYPICAL BRIDGE SECTION

TRAFFIC DATA

ADT 2001	600
ADT 2025	1400
DUAL	2%
TTST	1%

FUNCTIONAL CLASSIFICATION: LOCAL (RURAL)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

COLUMBUS COUNTY

BRIDGE NO. 364 ON SR 1947
OVER BIG CREEK

B-3830

MARCH 2005	NOT TO SCALE	FIGURE 5B

Appendix

United States Department of the Interior

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

October 22, 2003

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

Dear Mr. Feulner:

This letter is in response to your letter and biological evaluation (BE) of October 13, 2003 which provided the U.S. Fish and Wildlife Service (Service) with the biological conclusion of the North Carolina Department of Transportation (NCDOT) that the proposed replacement of Bridge No. 363 over Big Creek and Bridge No. 364 over an Unnamed Tributary to Big Creek, Columbus County (TIP No. B-3830) may affect, but is not likely to adversely affect the Waccamaw silverside (*Menidia extensa*). In addition, NCDOT concludes that there will be no adverse modification to the primary constituent elements of critical habitat for the Waccamaw silverside. The following comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

The submitted BE includes the following Special Project Commitments, which were discussed at an on-site meeting on April 16, 2003.

- NCDOT's High Quality Waters Standards will be enforced throughout project construction
- Using turbidity curtains
- Not using wetlands as equipment staging areas where practicable
- Minimizing heavy equipment operations within the stream channel
- Not placing live concrete in the water
- Both bridges will be designed to exclude any deck drains
- No in-water construction will occur during the spawning season for the Waccamaw silverside (April-June)

With the inclusion of these Special Project Commitments, the Service is able to concur that the projects may affect, but are not likely to adversely affect the Waccamaw silverside. In addition, from the information you provided and other available information, and due to the temporary nature of most of the impacts, the Service has determined that the projects will not cause an adverse modification of critical habitat.

We believe that the requirements of section 7 (a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review 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, Creedmore, NC
Chris Militscher, USEPA, Raleigh, NC

United States Department of the Interior

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

July 15, 2002

Mr. Mike Penny
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Penny:

This responds to your letter of October 3, 2001, requesting comments on nine bridge replacement projects. Five of these projects are within the area covered by this office. Our biologist working on projects of the North Carolina Department of Transportation (NCDOT) at that time, Tom McCartney, requested survey data on federally protected species from the consultant, Wilbur Smith Associates. The requested information was supplied to the Service in late March 2002 at Mr. McCartney's retirement. In the transition to a new NCDOT biologist, the new material was filed under the assumption that comments had been provided. The US Fish and Wildlife Service (Service) regrets the delay in providing these comments and appreciates your efforts to bring this oversight to our attention. This report provides scoping information in accordance with provisions of the Fish and Wildlife, Coordination Act (FWCA) (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543). This report also serves as initial scoping comments to federal and state resource agencies for use in their permitting and/or certification processes for this project.

The bridges scheduled for replacement are:

1. B-3680, Moore County, Bridge No. 2 on US 15/501 over CSX Railroad;
2. B-3830, Columbus County, Bridge No. 363 and 364 on SR 1947 over Friar Swamp;
3. B-4093, Cumberland County, Bridge No. 81 on SR 1728 over Gum Log Creek
4. B-4205, Montgomery County, Bridge No. 133 on SR 1310 over Doomas Creek, and;
5. B-4273, Scotland/Hoke Counties, Bridge No. 47 on US 401 over the Lumber River

General Fish and Wildlife Habitat and Wetlands

For each project, we recommend the following conservation measures to avoid or minimize adverse environmental impacts to fish and wildlife resources:

1. Wetland impacts should be avoided and minimized to the maximum extent practical as outlined in Section 404 (b)(1) of the Clean Water Act Amendments of 1977. Areas

exhibiting high biodiversity or ecological value important to the watershed and region should be avoided. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons.

2. 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 or adjacent to existing, roadways, utility corridors, or previously developed areas in order to minimize habitat fragmentation and encroachment. At the completion of construction, the entire detour area, including any previous detours from past construction activities, should be entirely removed and the impacted areas should be planted with appropriate, endemic vegetation, including trees if necessary;

3. 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, preferably via conservation easement, should be explored at the outset;

4. 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 15;

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

6. Activities within designated riparian buffers should be avoided or minimized.

Federal Species of Concern and State Listed Species

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

Federally Protected Species

The Natural Resources Technical Reports (NRTR) make determinations that a project will not affect a particular species, primarily plants, based on surveys in the recent past. If actual construction is several years away, the Service believes such determinations are premature and

that additional surveys will be required. It would be more appropriate to note that suitable habitat or the actual species was not found during preliminary surveys and such evidence provides early indications that the project is not likely to adversely affect the species.

Effect determinations for plants based on surveys within the project area may require work at a particular time of year for accurate identification. The biological conclusions of the NCDOT for plants should include the time of year that a survey was conducted, the person hours of surveying, and the approximate size of the area surveyed. Surveys should be done within two or three years of actual construction for those species inhabiting stable and/or climax communities. Plant species that utilize disturbed communities, e.g., Michaux sumac (*Rhus michauxii*) and Cooley's meadowrue (*Thalictrum cooleyi*), should be done within two years of actual construction if vegetation disturbing activities, e.g., regular mowing or timber harvesting, occur at the project site.

If surveys for a federally protected species should determine that a given project would adversely affect the species, a biological assessment (BA) may be prepared to fulfill the section 7(a)(2) requirement and in determining whether formal consultation with the Service is necessary. Please notify this office with the results of the surveys for the listed species that may occur in the project area. Please include survey methodologies and an analysis of the effects of the action, including consideration of direct, indirect, and cumulative effects.

Project Specific Comments

B-3680 (Moore County, Bridge No. 2 on US 15/501 over CSX Railroad)

The NRTR presents three design alternatives for the bridge replacement that vary in environmental impacts. Based on Table 2 (p. 8), the Service recommends Alternative 1 since it is the only alternative that would avoid all impacts to Piedmont alluvial forest and has the least amount of impacts on mixed mesic hardwood forest. Table 3 shows that impacts to jurisdictional wetlands for the Alternatives 1-3 are 1.10, 1.44, and 2.85 acres, respectively. However, these tabular data do not seem to correspond to the photographic presentation of the alternatives. These figures indicate that Alternative 2 would avoid most wetlands in the project area while Alternative 1 would cross a wetland just east of US 1. The Service recommends future design work seek to further minimize impacts to wetlands, especially forested wetlands which provide valuable wildlife habitat.

The NRTR accurately notes the four federally protected species for Moore County. The report states that habitat for the Cape Fear shiner (*Notropis mekistocholas*), red-cockaded woodpecker (RCW) (*Picoides borealis*), and American chaffseed (*Schwalbea americana*) do not exist in the project area. Surveys for Michaux sumac (*Rhus michauxii*) did not find the plant. Data on known locations of these species available to the Service indicate that they have not been found in the immediate vicinity of the project. Therefore, current data suggests that the project will not impact species protected by the ESA.

B-3830 (Columbus County, Bridge No. 363 and 364 on SR 1947 over Friar Swamp)

The NRTR for these two bridge replacements has not been released and design alternatives are still under consideration. The major issues for this project include impacts to wetlands, state-designed Outstanding Resource Water (ORW) that flow into Lake Waccamaw, and the Federally threatened Waccamaw silverside (WS) (*Menidia extensa*), a small (1.2 to 2.6 inches) fish endemic to the lake where it occurs in schools near the surface in open water. Furthermore, critical habitat has been designated for the WS that includes all of the lake up to the mean high water level that generally includes the lower reaches of stream flowing into the lake up to SR 1947. If a temporary detour bridge is required, this structure should be on the side of the existing structure away (north) from the lake. Such placement would avoid issues of adverse modification to critical habitat. Impacts can also be minimized by not installing "weep holes" or other structures on the bridge that would allow run-off or degrade water quality in the creek or lake. Overall, water run-off from structures should be minimized or avoided if at all possible. The NCDOT should use BMPs and effective sediment and erosion control measures to minimize debris and sediment entering the creek and lake. Finally, potential impacts would be minimized if construction is performed outside the WS spawning period of March through July.

The wetlands in the project enhance the water quality of Lake Waccamaw and provide high quality fish and wildlife habitat. Every effort should be made to minimize temporary impacts and avoid the permanent loss of such areas.

In addition to the WS, the other federally protected species in Columbus County include the RCW, shortnose sturgeon (*Acipenser brevirostrum*) (under the jurisdiction of the National Marine Fisheries Service), Cooley's meadowrue (*Thalictrum cooleyi*), and rough-leaved loosestrife (*Lysimachia asperulaefolia*). The NCDOT should determine project impacts on these species through either a thorough comparison of habitat requirements with conditions at the site or actual field surveys.

The Carolina pygmy sunfish (*Elassoma boehkei*), a FSC, has been reported near the project site. These small fish occur in heavy vegetated shallows of ponds, sloughs, and creeks. This FSC would benefit from all measures to preserve water quality and prevent the loss of vegetated wetlands.

B-4093 (Cumberland County, Bridge No. 81 on SR 1728 [Middle Road] over Gum Log Canal)

The NRTR states that two alternatives are under consideration for the project. Alternative 1 would construct the new bridge at the same location and use a temporary detour bridge. Alternative 2 would construct a new bridge approximately 20 feet upstream of the existing structure. Both alternatives would have the same permanent impacts, 0.02 acre, on jurisdictional wetlands. If Alternative 2 is implemented, the NCDOT should discuss the removal of the existing structure and the restoration of the waterway and associated wetlands at that site.

The Service does not concur with the preliminary determination that the project would have no effect on the small whorled pogonia (*Isotria medeoloides*), a Federally threatened perennial plant. This species is generally known from open, dry, deciduous woods with acid soil. The NRTR states that the species is characteristic of moist hardwood slopes and along stream bottoms "usually" in association with white pine. The Biological Conclusion (p. 14) is based on the absence of hardwood forests "dominated" by white pine. We do not believe that this plant requires woodlands with, or dominated by, white pine, but that white pine is often present in the forests containing the plant. The Service recommends that future conclusions be based on field surveys.

In general, the Service can accept the preliminary determination that the project would have no effect on the RCW, Saint Francis satyr (*Neonympha mitchellii francisci*), pondberry (*Lindera melissifolia*), rough-leaved loosestrife, Michaux's sumac, and American chaffseed. Records available to the Service indicate that none of the listed species of Cumberland County have been reported to occur near the project site.

Table 5 of the NRTR shows that two mussels designated as FSC have potential habitat within the project area. These are the Atlantic pigtoe (*Fusconaia masoni*) and yellow lampmussel (*Lampsilis cariosa*). The Service recommends that effective erosion and sedimentation control be used during all construction to minimize any impacts to these mussel species.

B-4205 (Montgomery County, Bridge No. 133 on SR 1310 [Lovejoy Road] over Dumas [Doomas] Creek)

Some documents for the project state that the bridge crosses Doomas Creek while other documents give the name as Dumas Creek. We will use the latter in our comments and future planning document should indicate the correct name.

The NRTR considers three alternatives, a new structure immediately downstream (Alternative 1), a new structure immediately upstream (Alternative 2), and replacement at the existing location with offsite detours on existing roads (Alternative 3). Table 2 (p. 12) presents impacts to jurisdictional water and wetlands. While there are only minor differences in impacts to wetlands, Alternative 1 has much greater permanent impacts to Dumas Creek (232 feet) versus the 32 feet for both Alternatives 2 and 3. The Service does not support Alternative 1 and would recommend Alternative 3.

The NRTR presents a biological conclusion for three federally listed animals and two plants. All conclusions are that the project would have no effects on these species. The conclusions for the three animals, the bald eagle (*Haliaeetus leucocephalus*), eastern cougar (*Felis concolor couguar*), and RCW were based on the absence of suitable habitat or, in the case of the cougar, the absence of recent evidence that the species exists in the area. The conclusions for the two plants, Schweintz's sunflower (*Helianthus schweinitzii*) and smooth coneflower (*Echinacea laevigata*) were based on field surveys which appear adequate. Occurrence data presently available to the Service indicate that the species most likely to occur near the project are

Schweintz's sunflower and Carolina creekshell (*Villosa vaughaniana*), a FSC. The NCDOT should carefully monitor the project area prior to construction to ensure that Schweintz's sunflower does not colonize the area.

Table 4 of the NRTR shows that two mussels designated as FSC have potential habitat within the project area. These are the Atlantic pigtoe (*Fusconaia masoni*), Brook floater (*Alasmidonta varicosa*), Savannah lilliput (*Toxolasma pullus*), and Carolina creekshell. The Service recommends that effective erosion and sedimentation control be used during all construction to minimize any impacts to these mussels species.

B-4273 (Scotland/Hoke Counties, Bridge No. 47 0n US 401 over the Lumber River)

The NRTR considers two alternatives: replacement at a new location, approximately 70 feet upstream of the existing structure (Alternative 1) and replacement at the same location (Alternative 2). Table 1 indicates that Alternative 2 would have less impacts on important plant communities such as cypress-gum swamp and coastal plains bottomland hardwoods. Table 2 shows that Alternative 2 would have less impacts (2.46 acres) on jurisdictional wetlands than Alternative 1 (4.45 acres). Based on these data, the Service considers Alternative 2 to be the least damaging to fish and wildlife habitat in the project area.

Table 3 accurately reflects the federally protected species known to occur in Scotland and Hoke Counties. The determinations that the project would have no effect on four species (RCW, Saint Francis' satyr, rough-leaved loosestrife, and American chaffseed) based on an absence of suitable habitat appear accurate. The systematic surveys for two plants with potential habitat, Canby's dropwort (*Oxypolis canbyi*) and Michaux's sumac, did not find these species and present sufficient evidence that the species do not occur in the project area in June 2001. Occurrence data available to the Service indicate that no Federally protected species have been reported in the project area.

The Service appreciates the opportunity to comment on these projects. Please continue to advise us of the progression of the planning process, including your official determination of the impacts of these bridge replacements. If you have any questions regarding these comments, please contact Howard Hall at 919-856-4520, Ext. 27.

Sincerely,

Garland B. Pardue, Ph.D.
Ecological Services Super-visor

cc: Ted Bisterfeld, USEPA, Atlanta, GA
David Timpy, USACE, Wilmington NC
John Hennessy, NCDWQ, Raleigh, NC
David Cox, NCWRC, Northside, NC

U.S. Department of Transportation
United States Coast Guard

Commander
United States Coast Guard (Aowb)
Fifth Coast Guard District

431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: Aowb
Phone: (757)398-6227
FAX: (757) 398-6334

16590
May 22, 2002

Mr. Michael Penney
Project Development Engineer
North Carolina Department of Transportation
Project Development and Environmental Analysis
1549 Mail Service Center
Raleigh, North Carolina 27699-1549

Dear Mr. Penney:

This is in response your letter dated May 14, 2002, regarding the replacement of Bridge No. 363 and No. 364 across Friar Swamp in Columbus County, North Carolina.

Since Friar Swamp is tidal, it is considered legally navigable for Bridge Administration purposes. It also meets the criteria for advance approval waterways outlined in Title 33, **Code of Federal Regulations**, Section 115.70 at each bridge site. Advance approval waterways are those that are navigable in law, but not actually navigated by other than small boats. The Commandant of the Coast Guard has given his advance approval to the construction of bridges across such waterways, so an individual bridge permit will not be required for the two bridge replacements across Friar Swamp.

The fact that a Coast Guard permit is not required does not relieve you of the responsibility for compliance with the requirements of any other Federal, State or local agency who may have jurisdiction over any aspect of the project.

If you should have any questions regarding this matter, please contact Ms. Linda Gilliam-Bonenberger, Bridge Management Specialist, at (757) 398-6227.

Sincerely,

ANN B. DEATON
Chief, Bridge Administration Section
By direction of the Commander
Fifth Coast Guard District

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

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

Division of Historical Resources
David J. Olson, Director

RECEIVED
MAY 16 2002
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

May 14, 2002'

MEMORANDUM

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

FROM: David Brook RSE for David Brook

SUBJECT: Bridge No. 363 on SR 1947 over Friar Swamp, B-3830, Columbus County, ER 02-7904

Thank you for your letter of September 26, 2001, concerning the above project.

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

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

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

DB:kgc

Federal Aid # BRZ-1947(1) *TIP* # B-3830 *County*: Columbus

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

Project Description: Replace Bridge Nos. 363 and 364 on SR 1947 over Friar Swamp

On 04/12/2002, representatives of the

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

Reviewed the subject project at

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

All parties present agreed

- [ ] There are no properties over fifty years old within the project's area of potential effects.
- [x] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- [x] There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the property identified as Properties 1-4 is considered not eligible for the National Register and no further evaluation of it is necessary.
- [x] There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- [x] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [x] There are no historic properties affected by this project. (*Attach any notes or documents as needed*)

Signed:

Richard S Conn — 16 APRIL 2002
Representative, NCDOT — Date

Michael C Dawn — 4/16/02
FHWA, for the Division Administrator, or other Federal Agency — Date

Claudia Brown — 4-16-02
Representative, HPO — Date

David Brook — 5/2/02
State Historic Preservation Officer — Date

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

North Carolina Department of Crime Control and Public Safety
Division of Emergency Management

Michael F. Easley, Governor

Bryan E. Beatty, Secretary

October 19, 2001

Mr. William D. Gilmore, P.E.,
Manager of the Project Development and Environmental Analysis Branch
Division of Highways
1549 Mail Service Center
Raliegh, NC 27699-1549

OCT 22 2001

Subject: **RE: Bridge Replacement Projects**

Dear Mr. Gilmore:

Thank you for your letters dated September 26, 2001 regarding the review of nine bridge replacement projects. The North Carolina Division of Emergency Management has reviewed the proposed projects and would like to provide comments to the Department of Transportation.

My staff has reviewed the Flood Insurance Rate Maps (FIRMs) for your project areas. The majority of these projects are located in Special Flood Hazard Areas, also know as the 100-year floodplain. Please ensure that the proposed projects do not cause an increase in the Base Flood Elevation (BFE) in these areas and that they comply with Nation Flood Insurance Program guidelines.

