STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

March 31, 2009

NC Division of Water Quality
2321 Crabtree Blvd., Suite 250
Raleigh, NC 27604

ATTN: Mr. Rob Ridings

Subject: **Application for Section 401 Water Quality Certification, Neuse Riparian Buffer Authorization, and Notice of Intent to Use Nationwide Permit 13** for the proposed replacement of Bridge No. 448 over Austin Creek and No. 140 over Smiths Creek on SR 2053 in Wake County, Federal Aid Project No. BRZ-2053(1); Division 5; TIP No. B-3919

$240.00 Debit to WBS Element 33554.1.1

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 448 over Austin Creek and No. 140 over Smiths Creek on SR 2053. There will be 85 feet of permanent surface water impacts due to the placement of riprap for bank stabilization, 11,356 square feet of Zone 1 impacts, and 19,098 square feet of Zone 2 impacts for road crossing and bridge construction. Written authorization from the USACE is not requested.

Please see enclosed copies of the Pre-Construction Notification (PCN), Stormwater Management Plan, permit drawings, and design plans for the above-referenced project. The Categorical Exclusion (CE) was completed in August 2004, addendum to the CE was completed in September 2007, and the Right-of-Way Consultation was completed in October 2008. Documents were distributed shortly thereafter. Additional copies are available upon request.

This project calls for a letting date of November 17, 2009 and a review date of September 29, 2009.

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

TELEPHONE: 919-431-2000
FAX: 919-431-2001
WEBSITE: WWW.NCDOT.ORG

LOCATION:
4701 Atlantic Ave.,
Suite 116
Raleigh, NC 27604

A copy of this permit application will be posted on the NCDOT Website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call James Pflaum at (919) 431-6527.

Sincerely,

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

w/attachment

Mr. Brian Wrenn, NCDWQ (5 Copies)
Mr. J. Wally Bowman, PE., Division Engineer
Mr. Chris Murray, DEO

W/o attachment (see website for attachments)

Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
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. Gary Jordan, USFWS
Mr. Travis Wilson, NCWRC
Ms. Anne Deaton, NCDMF
Mr. Steve Brown, PDEA
Mr. Eric Alsmeyer, USACE

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☐ Section 404 Permit ☐ Section 10 Permit	
1b. Specify Nationwide Permit (NWP) number: 13	or General Permit (GP) number:	
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No

1d. Type(s) of approval sought from the DWQ (check all that apply):

☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit

☐ 401 Water Quality Certification – Express ☒ Riparian Buffer Authorization

1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☒ Yes ☐ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.		☐ Yes ☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.		☐ Yes ☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?		☐ Yes ☒ No

2. Project Information

2a. Name of project:	Replacment of Bridge No.448 over Austin Creek and No. 140 over Smiths Creek on SR 2053
2b. County:	Wake
2c. Nearest municipality / town:	Wake Forest
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-3919

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	*not applicable*
3c. Responsible Party (for LLC if applicable):	*not applicable*
3d. Street address:	1598 Mail Service Center
3e. City, state, zip:	Raleigh, NC 27699-1598
3f. Telephone no.:	(919) 431-6527
3g. Fax no.:	(919) 431-2002
3h. Email address:	jrpflaum@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	*not applicable*
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	*not applicable*
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History		
1. Property Identification		
1a. Property identification no. (tax PIN or parcel ID):	*not applicable*	
1b. Site coordinates (in decimal degrees):	Latitude: 35.966152 (DD.DDDDDD)	Longitude: - 78.489896 (-DD.DDDDDD)
1c. Property size:	12 acres	
2. Surface Waters		
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Austin and Smiths Creek	
2b. Water Quality Classification of nearest receiving water:	C, NSW	
2c. River basin:	Neuse	
3. Project Description		
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: Primarily rural residential housing with forested land between lots and adjacent developments.		
3b. List the total estimated acreage of all existing wetlands on the property:		
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 175		
3d. Explain the purpose of the proposed project: To replace a structurally deficient and/ or functionally obsolete bridge.		
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves replacing bridge No.448 a 36-foot long, 26-foot wide, 2 span reinforced concrete floor with timber joists with a 86-foot long, 81-foot wide single span box beam bridge on the existing alignment. This project also involves replacing bridge No. 140 a 36-foot long, 26-foot wide, 2-span reinforced concrete floor with timber joists with a 100-foot long, 81-foot wide, single span box beam bridge on existing alignment. Offsite detour is planned to route traffic during construction. Standard road building equipment, such as trucks, dozers, and cranes will be used.		
4. Jurisdictional Determinations		
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments: No wetlands, all perennial streams	☐ Yes	☒ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary	☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known):	Agency/Consultant Company: Other:	
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.		
5. Project History		
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes	☒ No ☐ Unknown
5b. If yes, explain in detail according to "help file" instructions.		
6. Future Project Plans		
6a. Is this a phased project?	☐ Yes	☒ No
6b. If yes, explain.		

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☐ Wetlands ☒ Streams - tributaries ☒ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
W1 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W2 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W3 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W4 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W5 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
W6 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
				2g. **Total wetland impacts**	

2h. Comments:

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
S1 ☒ P ☐ T	Bank Stabilization	Austin Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	15	10
S2 ☒ P ☐ T	Bank Stabilization	Smiths Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	15	75
S3 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S4 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S5 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
S6 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
					3h. **Total stream and tributary impacts**	85 Permanent

3i. Comments: Riprap is used in the above mentioned impacts to prevent scour and erosion.

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
O4 ☐ P ☐ T				
			4f. Total open water impacts	

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
	5f. Total							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?	☒ Neuse ☐ Catawba ☐ Tar-Pamlico ☐ Randleman ☐ Other:				
6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☒ P ☐ T	Road Crossing	Austin/Smiths Creek	☐ Yes ☒ No	2308	3912
B2 ☒ P ☐ T	Bridge	Austin/Smiths Creek	☐ Yes ☒ No	9048	3830
B3 ☐ P ☐ T			☐ Yes ☐ No		
			6h. **Total buffer impacts**	11356	7742

6i. Comments: Total stream length buffer impacts are under 150' for bridge No. 448 and 140.

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

The proposed bridges are longer and span both streams, no bents will be placed in the stream. Timber bents will be removed from Austin and Smiths Creek. Level spreaders will be used in conjunction with PSRM lined ditches and riprap to enable sheet flow and prevent scour and erosion within the buffer. Offsite detour will be used to route traffic during construction.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

NCDOT's BMP's for bridge demolition and removal will be enforced.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☐ Yes ☒ No
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☐ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. **Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ**				
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?				☐ Yes ☒ No
6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.				
Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			
6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).				
6h. Comments:				

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☒ Yes ☐ No
1b. If yes, then is a diffuse flow plan included? If no, explain why. Comments: See Permit drawings	☒ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	n/a %
2b. Does this project require a Stormwater Management Plan?	☒ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan: See enclosed description	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☐ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	not applicable
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☒ Yes ☐ No
5b. Have all of the 401 Unit submittal requirements been met?	☒ Yes ☐ No

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments:	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes	☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description.		
4. Sewage Disposal (DWQ Requirement)		
4a. 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. not applicable		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes	☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes	☐ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☒ Raleigh ☐ Asheville	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? Field surveys, NHP database, and USFWS Website for Rockingham County		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes	☒ No
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat? NMFS County Index		
7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes	☒ No
7b. What data sources did you use to determine whether your site would impact historic or archeological resources? Categorical Exclusion for B-3919		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No
8b. If yes, explain how project meets FEMA requirements: Hydraulics coordinating with FEMA		
8c. What source(s) did you use to make the floodplain determination? FEMA flood maps		

Gregory J. Thorpe, Ph D Applicant/Agent's Printed Name	E. L. Lusk Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	4-1-09 Date

STORMWATER MANAGEMENT PLAN

State Project No.: **33353.1.1** (B-3919)
County: WAKE

Hydraulics Project Manager: Steven M. Bondor, P.E. (Greenhorne & O'Mara)
Anne Gamber, P.E. (NCDOT Hydraulics Unit)

PROJECT DESCRIPTION

Project B-3919 includes replacement of bridge number 448 over Austin Creek and bridge number 140 over Smiths Creek located on SR 2053 Jones Dairy Road.

The proposed Austin Creek Bridge is a single span 85 feet in length and includes approximately 700 feet of approach roadway with a curb and gutter cross section on the east side of Austin Creek and a ditch section on the west side. The proposed roadway on the east side and the bridge drainage will discharge to catch basins and pipes which tie to the existing roadway drainage system within the right of way. The existing system discharges to an existing riprap pad and disperses to sheet flow across the wooded stream buffer. The ditch section on the west side of Austin Creek on the north side of the roadway discharges to the existing woods in sheet flow similar to the existing drainage ditch at that location. The ditch on the south side of the roadway discharges to a level spreader upstream of the stream buffer.

The proposed Smiths Creek Bridge is a single span 100 feet in length and includes approximately 1100 feet of approach roadway with a ditch section. The south side of the roadway along the east side of Smiths Creek is a fill section with sheet flow from the pavement along the grass shoulder. The south side also includes a pipe system with a preformed scour hole at the outlet that drains the bridge. The north side of the roadway along the east side of Smiths Creek includes a cut section with a ditch that discharges to a flat sump upstream of the stream buffer. The sump will create sheet flow through the buffer. The north side of roadway along the west side of Smiths Creek includes a cut ditch that to the existing woods in sheet flow similar to the existing drainage ditch at that location. The ditch on the south side of the roadway on the west side of Smiths Creek discharges to a level spreader upstream of the stream buffer.

ENVIRONMENTAL DESCRIPTION

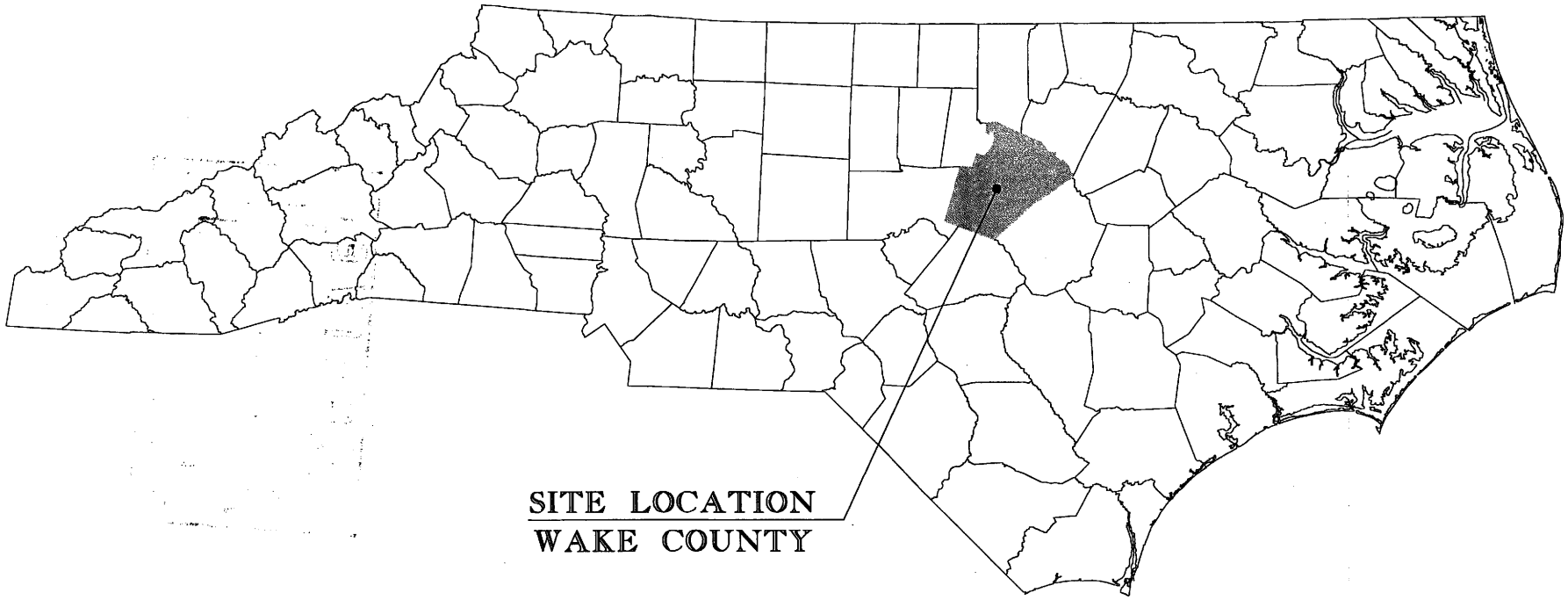
Both Austin Creek and Smiths Creek are jurisdictional streams located in the Neuse River Basin. The Neuse River basin includes buffer rules that require storm drainage be discharged as sheet flow upstream of the buffer limits. No wetlands are located within the project limits. The project causes impacts to the stream buffers due to fill from the roadway.

STORMWATER BEST MANAGEMENT PRACTICES

The purpose of Best Management Practices (BMPs) is to minimize degradation of surface waters caused by stormwater pollution from highway drainage. The BMP measures used on this project to reduce stormwater impacts are:

- Rip rap preformed scour hole at pipe outlets
- Level spreaders at ditch outlets to promote sheet flow upstream of stream buffers

COUNTY LOCATION VICINITY MAP



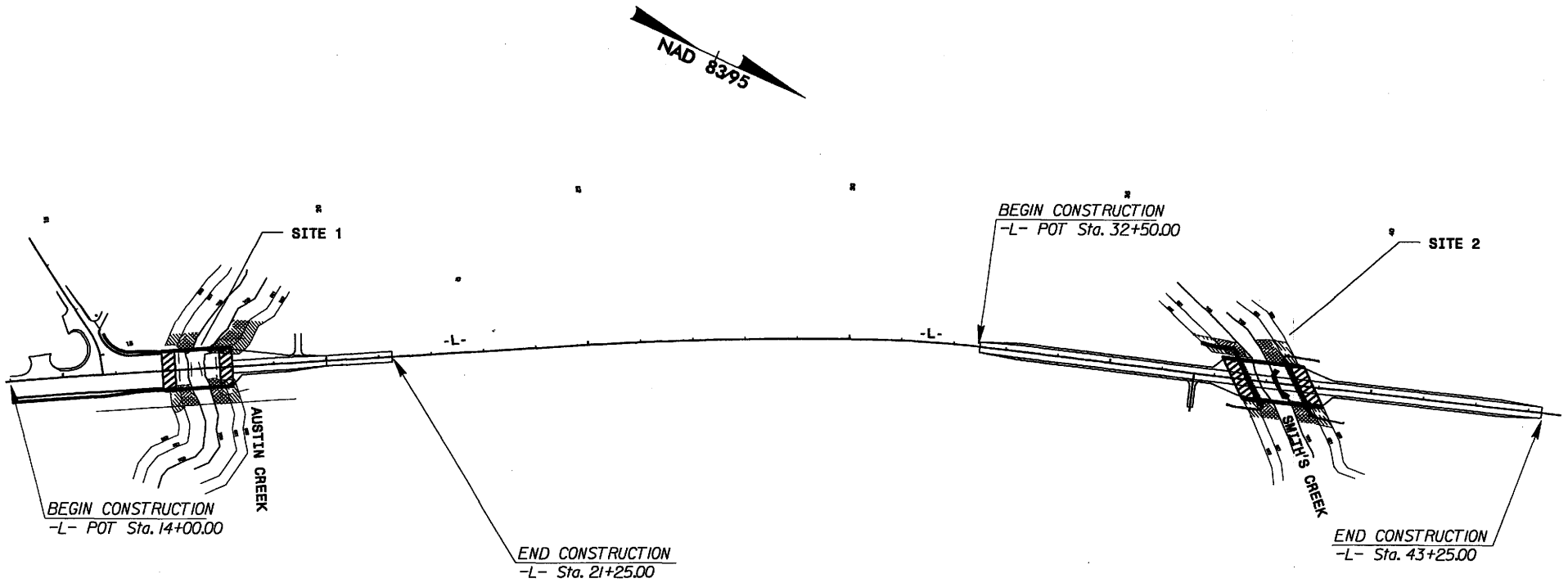
BUFFER PERMIT DRAWINGS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY

PROJECT: 33353.1.1 (B-3919)

BRIDGES NO. 448 OVER AUSTIN CREEK AND NO. 140 OVER SMITH'S CREEK ON SR-2053

SHEET 1 OF 10 01/22/09



300 0 300 600 900

GRAPHIC SCALE

SITE LOCATION MAP

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY

PROJECT: 33353.1.1 (B-3919)

BRIDGES NO. 448 OVER AUSTIN CREEK AND NO. 140 OVER SMITH'S CREEK ON SR-2053

SHEET 2 OF 10 **01/22/09**

PROPERTY OWNERS

PARCEL	OWNER NAME	ADDRESS
3	CHRISTINE M. CHALK HEIRS	905 QUAIL AVE., WAKE FOREST, NC 27587-7630
10	HERITAGE WAKE FOREST	P.O. BOX 1615 WAKE FOREST, NC 27588-1615
12	WAKE FOREST RETAIL INVESTORS, LLC	P.O. BOX 36469, CHARLOTTE, NC 28326-6439
4	GEORGE C MACKIE JR. & WIFE MARTHA H.	113 E. JUNIPER ST., WAKE FOREST, NC 27587-2309
9	DOROTHY M. ADCOCK PEARCE	255 JONES DAIRY RD. WAKE FOREST, NC 27587-7619

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 33353.1.1 (B-3919)

BRIDGES NO. 448 OVER AUSTIN CREEK AND NO. 140 OVER SMITH'S CREEK ON SR-2053

 01/22/09

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	Bridge	-L- 16+90 To 18+90		X		4521	2800	7321					
1	Bridge	-L- 16+90 To 18+90	X			1439	1292	2731					
		TOTAL											
2	Bridge	-L- 36+50 To 39+40		X		4527	1030	5557					
2	Bridge	-L- 36+50 To 39+40	X			869	2620	3489					
		TOTAL											
TOTAL:						11356	7742	19098	0.0	0.0	0.0		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 33353.1.1 (B-3919)
BRIDGES NO. 448 AND 140
OVER AUSTIN CREEK AND SMITH CREEK
1/22/2009
SHEET 4 OF 9

Rev. May 2006

PROJECT REFERENCE NO.	SHEET NO.
B-3919	2-
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

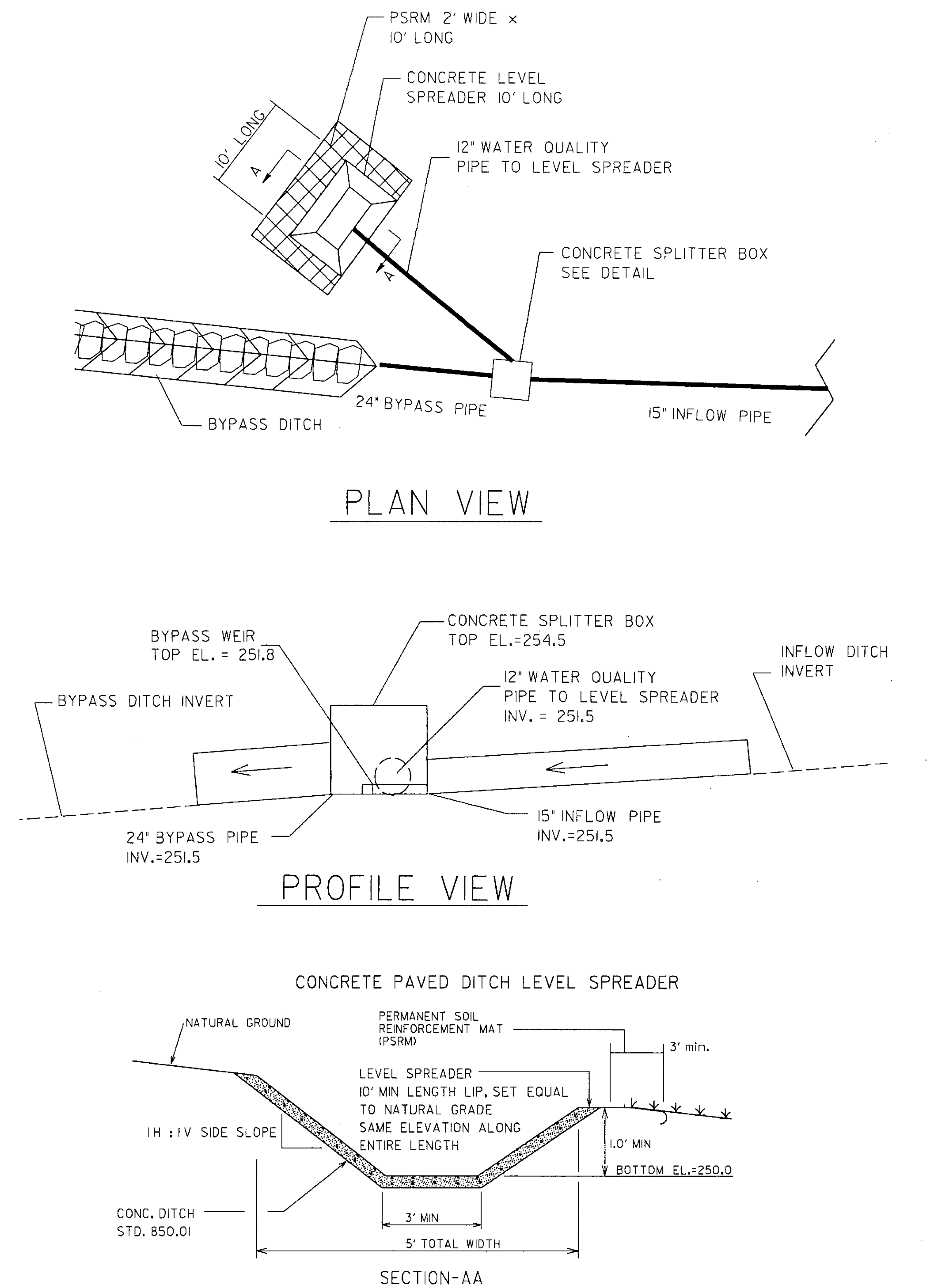
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 5 of 10

8/17/99

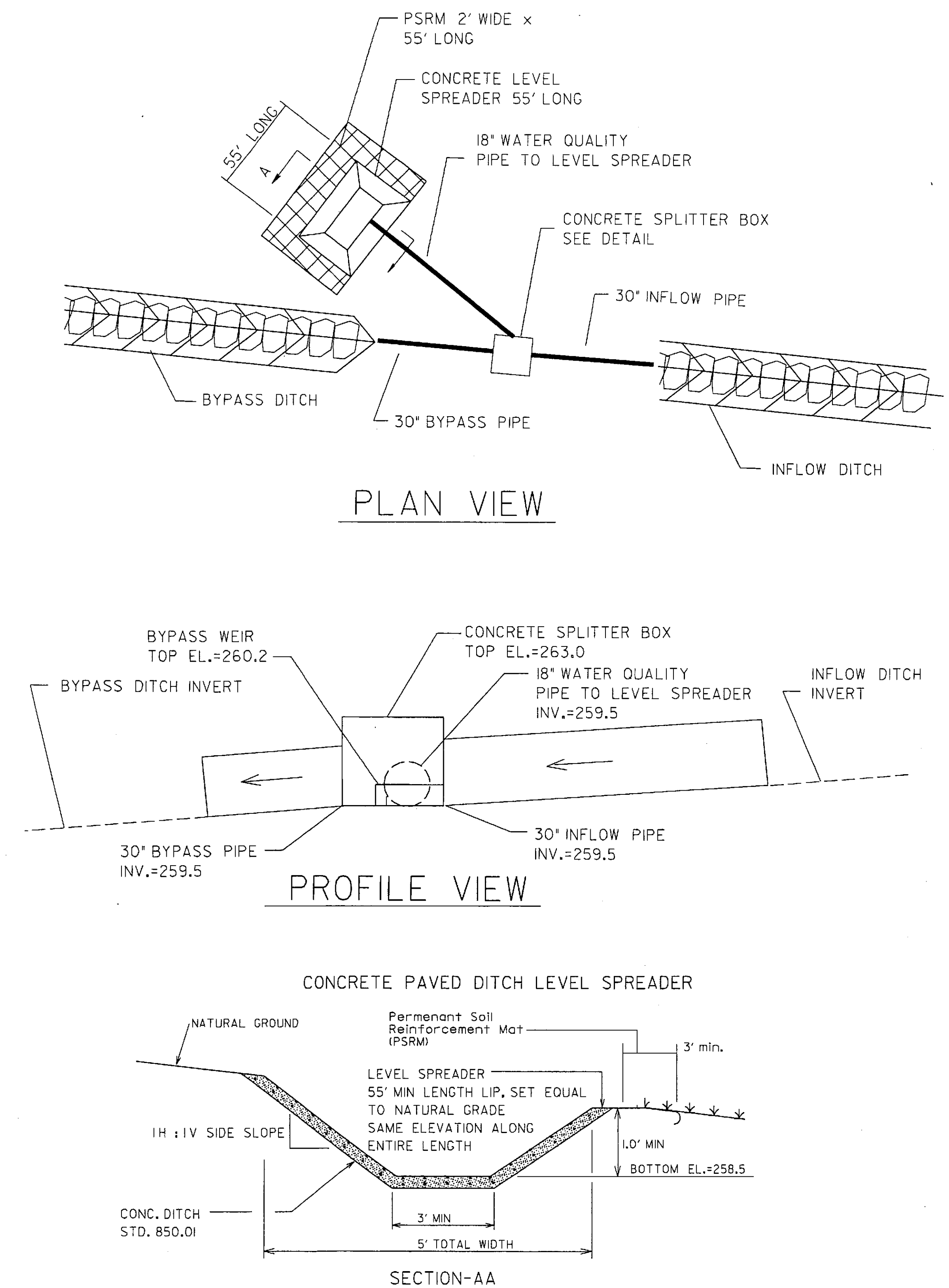
LEVEL SPREADER WITH BYPASS -L- STA 18+90 LT

(NOT TO SCALE)



LEVEL SPREADER WITH BYPASS -L- STA 39+00 LT

(NOT TO SCALE)



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

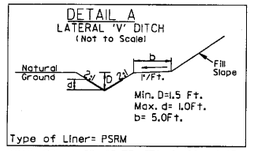
PROJECT REFERENCE NO.	SHEET NO.
B-3919	2-
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

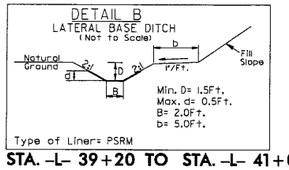
Buffer Drawing
Sheet 6 of 10

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



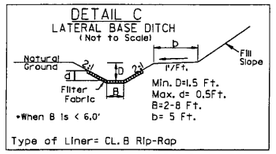
FROM STA. -L- 19+63 TO STA. -L- 20+50 LT

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



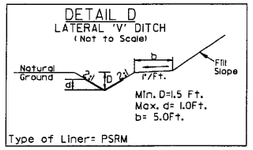
FROM STA. -L- 39+20 TO STA. -L- 41+00LT
FROM STA. -L- 35+00 TO STA. -L- 37+25RT
FROM STA. -L- 37+90 TO STA. -L- 38+90LT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



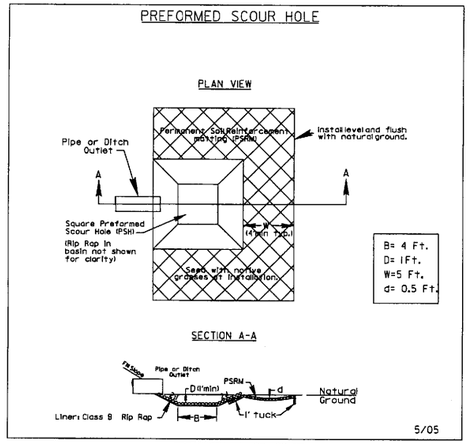
FROM STA. -L- 37+25 TO STA. -L- 37+70RT

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



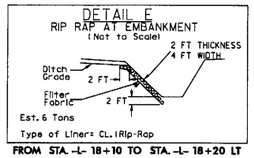
FROM STA. -L- 18+20 TO STA. -L- 18+92 LT

PREFORMED SCOUR HOLE



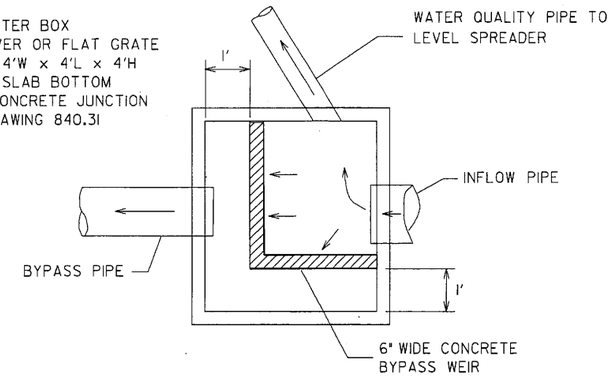
FROM STA. -L- 35+80 LT

DETAIL E
RIP RAP AT EMBANKMENT
(Not to Scale)

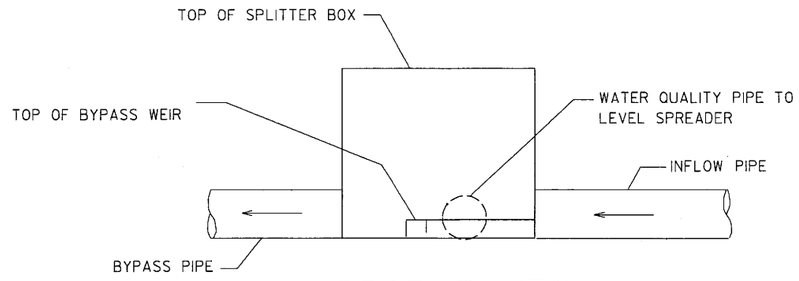


FROM STA. -L- 18+10 TO STA. -L- 18+20 LT
STA -L- 37+80 TO STA -L- 37+90 LT
STA -L-38+10 LT TO -L- STA 38+40 RT

6" CONCRETE SPLITTER BOX
WITH MANHOLE COVER OR FLAT GRATE
INSIDE DIMENSIONS 4'W x 4'L x 4'H
WITH 6" CONCRETE SLAB BOTTOM
CONSTRUCT PER CONCRETE JUNCTION
BOX STANDARD DRAWING 840.31



PLAN VIEW



PROFILE VIEW

FLOW SPLITTER DEVICE FOR LEVEL SPREADER

(NOT TO SCALE)

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-3919	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Buffer Drawing
Sheet 7 of 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y- POT STA. 10+00.00

-L- POT STA. 10+00.00

-L- PC STA. 10+73.92

CHRISTINE M. CHALK HEIRS
PIN 1850.03 14 5845
DB 1637, PG. 172
1444-E-02
PB. 2001, PG. 286

CHRISTINE M. CHALK HEIRS
PIN 1850.03 14 5845
PB. 1994, PG. 110
1444-E-02
DB 1637 PG. 172

L -STA. 18+20 TO 18+92.LT
BYPASS Y DITCH
LINED WITH PSRM
DETAIL D

LIBBY B. RHODES
PIN 1850.015 6444
DB 436, PG. 61

NAD 83

Buffer Drawing
Sheet ___ of 10

BEGIN CONSTRUCTION
-Y- STA. 13+50.00

-Y- PC STA. 14+52.22

-Y- PT STA. 15+07.49

WILLIAM O. BURWELL
PIN 1850.015 7354
DB 3370, PG. 589
P.B. 1984, PG. 1347

JOHNNY M. WALTERS
PIN 1850.03 24 3621
DB 1758, PG. 236

NISAR A. CHATHA
ZAIBUNISA CHATHA
AMJAD L SALEEM
ZOHRA AMJAD
DB 8596, PG. 215
P.B. 1988, PG. 38

PROP. 5' SIDEWALK

100' TRANS. LT

GLOVER TRAPP, JR. AND WFE, OTISTEEN M. TRAPP
PIN 1850.03 24 4854
DB 2267, PG. 697

SR 2053 JONES DAIRY ROAD
VARIABLE WIDTH BST

N 37° 53' 18.0" W

N 42° 38' 59.9" W

N 44° 47' 02.2" E

2' 6" C&G

BRIDGE #248

END CONSTRUCTION
-L- STA. 21+25.00

SITE 1

GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.01 36 0752
DB 1894, PG. 169
DB 1879, PG. 355

BOWLING GREEN ASSOCIATES, LLC
DB 1089 PG 001
PB 2005 PG 243

BEGIN TIP PROJECT B-3919
BEGIN CONSTRUCTION
-L- STA. 14+00.00

-L- PT STA. 15+72.56

-L- POT STA. 15+75.66
-Y- POT STA. 15+37.35

GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.01 35 5965
DB 2132, PG. 582

SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP

BEGIN BRIDGE
-L- STA. 17+12.70

BEGIN APPROACH SLAB
-L- STA. 16+88.70

END APPROACH SLAB
-L- STA. 18+21.70

END BRIDGE
-L- STA. 17+97.70

GRAU 350 TYPE-III PROP. 5' SIDEWALK

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

SR 2054 CHALK RD.			
2092 / 4800		2008 / 2030	ADT
492 / 1000	1662 / 4200	8138 / 16600	
6969 / 13400	SR 2053 JONES DAIRY RD.		

