

# FEASIBILITY STUDY

STIP Project FS-1514A

Proposed Improvements to Wilson Road (SR 1540)

from US 276 to Old US 64/Old Hendersonville Highway (SR 1504)

Transylvania County,

North Carolina



Feasibility Studies Unit

Division of Planning and Programming

North Carolina Department of Transportation

Prepared By: **HNTB**

DocuSigned by:

*David W. Bass, PE*

FF091E1C288F478...

David Bass, PE

Design Services Manager

HNTB

DocuSigned by:

*Derrick Lewis, PE*

9ED3BDDA931B400...

Derrick W. Lewis, PE

Feasibility Studies Unit Head

Feasibility Studies Unit

DocuSigned by:

*Lynnise Hawes, PE*

DC64C38D85234F8...

Lynnise Hawes, PE

Feasibility Studies Engineer

Feasibility Studies Unit

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## Table of Contents

1	INTRODUCTION.....	1
1.1	GENERAL DESCRIPTION.....	1
2	BACKGROUND.....	1
2.1	PURPOSE AND NEED.....	1
2.2	EXISTING CONDITIONS.....	1
2.3	EXISTING LAND USE.....	2
3	PREVIOUS STUDIES.....	2
4	ADJACENT PROJECTS.....	2
5	CRASH ANALYSIS.....	2
6	ALTERNATIVES.....	3
6.1	BUILD ALTERNATIVES.....	3
7	TRAFFIC VOLUMES.....	4
8	BUILD ALTERNATIVE IMPACTS AND COST ESTIMATES.....	5
8.1	IMPACTS.....	5
8.2	COST ESTIMATES.....	5
9	COMMUNITY RESOURCES.....	6
9.1	PLANS.....	6
	Transylvania County.....	6
	City of Brevard.....	6
	Land of Sky Regional Planning Organization.....	7
9.2	COMMUNITY FACILITIES.....	7
	Water and Wastewater.....	7
9.3	EMERGENCY MANAGEMENT SERVICES.....	7
9.4	HISTORIC RESOURCES.....	7
9.5	ARCHAEOLOGICAL RESOURCES.....	8
10	NATURAL ENVIRONMENT.....	8
10.1	WATER QUALITY RESOURCES.....	8
10.2	JURISDICTIONAL FEATURES.....	9

*Feasibility Study  
Improvements to Wilson Road (SR 1540)*

10.3	PROTECTED SPECIES.....	10
10.4	EXISTING NCDOT MITIGATION SITES .....	10
10.5	FEMA HAZARD MITIGATION GRANT PROGRAM PROPERTIES .....	10
10.6	NCDEQ, DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES .....	11
	Stormwater .....	11
	Erosion and Sediment Control .....	11
11	CONCLUSION.....	11
12	REFERENCES.....	12

FIGURES

APPENDIX A: ALTERNATIVE DESIGNS (under separate cover)

# 1 INTRODUCTION

## 1.1 GENERAL DESCRIPTION

This Feasibility Study provides a screening-level review of potential improvements needed to reduce over-topping of Wilson Road (SR 1540) by the French Broad River in Transylvania County. Wilson Road is a two-lane facility and is classified as a major collector by the Land of Sky Regional Planning Organization (RPO). It is approximately 3.6 miles from US 276 to Old US 64/Old Hendersonville Highway (SR 1504). Wilson Road forms the eastern boundary of the City of Brevard's planning jurisdiction. The project vicinity is shown on **Figure 1**.

## 2 BACKGROUND

### 2.1 PURPOSE AND NEED

The purpose of this project is to improve the facility and reduce over-topping of the road by the French Broad River during flood events. Sections of Wilson Road flood during 10-year and 50-year flood events, making the road impassable, except by boat, to residents, those traveling to or from businesses, and to the City of Brevard's wastewater treatment plant (WWTP). Elevating the roadway out of the 50-year floodplain would decrease the number of times the road is impassable due to flooding, thereby improving the perceived level of service.

In addition to the stated purpose and need, the Transylvania Transportation Advisory Committee identified other concerns and interests in its January 26, 2016 committee meeting. These include the need for guard rails where Wilson Road is adjacent to the river; raising and extending the bridge over the river at the northern end of the project out of the floodplain; increasing the travel lane width; straightening or realigning curves; providing paved bike lanes and shoulders; and improving the intersection of Wilson Road at US 276 and realigning Wilson Road at Ecusta Road.

*It should be noted that a Feasibility Study is a preliminary document that is the initial step in the planning and design process for a candidate project and not the product of exhaustive environmental or design investigations. The purpose of this feasibility study is to describe the proposed project, including cost, and identify potential problems that may require consideration in the planning and design phases.*

*If a candidate project is identified for funding in the State Transportation Improvement Program (STIP), the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the National Environmental Policy Act (NEPA).*

### 2.2 EXISTING CONDITIONS

Within the project study area, Wilson Road is a two-lane facility connecting US 276 and Old US 64/Old Hendersonville Highway, a distance of approximately 3.6 miles. The posted speed limit is 40 miles per hour (mph). The Land of Sky RPO classifies Wilson Road as a major collector. Wilson Road is located east of Brevard and serves as a bypass around the city in conjunction with Ecusta Road, connecting US 276 to US 64 (to the east)/US 276 (to the west) north of Brevard. Wilson Road is included as part of

each of the six bicycle routes provided by the City of Brevard. Transylvania County has designated Old US 64/Old Hendersonville Highway as bicycle Route 1.

