




STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 18, 2004

MEMORANDUM TO: William T. Goodwin, PE
Unit Head
Bridge Replacement Planning Unit
Project Development and Environmental Analysis Branch

FROM: Wayne C. Davis, Ph.D. 
Traffic Forecast Unit
Transportation Planning Branch

SUBJECT: B-4676, Replacement of Bridge No. 29 over Cub Creek on
SR 1001, Wilkes County

Please find attached the Traffic Forecast Report for TIP Bridge Replacement Project No. B-4676. Bridge No. 29 is located on SR 1001 over Cub Creek in Wilkesboro, Wilkes County. SR 1001 is a two-lane road and Bridge No. 29 is a two-lane concrete deck structure with asphalt overlay and metal guardrails. The area surrounding the bridge is urban and consists of commercial, recreational, and medium density residential land uses.

Information from the Census' 2001 County Business Patterns (<http://www.census.gov>) states that the major trade in Wilkes County is manufacturing. In the 2000 census, the largest age bracket is ages 35-44 and the percentage of people older than eighteen (18) is 77.4%. Future growth experienced in the county may be attributed to economic development as well as an increase in population.

According to the Town of Wilkesboro's planning staff, the area surrounding the bridge should experience some growth. SR 1001 (Oakwood Road) will be widened to three lanes between the US 421 Bypass and SR 2460 (South Bridge Street). An entrance into Cub Creek Park from SR 1001 will be constructed just north of the bridge. Vehicles currently enter the park from SR 1001 via an alley behind businesses fronting NC 18/268. The northeast corner of the intersection of SR 1001 and US 421 is being considered as a potential site for a visitor's center. SR 1001 may become a preferred route to Wilkesboro and North Wilkesboro from the visitor's center. A proposed bank, car wash and convenience store are to be constructed at the northwest corner of the intersection of SR 1001 and NC 18/268. Additionally, there are approximately ten homes along Edgewood Drive, which is just south of the bridge. For this forecast, the proposed US 421 to NC 18 bypass around Wilkesboro and North Wilkesboro was assumed to be constructed. It was further assumed that the bypass would divert much of the through traffic in this corridor once completed. This results in a lower calculated growth rate.

Historical AADT for years 1990 through 2002 were examined. Additionally, the Town of Wilkesboro Thoroughfare Plan 2020 ADT volumes in the vicinity of the bridge were examined and found to be below the current traffic volumes. Based on collected data, comments provided by the Town Planning Department, linear regression and trend analyses of the historical traffic data, future year traffic volumes were derived. The linear analysis shows an approximate average annual growth rate between 2.3% and 2.9%. After considering expected development and land uses in the area, the projection of base year volumes to future year volumes resulted in an approximate annual growth rate of 1.0% along NC 18/268 (west leg), 1.3% along NC 18/268 (north leg) and SR 2510, 2.6% along SR 1001, and 2.7% along Edgewood Drive. Interim traffic volumes can be approximated using straight-line interpolation.

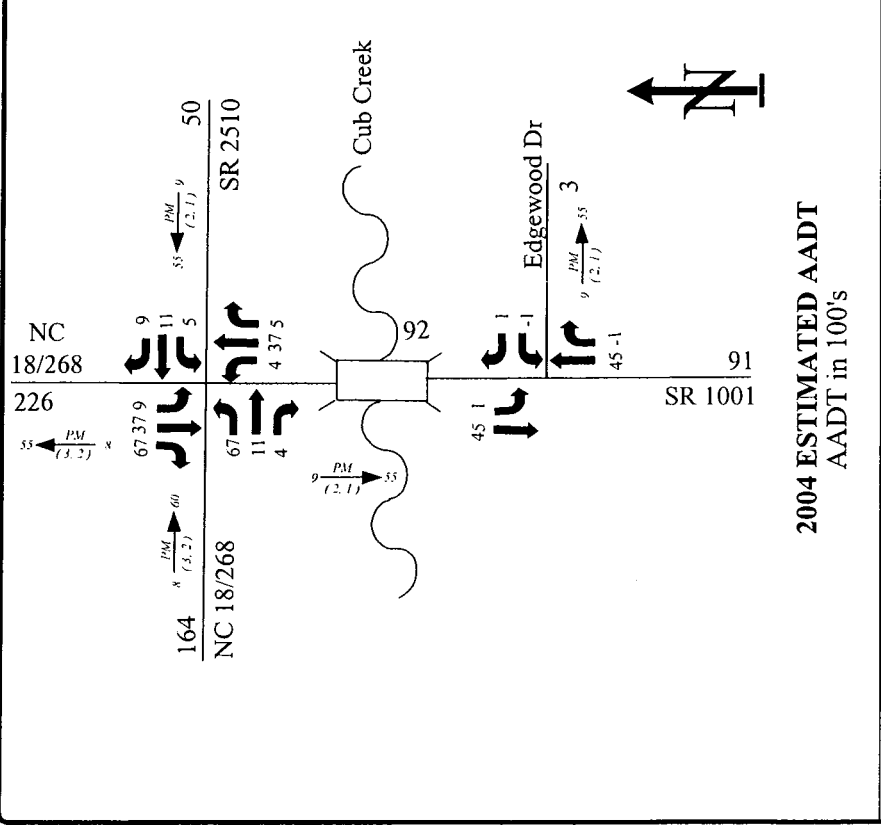
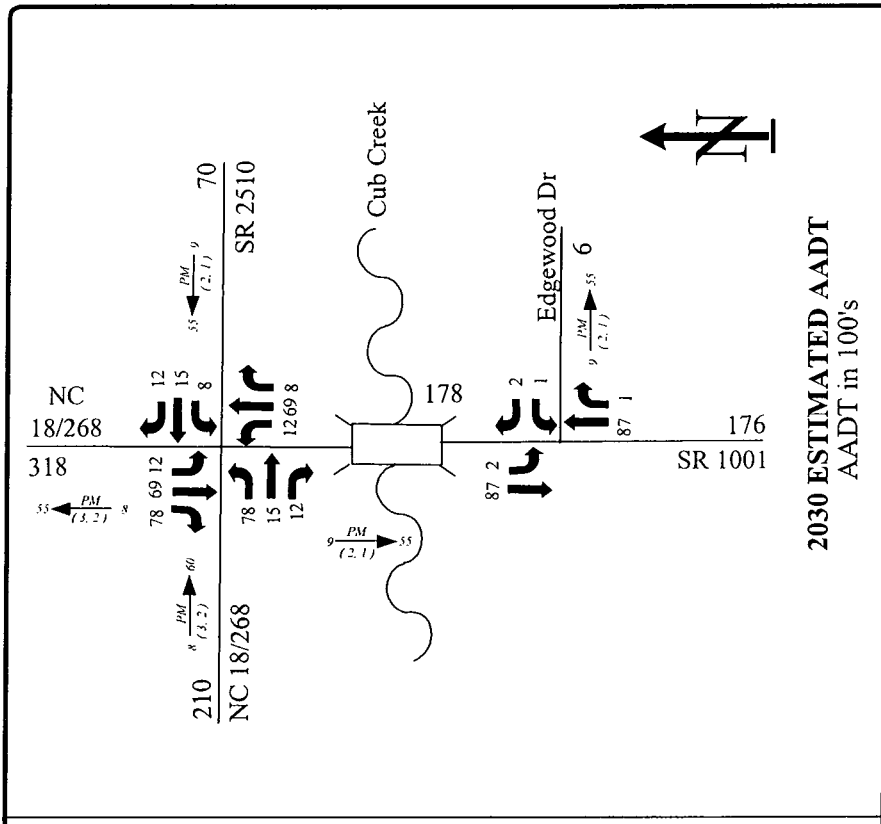
Existing traffic counts and area land uses were used to determine peak hour trip orientation and traffic characteristics. The K_{30} factor, truck percentages, and directional distribution were based upon existing traffic counts at the intersection of SR 1001 and NC 18/268, SR 1001 and SR 2460, and NC 18/268 and NC 18.

