



# **2013 Watauga County Comprehensive Transportation Plan**





# 2013 Watauga County Comprehensive Transportation Plan

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N.C. Department of Transportation

**In Cooperation with:** Watauga County  
Town of Boone  
Town of Blowing Rock  
Town of Seven Devils  
Town of Beech Mountain  
High Country Rural Planning Organization

*Published: September 2013*



*Pam Cook*

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Pam Cook, PE  
Mountains Planning Group Supervisor

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## Executive Summary

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In March of 2010, the Transportation Planning Branch of the North Carolina Department of Transportation and Watauga County initiated a study to cooperatively develop the Watauga County Comprehensive Transportation Plan (CTP), which includes Boone, Blowing Rock, Seven Devils, and Beech Mountain. This is a long range multi-modal transportation plan that covers transportation needs through 2040. Modes of transportation evaluated as part of this plan include: highway, public transportation and rail, bicycle, and pedestrian. This plan does not cover routine maintenance or minor operations issues. Refer to Appendix A for contact information on these types of issues.

Findings of this CTP study were based on an analysis of the transportation system, environmental screening, and public input, which are detailed in Chapter 1. Figure 1 shows the CTP maps, which were mutually adopted by NCDOT in 2013. Descriptive information and definitions for designations depicted on the CTP maps can be found in Appendix B. Implementation of the plan is the responsibility of Watauga County, its municipalities, and NCDOT. Refer to Chapter 2 for information on the implementation process.

This report documents the recommendations for improvements that are included in the Watauga County CTP. The major recommendations for improvements are listed below. More detailed information about these and other recommendations can be found in Chapter 2.

### **HIGHWAY**

- **US 221, TIP No. R-2915:** The CTP proposes widening US 221 from US 421 in Deep Gap to NC 88 in Ashe County to a four lane boulevard.
- **US 321-421, TIP No. R-2615:** The CTP proposes improving US 321-421 from the NC 105 BYP to US 321 at Vilas to a four lane divided, partially controlled access facility.
- **US 421 Bypass, TIP No. U-2703:** The CTP proposes a bypass south of Boone to relieve congestion on US 421, US 321 and NC 105 in Boone. This project would work in conjunction with other projects to reduce the mixed traffic on King Street, to improve linkage to major facilities, to improve traffic flow along major facilities, and to improve safety.
- **NC 105, TIP No. R-2566:** The CTP proposes widening NC 105 from the NC 105 BYP (SR 1107) to Avery County to a four lane facility with a median.
- **NC 105 BYP (SR 1107), Local ID WATA0002-H:** The CTP proposes widening the NC 105 BYP (SR 1107) from NC 105 to US 321-421 to a three lane facility.

- **NC 194, Local ID WATA0003-H:** The CTP proposes widening NC 194 from US 221-421 to Howards Creek Road (SR 1306) to a four lane boulevard.

#### **PUBLIC TRANSPORTATION & RAIL**

- **US 321, WATA0001-T:** The CTP proposes a new bus route between Boone and Blowing Rock utilizing US 321.
- **Park-and-Ride:** The CTP proposes seven new park-and-ride locations along major routes.

#### **BICYCLE/PEDESTRIAN**

- **Middle Fork Greenway, Local ID WATA0001-M:** The CTP proposes a new multi-use path between Boone and Blowing Rock parallel to US 321.