Bridges crossed by Wilson Road, or intersecting roads in the vicinity of the study area, are listed in **Table 1** and shown in **Figure 2**.

**Table 1. Bridges**

<b>Bridge Number</b>	<b>Roadway Carried</b>	<b>Feature/Roadway Crossed</b>	<b>Structure</b>
870036	Wilson Road (SR 1540)	French Broad River	Bridge
870038	Elm Bend Road (SR 1543)	French Broad River	Bridge
870039	US 276	French Broad River	Bridge
870040	Wilson Road (SR 1540)	Williamson Creek	Bridge
870206	Elm Bend Road (SR 1543)	French Broad River Overflow	Bridge

## 2.3 EXISTING LAND USE

Land use along Wilson Road is predominantly pastoral with the French Broad River and farmland along the western side of the road and houses and subdivisions along the eastern side. The French Broad River follows a sinuous path, and is immediately adjacent to Wilson Road in two locations for approximately 1.0 mile and 0.25 mile, respectively. These sections lie within the FEMA designated 100-year floodplain of the French Broad River. Where the river diverges from the road, fields are located in the floodplain. Wilson Road crosses the French Broad River at the northern end of the project, approximately 0.25 mile from its intersection with Old US 64/Old Hendersonville Highway. From the southern terminus of the project, single family houses are located to the east, generally upslope of the floodplain. Subdivisions, including Knob Creek, Middlemount, and Glen Cannon are also located to the east of Wilson Road. Single family homes, including some manufactured houses, are located between the French Broad River bridge crossing and the intersection of Wilson Road with Old US 64/Old Hendersonville Highway. In addition, there are several business and retail locations on Old US 64/Old Hendersonville Highway between the Wilson Road and Ecusta Road intersections. They include All American Electric of Brevard, NC, U.S. Post Office, TanksTees Screenprinting, Exxon, and Hunt Brother's Pizza, among others.

## 3 PREVIOUS STUDIES

No other studies have been conducted to determine the feasibility of improving the Wilson Road facility.

## 4 ADJACENT PROJECTS

There are no current NCDOT STIP projects within the study area.

## 5 CRASH ANALYSIS

A crash analysis of the Wilson Road corridor was conducted utilizing crash data provided by the NCDOT Traffic Safety Unit for a five-year period from October 1, 2010 to September 30, 2015.

Between October 2010 and September 2015, a total of 75 crashes was reported along Wilson Road. Of the 75 total crashes in the study area during the five-year period, none were fatal and 22 reported non-fatal injuries. Fixed object collisions accounted for the majority of incidents, with 38 crashes or 51 percent of total crashes. Among the objects struck, ditches accounted for 12 crashes, or 32 percent, and embankments accounted for 10 crashes, or 26 percent, of the total fixed object crashes.

Between October 2010 and September 2015, a total crash rate of 384.35 per 100 million vehicle miles traveled (MVMT) was reported in the study area. The total crash rate for Wilson Road is higher than the total critical crash rate of 253.10 for rural secondary roads identified by NCDOT. Critical crash rates are crash rates that have been statistically adjusted, based on other roads with similar characteristics, to remove the elements of chance and randomness. This is a check to determine if the “rate at a particular location is significantly higher than a pre-determined average rate for locations of similar characteristics, based on Poisson’s distribution” (Khisty and Lall, 1998). The crash rate for non-fatal injury, 112.74, and for wet crashes, 71.75, is higher than the critical crash rates of 73.41 for non-fatal injury and 42.77 for wet crashes. Statewide and critical crash rates are not calculated for property damage only crashes. Accident data for fatal, non-fatal, property damage, and wet crashes are provided below in **Table 2**.

**Table 2. Crash Data Analysis Summary**

Location	Number of Crashes	Crash Rate	Statewide Crash Rate <sup>1</sup>	Critical Crash Rate <sup>2</sup>
Fatal	0	0	2.57	3.19
Non-Fatal Injury	22	112.74	70.26	73.41
Property Damage Only	53	271.61	-	-
Wet Crashes	14	71.75	40.38	42.77
<b>Total</b>	<b>75</b>	<b>384.35</b>	<b>247.22</b>	<b>253.10</b>

<sup>1</sup>2012-2014 Statewide crash rates in crashes per 100 million vehicle miles for urban interstates in North Carolina.

<sup>2</sup>Based on the statewide crash rate (95% confidence interval).

## 6 ALTERNATIVES

### 6.1 BUILD ALTERNATIVES

Three build alternatives were analyzed for human and environmental impacts and to create cost estimates.

**Build Alternative 1 – Minimal upgrade using NCDOT’s Resurfacing, Restoration, and Rehabilitation (R-R or 3R) Guidelines (3R Alternative).** This alternative would add paved shoulders and correct some horizontal and vertical deficiencies, as well as adding safety features like guardrail. No major grade work or realignment would take place. The bridge over Williamson Creek would be replaced on new alignment due to a sub-standard horizontal curve. The bridge over the French Broad River at the northern terminus of the project would be replaced and realigned to help address flooding concerns.

**Build Alternative 2 – Upgrade to Major Collector Design Standards.** Wilson Road is designated as a major collector by the Land of Sky RPO. However, the horizontal and vertical curvatures are well below American Association of State Highway and Transportation Officials (AASHTO) standards for a facility with this designation and posted speed (40 mph). Build Alternative 2 corrects the horizontal curvature

by increasing the radii to meet minimum AASHTO standards. The vertical design would also meet AASHTO minimum design standards and move Wilson Road out of the 50-year floodplain. The bridges over Williamson Creek and the French Broad River would be replaced on new alignment. Build Alternative 2 also adds paved shoulders and increases the design speed of the road to 45 mph.