Projects Located in Special Flood Hazard Areas (100-year floodplain)

- B-4009, Bridge No. 33 in Anson County - Zone A
- B-3830, Bridge No. 363 in Columbus County - Zone A
- B-4205, Bridge No. 133 in Montgomery County - Zone A
- B-4273, Bridge No. 37 in Scotland County - Zone A
- B-3908, Bridge No. 246 in Stanly County - Zone A
- B-3909, Bridge No. 99 in Stanly County - Zone A
- B-4276, Bridge No. 33 in Stanly County - Zone A5

Projects Not Located in Special Flood Hazard Areas (100-year floodplain)

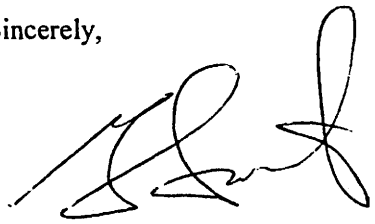
- B-4093, Bridge No. 81 in Cumberland County - Zone B (500-year floodplain)
- B-3680, Bridge No. 2 in Moore County - Zone X (500-year floodplain)

The Division of Emergency Management does not oversee the routing of Emergency Response Units on a day-to-day basis. However, utilizing off-site detour routes has the potential to increase response times of these units, especially if alternate routes are not available. Your agency should contact local emergency management officials or the local representatives responsible for roadways. NCEM would

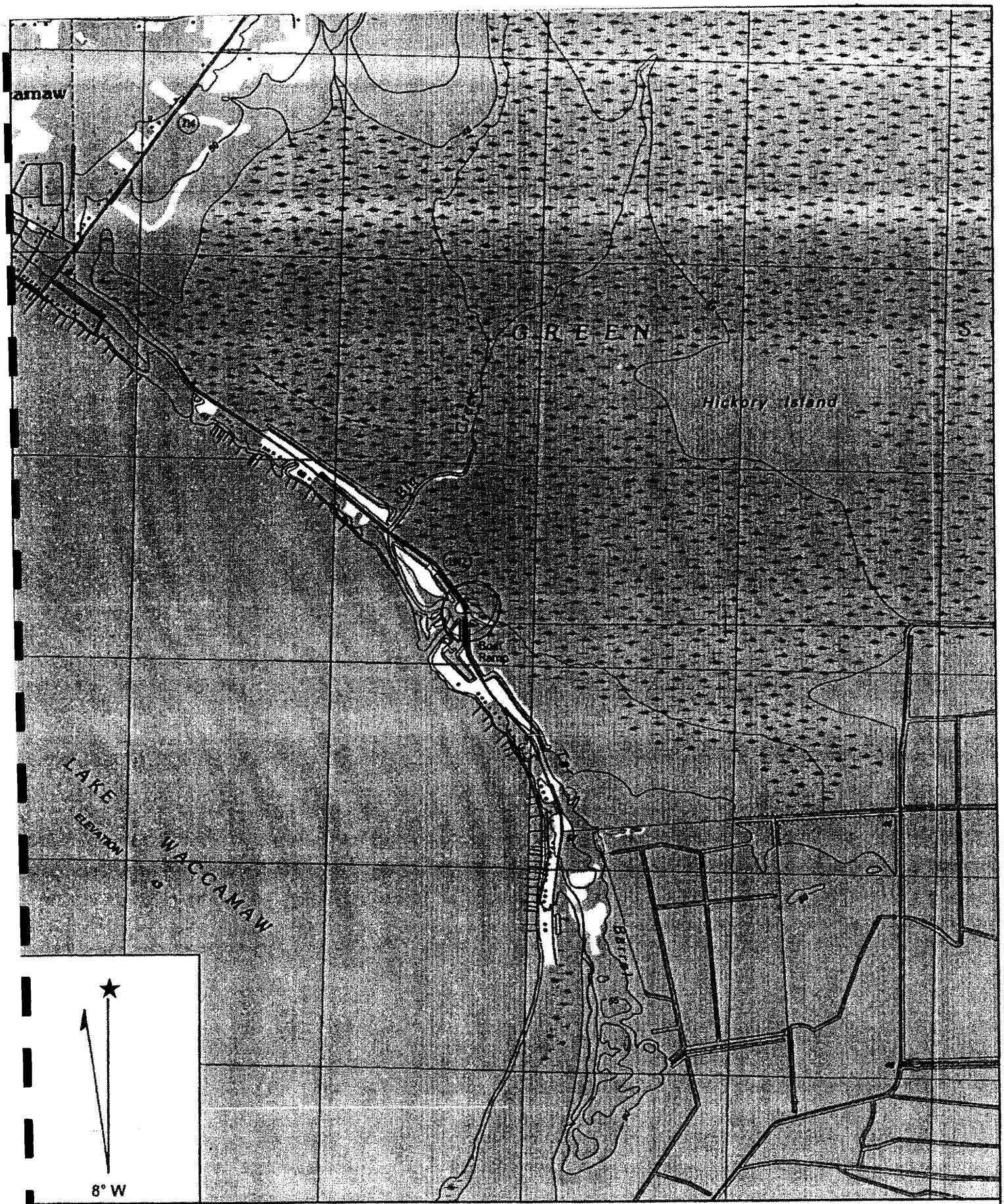
also like to advise that you pay close attention to roadways that have been identified as evacuation routes and the potential impacts your projects may have on evacuation travel.

If you have any further questions or need additional information, please do not hesitate to contact Steve Garrett at (919) 715-8000, extension 349.

Sincerely,



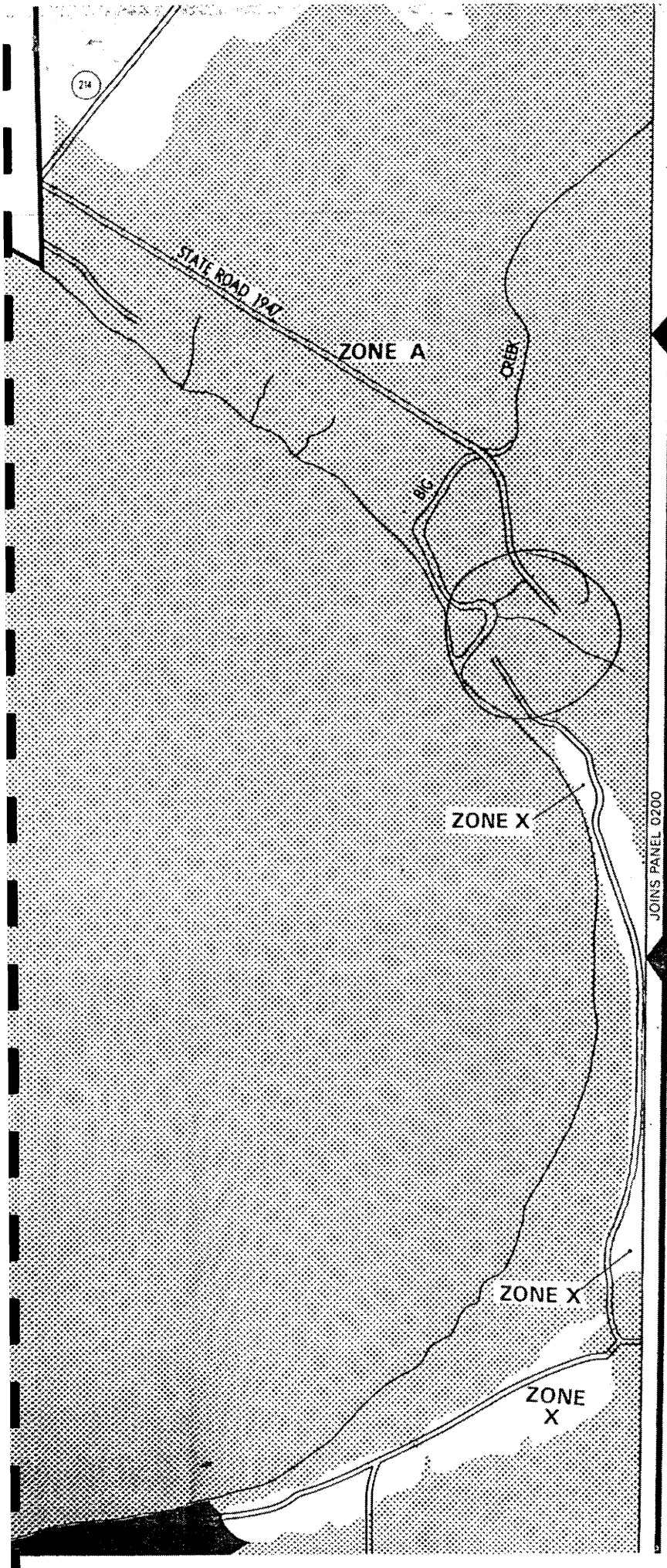
Gavin Smith, Ph.D.
Assistant Director, Hazard Mitigation
North Carolina Division of Emergency Management



Name: LAKE WACCAMAW EAST
Date: 10/10/2001
Scale: 1 inch equals 2000 feet

Location: 17 732843 E 3797300 N
Caption: Columbus County, B-3830
Bridge no, 363 on SR 1947 over Friar Swamp. L=91ft., W=25.5ft. yr built 1964

Copyright (C) 1997, Maptech, Inc.



Different Coastal Base Flood Elevations Within Special Flood Hazard Zone.

567 — Base Flood Elevation Line; Elevation in Feet*

A — A — Cross Section Line

(EL 19) — Base Flood Elevation in Feet Where Uniform Within Zone*

RM5 × — Elevation Reference Mark

M3.0 • — Mile Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all planimetric features outside Special Flood Hazard Area or all areas subject to flooding, particularly from local drainage sources of small size.

Areas of Special Flood Hazard (100-year flood) include zones, A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Coastal base flood elevations apply only landward of the shoreline.

This map incorporates approximate boundaries of coastal barriers established under the Coastal Barrier Resources Act (PL 97-348).

Elevation reference marks are described in the Flood Insurance Study Report.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

For adjoining panels, see separately printed Map Index.

MAP REPOSITORY

SCS Office, 112 West Smith Street, Whiteville, North Carolina (Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:

JUNE 16, 1978

FLOOD HAZARD BOUNDARY MAP REVISION:

FLOOD INSURANCE RATE MAP EFFECTIVE:

JUNE 3, 1991

FLOOD INSURANCE RATE MAP REVISIONS:

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

APPROXIMATE SCALE IN FEET

2000 0 2000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

COLUMBUS COUNTY, NORTH CAROLINA

(UNINCORPORATED AREAS)

PANEL 175 OF 350

COMMUNITY–PANEL NUMBER:
370305 0175 B

EFFECTIVE DATE:
JUNE 3, 1991

Federal Emergency Management Agency

Columbus County Commissioners

ADMINISTRATIVE BUILDING
111 WASHINGTON STREET - WHITEVILLE, NORTH CAROLINA 28472 - PHONE 910-640-6600 - FAX 910-642-2386
E-MAIL columbus@intrstar.net

November 7, 2001

COMMISSIONERS

Amon E. McKenzie
Zone 1

C.E. Wilson
Zone 2

Sammie Jacobs
Zone 3

Bill Memory
Zone 4

Lynwood Norris
Zone 5

Spruell R. Britt
Zone 6

David L. Dutton, Jr.
Zone 7

James E. Hill, Jr.
County Attorney

Ida L. Smith
Clerk to Board/
Asst. to Administrator

Mr. Elmo Vance, P.E., Project Development Engineer
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
Research and Development
1549 Mail Service Center
Raleigh, North Carolina 27699-1549

IN RE: Bridge Number 363 on SR 1947

Dear Mr. Vance:

In regards to your letter dated September 26, 2001 concerning Bridge Number 363 on SR 1947 over Friar Swamp, Columbus County has some concerns over the alternatives to repair said bridge. Fire Marshal John Saylor and Special Projects Coordinator Darren Clark investigated alternative routes for homeowners and emergency vehicles. Due to this bridge being located at the end of a state maintained road, there is no suitable ingress and egress to the homes other than this bridge. There are logging roads which can access the affected area but these roads are not suitable to withstand emergency vehicles and day to day traffic. Attached you will find a letter from the Fire Marshal stating the concerns on this matter. I hope that your office will find a suitable means to repair the bridge while allowing access along SR 1947 to homeowners.

The only alternatives stated in your letter we think will work are as follows:

1. Rehabilitate the existing structure, or
2. Replace the structure on location and temporarily detour onsite.

We feel these alternatives are necessary to provide the homeowners with adequate access to their homes and to provide the necessary protection and services provided by the Town of Lake Waccamaw.

Thank you for your immediate attention to this matter and if you have any questions, please feel free to contact the Administration Office of Columbus County at telephone: (910) 640-6600. If the Fire Marshal's Office can be of any further assistance in this matter, please do not hesitate to call at telephone: (910) 640-6613.

Sincerely,

Spruell R. Britt

SPRUELL R. BRITT, Chairman
COLUMBUS COUNTY COMMISSIONERS

SRB/jbh
Enclosure

Columbus County

Fire Marshal/Fire Inspector

November 1, 2001

To: Darren Currie
Parks and Recreation

From: John Saylor
County Fire Marshal

Subject: Bridge Inspection

As a result of our visit to the bridge at the Lake on 10-31-2001, I am providing the following response. As I understand our information, the NC DOT wants to make some improvements to this bridge in the coming years.
After our visit to this location, I can see no beneficial course of action during the time this bridge is under whatever repairs/renovations that will be done. I have listed below the replies to what we discussed from the DOT letter.

1. There is **NOT** an alternative detour available to the residents of this area. The road through the tree area is unsatisfactory for vehicle transportation. It is unacceptable for emergency vehicles to use due to the condition and length of time to travel into the area.
2. DOT would have to construct a temporary bridge through this area in order to provide traffic flow for residents and emergency traffic. This bridge would have to be able to support the weight of a loaded fire truck or in excess of 30,000 pounds.

I am not sure there is any feasible way to do this project without totally cutting off the residents in the area. I suggest that the DOT look at alternatives or not consider the project.
If you have any questions or comments please feel free to give me a call.

608 North Thompson Street
Telephone: 910-640-6613

Whiteville, North Carolina 28472
Fax: 910-640-1241

Flo Vance

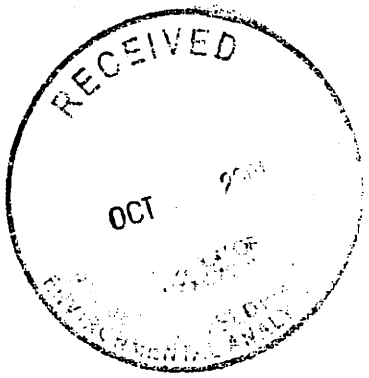
Columbus County Emergency Services

9-1-1/ Columbus Central

Addressing

Emergency Management

October 11, 2001



William D. Gilmore
NC Dept of Transportation
Research & Development
1549 Mail Service Center
Raleigh, NC 27699-1549

Dear Mr. Gilmore:

Subject: Your letter dated September 26, 2001, Columbus County B 3830, Bridge No. 363 on SR 1947

If the bridge in question, Bridge #363 on SR 1947, Bella Coola Road is closed, the residents on that road will have no way in or out except by boat on Lake Waccamaw. Bella Coola Road is a dead end road with no detour routes available.

Sincerely,

John H. Moore, Jr.
Director

JHM/skw

Emergency Services
Telephone: (910) 640-6610
Fax: (910) 640-1241

9-1-1/Columbus Central
Telephone: (910) 640-1428
Fax: (910) 640-2205

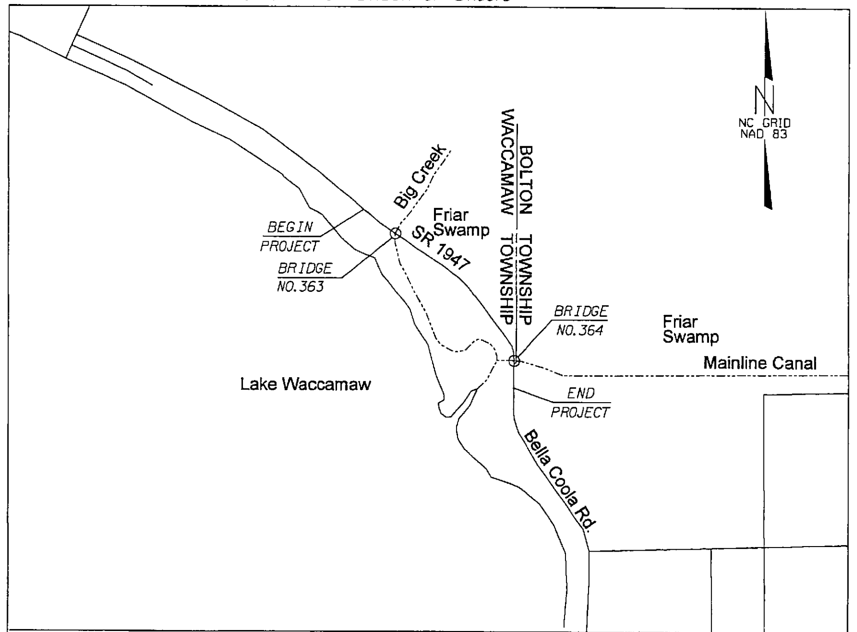
Addressing
Telephone: (910) 640-1518 or
(910) 641-0016

09/08/99

TIP PROJECT: B-3830

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

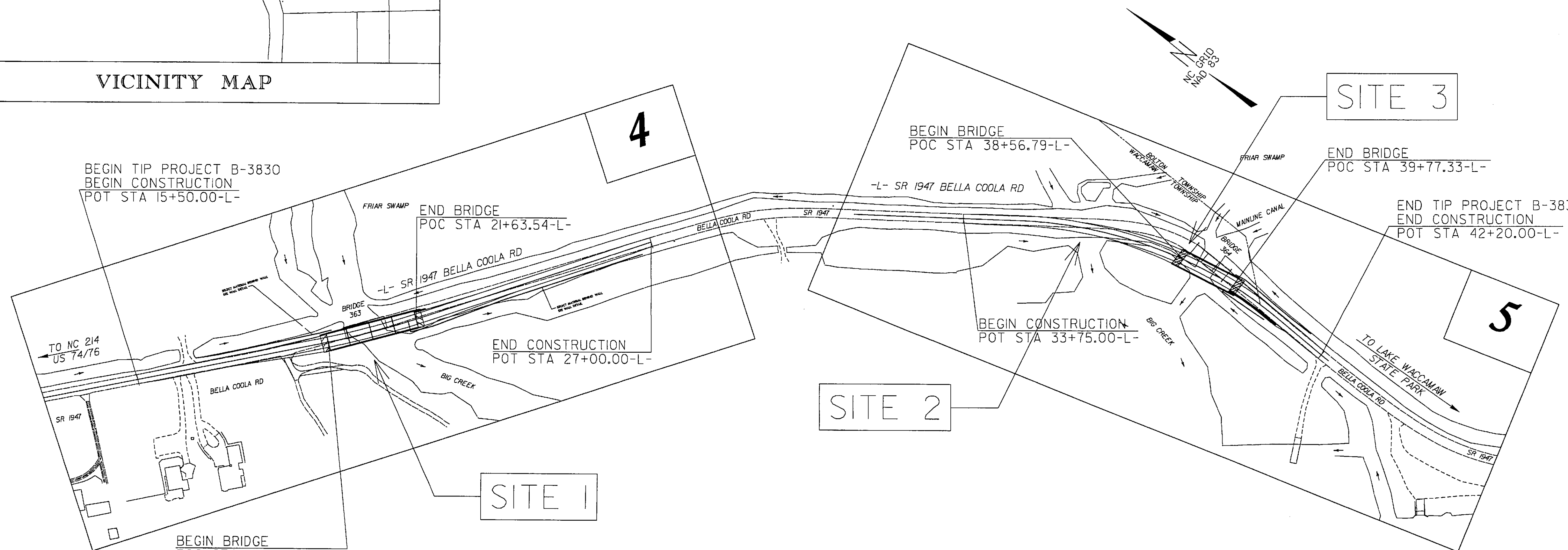
COLUMBUS COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3830	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33281.1.1	BRZ-1947(1)	P.E.
33281.1.2	BRZ-1947(1)	ROW / UTILITIES

***LOCATION:* BRIDGE NO. 363 AND NO. 364 OVER FRIAR SWAMP AND BIG CREEK ON SR 1947 (BELLA COOLA RD)**

***TYPE OF WORK:* GRADING, PAVING, DRAINAGE, AND STRUCTURES.**



WETLAND/ STREAM IMPACTS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NCDOT CONTACT: DOUG TAYLOR, P.E.