If you have any questions, do not hesitate to call Dr. Wayne C. Davis at (919) 715-5482 or email at wcdavis@dot.state.nc.us.

WCD/lmb

Attachment

Cc: Jay Bennett, PE
Laura Cove, PE
Nathan Phillips, PE
Hardee Cox



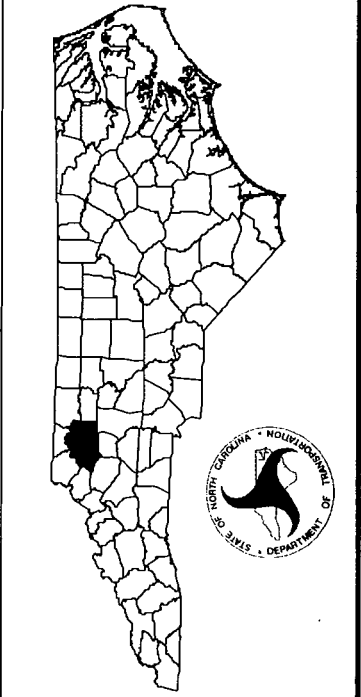
LOCATION:
Bridge No. 29 over Cub
Creek on SR 1001

PROJECT:
Bridge Replacement

COUNTY: Wilkes

DIV.: 11 **DATE:** April 2004

TIP # B-4676 **WBS #** 33831.1.1



LEGEND

VPD---# OF VEHICLES PER DAY
 ###- MUCH LESS THAN ### VPD
 X MOVEMENT PROHIBITED

DHV \xrightarrow{PM} D
 (d,t)

DHV DESIGN HOURLY VOLUME (%) = K30
 K30 = 30TH HIGHEST HOURLY VOLUME
 D DIRECTIONAL SPLIT (%)
 PM PM PEAK PERIOD
 (d,t) DUALS, TT-ST'S (%)
 NOTE: DHV \xrightarrow{D} D INDICATES THE DIRECTION D,
 REVERSE FLOW FOR AM PEAK.

Wilkes County
Bridge No. 29 on SR 1001 Over Cub Creek
Federal-Aid Project No. BRZ-1001(29)
State Project No. 33831.1.1
T.I.P. Project No. B-4676

INTRODUCTION: The replacement of Bridge No. 29 is included in the 2006-2012 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) and the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. PURPOSE AND NEED

Bridge Maintenance Unit records indicated the bridge has a sufficiency rating of 20.6 out of a possible 100 for a new structure. The bridge is considered functionally obsolete and structurally deficient.

Bridge 29 carries 9,200 vehicles per day with 17,800 vehicles per day projected for the future. The substandard deck width is becoming increasingly unacceptable and replacement of the bridge will result in safer traffic operations.

II. EXISTING CONDITIONS

The project is located 0.15 miles southeast of the intersection with NC18/NC 268 (see Figure 1). Land use in the project area is predominantly woodlands, farmlands, and residential. The northwest quadrant has a meadow with recreational softball fields/tennis courts. Christmas tree farmland is located east and south of the study area.

SR 1001 is classified as a rural local in the Statewide Functional Classification System and it is not a National Highway System Route.

In the vicinity of the bridge, SR 1001 has an 18-foot pavement width with two to four-foot grass shoulders (see Figures 3 and 4). The roadway grade is in a sag vertical curve just southeast of the existing bridge. The existing bridge on SR 1001 is located partially in an approximate 330-foot radius horizontal curve. There is a tangent located immediately to the northwest and a tangent located approximately 263-feet to the southeast. There is existing sidewalk to the south of the existing bridge with a pedestrian bridge located approximately 16-feet to the south of the existing bridge. The roadway is situated approximately 14.0 feet above the creek bed.

