

Corps Submittal Cover Sheet

Please provide the following info:

1. Project Name: Bridge 100677, SR 1397 Surrett Cove Road
2. Name of Property Owner/Applicant: NC DOT
3. Name of Consultant/Agent: _____
*Agent authorization needs to be attached.
4. Related/Previous Action ID number(s): _____
5. Site Address: N/A
6. Subdivision Name: _____
7. City: Leicester
8. County: Buncombe
9. Lat: 35.67281 Long: -82.85470 (Decimal Degrees *Please*)
10. Quadrangle Name: Sandymush
11. Waterway: Bald Fork Creek
12. Watershed: French Broad River
13. Requested Action:

☒ X Nationwide Permit # 14
☐ General Permit # _____
☐ Jurisdictional Determination Request
☐ Pre-Application Request

The following information will be completed by Corps office:

AID: _____

_____ Prepare File Folder _____ Assign number in ORM _____ Begin Date

Authorization: _____ Section 10 _____ Section 404

Project Description/ Nature of Activity/ Project Purpose:

Site/Waters Name: _____

Keywords: _____



PAT McCrory
Governor

NICHOLAS J. TENNYSON
Secretary

February 29, 2016

Ms. Lori Beckwith
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

Subject: Nationwide Permit #14
Bridge 100677, SR 1397 Surrett Cove Road
State Project No. 17BP.13.R.151
Buncombe County, NC

Dear Ms. Beckwith:

I have enclosed a set of plans, a PCN application for NWP #14, and a vicinity map relative to the proposed bridge replacement project on SR 1397 Surrett Cove Road, Buncombe County, NC.

We propose to replace the existing 28' timber/steel bridge with a double barrel box culvert (2@ 10' x 4') with low flow barrel and sills. Stream slope at the site is 3.00%. Culvert installation will result in permanent impact to 52 linear feet of Bald Fork Creek; floodplain bench construction will permanently impact an additional 83 linear feet. Temporary impacts to 130 feet of the stream are necessary for dewatering and an onsite detour culvert. The stream is approximately 10 feet wide with a predominately gravel/cobble/boulder substrate. Bald Fork Creek is classified as Class C.

Existing channel morphology will be maintained upstream and downstream of the culvert. Riparian vegetation will be reestablished along disturbed areas associated with the project. Stormwater will be diverted through grass-lined ditches or vegetated buffers prior to entering streams.

This project may impact potentially suitable northern long-eared bat (*Myotis septentrionalis*) (NLEB) summer roosting habitat via bridge and tree removal. Therefore, a may affect, not likely to adversely affect is requested for the NLEB. Minor tree clearing will be performed for the project. The existing bridge is constructed of steel and timber. The crown to bed measurement (distance from travel surface to streambed) is 5 feet. Clearance between the bottom of the bridge and the stream surface is approximately 2-3 feet. A survey of the bridge did not reveal any evidence of usage by bats.

For the proposed action, NCDOT has committed to the conservation measures listed below:



Ms. Lori Beckwith
Page -2 Bridge 100677, Buncombe County
February 29, 2016

- 1) No alterations of a known hibernaculum's entrance or interior environment if it impairs an essential behavioral pattern, including sheltering Northern long-eared bats (January 1 through December 31);
- 2) No tree removal within a 0.25 mile radius of a known hibernacula (January 1 through December 31); and
- 3) No cutting or destroying a known, occupied maternity roost tree, or any other trees within a 150-foot radius from the known, occupied maternity tree during the period from June 1 through and including July 31.

NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. Section 7 responsibilities are therefore considered fulfilled.

No effect on the remaining Buncombe County list of federally protected species (threatened or endangered) or designated critical habitat will occur. Andrew Henderson of US Fish and Wildlife Service is copied on the application for review.

As a part of the 401 Certification process, the project was processed through the DOT Programmatic Agreement for Minor Project as required by Section 106 of the National Historic Preservation Act of 1966 and GS 121-12(a). No Historic Resources will be affected.

By copy of this letter, we request Marla Chambers, North Carolina Wildlife Resources Commission Western Region Coordinator, to comment directly to the Corps concerning the permit request.

By copy of this letter, we are asking the Area Roadside Field Operations Engineer, to comment on the above project. Bald Fork Creek is classified as Class C. The project will not require a trout buffer variance.

By copy of this letter, I am forwarding one electronic copy of the application package to Kristi Lynn Carpenter, NC Division of Water Resources, Transportation Permitting Unit with cc to Kevin Barnett, NC DWR Asheville Regional Office for review and comment. Please charge the application fee of \$240.00 to WBS element # 17BP.13.R.151. Please forward comments directly to the Corps with copy to Division 13 Environmental Officer.

Your earliest consideration for this request would be greatly appreciated. If you have any questions or information needs, please contact me at (828) 251-6171.