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

GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 800
ADT 2027 = 1470
DHV = 14 %
D = 65 %
T = 3 % *
V = 50 MPH
* (TTST 1% + DUAL 2%)

FUNC. CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3830 =	0.320	MILES
LENGTH STRUCTURE TIP PROJECT B-3830 =	0.058	MILES
TOTAL LENGTH OF TIP PROJECT B-3830 =	0.378	MILES

Prepared In the Office of:

WILBUR SMITH ASSOCIATES

421 Fayetteville St, Suite 1303, Raleigh NC, 27601

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
August 17, 2007

LETTING DATE:
August 19, 2008

DAVID L. WILVER, P.E.
PROJECT ENGINEER

R.D. ODELL, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

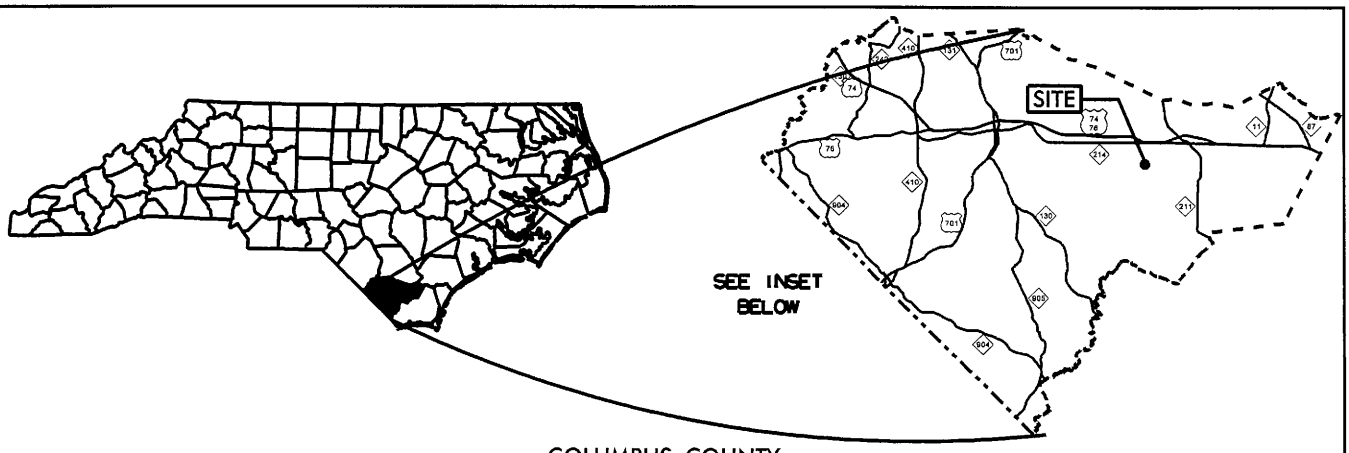
P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

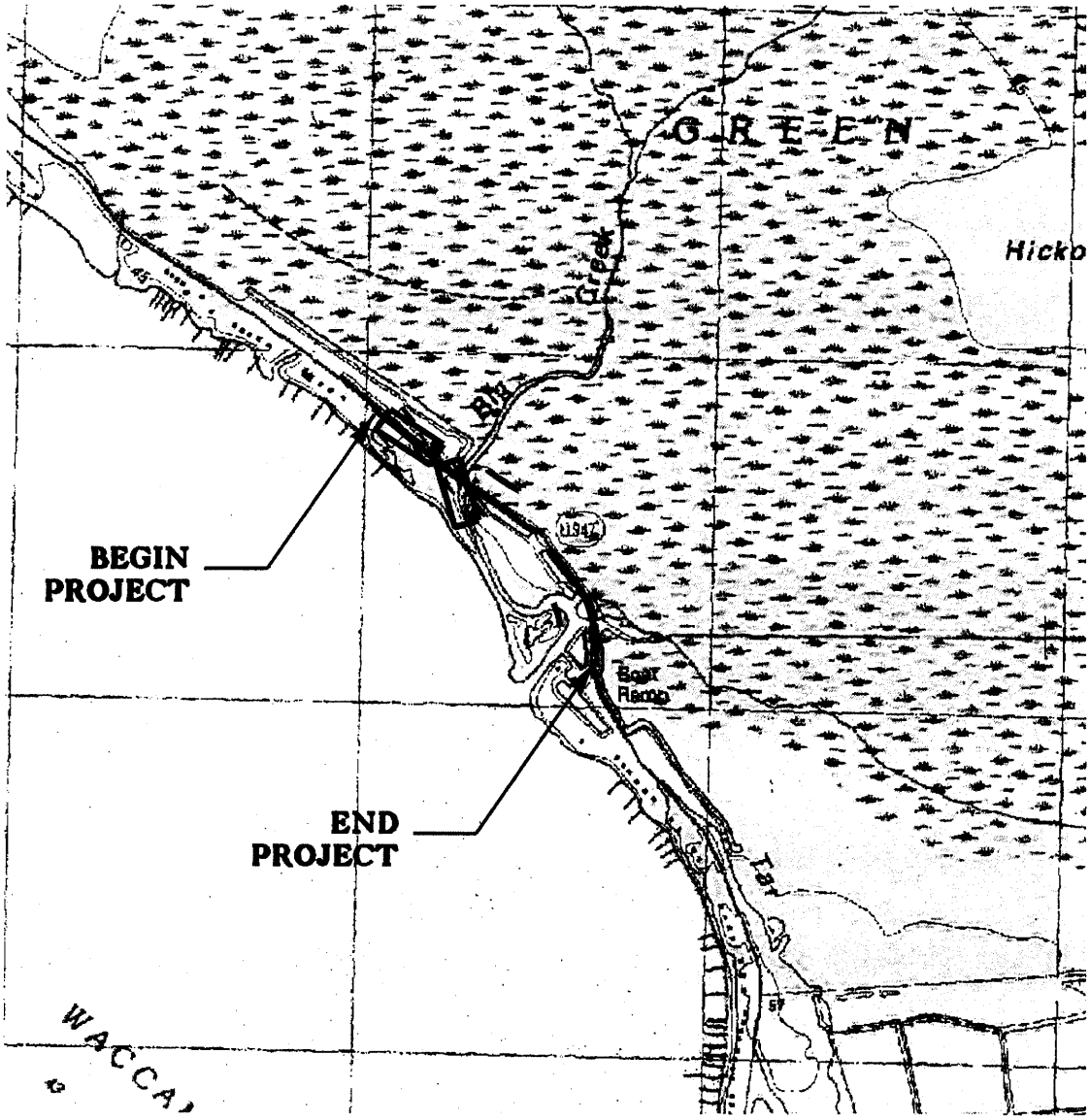
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Permit Drawing
Sheet 1 of 13

P.E.
STATE HIGHWAY DESIGN ENGINEER



COLUMBUS COUNTY



WETLAND IMPACTS
VICINITY MAP

Permit Drawing
Sheet 2 of 13

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

PROJECT:33281.1.1 (B-3830)
BRIDGE NO. 363 AND 364 OVER
FRIAR SWAMP AND BIG CREEK
ON SR 1947 (BELLA COOLA RD)

SHEET ___ OF ___ **10/17/07**

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
5	JAMES M. LITTLE	303 W. WHITAKER MILL RD RALEIGH, NC 27608
7	W. E. PRESCOTT JR, & JACK B. PRESCOTT & SUSAN P. LITTLE	303 W. WHITAKER MILL RD RALEIGH, NC 27608
6	STATE PROPERTY OFFICE OF NORTH CAROLINA	116 WEST JONES ST RALEIGH, NC 27603

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

PROJECT:33281.1.1 (B-3830)
BRIDGE NO. 363 AND 364 OVER
FRIAR SWAMP AND BIG CREEK
ON SR 1947 (BELLA COOLA RD)

 10/17/07

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	20+00/23+00 -L-	BRIDGE				0.010		0.018	0.015	0	0	
2	36+00/37+00 -L-	72" PIPE				0.011		0.030	0.024	21	26	
	RT											
3	37+00/38+75 -L-	BRIDGE	0.126					0.033		181		
	RT											
TOTALS:			0.13	0.00	0.00	0.02	0.00	0.08	0.04	202	26	0

Permit Drawing Sheet 4 of 13

The proposed Bridge #363 consists of a four-span cored slab superstructure atop pile bents. Two of the three bents are in the waterway creating permanent impacts. Each bent consists of 7-18" diameter pipe piles. Each pile has an impact area of 1.77 square feet. For the two bents in the water, the total impact is 24.8 sq. ft.

The proposed Bridge #364 will have a three-span cored slab superstructure atop pile bents. Both bents impact the waterway. Each bent consists of 9-HP12X53 steel piles. Each pile has an impact area of 1.0 sq. ft. The two bents in the water have a total impact of 18.0 sq. ft.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

COLUMBUS COUNTY
PROJECT: 33281.1.1 (B-3830)

SHEET #########

ATN Revised 3/31/05

PROJECT REFERENCE NO.	SHEET NO.
B-3830	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street Mall, Suite 1300, Raleigh, N.C. 27601
SUNGATE DESIGN GROUP, P.A. — 910 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

STATE OF NORTH CAROLINA

ENGLISH

NOTES
1. FOR CROSS SECTIONS OF: -L- SEE SHEETS: X-1 THRU X-10
2. FOR STRUCTURE PLANS: S- THRU S-

REVISIONS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

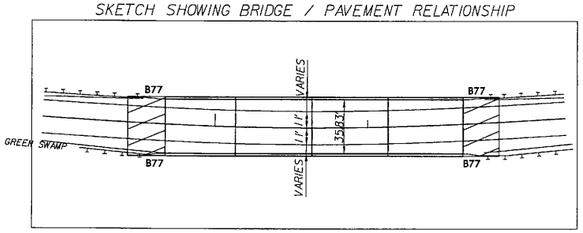
DENOTES TEMPORARY FILL IN WETLAND (GREEN SWAMP)

DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

NAD 83 NC GRID

SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP



CL STA 20+66 -L- 1@45' & 3@50' 21" CORED SLAB SKEW=90° GP=49.9

SELECT MATERIAL BEHIND WALL SEE WALL DETAIL

EXISTING BRIDGE TO BE REMOVED

SHOULDER BERM GUTTER END OF BRIDGE TO STA 21+86.5 -L- LT

CL 'I' RIP RAP

CL 'B' RIP RAP

RETAINING WALL 1

RETAINING WALL 2

SR 1947 (BELLA COOLA ROAD)

S 50° 00' 01.8" E

S 57° 03' 48.3" E

STEPHEN M. & PAOLA P. SMITH

JAMES F. HIGGS

B. WILSON

JAMES M. & SUSAN P. LITTLE

W. E. PRESCOTT, JR., & JACK B. PRESCOTT, & SUSAN P. LITTLE

LAT 'V' DITCH STA 16+20 TO STA 19+65 -L- RT SEE DETAIL 1

STD 'V' DITCH STA 19+65 TO STA 20+50 -L- RT EST DDE +/- 40 CY SEE DETAIL 2

SELECT MATERIAL BEHIND WALL SEE WALL DETAIL

BIG GREEN

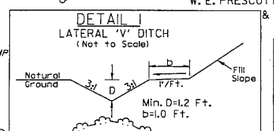
GREEN SWAMP

JURISDICTIONAL STREAM

SITE 1

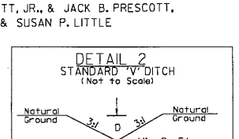
CURVE DATA FOR -L-
PI Sta 20+60.32
Δ = 7° 03' 46.5" (LT)
D = 3° 00' 00.0"
L = 235.43'
T = 117.86'
R = 1,909.86'
SE = 0.04
RUNOFF = 88'

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



FROM STA. 16+20 TO STA. 19+65 -L- RT

DETAIL 2
STANDARD 'V' DITCH
(Not to Scale)



FROM STA. 19+65 TO STA. 20+50 -L- RT

BEGIN PROJECT STA 15+50.00 EL. 45.16 MATCH EXISTING

BEGIN GRADE STA 16+00.00 EL. 45.42

PI = 16+75.00 EL = 45.87' VC = 150' K = 94

PI = 19+00.00 EL = 50.82' VC = 160' K = 64

BEGIN BRIDGE STA 19+68.46

21" CORED SLAB BRIDGE

END BRIDGE STA 21+63.54

PI = 22+00.00 EL = 49.92' VC = 140' K = 74

PI = 23+75.00 EL = 46.07' VC = 180' K = 102

END GRADE STA 26+50.00 EL. 44.86

END CONSTRUCTION STA 27+00.00 EL. 44.69 MATCH EXISTING

PROPOSED GRADE

FEATHER TO MATCH EXISTING

(+)0.6000%

(+)2.2000%

(-)0.3000%

(-)2.2000%

(-)0.4400%

EXISTING GROUND

EXCAVATE EST. 210 CY

EXCAVATE EST. 460 CY

ELEV=43.99

ELEV=42.52

BM #1
-L- Sta. 11+12.81 (39.14' RT)
EL 45.22
SPIKE IN 18" PINE TREE

BM #2
-L- Sta. 19+88.48 (38.55' RT)
EL 46.86
SPIKE IN 24" PINE TREE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 4700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 44.6 FT
BASE DISCHARGE	= 5700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 45.1 FT
OVERTOPPING DISCHARGE	=<4700 CFS
OVERTOPPING FREQUENCY	= < 50 YRS
OVERTOPPING ELEVATION	= 44.0 FT
DATE OF SURVEY	12-12-05
W.S. ELEVATION AT DATE OF SURVEY	= 41.7 FT

SR 1947 (BELLA COOLA RD) -L-

Permit Drawing Sheet 5 of 8

FILE: SFILES
DATE: SDATES
STIMES

PROJECT REFERENCE NO.	SHEET NO.
B-3830	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street Mall, Suite 1300, Raleigh, N.C. 27601
SUNGATE DESIGN GROUP, P.A. — 810 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

STATE OF NORTH CAROLINA
25
6
ENGLISH

NOTES

1. FOR CROSS SECTIONS OF: -L- — SEE SHEETS: X-1 THRU X-10
2. FOR STRUCTURE PLANS: — S- THRU S-

REVISIONS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER

NAD 83 NC GRID

SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP

B77 — VARIES — 35.63' — VARIES — B77 — B77

CL STA 20+66 -L- @45° & 3@50' 21" CORED SLAB SKEW=90° GP=49.9

SELECT MATERIAL BEHIND WALL SEE WALL DETAIL

EXISTING BRIDGE TO BE REMOVED

SHOULDER BERM GUTTER END OF BRIDGE TO STA 21+86.5 -L- LT

CL 'B' RIP RAP

CL 5B' RIP RAP

SR 1947 (BELLA COOLA ROAD)

S 50° 00' 01" E

S 57° 03' 48.3" E

RETAINING WALL 1

RETAINING WALL 2

REMOVE

RETAIN

STEPHEN M. & ALA P. SMITH

JAMES F. BROOKS

B. WILSON

JAMES M. & SUSAN P. LITTLE

LAT 'V' DITCH STA 16+20 TO STA 19+65 -L- RT SEE DETAIL 1

STD 'V' DITCH STA 19+65 TO STA 20+50 -L- RT EST DDE +/- 40 CY SEE DETAIL 2

W. E. PRESCOTT, JR., & JACK B. PRESCOTT, & SUSAN P. LITTLE

GREEN SWAMP

JURISDICTIONAL STREAM

CURVE DATA FOR -L-
PI Sta 20+60.32
△ = 7° 03' 46.51" (LT)
D = 3° 00' 00.0"
L = 235.43'
T = 117.86'
R = 1,909.86'
SE = 0.04
RUNOFF = 88'

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

Natural Ground — 3:1 — D — 3:1 — Fill Slope — F/F+1.

Min. D=1.2 Ft. b=1.0 Ft.

FROM STA. 16+20 TO STA. 19+65 -L- RT

DETAIL 2
STANDARD 'V' DITCH
(Not to Scale)

Natural Ground — 3:1 — D — 3:1 — Natural Ground

Min. D= Ft.

FROM STA. 19+65 TO STA. 20+50 -L- RT

BEGIN PROJECT STA 15+50.00 EL. 45.16 MATCH EXISTING

BEGIN GRADE STA 16+00.00 EL. 45.42

PI = 16+75.00
EL = 45.87'
VC = 150'
K = 94

PI = 19+00.00
EL = 50.82'
VC = 160'
K = 64

BEGIN BRIDGE STA 19+68.46

CL STA 20+66 -L- @45° & 3@50' 21" CORED SLAB SKEW=90° GP=49.9

21" CORED SLAB BRIDGE

END BRIDGE STA 21+63.54

PI = 22+00.00
EL = 49.92'
VC = 140'
K = 74

PI = 23+75.00
EL = 46.07'
VC = 180'
K = 102

END GRADE STA 26+50.00 EL. 44.86

END CONSTRUCTION STA 27+00.00 EL. 44.69 MATCH EXISTING

PROPOSED GRADE

FEATHER TO MATCH EXISTING

(+)0.6000%

(+)2.2000%

(-)0.3000%

(-)2.2000%

(-)0.4400%

EXISTING GROUND

EXCAVATE EST. 210 CY

EXCAVATE EST. 460 CY

ELEV=43.99

ELEV=42.52

50
40
30

BM #1
-L- Sta. 11+12.81 (39.14' RT)
EL 45.22
SPIKE IN 18" PINE TREE

BM #2
-L- Sta. 19+88.48 (38.55' RT)
EL 46.86
SPIKE IN 24" PINE TREE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 4700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 44.6 FT
BASE DISCHARGE	= 5700 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 45.1 FT
OVERTOPPING DISCHARGE	=<4700 CFS
OVERTOPPING FREQUENCY	= < 50 YRS
OVERTOPPING ELEVATION	= 44.0 FT
DATE OF SURVEY	12-12-05
W.S. ELEVATION AT DATE OF SURVEY	= 41.7 FT