Bridge No. 29 is a three-span structure that consists of an asphalt-wearing surface on prestressed concrete channels. The substructure consists of concrete caps on timber piles. The existing bridge (see Figure 3) was constructed in 1969. The overall length of the structure is 81 feet. The clear roadway width is 29 feet eight inches. The posted weight limit on this bridge is 26 tons for single vehicles and 29 tons for TTST's.

There are two utilities, a 4" and a 2" PVC pipe, attached to the upstream side of the bridge. There are no other utilities attached to the existing bridge. Overhead power and telephone lines cross the stream approximately 70 feet upstream of the bridge. Also, there is a pedestrian bridge, two 15" CMP's, and sewer manholes that are on the upstream side of the bridge. Utility impacts are anticipated to be medium.

The current traffic volume of 9,200 vehicles per day (VPD) is expected to increase to 17,800 VPD by the year 2030. The projected volume includes one percent truck-tractor semi-trailer (TTST) and two percent dual-tired vehicles (DT). The speed limit in the vicinity of the bridge is posted at 35 miles per hour (mph). There are four school buses crossing this bridge currently.

There were no accidents reported for the three-year period of January 1, 2000 to December 31, 2002.

III. ALTERNATIVES

A. Project Description

The replacement structure will consist of a bridge approximately 110-foot long. The bridge length is based on preliminary design information and is set by hydraulic requirements. The proposed structure will provide a 32-foot clear deck width providing two 12-foot travel lanes with four-feet between the edge of travelway and the face of the bridge rail on the left and four-feet between the edge of travelway and the face of the sidewalk on the right. There will be a 5.5-foot sidewalk on the right. The roadway grade of the new structure will be approximately the same as the existing grade.

The proposed approach roadway will consist of a 26-foot travel way providing for a 12-foot travel lane with eight-foot shoulder including four-foot paved shoulder on the left and a 14-foot lane with curb and gutter on the right. This roadway will be designed as a rural local. The design speed will be 40 mph.

B. Build Alternatives

Two (2) build alternatives studied for replacing the existing bridge are described below.

Alternate A replaces the bridge at the existing location. Traffic will be detoured offsite (see Figure 1) during the construction period. The length of approach work will be approximately 204 feet on the northwest side of the bridge and approximately 286 feet on the southeast side of the bridge. The existing pedestrian bridge will be removed and pedestrian traffic will utilize the sidewalk on the proposed bridge.

NCDOT Guidelines for Evaluation of Offsite Detours for Bridge Replacement Projects considers multiple project variables beginning with the additional time traveled by the average road user resulting from the offsite detour. The offsite detour for this project would include US 421 Bypass, NC 18, and NC18/NC 268 approximately 2.50 miles in length. The detour for the average road user would result in 3.84 minutes additional travel time (1.28 miles additional travel). Up to a twelve-month duration of construction is expected on this project. Based on the guidelines above the additional travel time is acceptable.

However in this case, Wilkes County Emergency Services has indicated that an offsite detour is not acceptable due to increased response time. Wilkes County Schools has indicated that rerouting buses around this project will not be a problem. In view of the objections from Wilkes County Emergency Services an offsite detour is not preferred. NCDOT Division 11 determined that an offsite detour was acceptable.

Alternate B replaces the bridge on new alignment southwest of the existing bridge. During construction, traffic will be maintained on the existing bridge. The length of approach work will be approximately 373 feet on the northwest side of the bridge and approximately 443 feet on the

southeast side of the bridge. The existing pedestrian bridge will be removed and pedestrian traffic will utilize the sidewalk on the proposed bridge.

C. Alternatives Eliminated From Further Study

The "Do-Nothing" Alternative will eventually necessitate removal of the bridge and closing of the road. This is not desirable due to the traffic service provided by SR 1001.

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

IV. DESIGN EXCEPTIONS ANTICIPATED

A design exception will be required for the horizontal curve to the southeast of the proposed bridge in Alternate A. The radius for this horizontal curve meets a design speed of 30 mph.

V. ESTIMATED COSTS

The estimated costs, based on current 2006 prices, are as follows:

Table 1. – Estimated Costs

	Alternate A	Alternate B
Structure Removal (existing)	\$ 17,600	\$ 17,600
Structure Removal (Pedestrian)	5,700	5,700
Structure (proposed)	396,000	396,000
Roadway Approaches	156,000	271,700
Miscellaneous and Mobilization	132,700	185,000
Engineering and Contingencies	117,000	124,000
Total Construction Cost	825,000	1,000,000
ROW/Const. Easements/Utilities:	TBD	TBD
	-----	-----
TOTAL	\$ 825,000	\$ 1,000,000

The estimated cost of the project, as shown in the 2006-2012 Transportation Improvement Program, is \$1,080,000 including \$80,000 for right-of-way, \$800,000 for construction, and \$200,000 for prior year costs.

VI. NATURAL RESOURCES

A. Physical Characteristics

1. Water Resources

The project study area is located within sub-basin 03-07-01 of the Yadkin River Basin. This area is part of the U.S. Geological Survey (USGS) Hydrologic Unit 03040101 of the North Carolina Region. Within the project study area there are two jurisdictional streams: Cub Creek and an unnamed tributary (UT) to Cub Creek. The structure targeted for replacement spans Cub Creek.

Cub Creek from its source to the Yadkin River has been assigned Stream Index Number 12-41 by the N.C. Division of Water Quality (NCDWQ).