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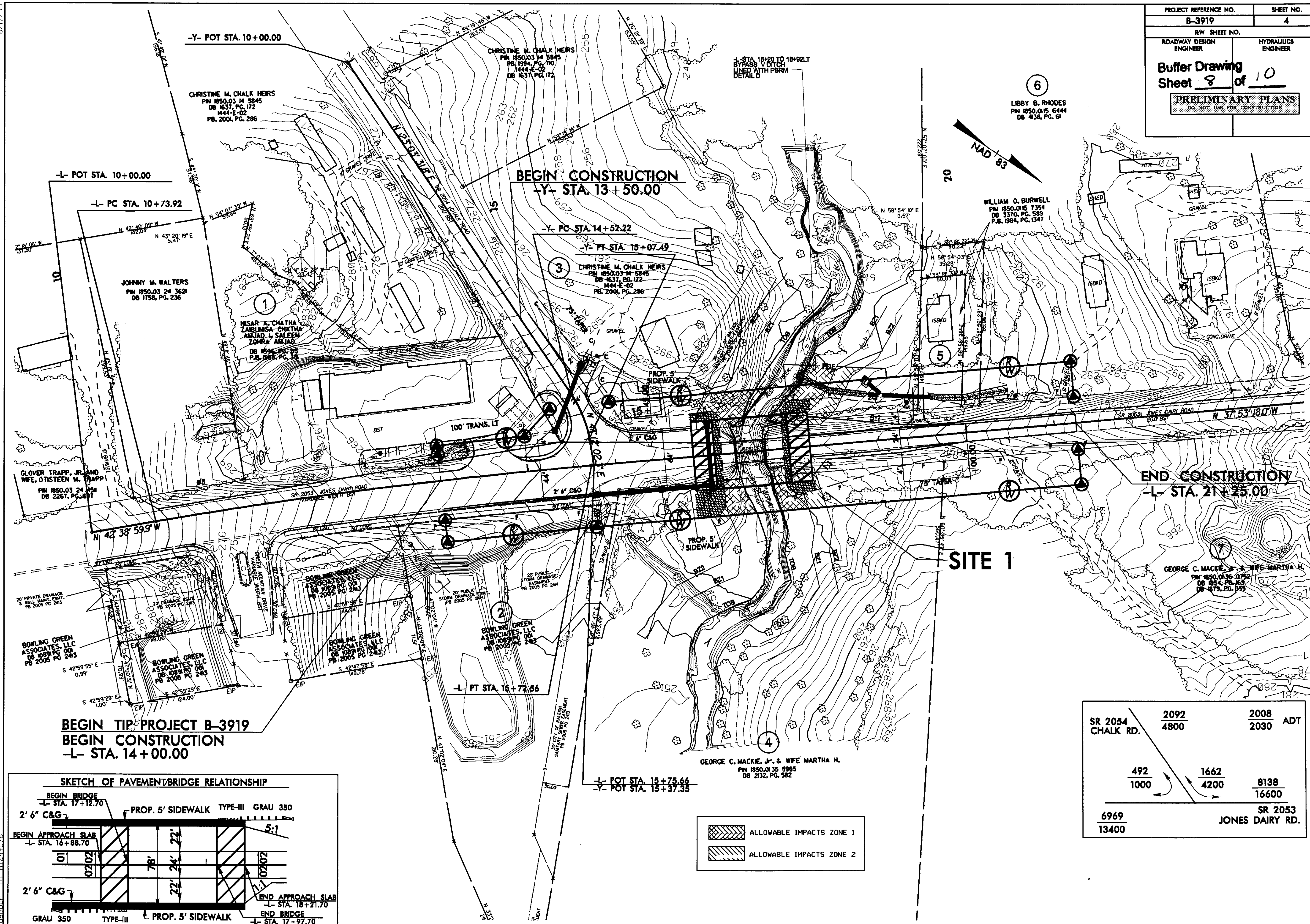
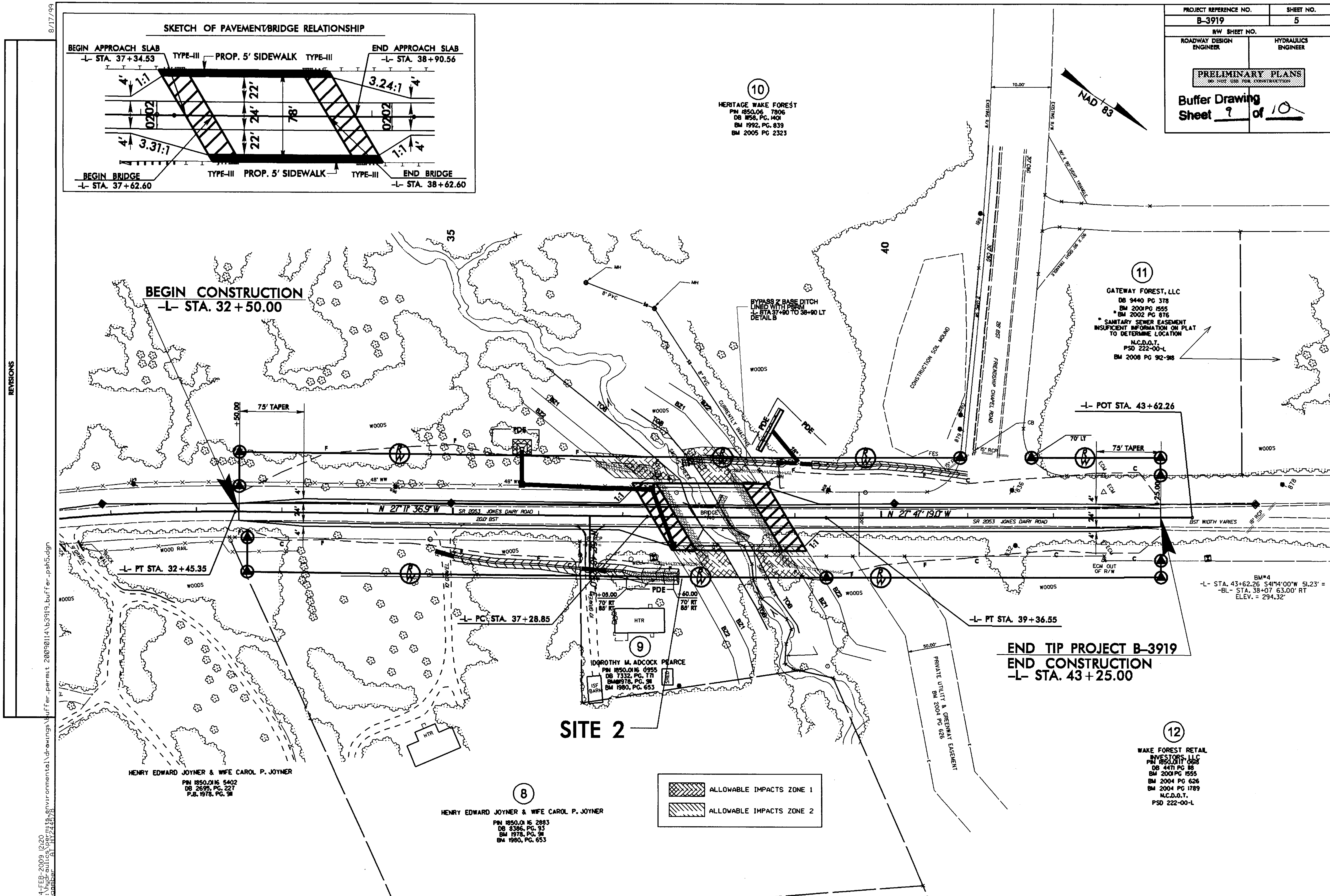

PROJECT REFERENCE NO.
B-3919
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Buffer Drawing
Sheet 8 of 10
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-Y- POT STA. 10+00.00
-L- POT STA. 10+00.00
-L- PC STA. 10+73.92
BEGIN CONSTRUCTION
-Y- STA. 13+50.00
-Y- PC STA. 14+52.22
-Y- PT STA. 15+07.49
CHRISTINE M. CHALK HEIRS
JOHNNY M. WALTERS
LIBBY B. RHODES
WILLIAM O. BURWELL
GLOVER TRAPP, JR. AND WIFE, OTISTEEN M. TRAPP
BOWLING GREEN ASSOCIATES, LLC
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
NAD 83
PROP. 5' SIDEWALK
100' TRANS. LT
SR 2053 JONES DAIRY ROAD
END CONSTRUCTION
-L- STA. 21+25.00
SITE 1
-L- PT STA. 15+72.56
BEGIN TIP PROJECT B-3919
BEGIN CONSTRUCTION
-L- STA. 14+00.00
-L- POT STA. 15+75.66
-Y- POT STA. 15+37.35
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP
BEGIN BRIDGE -L- STA. 17+12.70
BEGIN APPROACH SLAB -L- STA. 16+88.70
PROP. 5' SIDEWALK
END APPROACH SLAB -L- STA. 18+21.70
END BRIDGE -L- STA. 17+97.70
SR 2054 CHALK RD.
2092 / 4800
2008 / 2030 ADT
492 / 1000
1662 / 4200
8138 / 16600
6969 / 13400
SR 2053 JONES DAIRY RD.


PROJECT REFERENCE NO. B-3919
SHEET NO. 5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Buffer Drawing Sheet 9 of 10
SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP
BEGIN APPROACH SLAB -L- STA. 37+34.53
END APPROACH SLAB -L- STA. 38+90.56
PROP. 5' SIDEWALK
BEGIN BRIDGE -L- STA. 37+62.60
END BRIDGE -L- STA. 38+62.60
TYPE-III
NAD 83
HERITAGE WAKE FOREST
PIN 1850.06 7806
DB 1158, PG. 1401
BM 1992, PG. 839
BM 2005 PG 2323
BEGIN CONSTRUCTION -L- STA. 32+50.00
75' TAPER
WOODS
BYPASS 2' BASE DITCH LINED WITH PSRM -L- STA 37+90 TO 38+90 LT DETAIL B
CONSTRUCTION SOIL MOUND
FRIENDSHIP CHAPEL ROAD
GATEWAY FOREST, LLC
DB 9440 PG 378
BM 2001 PG 1555
BM 2002 PG 876
SANITARY SEWER EASEMENT INSUFICIENT INFORMATION ON PLAT TO DETERMINE LOCATION
N.C.D.O.T. PSD 222-00-L
BM 2008 PG 912-918
-L- POT STA. 43+62.26
N 27° 11' 36.9" W
SR 2053 JONES DAIRY ROAD
N 27° 47' 19.0" W
BST WIDTH VARIES
-L- PT STA. 32+45.35
-L- PC STA. 37+28.85
-L- PT STA. 39+36.55
BM#4
-L- STA. 43+62.26 S41°14'00"W 51.23' =
-BL- STA. 38+07 63.00' RT
ELEV. = 294.32'
DOROTHY M. ADCOCK PEARCE
PIN 1850.0116 0955
DB 7332, PG. 771
BM 1978, PG. 911
BM 1980, PG. 653
END TIP PROJECT B-3919
END CONSTRUCTION -L- STA. 43+25.00
PRIVATE UTILITY & GREENWAY EASEMENT BM 2004 PG 626
SITE 2
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.0116 5402
DB 2695, PG. 227
P.B. 1978, PG. 911
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.0116 2883
DB 8386, PG. 93
BM 1978, PG. 911
BM 1980, PG. 653
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
WAKE FOREST RETAIL INVESTORS, LLC
PIN 1850.0117 0618
DB 4471 PG 88
BM 2001 PG 1555
BM 2004 PG 626
BM 2004 PG 1789
N.C.D.O.T.
PSD 222-00-L
REVISIONS
24-FEB-2009 12:20

PROJECT REFERENCE NO.	SHEET NO.
B-3919	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

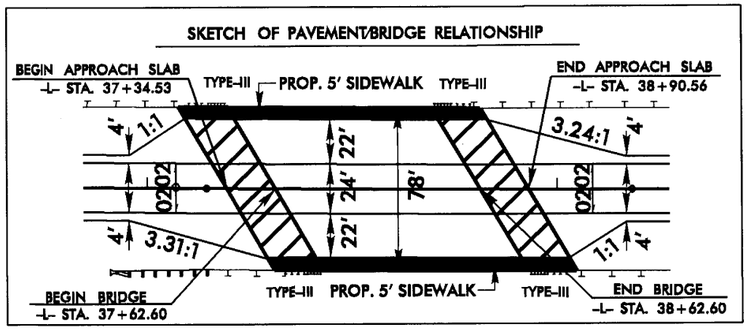
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 10 of 10

8/17/99

REVISIONS

SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP



10
HERITAGE WAKE FOREST
PIN 1850.06 7806
DB 1158, PG. 1401
BM 1992, PG. 839
BM 2005 PG 2323

11
GATEWAY FOREST, LLC
DB 9440 PG 378
BM 2001 PG 1555
* BM 2002 PG 876
* SANITARY SEWER EASEMENT INSUFFICIENT INFORMATION ON PLAT TO DETERMINE LOCATION
N.C.D.O.T.
PSD 222-00-L
BM 2008 PG 982-985

BEGIN CONSTRUCTION
-L- STA. 32+50.00

-L- POT STA. 43+62.26

-L- PT STA. 32+45.35

-L- PC STA. 37+28.85

-L- PT STA. 39+86.55

END TIP PROJECT B-3919
END CONSTRUCTION
-L- STA. 43+25.00

BYPASS'E BASE DITCH LINED WITH PSRM -L- STA 37+90 TO 38+90 LT DETAIL B

CONSTRUCTION SOIL MOUND

CURRENTLY MULCHED

9
DOROTHY M. ADCOCK PEARCE
PIN 1850.01 16 0955
DB 7332, PG. 771
BM1978, PG. 98
BM 1980, PG. 653

8
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.01 16 5402
DB 2695, PG. 227
P.B. 1978, PG. 98

HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.01 16 2883
DB 6396, PG. 93
BM 1978, PG. 98
BM 1980, PG. 653

12
WAKE FOREST RETAIL INVESTORS, LLC
PIN 1850.0117 0698
DB 4471 PG 86
BM 2001 PG 1555
BM 2004 PG 626
BM 2004 PG 1789
N.C.D.O.T.
PSD 222-00-L

BM#4
STA. 43+62.26 S41°14'00"W 51.23' = -BL- STA. 38+07 63.00' RT
ELEV. = 294.32'

SITE 2

ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2

NAD 83

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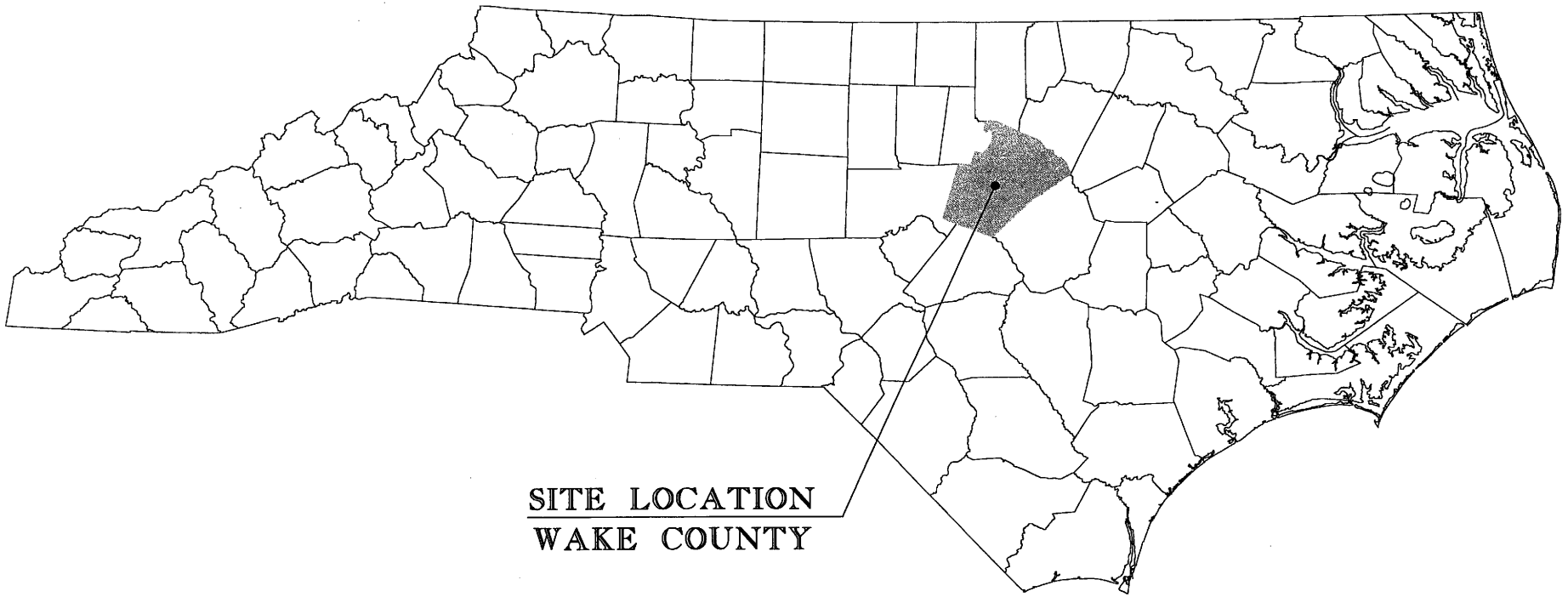
ApplPar

COUNTY LOCATION VICINITY MAP



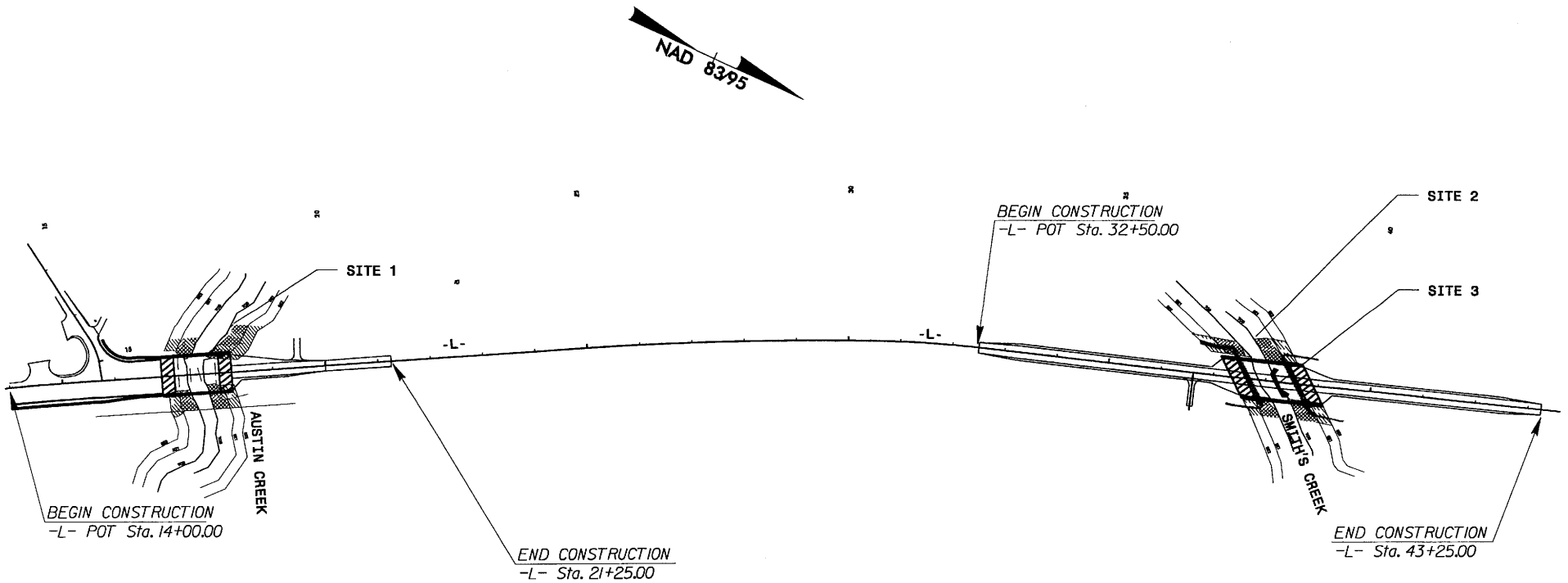
WETLAND and STREAM PERMIT DRAWINGS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY

PROJECT: 33353.1.1 (B-3919)

BRIDGES NO. 448 OVER AUSTIN CREEK AND NO. 140 OVER SMITH'S CREEK ON SR-2053

SHEET 1 OF 10 01/22/09



300 0 300 600 900

GRAPHIC SCALE

SITE LOCATION MAP

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY

PROJECT: 33353.1.1 (B-3919)

BRIDGES NO. 448 OVER AUSTIN CREEK AND NO. 140 OVER SMITH'S CREEK ON SR-2053

SHEET 2 OF 10 01/22/09

PROPERTY OWNERS

PARCEL	OWNER NAME	ADDRESS
3	CHRISTINE M. CHALK HEIRS	905 QUAIL AVE., WAKE FOREST, NC 27587-7630
10	HERITAGE WAKE FOREST	P.O. BOX 1615 WAKE FOREST, NC 27588-1615

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 33353.1.1 (B-3919)

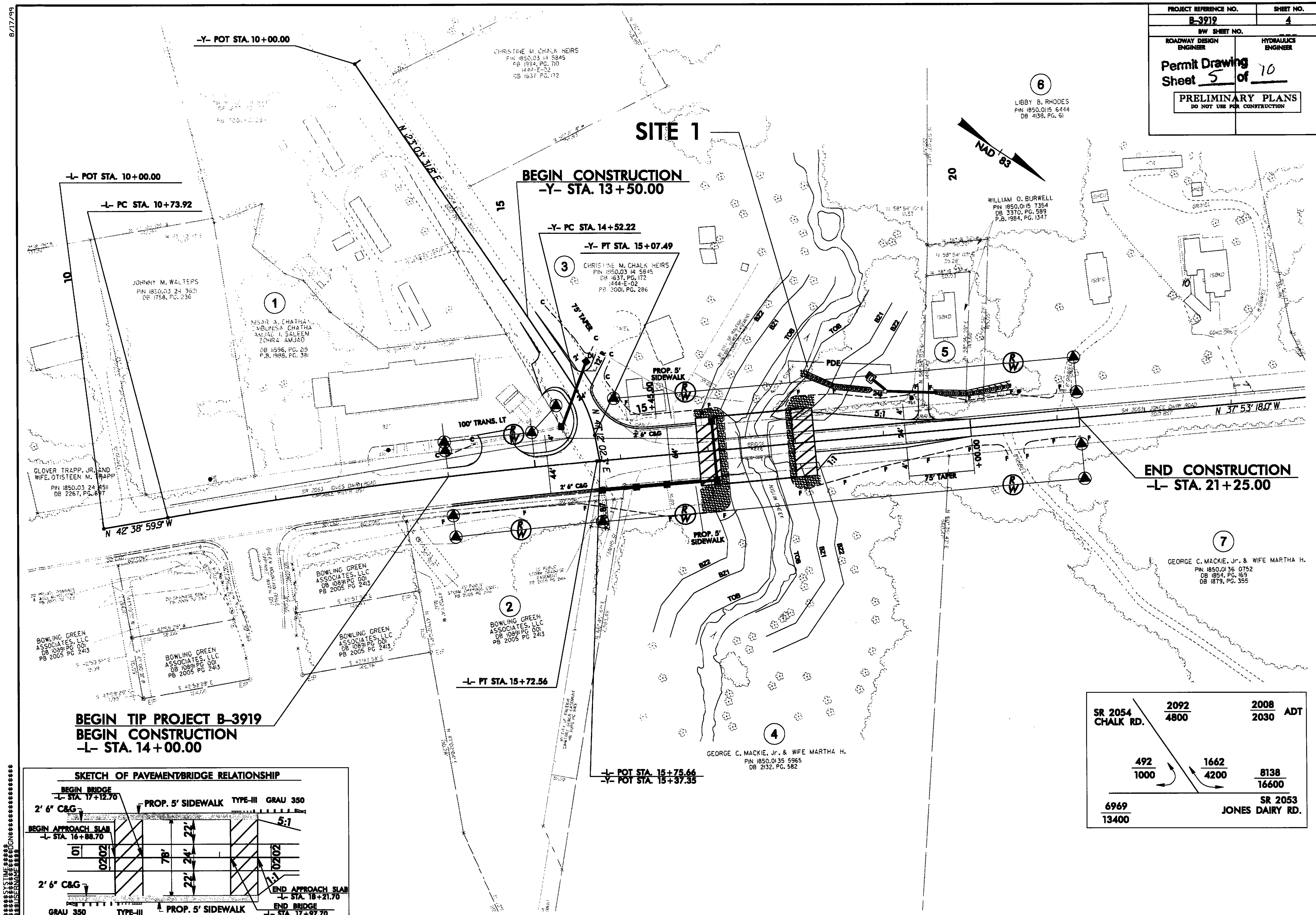
BRIDGES NO. 448 OVER AUSTIN CREEK AND NO. 140 OVER SMITH'S CREEK ON SR-2053

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
1	-L-18+10 TO 18+20 LT	RIPRAP at EMBANKMENT								10		
2	-L-37+80 TO 37+90 LT	RIPRAP at EMBANKMENT								10		
3	-L-38+10 LT TO 38+40 RT	RIPRAP at EMBANKMENT								65		
TOTALS:			0.00	0.00	0.00	0.00	0.00	0.00	0.00	85	0.00	0.00

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT 33353.1.1 (B-3919)
BRIDGES NO. 448 AND 140
OVER AUSTIN C" 'EK AND SMITH CREEK
SHEET 4 OI 10 1/22/2009

ATN Revised 3/31/05

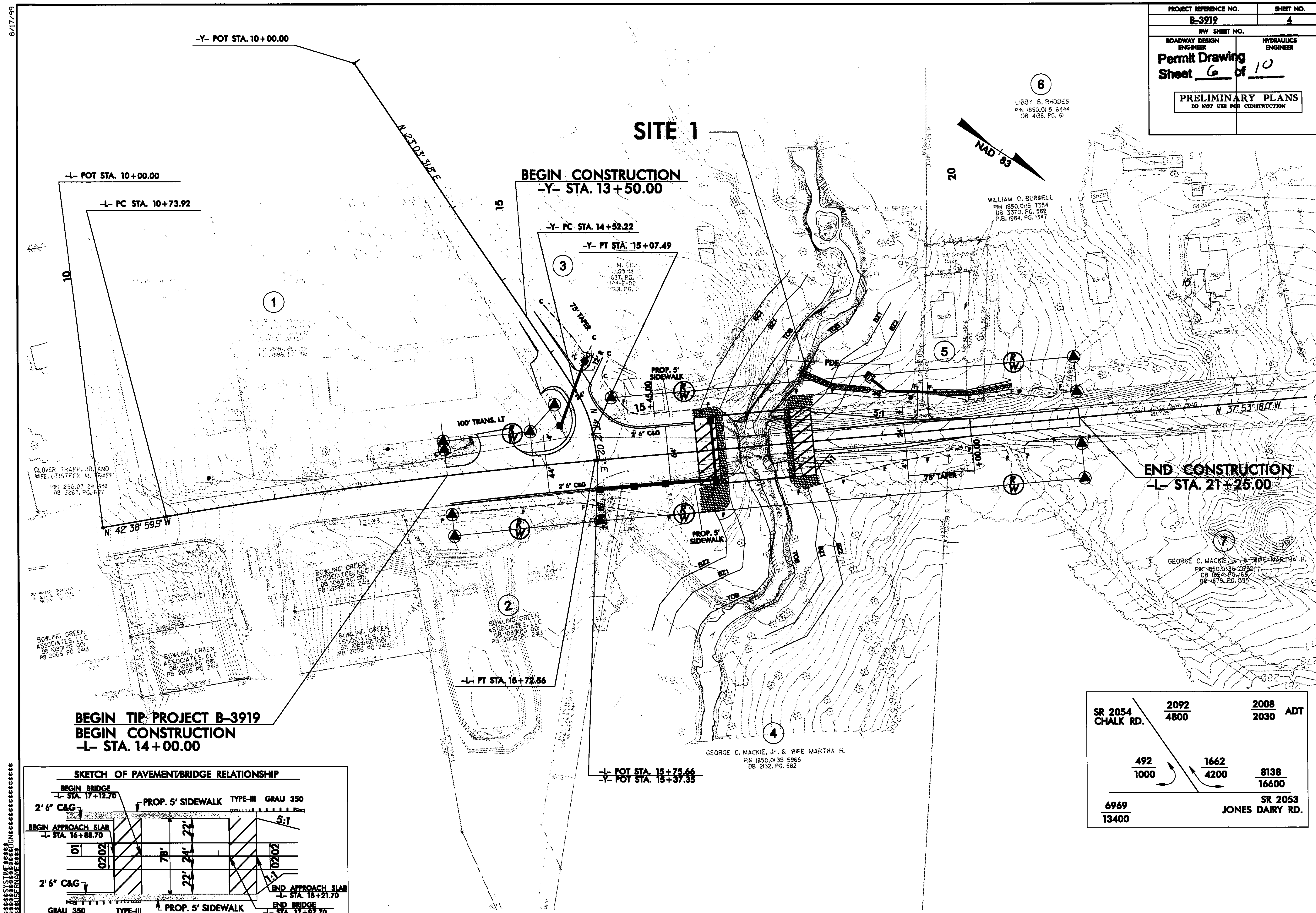


8/17/99
PROJECT REFERENCE NO. B-3919
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 5 of 10
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SITE 1
NAD 83
-Y- POT STA. 10+00.00
-L- POT STA. 10+00.00
-L- PC STA. 10+73.92
BEGIN CONSTRUCTION
-Y- STA. 13+50.00
-Y- PC STA. 14+52.22
-Y- PT STA. 15+07.49
N 23°03'31" E
N 42°38'59.9" W
N 37°53'18.0" W
CHRISTINE M. CHALK HEIRS
JOHNNY M. WALTERS
PIN 1850.03 24 3921
DB 1758, PG. 236
NISAR A. CHATHA
ZAIBUNISA CHATHA
AMJAD I. SALEEM
ZOHRA AMJAD
DB 1596, PG. 215
P.B. 1985, PG. 381
CHRISTINE M. CHALK HEIRS
PIN 1850.03 14 5845
DB 1637, PG. 172
1444-E-02
PB 2001, PG. 286
LIBBY B. RHODES
PIN 1850.0115 6444
DB 4138, PG. 61
WILLIAM O. BURWELL
PIN 1850.0115 7354
DB 3370, PG. 599
P.B. 1984, PG. 1347
GLOVER TRAPP, JR. AND WIFE, OTISTEEN M. TRAPP
PIN 1850.03 24 4511
DB 2267, PG. 697
BOWLING GREEN ASSOCIATES, LLC
DB 10891 PG 001
PB 2005 PG 2413
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.01 36 0752
DB 1854, PG. 169
DB 1879, PG. 355
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.01 35 5965
DB 2132, PG. 582
100' TRANS. LT
75' TAPER
PROP. 5' SIDEWALK
2' 6" C&G
PDE
5:1
1:1
END CONSTRUCTION
-L- STA. 21+25.00
-L- PT STA. 15+72.56
BEGIN TIP PROJECT B-3919
BEGIN CONSTRUCTION
-L- STA. 14+00.00
-L- POT STA. 15+75.66
-Y- POT STA. 15+37.35
SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP
BEGIN BRIDGE -L- STA. 17+12.70
2' 6" C&G
PROP. 5' SIDEWALK
TYPE-III
GRAU 350
BEGIN APPROACH SLAB -L- STA. 16+88.70
78'
22'
24'
END APPROACH SLAB -L- STA. 18+21.70
END BRIDGE -L- STA. 17+97.70
SR 2054 CHALK RD.
2092 / 4800
2008 / 2030
ADT
492 / 1000
1662 / 4200
8138 / 16600
6969 / 13400
SR 2053 JONES DAIRY RD.

PROJECT REFERENCE NO.	SHEET NO.
B-3919	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 6 of 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SITE 1
-Y- POT STA. 10+00.00
N 23°03'31.6" E
-L- POT STA. 10+00.00
-L- PC STA. 10+73.92
BEGIN CONSTRUCTION
-Y- STA. 13+50.00
-Y- PC STA. 14+52.22
-Y- PT STA. 15+07.49
NAD 83
LIBBY B. RHODES
PIN 1850.0115 6444
DB 4138, PG. 61
WILLIAM O. BURWELL
PIN 1850.0115 7354
DB 3370, PG. 589
P.B. 1984, PG. 1347
75' TAPER
100' TRANS. LT
PROP. 5' SIDEWALK
2' 6" C&G
PDE
N 37°53'18.0" W
GLOVER TRAPP, JR. AND
WIFE, OTISTEEN M. TRAPP
PIN 1850.03 24 1458
DB 2267, PG. 697
N 42°38'59.9" W
END CONSTRUCTION
-L- STA. 21+25.00
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.0136 0752
DB 1854, PG. 169
DB 1879, PG. 355
BOWLING GREEN
ASSOCIATES, LLC
DB 1093, PG 001
PB 2005, PG 2413
-L- PT STA. 15+72.56
BEGIN TIP PROJECT B-3919
BEGIN CONSTRUCTION
-L- STA. 14+00.00
-L- POT STA. 15+75.66
-Y- POT STA. 15+37.35
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.0135 5965
DB 2132, PG. 582
SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP
BEGIN BRIDGE
-L- STA. 17+12.70
PROP. 5' SIDEWALK
TYPE-III
GRAU 350
2' 6" C&G
5:1
BEGIN APPROACH SLAB
-L- STA. 16+88.70
78'
22'
24'
22'
1:1
END APPROACH SLAB
-L- STA. 18+21.70
END BRIDGE
-L- STA. 17+97.70
SR 2054
CHALK RD.
2092
4800
2008
2030
ADT
492
1000
1662
4200
8138
16600
6969
13400
SR 2053
JONES DAIRY RD.