SR 1947 (BELLA COOLA RD)-L-

14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

FILE: STIES
DATE: 5/24/05
STIMES

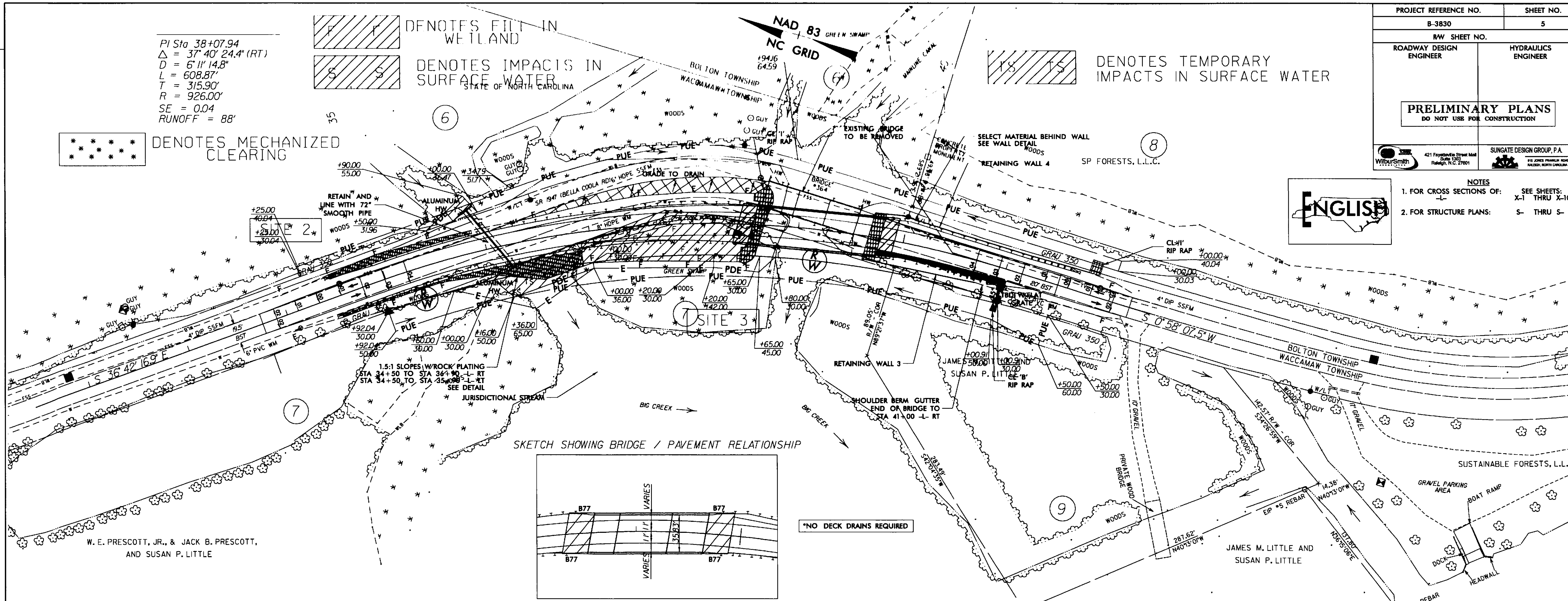
Permit Drawing
Sheet 6 of 13

PROJECT REFERENCE NO.	SHEET NO.
B-3830	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

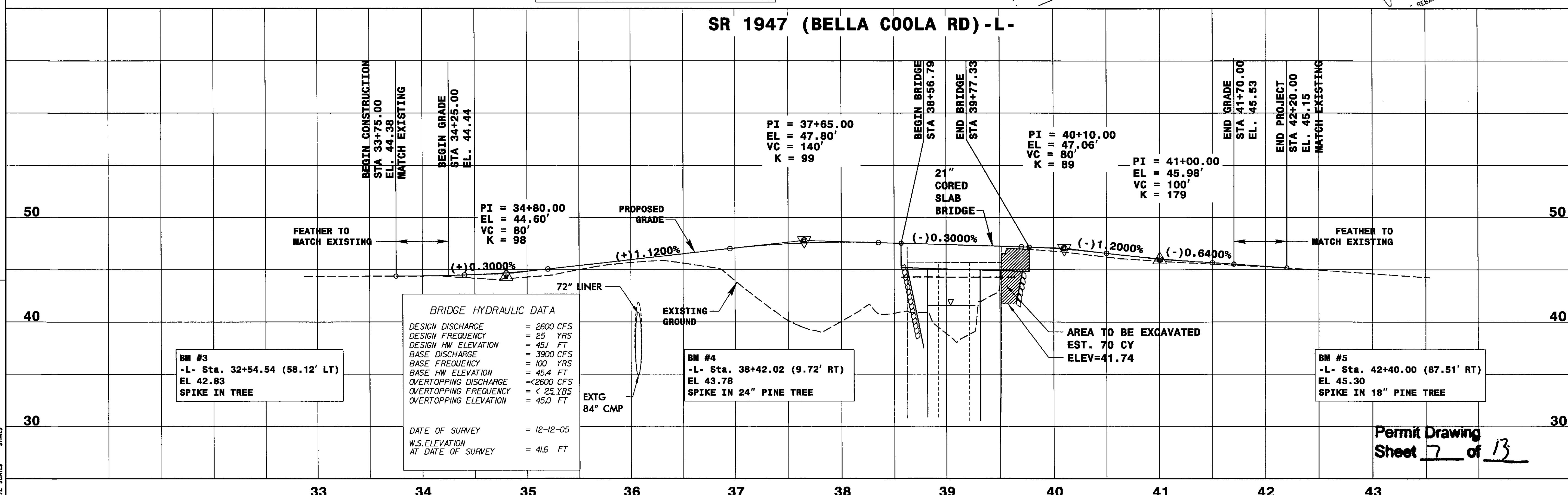
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street Mall, Suite 1303, Raleigh, N.C. 27601
SUNGATE DESIGN GROUP, P.A.

REVISIONS



PI Sta 38+07.94
Δ = 37° 40' 24.4" (RT)
D = 6° 11' 14.8"
L = 608.87'
T = 315.90'
R = 926.00'
SE = 0.04
RUNOFF = 88'
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
STATE OF NORTH CAROLINA
NAD 83 NC GRID
BOLTON TOWNSHIP
WACCAMAW TOWNSHIP
EXISTING BRIDGE TO BE REMOVED
SELECT MATERIAL BEHIND WALL SEE WALL DETAIL
RETAINING WALL 4
SP FORESTS, L.L.C.
ENGLISH
NOTES
1. FOR CROSS SECTIONS OF: -L- SEE SHEETS: X-1 THRU X-10
2. FOR STRUCTURE PLANS: S- THRU S-
SITE 2
SITE 3
RETAIN AND LINE WITH 72" SMOOTH PIPE
ALUMINUM HW
GRADE TO DRAIN
SR 1947 (BELLA COOLA RD)
CL-'I' RIP RAP
S 0° 58' 07.5" W
S 36° 42' 16.9" E
1.5:1 SLOPES W/ROCK PLATING STA 34+50 TO STA 36+90 -L- RT STA 34+50 TO STA 35+90 -L- LT SEE DETAIL
JURISDICTIONAL STREAM
BIG CREEK
RETAINING WALL 3
JAMES M. LITTLE AND SUSAN P. LITTLE
CL 'B' RIP RAP
SHOULDER BERM GUTTER END OF BRIDGE TO STA 41+00 -L- RT
SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP
*NO DECK DRAINS REQUIRED
W. E. PRESCOTT, JR., & JACK B. PRESCOTT, AND SUSAN P. LITTLE
SUSTAINABLE FORESTS, L.L.C.
GRAVEL PARKING AREA
BOAT RAMP
DOCK
HEADWALL
PRIVATE WOOD BRIDGE
WOODS



SR 1947 (BELLA COOLA RD)-L-
BEGIN CONSTRUCTION STA 33+75.00 EL. 44.38 MATCH EXISTING
BEGIN GRADE STA 34+25.00 EL. 44.44
PI = 34+80.00 EL = 44.60' VC = 80' K = 98
PI = 37+65.00 EL = 47.80' VC = 140' K = 99
BEGIN BRIDGE STA 38+56.79
END BRIDGE STA 39+77.33
21" CORED SLAB BRIDGE
PI = 40+10.00 EL = 47.06' VC = 80' K = 89
PI = 41+00.00 EL = 45.98' VC = 100' K = 179
END GRADE STA 41+70.00 EL. 45.53
END PROJECT STA 42+20.00 EL. 45.15 MATCH EXISTING
FEATHER TO MATCH EXISTING
PROPOSED GRADE
(+)0.3000%
(+)1.1200%
(-)0.3000%
(-)1.2000%
(-)0.6400%
72" LINER
EXISTING GROUND
EXTG 84" CMP
AREA TO BE EXCAVATED EST. 70 CY ELEV=41.74
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 2600 CFS
DESIGN FREQUENCY = 25 YRS
DESIGN HW ELEVATION = 45.1 FT
BASE DISCHARGE = 3900 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 45.4 FT
OVERTOPPING DISCHARGE =<2600 CFS
OVERTOPPING FREQUENCY = < 25 YRS
OVERTOPPING ELEVATION = 45.0 FT
DATE OF SURVEY = 12-12-05
W.S. ELEVATION AT DATE OF SURVEY = 41.6 FT
BM #3 -L- Sta. 32+54.54 (58.12' LT) EL 42.83 SPIKE IN TREE
BM #4 -L- Sta. 38+42.02 (9.72' RT) EL 43.78 SPIKE IN 24" PINE TREE
BM #5 -L- Sta. 42+40.00 (87.51' RT) EL 45.30 SPIKE IN 18" PINE TREE
50
40
30
33
34
35
36
37
38
39
40
41
42
43

Permit Drawing
Sheet 7 of 13

PROJECT REFERENCE NO.	SHEET NO.
B-3830	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES — 421 Fayetteville Street Mall, Suite 1200, Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A. — 810 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

REVISIONS

PI Sta 38+07.94
Δ = 37° 40' 24.4" (RT)
D = 6° 11' 14.8"
L = 608.87'
T = 315.90'
R = 926.00'
SE = 0.04
RUNOFF = 88'

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

STATE OF NORTH CAROLINA

NAD 83 NC GRID

ENGLISH

NOTES
1. FOR CROSS SECTIONS OF: -L- SEE SHEETS: X-1 THRU X-10
2. FOR STRUCTURE PLANS: S- THRU S-

BOLTON TOWNSHIP
WACCAMAW TOWNSHIP

SITE 2

SITE 3

EXISTING BRIDGE TO BE REMOVED

RETAIN AND LINE WITH 72" SMOOTH PIPE

RETAINING WALL 4

SELECT MATERIAL BEHIND WALL SEE WALL DETAIL

RETAINING WALL 3

1.5:1 SLOPES W/ROCK PLATING STA 34+30 TO STA 34+90 -L- RT
STA 34+50 TO STA 35+00 -L- RT
SEE DETAIL

JURISDICTIONAL STREAM

BIG CREEK

SP FORESTS, L.L.C.

JAMES M. LITTLE AND SUSAN P. LITTLE

W. E. PRESCOTT, JR., & JACK B. PRESCOTT, AND SUSAN P. LITTLE

SUSTAINABLE FORESTS, L.L.C.

GRAVEL PARKING AREA

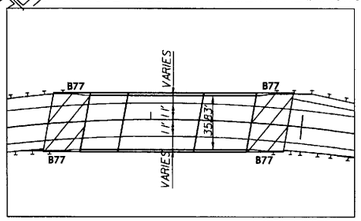
BOAT RAMP

DOCK

PRIVATE WOOD BRIDGE

*NO DECK DRAINS REQUIRED

SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP



SR 1947 (BELLA COOLA RD) -L-

BEGIN CONSTRUCTION STA 33+75.00 EL. 44.38 MATCH EXISTING

BEGIN GRADE STA 34+25.00 EL. 44.44

PI = 34+80.00 EL = 44.60' VC = 80' K = 98

PI = 37+65.00 EL = 47.80' VC = 140' K = 99

BEGIN BRIDGE STA 38+56.79

END BRIDGE STA 39+77.33

PI = 40+10.00 EL = 47.06' VC = 80' K = 89

PI = 41+00.00 EL = 45.98' VC = 100' K = 179

END GRADE STA 41+70.00 EL. 45.53

END PROJECT STA 42+20.00 EL. 45.15 MATCH EXISTING

FEATHER TO MATCH EXISTING

PROPOSED GRADE

(+)0.3000%

(+)1.1200%

(-)0.3000%

(-)1.2000%

(-)0.6400%

FEATHER TO MATCH EXISTING

72" LINER

EXISTING GROUND

21" CORED SLAB BRIDGE

AREA TO BE EXCAVATED EST. 70 CY ELEV=41.74

EXTG 84" CMP

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2600 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 45.1 FT
BASE DISCHARGE	= 3900 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 45.4 FT
OVERTOPPING DISCHARGE	=<2600 CFS
OVERTOPPING FREQUENCY	= < 25 YRS
OVERTOPPING ELEVATION	= 45.0 FT
DATE OF SURVEY	= 12-12-05
W.S. ELEVATION AT DATE OF SURVEY	= 41.6 FT

BM #3
-L- Sta. 32+54.54 (58.12' LT)
EL 42.83
SPIKE IN TREE

BM #4
-L- Sta. 38+42.02 (9.72' RT)
EL 43.78
SPIKE IN 24" PINE TREE

BM #5
-L- Sta. 42+40.00 (87.51' RT)
EL 45.30
SPIKE IN 18" PINE TREE

50 40 30

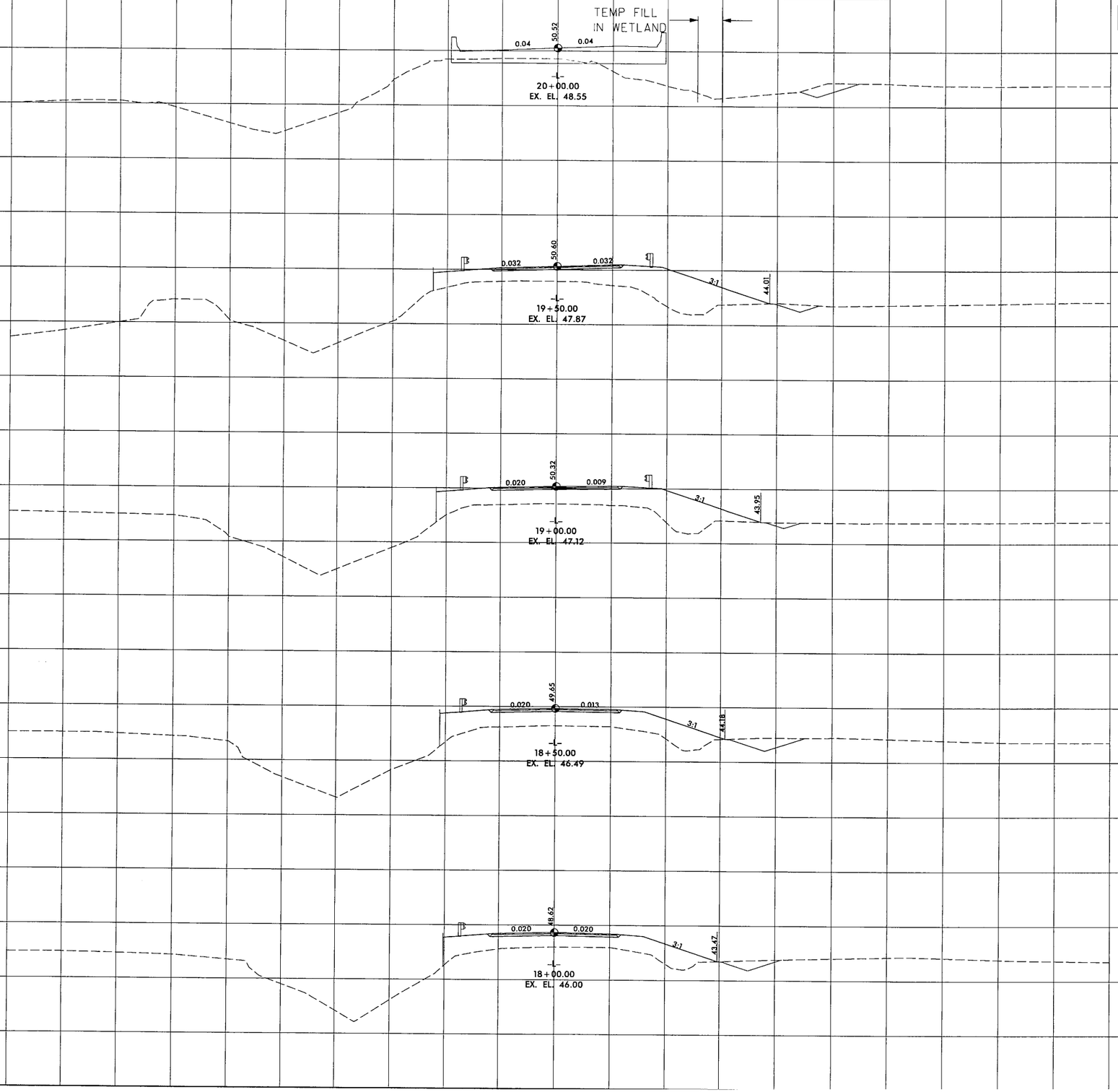
33 34 35 36 37 38 39 40 41 42 43

Permit Drawing
Sheet 8 of 13

FILE: STYLES
DATE: SCALES
STAGES

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	$MODELNAME$	

SITE 1

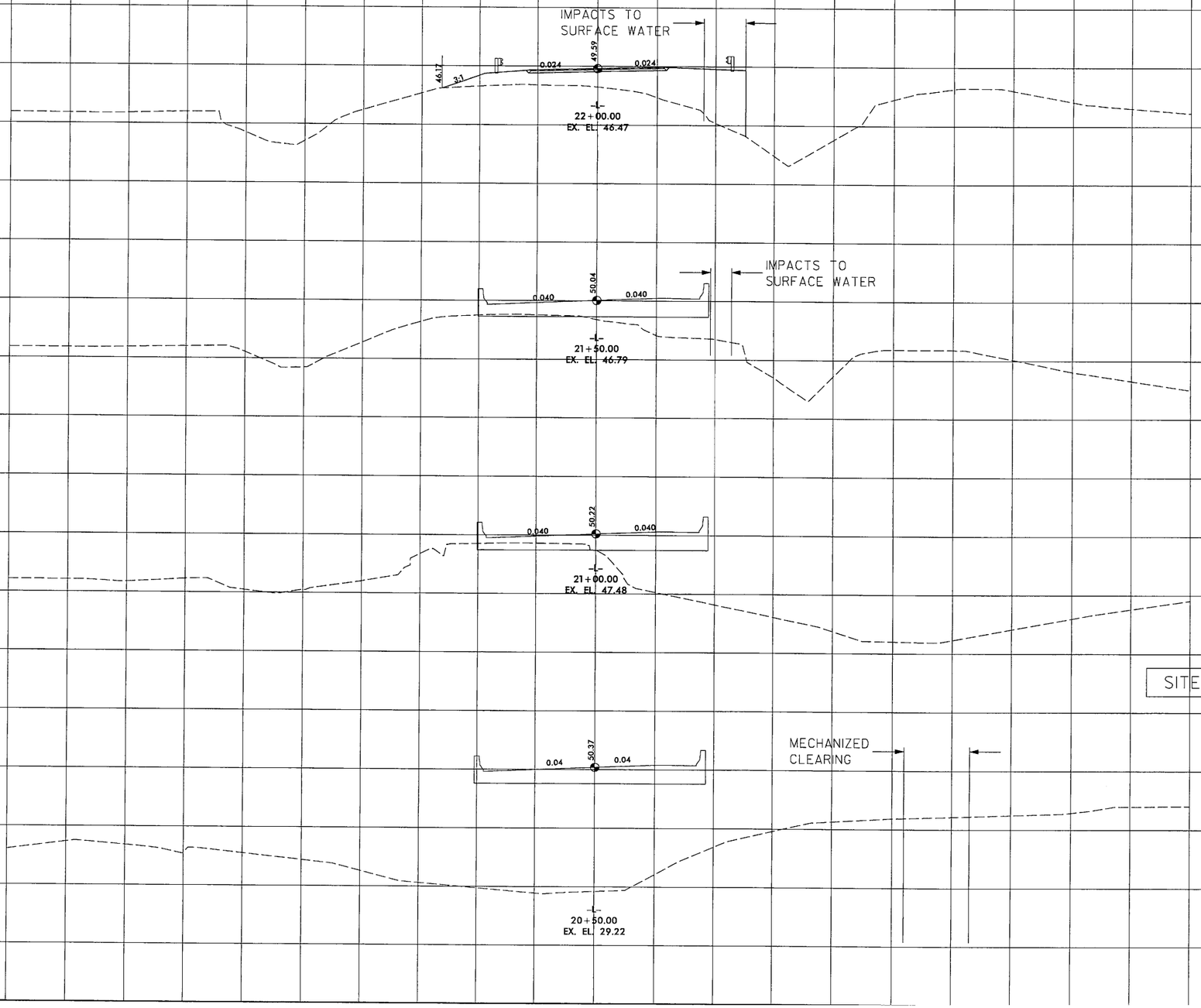


DATE: $DATE$
TIME: $TIME$
$FILE$

Permit Drawing
Sheet 9 of 13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	$MODELNAME$	