**Build Alternative 3 – Upgrade to Principal Arterial (US Route) Design Standards.** Wilson Road would become the primary route at the US 276 intersection and design speed would increase to 60 mph, with a posted speed limit of 55 mph. Due to the increased speed, horizontal and vertical upgrades would be required. This design would also raise and realign the road out of the 50-year floodplain. The bridges over Williamson Creek and the French Broad River would be realigned and replaced. Paved shoulders would be added. This alternative would benefit the City of Brevard by removing through traffic on local roads.

## 7 TRAFFIC VOLUMES

The average annual daily traffic (AADT) was forecast by NCDOT Transportation Planning Branch (TPB) for 2015 and 2040 and is shown in **Table 3**.

**Table 3. AADT for the No Build Alternative for years 2015 and 2040**

Facility	2015 (vpd) <sup>1</sup>	2040 (vpd)
US 276 to “Break”	1,800	2,000
“Break” to Elm Bend Road	2,600	2,900
Elm Bend Road to Williamson Creek Road (SR 1541)	3,600	4,000
Williamson Creek Road to Glen Cannon Drive (SR 1580)	3,000	3,400
Glen Cannon Drive to “Break”	3,200	3,600
“Break” to Old US 64/Old Hendersonville Highway (SR 1504)	3,600	4,000

<sup>1</sup>vpd = vehicles per day

<sup>2</sup>The “Break” occurs where there is a long distance between forecast values or there are intermediate roads/facilities/shopping centers that can notably change the forecast values.

As shown in **Table 3** the No Build volume of vehicles increases between the year 2015 and 2040. The average increase in traffic is predicted to be approximately 350 vehicles or 17 percent.

Based on this analysis, traffic volumes on Wilson Road are anticipated to increase. Improving the road, such that it is out of the 50-year storm event floodplain, will reduce the amount of time the facility is closed thereby potentially improving perceived user benefit.

*Evaluation of this complexity could not be performed as a part of this feasibility study level due to limitations associated with the traffic forecast and uncertainty of the design requirements. As such, the methodology utilized within this feasibility study was developed to provide an order of magnitude comparison of alternatives considered, utilizing the available traffic forecast. Information or feasible components identified within this feasibility study should provide an initial concept to begin this type of investigation during the NEPA phase, which will include the preparation of an updated traffic forecast and detailed traffic operations analysis.*

## 8 BUILD ALTERNATIVE IMPACTS AND COST ESTIMATES

### 8.1 IMPACTS

Potential impacts and cost estimates were developed for the Build Alternatives based on the functional designs. Impacts were measured using a 2,000-foot wide corridor and using the alternatives' slope stake limits plus 40 feet for impacts to streams, wetlands, and FEMA-regulated waters. Potential impacts are summarized in **Table 4** and discussed further in **Section 9**.

**Table 4. Potential Impacts of the Build Alternatives**

Resource	Study Area		
Historic Resources (6 known potential)	Elizur Patton House (Study List eligible) Jenkins House (Study List)		
Archaeological Resources	13 previously recorded sites Additional surveys would require coordination with the Eastern Band of Cherokee Indians		
Natural Heritage Element Occurrence	4 Federal Species of Concern 1 Threatened (Similarity of Appearance)		
Resource	Alternative 1: 3-3-3	Alternative 2: Collector	Alternative 3: US Route
Stream	5,050 ft	3,950 ft	2,260 ft
National Wetland Inventory (NWI) Wetland	0.14 ac	0 ac	0 ac
FEMA			
100-year flood zone (AE)	31 ac (9.5 ac in the floodway)	29 ac (4.7 ac in the floodway)	19.0 ac (3.2 ac in the floodway)
500-year flood zone	9	8	5
Residential Relocates	12	15	53
Business Relocates	1	1	0

*Because this feasibility study is not the product of an exhaustive environmental or design effort, but rather an initial step to this process, it was concluded that a more detailed impacts analysis would be performed during the NEPA phase.*

### 8.2 COST ESTIMATES

Right of way limits for the various alternatives were reduced or increased according to the various typical section dimensions of each alternative. **Table 5** shows the estimated cost of each alternative.



**Table 5. Cost Estimate**

Build Alternative	Cost			
	Construction <sup>1</sup>	Right of Way	Utility Relocation	Total
Alternative 1 (3R)	\$20,000,000	\$4,000,000	\$800,000	\$24,800,000
Alternative 2 (Collector)	\$27,000,000	\$5,100,000	\$1,800,000	\$33,900,000
Alternative 3 (US Route)	\$81,000,000	\$18,000,000	\$3,600,000	\$102,600,000

<sup>1</sup>Includes utility construction

## 9 COMMUNITY RESOURCES

A detailed community resources study was not conducted for this feasibility study. Geographic Information System (GIS) level research and a preliminary site review were completed. **Figure 2** shows the location of documented community resources within and near the project study area.

### 9.1 PLANS

#### Transylvania County

**2005 Comprehensive Plan** – This plan serves as a policy guide in developing the community’s physical and social form. A goal of the plan is to collaborate with the NCDOT to provide the best possible roads for Transylvania County and promote alternative transportation. The plan lists Wilson Road as a minor collector among the thoroughfare plan roads.