**Adopted by:**

Watauga County  
Date: April 16, 2013

Town of Boone  
Date: June 18, 2013

Town of Blowing Rock  
Date: March 12, 2013

Town of Seven Devils  
Date: April 9, 2013

Town of Beech Mountain  
Date: April 9, 2013

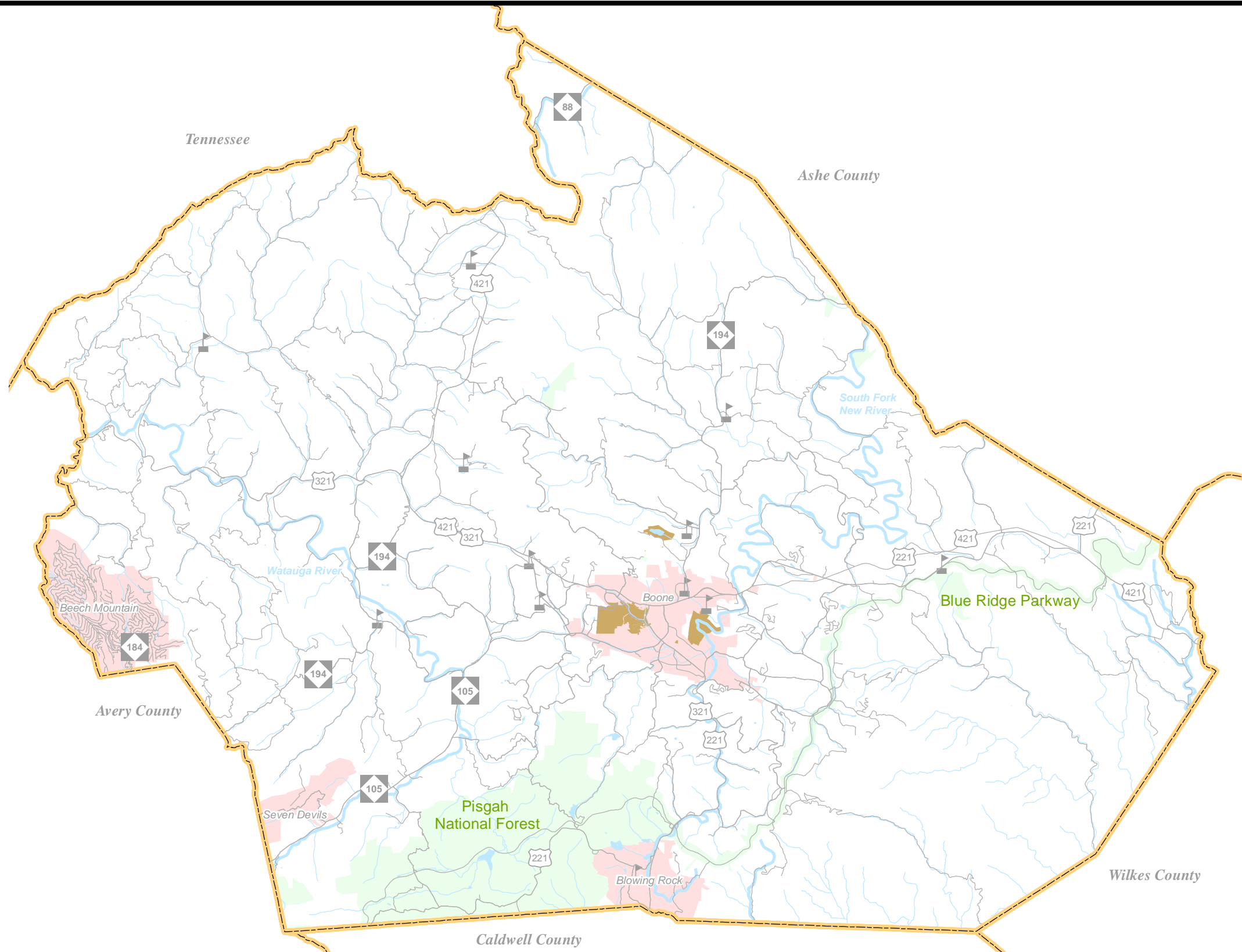
NCDOT  
Date: September 5, 2013

**Endorsed by:**

High Country RPO  
Date: August 21, 2013

**Recommended by:**

Transportation Planning Branch  
Date: August 16, 2013

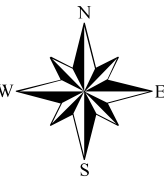


- Sheet 1 Adoption Sheet
- Sheet 2 Highway Map
- Sheet 3 Public Transportation and Rail Map
- Sheet 4 Bicycle Map
- Sheet 5 Pedestrian Map

**Legend**

- Roads
- Rivers and Streams
- Schools
- County Boundary
- Municipal Boundary
- Conservation Land
- Appalachian State University