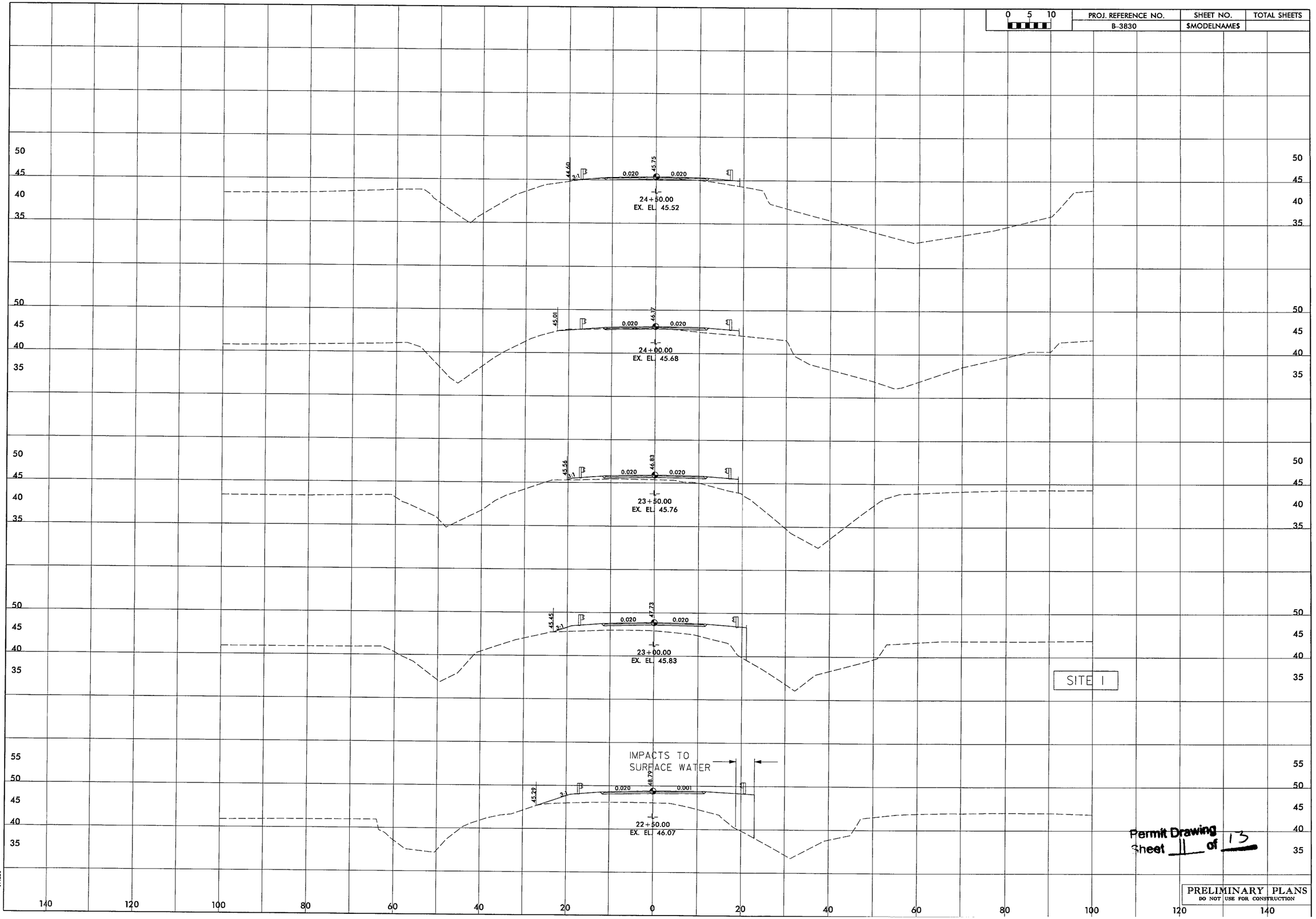


DATE: $DATE$
TIME: $TIME$
$FILE$

Permit Drawing
Sheet 10 of 13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	$MODELNAME$	

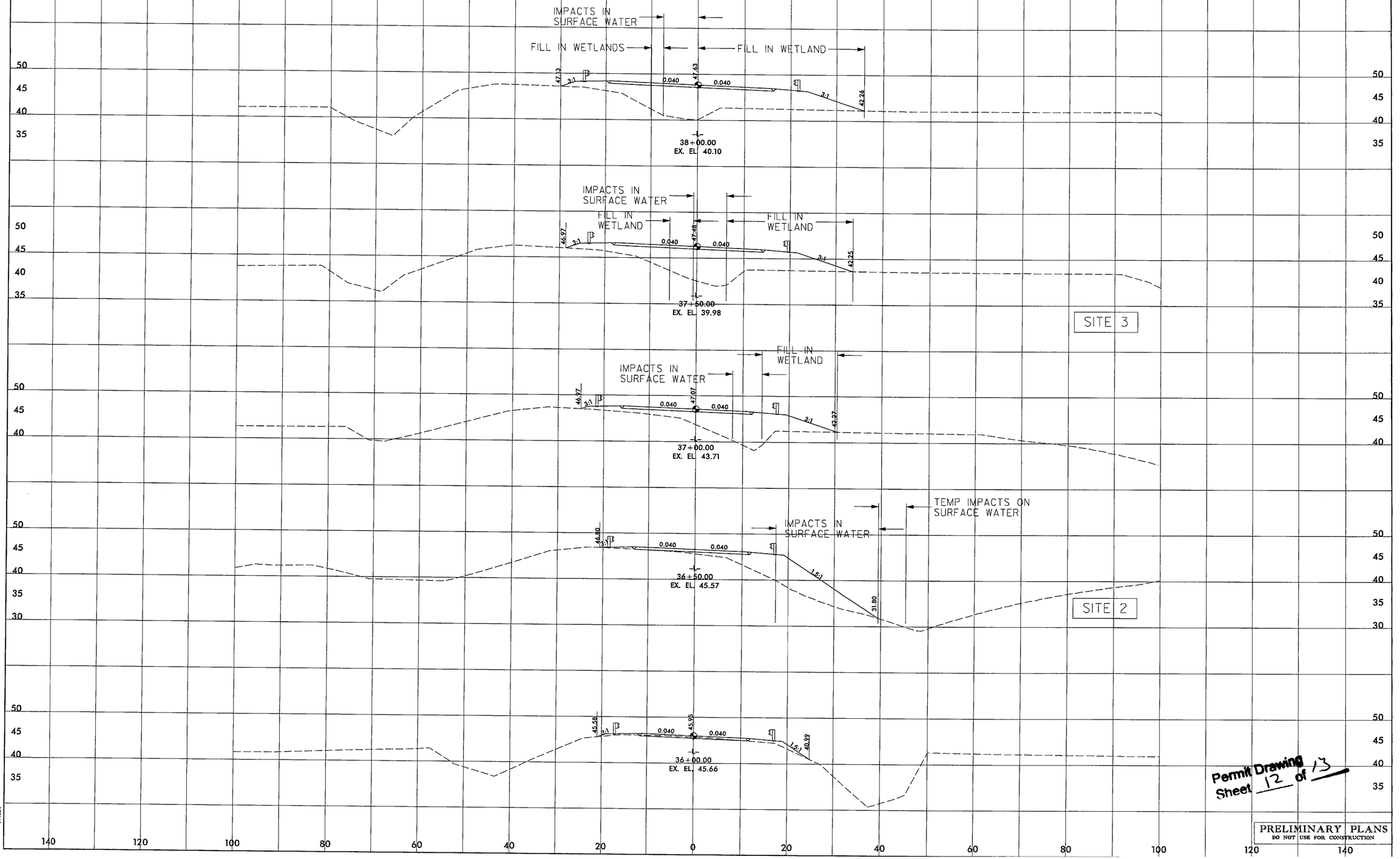


DATE: $DATE$
TIME: $TIME$
$FILE$

Permit Drawing
Sheet 11 of 13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	$MODELNAME$	

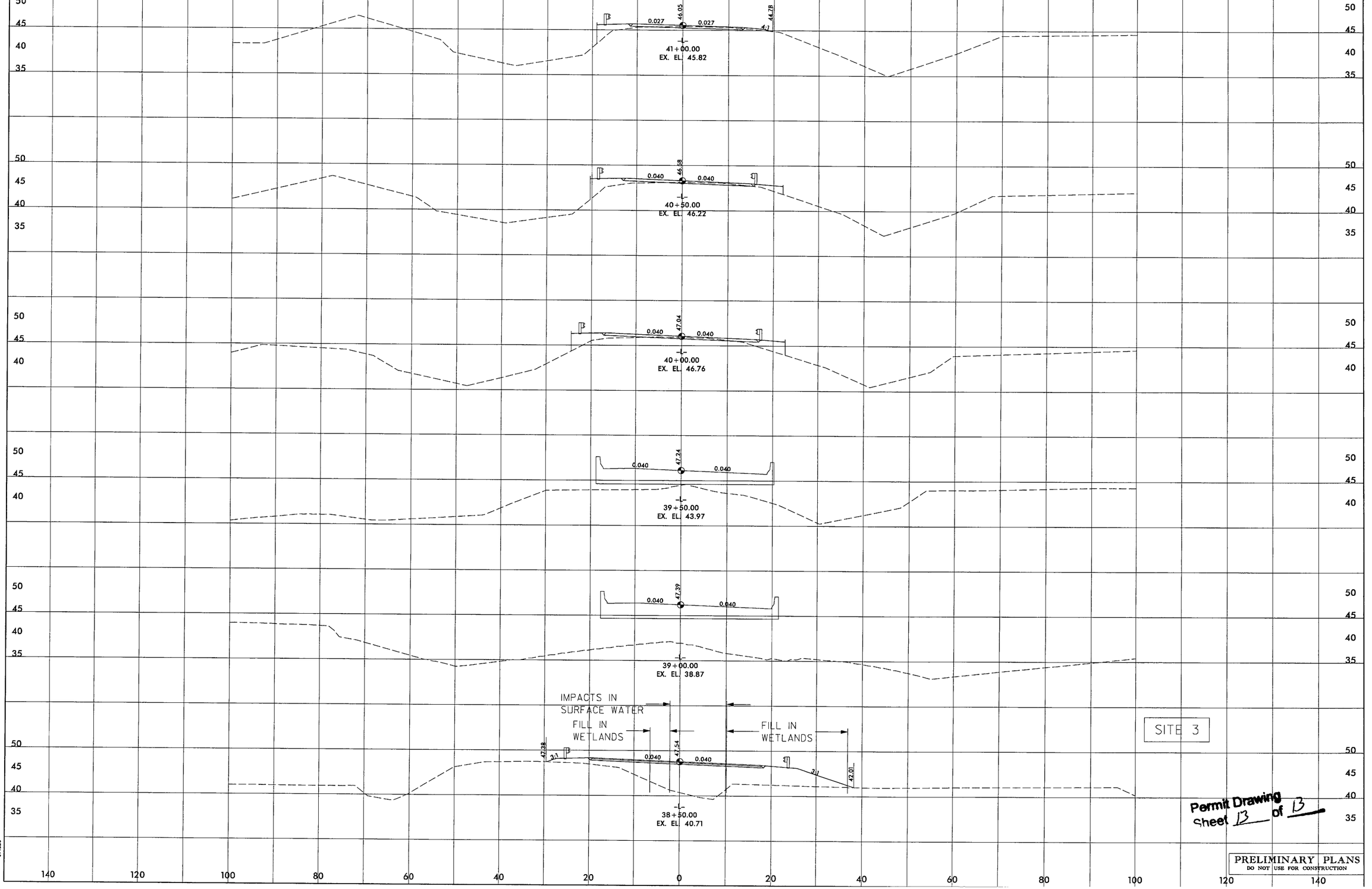


DATE: $DATES
TIME: $TIMES
$FILES

Permit Drawing
Sheet 12 of 13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	$MODELNAME$	



SITE 3

DATE: $DATES
TIME: $TIMES
$FILES

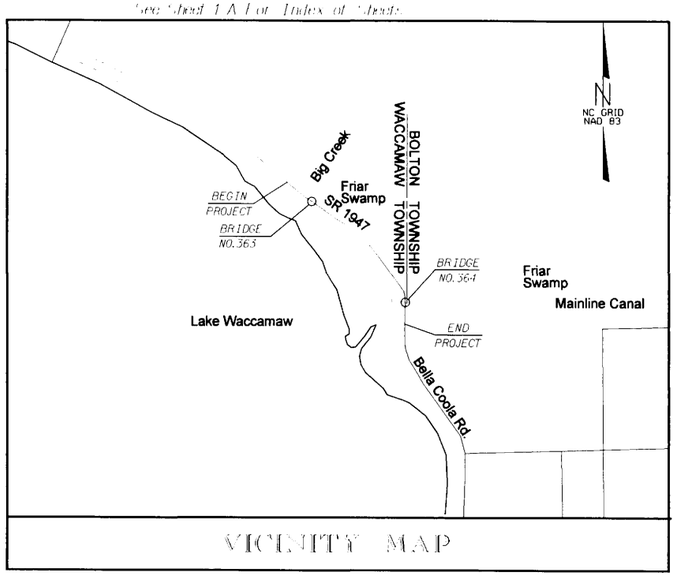
Permit Drawing
Sheet 13 of 13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TIP PROJECT: B-3830

CONTRACT:

See Sheet 1A for Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

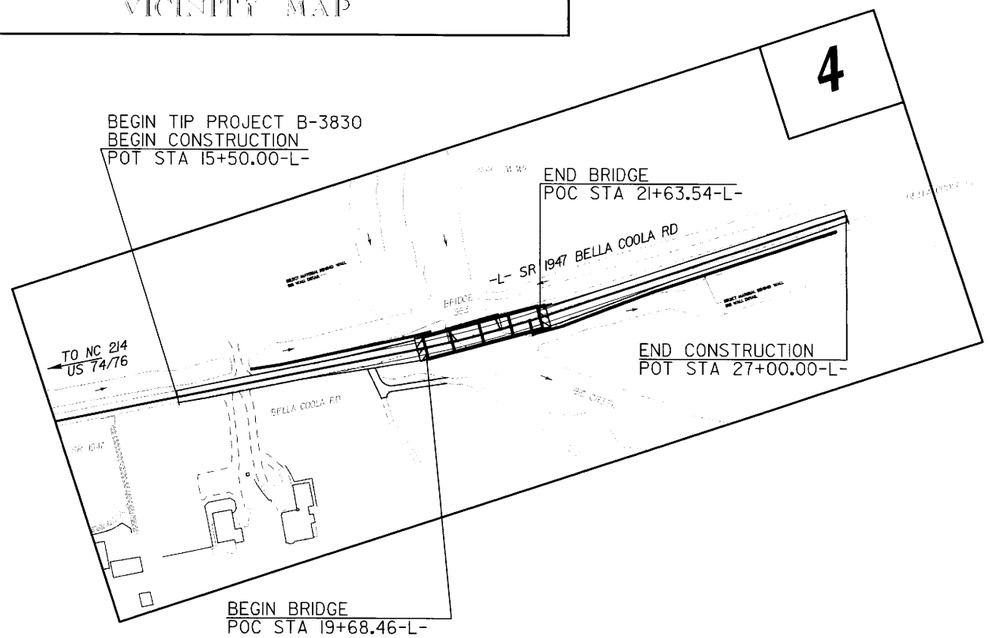
COLUMBUS COUNTY

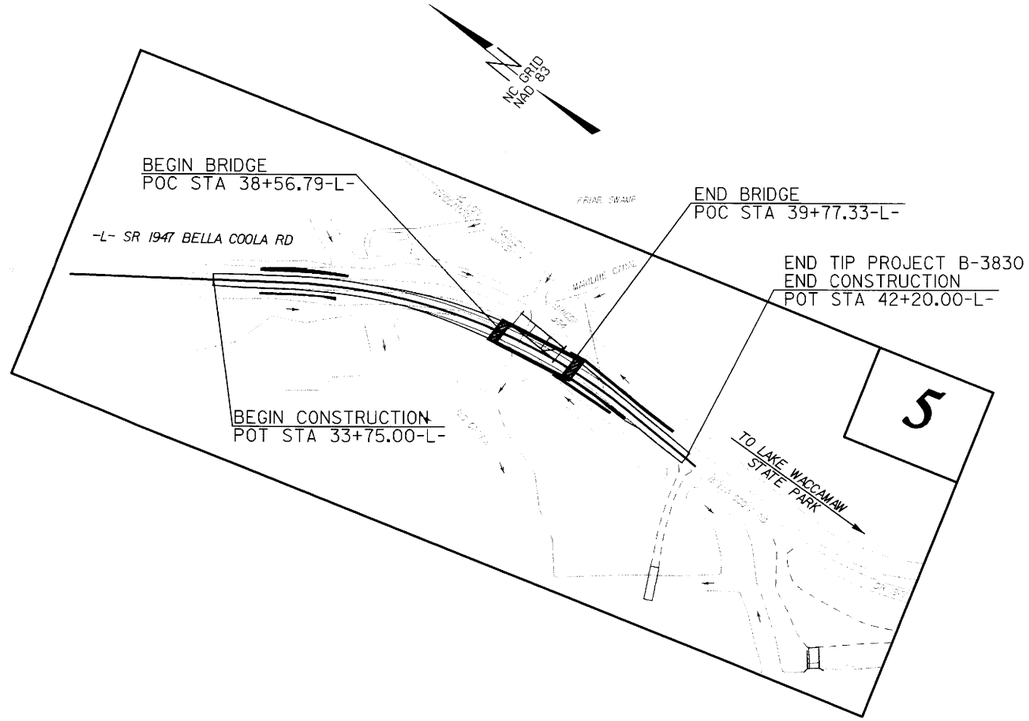
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3830	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33281.1.1	BRZ-1947(1)	P.E.
33281.1.2	BRZ-1947(1)	ROW / UTILITIES

LOCATION: BRIDGE NO. 363 AND NO. 364 OVER FRIAR SWAMP AND BIG CREEK ON SR 1947 (BELLA COOLA RD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES.





NCDOT CONTACT: DOUG TAYLOR, P.E.

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 800
ADT 2027 = 1470
DHV = 14 %
D = 65 %
T = 3 % *
V = 50 MPH
* (TTST 1% + DUAL 2%)

FUNC.CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3830 =	0.320	MILES
LENGTH STRUCTURE TIP PROJECT B-3830 =	0.058	MILES
TOTAL LENGTH OF TIP PROJECT B-3830 =	0.378	MILES

Prepared In the Office of:
WILBUR SMITH ASSOCIATES
421 Fayetteville St, Suite 1303, Raleigh NC, 27601

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
August 17, 2007

LETTING DATE:
August 19, 2008

DAVID L. WILVER, P.E.
PROJECT ENGINEER

R.D. ODELL, P.E.
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

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DATE: 10/22/2007 9:41:43 AM

Note: Not to Scale

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

PROJECT REFERENCE NO.	SHEET NO.
B-3830	1B
R/W SHEET NO.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- 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
- 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 — H
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — H
- 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
- Designated U/G Water Line (S.U.E.*)
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — H
- 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.