A Best Usage Classification of **C** has been assigned to Cub Creek. Class **C** waters are suitable for secondary recreation, aquatic life propagation and survival, fishing, wildlife, and agriculture. Secondary recreation includes wading, boating, and other uses not involving human body contact with waters on an organized or frequent basis. No other stream classifications have been assigned to Cub Creek. No High Quality Waters (**HQW**), Outstanding Resource Waters (**ORW**), Water Supply I (**WS-I**), Water Supply II (**WS-II**), or watershed Critical Areas (**CA**) occur within 1.0 mile of the project study area. No fish moratoria or stream buffer rules are applicable within the project study area.

2. Wetland Communities

Table 2: Plant Community Impacts Within Proposed Cut-Fill Limits

Plant Community	Alternate A (acres)	Alternate B (acres)
Disturbed/Maintained Land	0.51	1.10
Alluvial Forest	0.01	>0.01
Total	0.52	1.10

VII. AGENCY COMMENTS

The following are comments received during the scoping process:

1. United States Fish and Wildlife Service

Comment: “In all cases we recommend that an existing bridge be replaced with a new bridge.”

Comment: “ There are no known occurrences of federally listed species within Wilkes County or the project area. Therefore, we do not believe this project will affect any listed species.”

2. United States Coast Guard

Comment: “...Coast Guard Bridge permits will not be required for these proposed projects.”

3. North Carolina Division of Water Quality

Comment: “DWQ has no specific comments regarding this project.”

Comment: “Strict adherence to the Corps of Engineers guidelines for bridge demolition will be a condition of the 401 Water Quality Certification.”

Comment: “Bridge deck drains should not discharge directly into the stream.”

Comment: “If possible, bridge supports (bents) should not be placed into the stream.”

Comment: “A clear bank (rip-rap free) area of at least 10 feet should remain on each side of the stream underneath the bridge.”

4. North Carolina Wildlife Resources Commission

Comment: “Cub Creek is Class C waters. No special concerns are indicated at this time. Standard recommendations should apply.”

5. North Carolina Department of Cultural Resources

Comment: “If the replacement is to be located along the existing alignment and there is no onsite detour, it is unlikely that significant archaeological resources will be affected and no investigation is recommended. However, if the replacement is to be in a new location, or an onsite detour is proposed, an archaeological survey is recommended.”

Comment: “We have determined that the project as proposed will not affect any historic structures.”

6. Wilkes County Schools

Comment: “...none of these projects would unworkable situation for bus transportation.”

7. Wilkes County Emergency Services

Comment: “Replacing the bridge over Cub Creek on SR 1001 I believe would be a problem if you close the bridge. I don’t believe that main street Wilkesboro could handle the extra traffic and would impede emergency response to those areas.”

8. High Country RPO

Comment: “Specifically, B-4676 in Wilkes County looks like it may be near Cub Creek Park. Communities in this region are particularly concerned about the aesthetics of bridges that may visually impact park areas.”

9. Town of Wilkesboro

Comment: “We strongly encourage the DOT to preserve the pedestrian structure or upgrade the new bridge to accommodate pedestrian traffic.”

Comment: “We would also like to point out that the town property on the west side of the bridge is regulated by the LWCF federal program. If any of this land is needed for the bridge replacement it should be noted that their requirements will need to be met by attaining other lands to replace any property taken out of the program.”

Comment: “Finally I would like to point out that the Town of Wilkesboro, North Wilkesboro and the County of Wilkes has requested that SR 1001 be upgraded to a multi-lane facility in the TIP.”

10. NCDOT Division 11

Comment: Recommend replacing upstream (southwest) to improve alignment. SR 2460 is an acceptable alternate route; however, this will detour traffic down Main Street of Wilkesboro and this would not be well received.

11. NCDOT Traffic Safety Systems Management

Comment: Since a horizontal curve exists just south of the bridge structure, ensure there is adequate sight distance and stopping distance during all phases of construction.

12. NCDOT Location and Surveys

Comment: If constructing new bridge in existing footprint requires relocating pedestrian bridge and utilities, then horizontal alignment could be improved if new structure is relocated to the west upstream.

13. NCDOT Right of Way

Comment: It is the opinion of this office that the bridge should be replaced at its existing location with an on-site detour provided, (preferably) to the east (downstream) from the existing bridge to possibly eliminate the need to disturb the sidewalk and sidewalk bridge.