Sincerely,



Roger D. Bryan
Division 13 Environmental Officer

Enclosures

cc: J.J. Swain, Jr., P.E.
Chris Medlin, P.E.
Ben DeWit, CPESC
Kevin Barnett
Marla Chambers
Andrew Henderson



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:	<input checked="" type="checkbox"/> Section 404 Permit <input type="checkbox"/> Section 10 Permit
1b. Specify Nationwide Permit (NWP) number: 14 or General Permit (GP) number:	
1c. Has the NWP or GP number been verified by the Corps?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
1d. Type(s) of approval sought from the DWQ (check all that apply): <input checked="" type="checkbox"/> 401 Water Quality Certification – Regular <input type="checkbox"/> Non-404 Jurisdictional General Permit <input type="checkbox"/> 401 Water Quality Certification – Express <input type="checkbox"/> 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: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
For the record only for Corps Permit: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

2. Project Information

2a. Name of project:	Bridge 100677, SR 1397
2b. County:	Buncombe
2c. Nearest municipality / town:	Leicester
2d. Subdivision name:	N/A
2e. NCDOT only, T.I.P. or state project no:	17BP.13.R.151

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	N/A
3c. Responsible Party (for LLC if applicable):	N/A
3d. Street address:	N/A
3e. City, state, zip:	N/A
3f. Telephone no.:	N/A
3g. Fax no.:	N/A
3h. Email address:	N/A

4. Applicant Information (if different from owner)	
4a. Applicant is:	North Carolina Department of Transportation
4b. Name:	J.J. Swain, Jr., P.E., Division Engineer
4c. Business name (if applicable):	N.C. Department of Transportation
4d. Street address:	55 Orange Street, P.O. Box 3279
4e. City, state, zip:	Asheville, NC 28802
4f. Telephone no.:	828-251-6171
4g. Fax no.:	828-251-6394
4h. Email address:	rdbryan@ncdot.gov
5. Agent/Consultant Information (if applicable)	
5a. Name:	N/A
5b. Business name (if applicable):	N/A
5c. Street address:	N/A
5d. City, state, zip:	N/A
5e. Telephone no.:	N/A
5f. Fax no.:	N/A
5g. Email address:	N/A

B. Project Information and Prior Project History	
1. Property Identification	
1a. Property identification no. (tax PIN or parcel ID):	N/A
1b. Site coordinates (in decimal degrees):	Latitude: 35.67281° N Longitude: - 82.85470° W
1c. Property size:	0.1 acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Bald Fork (Creek)
2b. Water Quality Classification of nearest receiving water:	C
2c. River basin:	French Broad
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: Existing bridge on SR 1397 surrounded by low density residential area and forest.	
3b. List the total estimated acreage of all existing wetlands on the property: 0	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 200	
3d. Explain the purpose of the proposed project: Replace existing 28' timber/steel bridge with a double barrel box (2@ 10' x 4') culvert with low flow barrel and sills.	
3e. Describe the overall project in detail, including the type of equipment to be used: A permanent impact to 52 linear feet of Bald Fork Creek will be necessary for culvert construction with 83' of floodplain bench construction. A temporary impact of 130 linear feet will be necessary for an impervious dike to dewater the work area during construction and 45 linear feet of temporary pipe for an onsite detour. Equipment used will include excavator, crane, and trucks.	
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:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	<input type="checkbox"/> Preliminary <input type="checkbox"/> Final
4c. If yes, who delineated the jurisdictional areas? Name (if known): N/A	Agency/Consultant Company: Other: N/A
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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
5b. If yes, explain in detail according to "help file" instructions.	
6. Future Project Plans	
6a. Is this a phased project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
6b. If yes, explain.	

Proposed Impacts Inventory						
1. Impacts Summary						
1a. Which sections were completed below for your project (check all that apply):						
<input type="checkbox"/> Wetlands		<input checked="" type="checkbox"/> Streams - tributaries		<input type="checkbox"/> Buffers		
<input type="checkbox"/> Open Waters		<input type="checkbox"/> 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 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
W2 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
W3 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
W4 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
W5 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
W6 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corps <input type="checkbox"/> 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 <input type="checkbox"/> P <input checked="" type="checkbox"/> T	Impervious Dike/Dewatering	Bald Fork Creek	<input checked="" type="checkbox"/> PER <input type="checkbox"/> INT	<input checked="" type="checkbox"/> Corps <input type="checkbox"/> DWQ	10	130
S1 <input type="checkbox"/> P <input checked="" type="checkbox"/> T	Onsite Detour Pipe	Bald Fork Creek	<input checked="" type="checkbox"/> PER <input type="checkbox"/> INT	<input checked="" type="checkbox"/> Corps <input type="checkbox"/> DWQ	10	45*
S1 <input checked="" type="checkbox"/> P <input type="checkbox"/> T	Box Culvert	Bald Fork Creek	<input checked="" type="checkbox"/> PER <input type="checkbox"/> INT	<input checked="" type="checkbox"/> Corps <input type="checkbox"/> DWQ	10	52
S1 <input checked="" type="checkbox"/> P <input type="checkbox"/> T	Floodplain Benches	Bald Fork Creek	<input checked="" type="checkbox"/> PER <input type="checkbox"/> INT	<input checked="" type="checkbox"/> Corps <input type="checkbox"/> DWQ	10	83
S2 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> PER <input type="checkbox"/> INT	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
S3 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> PER <input type="checkbox"/> INT	<input type="checkbox"/> Corps <input type="checkbox"/> DWQ		
3h. Total stream and tributary impacts						265
3i. Comments: 52 feet of permanent culvert impact, 83 feet of permanent impacts for floodplain bench, 130 feet of temporary impacts for dewatering/onsite detour pipe. * - The 45 linear feet of detour pipe is within the 130' of dewatering.						