PROJECT REFERENCE NO.	SHEET NO.
B-3919	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 7 of 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/28/99

REVISIONS

DITCH LEGEND
LEFT DITCH
RIGHT DITCH

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1120	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 2320	FT
BASE DISCHARGE	= 2325	CFS
BASE FREQUENCY	= 100	YR
BASE HW ELEVATION	= 2341	FT
OVERTOPPING DISCHARGE	= 4320	CFS
OVERTOPPING FREQUENCY	= 500+±	YR
OVERTOPPING ELEVATION	= 2362	FT
DATE OF SURVEY	= 3/11/08	
NORMAL W.S.ELEVATION	= 2350	FT

-L-

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

PROPOSED 33" BOX BEAM BRIDGE
1 SPAN @ 85'
℄ -L- STA. 17+55.20
SKEW = 90°

PI = 14+75.00
EL = 261.01'
VC = 135'
* K = 88
V = 50 MPH

PI = 16+35.00
EL = 257.14'
VC = 185'
* K = 68
V = 50 MPH

PI = 19+00.00
EL = 257.93'
VC = 200'
* K = 64
V = 50 MPH

END GRADE
BEGIN RESURFACING
-L- STA. 20+00.00
ELEV. = 261.37'

END RESURFACING
-L- STA. 21+25.00

BEGIN BRIDGE
-L- STA. 17+12.70

END BRIDGE
-L- STA. 17+97.70

BEGIN GRADE
-L- STA. 14+00.00
ELEV. = 263.97'

(-)3.9500%
(-)2.4203%
(+)0.3000%
(+)3.4400%

BM# 2 RAILROAD SPIKE SET IN A 30" OAK TREE
-L- STA. 16+97.19 58.16' LT
ELEV. = 260.43'

BEGIN LT DITCH PI = 16+20 EI = 248.5
PI = 18+50 EI = 249.5
PI = 19+92 EI = 251.2
(+)3.3% (+)4.1%
PI = 19+63 EI = 254.1
(+)0.4% (+)0.4%
PI = 20+00 EI = 254.2
END LT DITCH PI = 20+50 EI = 254.4

SEE SHEET 4 FOR -L- PLAN

-Y-

END GRADE
-Y- STA. 15+25.31
ELEV. = 259.11'

BEGIN GRADE
-Y- STA. 13+50.00
ELEV. = 265.98'

PI = 14+82.50
EL = 259.97'
VC = 85'
K = 28

(-)3.4700%
(-)5.0883%
(-)2.0000%

PI = 13+95.00
EL = 264.42'
VC = 90'
K = 56

SEE SHEET 4 FOR -L- PLAN

-L-

BEGIN GRADE
-L- STA. 32+50.00
ELEV. = 287.80'

PI = 35+50.00
EL = 268.81'
VC = 432'
* K = 64
V = 50 MPH

PROPOSED 39" BOX BEAM BRIDGE
1 SPAN @ 100'
℄ -L- STA. 38+12.60
SKEW = 60°

PI = 40+85.00
EL = 271.39'
VC = 430'
* K = 64
V = 50 MPH

END GRADE
-L- STA. 43+25.00
ELEV. = 288.78'

BEGIN BRIDGE
-L- STA. 37+62.60

END BRIDGE
-L- STA. 38+62.60

(-)6.3305%
(+)0.4830%
(+)7.2456%

BEGIN RT DITCH -L- PI = 35+00 EI = 267.36
PI = 36+50 EI = 264.96
PI = 36+00 EI = 262.94
PI = 36+50 EI = 261.19
PI = 37+00 EI = 259.59
END RT DITCH -L- PI = 37+50 EI = 256.10
BEGIN LT DITCH -L- PI = 37+50 EI = 258.00
END LT DITCH -L- PI = 38+50 EI = 259.29
BEGIN LT DITCH -L- PI = 39+20 EI = 261.50
PI = 39+50 EI = 262.96
PI = 40+00 EI = 264.89
PI = 40+50 EI = 267.00
END LT DITCH -L- PI = 41+00 EI = 269.80

BM# 3 RAILROAD SPIKE SET IN A 32" PINE TREE
-L- STA. 37+36.45 48.05' RT
ELEV. = 263.02'

SEE SHEET 5 FOR -L- PLAN

-DR-

PI = 10+25.00
EL = 269.00'
VC = 26'
K = 5

BEGIN GRADE
-DR- STA. 10+12.00
ELEV. = 269.78'

(-)6.0000%
(-)11.0526%
(-)0.7100%

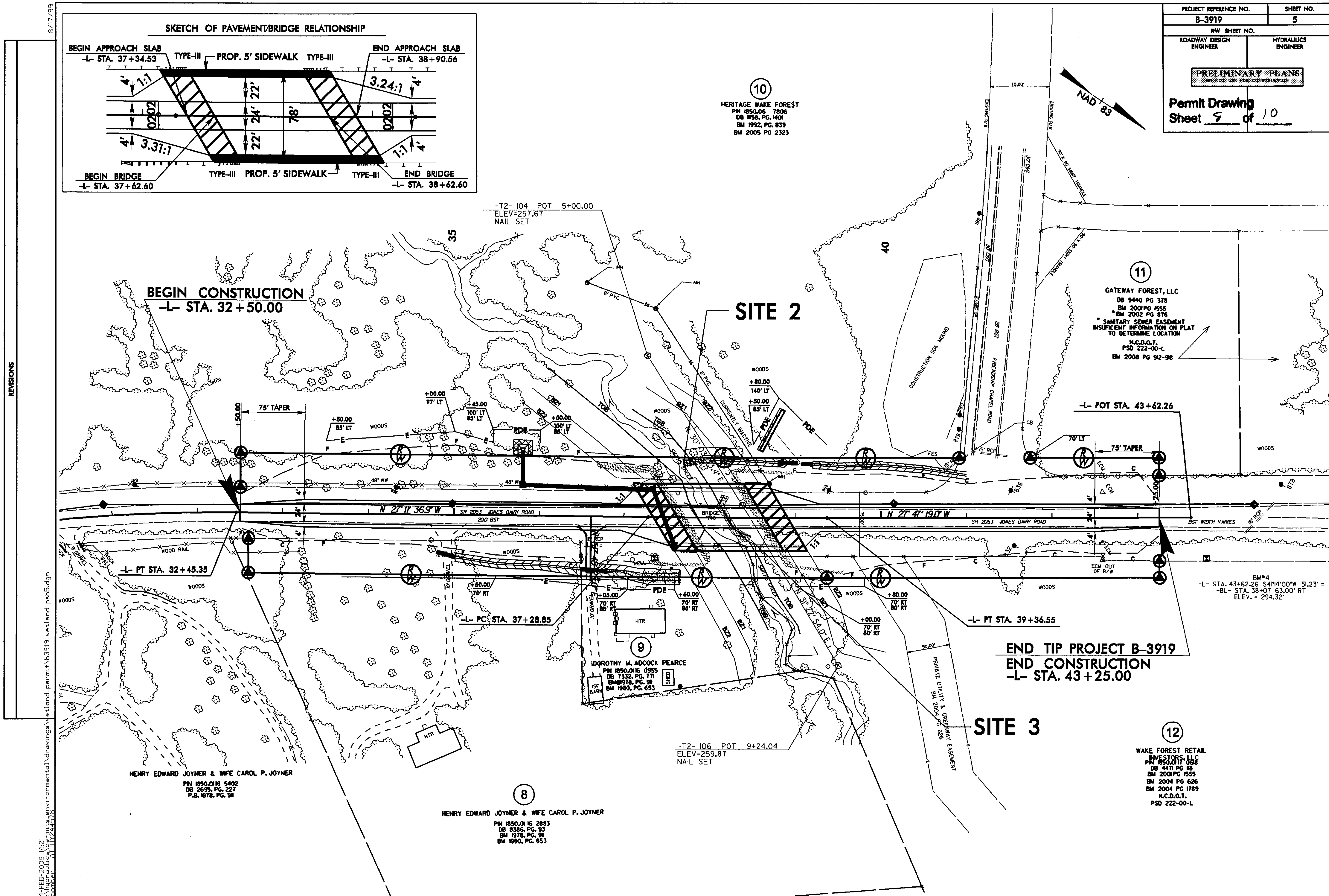
END GRADE
-DR- STA. 10+66.00
ELEV. = 265.09'

PI = 10+60.00
EL = 265.13'
VC = 12'
K = 1

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1040	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 2612	FT
BASE DISCHARGE	= 1150	CFS
BASE FREQUENCY	= 100	YR
BASE HW ELEVATION	= 2622	FT
OVERTOPPING DISCHARGE	= 3000	CFS
OVERTOPPING FREQUENCY	= 500+±	YR
OVERTOPPING ELEVATION	= 2632	FT
DATE OF SURVEY	= 3/11/08	
NORMAL W.S.ELEVATION	= 2538	FT

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



PROJECT REFERENCE NO.
B-3919
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 5 of 10
NAD 83
SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP
BEGIN APPROACH SLAB
-L- STA. 37+34.53
TYPE-III
PROP. 5' SIDEWALK
END APPROACH SLAB
-L- STA. 38+90.56
BEGIN BRIDGE
-L- STA. 37+62.60
END BRIDGE
-L- STA. 38+62.60
3.24:1
3.31:1
1:1
78'
24'
22'
HERITAGE WAKE FOREST
PIN 1850.06 7806
DB 1158, PG. 1401
BM 1992, PG. 839
BM 2005 PG 2323
-T2- 104 POT 5+00.00
ELEV=257.67
NAIL SET
BEGIN CONSTRUCTION
-L- STA. 32+50.00
SITE 2
GATEWAY FOREST, LLC
DB 9440 PG 378
BM 2001 PG 1555
BM 2002 PG 876
* SANITARY SEWER EASEMENT INSUFICIENT INFORMATION ON PLAT TO DETERMINE LOCATION
N.C.D.O.T.
PSD 222-00-L
BM 2008 PG 92-98
CONSTRUCTION SOIL MOUND
FRIENDSHIP CHAPEL ROAD
75' TAPER
-L- POT STA. 43+62.26
N 27° 11' 36.9" W
SR 2053 JONES DAIRY ROAD
N 27° 47' 19.0" W
BST WIDTH VARIES
-L- PT STA. 32+45.35
-L- PC STA. 37+28.85
-L- PT STA. 39+36.55
BM#4
-L- STA. 43+62.26 S41°14'00"W 51.23' =
-BL- STA. 38+07 63.00' RT
ELEV. = 294.32'
END TIP PROJECT B-3919
END CONSTRUCTION
-L- STA. 43+25.00
DOROTHY M. ADCOCK PEARCE
PIN 1850.0116 0955
DB 7332, PG. 771
BM 1978, PG. 911
BM 1980, PG. 653
PRIVATE UTILITY & GREENWAY EASEMENT
BM 2004 PG 626
SITE 3
-T2- 106 POT 9+24.04
ELEV=259.87
NAIL SET
WAKE FOREST RETAIL INVESTORS, LLC
DB 4471 PG 88
BM 2001 PG 1555
BM 2004 PG 626
BM 2004 PG 1789
N.C.D.O.T.
PSD 222-00-L
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.0116 5402
DB 2695, PG. 227
P.B. 1978, PG. 911
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.0116 2883
DB 8386, PG. 93
BM 1978, PG. 911
BM 1980, PG. 653
REVISIONS

8/17/99

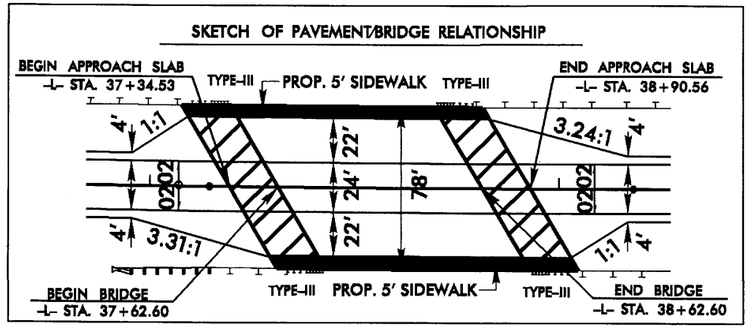
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3919	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 9 of 10

SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP



BEGIN CONSTRUCTION
-L- STA. 32+50.00

-T2- 104 POT 5+00.00
ELEV=257.67
NAIL SET

SITE 2

SITE 3

-L- PT STA. 32+45.35

-L- PC STA. 37+28.85

-L- POT STA. 43+62.26

-L- PT STA. 39+86.55

END TIP PROJECT B-3919
END CONSTRUCTION
-L- STA. 43+25.00

-T2- 106 POT 9+24.04
ELEV=259.87
NAIL SET

BM#4
STA. 43+62.26 S41°14'00"W 51.23' =
-BL- STA. 38+07 63.00' RT
ELEV. = 294.32'

N 27°11'36.9"W
SR 2053 JONES DAIRY ROAD
N 27°47'13.0"W
SR 2053 JONES DAIRY ROAD
N 31°24'54.0"E

(10)
HERITAGE WAKE FOREST
PIN #850.06 7806
DB #158, PG. 1401
BM 1992, PG. 839
BM 2005 PG 2323

(11)
GATEWAY FOREST, LLC
DB 9440 PG 378
BM 2001 PG 1555
* BM 2002 PG 876
* SANITARY SEWER EASEMENT INSUFFICIENT INFORMATION ON PLAT TO DETERMINE LOCATION
N.C.D.O.T.
PSD 222-00-L
BM 2008 PG 982-988

(9)
DOROTHY M. ADCOCK PEARCE
PIN 1850.01 16 0955
DB 7332, PG. 771
BM#1978, PG. 59
BM 1980, PG. 653

(8)
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.01 16 2883
DB 8386, PG. 93
BM 1978, PG. 59
BM 1980, PG. 653

HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PIN 1850.01 16 5402
DB 2695, PG. 227
P.B. 1978, PG. 59

(12)
WAKE FOREST RETAIL INVESTORS, LLC
PIN 1850.01 17 0636
DB 4471 PG 88
BM 2001 PG 1555
BM 2004 PG 626
BM 2004 PG 1789
N.C.D.O.T.
PSD 222-00-L

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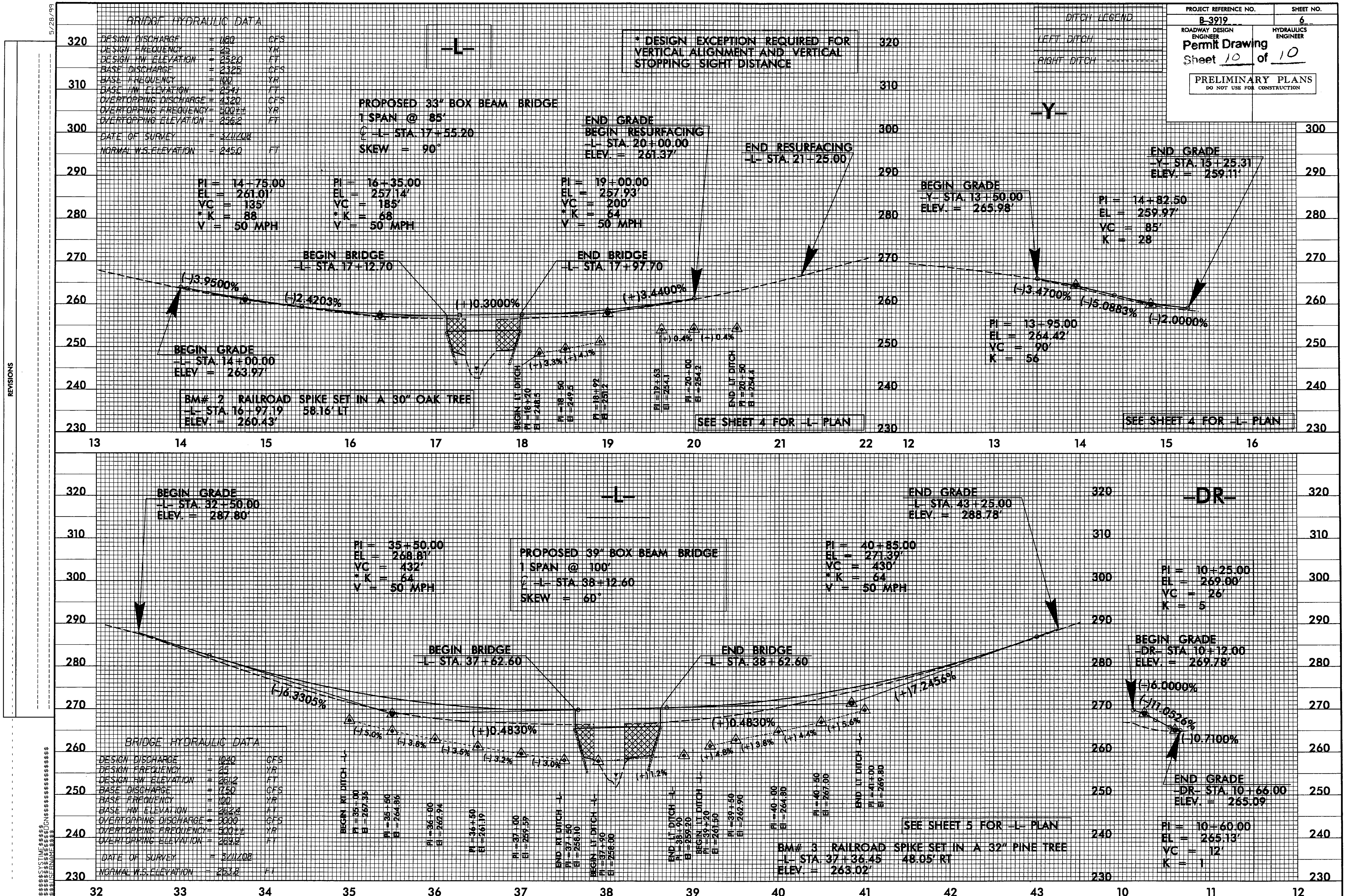


5/28/99
PROJECT REFERENCE NO. B-3919
SHEET NO. 6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing
Sheet 10 of 10
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
REVISIONS
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 1160 CFS
DESIGN FREQUENCY = 25 YR
DESIGN HW ELEVATION = 2520 FT
BASE DISCHARGE = 2325 CFS
BASE FREQUENCY = 100 YR
BASE HW ELEVATION = 2541 FT
OVERTOPPING DISCHARGE = 4320 CFS
OVERTOPPING FREQUENCY = 500+/- YR
OVERTOPPING ELEVATION = 2562 FT
DATE OF SURVEY = 3/1/08
NORMAL W.S. ELEVATION = 245.0 FT
-L-
* DESIGN EXCEPTION REQUIRED FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE
DITCH LEGEND
LEFT DITCH
RIGHT DITCH
PROPOSED 33" BOX BEAM BRIDGE
1 SPAN @ 85'
℄ -L- STA. 17+55.20
SKEW = 90°
END GRADE
BEGIN RESURFACING
-L- STA. 20+00.00
ELEV. = 261.37'
END RESURFACING
-L- STA. 21+25.00
-Y-
END GRADE
-Y- STA. 15+25.31
ELEV. = 259.11'
PI = 14+75.00
EL = 261.01'
VC = 135'
* K = 88
V = 50 MPH
PI = 16+35.00
EL = 257.14'
VC = 185'
* K = 68
V = 50 MPH
PI = 19+00.00
EL = 257.93'
VC = 200'
* K = 64
V = 50 MPH
BEGIN GRADE
-Y- STA. 13+50.00
ELEV. = 265.98'
PI = 14+82.50
EL = 259.97'
VC = 85'
K = 28
BEGIN BRIDGE
-L- STA. 17+12.70
END BRIDGE
-L- STA. 17+97.70
(-)3.9500%
(-)2.4203%
(+)0.3000%
(+)3.4400%
(-)3.4700%
(-)5.0883%
(-)2.0000%
PI = 13+95.00
EL = 264.42'
VC = 90'
K = 56
BEGIN GRADE
-L- STA. 14+00.00
ELEV = 263.97'
BM# 2 RAILROAD SPIKE SET IN A 30" OAK TREE
-L- STA. 16+97.19 58.16' LT
ELEV. = 260.43'
SEE SHEET 4 FOR -L- PLAN
SEE SHEET 4 FOR -L- PLAN
-L-
-DR-
BEGIN GRADE
-L- STA. 32+50.00
ELEV. = 287.80'
END GRADE
-L- STA. 43+25.00
ELEV. = 288.78'
PI = 35+50.00
EL = 268.81'
VC = 432'
* K = 64
V = 50 MPH
PROPOSED 39" BOX BEAM BRIDGE
1 SPAN @ 100'
℄ -L- STA. 38+12.60
SKEW = 60°
PI = 40+85.00
EL = 271.39'
VC = 430'
* K = 64
V = 50 MPH
PI = 10+25.00
EL = 269.00'
VC = 26'
K = 5
BEGIN GRADE
-DR- STA. 10+12.00
ELEV. = 269.78'
BEGIN BRIDGE
-L- STA. 37+62.60
END BRIDGE
-L- STA. 38+62.60
(-)6.3305%
(+)0.4830%
(+)0.4830%
(+)7.2456%
(-)6.0000%
(-)11.0526%
(-)0.7100%
END GRADE
-DR- STA. 10+66.00
ELEV. = 265.09'
PI = 10+60.00
EL = 265.13'
VC = 12'
K = 1
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 1040 CFS
DESIGN FREQUENCY = 25 YR
DESIGN HW ELEVATION = 2612 FT
BASE DISCHARGE = 1750 CFS
BASE FREQUENCY = 100 YR
BASE HW ELEVATION = 2624 FT
OVERTOPPING DISCHARGE = 3000 CFS
OVERTOPPING FREQUENCY = 500+/- YR
OVERTOPPING ELEVATION = 2692 FT
DATE OF SURVEY = 3/1/08
NORMAL W.S. ELEVATION = 253.8 FT
SEE SHEET 5 FOR -L- PLAN
BM# 3 RAILROAD SPIKE SET IN A 32" PINE TREE
-L- STA. 37+36.45 48.05' RT
ELEV. = 263.02'

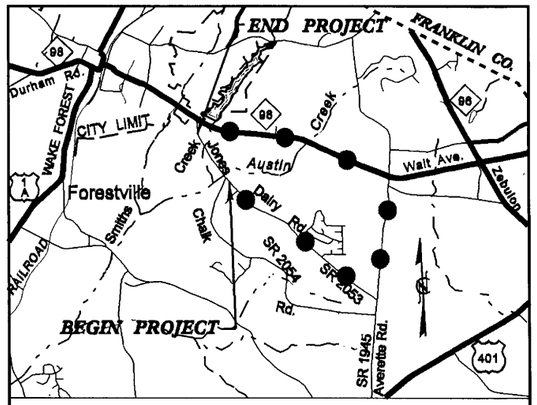
09/08/99

REVISIONS

TIP PROJECT: B-3919

CONTRACT: C202232

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



VICINITY MAP

OFF-SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

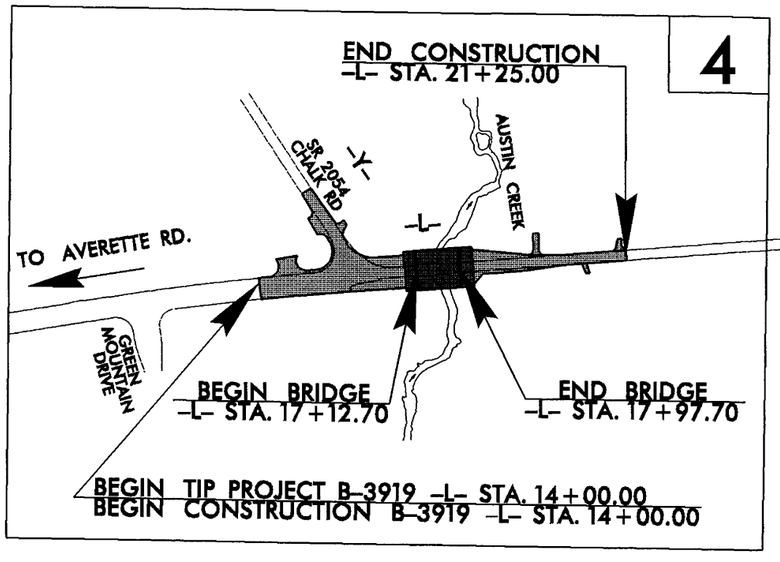
WAKE COUNTY

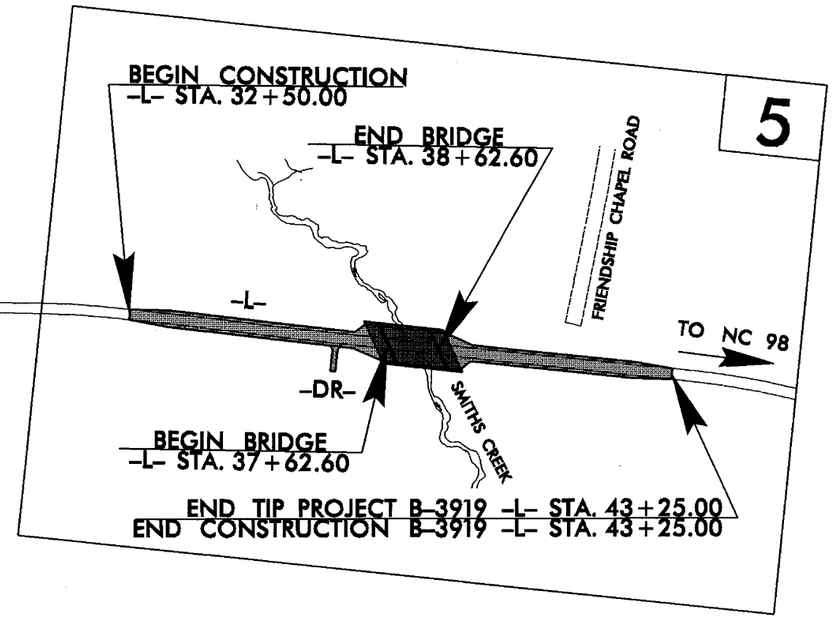
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3919	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33353.1.1	BRZ-2053(1)	P.E.
33353.2.1	BRZ-2053(1)	R/W & UTIL.

LOCATION: BRIDGE NO. 448 OVER AUSTIN CREEK AND
BRIDGE NO. 140 OVER SMITHS CREEK AND
APPROACHES ON SR 2053 (JONES DAIRY RD.)
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURES

NAD 83





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

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

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF WAKE FOREST.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 8,140
ADT 2030 = 16,600
DHV = 11 %
D = 63 %
T = 4 % *
V = 50 MPH**
FUNC CLASS = RURAL LOCAL
* (TTST 2% + DUAL 2%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3919 = 0.306
LENGTH STRUCTURES TIP PROJECT B-3919 = 0.035
TOTAL LENGTH TIP PROJECT B-3919 = 0.341 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 24, 2008

LETTING DATE: NOVEMBER 17, 2009

GLENN W. MUMFORD, PE
PROJECT ENGINEER

SUSAN C. LANCASTER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

10-MAR-2009 12:17
c:\projects\roadway\proj\b3919_rdy_tsh.dgn
$$$$USERNAME$$$$

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-3919	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

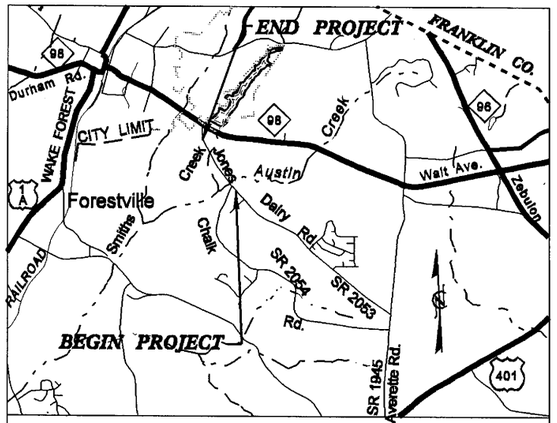
MISCELLANEOUS:

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

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-3919	1C
Location and Surveys	

B-3919



VICINITY MAP

SURVEY CONTROL SHEET B-3919

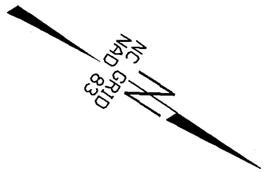
WAKE COUNTY

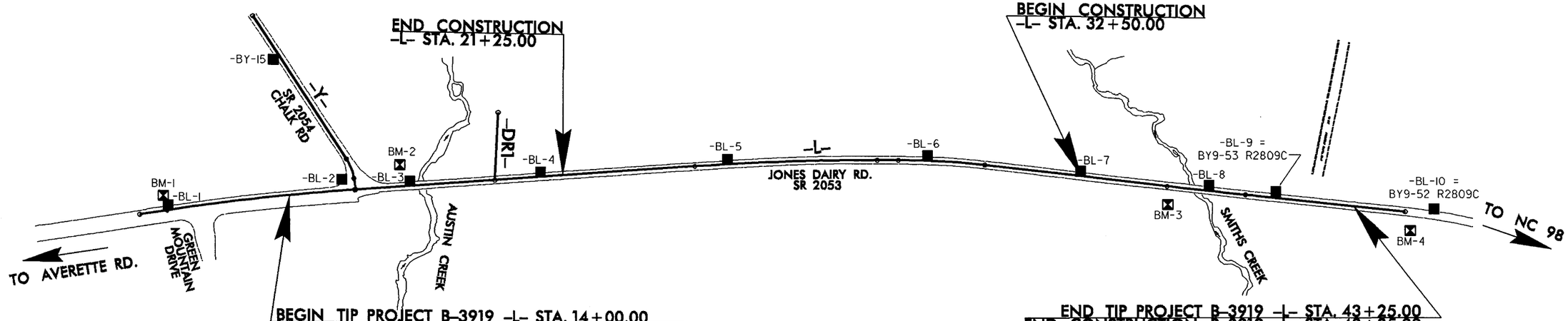
LOCATION: BRIDGE NO. 448 OVER AUSTIN CREEK AND BRIDGE NO. 140 OVER SMITHS CREEK AND APPROACHES ON SR 2053 (JONES DAIRY RD.)

NCGS MONUMENT "JIMWILL"
STATE PLANE COORDINATES

N=807009.9574
E=2142735.9407

▲





BEGIN TIP PROJECT B-3919 -L- STA. 14+00.00
BEGIN CONSTRUCTION B-3919 -L- STA. 14+00.00

END TIP PROJECT B-3919 -L- STA. 43+25.00
END CONSTRUCTION B-3919 -L- STA. 43+25.00

CONTROL DATA

BASELINE

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	804713.8278	2152474.6658	279.94	10+78.95	13.63 LT
2	BL-2	805056.8917	2152162.1761	259.47	15+41.20	29.31 LT
3	BL-3	805208.7756	2152064.9442	256.43	17+20.62	12.69 LT
4	BL-4	805481.3413	2151852.9061	263.07	20+65.95	12.64 LT
5	BL-5	805875.2103	2151547.3365	284.51	25+64.30	12.49 LT
6	BL-6	806307.3661	2151244.8532	292.50	30+90.69	13.22 LT
7	BL-7	806667.6417	2151053.1422	271.04	34+97.89	13.08 LT
8	BL-8	806969.3517	2150896.3300	266.47	38+38.00	14.38 LT
9	BL-9 = (BY9-53 R-2809C)	807125.2296	2150812.0501	269.91	40+15.26	16.51 LT
10	BL-10 = (BY9-52 R-2809C)	807498.6585	2150616.5252	296.42	OUTSIDE PROJECT LIMITS	

BY

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
15	BY-15	804730.1690	2151999.5086	270.74	11+26.42	18.06 RT
2	BL-2	805056.8917	2152162.1761	259.47	15+04.55	31.97 RT

BENCHMARK DATA

BM1 ELEVATION = 279.55
N 804689 E 2152461
L STATION 10+70 40 LEFT
R/R SPIKE SET IN A 16" OAK TREE

BM2 ELEVATION = 260.43
N 805162 E 2152043
L STATION 16+97 58 LEFT
R/R SPIKE SET IN A 30" OAK TREE

BM3 ELEVATION = 263.02
N 806908 E 2150998
L STATION 37+36 48 RIGHT
R/R SPIKE SET IN A 32" PINE TREE

BM4 ELEVATION = 294.32
N 807478 E 2150699
L STATION 43+62
N 41° 14' 00.2" E DIST 51.23
R/R SPIKE SET IN A 16" HICKORY TREE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "JIMWILL"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 807009.9574(ft) EASTING: 2142735.9407(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99993779
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "JIMWILL" TO -L- STATION 14+00.00 IS
S 77°53'57.0" E 9754.61'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTE: DRAWING NOT TO SCALE

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

B3919_ls_control_071018.txt

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

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

NETWORK ESTABLISHED FROM NCGS COORDINATES FROM PROJECT R2809C

10-MAR-2009 12:17
I:\Location_Surveys\b3919_ls_1c_081120.dgn
$$$$USERNAME$$$$

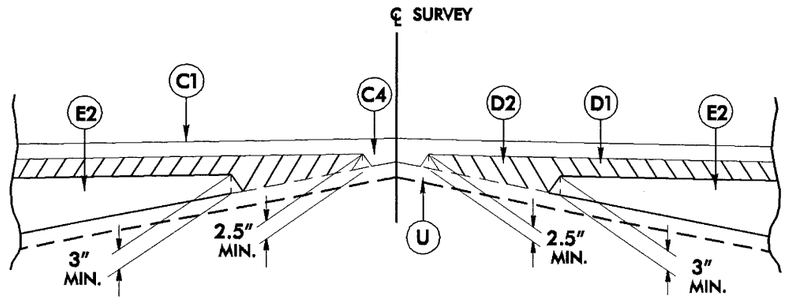
6/2/99

FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD IN EACH OF TWO LAYERS
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD IN EACH OF TWO LAYERS
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH
E1	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH
J	8" AGGREGATE BASE COURSE
R	2'-6" CONCRETE CURB AND GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING)

PROJECT REFERENCE NO.	SHEET NO.
B-3919	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



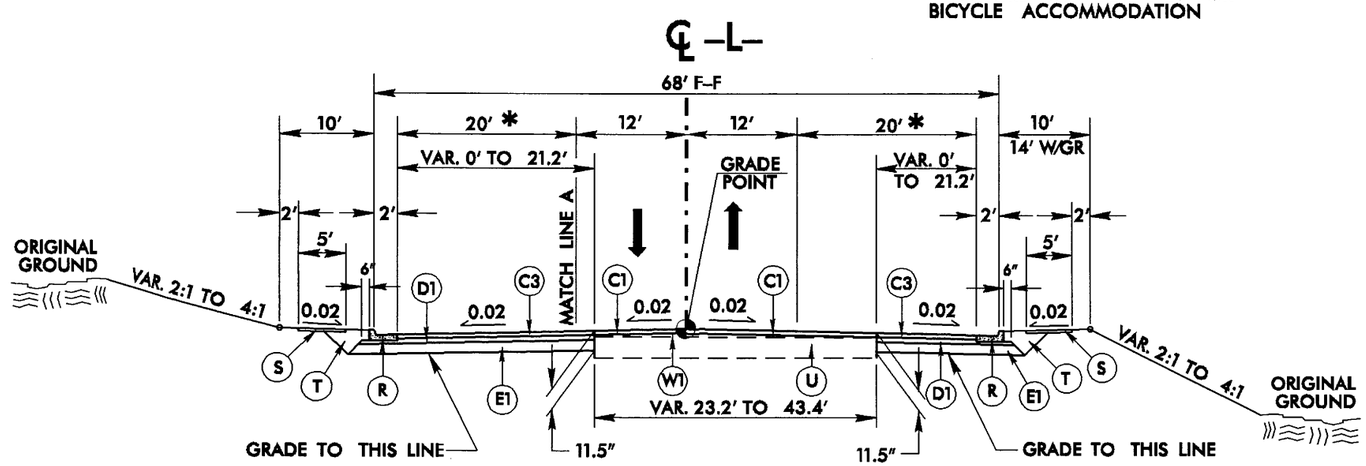
Detail Showing Method of Wedging

USE TYPICAL SECTION NO. 1 AT THE FOLLOWING LOCATIONS:

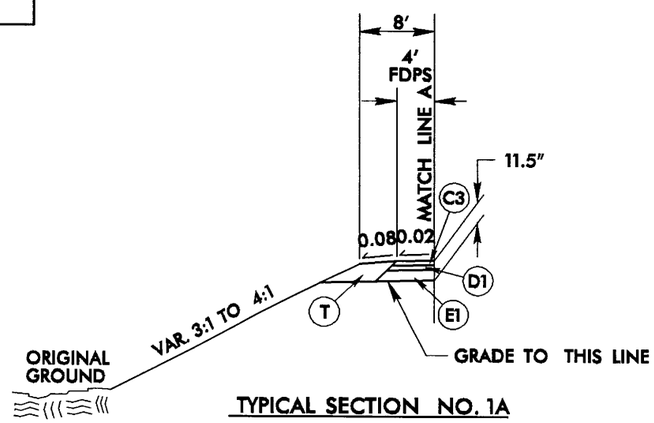
TRANSITION FROM EXISTING AT –L– STA. 14+00.00 TO TYPICAL SECTION NO. 1A AT –L– STA. 15+00.00

–L– STA. 15+00.00 TO –L– STA. 16+59.00

* 14' FUTURE OUTSIDE LANES FOR BICYCLE ACCOMMODATION



TYPICAL SECTION NO. 1



TYPICAL SECTION NO. 1A

USE TYPICAL SECTION NO. 1A IN CONJUNCTION WITH TYPICAL SECTION NO. 1 AT THE FOLLOWING LOCATION:

TRANSITION FROM EXISTING AT –L– STA. 14+00.00 LT. TO TYPICAL SECTION NO. 1A AT –L– STA. 15+00.00 LT.