**2025 Comprehensive Plan** – The Final Draft 2025 Comprehensive Plan was sent to the Transylvania Board of Commissioners in August for a public hearing and adoption. The plan is designed as a policy guide for decision in the next 10 years and is a tool for sharing Transylvania County’s vision of the future. The plan does not provide regulations. However, Wilson Road is the sixth “road improvement” listed in response to the 2025 Survey Question “...What one road or road improvement is needed in 10 years?”

#### City of Brevard

**2002 Land Use Plan** – The purpose of this plan was to provide a way to coordinate land use planning, infrastructure planning, and environmental protection to help guide the growth and development of the community.

**2015 Comprehensive Plan** – The plan uses a direction-setting framework based around five functional elements that include: Arts and Culture, Economic Health, Environmental Health, a Livable Community, and Infrastructure. This framework provides a “clear, relevant basis for the City’s growth and development over the next several years.” This Comprehensive Plan also refers to the Transylvania County Comprehensive Transportation Plans and supports their implementation.

## Land of Sky Regional Planning Organization

**Transylvania Comprehensive Transportation Plan – Highway Map** (updated 2012) – The CTP highway map shows Wilson Road as a minor thoroughfare that needs improvement.

**Transylvania Comprehensive Transportation Plan – Bicycle Map** (updated 2012) – The CTP bicycle map shows Wilson Road as having on-road bicycle facilities that need improvement.

**Blue Ridge Bike Plan** – Plan developed to address safety and other concerns including the best expenditure of resources, identification of dangerous roads and intersections, and identification of destination connections. The plan developed recommendations that communities could use to improve bicycling conditions. Wilson Road from Barclay Road to Old US 64/Old Hendersonville Highway was identified as Transylvania County Priority Corridor 1. The plan proposes bike lanes within the City of Brevard's ETJ and bikeable shoulders in the unincorporated areas.

## 9.2 COMMUNITY FACILITIES

There are no schools, churches, cemeteries, parks or greenways within the project study area. There is a post office located near the intersection of Wilson Road and Old US 64/Old Hendersonville Highway at 1 Old Hendersonville Highway, Pisgah Forest.

### Water and Wastewater

A City of Brevard wastewater treatment plant (WWTP) is located at 3226 Wilson Road. According to plant manager Emory Owen, the plant opened in 1987. It currently treats 1.3 million gallons per day (MGD) and is rated for 2.5 MGD. The plant discharges under National Pollution Discharge Elimination Systems (NPDES) permit number NC0060534 into the French Broad River, upstream of Wilson Road. Upgrades to the WWTP are underway and will eventually result in increasing the plant capacity, according to David Lutz, City of Brevard Public Works Director. This plant serves the City of Brevard, including those residences immediately adjacent to Wilson Road. In addition, the City maintains water service along Wilson Road. It is unknown whether or not residents of the subdivisions off Wilson Road use city water and sewer services.

This WWTP is also affected during flood events. There is only one point of ingress/egress from Wilson Road and during flood events it is not always accessible by vehicle.

## 9.3 EMERGENCY MANAGEMENT SERVICES

The study area is served by the Transylvania County Sheriff's Department and the City of Brevard Police Department. Fire and rescue services are provided by the Brevard Fire Department. There are no police, fire, or emergency medical system (EMS) stations within the project study area.

## 9.4 HISTORIC RESOURCES

Records and maps were reviewed on the North Carolina State Historic Preservation Office's (HPO) website for historic architectural resources that had been identified in previous surveys or that were listed in or had been determined eligible for listing in the National Register of Historic Places (NRHP). Six

architectural resources were found within the study area. The Elizur Patton House is located on Old US 64/Old Hendersonville Highway and is study list eligible. The Jenkins House is located on Wilson Road near the southern terminus of the project and is on the study list. It is recommended that further assessment of these and the other remaining sites be completed. Additional surveys of the study area may be required to determine if additional resources are present.

## 9.5 ARCHAEOLOGICAL RESOURCES

A review of archaeological site files on June 10, 2016 identified approximately 13 previously recorded archaeological sites within the project study area. It is unlikely that the project would impact all 13 sites and only those that have the potential for ground disturbance should be evaluated for the presence of archaeological resources. Additional surveys may be required to examine areas with a high probability of archaeological resources.

Transylvania County is within the Eastern Band of Cherokee Indians territory and any additional surveys would require coordination with them.

## 10 NATURAL ENVIRONMENT

A detailed environmental study was not conducted for this feasibility study. GIS level research and a preliminary site review were completed. **Figure 3** shows the location of documented natural resources within and near the project study area.

### 10.1 WATER QUALITY RESOURCES

The project is located in the French Broad River Basin (8-digit hydrologic unit code (HUC) 06010105). Wilson Road is within the Davidson River-French Broad River Sub-Basin (10-digit HUC 0601010502); and is also within the Williamson Creek-French Broad River watershed.

There are several “blue line” streams within the corridor that are listed on the following table. “Blue line” streams are shown on the USGS 7.5-minute Topographic Quadrangle maps as solid blue lines, indicating that they were considered to be perennial waters at the time the map was developed. There are five streams, totaling 22,692 feet, within the study area. These streams are listed in **Table 6**.