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 <input type="checkbox"/> P <input type="checkbox"/> T				
O2 <input type="checkbox"/> P <input type="checkbox"/> T				
O3 <input type="checkbox"/> P <input type="checkbox"/> T				
O4 <input type="checkbox"/> P <input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input type="checkbox"/> 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?			<input type="checkbox"/> Neuse <input type="checkbox"/> Tar-Pamlico <input type="checkbox"/> Other: <input type="checkbox"/> Catawba <input type="checkbox"/> Randleman		
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 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No		
B2 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No		
B3 <input type="checkbox"/> P <input type="checkbox"/> T			<input type="checkbox"/> Yes <input type="checkbox"/> No		
6h. Total buffer impacts					

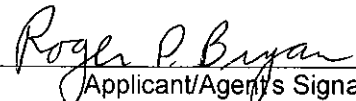
6i. Comments:

D. Impact Justification and Mitigation		
1. Avoidance and Minimization		
1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project. Minimized length of culvert and added low flow barrel and sills to maintain natural stream channel bottom within the structure.		
1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques. N/A		
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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
2b. If yes, mitigation is required by (check all that apply):	<input type="checkbox"/> DWQ <input checked="" type="checkbox"/> Corps	
2c. If yes, which mitigation option will be used for this project?	<input type="checkbox"/> Mitigation bank <input checked="" type="checkbox"/> Payment to in-lieu fee program <input type="checkbox"/> Permittee Responsible Mitigation	
3. Complete if Using a Mitigation Bank		
3a. Name of Mitigation Bank:		
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.	<input checked="" type="checkbox"/> Yes	
4b. Stream mitigation requested:	52 linear feet	
4c. If using stream mitigation, stream temperature:	<input type="checkbox"/> warm <input checked="" type="checkbox"/> cool <input type="checkbox"/> 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?				<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
1b. If yes, then is a diffuse flow plan included? If no, explain why. Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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: The project will use BMP's to the Maximum Extent Practicable (MEP) in compliance with NCDOT's NPDES Permit No. 000250 Post Construction Stormwater Program	
2e. Who will be responsible for the review of the Stormwater Management Plan?	<input type="checkbox"/> Certified Local Government <input checked="" type="checkbox"/> DWQ Stormwater Program <input type="checkbox"/> DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	N/A
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	<input type="checkbox"/> Phase II <input type="checkbox"/> NSW <input type="checkbox"/> USMP <input type="checkbox"/> Water Supply Watershed <input checked="" type="checkbox"/> Other: N/A
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	N/A
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	<input type="checkbox"/> Coastal counties <input type="checkbox"/> HQW <input type="checkbox"/> ORW <input type="checkbox"/> Session Law 2006-246 <input checked="" type="checkbox"/> Other: N/A
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	N/A
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	N/A
5b. Have all of the 401 Unit submittal requirements been met?	N/A

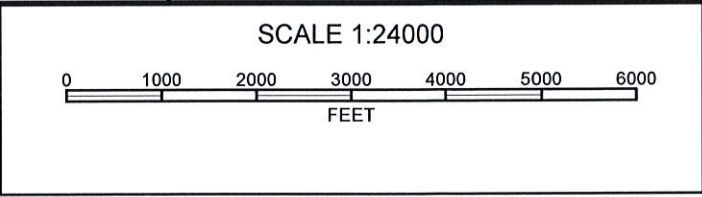
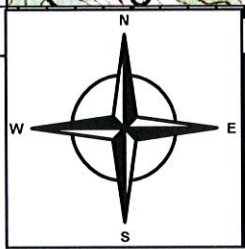
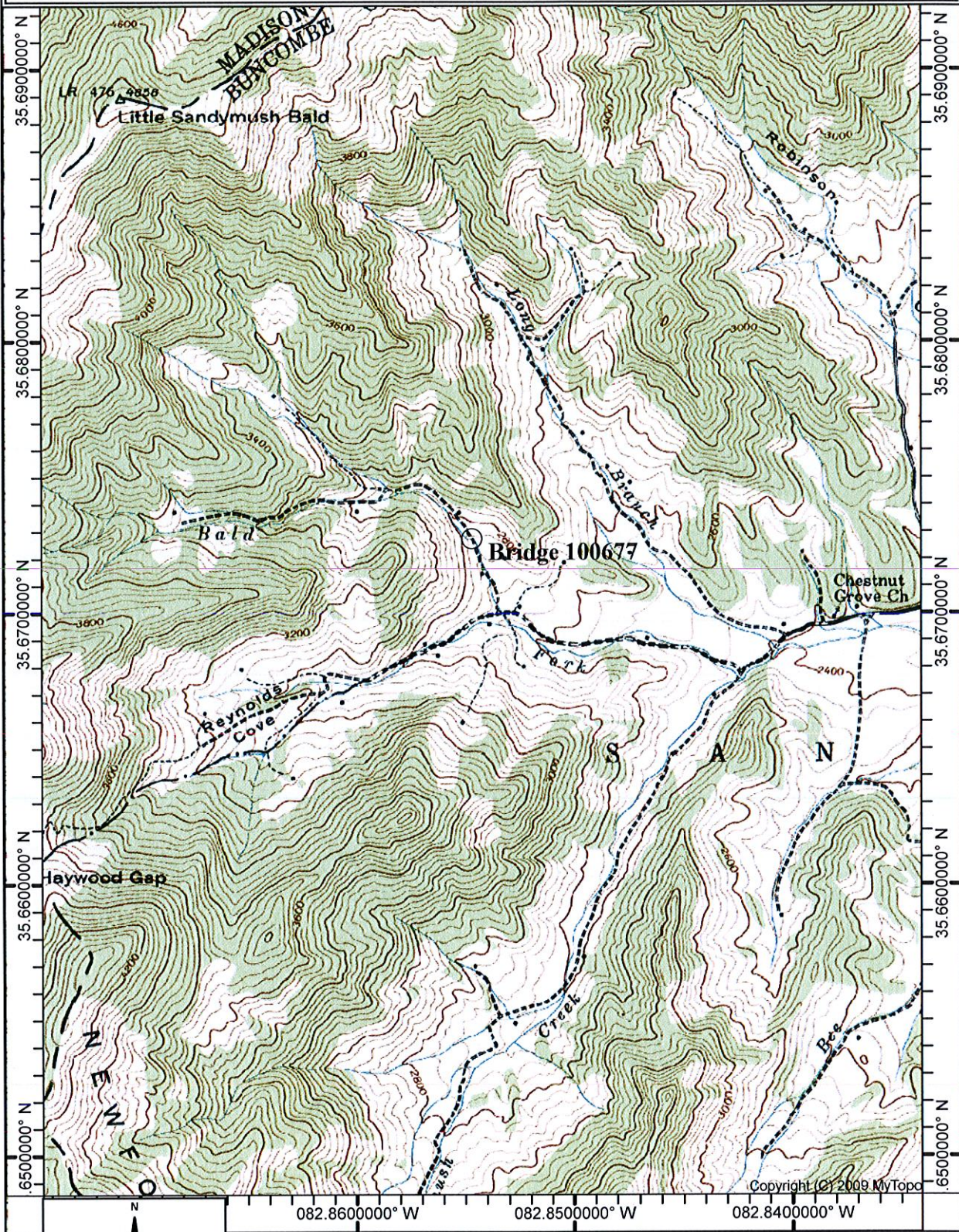
F. Supplementary Information	
1. Environmental Documentation (DWQ Requirement)	
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
1b. If you answered "yes" to 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)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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:	<input type="checkbox"/> Yes <input type="checkbox"/> 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)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2b. Is this an after-the-fact permit application?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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. N/A	