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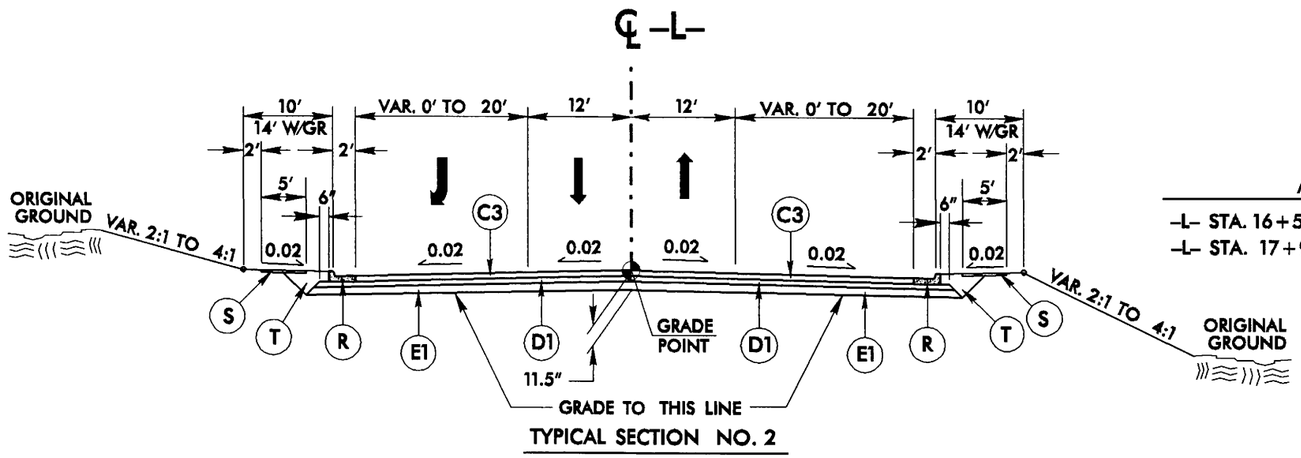
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-3919	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE	
C1	1½" S9.5B
C2	2.5" S9.5B
C3	3" S9.5B
C4	VAR. DEPTH S9.5B
D1	3" I19.0B
D2	VAR. DEPTH I19.0B
E1	5.5" B25.0B
E2	VAR. DEPTH B25.0B
J	8" ABC
R	2'-6" C & G
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING DETAIL

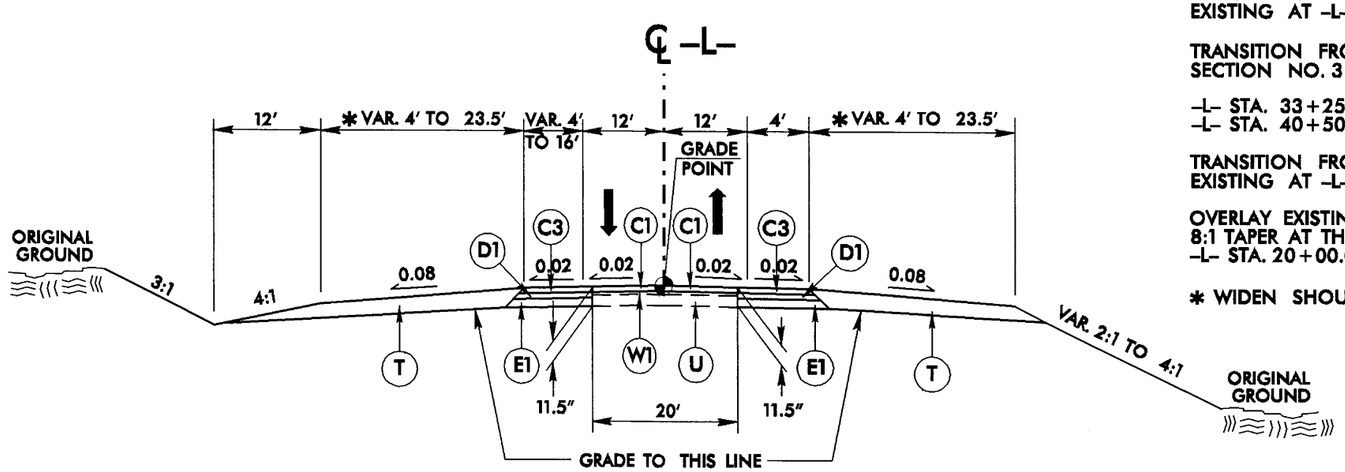
REVISIONS



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
AT THE FOLLOWING LOCATIONS:

-L- STA. 16+59.00 TO -L- STA. 17+12.70 (BEGIN BRIDGE NO. 448)
-L- STA. 17+97.70 (END BRIDGE NO. 448) TO -L- STA. 18+21.70



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
AT THE FOLLOWING LOCATIONS:

-L- STA. 18+57.00 TO 19+25.00

TRANSITION FROM TYPICAL SECTION NO. 3 AT -L- STA. 19+25.00 TO EXISTING AT -L- STA. 20+00.00

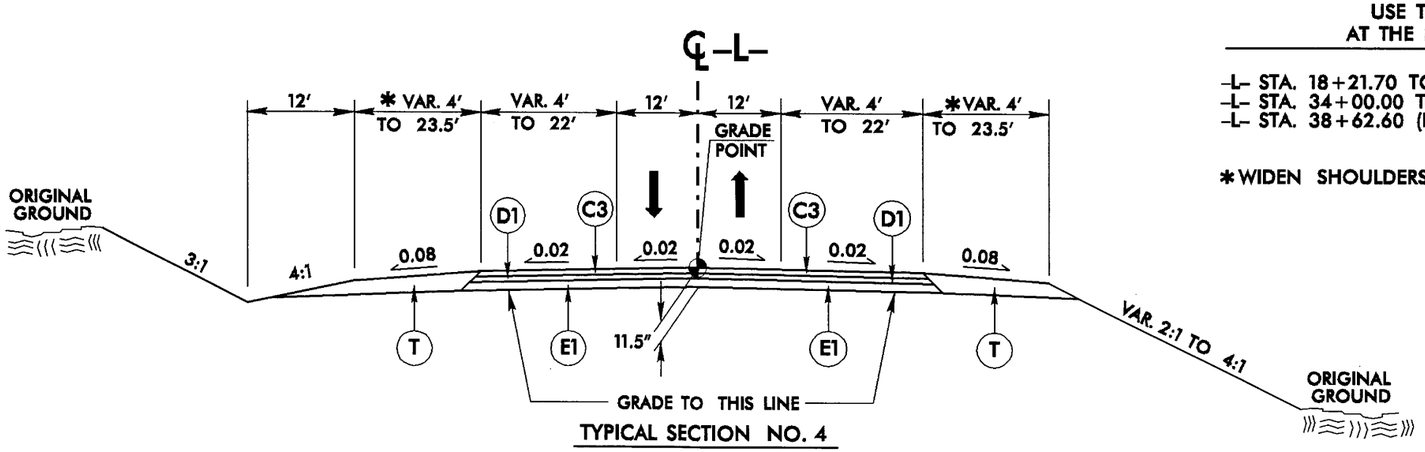
TRANSITION FROM EXISTING AT -L- STA. 32+50.00 TO TYPICAL SECTION NO. 3 AT -L- STA. 33+25.00

-L- STA. 33+25.00+/- TO 34+00.00
-L- STA. 40+50.00+/- TO 42+50.00

TRANSITION FROM TYPICAL SECTION NO. 3 AT -L- STA. 42+50.00 TO EXISTING AT -L- STA. 43+25.00

OVERLAY EXISTING PAVEMENT AND TRANSITION SHOULDERS AT AN 8:1 TAPER AT THE FOLLOWING LOCATIONS:
-L- STA. 20+00.00 TO -L- 21+25.00

* WIDEN SHOULDERS AN ADDITIONAL 3' WHERE GUARDRAIL IS PROPOSED



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
AT THE FOLLOWING LOCATIONS:

-L- STA. 18+21.70 TO -L- STA. 18+57.00
-L- STA. 34+00.00 TO -L- STA. 37+62.60 (BEGIN BRIDGE NO. 140)
-L- STA. 38+62.60 (END BRIDGE NO. 140) TO -L- STA. 40+50.00

*WIDEN SHOULDERS AN ADDITIONAL 3' WHERE GUARDRAIL IS PROPOSED

10-MAR-2009 12:18
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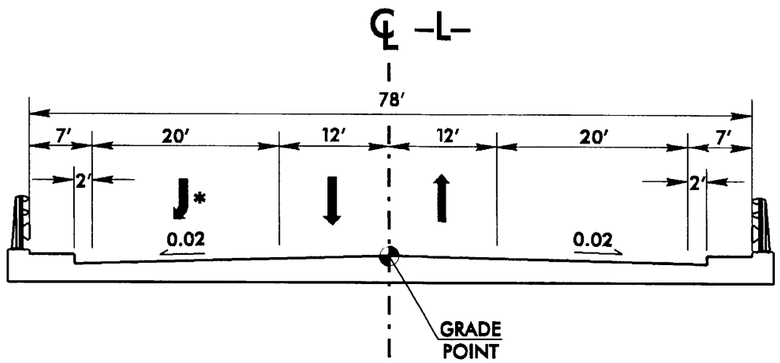
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-3919	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE	
C1	1½" S9.5B
C2	2.5" S9.5B
C3	3" S9.5B
C4	VAR. DEPTH S9.5B
D1	3" I19.0B
D2	VAR. DEPTH I19.0B
E1	5.5" B25.0B
E2	VAR. DEPTH B25.0B
J	8" ABC
R	2'-6" C & G
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING DETAIL

REVISIONS



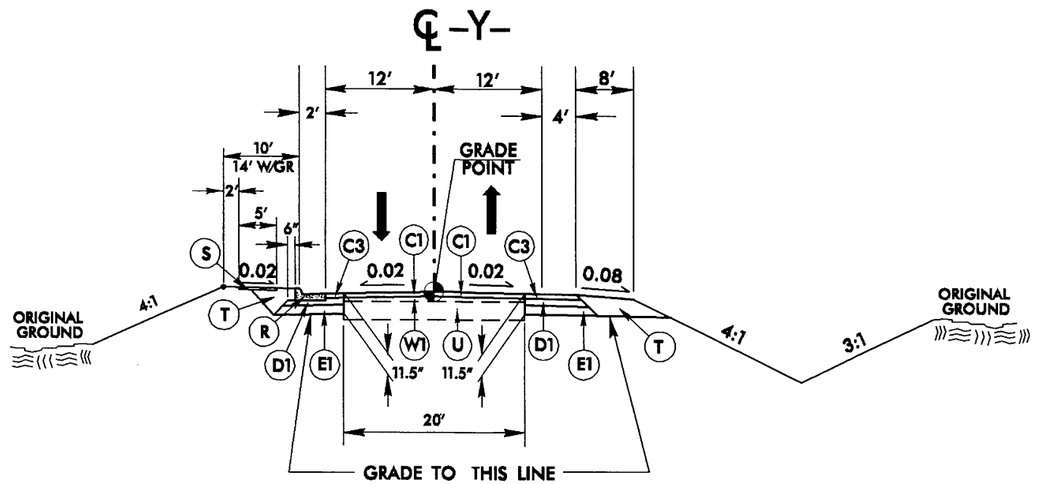
TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
AT THE FOLLOWING LOCATIONS:

-L- STA. 17+12.70 (BEGIN BRIDGE NO. 448)
TO -L- STA. 17+97.70 (END BRIDGE NO. 448)

* RIGHT TURN LANE ONLY ON BRIDGE NO. 448

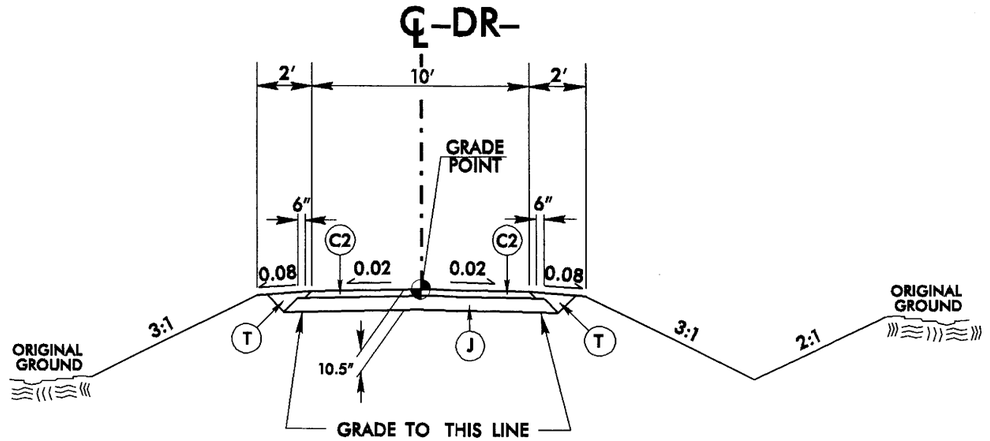
-L- STA. 37+62.60 (BEGIN BRIDGE NO. 140)
TO -L- STA. 38+62.60 (END BRIDGE NO. 140)



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6
AT THE FOLLOWING LOCATIONS:

TRANSITION FROM EXISTING AT -Y- STA. 13+50
TO TYPICAL SECTION NO. 6 AT -Y- STA. 14+25.00
-Y- STA. 14+25.00 TO -Y- STA. 15+25.31



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7
AT THE FOLLOWING LOCATION:

-DR- STA. 10+12.00 TO -DR- STA. 10+66.00

10-MAR-2009 12:18
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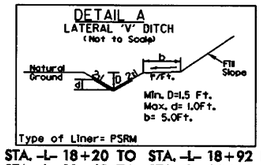
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-3919	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

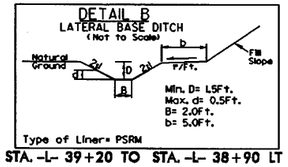
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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



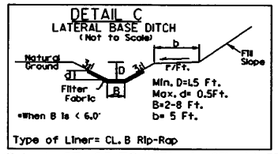
STA. -L- 18+20 TO STA. -L- 18+92 LT
STA. -L- 19+63 TO STA. -L- 20+50 LT

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



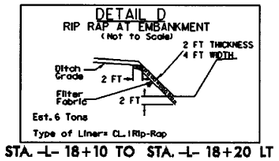
STA. -L- 39+20 TO STA. -L- 38+90 LT
STA. -L- 39+00 TO STA. -L- 41+00 LT
STA. -L- 35+00 TO STA. -L- 37+25 RT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



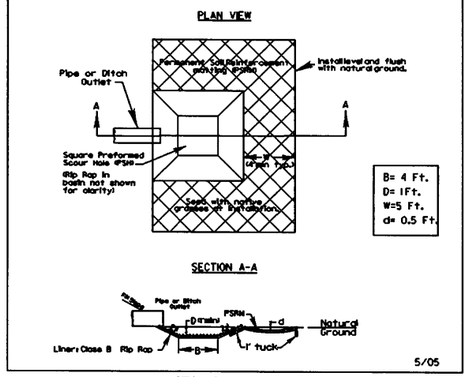
STA. -L- 37+25 TO STA. -L- 37+66 RT

DETAIL D
RIP RAP AT EMBANKMENT
(Not to Scale)



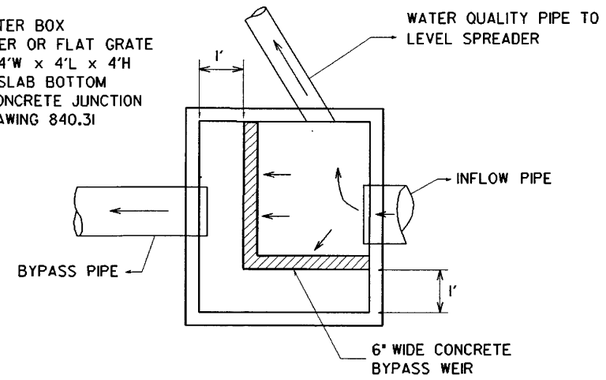
STA. -L- 18+10 TO STA. -L- 18+20 LT
STA -L- 37+80 TO STA -L- 37+90 LT
STA -L- 38+10 LT TO -L- STA 38+40 RT

PREFORMED SCOUR HOLE

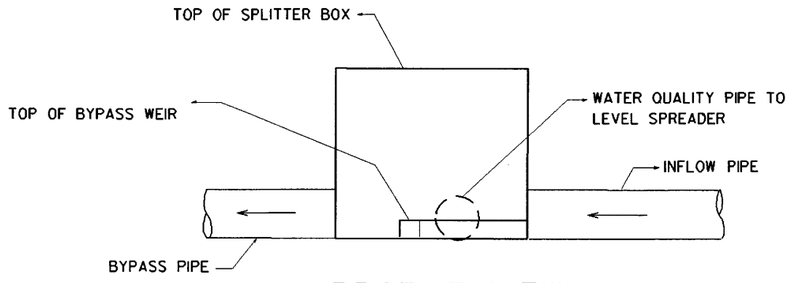


STA. -L- 35+80 LT

6" CONCRETE SPLITTER BOX
WITH MANHOLE COVER OR FLAT GRATE
INSIDE DIMENSIONS 4'W x 4'L x 4'H
WITH 6" CONCRETE SLAB BOTTOM
CONSTRUCT PER CONCRETE JUNCTION
BOX STANDARD DRAWING 840.31



PLAN VIEW



PROFILE VIEW

FLOW SPLITTER DEVICE FOR LEVEL SPREADER

(NOT TO SCALE)

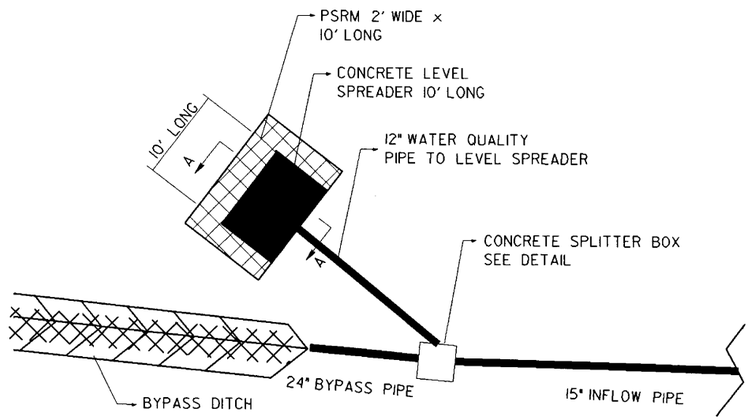
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-3919	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

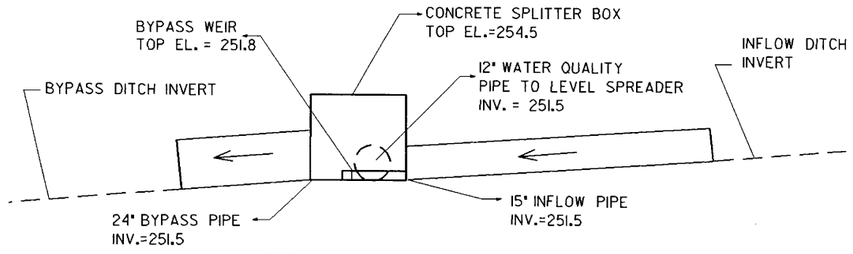
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LEVEL SPREADER WITH BYPASS
-L- STA 18+90 LT

(NOT TO SCALE)

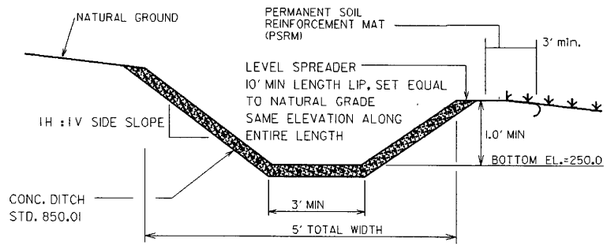


PLAN VIEW



PROFILE VIEW

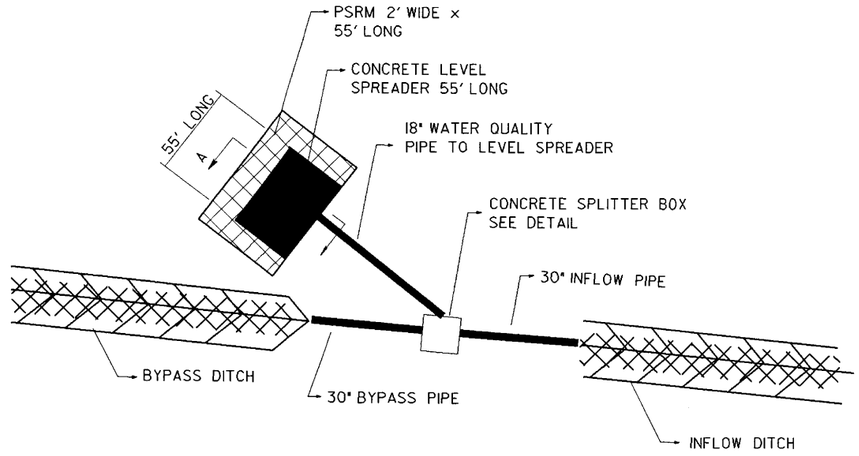
CONCRETE PAVED DITCH LEVEL SPREADER



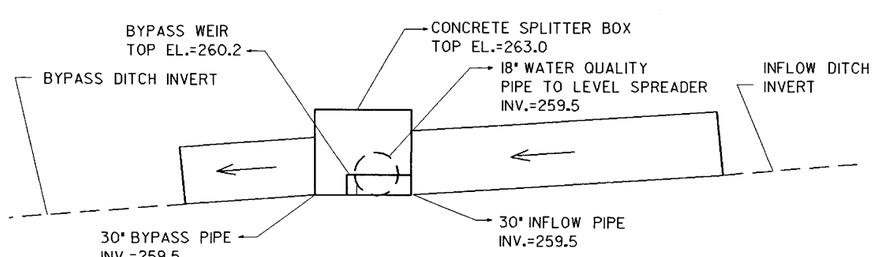
SECTION-AA

LEVEL SPREADER WITH BYPASS
-L- STA 39+00 LT

(NOT TO SCALE)

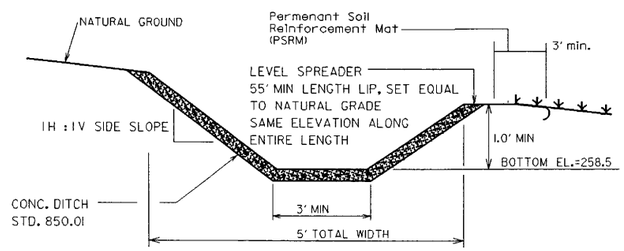


PLAN VIEW



PROFILE VIEW

CONCRETE PAVED DITCH LEVEL SPREADER



SECTION-AA

10-MAR-2009 12:18
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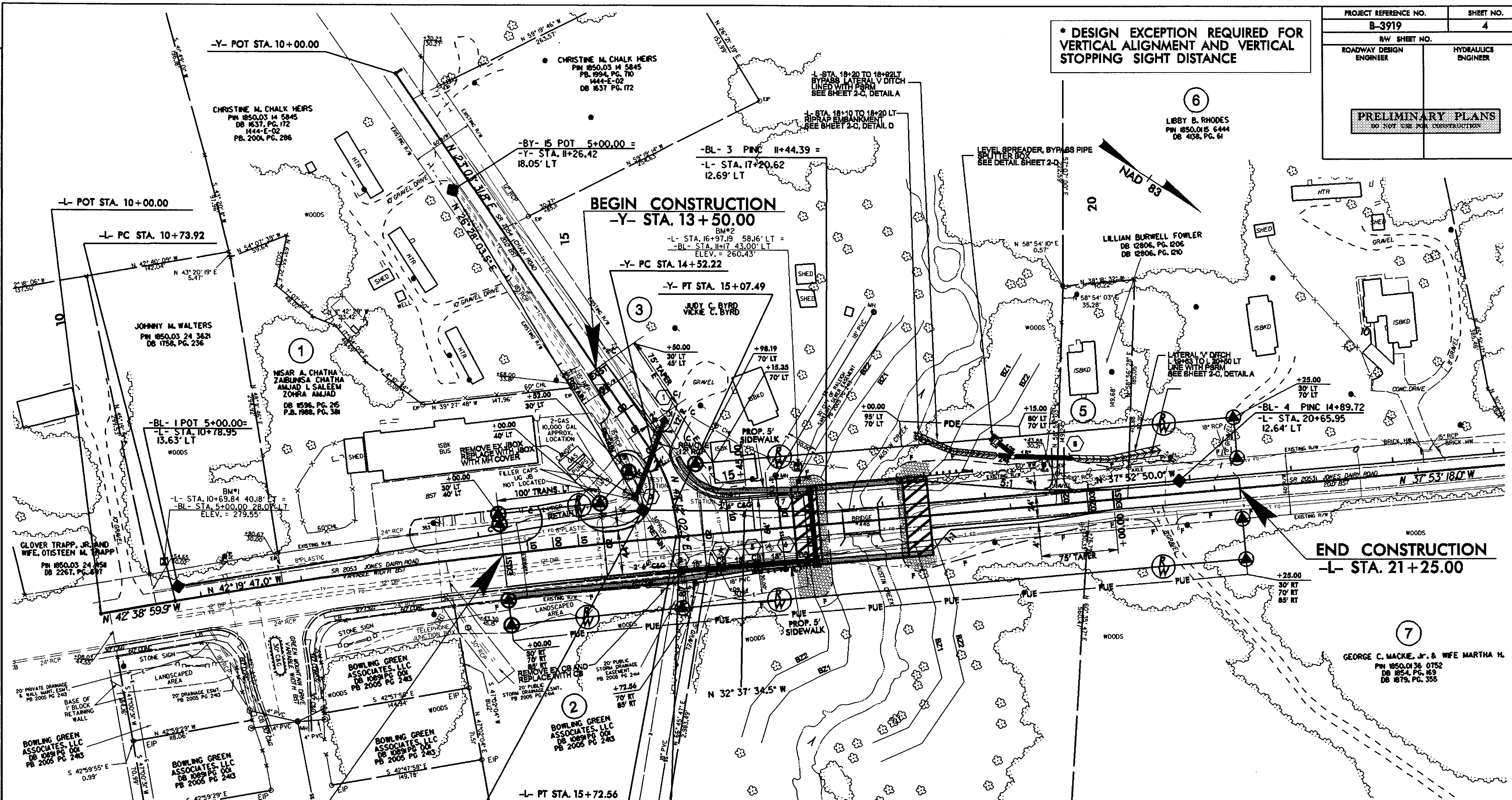
PROJECT REFERENCE NO.	SHEET NO.
B-3919	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

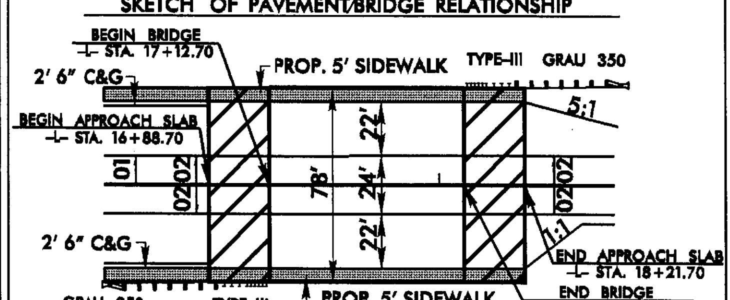
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

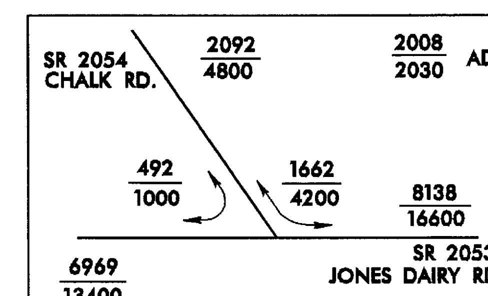


-Y- POT STA. 10+00.00
CHRISTINE M. CHALK HEIRS
PIN 1850.03 14 5845
-L- POT STA. 10+00.00
-L- PC STA. 10+73.92
JOHNNY M. WALTERS
PIN 1850.03 24 3621
DB 1758, PG. 236
NISAR A. CHATHA
ZAIBUNISA CHATHA
AMJAD I. SALEEM
ZOHRA AMJAD
DB 1596, PG. 215
P.B. 1988, PG. 381
-BL- 1 POT 5+00.00=
-L- STA. 10+78.95
13.63' LT
-BY- 15 POT 5+00.00 =
-Y- STA. 11+26.42
18.05' LT
BEGIN CONSTRUCTION
-Y- STA. 13+50.00
-Y- PC STA. 14+52.22
-Y- PT STA. 15+07.49
JUDY C. BYRD
VICKIE C. BYRD
-BL- 3 PINC 11+44.39 =
-L- STA. 17+20.62
12.69' LT
LIBBY B. RHODES
PIN 1850.0115 6444
DB 4138, PG. 61
LILLIAN BURWELL FOWLER
DB 12806, PG. 1206
DB 12806, PG. 1210
NAD 83
-BL- 4 PINC 14+89.72
-L- STA. 20+65.95
12.64' LT
END CONSTRUCTION
-L- STA. 21+25.00
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PIN 1850.0136 0752
PB 1854, PG. 169
DB 1879, PG. 355
SR 2053 JONES DAIRY ROAD
N 42° 19' 47.0" W
N 37° 53' 18.0" W
GLOVER TRAPP, JR. AND WIFE, OTISTEEN M. TRAPP
BOWLING GREEN ASSOCIATES, LLC
DB 10891 PG 001
PB 2005 PG 243
-L- PT STA. 15+72.56
-BL- 2 PINC 9+64.05 =
-BY- 16 PINC 8+64.98 =
-L- STA. 15+41.20
29.31' LT
BEGIN TIP PROJECT B-3919
BEGIN CONSTRUCTION
-L- STA. 14+00.00
-L- POT STA. 15+75.66
-Y- POT STA. 15+37.35
GEORGE C. MACKIE, Jr. & WIFE MARTHA H.
PROP. 5' SIDEWALK

SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP



-L-	-Y-
PI Sta 13+23.38	PI Sta 14+80.27
Δ = 4° 45' 41.9" (RT)	Δ = 24° 08' 30.6" (RT)
D = 0° 57' 17.7"	D = 43° 40' 51.2"
L = 498.64'	L = 55.27'
T = 249.46'	T = 28.05'
R = 6,000.00'	R = 131.17'
INC = 25'	
RO = SEE PLANS	



NOTES:
1) SEE SHEET 6 FOR -L- PROFILE
2) SEE SHEET 6 FOR -Y- PROFILE
3) SEE SHEETS S1 - S? FOR STRUCTURE PLANS
4) DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

REVISIONS

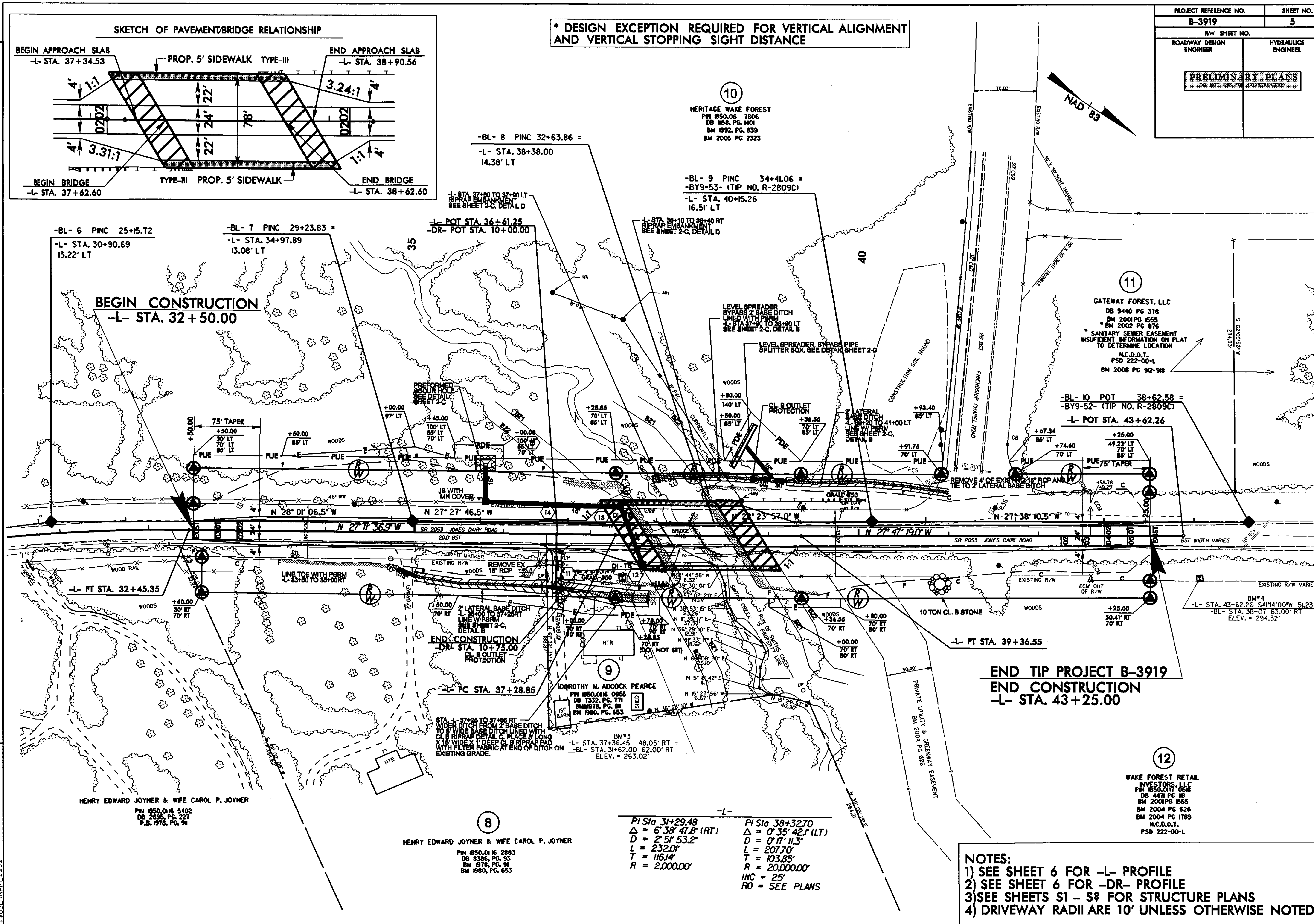
8/17/99

10-MAR-2009 12:20

PROJECT REFERENCE NO.	SHEET NO.
B-3919	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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



SKETCH OF PAVEMENT/BRIDGE RELATIONSHIP
BEGIN APPROACH SLAB
-L- STA. 37+34.53
PROP. 5' SIDEWALK TYPE-III
END APPROACH SLAB
-L- STA. 38+90.56
BEGIN BRIDGE
-L- STA. 37+62.60
TYPE-III PROP. 5' SIDEWALK
END BRIDGE
-L- STA. 38+62.60
NAD 83
BEGIN CONSTRUCTION
-L- STA. 32+50.00
-BL- 6 PINC 25+15.72
-L- STA. 30+90.69
13.22' LT
-BL- 7 PINC 29+23.83 =
-L- STA. 34+97.89
13.08' LT
-L- POT STA. 36+61.25
-DR- POT STA. 10+00.00
-BL- 8 PINC 32+63.86 =
-L- STA. 38+38.00
14.38' LT
-BL- 9 PINC 34+41.06 =
-BY9-53- (TIP NO. R-2809C)
-L- STA. 40+15.26
16.51' LT
-BL- 10 POT 38+62.58 =
-BY9-52- (TIP NO. R-2809C)
-L- POT STA. 43+62.26
N 28° 01' 06.5" W
N 27° 27' 46.5" W
N 27° 11' 36.9" W
N 27° 23' 57.0" W
N 27° 47' 19.0" W
N 27° 38' 10.5" W
SR 2053 JONES DAIRY ROAD
FRIENDSHIP CHAPEL ROAD
-L- PT STA. 32+45.35
-L- PC STA. 37+28.85
-L- PT STA. 39+36.55
END CONSTRUCTION
-DR- STA. 10+75.00
END TIP PROJECT B-3919
END CONSTRUCTION
-L- STA. 43+25.00
10 HERITAGE WAKE FOREST
11 GATEWAY FOREST, LLC
12 WAKE FOREST RETAIL INVESTORS, LLC
9 DOROTHY M. ADCOCK PEARCE
8 HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
HENRY EDWARD JOYNER & WIFE CAROL P. JOYNER
PRIVATE UTILITY & GREENWAY EASEMENT
BM#3
-L- STA. 37+36.45 48.05' RT =
-BL- STA. 31+62.00 62.00' RT
ELEV. = 263.02'
BM#4
-L- STA. 43+62.26 S41°14'00"W 51.23' =
-BL- STA. 38+07 63.00' RT
ELEV. = 294.32'
10 TON CL. B STONE
WOODS

-L-

PI Sta 31+29.48	PI Sta 38+32.70
Δ = 6° 38' 47.8" (RT)	Δ = 0° 35' 42.1" (LT)
D = 2° 51' 53.2"	D = 0° 17' 11.3"
L = 232.01'	L = 207.70'
T = 116.14'	T = 103.85'
R = 2,000.00'	R = 20,000.00'
	INC = 25'
	RO = SEE PLANS

NOTES:
1) SEE SHEET 6 FOR -L- PROFILE
2) SEE SHEET 6 FOR -DR- PROFILE
3) SEE SHEETS S1 – S? FOR STRUCTURE PLANS
4) DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

REVISIONS

8/17/99

10-MAR-2009 12:20
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-3919	6

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DITCH LEGEND
LEFT DITCH — - - —
RIGHT DITCH - - - - - - -

BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 1180 CFS
DESIGN FREQUENCY = 25 YR
DESIGN HW ELEVATION = 252.0 FT
BASE DISCHARGE = 2325 CFS
BASE FREQUENCY = 100 YR
BASE HW ELEVATION = 254.1 FT
OVERTOPPING DISCHARGE = 4320 CFS
OVERTOPPING FREQUENCY = 500++ YR
OVERTOPPING ELEVATION = 256.2 FT
DATE OF SURVEY = 3/11/08
NORMAL W.S.ELEVATION = 245.0 FT

PROPOSED 33" BOX BEAM BRIDGE
1 SPAN @ 85'
℄ -L- STA. 17+55.20
SKEW = 90°

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

PI = 14+75.00
EL = 261.01'
VC = 135'
* K = 88
V = 50 MPH

PI = 16+35.00
EL = 257.14'
VC = 185'
* K = 68
V = 50 MPH

PI = 19+00.00
EL = 257.93'
VC = 200'
* K = 64
V = 50 MPH

END GRADE
BEGIN RESURFACING
-L- STA. 20+00.00
ELEV. = 261.37'

END RESURFACING
-L- STA. 21+25.00

BEGIN BRIDGE
-L- STA. 17+12.70

END BRIDGE
-L- STA. 17+97.70

BEGIN GRADE
-L- STA. 14+00.00
ELEV = 263.97'

BM# 2 RAILROAD SPIKE SET IN A 30" OAK TREE
-L- STA. 16+97.19 58.16' LT
ELEV. = 260.43'

SEE SHEET 4 FOR -L- PLAN

BEGIN GRADE
-Y- STA. 13+50.00
ELEV. = 265.98'

END GRADE
-Y- STA. 15+25.31
ELEV. = 259.11'

PI = 14+82.50
EL = 259.97'
VC = 85'
K = 28

PI = 13+95.00
EL = 264.42'
VC = 90'
K = 56

SEE SHEET 4 FOR -L- PLAN

BEGIN GRADE
-L- STA. 32+50.00
ELEV. = 287.80'

END GRADE
-L- STA. 43+25.00
ELEV. = 288.73'

PI = 35+50.00
EL = 268.81'
VC = 432'
* K = 64
V = 50 MPH

PROPOSED 39" BOX BEAM BRIDGE
1 SPAN @ 100'
℄ -L- STA. 38+12.60
SKEW = 60°

PI = 40+85.00
EL = 271.39'
VC = 430'
* K = 64
V = 50 MPH

BEGIN BRIDGE
-L- STA. 37+62.60

END BRIDGE
-L- STA. 38+62.60

BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 1040 CFS
DESIGN FREQUENCY = 25 YR
DESIGN HW ELEVATION = 261.2 FT
BASE DISCHARGE = 1750 CFS
BASE FREQUENCY = 100 YR
BASE HW ELEVATION = 262.4 FT
OVERTOPPING DISCHARGE = 9000 CFS
OVERTOPPING FREQUENCY = 500++ YR
OVERTOPPING ELEVATION = 269.9 FT
DATE OF SURVEY = 3/11/08
NORMAL W.S.ELEVATION = 253.8 FT

SEE SHEET 5 FOR -L- PLAN

BM# 3 RAILROAD SPIKE SET IN A 32" PINE TREE
-L- STA. 37+36.45 48.05' RT
ELEV. = 263.02'

PI = 10+25.00
EL = 269.00'
VC = 26'
K = 5

BEGIN GRADE
-DR- STA. 10+12.00
ELEV. = 269.78'

END GRADE
-DR- STA. 10+66.00
ELEV. = 265.09

PI = 10+60.00
EL = 265.13'
VC = 12'
K = 1

North Carolina Department of Transportation
PROJECT ENVIRONMENTAL CONSULTATION FORM
I.D. No. B-3919

I. GENERAL INFORMATION

a.	Consultation Phase:	Right of Way	
b.	Project Description	**Bridge No. 448 on SR 2053 over Austin Creek and Bridge No. 140 on SR 2053 over Smith's Creek** Town of Wake Forest, Wake County, Division 5.	
c.	WBS Element No.: State Project: Federal Project:	33353.1.1 8.2408501 BRZ-2053(1)	
d.	Document Type:	CE	08/20/04 Date
		CE Addendum	09/11/07 Date

II. CONCLUSIONS

The above environmental document has been reevaluated as required by 23 CFR 771. It was determined that the current proposed action is essentially the same as the original proposed action. Proposed changes, if any, are noted below in Section III. It has been determined that anticipated social, economic, and environmental impacts were accurately described in the above referenced document(s) unless noted otherwise herein. Therefore, the original Administration Action remains valid.