**Table 6. Potential Stream Impacts**

Stream Name	DWR ID	Classification	Length <sup>1</sup> within Corridor (ft)	Corridor Crossing Location
French Broad River	6-(27)	B	16,390	Parallel to Wilson Road, crosses Wilson Road approximately 0.2 mile south of Old US 64/Old Hendersonville Highway
Cateechee Branch	6-29	B	2,760	Crosses Wilson Road approximately 0.08 mile south of Elm Bend Road
Williamson Creek	6-32	C; Tr, HQW	2,260	Crosses Wilson Road approximately 0.14 mile north of Glen Cannon Drive
Lamb Creek (Simpson Lake)	6-33	C; Tr	450	Confluence with the French Broad River, west of Wilson Road
Davidson River	6-31-(21)	B	840	In northeast corner of the study area. Crosses Old US 64/Hendersonville Highway approximately 0.19 mile east of Wilson Road intersection

<sup>1</sup> Stream length is approximate and based on GIS data.

The North Carolina Department of Environmental Quality-Division of Water Resources (NCDWR) monitors water quality in North Carolina. Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters meeting water quality standards or that have impaired uses. No streams within the study area are included in the current (2014) North Carolina 303(d) list of impaired waters.

Water classifications are designated by NCDWR. All waters must at least meet the standards for “C” classification. These waters are protected for infrequent secondary recreation and must be swimmable and/or fishable. Class B waters are protected for primary recreation, or any recreation that requires human body contact with the water and occurs in an organized manner or on a frequent basis. Trout water (Tr) is a supplemental classification to protect fresh waters that have conditions that will allow for trout propagation and stock survival on a year-round basis. High Quality Waters (HQW) designation is intended to protect waters that are rated “excellent” based on biological and physical/chemical characteristics. The HQW management area for Williamson Creek is partially located within the study area as shown on **Figure 3**.

## 10.2 JURISDICTIONAL FEATURES

“Waters of the United States” include surface waters and wetlands (inundated or saturated areas that support vegetation typically adapted to wet conditions) as defined in 33 CFR Part 328.3. Impacts to waters of the United States fall under the jurisdiction of the US Army Corps of Engineers (USACE) through Section 404 of the Clean Water Act (33 U.S.C. 1344) and under the jurisdiction of the NCDWR through the Section 401 Water Quality Certification Process (NC General Statutes Chapter 143 Article 21, Part 1). Although the above listed streams are likely jurisdictional, a wetland determination and

stream identification field study would be required, with concurrence from the USACE, to establish whether they are jurisdictional.

There is one National Wetland Inventory wetland identified within the project study area that is approximately 3.8 acres. There are also two ponds that total 1.7 acres. A field study would be required to determine whether there are additional wetlands or ponds and if they are jurisdictional.

### 10.3 PROTECTED SPECIES

Species with the federal status of endangered or threatened are protected under provisions of the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et. seq.). Any action likely to adversely affect a species classified as federally protected will require field surveys and will be subject to review by the United States Fish and Wildlife Service (USFWS). The USFWS online database was reviewed for federally listed species potentially occurring in Transylvania County. There are 11 federally protected species listed for Transylvania County as of July 24, 2015. They are listed in **Table 7**. Those with an asterisk (\*) are in the NC Natural Heritage Program's Natural Heritage Element Occurrence database and have been reported to occur within the project study area.

Although not within the study area, critical habitat is designated for the Appalachian elktoe.

There are 27 "current" species listed as Federal Species of Concern and no Candidate species listed by the USFWS for Transylvania County.

**Table 7. Threatened and Endangered Species in Transylvania County**

Scientific Name	Common Name	Status
<i>Glyptemys muhlenbergii</i> *	Bog turtle	Threatened (due to similarity of appearance)
<i>Glaucomys sabrinus coloratus</i>	Carolina northern flying squirrel	Endangered
<i>Myotis grisescens</i>	Gray bat	Endangered
<i>Myotis septentrionalis</i>	Northern long-eared bat	Threatened
<i>Alasmidonta raveneliana</i>	Appalachian elktoe	Endangered
<i>Sarracenia rubra</i> ssp. <i>Jonesii</i>	Mountain sweet pitcher plant	Endangered
<i>Isotria medeoloides</i>	Small whorled pogonia	Threatened
<i>Geum radiatum</i>	Spreading avens	Endangered
<i>Helonias bullata</i>	Swamp pink	Threatened
<i>Spiraea virginiana</i>	Virginia spiraea	Threatened
<i>Gymnoderma lineare</i>	Rock gnome lichen	Endangered

### 10.4 EXISTING NCDOT MITIGATION SITES

There are no NCDOT mitigation sites within the project study area.

### 10.5 FEMA HAZARD MITIGATION GRANT PROGRAM PROPERTIES

Transylvania County participates in the FEMA National Flood Insurance Program (NFIP). The amount of potential floodplain impacts within the study area are listed in **Table 8**.

**Table 8. Potential Floodplain Impacts**

Zone	Area (ac)
100-year flood zone (Zone AE, with base flood elevation, mandatory flood insurance purchase)	470
500-year flood zone (Zone 0.2 percent chance annual flood hazard)	35

This project will involve construction activities on or adjacent to FEMA-regulated streams. Therefore, in accordance with Executive Order 11988, the NCDOT Hydraulics Unit will need to coordinate with the NC Floodplain Mapping Program (FMP), the delegated state agency for administering the NFIP, to determine the status of the project with regard to applicability of NCDOT's Memorandum of Agreement with FMP (dated April 22, 2013), or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

The *Draft Transylvania County Multi-Jurisdictional Hazard Mitigation Plan* was developed in a collaborative effort among Transylvania County, the City of Brevard, and Town of Rosman in 2011. The primary purpose of the plan was "to substantially, or permanently, reduce the planning area's vulnerability to natural hazards." This document has not been adopted by any of the collaborators to date.