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?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
5c. If yes, indicate the USFWS Field Office you have contacted.	<input type="checkbox"/> Raleigh <input type="checkbox"/> Asheville	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? Field survey of the project area and evaluation of current distribution data.		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat? Current Maps/Database		
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)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
7b. What data sources did you use to determine whether your site would impact historic or archeological resources? Current Maps/Database		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
8b. If yes, explain how project meets FEMA requirements: Project will not impact water passage or flood zone beyond existing conditions		
8c. What source(s) did you use to make the floodplain determination? Current FEMA Maps		
Roger D. Bryan Applicant/Agent's Printed Name	 Applicant/Agent's Signature <small>(Agent's signature is valid only if an authorization letter from the applicant is provided.)</small>	2/29/2016 Date

Map Name: SANDYMUSH
Print Date: 02/29/16

Scale: 1 inch = 2,000 ft.
Map Center: 035.6710903° N 08

Horizontal Datum: NAD27



Copyright (C) 2009 MyTopo



Figure 1. Bridge 100677, Bald Fork Creek near bankfull level (above and below), Buncombe County, NC.



Figure 2. Bridge 100677 Substructure and Deck, Buncombe County, NC.



PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

February 26, 2016

Mr. Roger Bryan
NCDOT Division 13 Environmental Supervisor
North Carolina Department of Transportation
Post Office Box 3279
Asheville, North Carolina 28802

Dear Mr. Bryan:

Subject: Mitigation Acceptance Letter:

Division 13 Project, Replace Bridge Number 100677 over Bald Creek on SR 1397 (Surrett Cove Road), Buncombe County; WBS Element 17BP.13.R.151

The purpose of this letter is to notify you that the North Carolina Department of Environmental Quality – Division of Mitigation Services (NCDEQ-DMS) will provide the compensatory stream mitigation for the subject project. Based on the information received from you on February 24, 2016, the impacts are located in CU 06010105 of the French Broad River basin in the Southern Mountains (SM) Eco-Region, and are as follows:

French Broad 06010105 SM	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	52.0	0	0	0	0	0	0

This impact and associated mitigation need were under projected by the NCDOT in the 2016 impact data. NCDEQ-DMS will commit to implement sufficient compensatory stream mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from NCDEQ-DMS.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
Credit Management Supervisor