III. CHANGES IN PROPOSED ACTION AND ENVIRONMENTAL CONSEQUENCES

1. Protected species status and water resources were reviewed (see attached memorandum from the NCDOT Natural Environment Unit dated 08/28/08).

   As of January 31, 2008 the United States Fish and Wildlife Service (http://www.fws.gov/nc-es/es/countyfr.html) lists three federally protected species for Wake County, the red-cockaded woodpecker (Picoides borealis), Dwarf wedgemussel (Alasmidonta heterodon), and Michaux's sumac (Rhus michauxii). No new species have been added since the completion of the referenced documents. Descriptions and biological conclusions of "No Effect" were given for all of the above mentioned species in the CE. Biological conclusions of "No Effect" are still valid for the federally protected species identified in the Categorical Exclusion and Categorical Exclusion Addendum as potentially present within the project area.

   Suitable habitat for the Dwarf wedgemussel is not present in the project area. Surveys conducted in February 2003 on Austin Creek and January 30, 2006 on Smith's Creek did not yield any individuals or suitable habitat. Therefore this project will have no effect on the Dwarf wedgemussel.

Suitable habitat for Michaux's sumac (maintained roadsides) is present in the project area. Surveys for this species were conducted on January 10, 2006, June 25, 2007, and May 15, 2008 and did not yield any individuals. A review of the Natural Heritage Program database (updated February 2008) revealed no occurrences of this species within 1.0 mile of the project area. Therefore, the biological conclusion of 'No Effect' remains valid for Michaux's sumac.

The bald eagle was officially delisted on August 8, 2007 (CFR 50 Part 17). The bald eagle is still afforded protection under the Bald and Golden Eagle Protection Act. A description of the bald eagle and its habitat is included in the CE. Suitable habitat for bald eagle nesting/foraging does not exist within the project area. Additionally, a review of the Natural Heritage Program database (updated February 2008) revealed no occurrences of this species within 1.0 mile of the project study area. Therefore, the proposed project will not affect the bald eagle.

2. Water resource classifications have not changed since the referenced Categorical Exclusion (CE). The Division of Water Quality best usage classification for Austin Creek [DWQ Index No. 27-23-2] and Smith's Creek [DWQ Index No. 27-23-2] and its tributaries remains C, NSW.

   Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile up or down stream of Bridge No. 448 over Austin Creek. Bridge No. 140 over Smith Creek is located approximately 0.4 miles downstream of the Wake Forest Reservoir. The Wake Forest Reservoir is classified as WS-II, HQW, NSW, CA.

3. The proposed project will include raised sidewalks on both sides of Bridge No. 140 due to development occurring in the area.

4. To accommodate a greenway access underneath Bridge No. 140 over Smith's Creek, the proposed bridge's vertical profile has been raised to allow 7-foot access under the bridge. The revised grade has extended the project construction limits.

5. Two (2) known Underground Storage Tank facilities and one (1) automotive repair facility were noted in the project area in an evaluation performed by the NCDOT Geotechnical Unit in January 2008. Anticipated impact to the project from these facilities is expected to be low.

IV. LIST OF ENVIRONMENTAL COMMITMENTS

D.O.T. will implement all practical measures and procedures to minimize and avoid environmental impacts.

Please see attached for revisions and updates to the Green Sheet Commitments for this project.

Project Commitments

Bridge No. 448 on SR 2053 Over Austin Creek and Bridge No. 140 on SR 2053 Over Smith's Creek

Town of Wake Forest
Wake County
WBS Element 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

** Updates to Green Sheet Commitments appear below in Italics.*

Project Development & Environmental Analysis Branch, Division 5, Roadway Design

1. If the proposed alignment is altered from what is stated in the planning document, the NCDOT will contact the appropriate agencies in order to reevaluate any potential impacts.

   No Change.

2. Traffic will be maintained off-site during the construction of this project. At no time will both bridges be non-operational, as there are several residents between the two bridges who require access to SR 2053. Residents will always have access to one of the two bridges, and the construction will be phased appropriately.

   No Change.

3. Coordination with the Town of Wake Forest will continue for possible accommodation of town-constructed greenway trail crossings under the bridges.

   The design of Bridge No.140 over Smith's Creek has been altered to accommodate a greenway under the bridge.

Division 5

4. NCDOT will coordinate with the Wake County Public Schools Transportation Department in order to minimize impacts to the school bus routes. The Department requested that the Wake Forest school offices be specifically notified so drivers can be alerted as soon as possible.

   No Change.

Project Commitments (Cont.)

Bridge No. 448 on SR 2053 Over Austin Creek and Bridge No. 140 on SR 2053 Over Smith's Creek

Town of Wake Forest
Wake County
WBS Element 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

** Updates to Green Sheet Commitments appear below in Italics.*

Standard Project Committments

5. The appropriate utilities or local government officials will be consulted concerning possible relocation of utilities during final design.

   No Change.

6. NCDOT Best Management Practices (BMPs) for the Protection of Surface Waters will be followed during construction of this project in order to ensure minimal impact to water resources.

   No Change.

7. DOT will adhere to the Best Management Practices (BMPs) for "Bridge Demolition and Removal" during the removal of Bridge No. 448 and Bridge No. 140.

   No Change.

8. All Neuse River Buffer Rules will apply.

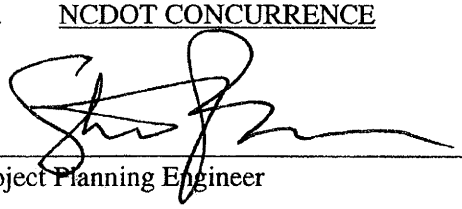
   No Change.

V. COORDINATION

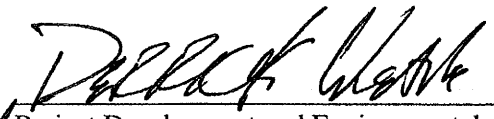
Project Development and Environmental Analysis Branch personnel have discussed current project proposals with others as follows:

Design Engineer:	Susan Lancaster, Roadway Design	10/02/2008 Date
FHWA Engineer:	Jake Rigsbee	10/03/2008 Date
Natural Environment Unit:	James Pflaum	10/02/2008 Date

VI. NCDOT CONCURRENCE



Project Planning Engineer — Date: 10/3/08



For Project Development and Environmental Analysis Branch Manager — Date: 10/3/08

VII. FHWA CONCURRENCE

Not Required

Federal Highway Administration
Division Administrator — Date

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 28, 2008

MEMORANDUM TO: Derrick Weaver, Project Engineer
Central Project Development Unit

FROM: James Pflaum, Environmental Specialist
Natural Environment Unit

SUBJECT: Water resources and protected species update for a Federal Highway Administration (FHWA) Right of Way Consultation for the proposed replacement of Bridge No. 448 over Austin Creek and Bridge No. 140 over Smith's Creek on SR 2053 in Wake County. TIP No. B-3919.

REFERENCE: Categorical Exclusion addendum, dated September 2007

The following memorandum provides information to assist in the preparation of a FHWA Right of Way Consultation for the proposed project. It addresses water resources, federally protected species under the Endangered Species Act, and moratoria potentially impacted by the project and serves to update the previously submitted documents with respect to these issues.

WATER RESOURCES

Water resource classifications have not changed since the referenced Categorical Exclusion (CE). The Division of Water Quality best usage classification for Austin Creek [DWQ Index No. 27-23-2] and Smith's Creek [DWQ Index No. 27-23-2] and its tributaries remains C, NSW. No Portion of Austin Creek or Smith's Creek, its tributaries, or other surface waters within 1.0 mile of the project area are listed on the Final 2006 303(d) List of Impaired Waters.

Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile up or down stream of Bridge No. 448 over Austin Creek. Bridge No. 140 over Smith Creek is located approximately 0.4 miles downstream of the Wake Forest Reservoir. The Wake Forest Reservoir is classified as WS-II, HQW, NSW, CA.

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

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

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD
SUITE 240
RALEIGH NC 27604

FEDERALLY PROTECTED SPECIES

As of January 31, 2008 the United States Fish and Wildlife Service (http://www.fws.gov/nc-es/es/countyfr.html) lists three federally protected species for Wake County, the red-cockaded woodpecker (*Picoides borealis*), Dwarf wedgemussel (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michauxii*). No new species have been added since the completion of the referenced documents. Descriptions and biological conclusions of "No Effect" were given for all of the above mentioned species in the CE.

Suitable habitat for the Dwarf wedgemussel is not present in the project area. Surveys conducted in February 2003 on Austin Creek and January 30, 2006 on Smith's Creek did not yield any individuals or suitable habitat. Therefore this project will have no effect on the Dwarf wedgemussel.

Suitable habitat for Michaux's sumac (maintained roadsides) is present in the project area. Surveys for this species were conducted on January 10, 2006, June 25, 2007, and May 15, 2008 and did not yield any individuals. A review of the Natural Heritage Program database (updated February 2008) revealed no occurrences of this species within 1.0 mile of the project area. Therefore, the biological conclusion of 'No Effect' remains valid for Michaux's sumac.

The bald eagle was officially delisted on August 8, 2007 (CFR 50 Part 17). The bald eagle is still afforded protection under the Bald and Golden Eagle Protection Act. A description of the bald eagle and its habitat is included in the CE. Suitable habitat for bald eagle nesting/foraging does not exist within the project area. Additionally, a review of the Natural Heritage Program database (updated February 2008) revealed no occurrences of this species within 1.0 mile of the project study area. Therefore, the proposed project will not affect the bald eagle.

cc:
B-3919 file

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element No. 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

ADDENDUM
TO
CATEGORICAL EXCLUSION

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED:

9/11/07
Date

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

9/11/07
Date

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

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element No. 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

ADDENDUM TO CATEGORICAL EXCLUSION

August 2007

DOCUMENTATION PREPARED IN PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH BY:

NORTH CAROLINA PROFESSIONAL SEAL 26985 ENGINEER JENNIFER M. FULLER

9-11-07
Date

Jennifer M. Fuller, P.E., Project Planning Engineer
Project Development and Environmental Analysis Branch

9-11-07
Date

Derrick G. Weaver, P.E., Project Development Group Supervisor
Project Development and Environmental Analysis Branch

ENVIRONMENTAL COMMITMENTS

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

Project Development & Environmental Analysis Branch, Division 5, Roadway Design

1. If the proposed alignment is altered from what is stated in the planning document, the NCDOT will contact the appropriate agencies in order to reevaluate any potential impacts.
2. Traffic will be maintained off-site during the construction of this project. At no time will both bridges be non-operational, as there are several residents between the two bridges who require access to SR 2053. Residents will always have access to one of the two bridges, and the construction will be phased appropriately.
3. Coordination with the Town of Wake Forest will continue for possible accommodation of town-constructed greenway trail crossings under the bridges.

Division 5

4. NCDOT will coordinate with the Wake County Public Schools Transportation Department in order to minimize impacts to the school bus routes. The Department requested that the Wake Forest school offices be specifically notified so drivers can be alerted as soon as possible.

Standard Project Committments

5. The appropriate utilities or local government officials will be consulted concerning possible relocation of utilities during final design.
6. NCDOT Best Management Practices (BMPs) for the Protection of Surface Waters will be followed during construction of this project in order to ensure minimal impact to water resources.
7. DOT will adhere to the Best Management Practices (BMPs) for "Bridge Demolition and Removal" during the removal of Bridge No. 448 and Bridge No. 140.
8. All Neuse River Buffer Rules will apply.

Addendum to Categorical Exclusion

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element 33353.1.1
Federal Project BRZ-2053(1)
State Project 8.2408501

TIP No. B-3919

INTRODUCTION:

Bridge Nos. 448 and 140 are located in Wake County on SR 2053 (Jones Dairy Road) over Austin and Smith's Creek, respectively. A Categorical Exclusion (CE) for the proposed replacement of these bridges was approved on August 20, 2004. At that time, NCDOT proposed to replace-in-place the existing two-lane bridges with new two-lane bridges, with some minor approach work.

Coordination with the Wake Forest Town Planners revealed the Wake Forest Transportation Plan, adopted January 2003, includes a five-lane cross section proposed for Jones Dairy Road to accommodate the heavy residential development in this area of town, now and in the future. NCDOT was requested to consider multi-lane bridges in TIP Project B-3919. Upon studying this concept, NCDOT agrees it is prudent to propose multi-lane bridges for these locations.

Due to wider proposed bridges, further environmental analysis was required. It is the purpose of this report to document the new information acquired as a result of the design change. This document is not meant to be a stand-alone document; it must be considered in conjunction with the Categorical Exclusion for the subject project.

The location is shown in Figure 1 of this document. B-3919 is programmed in the latest approved North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) as a bridge replacement project. Right-of-Way acquisition is planned for Federal Fiscal Year 2007 and Construction for Federal Fiscal Year 2008. This project is part of the Federal-Aid Bridge Replacement and Rehabilitation Program and has been classified as a "Categorical Exclusion". No substantial environmental impacts are expected.

PROPOSED ACTION:

Bridge No. 448 will be replaced with a 90-foot long bridge at the existing location and Bridge No. 140 will be replaced with new 75-foot long bridge at the existing location (see Figure 2A through 2B of this document. The cross section of bridge number 448 will include a 12-foot wide center turn lane, two 12-foot travel lanes in each direction, and two 14-foot outside lanes in each direction with 2'-6" concrete curb and gutter and 5-foot concrete sidewalk on both sides. Bridge number 140 will include an the same lane widths as bridge number 448, except sidewalk is not proposed at this time. Both bridges will have 79 feet total width. Figure 2 of this document shows the proposed cross sections of the bridges.

Approach work to the north of Bridge No. 448 includes tying into Chalks Road, approximately

100 feet from the end of the bridge approach slab. Approach work to the south of Bridge No. 448 includes approximately 150 feet of pavement tapers from the end of the bridge approach slab back to existing. Approach work to the north of Bridge No. 448 includes tying into Chalks Road, approximately 100 feet from the end of the bridge approach slab. Approach work to the south of Bridge No. 448 includes approximately 150 feet of pavement tapers from the end of the bridge approach slab back to existing. Based on preliminary design, the design speed is 50 mph.

Traffic will be detoured off-site during construction, utilizing NC 98 and Averette Road. The off-site detour is approximately 0.7 miles longer for through traffic on SR 2053 than the existing travel route. The design speed is 50 mph.

Design exceptions occur when the proposed design will not meet the standards for a particular design speed. Design exceptions are commonly used when trying to utilize the existing alignment for a road in order to minimize impacts and costs, as is the case for this project. The speed limit for Jones Dairy Road is posted at 55 mph, with curves signed for cautionary 45 mph. The design speed for Bridge Nos. 448 and 140 on Jones Dairy Road will be 50 mph. NCDOT anticipates the need for a design exception for the vertical alignments for both bridges.

ESTIMATED COST:

	Replacement of Bridges No. 448 and No. 140
Structures	**$ 1,369,620**
Roadway Approaches	**$ 533,820**
Detour Structure and Approaches	**-0-**
Structure Removal	**$ 28,785**
Utilities construction	**$ 103,640**
Miscellaneous and Mobilization (10% structures & utilities)	**$ 151,000**
Miscellaneous and Mobilization (35% Preliminary)	**$ 238,135**
Engineering & Contingencies (15%)	**$ 375,000**
Total Construction Cost	**$ 2,800,000**
Right-of-Way Costs (includes Utilities relocation)	**$ 250,360**
Total Project Cost	**$ 3,050,360**

COMMUNITY IMPACT ASSESSMENT:

A Community Impact Assessment (CIA) was produced for B-3919 in January 2007 by NCDOT community planners. Recommendations are as follows:

- NCDOT should work with the Town of Wake Forest to determine an appropriate location and design for a greenway crossing of Jones Dairy Road. If a grade separated crossing is not feasible the intersection of the roadway with Chalk Road may be appropriate for an at grade crossing. It should be assumed that relatively young children, accessing area parks and schools will be using this crossing.
- If an off site detour is used, NCDOT should coordinate with the Wake County Public Schools Transportation Department in order to minimize impacts to the school buses routes. The Department requested that the Wake Forest offices be specifically notified so drivers can be alerted as soon as possible.
- NCDOT should coordinate the replacement schedule of this bridge with Bridge 448 so that the homes between the bridges maintain appropriate access.

Indirect and Cumulative Impacts (ICI) were also addressed in the CIA. Regional growth pressures will likely drive continued development in the area. The bridge project complies with the Town of Wake Forest's plan to manage expected growth and maintain quality of life. Thus, changes in the patterns of residential or commercial development and/or land uses in the vicinity of the bridge project would not be anticipated as directly stemming from the bridge's replacement. For these reasons, indirect and cumulative effects on the existing resources, including downstream water quality, should be minimal.

NATURAL RESOURCES:

A site visit was completed on January 10, 2006 by NCDOT biologists. Additional impacts at each bridge were evaluated.

Water Resources

The project study area in the southeast quadrant of Austin Creek supports an **ephemeral channel** that drains into Austin Creek. This channel is not shown on the quadrant map (Rolesville), the soils map of Wake County, or with GIS mapping. This channel was rated using the North Carolina Division of Water Quality (NCDWQ) worksheet and had a score of 4. Even though the project is located in the Neuse River basin this ephemeral channel is not subject to the Riparian or Watershed Buffer rules because it does not appear on the soils or the quadrant map.
The Smith Creek bridge is located less than 1 mile from a WS-II resource: the Wake Forest Reservoir. Therefore, Design Standards for Sensitive Watersheds apply.

Wake County is a participant in the National Flood Insurance Regular Program, which is administered by the Federal Emergency Management Agency (FEMA). These crossings of Austin and Smith Creeks are located within detailed flood study reaches in a flood hazard zones designated as Zone AE, for which 100-year base flood elevations have been determined and regulated floodways are established. Both Austin and Smith Creeks were designated in the currently effective FEMA Flood Insurance Study (FIS) for Wake County as "Flooding Sources Studied by Detailed Methods: Redelineated", meaning that they were studied by detailed methods for previous FISs, but were only partially revised in the current study. Their effective analyses remain valid; however, their floodplain delineations have been revised on the current Flood Insurance Rate Map (FIRM). A copy of the current FIRM is attached, (see Figure 3) on

which are depicted the established limits of the 100-year floodplain and floodway in the vicinity of the project. It was noted in the published effective FEMA FIS for Wake County that the existing bridge over Austin Creek is shown in the flood profile to be currently inundated by the 100-year flood event. It is therefore recommended that the proposed approach roadway and bridge deck elevation be set at the same elevation as that of the existing bridge. The proposed bridge replacements will be "in-kind" replacements and will provide equivalent or improved conveyance compared to that of the existing bridges; therefore, it is not anticipated that this project will have any significant adverse effect on the existing floodplain and associated flood hazard. Any potential improvement in conveyance provided by the replacement structures may result in a lower 100-year water surface elevation; therefore, it is anticipated that approval of a Conditional Letter of Map Revision (CLOMR) will be required by FEMA. After the project is constructed, approval of a final Letter of Map Revision (LOMR) will also be required upon project acceptance by NCDOT. NCDOT Hydraulics Unit will coordinate with FEMA and local authorities in the final design stage and after project acceptance to ensure compliance with applicable floodplain management ordinances. Recommendations made in this report are preliminary and could be subject to change during the final and more detailed design phase of the project.

Biotic Communities

Tables 1 and 2 in the Categorical Exclusion (CE) summarize the impact area by plant community type. The current project study area is now wider but the approach length has decreased at both bridges. Impacts by plant community type are listed below in Table 1.

Table 1. Plant Community Impacts for Bridge No. 448 over Austin Creek

Plant Community	Acres Impacted	% of Project Study Area
Mixed Hardwood Forest	0.12	6.7
Mixed Pine/Hardwood Forest	0.10	5.5
Piedmont/Low Mountain Alluvial Forest	0.29	16.1
Early Successional land	0	0
Maintained/ Disturbed	1.29	71.7
Totals	1.80	100

At the time of the site visit the southwest quadrant was recently disturbed/graded. The plant community impacts in this quadrant changed to maintained/ disturbed. A new sewer easement is located in the southwest quadrant. Plant community impacts for this area are now Maintained/Disturbed. There are no Early Successional land impacts at the Austin Creek bridge study area.

Table 2. Plant Community Impacts for Bridge No. 140 over Smith Creek

Plant Community	Acres Impacted	% of project Study Area
Mixed Hardwood Forest	0	0
Mixed Pine/Hardwood Forest	0.65	24
Pine Plantation	0.22	8
Piedmont/Low Mountain Alluvial Forest	0.17	6
Successional Land	0.36	13
Maintained/ Disturbed	1.35	49
Totals	2.75	100

Adjacent to the roadway impacts, a Maintained/Disturbed community is present in all four quadrants at the Smith Creek crossing. A small amount of Piedmont/Low Mountain Alluvial forest is present adjacent to Smith's Creek in the northeast quadrant. The differences in plant community impacts from above to the CE can be attributed to the shorter and wider study area.

Waters of the United States

No wetlands were found in the additional study area at either bridge.

Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE) and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of May 10, 2007 the USFWS lists the following federally protected species for Wake County (Table 3).

Table 3. Federally-Protected Species for Wake County

Scientific Name	Common Name	Status
Haliaeetus leucocephalus	Bald Eagle	Threatened (proposed for delisting)
Picoides borealis	Red-cockaded woodpecker	Endangered
Alasmidonta heterodon	Dwarf wedgemussel	Endangered
Rhus michauxii	Michaux Sumac	Endangered

"E" denotes Endangered (a species in danger of extinction throughout all or a significant portion of its range).

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

Bald Eagle (*Haliaeetus leucocephalus*)..... **Threatened (proposed for delisting)**

BIOLOGICAL CONCLUSION: NO EFFECT

The study area was evaluated for the bald eagle on January 10, 2006. The study area does not support significant large trees that would be suitable for the bald eagle and the study area is not within site distance of a large body of water. The two bridges are located on a busy road that is approximately 0.2 mile from the new multi-lane Wake Forest NC 98 bypass. The Smith Creek bridge, however, is approximately 0.3 mile downstream from the Wake Forest Reservoir shown on the Rolesville quadrant map. The Wake Forest Reservoir personnel said they have not ever seen a bald eagle at the reservoir. The closest active bald eagle nest known by the Natural Heritage Program (NHP) is over 12 miles away at Lick Creek area of Falls Lake. No bald eagles were observed during the field visit. A biological conclusion of No Effect was reached. Mr. Gary Jordan of the US Fish and Wildlife Service was contacted by email and concurred with the No Effect Biological Conclusion.

Red-cockaded woodpecker (*Picoides borealis*) **Endangered**

BIOLOGICAL CONCLUSION: NO EFFECT

The additional study area at both bridges did not support suitable habitat in the form of large

contiguous pine dominated stands greater than 30 years old. Scattered mature pine trees are present in the study area in residential areas. No ½ mile survey was conducted. A search of the NCNHP database on January 12, 2006 found no occurrence of this species within 1.0 mile of the study area. Therefore, this project will have a No Effect on the red-cockaded woodpecker.

Dwarf wedge mussel (*Alasmidonta heterodon*) **Endangered**

BIOLOGICAL CONCLUSION: NO EFFECT

Dwarf wedge mussel was surveyed for Austin Creek in February 2003 by NCDOT biologists Sharon Snider and Karen Lynch. No mussels or relics were found and Austin Creek lacked suitable habitat. A Biological Conclusion of No Effect was reached as stated in the August 2004 Categorical Exclusion (CE). A recent habitat assessment was conducted in Smith Creek on January 30, 2006 by NCDOT biologists. Smith Creek was characterized as a slow flowing, sandy creek with moderate beaver impact not providing suitable habitat for freshwater mussels. The project area of B-3919 also lacks suitable habitat for the dwarf wedge mussel. Therefore it can be concluded that there will be No Effect to the dwarf wedge mussel from construction of B-3919.

Michaux's sumac (*Rhus michauxii*) **Endangered**

BIOLOGICAL CONCLUSION: NO EFFECT

Habitat in the form of forest edges and roadsides are present within the project area. Plant by plant surveys for Michaux's sumac were conducted on January 10, 2006 by NCDOT biologists. Habitat was marginal because most of the area was too thick and did not have sufficient daylight especially at the Smith Creek bridge. Other areas that were more open were maintained or disturbed such as the southeast quadrant of the Austin Creek bridge. Weedy species precluded its growth in other areas especially in the northeast quadrant of the Smith Creek bridge.

Since surveys were conducted outside the growing season Mr. Gary Jordan (USFWS) was contacted (email Jan. 11, 2006) by Karen Lynch. The information above was presented to Mr. Jordan as a Biological Conclusion of No Effect. Mr. Jordan agreed with the Biological Conclusion of No Effect.

Federal Species of Concern and State Listed Species

There are sixteen Federal Species of Concern (FSC) listed for Wake County as of May 10, 2007. Eleven species were reported in the NRTR. The entire list of species and their state status are listed below in Table 4. The habitat column refers to existence of suitable habitat for each species in the study area.

Surveys for these species were not conducted during the site visit, nor were any of these species observed. As of January 12, 2006 review of the NCNHP database of the rare species and unique habitats revealed no records of North Carolina rare and/or protected species in or near the study area or within 1.0 mile.

Table 4. Federal Species of Concern for Wake County.

Scientific Name	Common Name	NC Status	Habitat
Anguilla rostrata	American eel	W1	Yes
Aimophila aestivalis	Bachman's sparrow	SC	No
Etheostoma collis lepidinion	Carolina darter	SC	Yes
Noturus furiosus	Carolina madtom	SC(PT)	Yes
Lythrurus matutinus	Pinewoods shiner	W2	Yes
Ambloplites cavifrons	Roanoke bass	SR	Yes
Myotis austroriparius	Southeastern myotis	SC	Yes
Heterodon simus	Southern hognose snake	SC	No
Fusconaia masoni	Atlantic pigtoe	E	Yes
Speyeria diana	Diana fritillary (butterfly)	W2	No
Lasmigona subviridus	Green floater	E	Yes
Elliptio lanceolata	Yellow lance	E	Yes
Lindera subcoriacea	Bog spicebush	T	No
Trillium pusillum var. *pusillum*	Carolina trillium	E	No
Sagittaria graminea var. *weatherbiana*	Grassleaf arrowhead	SR-T	Yes
Monotropsis odorata	Sweet pinesap	SR-T	No

"SC" – Significantly Rare: Any species which has not been listed by the North Carolina Wildlife Resources Commission as an Endangered, Threatened, or Speciel Concern species: but which exists in the state in small numbers and has been determined by the NCNHP to need monitoring.

"(P_" – Proposed: Species proposed in the *Federal Register* as a status different from its current Federal status.

"_T)" – Threatened: A taxon "which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range".

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

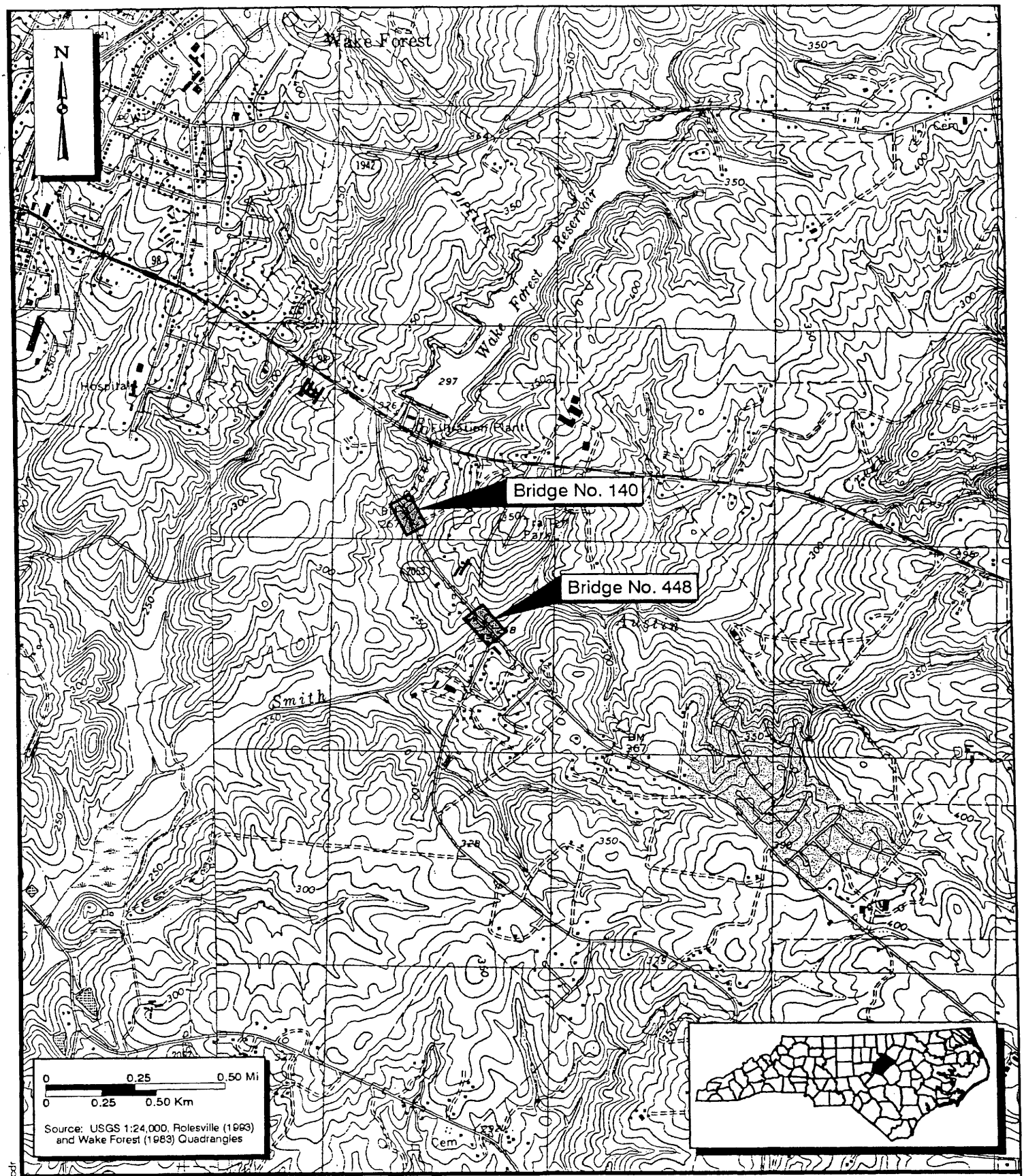
"SR"-- Significantly Rare: Species which are rare in North Carolina, generally with 1-100 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease).

"-T" – Throughout: These species are rare throughout their ranges (fewer than 100 populations total).

"W1' – Watch: Any other species believed to be of conservation concern in the state because of scarcity, declining populations, threats to populations, or inadequacy of information to asses its rarity.

CONCLUSION:

The environmental impacts associated with the multi-lane bridges described herein will impart no greater impacts than did the two-lane bridges described in the CE. It is concluded that the project as redesigned will not result in substantial adverse social, economic, or environmental impacts, and that the categorical exclusion classification, as defined in 40 CFR 1508.4 and 23 CFR 771.117, is appropriate.

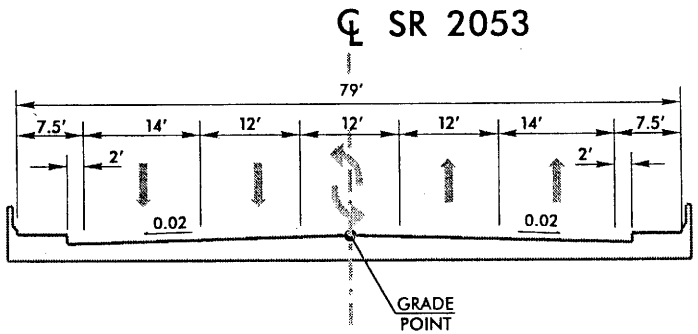


Environmental Services, Inc.