0 2.5 5 Miles

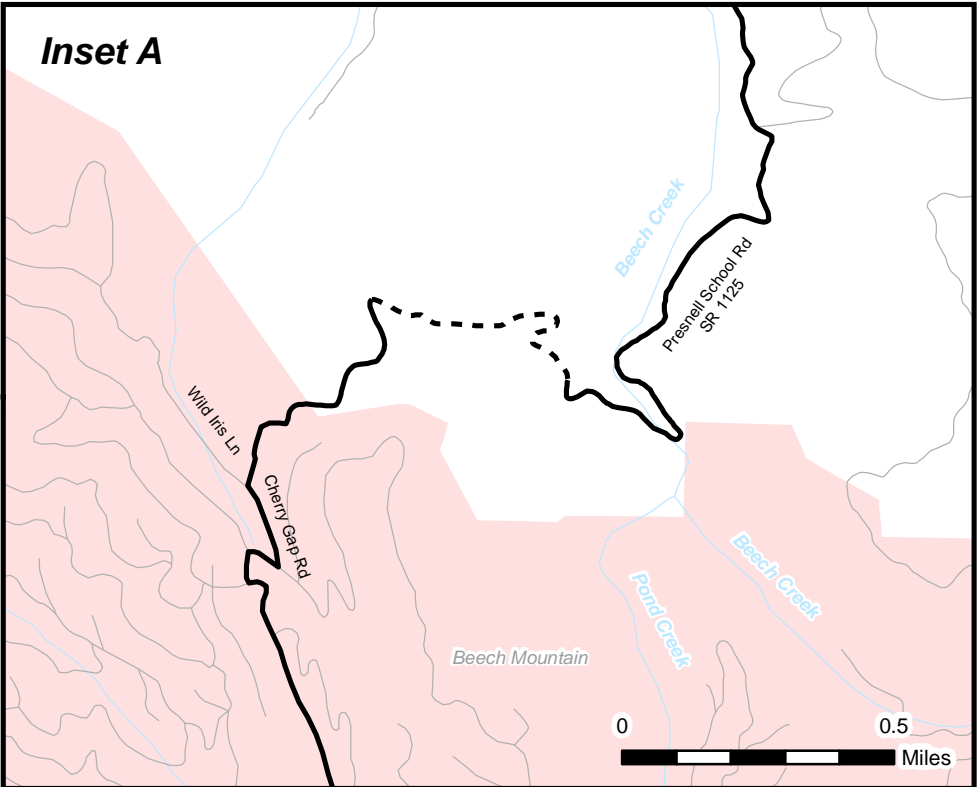