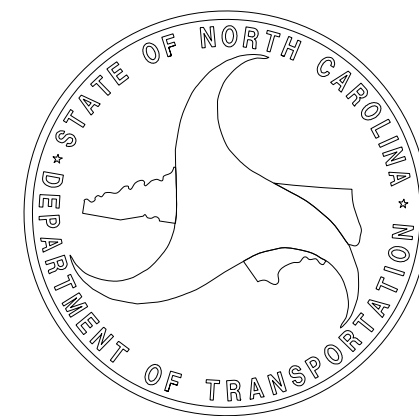
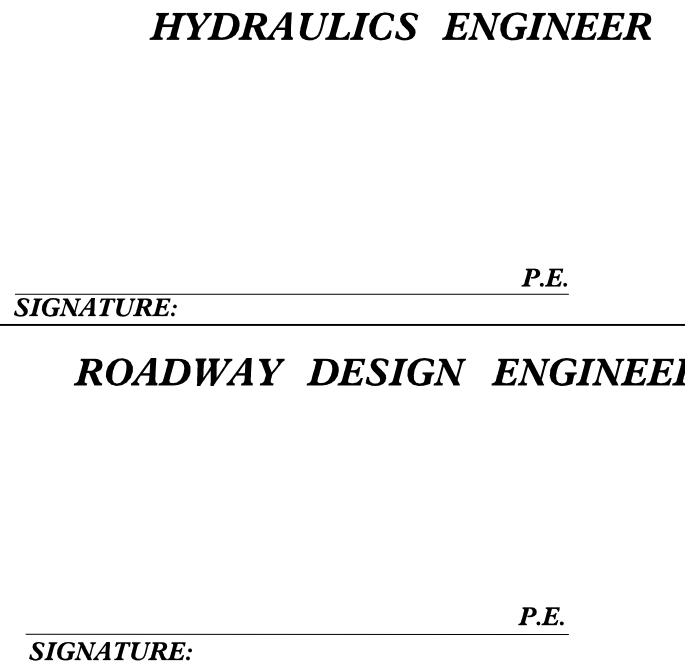
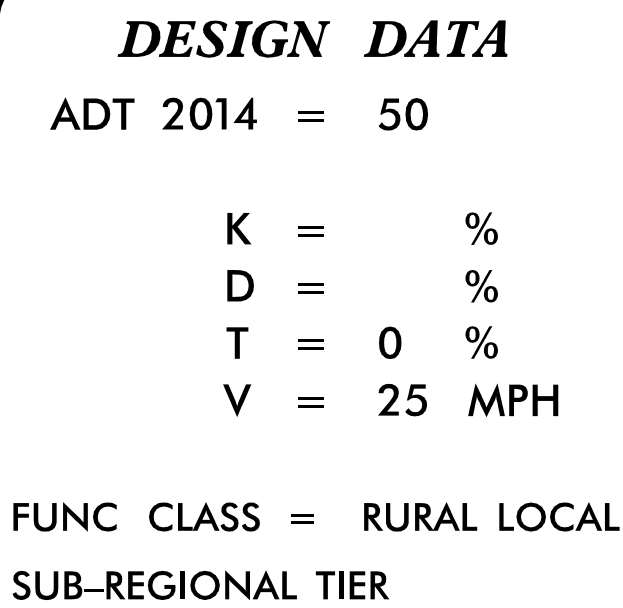
cc: Ms. Lori Beckwith, USACE – Asheville Regulatory Field Office
Mr. Christopher D. Medlin, P.E., Division 13 Bridge Maintenance Manager
Ms. Linda Fitzpatrick, NCDOT – PDEA
File: SR 1397 – Bridge 100677 – Division 13



State of North Carolina | Environmental Quality
1601 Mail Service Center | Raleigh, North Carolina 27699-1601
919-707-8600

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DDGN\$\$\$\$\$
 \$\$\$USERNAME\$\$\$

CONTRACT: C203573



4

-L- STA 10 + 75.00
BEGIN BRIDGE REPLACEMENT
PROJECT 17BP.13.R.151

BEGIN CULVERT
-L- STA. 12 + 50 +/-

BEGIN DETOUR
-DET- STA. 11 + 77.22

END CULVERT
-L- STA. 12 + 90 +/-

END DETOUR
-DET- STA. 13 + 27.27

-L- STA 14 + 40.00
END BRIDGE REPLACEMENT
PROJECT 17BP.13.R.151

SR 1397 SURRETT COVE RD

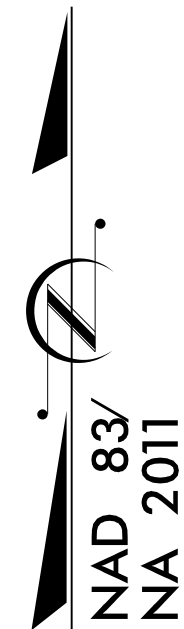
BALD CREEK

BALD CREEK

TO RANDALL COVE ROAD

TO BALD CREEK ROAD

PERMIT DRAWING
SHEET 1 OF 4



**amec
foster
wheeler**

2801 Yorkmont Road, Suite 100
Charlotte, NC 28208
Phone (704) 357-8600
Fax (704) 357-8638

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

8/17/99

REVISIONS

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

PERMIT DRAWING
SHEET 2 OF 4

HUGH ROBERT BOYD
DB 3700 PG 30

PROPOSED FLOODPLAIN
BENCH

IMPERVIOUS DIKE

2 - 10X4 BOX
CULVERT

PROPOSED BANK
STABILIZATION

WD B

WD SPRING
HOUSE

SURRETT COVE RD
SR 1397

EXISTING R/W
BALD CREEK

WOODS

JOHN P. & DIANE W. THOMAS
DB 3743 PG 892



N 01°47'17" E
332.98'

*DO NOT DISTURB OIL TANK

TED J. & JANIE SURRETT
DB 4975 PG 159

BRIDGE 100677

NAD 83/NSRS 2007

PROJECT REFERENCE NO.		SHEET NO.	
17BP13.R151		4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
 KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266		 amc foster wheeler 2801 Yorkmont Road, Suite 100 Charlotte, NC 28208 Phone (704) 357-8600 Fax (704) 357-8638	