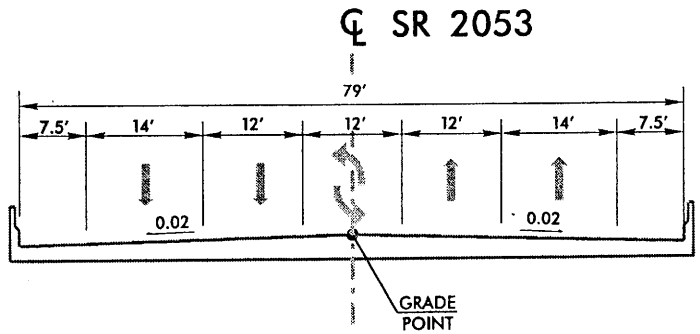
Location Map
Bridge No. 448 over Austin Creek and
Bridge No.140 over Smith Creek on SR 2053
Wake County, North Carolina
TIP B-3919

Figure:	1
Project:	ER00041.14
Date:	March 2002

ER00041.14/location3919_20.cdr



TYPICAL SECTION ON BRIDGE NO. 448



TYPICAL SECTION ON BRIDGE NO. 140

B–3919

PROPOSED CROSS SECTIONS ON BRIDGES

FIGURE 2

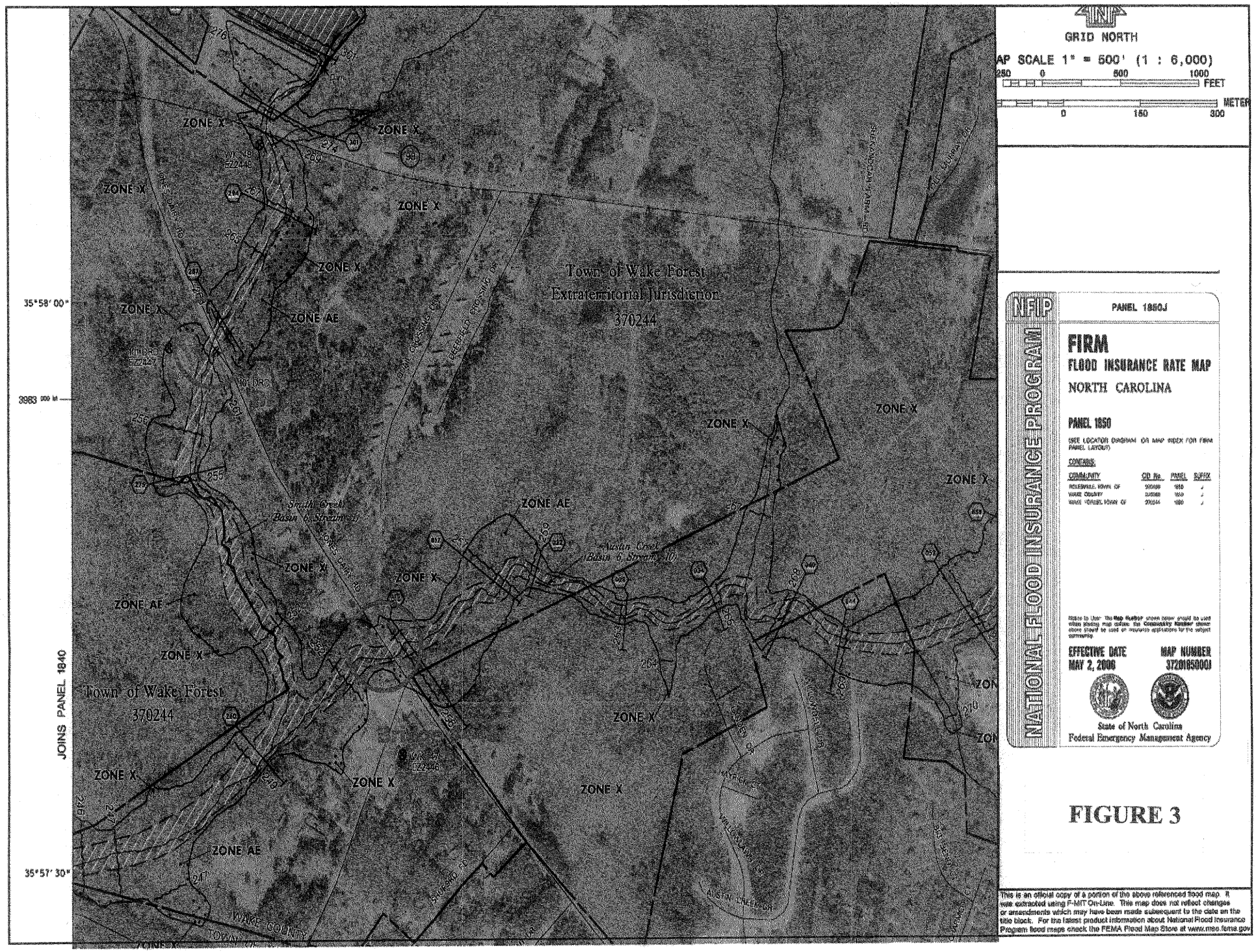


FIGURE 3

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element No. 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

CATEGORICAL EXCLUSION

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED:

8/20/04
Date

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

8/20/04
Date

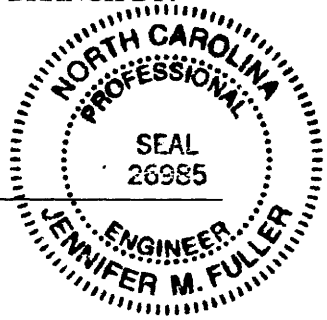
for **John F. Sullivan III, P.E. Division Administrator**
Federal Highway Administration

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element No. 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

CATEGORICAL EXCLUSION

August 2004

DOCUMENTATION PREPARED IN
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH BY:



8/12/04
Date

Jennifer M. Fuller, P.E., Project Development Engineer
Project Development and Environmental Analysis Branch

8/12/04
Date

S. Eric Midkiff, P.E., Project Development Unit Head
Project Development and Environmental Analysis Branch

ENVIRONMENTAL COMMITMENTS

Bridge No. 448 on SR 2053 Over Austin Creek
and
Bridge No. 140 on SR 2053 Over Smith's Creek
Town of Wake Forest

Wake County
WBS Element 33353.1.1
Federal Project No. BRZ-2053(1)
State Project No. 8.2408501
T.I.P. PROJECT B-3919

Division 5, Roadside Environmental

1. The appropriate utilities or local government officials will be consulted concerning possible relocation of utilities during final design.
2. NCDOT Best Management Practices (BMPs) for the Protection of Surface Waters will be followed during construction of this project in order to ensure minimal impact to water resources.
3. DOT will adhere to the Best Management Practices (BMPs) for "Bridge Demolition and Removal" during the removal of Bridge No. 448 and Bridge No. 140.

Project Development & Environmental Analysis Branch, Division 5, Roadway Design

4. If the proposed alignment is altered from what is stated in the planning document, the NCDOT will contact the appropriate agencies in order to reevaluate any potential impacts.
5. Traffic will be maintained off-site during the construction of this project. At no time will both bridges be non-operational, as there are several residents between the two bridges who require access to SR 2053. Residents will always have access to one of the two bridges, and the construction will be phased appropriately.

Project Development & Environmental Analysis Branch, Division 5, Roadway Design, Hydraulics Design, Roadside Environmental

6. All Neuse River Buffer Rules will apply.

Bridge No. 448 on SR 2053
Over Austin Creek
and
Bridge No. 140 on SR 2053
Over Smith's Creek
Town of Wake Forest
Wake County
WBS Element 33353.1.1
Federal Project BRZ-2053(1)
State Project 8.2408501

TIP No. B-3919

INTRODUCTION: Bridge Nos. 448 and 140 are located in Wake County on SR 2053 (Jones Dairy Road) over Austin and Smith's Creek, respectively. The location is shown in Figure 1 of Appendix A. B-3919 is programmed in the latest approved North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) as a bridge replacement project. This project is part of the Federal-Aid Bridge Replacement and Rehabilitation Program and has been classified as a "Categorical Exclusion". No substantial environmental impacts are expected.

I. PURPOSE AND NEED STATEMENT

The bridges are in need of replacing due to deteriorating structural integrity and a deficient cross section. The replacement of these inadequate structures will result in safer traffic operations.

II. EXISTING CONDITIONS

SR 2053 (Jones Dairy Road) is classified as Rural Local in the Statewide Functional Classification System. It is located in Wake Forest, N.C. Currently, the traffic volume is 6600 vehicles per day (VPD) and projected to be 16,600 VPD for the year 2030. Approximately 2% of the traffic is dual–tire (DT) vehicles and 2% is truck-tractor semi-trailers (TTST). The posted speed limit is 55mph with cautionary posted speed of 45 mph for the curves in the vicinity of the bridges. The road serves primarily local residential traffic.

Both of the existing bridges were completed in 1953. They are composed of two-span timber and steel structures. The decks are 36 feet long and 25.5 feet wide. The superstructures are reinforced concrete floors on timber joists. The end bents and interior bents are timber caps on timber piles. The crown-to-stream vertical clearance is approximately 12 feet for each bridge. Both bridges carry two lanes of traffic.

According to NCDOT's Bridge Maintenance Unit records, the sufficiency rating for Bridge No. 448 is 39.2 and for Bridge No. 140 is 21.9, out of a possible 100 for a new structure. Presently the bridges are posted with weight restrictions of 18 tons for single vehicles and 26 tons for truck-tractor semi-trailers.

Both vertical and horizontal alignment is good in the project vicinity. The pavement width on the approaches to the existing bridge is 18 feet for Bridge No. 448 and 20 feet for Bridge No. 140. Shoulders on the approaches of the bridge are approximately 4 feet wide.

In an analysis of a recent three-year period the NCDOT's Traffic Engineering Branch indicates that four accidents at Bridge No. 448 and four accidents at Bridge No. 140 were reported. None of the accidents were attributed to the alignment or the bridge.

There are 40 daily school bus crossings over the studied bridges. Due to the high number of buses, on-site detours were studied for these bridges.

Several utilities were noted in the area. At bridge No. 448, there are aerial power lines, cable-TV boxes, and a Town of Wake Forest water line along the north side of SR 2053. An underground telephone line is located on the south side of SR 2053. A fiber optic line is buried south of SR 2053, but crosses Austin Creek on the north sided of the existing structure. At bridge No. 140, there are overhead power and telephone lines along the south side of SR 2053. A CATV box is located on the north side of SR 2053, as is a Town of Wake Forest water line. A fiber optic line runs underground on the north and south sides.

III. ALTERNATIVES

A. Project Description

Bridge No. 448 and Bridge No. 140 will each be replaced with new 50-foot long bridges at their existing locations (see Figure 2A through 2D in Appendix A for the project study areas). The cross section of the new bridges will include two 12-foot wide lanes with 8-foot wide shoulders.

There will be approximately 600 feet of new approach work to the north and 650 feet of new approach work to the south for Bridge No 448. There will be approximately 550 feet of new approach work to the north and 1100 feet of new approach work to the south for Bridge No 140. The pavement width on the approaches will be 32 feet including two 12-foot lanes and 4-foot paved shoulders. Additionally there will be 4-foot grass shoulders. Based on preliminary design, the design speed is 60 mph.

B. Reasonable and Feasible Alternatives

Alternate 1: **(Preferred)** Replace Bridge No. 448 and Bridge No. 140 with two new 50-foot long bridges at approximately the same location and roadway elevation as the existing bridges. *Traffic will be detoured off-site during construction, utilizing NC 98 and Averette Road (see figure 3 in Appendix A).* The off-site detour is approximately 0.7 miles longer for through traffic on SR 2053 than the existing travel route. The design speed is 60 mph.

Alternate 2: Replace Bridge No. 448 with and Bridge No. 140 with two new 50-foot long bridges at approximately the same location and roadway elevation as the existing bridges. *Traffic will be maintained using temporary on-site detours during construction.* The detours would utilize triple 72 inch corrugated steel pipe to be placed upstream of the existing structure. The design speed is 60 mph.

C. Alternatives Eliminated From Further Consideration

Because the existing horizontal alignment is suitable, a realignment alternative was not considered, as it would increase costs and cause relocations.

"Do-nothing" is not practical; requiring the eventual closing of the road as the existing bridge completely deteriorates. Rehabilitation of the existing deteriorating bridge is neither practical nor economical.

Multi-lane bridges were considered at the request of The Town of Wake Forest. The Town of Wake Forest Transportation Plan, adopted in January 2003, proposes a five-lane curb and gutter cross-section on Jones Dairy Road in the future. However, widening of Jones Dairy Road is not listed in the NCDOT 2004-2010 Transportation Improvement Program. Bridge replacement funds are only available for bridge replacements and associated construction like detours and approach work, so to fund widening on Jones Dairy Road, a new project must be created and approved by the NCDOT Board of Transportation for inclusion in the NCDOT Transportation Improvement Program (T.I.P.). Additionally, Average Daily Traffic forecasts (ADTs) for the year 2030 show approximately 16,600 vehicles per day on this road. This volume of traffic will still function at an acceptable level of service on two lanes. Therefore, multi-lane bridges were dropped from consideration.

D. Preferred Alternative

Bridges No. 448 and 140 will be replaced at the existing location as shown by Alternative 1 in Figures 2A and 2C. Alternative 1 is recommended because it minimizes impacts on the sensitive natural ecosystems in the vicinity of the site and provides the most economic design. Also, this alternative will have a minimal impact on the floodplain and on adjacent properties.

A road user analysis was performed based on vpd and an average of 0.7 miles of indirect travel. At a vehicle operating cost of $0.36 per mile, the cost of additional travel would be about $1,057,770 during a 24-month construction period. The estimated cost of maintaining traffic on-site for Alternative 2 is $1,783,721. This indicates it is more economical to detour traffic off-site during the construction period, therefore traffic will be maintained off-site during the construction of this project. At no time will both bridges be non-operational, as there are several residents between the two bridges who require access to SR 2053. Residents will always have access to one of the two bridges, and the construction will be phased appropriately.

Design exceptions occur when the proposed design will not meet the standards for a particular design speed. Design exceptions are commonly used when trying to utilize the existing alignment for a road in order to minimize impacts and costs, as is the case for this project. The speed limit for Jones Dairy Road is posted at 55 mph, with curves signed for cautionary 45 mph. Based on this posted speed limit, the design speed for Bridge Nos. 448 and 140 on Jones Dairy Road will be 60 mph. NCDOT anticipates the need for a design exception for the crest and sag vertical curves over Smith's Creek for Bridge No. 140.

The NCDOT Division 5 Engineer concurs with the selection of Alternative 1 as the preferred alternative.

IV. ESTIMATED COST

	Alternative 1 Preferred	Alternative 2
Structure	$ 330,400	$ 330,400
Roadway Approaches	$ 1,080,463	$ 886,776
Detour Structure and Approaches	-0-	$ 1,386,021
Structure Removal	$ 14,504	$ 14,504
Miscellaneous and Mobilization (45%)	$ 641,633	$ 1,178,299
Engineering & Contingencies	$ 383,000	$ 604,000
Total Construction Cost	$ 2,450,000	$ 4,400,000
Right-of-way Costs	$ 182,475	$ 397,700
Total Project Cost	$ 2,632,475	$ 4,797,700

V. NATURAL RESOURCES

1.0 INTRODUCTION

Purpose

The purpose of this study is to provide an evaluation of existing natural resources in the project study area. Specifically, the tasks performed for this study include: 1) an assessment of natural resource features within the project study area including descriptions of vegetation, wildlife, protected species, streams, wetlands, and water quality; 2) an evaluation of potential environmental impacts resulting from construction; and 3) a preliminary determination of permit needs.

Methodology

Materials and research data in support of this investigation have been derived from a number of sources. The Rolesville NC, U.S. Geological Survey (USGS) 7.5-minute topographic maps were consulted to determine physiographic relief and to assess landscape characteristics (USGS 1993). U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping was also consulted to determine what potential wetland types may be encountered in the field. Recent aerial photography (1:1200) furnished by the NCDOT was also used in the evaluation of the study area.

Aerial photography served as the basis for mapping plant communities and wetlands. Plant community patterns were identified from available mapping sources and then field

verified. Plant community descriptions are based on a classification system utilized by the North Carolina Natural Heritage Program (NHP) (Schafale and Weakley 1990). When appropriate, community classifications were modified to better reflect field observations. Vascular plant names typically follow nomenclature found in Radford *et al.* (1968).

Jurisdictional areas 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).

Water resource information for Austin Creek and Smith Creek was derived from the most recent versions of the *Neuse River Basinwide Water Quality Plan* (DWQ 1998), *Basinwide Assessment Report: Neuse River Basin* (DWQ 2001), and N. C. Division of Water Quality (DWQ) internet resources. Quantitative sampling was not undertaken to support existing data.

The most current USFWS list (25 February 2003) of federal protected species with ranges extending into Wake County was reviewed prior to initiation of the field investigation. In addition, NC Natural Heritage Program (NHP) records documenting occurrences of federal or state-listed species were consulted before commencing the field investigation. Direct observations of terrestrial and aquatic wildlife were documented, and expected population distributions were determined through observations of available habitat and review of supportive documentation found in Martof *et al.* (1980), Webster *et al.* (1985), Menhinick (1991), Hamel (1992), Rohde *et al.* (1994), and Palmer and Braswell (1995).

Definitions

B-3919 is located on SR 2053 and crosses Austin Creek (Bridge No. 448) and Smith Creek (Bridge No. 140) southeast of Wake Forest in Wake County, North Carolina.

- The Austin Creek crossing is located approximately 0.6 mi (1.0 km) south of the intersection of NC 98 and SR 2053 and is approximately 1881 ft (574 m) in length with the widths ranging from approximately 25 ft (8 m) to approximately 160 ft (49 m).

- The Smith Creek crossing is located approximately 0.3 mi (1.0 km) south of the intersection of NC 98 and SR 2053 and is approximately 1525 ft (465 m) in length with widths ranging from approximately 40 ft (12 m) to approximately 140 ft (43 m).

The project vicinity describes an area extending 0.5 mile (0.8 km) on all sides of the project study area.

2.0 PHYSICAL RESOURCES

The project study areas for both segments of B-3919 (project study areas) are located in the piedmont physiographic province of North Carolina with topography that is generally characterized as gently sloping to nearly level. The project vicinity is rural in nature and surrounding land use includes a mixture of residential, commercial, and silvicultural use.

- Elevations in the Bridge No. 448 project study area range from 250 to 310 ft (76 to 95 m) above mean sea level (USGS 1993).

- Elevations in the Bridge No. 140 project study area range from 260 to 310 ft (79 to

95 m) above mean sea level (USGS 1993).

The project study areas consist of existing maintained rights-of-way, residential areas and successional areas.

Soils

The project study area for Bridge No. 448 (Austin Creek) crosses seven soils types (USDA 1970). The are no hydric soil mapping units located within the Bridge No 448 project study area. Non-hydric soil mapping units within project study areas that may contain hydric inclusions include the Chewacla mapping unit (*Aquic Fluventic Dystrochrepts*), which is typically found on somewhat poorly drained floodplains. The Chewacla mapping unit may contain inclusions of the poorly drained Wehadkee (*Fluventic Haplaquepts*) along drainageways. Other non-hydric soils within the project study area are Appling sandy loam (*Typic Hapludults*), Cecil sandy loam (*Typic Hapludults*), Wake soils (*Lithic Udipsamments*), Louisburg loamy sand (*Ruptic-Ultic Dystrochepts*), and Wedowee sandy loam (*Typic Hapludults*).

The project study area for Bridge No. 140 (Smith Creek) crosses three soil types (USDA 1970). There are no hydric soils within the Bridge No. 140 project study area. Non-hydric soils within the Bridge No. 140 project study area that may contain hydric inclusions include the Chewacla mapping unit, which is typically found on somewhat poorly drained floodplains. The Chewacla mapping unit may contain inclusions of the poorly drained Wehadkee series along drainageways. Other non-hydric soils within the project study area include Appling sandy loam, Cecil sandy loam, and Wake soils.

Water Resources

STREAM CHARACTERISTICS

Austin Creek is the only water resource likely to be impacted by the proposed Bridge No. 448 replacement. Austin Creek has been assigned Stream Index Number (SIN) 27-23-3 and a Best Usage Classification of **C NSW** by the DWQ (DEM 1993) (DENR 2002a). Austin Creek originates west of NC 96 and north of Jones Dairy Road (SR 2053) in Wake County and flows southwest to its confluence with Smith Creek southwest of the Bridge No. 448 project study area. Austin Creek is located within sub-basin 030402 of the Neuse River Basin (DWQ 1998) and is part of USGS hydrologic unit 03020201 (USGS 1974).

Smith Creek is the only water resource likely to be impacted by the proposed Bridge No. 140 replacement. Smith Creek has been assigned SIN 27-23-(2) and a Best Usage Classification of **C NSW** from the dam at the Wake Forest Reservoir to the Neuse River (DEM 1993) (DENR 2002a). Smith Creek originates southeast of Youngsville and flows south/southwest through the Wake Forest Reservoir to the Neuse River. Smith Creek is located within sub-basin 030402 of the Neuse River Basin (DWQ 1998) and is part of USGS hydrologic unit 03020201 (USGS 1974).

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. The **C** designation indicates waters designated for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. The **NSW** designation indicates a nutrient sensitive water which requires limitations on nutrient inputs. Point

source discharges of treated wastewater are permitted in these waters, pursuant to Rules .0104 and .0211 of 15A NCAC 2B; however, local programs to control nonpoint source and stormwater discharge of pollution are required.

Waters are classified according to their best intended uses. Use support ratings are assigned to bodies of water to depict how well a body of water supports its designated uses (DWQ 1998).

- Austin Creek was not evaluated for support uses, but it is a tributary of Smith Creek. A stream that is tributary to a monitored segment of a stream rated fully supporting (FS) or fully supporting but threatened (ST) receives the same rating on an evaluated basis (DWQ 1998).

- Smith Creek is rated as "fully supporting but threatened" (ST) from its source to its confluence with the Neuse River. Fully supporting but threatened is a rating given to a water body that "fully supports its designated uses but may not in the future unless pollution prevention or control action is taken" (DWQ 1998).

No Outstanding Resource Waters (**ORW**), High Quality Waters (**HQW**), **WS-I**, or **WS-II** Waters occur within 1.0 mi (1.6 km) upstream or downstream of Bridge No. 448 over Austin Creek (DENR 2002).

Bridge No. 140 over Smith Creek is located approximately 0.4 mi (0.6 km) downstream of the Wake Forest Reservoir. The Wake Forest Reservoir is classified as **WS-II HQ NSW CA** waters. **WS-II HQ NSW CA** waters are protected as water supplies which are generally in predominantly undeveloped watersheds (**WS-II**), waters that have been rated as excellent based on biological and physical/chemical characteristics through division monitoring or special studies (**HQ**), which require limitations on nutrient inputs (**NSW**), and is protected as a critical area (**CA**) for 0.5 mi (0.8 km) upstream of the water supply intake (DEM 1993).

Neither Austin Creek nor Smith Creek is designated as a North Carolina Natural and Scenic River, nor as a national Wild and Scenic River.

Austin Creek is a perennial stream with moderate flow over substrate consisting of sand, silt, gravel, and rock. The channel ranges from approximately 10 to 20 ft (3 to 6 m) wide and water surface depths range from approximately 1.0 ft (0.3 m) to greater than 3 ft (0.9 m) within the project study area. Preliminary observations indicate that the portion of Austin Creek upstream of Bridge No. 448 represents a "E" stream type and the portion of Austin Creek downstream of Bridge No. 448 represents a "G" stream type pursuant to Rosgen (1996). The "E" stream type has a gently to moderately sloped, relatively deep and narrow, slightly entrenched channel with high sinuosity and is characterized by riffle-pool sequences, well defined meanders, and a well-developed floodplain. The "G" stream type has a moderately to gently sloped, relatively deep and narrow, highly entrenched, moderately to highly sinuous channel and is characterized by the lack of a developed floodplain, a meandering channel, and terraces consisting of abandoned floodplains.

Smith Creek is a perennial stream with moderate flow over substrate consisting of sand and gravel. The channel ranges from approximately 10 to 15 ft (3 to 5 m) wide and water surface depths range from approximately 0.5 ft (0.2 m) to greater than 2.0 ft (0.6 m) within the project study area. Preliminary observations indicate that this portion of Smith Creek represents a "G" stream type pursuant to Rosgen (1996). The

"G" stream type has a moderately to gently sloped, relatively deep and narrow, highly entrenched, moderately to highly sinuous channel and is characterized by the lack of a developed floodplain, a meandering channel, and terraces consisting of abandoned floodplains.

WATER QUALITY INFORMATION

One method used by DWQ to monitor water quality is through long-term monitoring of macroinvertebrates (DEHNR 1989).

- There are no long-term macroinvertebrate monitoring stations located on Austin Creek.
- Benthic macroinvertebrates from Smith Creek were sampled in 1986, 1995, and 2000 at SR 2045 approximately 3.3 mi (5.3 km) downstream of the project study areas. This site received a bioclassification rating of Poor in 1986 due to a spill of dairy waste, but recovered to Good-Fair rating in 1995 (DWQ 1996). In 2000, Smith Creek received an Fair bioclassification rating (DWQ 2001).

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 communities.

- Austin Creek has not received a NCIBI rating (DWQ 2001).
- Smith Creek received a NCIBI score of Fair in 1995 (DWQ 1996) and received a rating of Excellent in 2000 (DWQ 2001).

An NCIBI rating of Fair indicates that the system is dominated by omnivores, tolerant species and habitat generalists; there are few top carnivores; growth rates and condition factors are commonly depressed; and diseased fish are often present (DWQ 2001). Streams receiving an Excellent NCIBI rating are "comparable to the best situations without human disturbance. All regionally expected species for the habitat and stream size, including the most intolerant forms are present, all with a full array of size classes and a balance of trophic sructure" (DWQ 2001).

Neuse River Riparian Buffers

Since the project study areas are within the Neuse River Drainage Basin, jurisdictional surface waters are subject to the Neuse River Riparian Buffer Rules. The Buffer Rules apply to a 50-ft (15 m) wide riparian buffer directly adjacent to surface waters in the Neuse River Drainage Basin. This includes intermittent streams, perennial streams, lakes, ponds, and estuaries that are depicted on either USGS topographic maps or county soil survey maps, but does not include jurisdictional wetlands (non-surface waters) regulated under Section 404 of the Clean Water Act. Austin Creek and Smith Creek are mapped on the USGS map and county soil survey map and are subject to the Buffer Rules. The Buffer Rules are discussed in Section 4.2.

ESSENTIAL FISH HABITAT ASSESSMENT

Essential Fish Habitat (EFH) is defined by the National Marine Fisheries Service (NMFS) as "those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity" (NMFS 1999). For the purpose of interpreting the definition of EFH: "waters" include aquatic areas and their associated physical, chemical, and biological

properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (NMFS 1999). An EFH Assessment is an analysis of the effects of a proposed action on EFH. Pursuant to 50 CFR 600.920 (g) mandatory contents include: a description of the proposed action, an analysis of the effects of that action on EFH, the Federal action agency's views on those effects; and proposed mitigation, if applicable. An adverse effect includes any impact which reduces the quality and/or quantity of EFH. Pursuant to 50 CFR 600.810 adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, or reduction in a species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

During the agency review period for the proposed project, the COE makes the determination of whether or not a proposed project "may adversely affect" EFH. This determination by the COE is submitted to the NMFS for their review and comment. NMFS will then determine if additional consultation is necessary regarding the proposed project or if they concur with COE's decision.

EFH is only designated for federally managed species that have a management plan under a Fisheries Management Council (Ron Sechler, NMFS, Personal Communication). The South Atlantic Fisheries Council manages species such as red drum (*Sciaenops ocellatas*), bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatus*) and several species of shrimp. At this time anadromous fish are not considered for EFH designations (Ron Sechler, NMFS, Personal Communication). ESI has reviewed the most recent species list prepared by NMFS pertaining to EFH, and all listed species are either marine or estuarine in nature and do not occur in either project study area (NMFS 2001). ESI's opinion based on best professional judgment and reviewing pertinent literature and regulations is that the proposed project will not have any detrimental effect on EFH.

PERMITTED DISCHARGERS

Discharges that enter surface waters through a pipe, ditch or other well-defined point of discharge are broadly referred to as "point sources." Wastewater point source discharges include municipal (city and county) and industrial wastewater treatment plants and small domestic wastewater treatment systems serving schools, commercial offices, residential subdivisions and individual homes (DENR 2002b). Stormwater point source discharges include stormwater collection systems for municipalities and stormwater discharges associated with certain industrial activities. Point source dischargers in North Carolina must apply for and obtain a National Pollutant Discharge Elimination System (NPDES) permit. Discharge permits are issued under the NPDES program, delegated to DWQ by the Environmental Protection Agency (EPA).

- There is one permitted point source discharger, Jones Dairy Farm Utilities (NPDES NC0064149), on Austin Creek (DENR 2002b). Jones Dairy Farm Utilities is located approximately 1.0 mi (1.6 km) upstream of the project study area for Bridge No. 448 and is permitted to discharge 0.16 million gallons per day (MGD).

- There are two permitted point source dischargers located on Smith Creek (DENR 2001b). The Town of Wake Forest Wastewater Treatment Plant (NPDES

NC0007528) located 0.2 mi (0.3 km) upstream of Bridge No. 140. The amount of discharge from this facility is not limited (DENR 2002b). The Whippoorwill Valley Wastewater Treatment Plant (NC0073318) is located downstream of Bridge No. 140 and is permitted to discharge up to 0.05 MGD (DENR 2002b).

The only evidence of non-point source discharge observed within the Bridge No. 448 project study area (Austin Creek) is stormwater runoff. Jones Dairy Farm Utilities is a point and non-point pollution source farther upstream of Bridge No. 448.

Evidence of non-point source discharges observed within the Bridge No.140 project study area (Smith Creek) includes stormwater runoff. Turbidity was noted in Smith Creek during the field investigation. Upstream of Bridge No. 140 sedimentation is a major non-point pollution source. Sedimentation is likely due to bank erosion and stormwater runoff.

IMPACTS TO WATER RESOURCES

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 stream resulting from demolition.

The Bridge No 448 is 35.5 ft (10.8 m) long with a clear deck width of 25.5 ft (7.8 m). Components of the superstructure will be removed without dropping them into Waters of the United States. Since the substructure consists of timber, this will also be removed without dropping any portion into Waters of the United States. This project can be classified as a Case 3 by the BMP's for Bridge Demolition and Removal (NCDOT 1999). Case 3 bridge replacements have no special restrictions beyond those outlined in BMPs for Protection of Surface Waters and BMPs for Bridge Demolition and Removal (NCDOT 1999).

Bridge No. 140 is 35.7 ft (10.9 m) long with a clear deck width of 25.4 ft (7.7 m). Components of the superstructure will be removed without dropping them into Waters of the United States. Since the substructure consists of timber, this will also be removed without dropping any portion into Waters of the United States. This project can be classified as a Case 3 by the BMP's for Bridge Demolition and Removal (NCDOT 1999). Case 3 bridge replacements have no special restrictions beyond those outlined in BMPs for Protection of Surface Waters and BMPs for Bridge Demolition and Removal (NCDOT 1999).

Short-term impacts to water quality, such as sedimentation and turbidity, may result from construction-related activities. Best Management Practices (BMPs) can minimize impacts during construction, including implementation of stringent erosion and sedimentation control measures, and avoidance of using wetlands as staging areas.

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 bridge, 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 if roadway or bridge surface area increases. However, due to the limited amount of overall change anticipated in the surrounding areas, impacts are expected to be temporary in nature.

In-stream construction activities will be scheduled to avoid and minimize impacts to aquatic resources/organisms.

3.0 BIOTIC RESOURCES

3.1 Terrestrial Communities

Existing Vegetation Patterns
Distribution and composition of plant communities throughout the project study area reflect landscape-level variations in topography, soils, hydrology, and past and present land use practices. Logging, farming, selective cutting, and natural succession after fires, hurricanes, and other disturbances have resulted in the present vegetative patterns. When appropriate, the plant community names have been adopted and modified from the NHP classification system (Schafale and Weakley 1990) and the descriptions written to reflect local variations within the project study areas. Both project study areas are similar in nature and have been highly impacted and have very little resemblance to any natural community. Four plant communities occur within the project study areas and two additional communities are the result of human activities.

- The plant communities for the Austin Creek crossing total approximately 3.16 ac (1.28 ha) and do not include the open water attributed to Austin Creek [0.06 ac (0.02 ha)] or impervious road surface [1.00 ac (0.40 ha)].

- The plant communities for the Smith Creek Crossing total approximately 4.66 ac (1.89 ha) and do not include the open water attributed to Smith Creek [0.06 ac (0.02 ha)] or impervious road surface [0.95 ac (0.38 ha)].

Mixed Hardwood Forest – Mixed hardwood forest consists of white oak (*Quercus alba*), sweetgum (*Liquidambar styraciflua*), and flowering dogwood (*Cornus florida*). The shrub stratum is dominated by sweetgum, American holly (*Ilex opaca*) and red cedar (Juniperus virginiana). Groundcover species consist of Japanese honeysuckle (*Lonicera japonica*), common greenbrier (Smilax rotundifolia), and scattered Nepal microstegium (Eulalia vimineum).

- Mixed hardwood forest is a small component of the northwest quadrant of the Austin Creek bridge crossing. Mixed hardwood forest covers approximately 0.04 ac (0.02 ha) [1.0 percent] of the Austin Creek project study area.

- Mixed hardwood forest is a small component of the southwest quadrant of the Smith Creek bridge crossing. Mixed hardwood forest covers approximately 0.40 ac (0.16 ha) [7.1 percent] of the Smith Creek project study area.

Mixed Pine/Hardwood Forest –Mixed pine/hardwood forest consists of loblolly pine (*Pinus taeda*), willow oak (*Quercus phellos*), winged elm (*Ulmus alata*) and white oak. The shrub stratum is dominated by sweetgum saplings, black cherry (*Prunus serotina*), loblolly pine, and eastern red cedar. Groundcover species consist of Japanese honeysuckle, blackberry (*Rubus* spp.), and common greenbrier.

- Mixed pine/hardwood forest is a small component of the southwest quadrant of the Austin Creek bridge crossing. Mixed pine/hardwood forest covers approximately 0.12 ac (0.05 ha) [2.8 percent] of the Austin Creek project study area.

- Mixed pine/hardwood forest is a small component of the northeast quadrant of the

Smith Creek bridge crossing. Mixed pine/hardwood forest covers approximately 0.08 ac (0.03 ha) [1.4 percent] of the Smith Creek project study area.

Pine Plantation – Pine plantation community is dominated by loblolly pines. The shrub stratum is dominated by sweetgum saplings and eastern red cedar. Groundcover species consist of Japanese honeysuckle, common greenbrier, blackberry, and broomsedge (*Andropogon virginicus*).

- The pine plantation community does not occur within the Austin Creek project study area.

- Pine plantation community occurs in the northwest quadrant of the bridge crossing and covers approximately 0.65 ac (0.26 ha) [11.4 percent] of the Smith Creek project study area.

Piedmont/Low Mountain Alluvial Forest –Piedmont/low mountain alluvial forest has recently been logged and the remaining tree strata is dominated by sweetgum, red maple (*Acer rubrum*), tulip poplar (*Liriodendron tulipifera*), and American sycamore (*Platanus occidentalis*). The shrub stratum is dominated by Chinese privet (*Ligustrum sinense*), sweetgum, and red maple. Groundcover species consist of Japanese honeysuckle, Nepal microsteguim, blackberry, and common greenbrier, with scattered river oats (*Chasmanthium latifolium*). This plant community is associated with floodplains of smaller streams and is seasonally or intermittently flooded.

- Piedmont/low mountain alluvial forest occurs in the northeast and southeast quadrants of the Austin Creek bridge crossing. Piedmont/low mountain alluvial forest covers approximately 0.51 ac (0.21 ha) [12.1 percent] of the Austin Creek project study area.

- Piedmont/low mountain alluvial forest occurs in the northeast quadrant of the Smith Creek bridge crossing. Piedmont/low mountain alluvial forest covers approximately 0.03 ac (0.01 ha) [0.5 percent] of the Smith Creek project study area.

Successional Land –Successional land consist of loblolly pines, sweetgum, Japanese honeysuckle, blackberry, common greenbrier, kudzu (*Pueraria lobata*), Chinese privet, and various grasses including witch grass (*Panicum* spp.).

- The northeast quadrant of the Austin Creek bridge crossing is dominated by successional land. Successional land covers approximately 0.35 ac (0.14 ha) [8.3 percent] of the Austin Creek project study area.

- The southwest quadrant of the Smith Creek bridge crossing is dominated by successional land. Successional land covers approximately 2.08 ac (0.84 ha) [36.7 percent] of the Smith Creek project study area.

Maintained/Disturbed Land – Maintained/disturbed land includes roadways, roadsides, maintained residential yards, power line right-of-way corridors, and areas where other human related activities dominate the landscape. Roadsides and powerline right-of-ways are typically maintained by mowing and/or herbicides. Species observed within the road rights-of-way include blackberry, Japanese honeysuckle, sweetgum saplings, plantain (*Plantago* spp.), and various maintained roadside grasses including fescue (*Festuca* spp.), and Bermuda grass (*Cynodon dactylon*).

- Maintained/disturbed land dominates the northwest and southwest quadrants of the Austin Creek bridge crossing. Maintained/disturbed land covers approximately 2.14 ac (0.87 ha) [50.7 percent] of the Austin Creek project study area.

- Maintained/disturbed land dominates the southeast quadrant of the Smith Creek bridge crossing. Maintained/disturbed land covers approximately 1.42 ac (0.57 ha) [25.0 percent] of the Smith Creek study area.

The plant communities within the project study areas were mapped on an aerial photo base and field verified. A summary of the coverage of each plant community within each project study area is presented in Table 1 for Bridge No. 448 and Table 2 for Bridge No. 140. Open water areas and impervious road surfaces are not included in the plant community assessments.

Table 1. Plant Communities Within the Project Study Area for Bridge No. 448.

Plant Community	Area acres (hectares)	% of Project Study Area[a]
Mixed Hardwood Forest	0.04 (0.02)	1.0
Mixed Pine/Hardwood Forest	0.12 (0.05)	2.8
Piedmont/Low Mountain Alluvial Forest (recently logged)	0.51 (0.21)	12.1
Successional Land	0.35 (0.14)	8.3
Maintained/Disturbed Land	2.14 (0.87)	50.7
Totals[a]:	3.16 (1.29)	74.9

[a] Project Study Area includes the open water area attributed to the Austin Creek channel [0.06 ac (0.02 ha)] (1.4 percent) and impervious road surface [1.00 ac (0.40 ha)] (23.7 percent) not included in this plant community assessment.