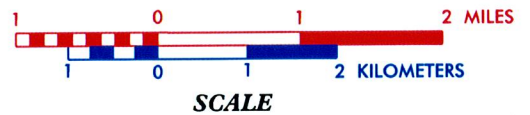
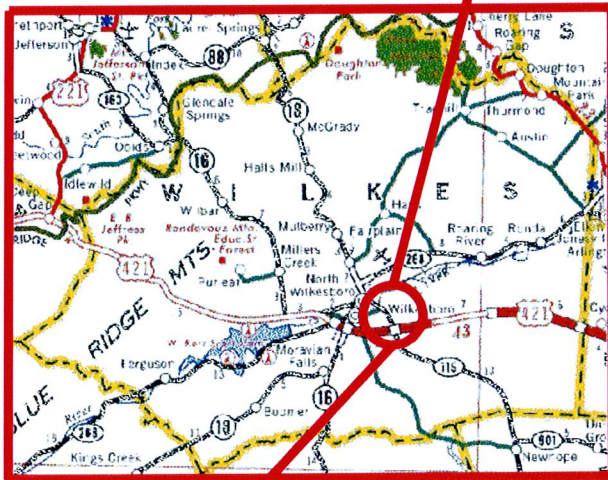
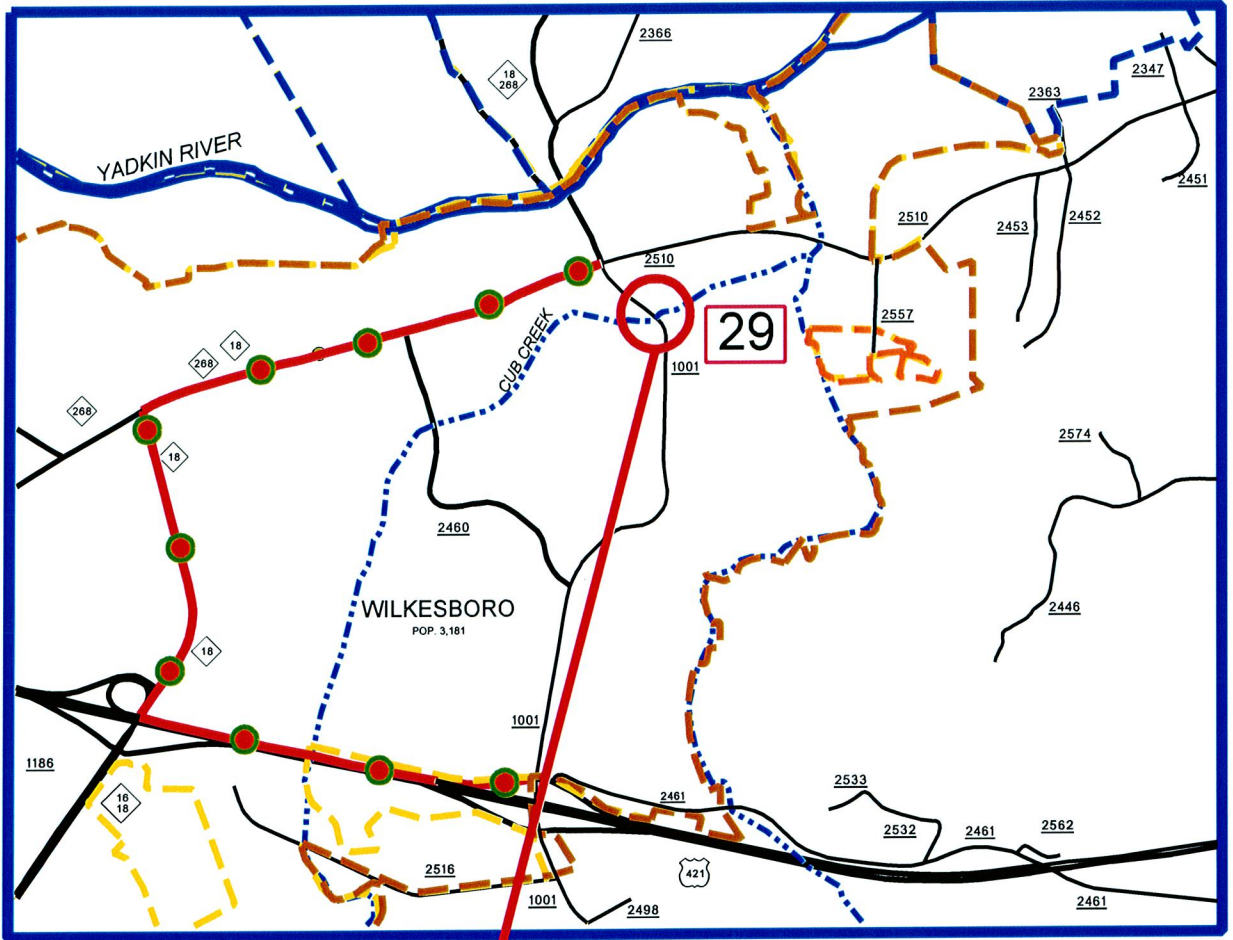
14. NCDOT Congestion Management

Comment: The Division Traffic Engineer is concerned about the proposed detour route. He is concerned if SR 2460 can handle the additional turning traffic at its intersection with NC 18/NC 268. Traffic on NC 18/268 backs through the intersection during the afternoon peak hour. He mentioned that while traffic is detoured from SR 1001, the signal timing could be adjusted.

Comment: According to the Work Zone Traffic Control Unit, the proposed detour route is not the best option. They are concerned with the lack of left turn lane storage from NC 18/268 onto SR 2460 and a back up occurring on NC 18/268, which is already congested at peak times. The concern is with the alignment of the proposed detour. They recommend using NC 18 to US 421 Bypass as the detour option. The detour user cost for this option is much less than the alternative SR 2510, NC 115, US 421 Bypass. Also, if the bridge were to be realigned, then traffic could be maintained on the existing route. The recommended detour option could then be used to do the tie-in work.

15. NCDOT Division of Bicycle & Pedestrian Transportation

Comment: In accordance with the NCDOT bridge we recommend a 7'-6" offset on both sides of the roadway and AASHTO standard bicycle safe railing height of 54" to accommodate future sidewalks and safe bicycle access.



	<p>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS</p>
	<p>WILKES COUNTY BRIDGE NO. 29 ON SR 1001 OVER CUB CREEK TIP NO. B-4676</p>
<p>VICINITY MAP FIGURE 1</p>	