PROPOSED BANK
STABILIZATION

BALD CREEK

HTR

PORCH

EXISTING R/W

SURRETT COVE RD
SR 1397

EXISTING R/W

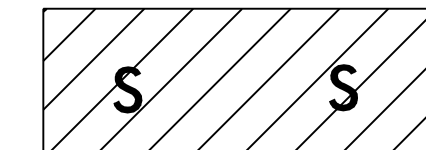
WOODS

TEMP. PIPE DIVERSION FOR DEWATERING
(120 LF OF 30" PIPE)

PROPOSED TEMP.
2 - 47" X 71" ARCH PIPE
(45 LF)

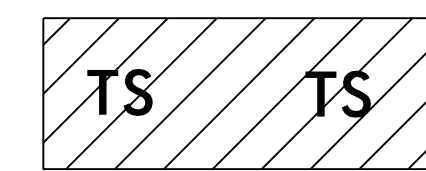
IMPERVIOUS DIKE

PROPOSED FLOODPLAIN
BENCH



DENOTES IMPACTS IN
SURFACE WATER

MEGAN BRENT JOHNSON
DB 2081 PG 47



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 5
FOR STRUCTURE PLANS, SEE
SHEETS S-1 TO S-?

8/17/99

REVISIONS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

PERMIT DRAWING
SHEET 3 OF 4

HUGH ROBERT BOYD
DB 3700 PG 30

PROPOSED FLOODPLAIN
BENCH

IMPERVIOUS DIKE

2 - 10X4 BOX
CULVERT


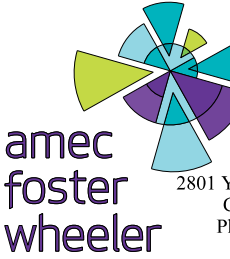
PROPOSED BANK