## 10.6 NCDEQ, DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES (DEMLR)

### Stormwater

In addition to the Section 404 Water Quality Certification Process discussed in **Section 10.2**, NCDWR also monitors streams and water bodies under NPDES. NPDES is a storm water permitting program for roadway construction and material storage facilities. The permit requirements include implementing a comprehensive storm water management program, monitoring the program, and annual reports of the program's effectiveness and direction. Neither Transylvania County nor the City of Brevard have NPDES stormwater permit requirements. As noted in Section 9.2, the City of Brevard Wastewater Treatment Plant (adjacent to Wilson Road) discharges into the French Broad River under a NPDES major/minor permit.

### Erosion and Sediment Control

In accordance with the North Carolina Sedimentation Pollution Control Act of 1973, projects disturbing more than one acre of land must submit an Erosion and Sedimentation Control Plan to the NCDEQ DEMLR. The plan must include erosion control measures and be approved by the DEMLR prior to construction.

## 11 CONCLUSION

Developing any of the Build Alternatives to reduce over-topping of Wilson Road by the French Broad River presents many challenges, the topography, proximity of the river to the road, and the winding

nature of the road among them. The primary purpose of improving the road would be to reduce over-topping by moving the road out of the 10-year and 50-year floodplain.

Alternative 1 (3R) would improve the sub-standard curvature of the road at the Williamson Creek bridge and add a paved shoulder and correct other horizontal and vertical deficiencies. With the exception of the bridge replacement at the French Broad River, the road would not be moved out of the 100-year and 50-year floodplains, thereby not meeting the purpose of the project.

Alternative 2 (Collector) corrects the horizontal curvature by increasing the radii to meet minimum AASHTO standards. The vertical design would also meet AASHTO minimum design standards and move Wilson Road out of the 50-year floodplain. The bridge over Williamson Creek and the French Broad River would be replaced on new alignment. Build Alternative 2 also adds paved shoulders and increases the design speed of the road to 45 mph. This alternative would meet the purpose of the project.

Alternative 3 (US Route) would change the classification of Wilson Road from a major collector to a principal arterial. Design standards would be more restrictive and posted speed limits would increase and therefore horizontal and vertical upgrades would be required. This design would also raise and realign the road out of the 50-year floodplain. The bridges over Williamson Creek and the French Broad River would be realigned and replaced. Paved shoulders would be added. This alternative would meet the purpose of the project.

The proposed Alternatives may result in impacts to overhead and underground utilities, streams and wetlands, residential and business relocations, and other cultural resources. It should be noted that indirect and cumulative effects of the project were not evaluated as part of this feasibility study.

The cost estimate for each Build Alternative is listed in **Table 5**.

The high-level traffic analysis predicts traffic to increase by approximately 350 vehicles or 17 percent. Improving the road, such that it is out of the 50-year storm event floodplain, will reduce the amount of time the facility is closed thereby potentially improving perceived user benefit. Improving the horizontal curvature, vertical design, pavement, and adding paved shoulders on the road may reduce the number of crashes. Alternative 2 meets the purpose and need of the project and is therefore the Preferred Alternative.