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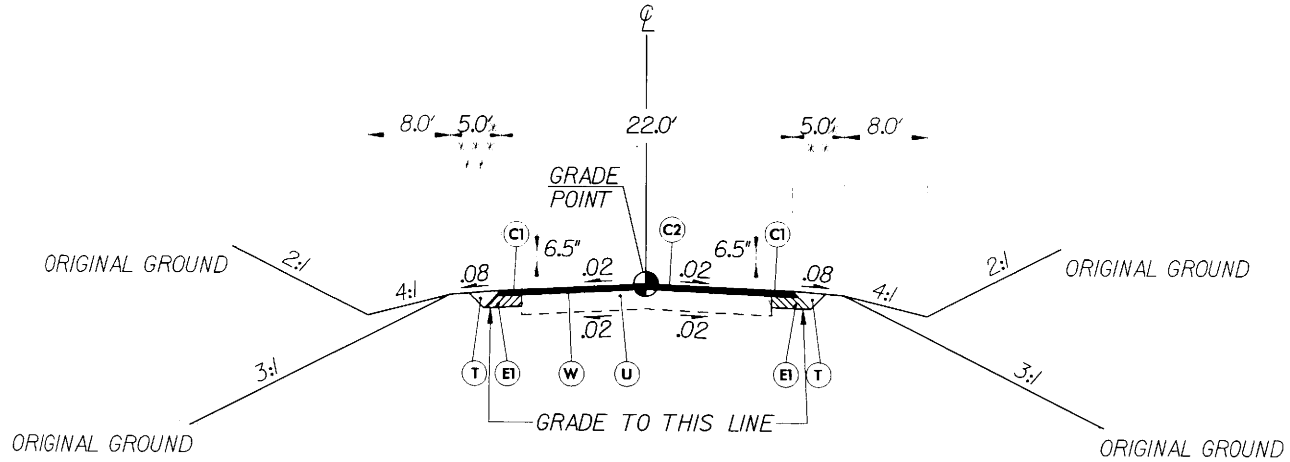
PROJECT REFERENCE NO.	SHEET NO.
B-3830	2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

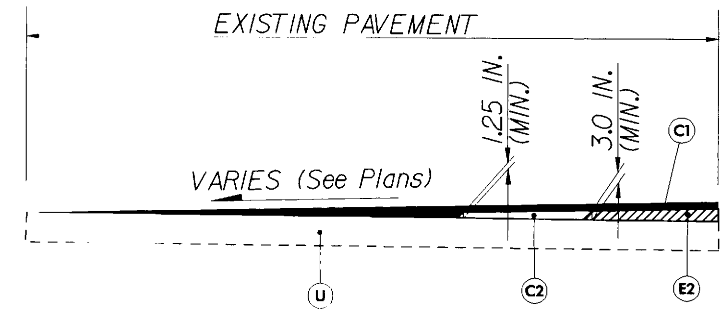
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SUNGATE DESIGN GROUP, P.A.



TYPICAL SECTION NO.1

USE ON: -L-Sta. 15+50.00 to Sta.17+00.00
-L-Sta.23+58.00 to Sta.27+00.00
-L-Sta.33+75.00 to Sta.36+27.86
-L-Sta.39+77.33 (END BRIDGE) to Sta.42+20.00



WEDGING DETAIL

NOTES:

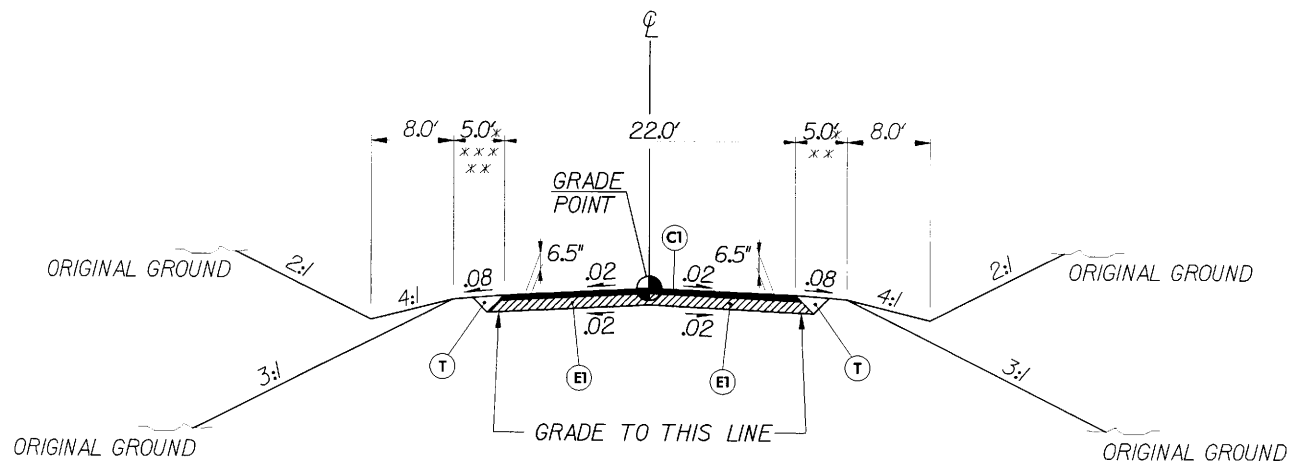
* TOTAL SHOULDER WIDTH TO BE INCREASED 3' WHERE GUARDRAIL IS USED.

** CONSTRUCT FULL DEPTH PAVED SHOULDERS AT WIDTHS & LOCATIONS SHOWN ON PLAN SHEET 4 & 5 AS REQUIRED FOR TRAFFIC CONTROL.

*** VARY GRADED SHOULDER WIDTH LEFT (5' MAX.) TO MATCH EXISTING SHOULDER (SEE CROSS SECTIONS)

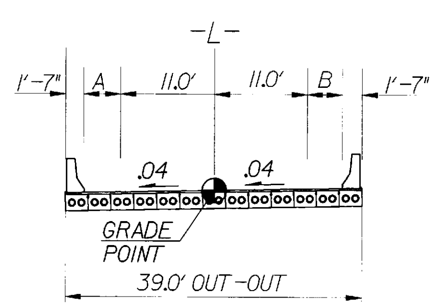
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

PAVEMENT SCHEDULE	
C1	PROPOSED APPROX. 2.50 IN. ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 140 LBS/SY IN EACH OF TWO LAYERS.
C2	PROPOSED VAR. DEPTH. ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 112 LBS PER SY PER 1 IN. DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.25 IN. NOR GREATER THAN 1.5 IN. IN DEPTH.
E1	PROPOSED APPROX. 4.0 IN. ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS/SY.
E2	PROPOSED VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SY PER 1 IN. DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0 IN. NOR GREATER THAN 5.5 IN. IN DEPTH.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING



TYPICAL SECTION NO.2

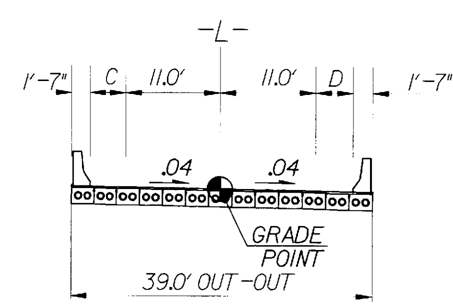
USE ON: -L-Sta.17+00.00 to Sta.19+68.46 (BEGIN BRIDGE)
-L-Sta.21+63.54 (END BRIDGE) to Sta.23+58.00
-L-Sta.36+27.86 to Sta.38+56.79 (BEGIN BRIDGE)



TYPICAL SECTION ON STRUCTURE

USE ON: -L- Sta. 19+68.46 (BEGIN BRIDGE) to Sta. 21+63.54 (END BRIDGE)

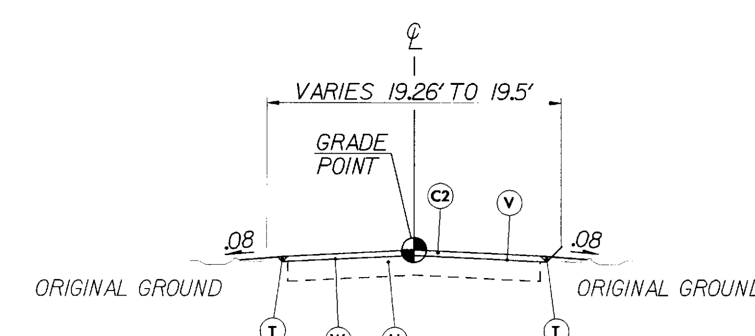
A = VARIES FROM 6.92' TO 9.41'
B = VARIES FROM 4.43' TO 6.91'



TYPICAL SECTION ON STRUCTURE

USE ON: -L- Sta. 38+56.79 (BEGIN BRIDGE) to Sta. 39+77.33 (END BRIDGE)

C = VARIES FROM 5.47' TO 8.02'
D = VARIES FROM 5.81' TO 8.36'



TYPICAL SECTION NO.3

USE ON: -L- RESURFACE Sta. 27+00.00 to Sta.33+75.00

NOTE: SHOULDER WIDTH VARIES ON BRIDGE DUE TO HORIZONTAL CURVE ON TANGENT BRIDGE.

REVISIONS

COMPUTED BY: DATE:
CHECKED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
B-3830	3D

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	J. M. LITTLE
2	4	STEPHEN M. & PAULA P. SMITH
3	4	JAMES F. RIGGS
4	4	JAMES M. & SUSAN P. LITTLE
5	4	J. M. LITTLE
6	4 & 5	STATE OF NORTH CAROLINA
7	4 & 5	W. E. PRESCOTT, JR., & JACK B. PRESCOTT, & SUSAN P. LITTLE
8	5	SP FORESTS, L.L.C.
9	5	JAMES M. LITTLE AND SUSAN P. LITTLE

REVISIONS

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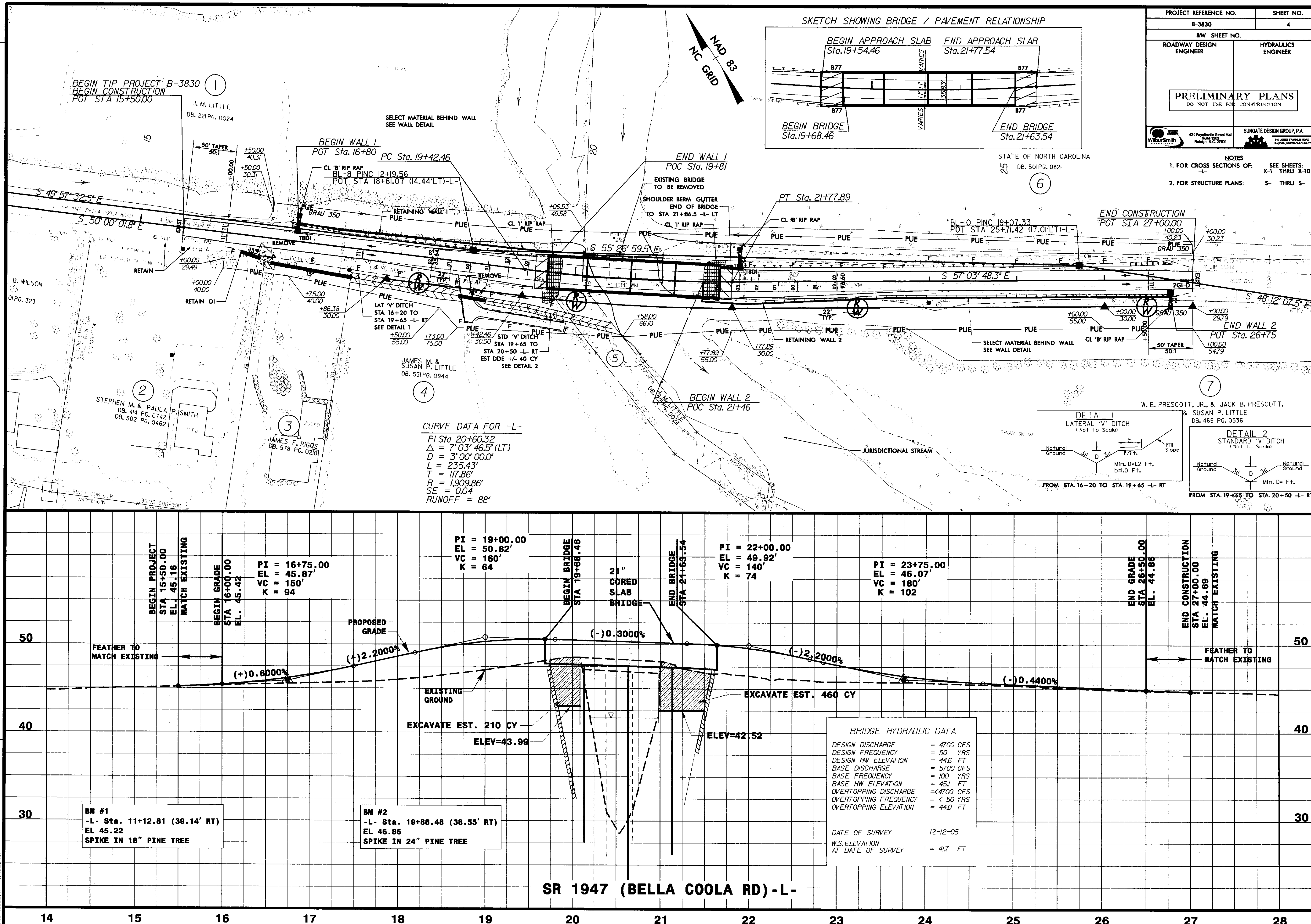


PROJECT REFERENCE NO. B-3830
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
WilburSmith
SUNGATE DESIGN GROUP, P.A.
NOTES
1. FOR CROSS SECTIONS OF: -L- SEE SHEETS: X-1 THRU X-10
2. FOR STRUCTURE PLANS: SEE SHEETS: S- THRU S-
SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP
BEGIN APPROACH SLAB Sta.19+54.46
END APPROACH SLAB Sta.21+77.54
BEGIN BRIDGE Sta.19+68.46
END BRIDGE Sta.21+63.54
NAD 83 NC GRID
BEGIN TIP PROJECT B-3830
BEGIN CONSTRUCTION
POT STA 15+50.00
J. M. LITTLE DB. 221 PG. 0024
SELECT MATERIAL BEHIND WALL SEE WALL DETAIL
BEGIN WALL 1 POT Sta. 16+80
PC Sta. 19+42.46
CL 'B' RIP RAP
BL-8 PINC 12+19.56
POT STA 18+81.07 (14.44' LT) -L-
END WALL 1 POC Sta. 19+81
EXISTING BRIDGE TO BE REMOVED
SHOULDER BERM GUTTER END OF BRIDGE TO STA 21+86.5 -L- LT
PT Sta. 21+77.89
STATE OF NORTH CAROLINA DB. 501 PG. 0821
BL-10 PINC 19+07.33
POT STA 25+71.42 (17.01' LT) -L-
END CONSTRUCTION POT STA 27+00.00
S 49° 57' 32.5" E
S 50° 00' 01.8" E
S 55° 26' 59.5" E
S 57° 03' 48.3" E
S 48° 12' 07.5" E
LAT 'V' DITCH STA 16+20 TO STA 19+65 -L- RT SEE DETAIL 1
STD 'V' DITCH STA 19+65 TO STA 20+50 -L- RT EST DDE +/- 40 CY SEE DETAIL 2
RETAINING WALL 2
SELECT MATERIAL BEHIND WALL SEE WALL DETAIL
END WALL 2 POT Sta. 26+75
BEGIN WALL 2 POC Sta. 21+46
JURISDICTIONAL STREAM
B. WILSON
STEPHEN M. & PAULA P. SMITH DB. 414 PG. 0742 DB. 502 PG. 0462
JAMES F. RIGGS DB. 578 PG. 0210
JAMES M. & SUSAN P. LITTLE DB. 551 PG. 0944
W. E. PRESCOTT, JR., & JACK B. PRESCOTT, & SUSAN P. LITTLE DB. 465 PG. 0536
CURVE DATA FOR -L-
PI Sta 20+60.32
Δ = 7° 03' 46.5" (LT)
D = 3° 00' 00.0"
L = 235.43'
T = 117.86'
R = 1,909.86'
SE = 0.04
RUNOFF = 88'
DETAIL 1 LATERAL 'V' DITCH (Not to Scale)
Min. D=1.2 Ft. b=1.0 Ft.
FROM STA. 16+20 TO STA. 19+65 -L- RT
DETAIL 2 STANDARD 'V' DITCH (Not to Scale)
Min. D= Ft.
FROM STA. 19+65 TO STA. 20+50 -L- RT
BEGIN PROJECT STA 15+50.00 EL. 45.16 MATCH EXISTING
BEGIN GRADE STA 16+00.00 EL. 45.42
PI = 16+75.00 EL = 45.87' VC = 150' K = 94
PI = 19+00.00 EL = 50.82' VC = 160' K = 64
BEGIN BRIDGE STA 19+68.46
21" CORED SLAB BRIDGE
END BRIDGE STA 21+63.54
PI = 22+00.00 EL = 49.92' VC = 140' K = 74
PI = 23+75.00 EL = 46.07' VC = 180' K = 102
END GRADE STA 26+50.00 EL. 44.86
END CONSTRUCTION STA 27+00.00 EL. 44.69 MATCH EXISTING
FEATHER TO MATCH EXISTING
PROPOSED GRADE
(+)0.6000%
(+)2.2000%
(-)0.3000%
(-)2.2000%
(-)0.4400%
EXISTING GROUND
EXCAVATE EST. 210 CY
ELEV=43.99
EXCAVATE EST. 460 CY
ELEV=42.52
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 4700 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 44.6 FT
BASE DISCHARGE = 5700 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 45.1 FT
OVERTOPPING DISCHARGE =<4700 CFS
OVERTOPPING FREQUENCY = < 50 YRS
OVERTOPPING ELEVATION = 44.0 FT
DATE OF SURVEY 12-12-05
W.S. ELEVATION AT DATE OF SURVEY = 41.7 FT
BM #1 -L- Sta. 11+12.81 (39.14' RT) EL 45.22 SPIKE IN 18" PINE TREE
BM #2 -L- Sta. 19+88.48 (38.55' RT) EL 46.86 SPIKE IN 24" PINE TREE
SR 1947 (BELLA COOLA RD) -L-
14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
50 40 30
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3830	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street Mall, Suite 1900, Raleigh, N.C. 27601

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

REVISIONS

CURVE DATA FOR -L-
PI Sta 38+07.94
Δ = 37° 40' 24.4" (RT)
D = 6° 11' 14.8"
L = 608.87'
T = 315.90'
R = 926.00'
SE = 0.04
RUNOFF = 88'