**NORTH SIDE
OF BRIDGE**



**SOUTHEAST
APPROACH**



**NORTHWEST
APPROACH**

**B-4676
Replacement of Bridge
No. 29 on SR 1001
Over Cub Creek
Wilkes County**


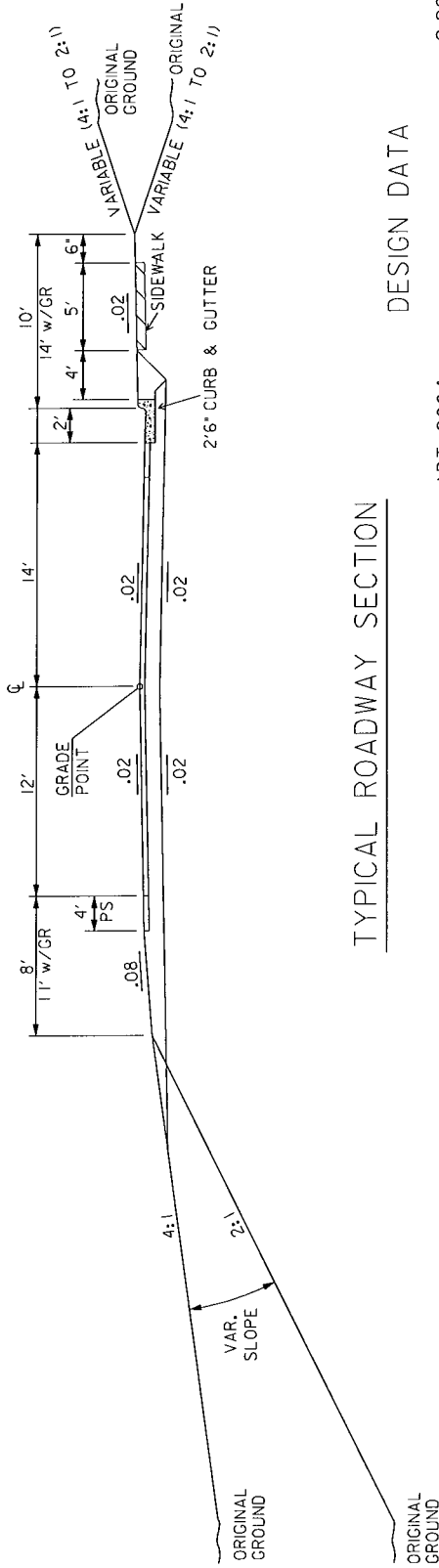


FIGURE 3

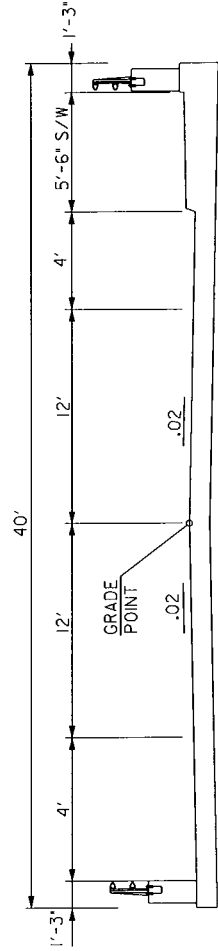
B-4676
 SR 100 I, BRIDGE NO. 29, WILKES COUNTY
 REPLACE BRIDGE OVER CUB CREEK



TYPICAL ROADWAY SECTION

DESIGN DATA

ADT 2004	9,200	LOS C
ADT 2007	10,200	LOS D
ADT 2030	17,800	LOS D
DUAL	2%	
TTST	1%	
DESIGN SPEED	40	mph
POSTED SPEED	35	mph
RURAL LOCAL	533	
MIN. RADIUS (Se=0.04, 40mph)	7%	
MAX. GRADE	MIN. DES. K FACTORS: Ksag= 64	Kcrest= 44
GUARDRAIL LENGTHS: L = 175' - L1= 75'		



TYPICAL BRIDGE SECTION

EXISTING BRIDGE LENGTH IS 81 FT.

* - BICYCLE ROUTE

PREPARED BY: WANG ENGINEERING
 MARCH 24, 2005



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

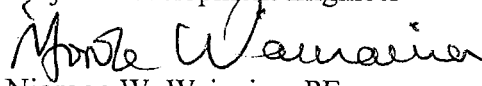
Michael F. Easley
GOVERNOR

Lyndo Tippet
SECRETARY

January 4, 2006

MEMORANDUM TO: Mr. William (Bill) Goodwin, P. E.
Project Development Unit Manager
Project Development and Environmental Analysis Branch

ATTENTION: Tracy Walters
Project Development Engineer

FROM: 
Njoroge W. Wainaina, PE
State Geotechnical Engineer

TIP NO. B-4676
WBS 33831.1.1
FEDERAL PROJECT: BRZ-1001 (29)
COUNTY: Wilkes
DESCRIPTION: Bridge # 29 over Cub Creek on SR 1001 (Oakwoods Ave)
SUBJECT: Geotechnical Pre-Scoping Report (PDEA 1C)

The Geotechnical Engineering Unit performed a limited pre-scoping investigation of the above reference project to provide an early identification of any Geotechnical and GeoEnvironmental issues that might impact the project's planning, design or construction. The following information summarizes our findings.

Geoenvironmental Issues

Purpose

This report presents the results of a geoenvironmental impact evaluation conducted along the above referenced project. The main purpose of this investigation is to identify properties within the project study area that are or may be contaminated and therefore result in increased project costs and future liability if acquired by the Department. Geoenvironmental impacts may include,

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GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

but are not limited to, active and abandoned underground storage tank (UST) sites, hazardous waste sites, regulated landfills and unregulated dumpsites.

Techniques/Methodologies Used

The Geographical Information System (GIS) was consulted to identify known environmentally impacting sites in relation to the project corridor. GeoEnvironmental Section personnel conducted a field reconnaissance survey along the project corridor on November 15, 2005

Findings

Underground Storage Tank (UST) Facilities

Based on our study, there are no UST sites identified within the project limits.

Hazardous Waste Sites

No Hazardous Waste Sites were identified within the project limits.

Landfills

No apparent landfills were identified within the project limits.

Other GeoEnvironmental Concerns

There were no other geoenvironmental concerns identified within the project limits.

Anticipated Impacts

There are no geoenvironmental impacts anticipated within the project limits.