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*Feasibility Study  
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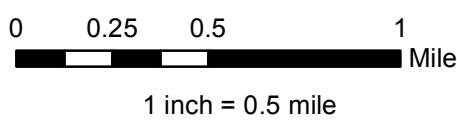
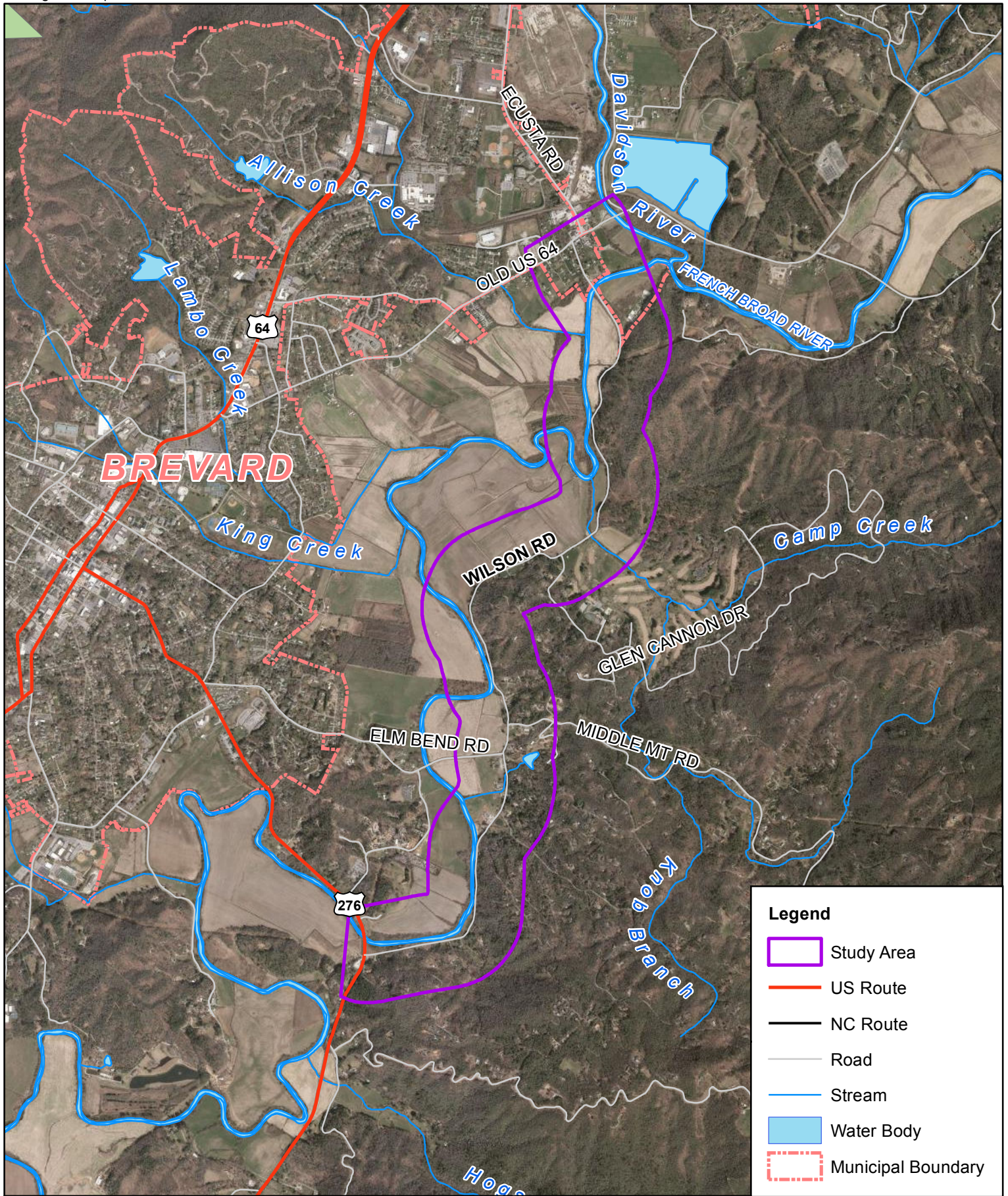
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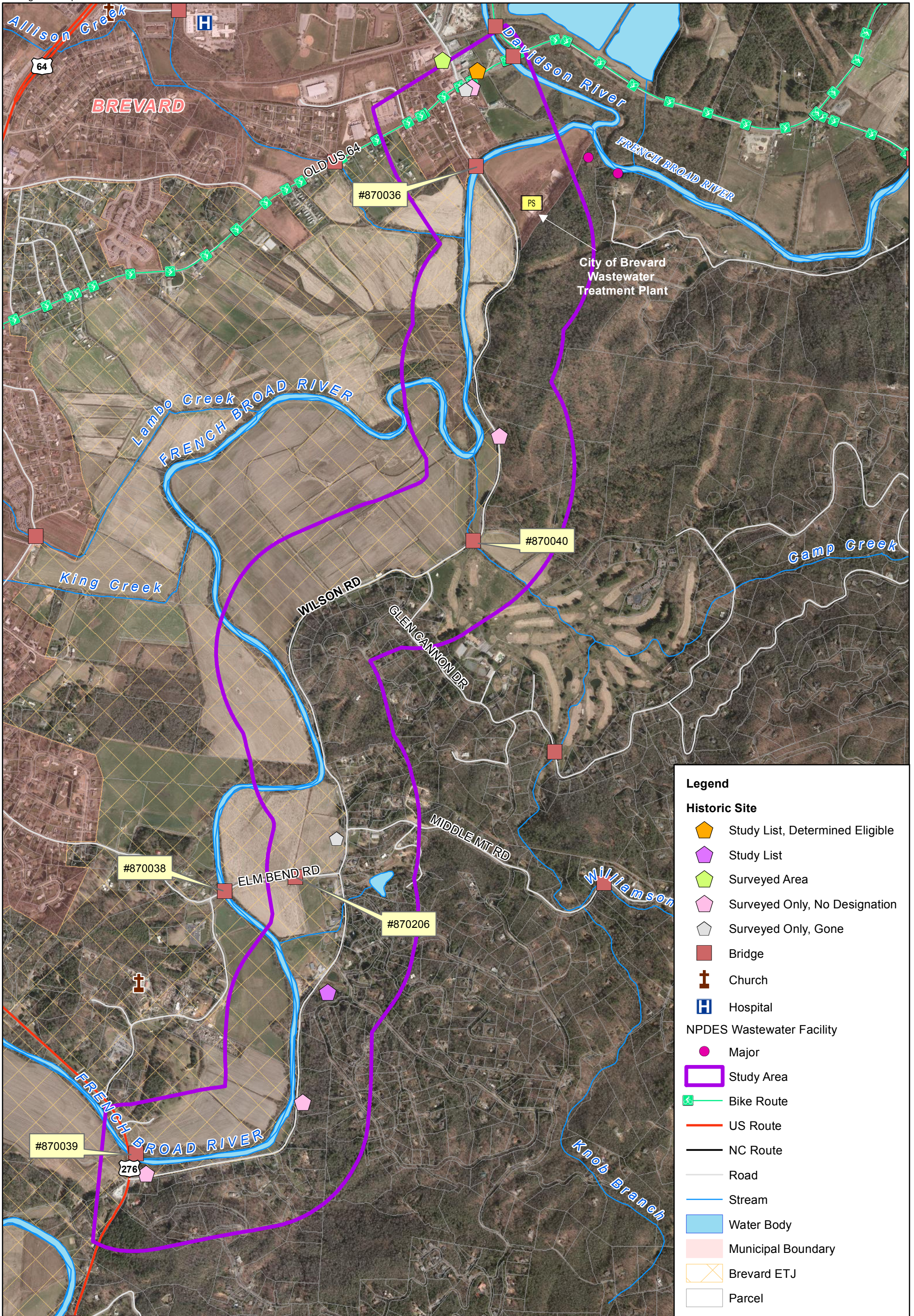
**FIGURES**