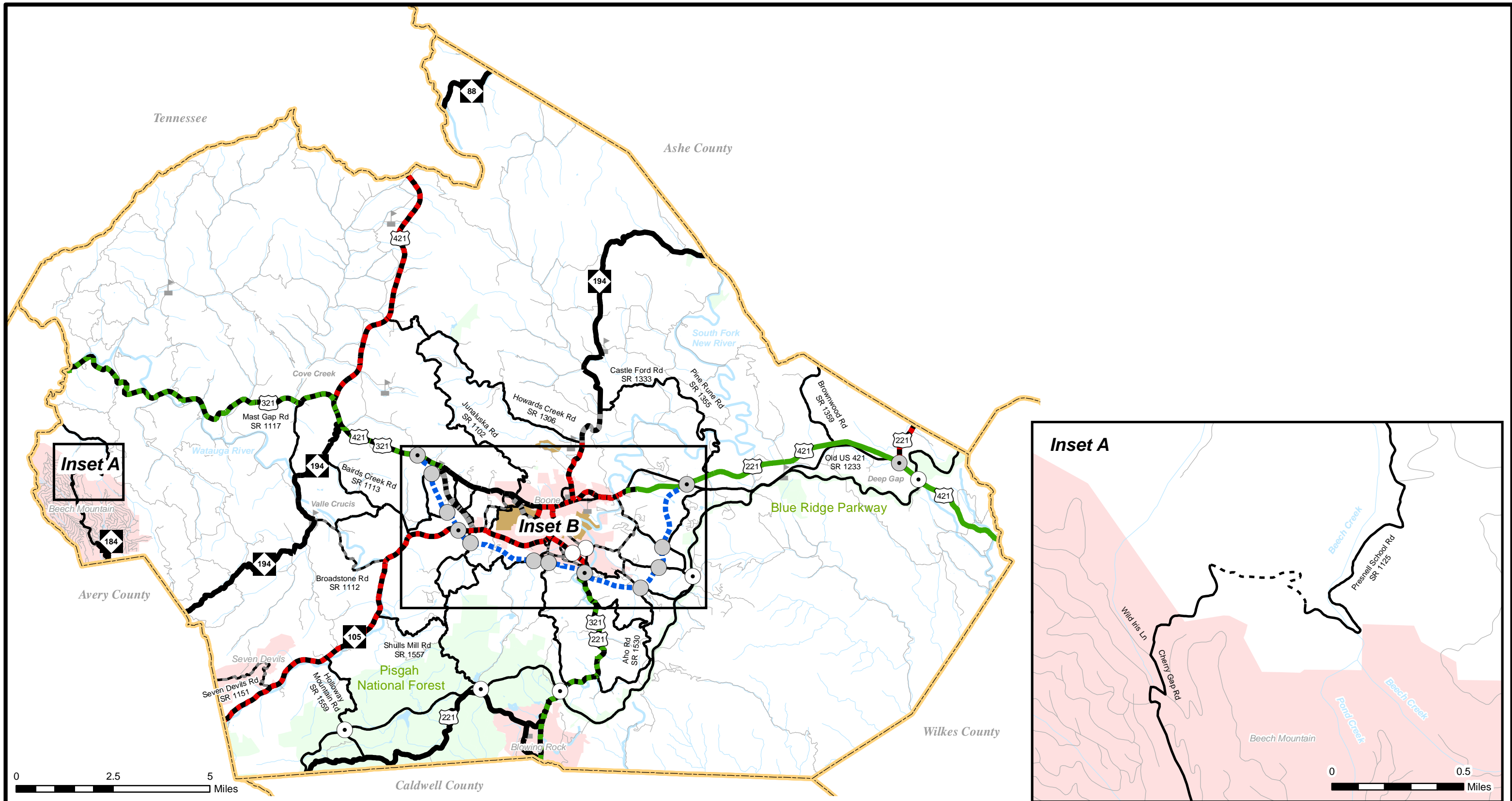