The GeoEnvironmental Section observed no additional contaminated properties during the field reconnaissance and regulatory agencies' records search. Please note that discovery of additional sites not recorded by regulatory agencies and not reasonably discernable during the project reconnaissance may occur. The GeoEnvironmental Section should be notified immediately after discovery of such sites so their potential impact(s) may be assessed.

If there are any questions regarding the geoenvironmental comments, please contact Cyrus Parker, LG at 919-250-4088.

GEOTECHNICAL ISSUES

Methods

The Geotechnical Engineering Unit Western Region conducted a field reconnaissance of the project site on November 30, 2005, and a field investigation on December 6-7, 2005. The investigation consisted of 2 borings using a CME 550 power drilling machine equipped with a NX casing advancer. Boring No. 1 was located 2 feet north of the existing north end bent and 36 feet east of the centerline of the existing road. Boring No. 2 was located 13 feet south of the south end bent and 19 feet east of the centerline.

Findings

Bridge 29 is located in the City of Wilkesboro on Cub Creek, approximately 4000 feet upstream from its confluence with the Yadkin River. The bridge site is located on a broad floodplain surrounded by low hills. The floodplain is about 300 feet wide at the bridge but widens to over 500 feet in the near upstream and downstream vicinities. The floodplain is occupied by a tree nursery and an athletic field. The surrounding hills are residential and commercial properties.

Cub Creek is a riffling stream on a bed of sand and small gravel, in a channel about 20-25 feet wide. The channel banks are 5-7 feet high in sand and silt.

The existing bridge is 83 feet long and 30 feet wide, with the bridge deck approximately 13 feet above the stream channel. The bridge is a steel girder structure with timber abutments and wingwalls, and with 2 interior bents of timber.

A concrete pedestrian bridge 4 feet wide is located 20 feet upstream of the rail of Bridge 29. Utilities at the site include a sewer line, a water main and at least one buried cable in addition to overhead power lines. The ruins of an older concrete bridge bent lie in place beneath the existing bridge, between the south abutment and the first interior bent.

Both borings at the site penetrated 10 to 11 feet of alluvial floodplain soils overlying 11 to 12 feet of silty to sandy saprolite. Boring No. 1 encountered weathered rock beneath the saprolite at a depth of 22 feet, and it continued in weathered rock to termination in same at a depth of 29.9 feet. Boring No. 2 passed from saprolite into a thin layer of weathered rock at 26.5 feet, grading to hard rock at a depth of 27.5 feet. Weathered rock is approximately 13 feet beneath the stream bed in boring No. 1 and 14 feet beneath the stream bed in boring No. 2.

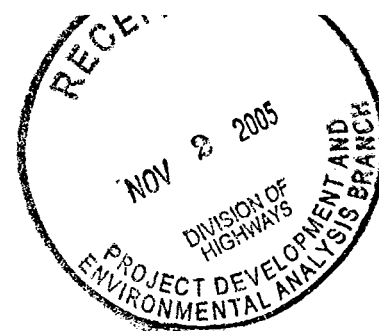
Anticipated Impacts and Recommendations

Boring results indicate that any new structure at this site is likely to be supported on piles at the end bents, and if an interior bent is required, it will have a drilled shaft foundation.

Construction of a replacement located on the existing alignment, with use of an off- site detour, would be feasible at this site and would have the least impact. Construction on the upstream side would impact the pedestrian bridge on that side. Construction on the downstream side would probably require excavation of a cut in soil on the south approach.

For further information concerning geotechnical issues, please contact Louis L. Acker, LG, in the Asheville Field Office, or John Pilipchuk in the Western Regional Office, Geotechnical Engineering Unit.

NWW/CFPLLA/JLP/dbm/jb



North Carolina Wildlife Resources Commission

Richard B. Hamilton, Executive Director

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

FROM: Marla Chambers, Western NCDOT Permit Coordinator *Marla Chambers*
Habitat Conservation Program, NCWRC

DATE: October 27, 2005

SUBJECT: Scoping review of NCDOT's proposed bridge replacement projects in Ashe, Watauga, Alleghany, Mecklenburg, Union, and Wilkes Counties. Group No. 58, TIP Nos. B-3806, B-3924, B-4406, B-4580, B-4650, B-4652, B-4676, and B-4677.

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

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

1. We generally prefer spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.
2. Bridge deck drains should not discharge directly into the stream.
3. Live concrete should not be allowed to contact the water in or entering into the stream.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

4. If possible, bridge supports (bents) should not be placed in the stream.
5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.
6. A clear bank (riprap free) area of at least 10 feet should remain on each side of the stream underneath the bridge.
7. In trout waters, the N.C. Wildlife Resources Commission reviews all U.S. Army Corps of Engineers nationwide and general '404' permits. We have the option of requesting additional measures to protect trout and trout habitat and we can recommend that the project require an individual '404' permit.
8. In streams that contain threatened or endangered species, Mr. Logan Williams with the NCDOT - ONE should be notified. Special measures to protect these sensitive species may be required. NCDOT should also contact the U.S. Fish and Wildlife Service for information on requirements of the Endangered Species Act as it relates to the project.
9. In streams that are used by anadromous fish, the NCDOT official policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997)" should be followed.
10. In areas with significant fisheries for sunfish, seasonal exclusions may also be recommended.
11. Sedimentation and erosion control measures sufficient to protect aquatic resources must be implemented prior to any ground disturbing activities. Structures should be maintained regularly, especially following rainfall events.
12. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 calendar days of ground disturbing activities to provide long-term erosion control. Tall fescue should not be used in riparian areas.
13. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.
14. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams.