STABILIZATION

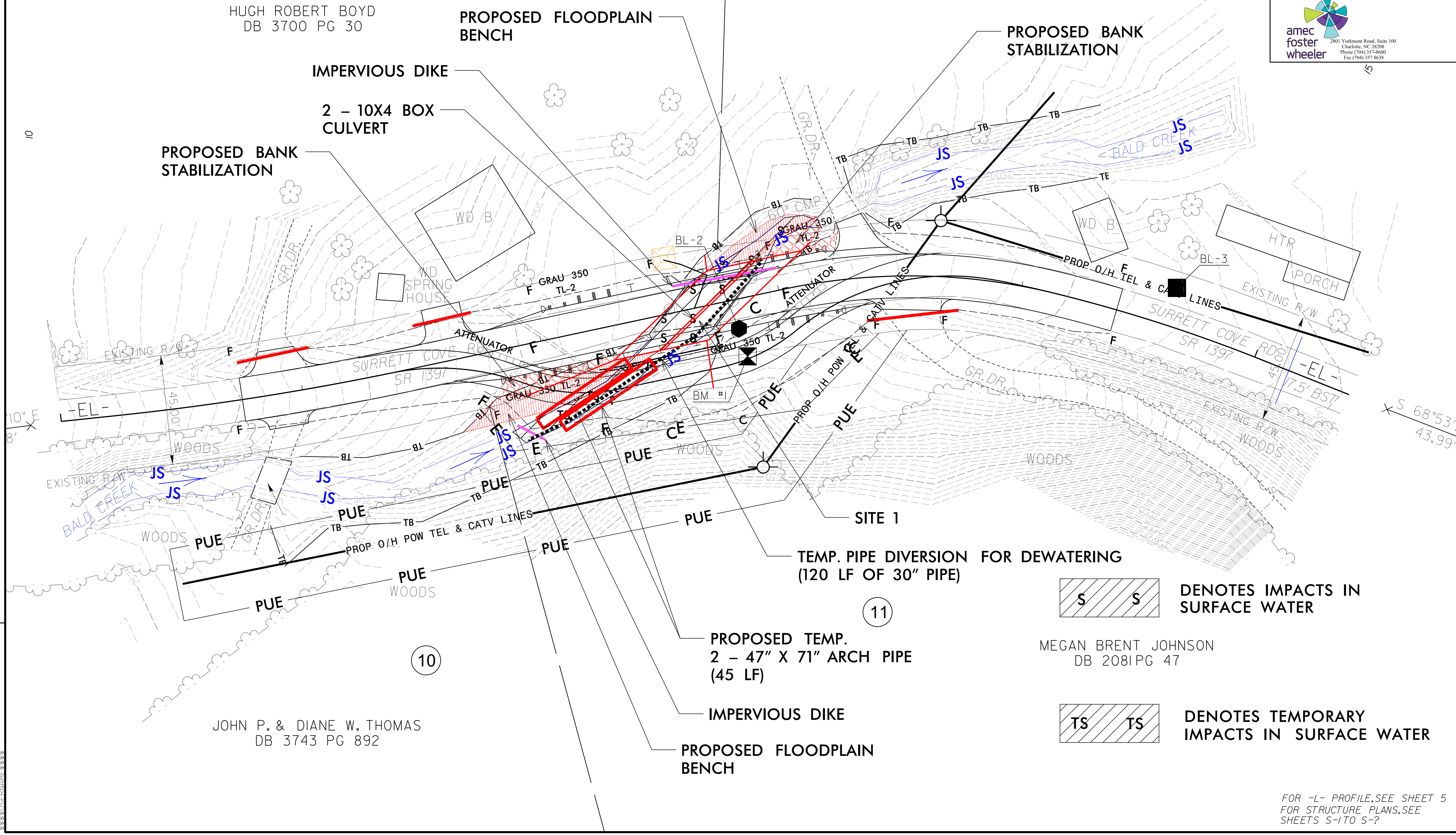
*DO NOT DISTURB OIL TANK

TED J. & JANIE SURRETT
DB 4975 PG 159

BRIDGE 100677

NAD 83/NSRS 2007

PROJECT REFERENCE NO.		SHEET NO.	
17BP13.R151		4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
 KCI http://www.kci.com		Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266	
 amc foster wheeler 2801 Yorkmont Road, Suite 100 Charlotte, NC 28208 Phone (704) 357-8600 Fax (704) 357-8638			



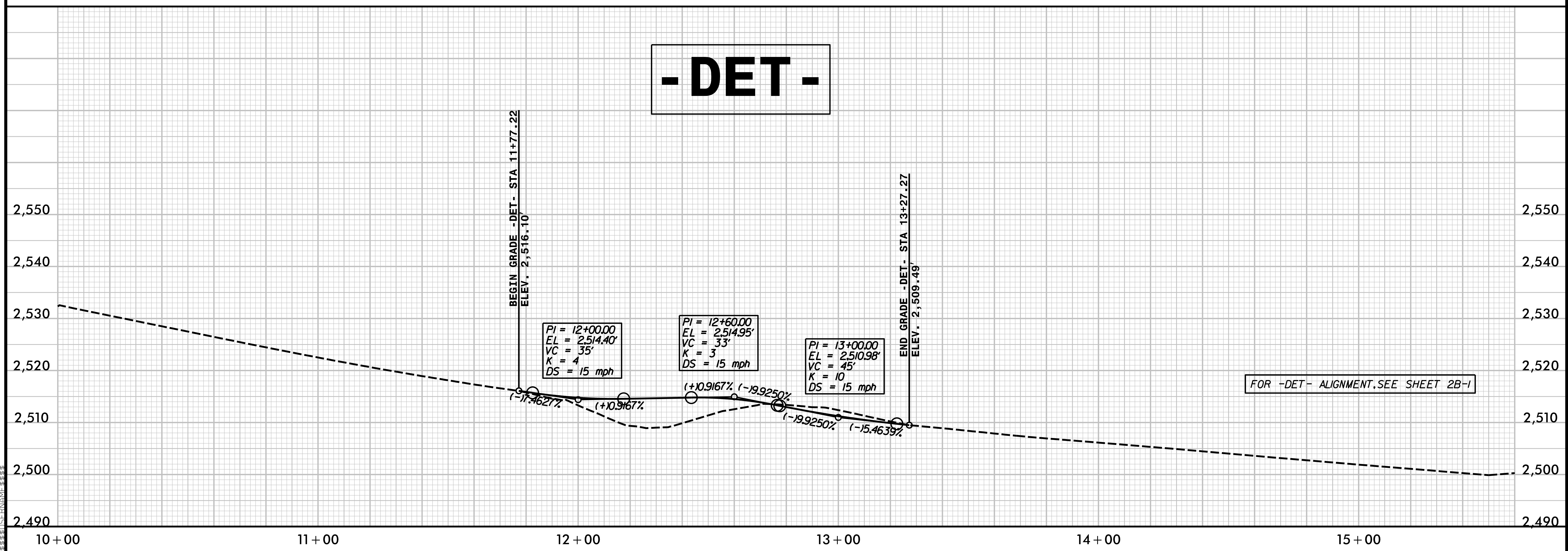
DENOTES IMPACTS IN
SURFACE WATER

MEGAN BRENT JOHNSON
DB 2081 PG 47



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 5
FOR STRUCTURE PLANS, SEE
SHEETS S-1 TO S-?





North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN

(Version 2.02; Released April 2015)