Table 2. Plant Communities Within the Project Study Area for Bridge No. 140.

Plant Community	Area acres (hectares)	% of Project Study Area[a]
Mixed Hardwood Forest	0.40 (0.16)	7.1
Mixed Pine/Hardwood Forest	0.08 (0.03)	1.4
Pine Plantation	0.65 (0.26)	11.4
Piedmont/Low Mountain Alluvial Forest	0.03 (0.01)	0.5
Successional Land	2.08 (0.84)	36.7
Maintained/Disturbed Land	1.42 (0.57)	25.0
Totals[a]:	4.66 (1.87)	82.1

[a] Project Study Area includes the open water area attributed to the Smith Creek channel [0.06 ac (0.02 ha)] (1.1 percent) and impervious road surface [0.95 ac (0.38 ha)] (16.8 percent) not included in this plant community assessment.

Terrestrial Wildlife

The communities within the project study areas are fragmented and disturbed along both sides of SR 2053. The communities within both project study areas are similar and wildlife species that may be expected in the project study areas are expected to be similar. The species that would be expected within the project study areas are those adapted to fragmentation, agricultural practices and urban disturbed areas such as roadsides and

residential areas. The project study areas were visually surveyed for signs of terrestrial wildlife.

Mammals directly observed or evidenced by tracks or scat include Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), and white-tailed deer (*Odocoileus virginianus*). Beaver (*Castor canadensis*) activity is evident in both Austin and Smith Creek. Insectivores such as southeastern shrew (*Sorex longirostris*) and northern short-tailed shrew (*Blarina brevicauda*) may also be present in the project study area. Other mammals expected to occur in and around the project study areas include eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis),* and rodents such as golden mouse (*Ochrotomys nuttalli*), and gray fox (*Urocyon cinereoargenteus*).

No terrestrial reptiles were observed within the project study areas for Austin Creek or Smith Creek. Terrestrial reptiles expected to occur in the project study area include such species as eastern box turtle (*Terrapene carolina*), fived-lined skink (*Eumeces fasciatus*), broadhead skink (*Eumeces laticeps*), black racer (*Coluber constrictor*), and rat snake (*Elaphe obsoleta*).

No terrestrial or aboreal amphibians were observed within the project study areas for Austin Creek or Smith Creek. Terrestrial or aboreal amphibians expected to occur in the project study area include such species as Fowler's toad (*Bufo woodhousei*) and spring peeper (*Pseudacris crucifer*).

No avian species were observed within the project study areas for Austin Creek and Smith Creek. Avian species expected to occur in the project study areas include the turkey vulture (*Cathartes aura*), red-shouldered hawk (*Buteo lineatus*), mourning dove (*Zenaida macroura*), downy woodpecker (*Picoides pubescens),* pileated woodpecker (*Dryocopus pileatus*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), Carolina chickadee (*Poecile carolinensis*), Carolina wren (*Thryothorus ludovicianus*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), and northern cardinal (*Cardinalis cardinalis*).

Most of the terrestrial wildlife occurring in the project study areas for Austin Creek and Smith Creek are typically adapted to life in fragmented landscapes, and overall impacts should be minor. Due to the lack of, or limited, infringement on natural communities, the proposed bridge replacement will not result in significant loss or displacement of known terrestrial animal populations. Wildlife movement corridors are not expected to be significantly impacted by the proposed project.

3.2 Aquatic Communities

The aquatic habitat located within the project study area for Bridge No. 448 includes Austin Creek and the aquatic habitat within the project study area for Bridge No. 140 includes Smith Creek. No distinct areas containing significant amounts of aquatic vegetation were observed in the channel during the field investigation of either bridge.

Visual observation of stream banks and channel within the project study areas were conducted in Austin Creek and Smith Creek to document the aquatic community.

Aquatic Wildlife

Since these two streams are located in close proximity and share similar habitats fish species expected to occur should be similar. No fish species were documented in Austin Creek during the field investigation. Eastern mosquitofish (*Gambusia holbrooki*) and bluegill (*Lepomis macrochirus*) were documented in Smith Creek. Fish species that may

occur in Austin Creek and Smith Creek include American eel (*Anguilla rostrata*), redfin pickerel (*Esox americanus*), golden shiner (*Notemigonus crysoleucas*), rosyside dace (*Clinostomus funduloides*), bluehead chub (*Nocomis leptocephalus*), greenfin shiner (*Notropis chloristius*), swallowtail shiner (*Notropis procne*), white shiner (*Notropis albeolus*), rosefin shiner (*Notropis ardens*), creek chub (*Semotilus atromaculatus*), pirate perch (*Aphredodrus sayanus*), flier (*Centrarchus macropterus*), green sunfish (*Lepomis cyanellus*), redbreast sunfish (*Lepomis auritus*), pumpkinseed (*Lepois gibbosus*), largemouth bass (*Micropterus salmoides*), yellow perch (*Perca flavens*), and Johnny darter (*Etheostoma nigrum*) (Menhinick 1991). Menhinick (1991) does not document any anadromous fish as occurring in the upper reaches of Smith Creek or Austin Creek, Wake County, North Carolina.

Austin Creek and Smith Creek provide riparian and benthic habitat for a variety of amphibians and aquatic reptiles. Although none were observed during the field investigation, the following species are expected to occur in the project study area: green frog (*Rana clamitans*), pickerel frog (*Rana palustris*), and common snapping turtle (*Chelydra serpentina*).

Waterfowl expected to utilize this portion of Smith Creek and Austin Creek include such species as wood duck (*Aix spoinsa*) and mallard (*Anas platyrhynchos*).

Wading birds expected to utilize this portion of Smith Creek and Austin Creek include such species as green heron (*Butorides virescens*) and great blue heron (*Ardea herodias*).

Limited benthic macroinvertebrate sampling was conducted. These surveys included rock and log washes, limited bottom sampling, and walking all streambanks in the project study area to locate freshwater mussel middens. Rock and log washes and limited bottom sampling conducted within the channels of Austin Creek and Smith Creek produced various aquatic macroinvertebrates. Table 3 provides a list of the benthic organisms collected and identified to Order and Family when possible. Identifications are based on McCafferty (1998).

Table 3. Benthic Macroinvertebrates Collected in Austin Creek and Smith Creek.

Order	Family	Common Name	Austin Creek	Smith Creek
Gastropoda		Snails	X	X
Pelecypoda	Sphaeriidae	Fingernail clams	X	
Ephemeroptera	Heptageniidae	Flathead mayfly	X	
	Siphlonuridae	Primitive minnow mayfly	X	
Odonata	Aeshinudae	Darners		X
	Calopterygidae	Broadwinged damselfly	X	
Trichoptera	Hydropsychidae	Common Netspinners	X	X
Diptera	Simuliidae	Black fly		X
	Chironomidae	Midges	X	
Amphipoda		Scuds	X	
Decapoda		Crayfish	X	

3.3 Summary of Anticipated Impacts

Terrestrial Communities

These two bridge replacements are expected to involve minor impacts to the terrestrial communities located within the project study areas. In-place replacement of the existing structure will reduce permanent impacts to plant communities and limit community fragmentation. Impacts resulting from bridge replacements are generally limited to narrow strips adjacent to the existing bridge structure and roadway approach segments. Plant communities within the project study area are presented in Table 1; however, actual impacts will be limited to the designed right-of-way and permitted construction limits (Table 4). Due to the anticipated lack of, or limited, infringement on natural communities, the proposed bridge replacement should not result in significant loss or displacement of known terrestrial animal populations. Wildlife movement corridors should not be significantly impacted by the proposed project. Wildlife known to utilize the project study areas are generally acclimated to fragmented landscapes, and the bridge replacement should not create any additional detrimental conditions within the project study areas.

Table 4. Plant Community Impacts for Bridge No. 448 over Austin Creek.

Plant Community	ALT 1[a]	ALT 2[b]	
	Bridge Replacement Area acres (hectares)	Bridge Replacement Area acres (hectares)	Temporary Detour Area acres (hectares)[c]
Mixed Hardwood Forest	0.04 ac (0.02 ha)	0.04 ac (0.02 ha)	0.0
Mixed Pine/Hardwood Forest	0.12 ac (0.05 ha)	0.12 ac (0.05 ha)	0.0
Piedmont/Low Mountain Alluvial Forest	0.0	0.0	0.51 ac (0.21 ha)
Successional Land	0.0	0.0	0.35 ac (0.14 ha)
Maintained/Disturbed Land	1.40 ac (0.57 ha)	1.40 ac (0.57 ha)	0.74 ac (0.30 ha)
Total[d]:	1.56 ac (0.64 ha)	1.56 ac (0.64 ha)	1.60 ac (0.65 ha)
Total/ALT[d]	1.56 ac (0.64 ha)	3.16 ac (1.29 ha)	

[a] ALT 1 areas do not include 0.04 ac (0.02 ha) of open water and 1.00 ac (0.40 ha) of impervious road surface.

[b] ALT 2 areas do not include 0.06 ac (0.02 ha) of open water and 1.00 ac (0.40 ha) of impervious road surface.

[c] Note Temporary detour impacts area based on the portion of the onsite detour not included in the permanent impacts.

[d] Totals do not include the open water area attributed to the Austin Creek channel or impervious road surface.

Table 5. Plant Community Impacts for Bridge No. 140 over Smith Creek.

Plant Community	ALT 1[a]	ALT 2[b]	
	Bridge Replacement Area acres (hectares)	Bridge Replacement Area acres (hectares)	Temporary Detour Area acres (hectares)[c]
Mixed Hardwood Forest	0.14 ac (0.06 ha)	0.14 ac (0.06 ha)	0.25 ac (0.10 ha)
Pine Plantation	0.04 ac (0.02 ha)	0.04 ac (0.02 ha)	0.61 ac (0.25 ha)
Piedmont/Low Mountain Alluvial Forest	0.03 ac (0.01 ha)	0.03 ac (0.01 ha)	0.0 ac (0.0 ha)
Mixed Pine/Hardwood Forest	0.08 ac (0.03 ha)	0.08 ac (0.03 ha)	0.0 ac (0.0 ha)
Successional Land	0.65 ac (0.26 ha)	0.65 ac (0.26 ha)	1.40 ac (0.57 ha)
Maintained/Disturbed Land	1.30 ac (0.53 ha)	1.30 ac (0.53 ha)	0.17 ac (0.07 ha)
Total[d]:	2.24 ac (0.91ha)	2.24 ac (0.91ha)	2.43 ac (0.99 ha)
Total/ALT[d]	2.24 ac (0.91 ha)	4.67 ac (1.90 ha)	

[a] ALT 1 areas do not include 0.03 ac (0.01 ha) of open water and 0.95 ac (0.38 ha) of impervious road surface.

[b] ALT 2 areas do not include 0.06 ac (0.02 ha) of open water and 0.95 ac (0.38 ha) of impervious road surface.

[c] Note Temporary detour impacts area based on the portion of the onsite detour not included in the permanent impacts.

[d] Totals do not include the open water area attributed to the Smith Creek channel or impervious road surface.

Potential plant community impacts for the Bridge No. 448 over Austin Creek are minimal due to the in-kind replacement of a bridge with a bridge, on or very near the existing alignment. For Bridge No. 448 over Austin Creek, ALT 1 and ALT 2 have the same amount of permanent impacts, 1.56 ac (0.64 ha), but ALT 2 has 1.60 ac (0.65 ha) of additional temporary impacts. ALT 1 would be the recommended alternative if an off site detour is feasible.

Potential plant community impacts for the Bridge No. 448 over Austin Creek are minimal due to the in-kind replacement of a bridge with a bridge, on or very near the existing alignment. For Bridge No. 140 over Smith Creek, ALT 1 and ALT 2 have the same amount of permanent impacts, 2.24 ac (0.91 ha), but ALT 2 has 2.43 ac (0.99 ha) of additional temporary impacts. ALT 1 would be the recommended alternative if an off site detour is feasible.

An off site detour for both bridges has been determined to not be feasible. So at least one of the bridges must have an onsite detour. The temporary detour for ALT 2 for Bridge No. 448 over Austin Creek would have lesser impact to plant communities than the temporary detour for ALT 2 for Bridge No. 140 over Smith Creek.

Aquatic Communities

The replacement of Bridge No. 448 over Austin Creek and Bridge No. 140 over Smith Creek will likely cause temporary impacts to the aquatic communities in and around the project study area. Potential impacts to down-stream aquatic habitat will be avoided by bridging Austin Creek and Smith Creek to maintain regular flow and stream integrity. Support structures should be designed to avoid wetland or open water habitats whenever

possible. In addition, temporary impacts to downstream habitat from increased sediment during construction are expected to be reduced by limiting in-stream work to an absolute minimum, except for the removal of the portion of the sub-structure below the water. Waterborne sediment flowing downstream can be minimized by use of a floating silt curtain. Stockpiled material should be kept a minimum of 50 ft (15 m) from the stream channel. Silt fences should also be erected around any stockpiled material in order to minimize the chance of erosion or run-off from affecting the stream channel. Bridge Demolition and Removal (BDR) will follow current NCDOT Guidelines. Best Management Practices (BMPs) for the protection of surface waters should be strictly enforced to reduce impacts during all construction phases.

The proposed bridge replacements call for the in-kind replacement of the existing structure with a new channel spanning structure that would maintain stream current flow. Aquatic wildlife may be temporarily displaced during the bridge replacement project. No long-term or permanent impacts to aquatic communities are expected to result from the proposed bridge replacements. Any species that may be temporarily displaced would be expected to re-colonize the area quickly once construction is complete. No impacts are anticipated to anadromous fish runs or to fish spawning habitat.

4.0 JURISDICTIONAL TOPICS

4.1 Waters of the United States

Water bodies such as rivers, lakes, and streams are subject to jurisdictional consideration under the Section 404 program of the Clean Water Act (CWA). Additionally, wetlands are also considered "waters of the United States" and are also subject to jurisdictional consideration. Wetlands have been defined by EPA and COE as:

> Those areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas [33 CFR 328.3(b)(1986)].

Wetlands subject to review under Section 404 of the CWA (33 U.S.C. 1344) are defined by the presence of three criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology at or near the surface for a portion (12.5 percent) of the growing season (DOA 1987).

No jurisdictional wetlands occur within the Bridge No. 448 (Austin Creek) project study area. The surface water within the Austin Creek stream channel is classified as lower perennial riverine system (R2) (Cowardin 1979) and is the only jurisdictional areas that occur within the Austin Creek project study area. R2 systems account for 0.06 ac (0.02 ha) [1.4 percent] within the Bridge No. 448 project study area.

No jurisdictional wetlands occur within the Bridge No. 140 (Smith Creek) project study area. The surface water within the Smith Creek stream channel is also classified as lower perennial riverine system (R2) (Cowardin 1979) and is the only jurisdictional areas that occur within the Smith Creek project study area. R2 systems account for 0.06 ac (0.02 ha) [1.1 percent] within the Bridge No. 140 project study area.

R2 systems are identified as those areas contained within a channel that are not

dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, contain less than 0.5 parts per thousand (ppt) ocean derived salts, have no tidal influence, and generally have slow flowing water all year (Cowardin *et al.* 1979). These communities are generally associated with well-developed floodplains.

ESI delineated the jurisdictional extent of the surface water based on current COE and DWQ methodology, and the areas were subsequently mapped with Trimble™ Global Positioning System (GPS) units. Table 6 and Table 7 contain the approximate area and length of the R2 system occurring within each alternative for each respective bridge, although permanent impacts are not expected due to the use of channel-spanning structures. During bridge removal procedures (see Section 2.2), NCDOT's BMP's will be utilized, including erosion control measures; therefore it is anticipated that removing the existing structures will result in no impact to surrounding surface waters. Impacts to surface waters are not anticipated due to the in-kind replacement of a bridge with a bridge, on or very near the existing alignment. No long-term impacts to surface waters are expected from this project.

Table 6. Surface Waters Within Each Alternative for Bridge No. 448.

Jurisdictional Areas	Potential Impacts for Bridge No. 448 Acres (hectares)			
	ALT 1	ALT 2		
	Bridge Replacement Area	Bridge Replacement Area		Temporary Detour Area[a]
R2 (ac) (ha)	0.04 (0.02)	0.04 (0.02)		0.02 (0.01)
Totals for ALT:	0.04 (0.02)		0.06 (0.03)	
	Potential Impacts Linear feet (meters)			
Linear ft (m)	80 (24)	80 (24)		60 (18)
Total for ALT:	80 (24)		140 (42)	

[a] Temporary detour areas are based on the portion of the area not included in the permanent bridge areas.

Table 7. Surface Waters Within Each Alternative for Bridge No. 140.

Jurisdictional Areas	Potential Impacts for Bridge No. 140 Acres (hectares)			
	ALT 1	ALT 2		
	Bridge Replacement Area	Bridge Replacement Area		Temporary Detour Area[a]
R2 (ac) (ha)	0.03 (0.01)	0.03 (0.01)		0.03 (0.01)
Totals for ALT:	0.03 (0.01)		0.06 (0.02)	
	Potential Impacts Linear feet (meters)			
Linear ft (m)	80 (24)	80 (24)		70 (21)
Total for ALT:	80 (24)		150 (45)	

[a] Temporary detour areas are based on the portion of the area not included in the permanent bridge areas.

4.2 PERMITS AND CONSULTATIONS

Impacts to jurisdictional surface waters are not anticipated from the proposed project. However, construction activities resulting in impacts will require permits and certifications from various regulatory agencies in charge of protecting the water quality of public water resources. Surface water systems and wetlands receive similar treatment and

consideration with respect to most regulatory permits. These permits are authorized under the Clean Water Act and under separate state laws regarding significant water resources.

Section 404 Permits
In accordance with provisions of Section 404 of the Clean Water Act (33 U.S.C. 1344), a permit will be required from the COE for the discharge of dredged or fill material into "Waters of the United States." The proposed project may not result in impacts to Austin Creek or Smith Creek provided that the stream channel is bridged, there is no disturbance to the stream during construction activities, and bridge demolition does not result in material falling into the stream.

Given the limited nature of potential impacts, a Nationwide Permit (NWP) 23 (33 CFR 330 Appendix A) for Categorical Exclusion is likely to be applicable at the stream crossing found in the project study area. NWP 33 may be needed if temporary structures, work and discharges, including cofferdams are necessary for this project. However, final decisions concerning applicable permits for the proposed project rest with the COE.

Water Quality Certification
This project will also require a 401 Water Quality General Certification from the DWQ prior to the issuance of a Section 404 Nationwide Permit. Section 401 of the Clean Water Act requires that the state issue or deny water quality certification for any federally permitted or licensed activity that may result in a discharge into the Waters of the United States. Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulation. Issuance of a 401 Certification from the DWQ is a prerequisite to the issuance of a Section 404 Permit.

Anticipated impacts to open water areas will be limited to the actual right-of-way width and will be determined by NCDOT during the design phase of this project. Impacts to open water areas of Austin Creek and Smith Creek are not expected due to the use of channel-spanning structures. During bridge removal procedures, NCDOT's BMP's will be utilized, including erosion control measures. Floating turbidity curtains are also recommended to minimize the amount of turbid water flowing off-site.

Neuse River Buffer Rules
Since the project study areas are located within the Neuse River Drainage Basin, the stream channels are subject to the Neuse River Riparian Buffer Rules. The Buffer Rules apply to a 50-ft (15 m) wide riparian buffer directly adjacent to surface waters in the Neuse River Drainage Basin. This includes intermittent streams, perennial streams, lakes, ponds, and estuaries that are depicted on either USGS topographic maps or county soil survey maps, but does not include jurisdictional wetlands (non-surface waters) regulated under Section 404 of the Clean Water Act. Austin Creek and Smith Creek are mapped on the USGS map and are subject to the Buffer Rules. The riparian buffer consists of two distinct zones. Zone 1 comprises a 30-ft (9 m) wide area adjacent to the surface water that can not be disturbed except for those specific activities that are allowed by the Buffer Rules. Zone 2 comprises a 20-ft (6 m) wide area adjacent to Zone 1 that is to be left undisturbed except for those activities specifically allowed by the Buffer Rules.

Activities in the buffer area beyond the footprint of the existing use are classified as either "exempt", "allowable"," allowable with mitigation", or " prohibited." Table 8 provides a list of activities that may be subject to Buffer Rules within the project study area provided with their classifications. Depending upon project alternatives, not all of the uses listed may apply, and other uses not listed here, such as utility crossings and

roadside drainage ditches, among others, may be regulated under the Buffer Rules. Guidelines will be consulted in their entirety to review all project related uses subject to the Buffer Rules.

Table 8. Activities That May Be Subject to the Buffer Rules in the Project Study Area.

Use	Exempt	Allowable	Allowable With Mitigation	Prohibited
Bridges		X		
Road crossings that impact less than or equal to 40 linear ft (12 m)	X			
Road crossings that impact greater than 40 linear ft (12 m) but less than or equal to 150 linear ft (46 m) or 0.33 ac (0.13 ha) of riparian area.		X		
Road crossings that impact greater than 150 linear ft (46 m) or greater than 0.33 ac (0.13 ha) of riparian buffer.			X	
Temporary roads used for bridge construction or replacement provided that restoration activities such as soil stabilization and revegetation occur immediately after construction.		X		

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

ALT 1 for Bridge No. 448 over Austin Creek, the recommended alternative, does not expand the existing right-of-way of the assumed current 80 linear ft (24 m). There are no anticipated permanent impacts to riparian buffers for ALT 1, therefore no further action with respect to DWQ is required. ALT 2 will have no permanent impacts to riparian buffers and will have 60 linear ft (18 m) of potential impacts to riparian buffers associated with the temporary detour. Temporary impacts associated with the temporary detour would be considered allowable provided there is no practical alternative to the requested use. Allowable uses require written authorization from DWQ.

ALT 1 for Bridge No. 140 over Smith Creek, the recommended alternative, does not expand the existing right-of-way of the assumed current 80 linear ft (24 m). There are no anticipated permanent impacts to riparian buffers, therefore no further action with respect to DWQ is required. ALT 2 will have no permanent impacts to riparian buffers and will

have 70 linear ft (21 m) of potential impacts to riparian buffers associated with the temporary detour. Temporary impacts associated with the temporary detour would be considered allowable provided there is no practical alternative to the requested use. Allowable uses require written authorization from DWQ.

4.3 Mitigation

Mitigation has been defined in NEPA regulations to include efforts which: a) avoid; b) minimize; c) rectify; d) reduce or eliminate; or e) compensate for adverse impacts to the environment [40 CFR 1508.20 (a-e)]. Mitigation of wetland impacts is recommended in accordance with Section 404(b)(1) Guidelines of the CWA (40 CFR 230), FHWA step-down procedures (23 CFR 777.1 et seq.), mitigation policy mandates articulated in the COE/EPA Memorandum of Agreement (MOA), Executive Order 11990 (42 FR 26961 (1977), and U.S. Fish and Wildlife Service (FWS) mitigation policy directives (46 FR 7644-7663 (1981).

Section 404(b)(1) Guidelines, the COE/EPA MOA, and Executive Order 11990, stress avoidance and minimization as primary considerations for protection of wetlands. Practicable alternatives analysis must be fully evaluated before compensatory mitigation can be discussed.

Avoidance – No wetlands will be impacted by the proposed project. Impacts to the jurisdictional surface waters present can be avoided by bridging the stream channel, by avoiding construction activities in the stream channels, and by avoiding deposition into the stream channel during bridge demolition.

Minimization – Minimization of jurisdictional impacts is being achieved by the in-kind replacement of a bridge with a bridge and utilizing as much of the existing bridge corridor as possible. This should result in a minimal amount of new impact depending on the final design of the new bridge. Utilization of BMPs is recommended in an effort to minimize impacts, including avoiding placing staging areas within wetlands.

Mitigation – Due to the anticipated lack of jurisdictional impacts, no mitigation is expected to be required for this project. 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.

4.4 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 federal protected species listed for Wake County (USFWS list dated 25 February 2003) are presented in Table 9.

Table 9. Federally Protected Species Listed for Wake County, NC.

Common Name	Scientific Name	Status[a]	Biological Conclusion
Bald eagle	*Haliaeetus leucocephalus*	T(pd)	**No Effect**
Red-cockaded woodpecker	*Picoides borealis*	E	**No Effect**
Dwarf wedgemussel	*Alasmidonta heterodon*	E	**No Effect**

Michaux's sumac	*Rhus michauxii*	E	**No Effect**

[a] E- Endangered, T(pd)- Threatened (proposed for delisting)

Bald eagle - Bald eagles typically nest in tall, living trees in a conspicuous location near water and forage over large bodies of water with adjacent trees available for perching (Hamel 1992). Preventing disturbance activities within a primary zone extending 750 to 1500 feet (229 to 457 m) outward from a nest tree is considered critical for maintaining acceptable conditions for eagles (USFWS 1987). USFWS recommends avoiding any disturbance activities, including construction and tree cutting, within this primary zone. Within a secondary zone extending from the primary zone boundary out to a distance of 1.0 mile (1.6 km) from a nest tree, construction and land-clearing activities should be restricted to the non-nesting period. USFWS also recommends avoiding alteration of natural shorelines where bald eagles forage, and avoiding significant land-clearing activities within 1500 feet (458 m) of roosting sites.

BIOLOGICAL CONCLUSION: No Effect
NHP records through 14 January 2002 indicate no documented occurrences of bald eagle nests within 3.0 mi (4.8 km) of the Austin Creek or Smith Creek project study areas. The project study areas do not contain large areas of open water, and therefore are not considered to be suitable nesting and foraging habitat for bald eagles. This project will not have any effect on the bald eagle.

Red-cockaded woodpecker (RCW) - This small woodpecker measuring 7.0 to 8.5 inches (19.3 to 23.4 cm) 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. Primary nest sites for RCWs include open pine stands greater than 60 years of age with little or no mid-story development. Foraging habitat is comprised of open pine or pine/mixed hardwood stands 30 years of age or older (Henry 1989). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf (*Pinus palustris*), slash (*P. elliotii*), and pond (*P. serotina*) pines. Nest cavities are constructed in the heartwood of living pines, generally older than 60 years, that have been infected with red-heart disease. Nest cavity trees tend to occur in clusters, which are referred to as colonies. The woodpecker drills holes into the bark around the cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees. Pine flatwoods or pine-dominated savannas that have been maintained by frequent natural fires serve as ideal nesting and foraging sites for this woodpecker. Development of a thick understory may result in abandonment of cavity trees.

BIOLOGICAL CONCLUSION: No Effect
NHP records through 14 January 2002 do not document occurrences of the RCW within 3.0 miles (4.8 km) of the project study areas for Austin Creek or Smith Creek. The project study areas for Austin Creek or Smith Creek contain no large contiguous pine stands greater than 60 years old that are suitable for nesting nor do they contain large contiguous pines stands greater than 30 years old suitable for foraging. Mature pine trees with open understories exist primarily within residential yards located within the project study areas. No cavity trees were found within the project study area. This project will not effect the RCW.

Dwarf wedgemussel – The dwarf wedgemussel rarely exceeds 1.5 inches (3.8 cm) in

length. The outer shell is brown or yellowish brown with faint green rays, and the nacre is bluish or silvery white. The shells of the females are somewhat wider that those of males. This mussel species typically inhabits streams with moderate flow velocities and substrates varying in texture from gravel and coarse sand to mud with little silt deposition (USFWS 1993). It is generally found in association with other mussels but is never very numerous. As with other mussel species, the dwarf wedge mussel has suffered from excess siltation in streams and rivers and from the toxic effects of various pollutants entering waterways

BIOLOGICAL CONCLUSION: NO EFFECT

NHP records through 14 January 2002 do not document any occurrences of dwarf wedgemussel within 3.0 mi (3.8 km) of the project study areas for Austin Creek or Smith Creek as of 14 January 2002. The dwarf wedgemussel is not known to occur in any portion of Smith Creek or Austin Creek, but it is known to occur in the Little River and Swift creek subbasins in Wake County (NCWRC 2001). Johnny darter, the fish host for the dwarf wedgemussel, has been documented in Smith Creek (Mehhinick 1991). Smith Creek and Austin Creek may constitute potentially suitable habitat for the dwarf wedgemussel. During the field investigation 14 January 2002, no mussel middens were observed within the project study areas for Austin Creek and Smith Creek, although fingernail clams were collected from Austin Creek. A survey was conducted on February 3, 2003. The approximately 2-3 meter wide stream was screened 400 meters downstream and 100 meters upstream by wading in the water using batiscopes for visual surveys; tactile methods were employed along creekbeds where stable banks occurred. Most banks, however, were highly unstable and erosion was evident. Substrate consisted largely of coarse sand, with sand deposits throughout the channel. Urban garbage was found in the creek at the bridge site and at least 100 meters downstream. A total of 2.5 person-hours were spent during the survey. No mussels or relict shells were seen. Given the survey results and poor habitat, it is apparent that the dwarf wedgemussel does not occur in the project footprint. Additionally, there are no known occurrences of the species within a mile of the project. In conclusion, project construction will not affect this species.

Michaux's sumac - Michaux's sumac is a densely pubescent, deciduous, rhizomatous shrub, usually less than 2.0 feet (0.7 m) high. The alternate, compound leaves consist of 9 to 13 hairy, round-based, toothed leaflets borne on a hairy rachis that may be slightly winged (Radford *et al.* 1968). Small male and female flowers are produced during June on separate plants; female flowers are produced on terminal, erect clusters followed by small, hairy, red fruits (drupes) in August and September. Michaux's sumac tends to grow in disturbed areas where competition is reduced by periodic fire or other disturbances, and may grow along roadside margins or utility right-of-ways. In the Piedmont, Michaux's sumac appears to prefer clay soil derived from mafic rocks or sandy soil derived from granite (Weakley 1993). Michaux's sumac ranges from south Virginia through Georgia in the inner Coastal Plain and lower Piedmont.

BIOLOGICAL CONCLUSION: MAY AFFECT, Not Likely to Adversely Affect

NHP records do not document the occurrence of this species within 3.0 miles (4.8 km) of the project study areas for Austin Creek and Smith Creek. Potential habitat for Michaux's sumac exists within the Austin Creek and Smith Creek project study areas. Potential habitat includes the road right-of-way and open successional areas. A cursory survey for Michaux's sumac was conducted on January 17, 2002. No Michaux's sumac stems were observed. Surveys for Michaux's Sumac were conducted on June 27, 2002 by NCDOT personnel. All available habitat was walked and a thorough search of the area performed. No specimens of Michaux's Sumac were found. Another survey will be conducted in the Summer of 2004 or 2005.

Federal Species of Concern

The 25 February 2003 USFWS list also includes a category of species designated as "Federal species of concern" (FSC). The FSC designation provides no federal protection under the ESA for the species listed. The presence of potential suitable habitat (Amoroso 1999, LeGrand and Hall 2001) within the project study area has been evaluated for the FSC species listed for Wake County (Table 10).

Table 10. Federal Species of Concern (FSC) Listed for Wake County, NC.

Common Name	Scientific Name	State Status[a]	Potential Habitat
Southeastern bat	*Myotis austroriparius*	SC	No
Bachman's sparrow	*Aimophila aestivalis*	SC	No
Southern hognose snake	*Heterodon simus*	SR(PSC)	No
Pinewoods dater	*Lythrurus matutinus*	SR	Yes
Carolina darter	*Etheostoma collis lepidinion*	SC	Yes
Yellow lance	*Elliptio lanceolata*	T(PE)[b]	Yes
Atlantic pigtoe	*Fusconaia masoni*	T(PE)[b]	Yes
Green floater	*Lasmigona subviridus*	E	Yes
Diana fritillary butterfly	*Speyeria diana*	SR	No
Sweet pinesap	*Monotropis odorata*	C	No
Carolina least trillum	*Trillium pusillum* var. *pusillum*	E	No

[a] E - Endangered, T - Threatened, PE- Proposed Endangered, SC - Special Concern, C - Candidate, W - Watch List, PSC –Proposed Special Concern, SR – Significantly Rare.

[b]Atlantic pigtoe and yellow lance will receive a State Endangered status effective 1 July 2002 (NCWRC 2001).

No FSC were observed during the field investigation. NHP records show no documented occurrences within the project study areas or within 3.0 mi (4.8 km) of the project study areas for Austin Creek or Smith Creek. Austin Creek and Smith Creek do provide habitat for the aquatic species listed; however, use of BMPs and avoiding construction activities in the stream channels will avoid impacts to potential habitat.

State Listed 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.).*

No State listed species have been documented within the project study areas for Austin Creek and Smith Creek. In 1995 the Neuse River waterdog (*Necturus lewisi*) (SC) was

documented approximately 1.5 mi (2.4 km) upstream of the Austin Creek project study area in the Mitchell's Mill Pond State Natural Area. In 1987 the least brook lamprey *(Lampetra aepyptera)* [SC(PT)] was documented approximately 2.0 mi (3.2 km) northeast of the Austin Creek project study area in the Little River. The proposed projects are not expected to impact any known populations of state listed species.

5.0 REFERENCES

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VI. CULTURAL RESOURCES

A. Compliance Guidelines

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

B. Historic Architecture & Archaeology

The State Historic Preservation Office (SHPO) reviewed the subject project and determined that neither a historic architectural survey nor an archaeological survey would be required. The SHPO states the project is not likely to affect any resources of historical significance (see letters dated January 22, 2001and February 21, 2001 in Appendix C).

VII. GENERAL ENVIRONMENTAL EFFECTS

This project is expected to have an overall positive impact. Replacement of the inadequate bridges will result in safer traffic operations.

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

This bridge replacement will not have a substantial adverse effect on the quality of the human or natural environment by implementing the environmental commitments of this document in addition to use of current NCDOT standards and specifications.

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

There are no hazardous waste impacts.

No adverse effect on families or communities is anticipated. Right-of-way acquisition will be limited. One business would be temporarily displaced during construction. Refer to the relocation report in Appendix B.

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

There are no publicly owned parks, recreational facilities, or wildlife and waterfowl refuges of national, state, or local significance in the vicinity of the project. This project will not impact any resource protected by Section 4(f) of the US Department of Transportation Act of 1966.

This project has been coordinated with the United States Natural Resources Conservation Service. The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impact to prime farmland of all land acquisition and construction projects. With the exception of the construction of a temporary detour, all work will be done within the existing right-of-way. There are no soils classified as prime, unique, or having state or local importance in the vicinity of the project. Therefore, the project will not involve the direct conversion of farmland acreage within these classifications.

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 (state air quality implementation plan) in compliance with 15 NCAC 2D.0520.

The replacement of Bridge Nos. 448 and 140 are to be at approximately the same location and elevation. Since no additional through lanes are proposed, the project will not increase traffic volumes. Therefore, it will not have a significant impact on noise and air quality. Noise levels could increase during construction but will be temporary.

The project is located in Wake County, which is within the Raleigh-Durham nonattainment area for ozone (O3) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as 1/3 moderate nonattainment area for O3 and CO. However, due to improved monitoring data, these areas were redesignated as a maintenance area for O3 on June 17, 1994, and maintenance for CO on September 18, 1995. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The Capital Area 2025 Long Range Transportation Plan (LRTP) and the 2004-2010 Metropolitan Transportation Improvement Program (MTIP) has been determined to conform to the intent of the SIP. The USDOT air quality conformity approval of the LRTP was August 20, 2002 and the USDOT air quality conformity approval for the MTIP was October 1, 2003. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There have been no significant changes in the projects design concept or scope, as used in the

conformity analyses.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Environmental Management, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no underground storage tanks or hazardous waste sites in the project area.