NAD 83 NC GRID

STATE OF NORTH CAROLINA
DB. 501 PG. 0821

BL-6 PINC 32+07.05
POC STA 38+62.50 (44.79'LT) -L-

PC Sta. 34+92.04

BEGIN CONSTRUCTION
POT STA 33+75.00

RETAIN AND LINE WITH 72" SMOOTH PIPE

ALUMINUM HW

GRADE TO DRAIN

EXISTING BRIDGE TO BE REMOVED

CL 'I' RIP RAP

SELECT MATERIAL BEHIND WALL SEE WALL DETAIL

RETAINING WALL 4
PT Sta. 41+00.91

SP FORESTS, L.L.C.
DB. 671 PG. 0495

END WALL 4
POT 41+75

END TIP PROJECT B-3830
END CONSTRUCTION
POT STA 42+20.00

BL-7 PINC 38+07.29

S 48° 12' 07.5" E
S 32° 45' 29.5" E
S 36° 42' 16.9" E
S 0° 03' 49.3" W
S 0° 58' 07.5" W
S 15° 19' 05.0" E

50' TAPER 50:1

1.5:1 SLOPES W/ROCK PLATING
STA 34+50 TO STA 36+90 -L- RT
STA 34+50 TO STA 35+90 -L- LT
SEE DETAIL

JURISDICTIONAL STREAM

TBDI W/FLAT GRATE

CL 'B' RIP RAP

RETAINING WALL 3
END WALL 3
POC Sta. 40+75

SHOULDER BERM GUTTER END OR BRIDGE TO STA 41+00 -L- RT

BL-5 PINC 25+19.33
POT STA 31+84.05 (15.46'LT)-L-

POT Sta. 31+42.02

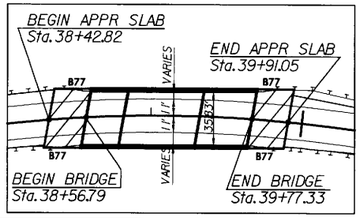
W. E. PRESCOTT, JR., & JACK B. PRESCOTT, AND SUSAN P. LITTLE
DB. 465 PG. 0536

JAMES M. LITTLE AND SUSAN P. LITTLE
DB. 551 PG. 944

SUSTAINABLE FORESTS, L.L.C.
DB. 556 PG. 0030

JAMES M. LITTLE AND SUSAN P. LITTLE
DB. 551 PG. 944

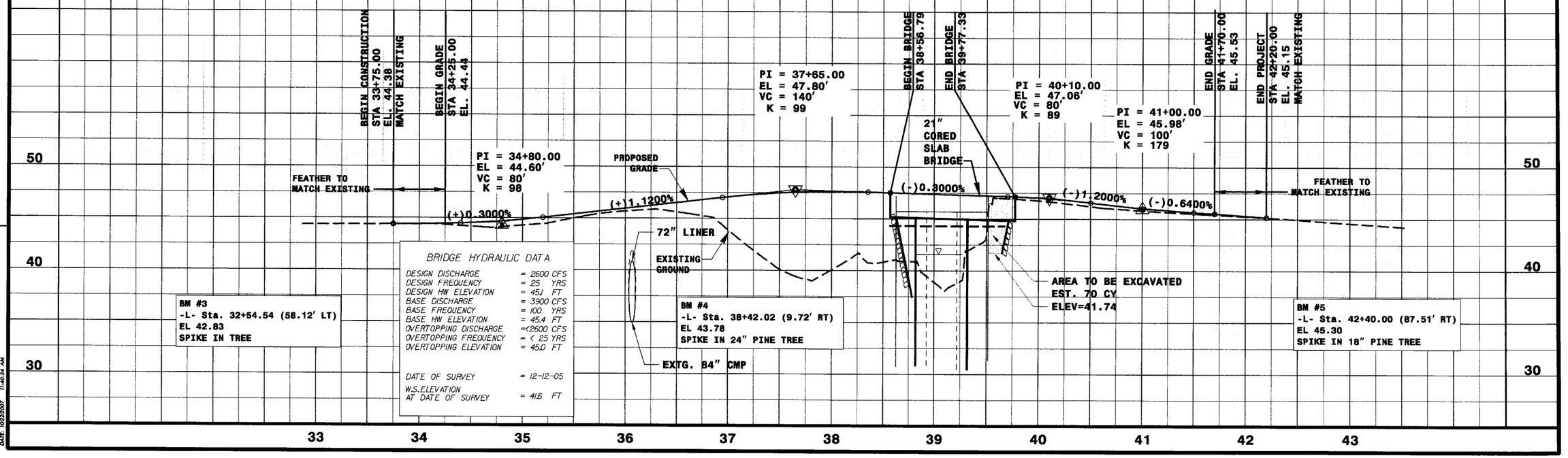
SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP



*NO DECK DRAINS REQUIRED

NOTES
1. FOR CROSS SECTIONS OF: -L- — SEE SHEETS: X-1 THRU X-10
2. FOR STRUCTURE PLANS: S- THRU S-

SR 1947 (BELLA COOLA RD) -L-



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2600 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 45.1 FT
BASE DISCHARGE	= 3900 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 45.4 FT
OVERTOPPING DISCHARGE	=<2600 CFS
OVERTOPPING FREQUENCY	= < 25 YRS
OVERTOPPING ELEVATION	= 45.0 FT
DATE OF SURVEY	= 12-12-05
W.S. ELEVATION AT DATE OF SURVEY	= 41.6 FT

BM #3
-L- Sta. 32+54.54 (58.12' LT)
EL 42.83
SPIKE IN TREE

BM #4
-L- Sta. 38+42.02 (9.72' RT)
EL 43.78
SPIKE IN 24" PINE TREE

BM #5
-L- Sta. 42+40.00 (87.51' RT)
EL 45.30
SPIKE IN 18" PINE TREE

FILE: n:\roads\b3830\roadway\prod\B3830_RDY_pshS.dgn
DATE: 10/22/2007 11:40:04 AM

B–3830
CROSS–SECTIONS

INDEX OF SHEETS

TITLE	SHEET NO.
CROSS–SECTION INDEX	X–1
CROSS SECTION SUMMARY	X–1A
–L–	X–2 THRU X–10

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".

REVISIONS

FILE: r:\NCDOT\B3830\Roadway\Xsc\B3830_RDY_xpl_cover.dgn
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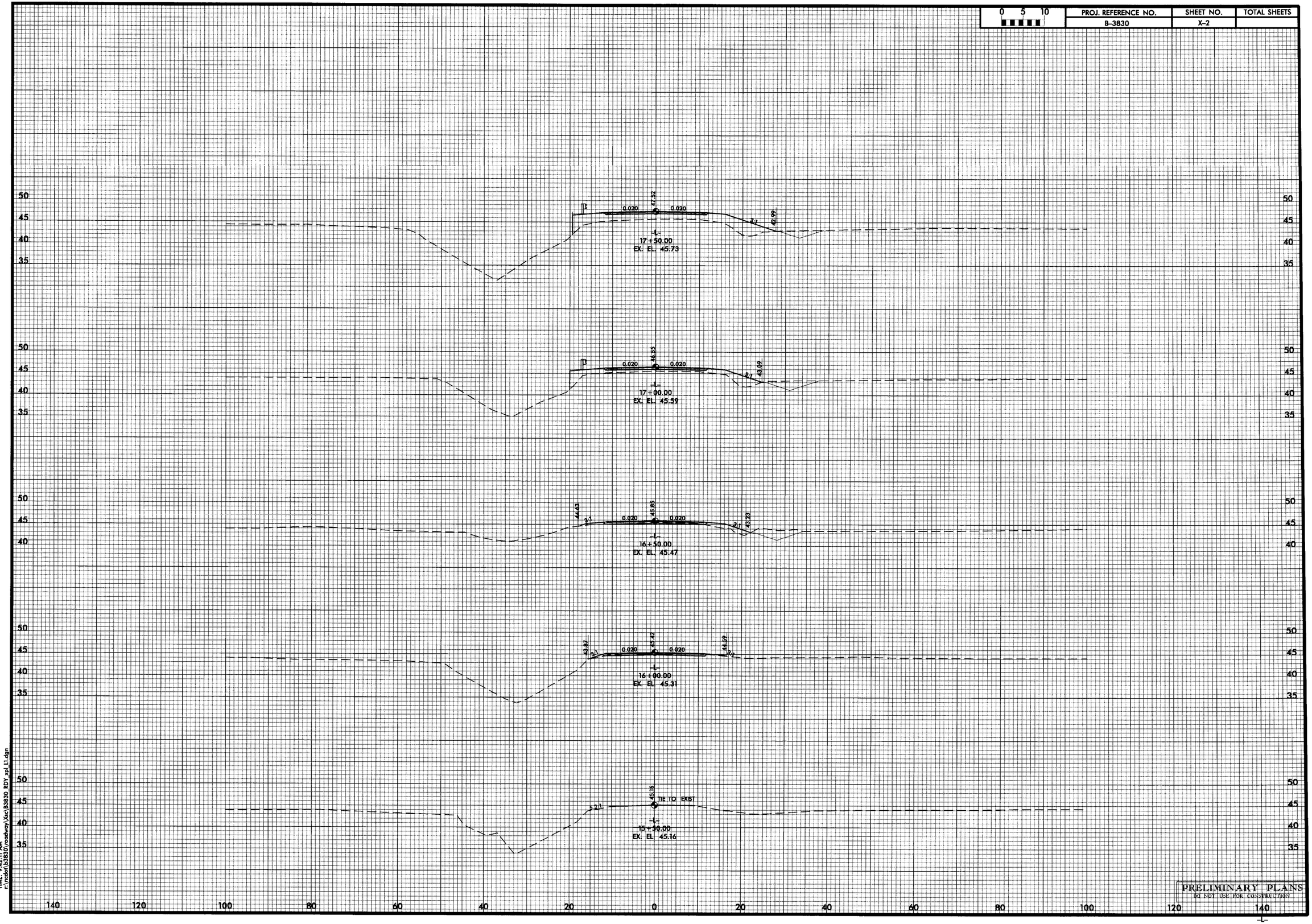
0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	X-2	



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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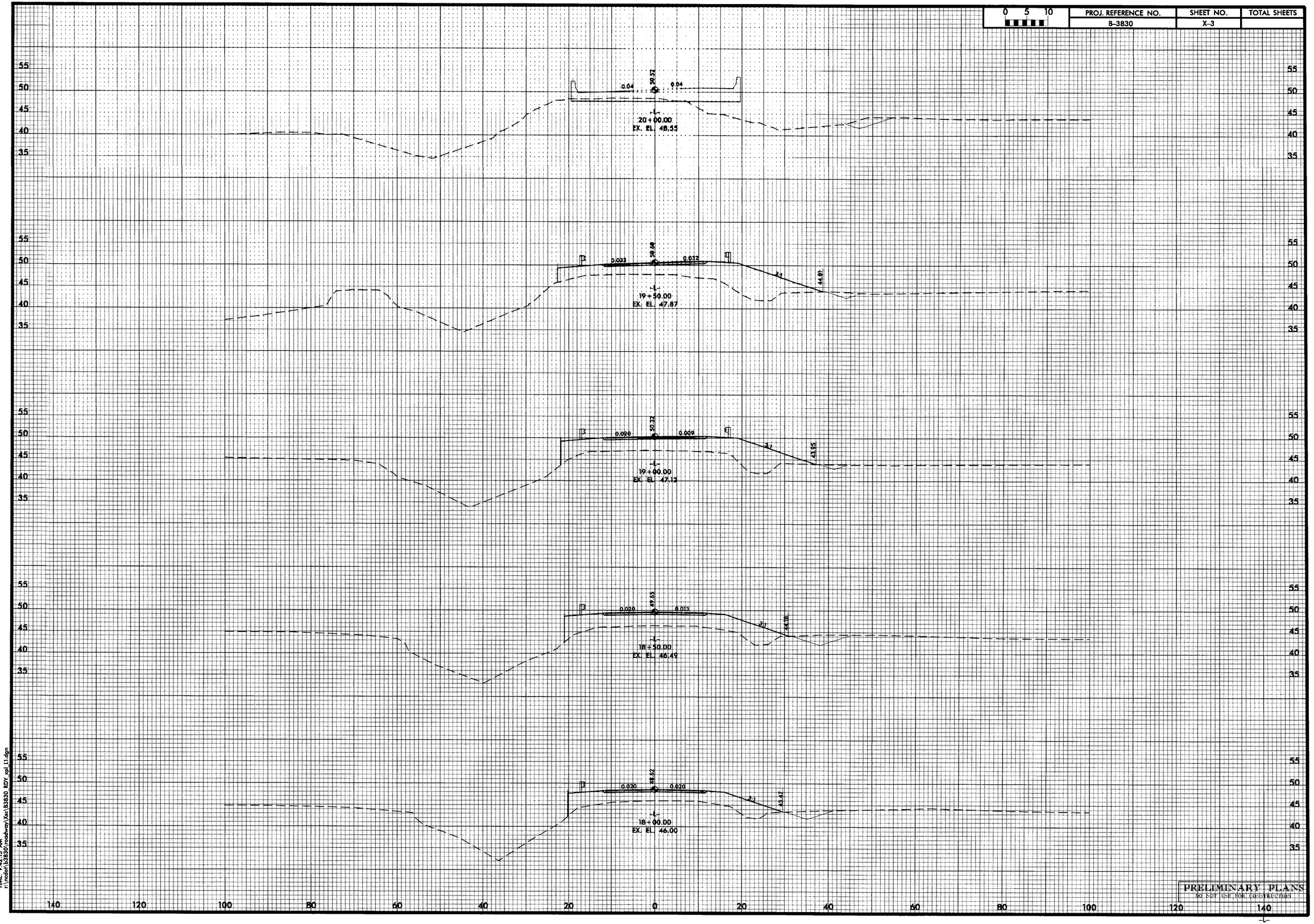
0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	X-3	



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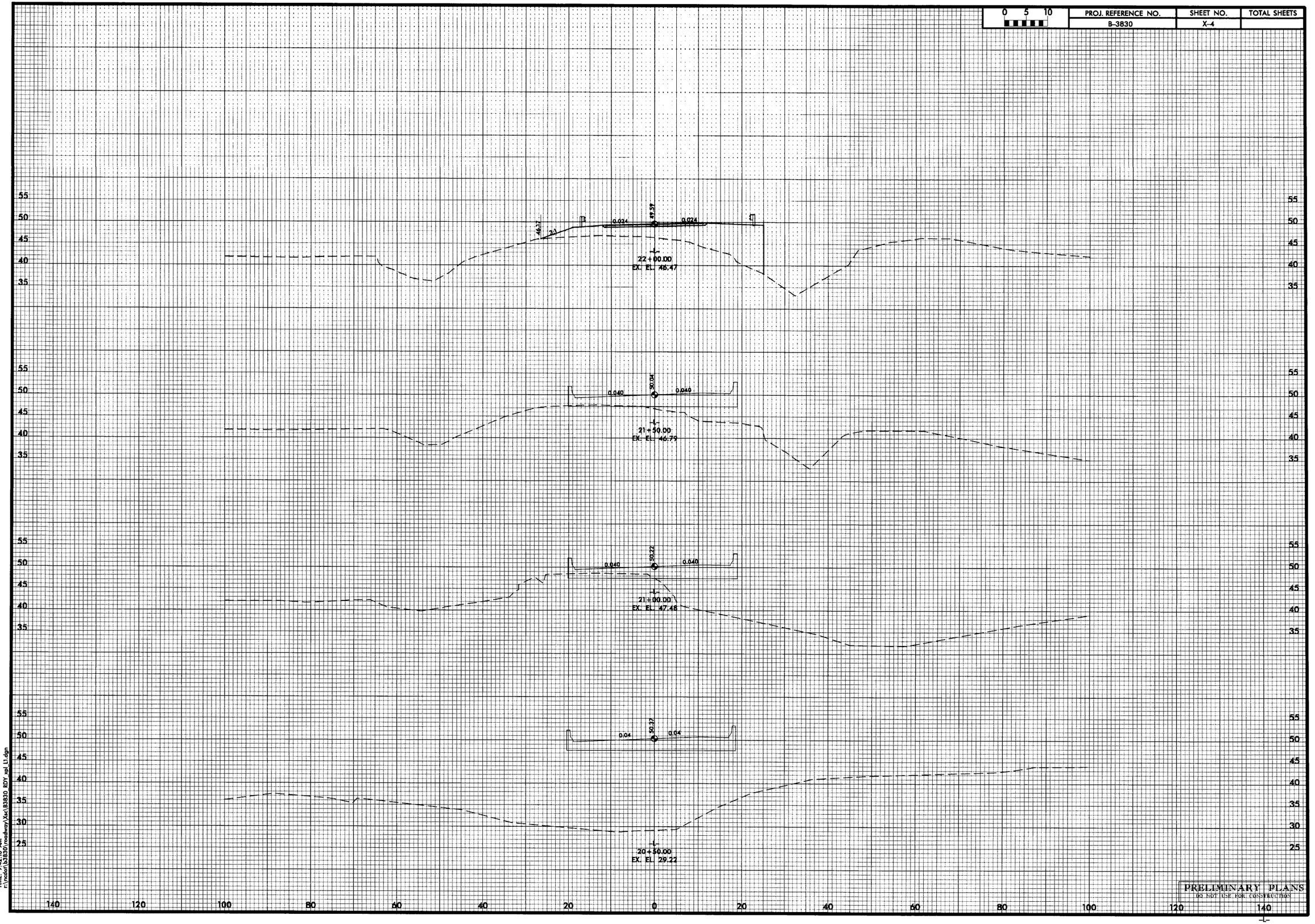

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DO NOT USE FOR CONSTRUCTION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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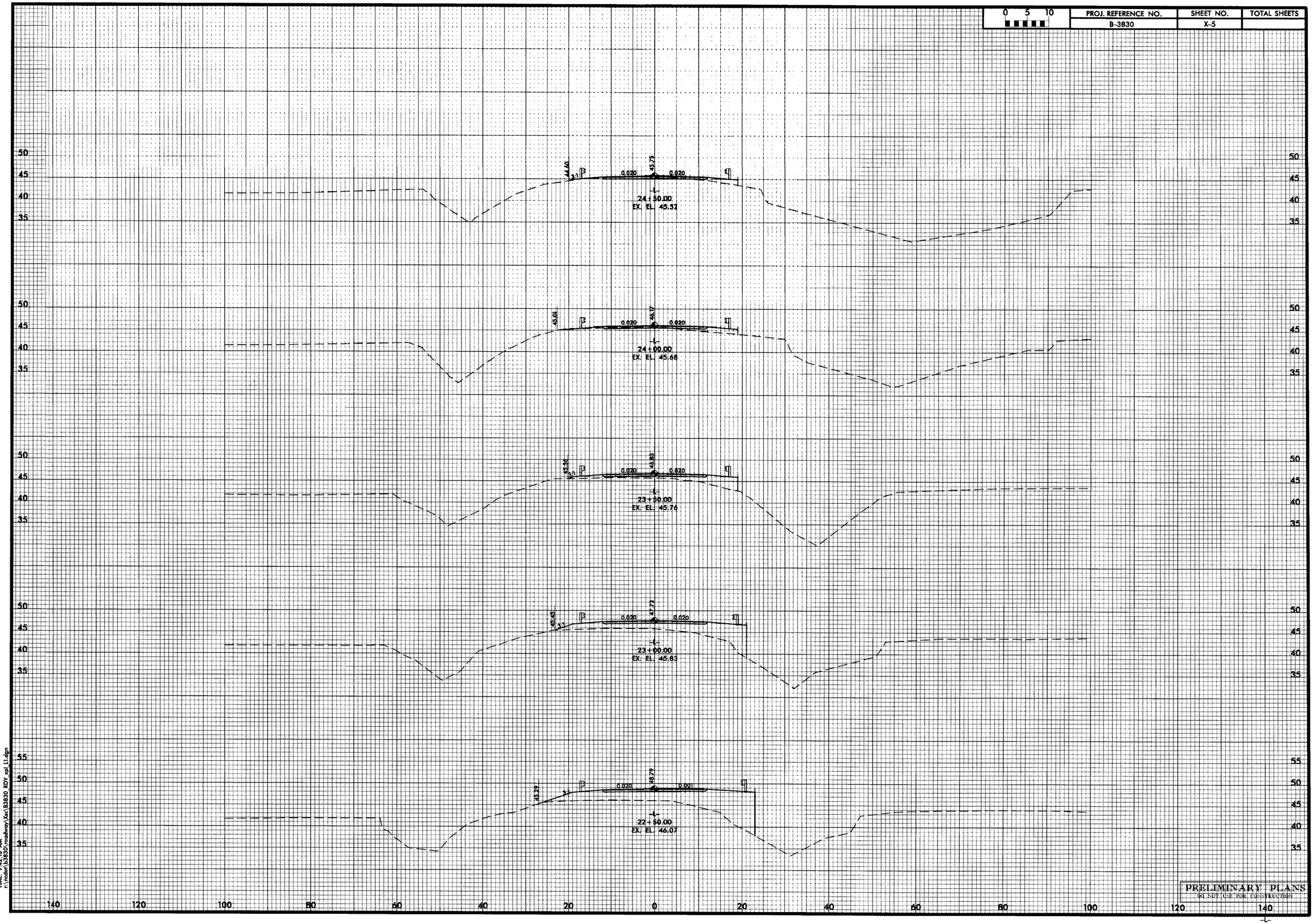