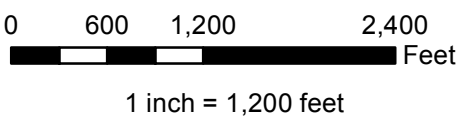
VICINITY MAP  
STIP Project No. FS-1514A  
Improvements to Wilson Road  
Transylvania County

FIGURE

1



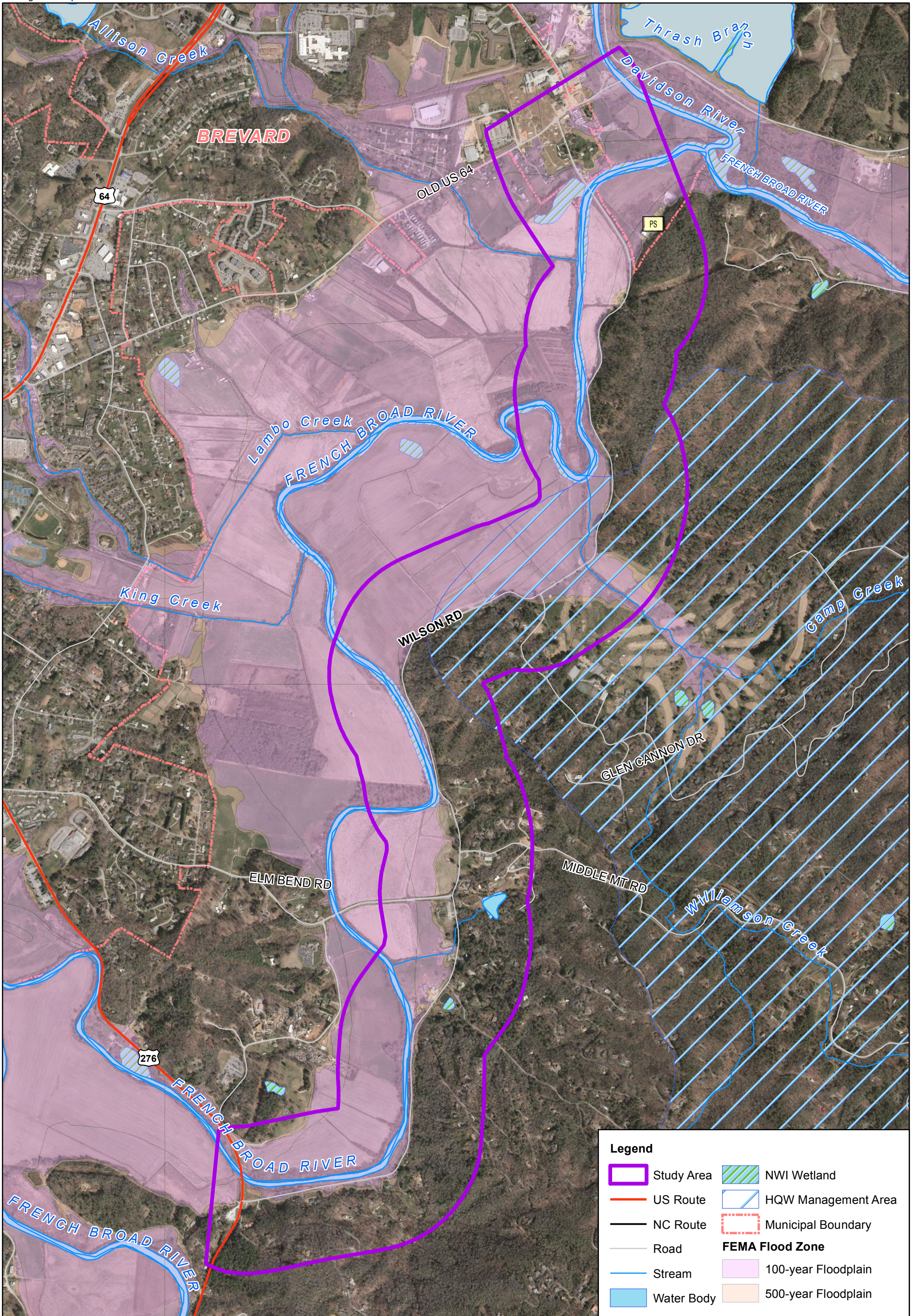
- Legend**
- Historic Site**
- Study List, Determined Eligible
  - Study List
  - Surveyed Area
  - Surveyed Only, No Designation
  - Surveyed Only, Gone
  - Bridge
  - Church
  - Hospital
- NPDES Wastewater Facility**
- Major
  - Study Area
  - Bike Route
  - US Route
  - NC Route
  - Road
  - Stream
  - Water Body
  - Municipal Boundary
  - Brevard ETJ
  - Parcel



COMMUNITY FEATURES  
 STIP Project No. FS-1514A  
 Improvements to Wilson Road  
 Transylvania County

FIGURE  
**2**

Sources: City of Brevard, Transylvania County, NCDEQ, NCDOT, and NCOneMap



**Legend**

Study Area	NWI Wetland
US Route	HQW Management Area
NC Route	Municipal Boundary
Road	<b>FEMA Flood Zone</b>
Stream	100-year Floodplain
Water Body	500-year Floodplain



0 600 1,200 2,400 Feet  
1 inch = 1,200 feet

NATURAL RESOURCES FEATURES  
STIP Project No. FS-1514A  
Improvements to Wilson Road  
Transylvania County **FIGURE 3**

Sources: City of Brevard, NC One Map, NCDOT, NCDEQ, NCFMP