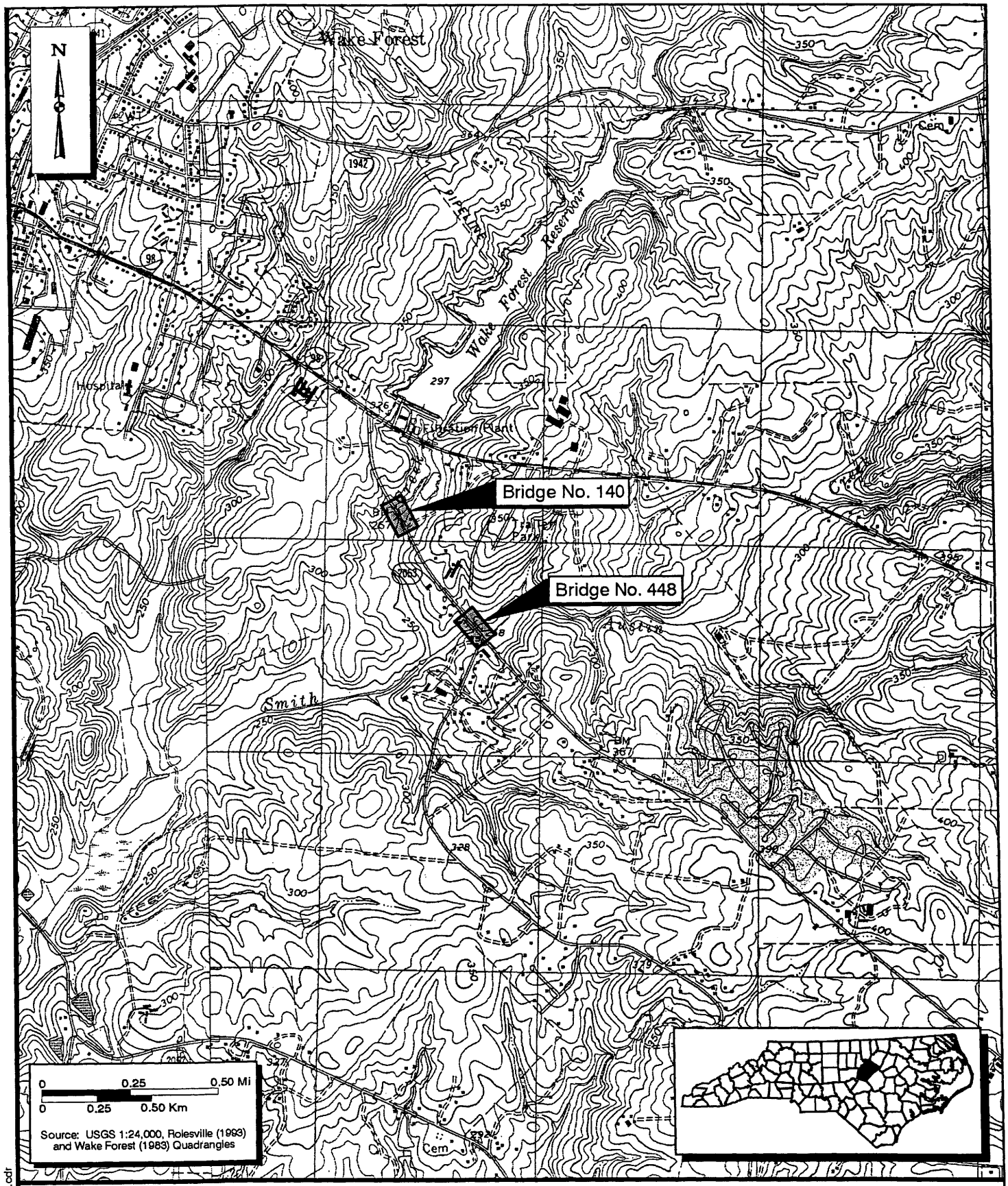
Wake County is a participant in the National Flood Insurance Program. There are no practical alternatives to crossing the floodplain area. Any shift in alignment will result in an impact area of about the same magnitude. The proposed project is not anticipated to increase the level or extent of upstream flood potential.

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

VIII. AGENCY COMMENTS

Comments from agencies will be incorporated during the project development and design for the proposed project. Refer to Appendix C for agency correspondence.

APPENDIX A

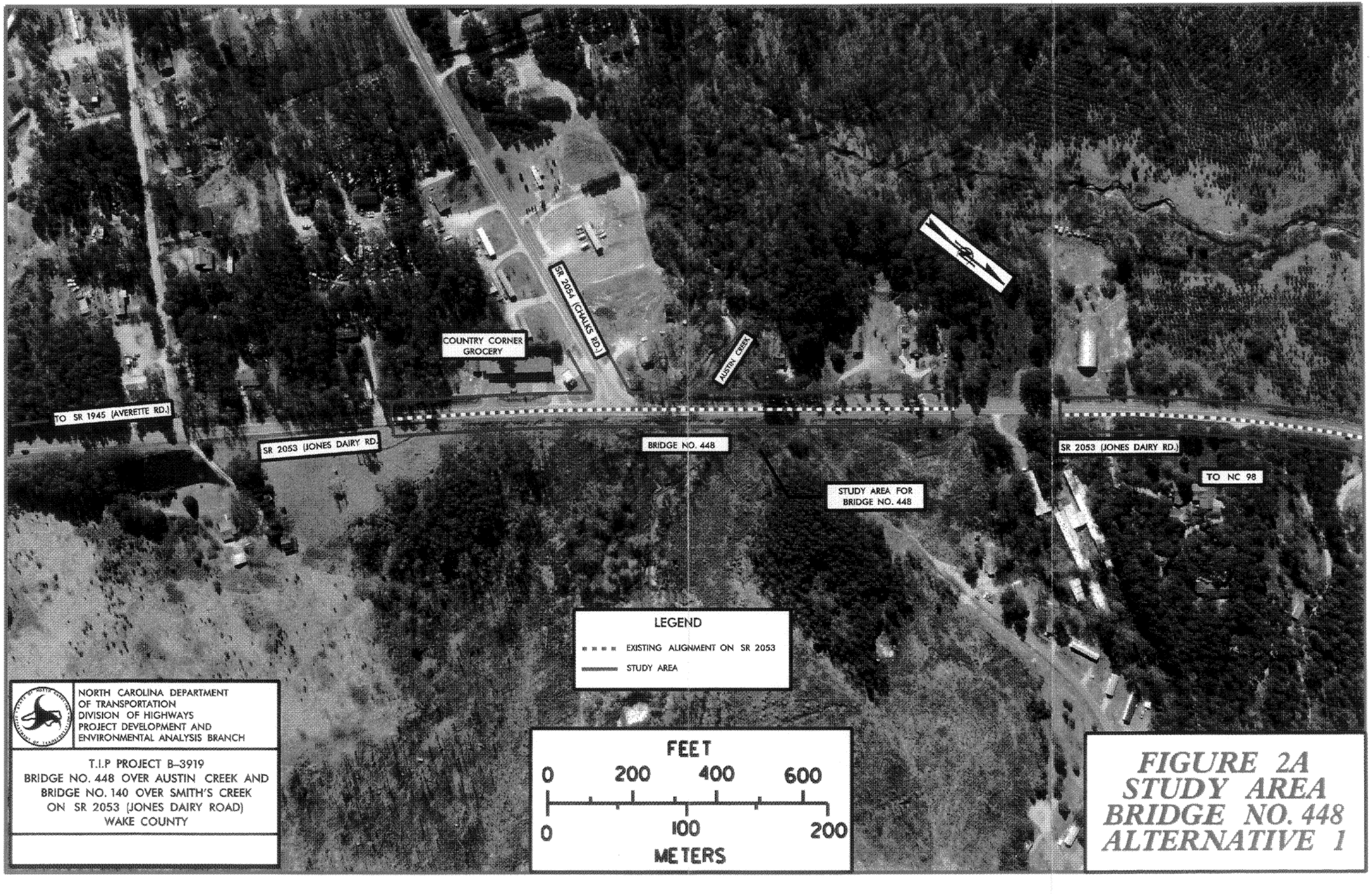


Environmental Services, Inc.

Location Map
Bridge No. 448 over Austin Creek and
Bridge No.140 over Smith Creek on SR 2053
Wake County, North Carolina
TIP B-3919

Figure:	1
Project:	ER00041.14
Date:	March 2002

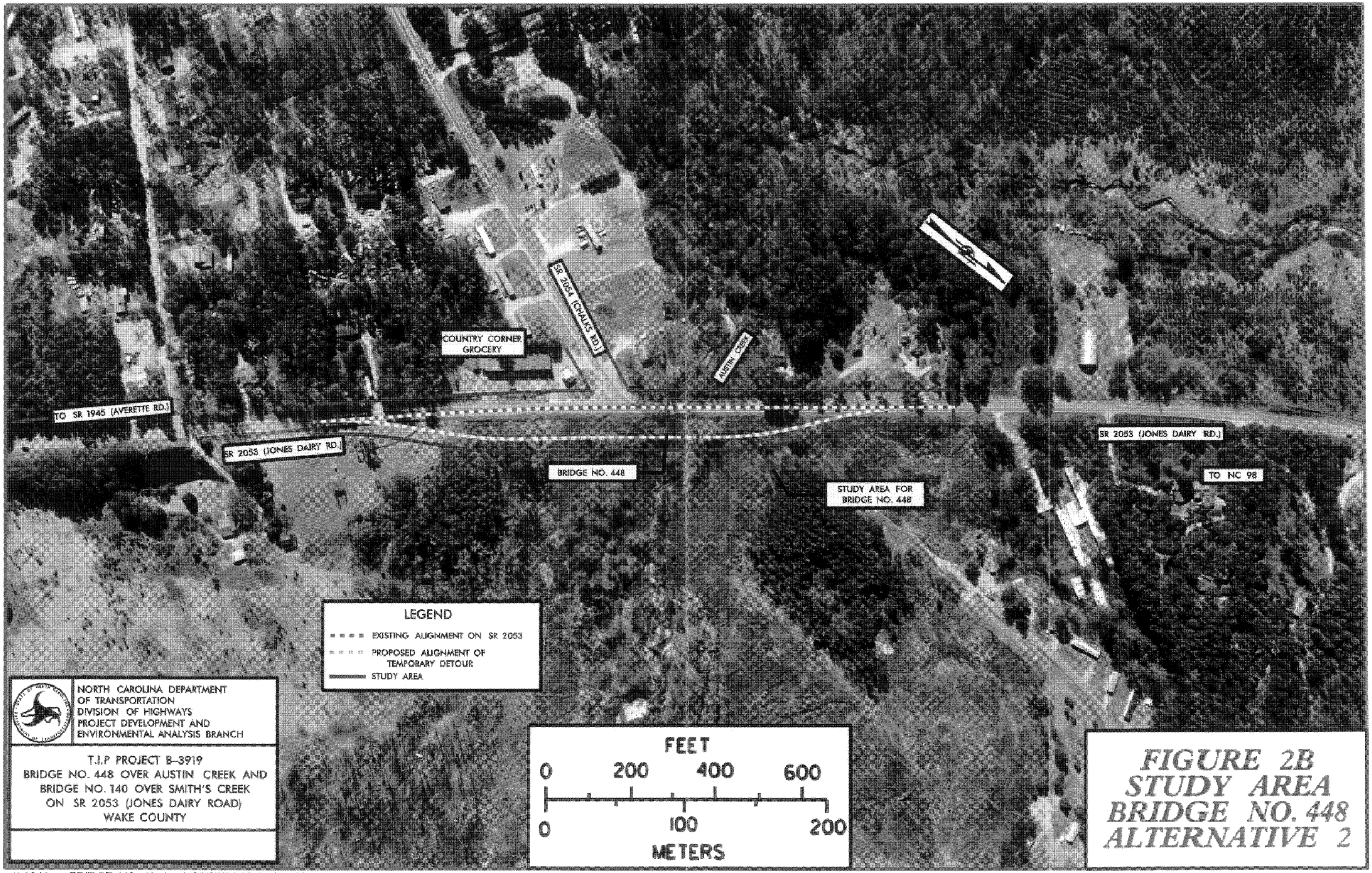
ER00041.14/location3919_20.cdr



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

T.I.P PROJECT B-3919
BRIDGE NO. 448 OVER AUSTIN CREEK AND
BRIDGE NO. 140 OVER SMITH'S CREEK
ON SR 2053 (JONES DAIRY ROAD)
WAKE COUNTY

FIGURE 2A STUDY AREA BRIDGE NO. 448 ALTERNATIVE 1

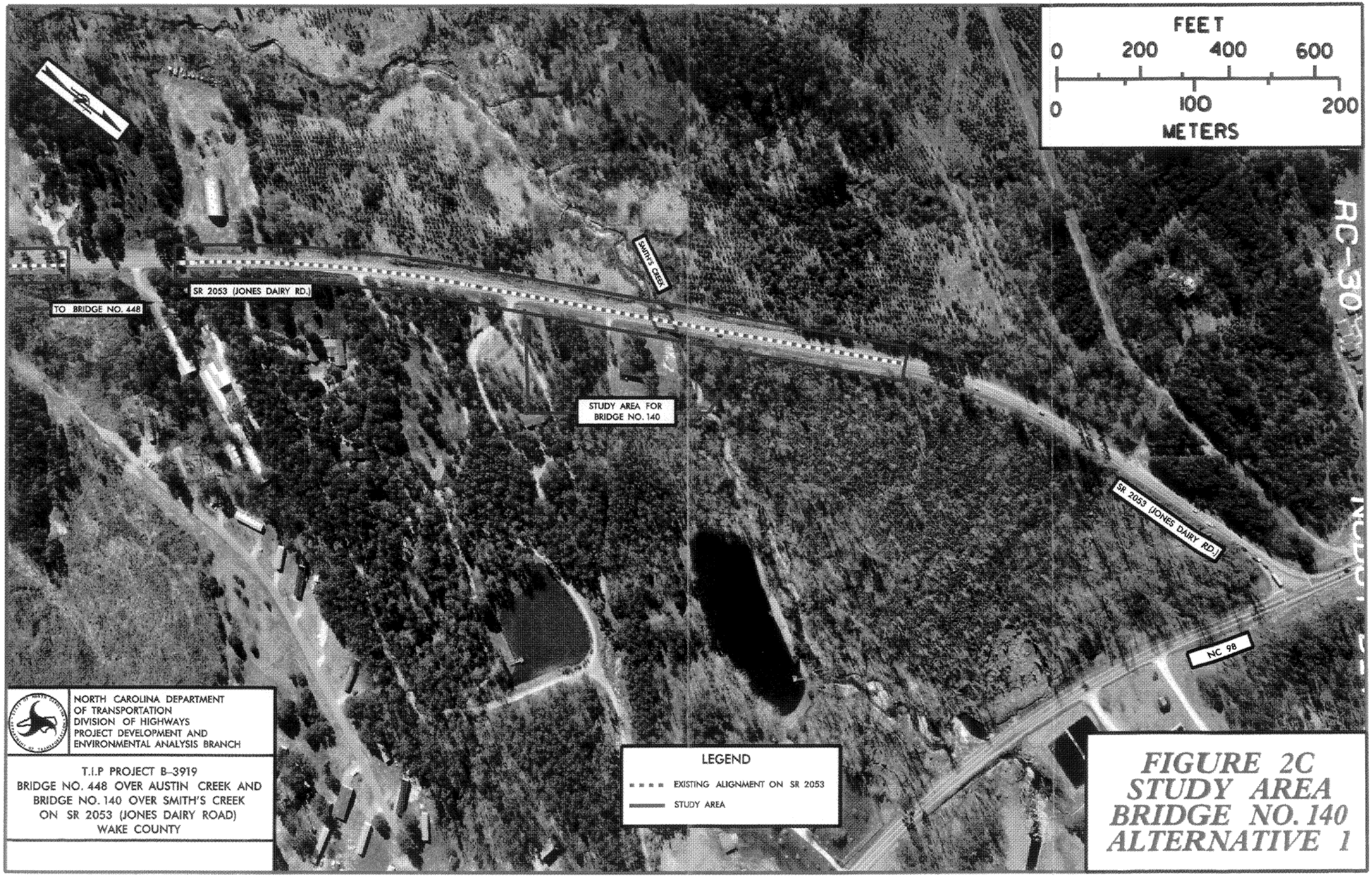


NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

T.I.P PROJECT B-3919
BRIDGE NO. 448 OVER AUSTIN CREEK AND
BRIDGE NO. 140 OVER SMITH'S CREEK
ON SR 2053 (JONES DAIRY ROAD)
WAKE COUNTY

FIGURE 2B STUDY AREA BRIDGE NO. 448 ALTERNATIVE 2

...\b3919aer BRIDGE 448 with det.d 08/25/04 10:49:56 AM

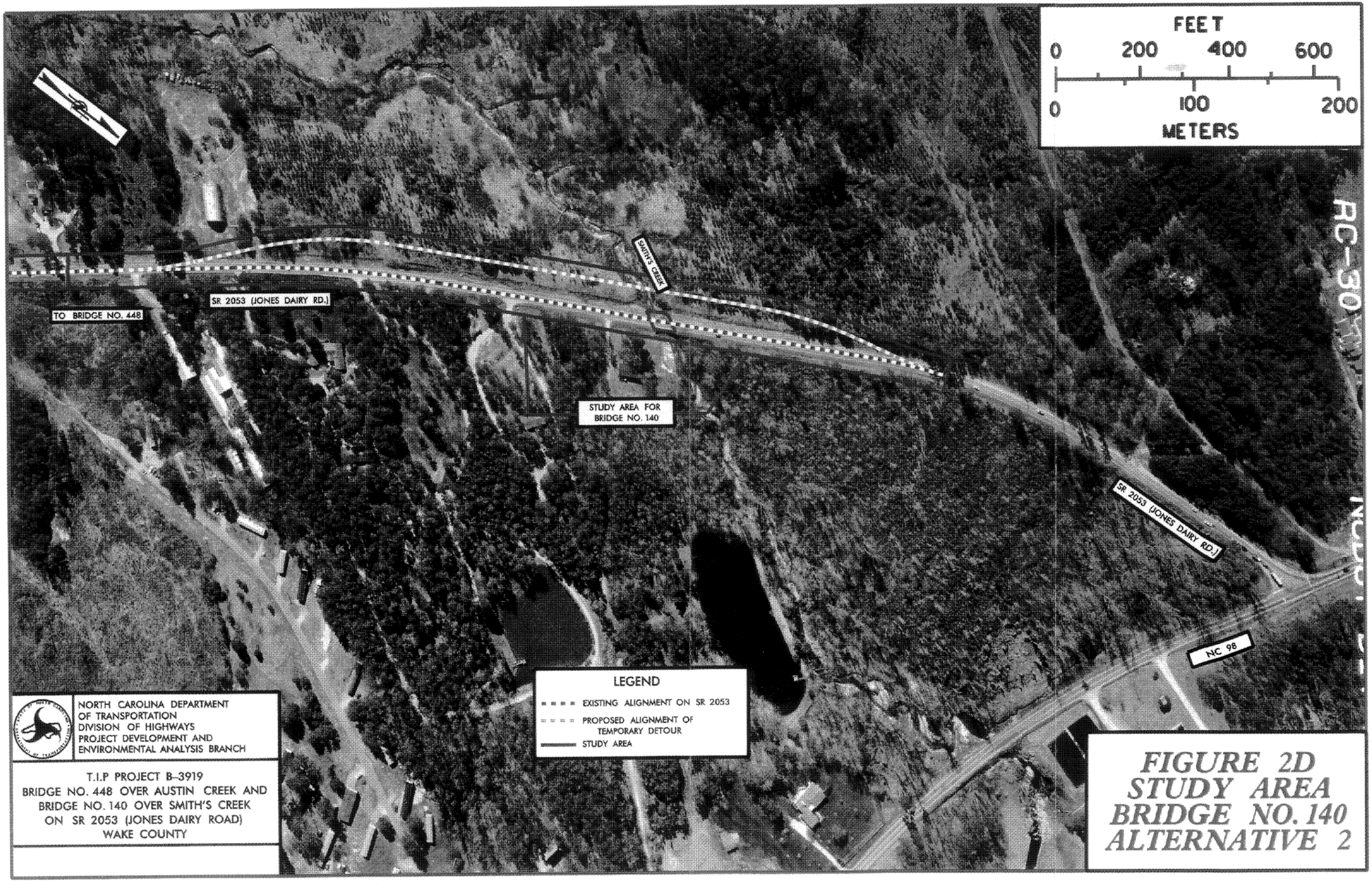


RC-50

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

T.I.P PROJECT B-3919
BRIDGE NO. 448 OVER AUSTIN CREEK AND
BRIDGE NO. 140 OVER SMITH'S CREEK
ON SR 2053 (JONES DAIRY ROAD)
WAKE COUNTY

FIGURE 2C STUDY AREA BRIDGE NO. 140 ALTERNATIVE 1


FEET
0 200 400 600
0 100 200
METERS
SMITH'S CREEK
SR 2053 (JONES DAIRY RD.)
TO BRIDGE NO. 448
STUDY AREA FOR
BRIDGE NO. 140
SR 2053 (JONES DAIRY RD.)
NC 98
LEGEND
EXISTING ALIGNMENT ON SR 2053
PROPOSED ALIGNMENT OF TEMPORARY DETOUR
STUDY AREA
NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH
T.I.P PROJECT B-3919
BRIDGE NO. 448 OVER AUSTIN CREEK AND
BRIDGE NO. 140 OVER SMITH'S CREEK
ON SR 2053 (JONES DAIRY ROAD)
WAKE COUNTY
RC-30
FIGURE 2D
STUDY AREA
BRIDGE NO. 140
ALTERNATIVE 2

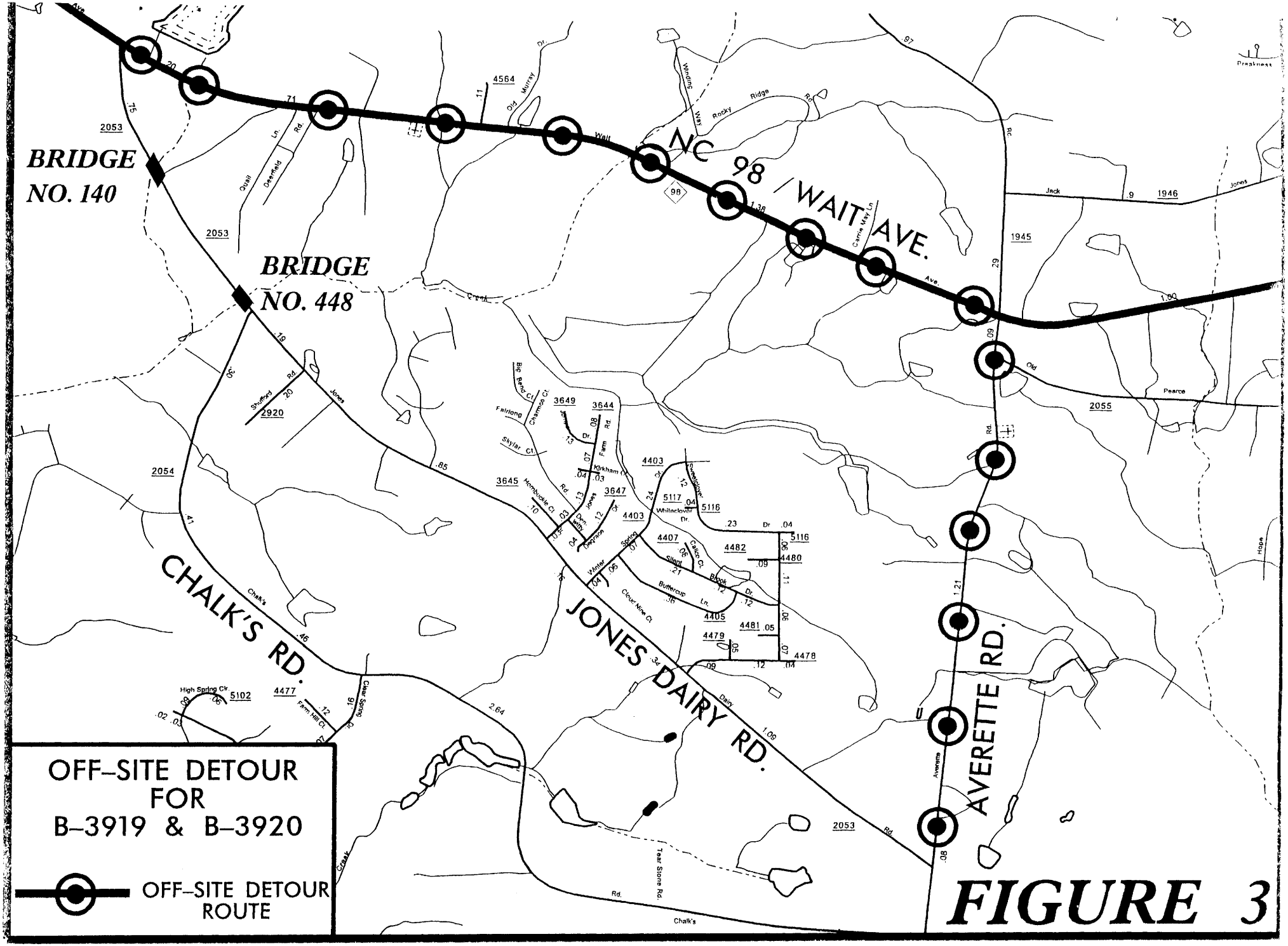
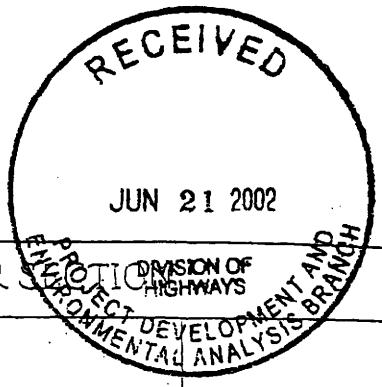

BRIDGE NO. 140
BRIDGE NO. 448
NC 98 / WAIT AVE.
CHALK'S RD.
JONES DAIRY RD.
AVERETTE RD.
OFF-SITE DETOUR FOR B-3919 & B-3920
OFF-SITE DETOUR ROUTE

FIGURE 3

APPENDIX B

REQUEST FOR R/W COST ESTIMATE



ATE: 03-20-02
CEIVED
D.: B-3919
OUNTY: WAKE
ROJECT NO.: 8.2408501
NGINEER: JENNIFER SAFRON/PDEA
STIMATED NO. OF PARCELS: 17
ESIDENTIAL RELOCATION: 0 / 0
JSINESS RELOCATION: 0 / 0
AND AND DAMAGE: 272,700 *
TILITIES: 40,000
CQUISTION: 85,000
OTAL ESTIMATED R/W COST 397,700

ALTERNATE OR SECTION			
/	/	/	/
/	/	/	/

JECT DESCRIPTION AND SPECIAL INSTRUCTIONS:

BRIDGE NO. 448 OVER AUSTIN CREEK AND BRIDGE NO. 140 OVER SMITH'S CREEK AND APPROACHES ON SR 2053 (JONES DAIRY ROAD)

E OF PLANS FURNISHED FOR ESTIMATES: AERIAL ** DUE 05-01-02 **

OR ESTIMATES OF LAND AND DAMAGES (WITH DATES):

CREASES OR DECREASES ARE SIGNIFICANT, PLEASE EXPLAIN:
* MAINLINE = 57,475 DETOURS = 215,225

UNT THAT HAS BEEN ADDED TO LAND AND DAMAGE TO COVER CONDEMNATION AND ADMINISTRATIVE

EASES: $_____ AND OR: 25 %

MATED BY: ANDREW QUESTELL (DATE) 05-30-02

: THIS ESTIMATE WAS NOT BASED UPON FINAL RIGHT OF WAY PLANS NOR FINAL DESIGN DATA. EFORE, ITS ACCURACY IS SUBJECT TO WHATEVER PLANS AND / OR DESIGN DATA PROVIDED BY ESTING PARTY.

RELOCATION REPORT

North Carolina Department of Transportation
AREA RELOCATION OFFICE

[X] E.I.S. [ ] CORRIDOR [ ] DESIGN

PROJECT:	8.2408501	COUNTY	Wake	Alternate	#448
I.D. NO.:	B-3919	F.A. PROJECT	BRZ-2553 (1)		
DESCRIPTION OF PROJECT:	Bridge No. 448 over Austin Creek and Bridge No. 140 over Smith's Creek and approaches on SR 2053 (Jones Dairy Road)				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	0	0	0	0
Businesses	1	0	1	1
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP

VALUE OF DWELLING				DSS DWELLING AVAILABLE			
Owners		Tenants		For Sale		For Rent	
0-20M		$ 0-150		0-20M		$ 0-150	
20-40M		150-250		20-40M		150-250	
40-70M		250-400		40-70M		250-400	
70-100M		400-600		70-100M		400-600	
100 UP		600 UP		100 UP		600 UP	
TOTAL							

ANSWER ALL QUESTIONS

Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affect by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
	X	8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION?

REMARKS (Respond by Number)

3. Business services will continue as in before condition.

4. Business is fruit stand flee market – one employee - minority owner. Business does not operate 5 days per week.

6. MLS, Realtor.com

11. As in the before condition.

12. Adequate housing will be available.

13. MLS, Realtor.com

Leonard G Scarborough /tsg

Leonard G. Scarborough/tsg
Division Right of Way Agent

Date 4/5/02

Ann Simpson

Approved by

4-12-02

Date

Form 15.4 Revised 02/95 d

Original & 1 Copy: State Relocation Agent
2 Copy Area Relocation Office

RELOCATION REPORT

North Carolina Department of Transportation
AREA RELOCATION OFFICE

[X] E.I.S. [ ] CORRIDOR [ ] DESIGN

PROJECT:	8.2408501	COUNTY	Wake	Alternate	#140
I.D. NO.:	B-3919	F.A. PROJECT	BRZ-2553 (1)		
DESCRIPTION OF PROJECT:	Bridge No. 448 over Austin Creek and Bridge No. 140 over Smith's Creek and approaches on SR 2053 (Jones Dairy Road)				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential				
Businesses				
Farms				
Non-Profit				

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP

VALUE OF DWELLING				DSS DWELLING AVAILABLE			
Owners		Tenants		For Sale		For Rent	
0-20M		$ 0-150		0-20M		$ 0-150	
20-40M		150-250		20-40M		150-250	
40-70M		250-400		40-70M		250-400	
70-100M		400-600		70-100M		400-600	
100 UP		600 UP		100 UP		600 UP	
TOTAL							

ANSWER ALL QUESTIONS

Yes	No	*Explain all "YES" answers.*
		1. Will special relocation services be necessary?
		2. Will schools or churches be affect by displacement?
		3. Will business services still be available after project?
		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
		5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
		7. Will additional housing programs be needed?
		8. Should Last Resort Housing be considered?
		9. Are there large, disabled, elderly, etc. families?
		10. Will public housing be needed for project?
		11. Is public housing available?
		12. Is it felt there will be adequate DSS housing housing available during relocation period?
		13. Will there be a problem of housing within financial means?
		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION?

REMARKS (Respond by Number)

NEGATIVE REPORT

L. G. Scarborough 4-5-02

Leonard G. Scarborough/tsg
Division Right of Way Agent

Date

Ann Simpson 4-12-02

Approved by

Date

Form 15.4 Revised 02/95 d

Original & 1 Copy: State Relocation Agent
2 Copy Area Relocation Office

APPENDIX C

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North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

Michael F. Easley, Governor

Division of Archives and History
Jeffrey J. Crow, Director

January 22, 2001

MEMORANDUM

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

From: David Brook [signature: for David Brook]
Deputy State Historic Preservation Officer

Re: Replace Bridge No. 448 on SR 2053 over Austin Creek,
TIP No. B-3919, Wake County, ER 01-7927

We regret that a member of or staff was unable to attend the December 7, 2000, meeting of the minds for the above project.

Based upon our review of the photographs and the information provided, we offer our preliminary comments regarding this project.

In terms of historic architectural resources we are aware of no historic structures located within the area of potential effect. We recommend that no historic architectural survey be conducted for this project.

There are no known archaeological sites within the project area. Based on our present knowledge of the area, it is unlikely that any archaeological resources which may be eligible for inclusion in the National Register of Historic Places, will be affected by the project construction. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

Having provided this information, we look forward to the receipt of either a Categorical Exclusion or Environmental Assessment, which indicates how NCDOT addressed our comments.

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 any questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919 733-4763.

North Carolina Department of Cultural Resources

State Historic Preservation Office
David L. S. Brook, Administrator

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

Division of Archives and History
Jeffrey J. Crow, Director

February 21, 2001

MEMORANDUM

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

From: David Brook
Deputy State Historic Preservation Officer

Re: Replacement of Bridge 140 on SR 2053 over Austin Creek.
TIP No. B-3920, Wake County. ER 01-7910

We regret that a member of our staff was unable to attend the December 7, 2000, meeting of the minds for the above project.

Based upon our review of the photographs and the information discussed at the meeting, we offer our preliminary comments regarding this project.

In terms of historic architectural resources we are aware of no historic structures located within the area of potential effect. We recommend that no historic architectural survey be conducted for this project.

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

Having provided this information, we look forward to the receipt of either a Categorical Exclusion or Environmental Assessment, which indicates how NCDOT addressed our comments.

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount St., Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919) 733-4763 • 733-8653
RESTORATION	515 N. Blount St., Raleigh NC	4613 Mail Service Center, Raleigh NC 27699-4613	(919) 733-6547 • 715-4801
SURVEY & PLANNING	515 N. Blount St., Raleigh NC	4618 Mail Service Center, Raleigh NC 27699-4618	(919) 733-6545 • 715-4801

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 any questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919 733-4763.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

January 9, 2002

MEMORANDUM TO: Jennifer Safron, P.E.
Project Development Engineer

FROM: Stephen Walker SEW
Traffic Noise/Air Quality Section

SUBJECT: Replacement of Bridge # 448 over Austin Creek and Bridge # 140 over Smiths Creek on SR 2053, Wake County, F.A. BRZ-2053(1), State Project # 5.2408501, TIP # B-3919

The project is located in Wake County, which is within the Raleigh-Durham nonattainment area for ozone (O_3) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as "moderate" nonattainment area for O_3 and CO. However, due to improved monitoring data, these areas were redesignated as "maintenance" for O_3 on June 17, 1994 and "maintenance" for CO on September 18, 1995. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The Capital Area 2025 Long Rang Transportation Plan (LRTP) and the 2000-2006 Metropolitan Transportation Improvement Program (MTIP) has been determined to conform to the intent of the SIP. The USDOT air quality conformity approval of the LRTP was August 20, 1999 and the USDOT air quality conformity approval for the MTIP was October 1, 2001. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There has been no significant changes in the projects's design concept or scope, as used in the conformity analyses.

The project proposes the replacement of Bridge # 448 over Austin Creek and Bridge # 140 over Smiths Creek on SR 2053. The bridges are planned to be replaced at approximately the same location and elevation. No additional through traffic lanes are planned; therefore, the project will not increase traffic volumes. The noise transmission reduction provided to the interior of the structures within the project limits should be sufficient to moderate any intrusive traffic noise. Therefore, the project's impact on noise and air quality will not be significant.

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.DOH.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

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 of Title 23 of the Code of Federal Regulations, Part 772, and for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

B #20

WAKE COUNTY PUBLIC SCHOOL SYSTEM

Department of Transportation

November 13, 2000

Mr. John L. Williams
N.C. Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Williams:

Thank you for including the Wake County Public Schools Transportation Department in your planning process to determine the impact bridge closings would have on our program.

The following numbers of buses travel the bridges indicated on a daily basis:

Bridge #	Road	# Buses Impacted
273	Old Stage Road	4
525	Kildaire Farm Road	30
174	Riley Hill Road	7
317	Johnson Pond Road	10
108	Norwood Road	6
125	Burlington Mills Road	6
311	Penny Road	13
127	Ligon Mill Road	25
140	Hwy SR 2053	40
448	Hwy SR 2053	40

Rerouting due to bridge closings may cause some delays for bus routes, and in turn increasing length of ride times for students on buses that normally cross those bridges. The most impacted bridge closings are Bridge Nos. 140 & 448 which impacts the majority of our Wake Forest Transportation operations with 40 buses affected by their closing and Bridge No. 525 which impacts 30 of our Cary Transportation buses.

Please keep us apprised as things progress so we can make the necessary adjustments to routes to ensure smooth operations with the transportation of students to and from school. If you need additional information, please let us know.

Sincerely,

Wyatt L. Currin
Department of Transportation
Wake County Public Schools

c: Mr. William McNeal
Mr. Walt Sherlin

... Road • PO Box 28041 • Raleigh, North Carolina 27610 • 919/856-8050, FAX: 919/856-7773