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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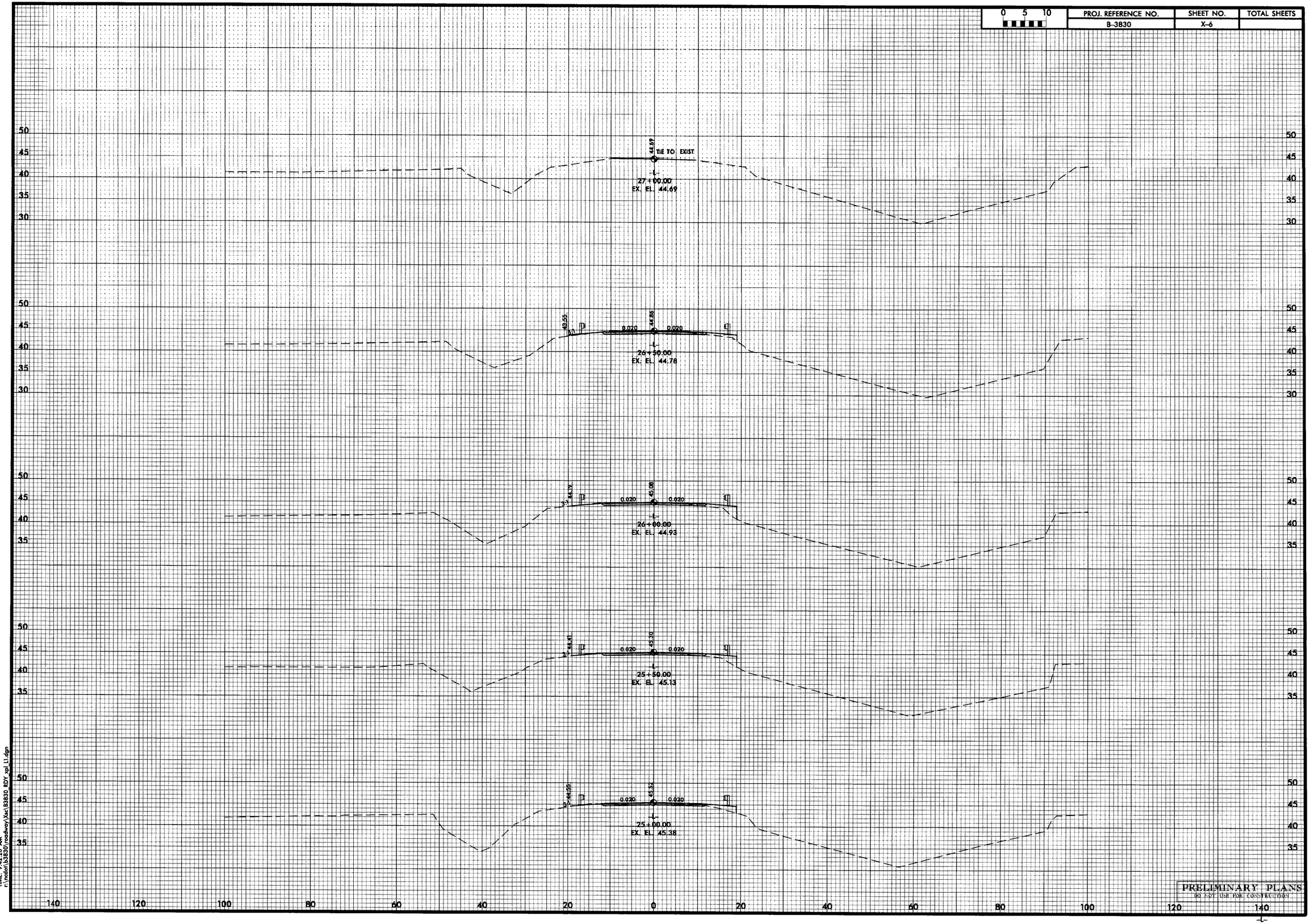

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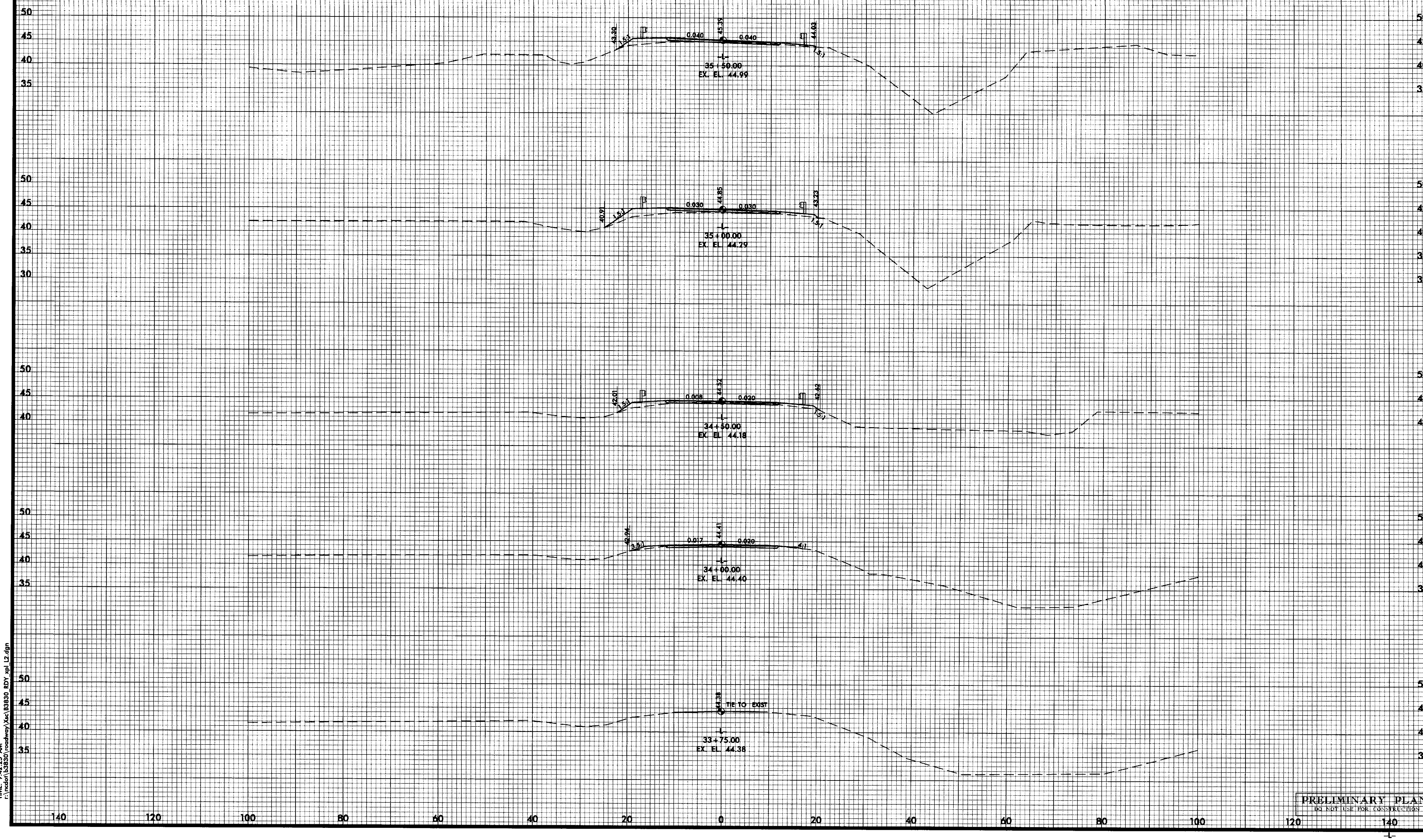
PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
B-3830	X-7	



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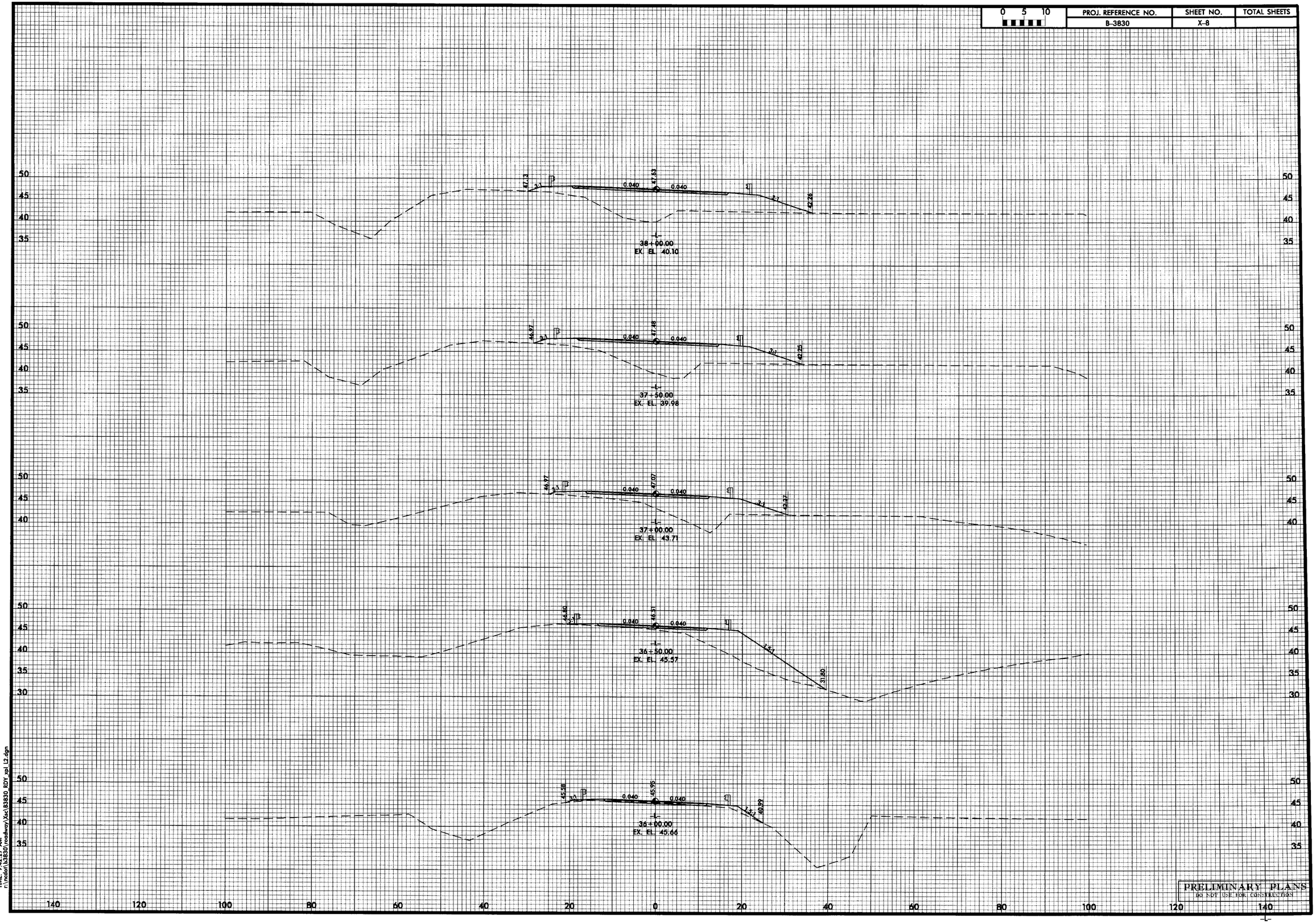
0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	X-8	



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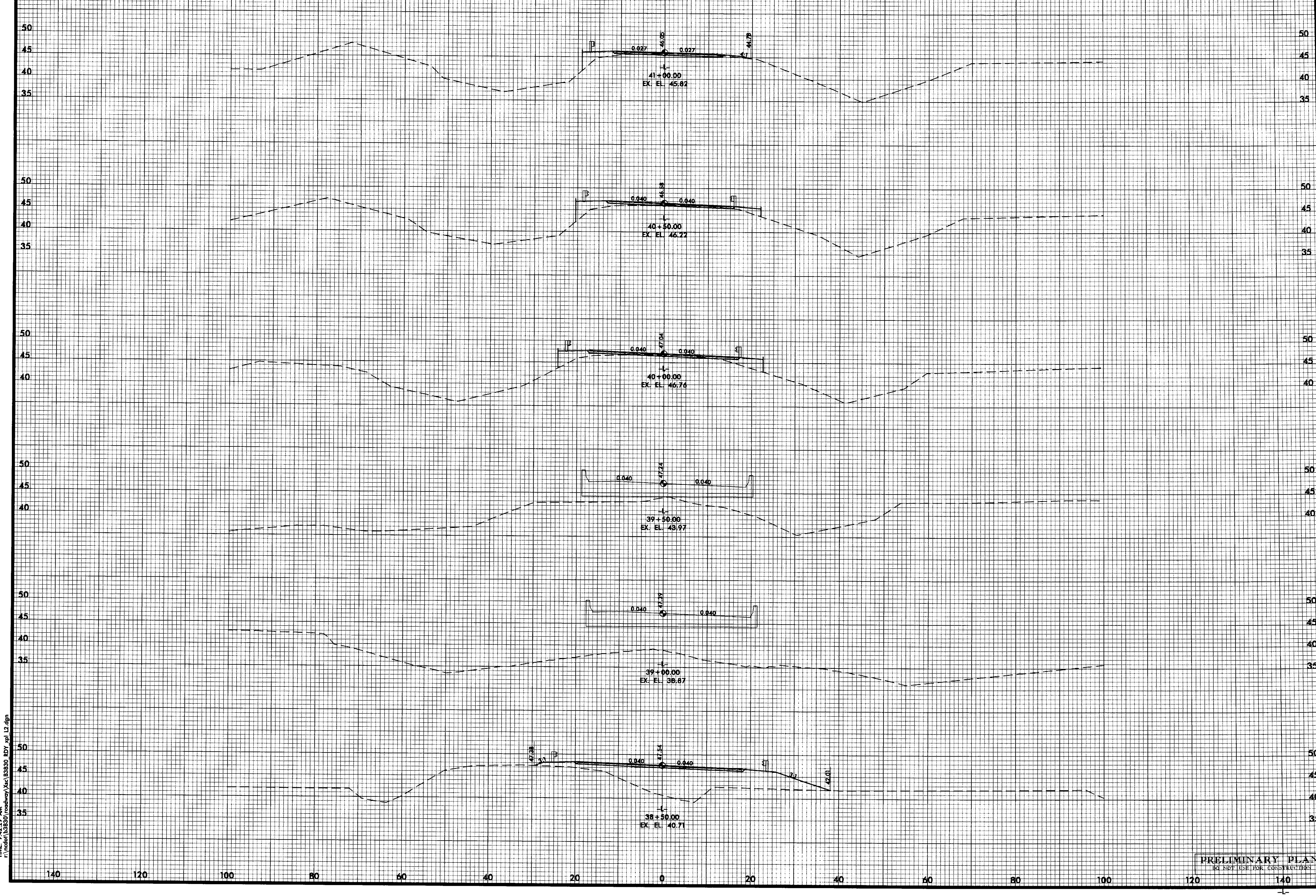
0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	X-9	



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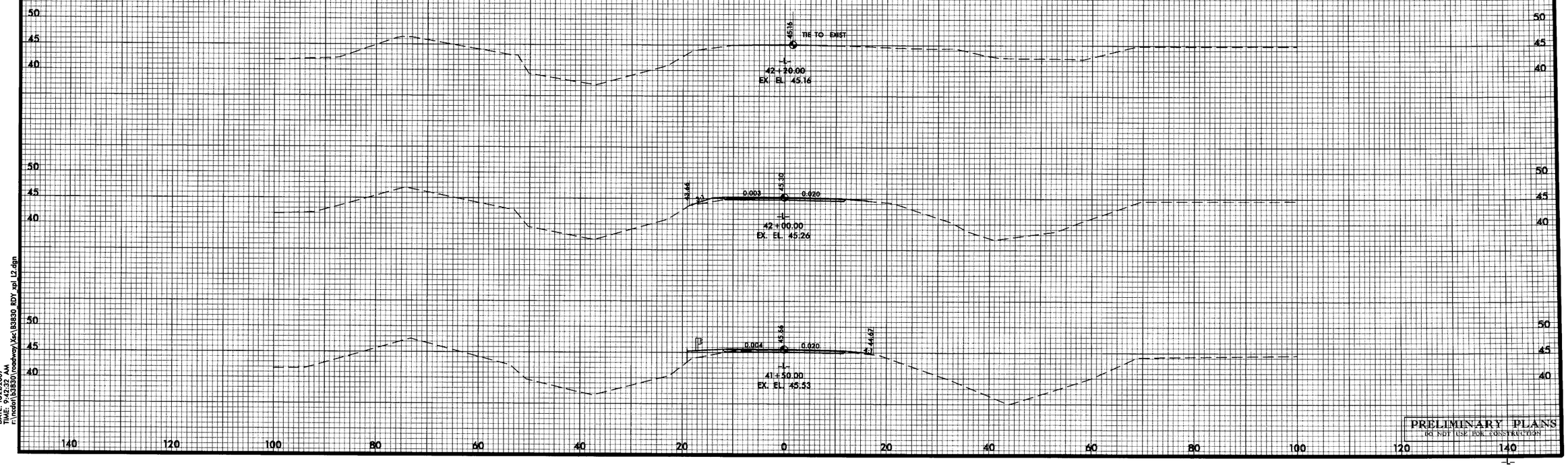
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	B-3830	X-10	



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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