FOR NCDOT PROJECTS

WBS Element:	17.BP.13.R.151	TIP No.:	SF-100677	County(ies):	Buncombe	Page	1	of	2		
General Project Information											
WBS Element:	17.BP.13.R.151		TIP Number:	SF-100677		Project Type:	Bridge Replacement		Date:	2/24/2016	
NCDOT Contact:	Marc Shown			Contractor / Designer:	Shirshant Sharma						
	Address:	NCDOT Hydraulics Unit 1590 Mail Service Center Raleigh, NC - 27699-1590				Address:	Amec Foster Wheeler 2801 Yorkmont Road, Suite 100 Charlotte, NC 28208				
	Phone:	919-707-6700				Phone:	704-357-5511				
	Email:	mshown@ncdot.gov				Email:	shirshant.sharma@amecfw.com				
City/Town:	Leicester				County(ies):	Buncombe					
River Basin(s):	French Broad				CAMA County?	No					
Wetlands within Project Limits?	No										
Project Description											
Project Length (lin. miles or feet):	475 ft		Surrounding Land Use:	Woods (Rural)							
	Proposed Project				Existing Site						
Project Built-Upon Area (ac.)	0.2 ac.				0.2 ac.						
Typical Cross Section Description:	(Approach) 2 - 9ft lanes with 3ft grassed shoulders (Culvert) 2 - 9ft lane with 3ft paved shoulders				(Approach) 2 - 8.5ft lanes with 4ft grassed shoulders (Bridge) 1 - 13ft lane with 3.3ft paved shoulder						
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	1000		Year:	2014		Existing:	1000		Year:	2011
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The existing single span 28' bridge is being replaced with a proposed double 10X4 (partially buried) box culvert. The culvert section will be normal crown with 2% cross slope, with 9' travel lanes and 3' shoulders. The right barrel has a 1' concrete sill and will function as a low flow barrel. The left barrel has a 2' concrete sill and will function as an overflow barrel. Existing drainage patterns are being maintained and stormwater runoff is being discharged as far away from the stream as possible.										
Waterbody Information											
Surface Water Body (1):	Bald Creek				NCDWR Stream Index No.:	5-22-2					
NCDWR Surface Water Classification for Water Body				Primary Classification:	Class C						
				Supplemental Classification:	None						
Other Stream Classification:	None										
Impairments:	None										
Aquatic T&E Species?	No				Comments:						
NRTR Stream ID:											
Project Includes Bridge Spanning Water Body?	Yes		Deck Drains Discharge Over Buffer?	No		Buffer Rules in Effect:	N/A				
Deck Drains Discharge Over Water Body?	No		(If yes, provide justification in the General Project Narrative)			Dissipator Pads Provided in Buffer?					
(If yes, provide justification in the General Project Narrative)					(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)						



North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.02; Released April 2015)

WBS Element: 17.BP.13.R.1 TIP No.: SF-100677 County(ies): Buncombe Page 2 of 2

Bridge to Culvert Avoidance and Minimization

Proposed Structure Summary

Sheet No. & Station	Sheet No.: 4	Station: 2.7	Sq. Miles	Number of Culverts:	2
Drainage Area (ac or sq mi):				Culvert Width/Diameter (ft):	10
Surface Water Body:	(1)Bald Creek			Culvert Height (ft):	4
Culvert Type:	Concrete Box Culvert			Culvert Length (ft)	52
Avoidance and Minimization Efforts: (Bridge to Culvert)	The proposed culvert has two barrels with one functioning as a low flow barrel. As such, under low flow (bankfull) conditions, the existing stream is approximately 17 feet in width whereas the low flow culvert opening is only 10 feet in width. This results in a somewhat higher velocity in the culvert at the upstream end. However, at the downstream end of the culvert, the backwater from the 60" pipe downstream results in a proposed outlet velocity that is less than existing. The proposed culvert slope is flatter than existing to reduce outlet velocities and minimize erosion.				
Stream Slope			Fish and/or Aquatic Life Passage		
Existing Average Stream Slope (%):	3.00	%	Existing Low Flow Channel Dimensions in the Stream:	2.5' deep trapezoidal channel, 15' top width, 8' bottom width, 2:1 side slopes.	
Proposed Culvert Slope (%):	1.80	%	Proposed Low Flow Dimensions Through the Culvert:	10'X1'	
Proposed Culvert Burial Depth (ft):	1'		Existing Low Flow Velocities in the Stream (ft/s):	2.0 (U/S) / 3.1 (D/S)	
Existing Streambed Material:	Mix of coarse sand, gravel and cobble (D50 = 7 mm)		Proposed Low Flow Velocities Through the Culvert (ft/s):	3.72 (U/S) / 2.2 (D/S)	
Proposed Sills/Baffles:	Concrete Sills (1' Deep RT, 2' Deep LT) - The culvert is buried 1' below the existing streambed, but the second culvert barrel has an additional 1 foot of sill height so that it functions as an overflow barrel.		Alternating Low Flow Sills/Baffles:	Right barrel is low flow, left barrel is high flow. No alternating baffles.	

Culvert/Stream Alignment

Stream Patterns Upstream and Downstream of the Culvert that Could Affect Fish Passage and Bank Stability:	NA	
Bed Forms Impacted by Culvert (riffles, pools, glides, etc.):	NA	
Low Flow Floodplain Bench Required? (provide justification)	Yes	Culvert overtops at less than 5 year event. Floodplain bench has been provided to separate low flow and high flows through the two culvert barrels. The low flow event is the flow which resulted in 1 foot of depth at the upstream end of the low flow culvert
Sharp Bends at Inlet/Outlet? (describe culvert alignment with stream)	Yes	Inlet to the culvert has a sharp bend, hence extended wing walls are proposed to channelize water and prevent erosion.
Stream Realignment Necessary? (provide justification)		No
Bank Stabilization:	Wing walls are expected to provide sufficient stabilization. Drainage area to the culvert is 2.7 sq. mi and the culvert overtops at less than 5 year event so majority of flow will be passed over the culvert.	

Outlet Velocities

Natural Stream Channel 2-yr Velocity (ft/s):	3.52 (existing)	Natural Stream Channel 10-yr Velocity (ft/s):	12.84 (existing)
Proposed Culvert 2-yr Outlet Velocity (ft/s):	5	Proposed Culvert 10-yr Outlet Velocity (ft/s):	8.3

Roadway Geometric Considerations

Evaluate/Describe Roadway Geometric Constraints:

--