15. Only clean, sediment-free rock should be used as temporary fill (causeways), and should be removed without excessive disturbance of the natural stream bottom when construction is completed.
16. During subsurface investigations, equipment should be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.
17. If culvert installation is being considered, conduct subsurface investigations prior to structure design to determine design options and constraints and to ensure that wildlife passage issues are addressed.

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

1. The culvert must be designed to allow for aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream end to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxious or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, the base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.
2. If multiple pipes or cells are used, at least one pipe or box should be designed to remain dry during normal flows to allow for wildlife passage.
3. Culverts or pipes should be situated along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

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

Project specific comments:

1. B-3806, Ashe Co., Bridge No. 456 over Ashworth Creek (or Little Phoenix Creek?) on SR 1573 (Old Highway 16). Little Phoenix (or Asheworth) Creek, Class C Tr+ waters, may be inhabited by wild brook trout and flows into the North Fork New River, Class C+ waters, a short ways downstream. Kanawha minnow (*Phenacobius teretulus*), Federal Species of Concern (FSC) and state special concern (SC); Kanawha darter (*Etheostoma kanawhae*), state Significantly Rare (SR); tonguetied minnow (*Exoglossum laurae*), state SR; and crayfish on the NC Watch List, New River crayfish (*Cambarus chasmodactylus*) and *Orconectes cristavarius* (no common name), occur in the North Fork New River and tributary streams in this area. In addition, seep mudalia (*Leptoxis dilatata*), state Threatened (T); green floater (*Lasmigona subviridis*), FSC and state Endangered (E); and spike (*Elliptio dilatata*), state SC; occur in the mainstem North Fork New River just downstream of the confluence with Little Phoenix (or Asheworth) Creek. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure. A trout moratorium may be requested.
2. B-3924, Watauga Co., Bridge No. 33 over Meat Camp Creek on SR 1335 (Meat Camp Road). Meat Camp Creek, classified as C Tr+, supports wild brown and brook trout and is Hatchery Supported Designated Public Mountain Trout Water (DPMTW). It joins the South Fork New River, classified C+, downstream. The Kanawha minnow, FSC and state SC; spike, state SC; sharpnose darter (*Percina oxyrhynchus*), state SC; the tonguetied minnow, state SR; and Kanawha darter, state SR; are listed fish and mussel species found in Meat Camp or South Fork New River. In addition, seep mudalia, state T; green floater, FSC and state E; and crayfish on the NC Watch List, New River crayfish and *Orconectes cristavarius* (no common name), occur in the South Fork New River system in this vicinity and downstream. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure.
3. B-4406, Alleghany Co., Bridge No. 9 over a creek (appears to be Prathers Creek) on US 221. Prathers Creek, classified as B Tr+, is DPMTW and flows into the South Fork New River, classified B ORW, not far downstream. The Kanawha minnow, FSC and state SC; Kanawha darter, state SR; seep mudalia, state T; green floater, FSC and state E; tonguetied minnow, state SR; sharpnose darter, state SC; spike, state SC; and crayfish on the NC Watch List,

New River crayfish and *Orconectes cristavarius* (no common name), occur in the South Fork New River system in the vicinity of this project. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure.

4. B-4580, Mecklenburg Co., Bridge No. 177 over Reedy Creek on SR 2804 (Reedy Creek Road). Reedy Creek is Class C waters. An historic record for the Carolina heelsplitter (*Lasmigona decorata*), a federal and state E mussel, has been recorded in a tributary of Reedy Creek, Crozier Branch, a short distance downstream of the project. Strict sediment and erosion control measures should be used to prevent negative impacts downstream. No other special concerns are indicated at this time. Standard recommendations should apply.
5. B-4650, Union Co., Bridge No. 221 over West Fork Twelvemile Creek on SR 1315 (New Town Road). West Fork Twelvemile Creek joins the East Fork Twelvemile Creek, both Class C waters, not far downstream. The notched rainbow (*Villosa constricta*), state SC, as well as the currently stable eastern Elliptio (*Elliptio complanata*), inhabit the project area. A large portion of the East Fork Twelvemile Creek is a Significant Natural Heritage Area, including the portion downstream of the confluence with the West Fork. Carolina creekshell (*Villosa vaughaniana*), FSC and state E, and notched rainbow occur in East Fork Twelvemile Creek, as well as a number of Elliptio species. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure. Continue coordination with state and federal wildlife resources agencies.
6. B-4652, Union Co., Bridge No. 118 over Lanes Creek on SR 1937 (Old Pageland-Marshville Road). Lanes Creek, classified WS-V waters, is a Significant Natural Heritage Area in the project area. Listed species found in Lanes Creek include Carolina creekshell, FSC and state E; Carolina darter (*Etheostoma collis collis*), FSC and state SC; Savannah lilliput (*Toxolasma pullus*), FSC and state E; Atlantic Pigtoe (*Fusconaia masoni*), FSC and state E; and creeper (*Strophitus undulatus*), state T. Sediment and erosion control measures should adhere to the design standards for sensitive watersheds. The bridge should be replaced with another spanning structure. Continue coordination with state and federal wildlife resources agencies.
7. B-4676, Wilkes Co., Bridge No. 29 over Cub Creek on SR 1001 (Oakwoods Avenue?). Cub Creek is Class C waters. No special concerns are indicated at this time. Standard recommendations should apply.
8. B-4677, Wilkes Co., Bridge No. 99 over a creek (appears to be Coal Creek) on SR 1317 (Purlear Road). Coal Creek is classified WS-IV waters. No special concerns are indicated at this time. Standard recommendations should apply.

We request that NCDOT routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. The NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from

contacting water in or entering into these streams. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks, reducing habitat fragmentation and vehicle related mortality at highway crossings.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (704) 545-3841. Thank you for the opportunity to review and comment on this project.

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