Sheet 1 of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details

**Adoption Sheet  
Watauga County**

**Comprehensive  
Transportation Plan**

Plan Date: August 2, 2012



#### Freeways

- Existing
- - - Needs Improvement
- . . . Recommended

#### Expressways

- Existing
- - - Needs Improvement
- . . . Recommended

#### Boulevards

- Existing
- - - Needs Improvement
- . . . Recommended

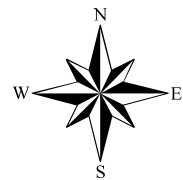
#### Other Major Thoroughfares

- Existing
- - - Needs Improvement
- . . . Recommended

#### Minor Thoroughfares

- Existing
- - - Needs Improvement
- . . . Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation



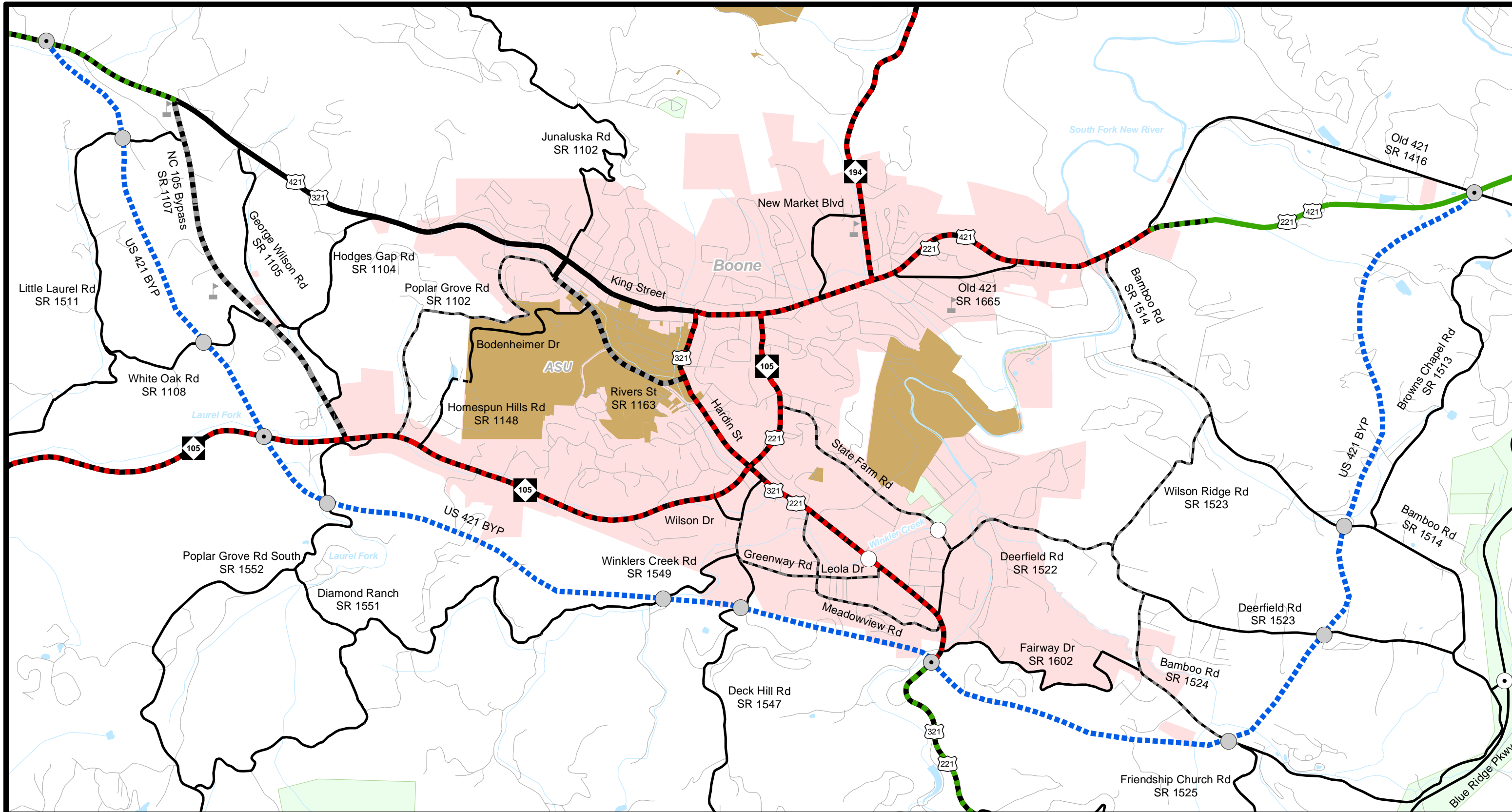
Sheet 2 of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details

## Highway Map Watauga County

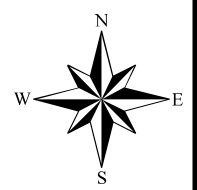
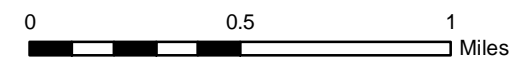
## Comprehensive Transportation Plan

Plan Date: August 2, 2012





- |                    |                                  |                            |
|--------------------|----------------------------------|----------------------------|
| <b>Freeways</b>    | <b>Boulevards</b>                | <b>Minor Thoroughfares</b> |
| Existing           | Existing                         | Existing                   |
| Needs Improvement  | Needs Improvement                | Needs Improvement          |
| Recommended        | Recommended                      | Recommended                |
| <b>Expressways</b> | <b>Other Major Thoroughfares</b> | Existing Interchange       |
| Existing           | Existing                         | Proposed Interchange       |
| Needs Improvement  | Needs Improvement                | Existing Grade Separation  |
| Recommended        | Recommended                      | Proposed Grade Separation  |

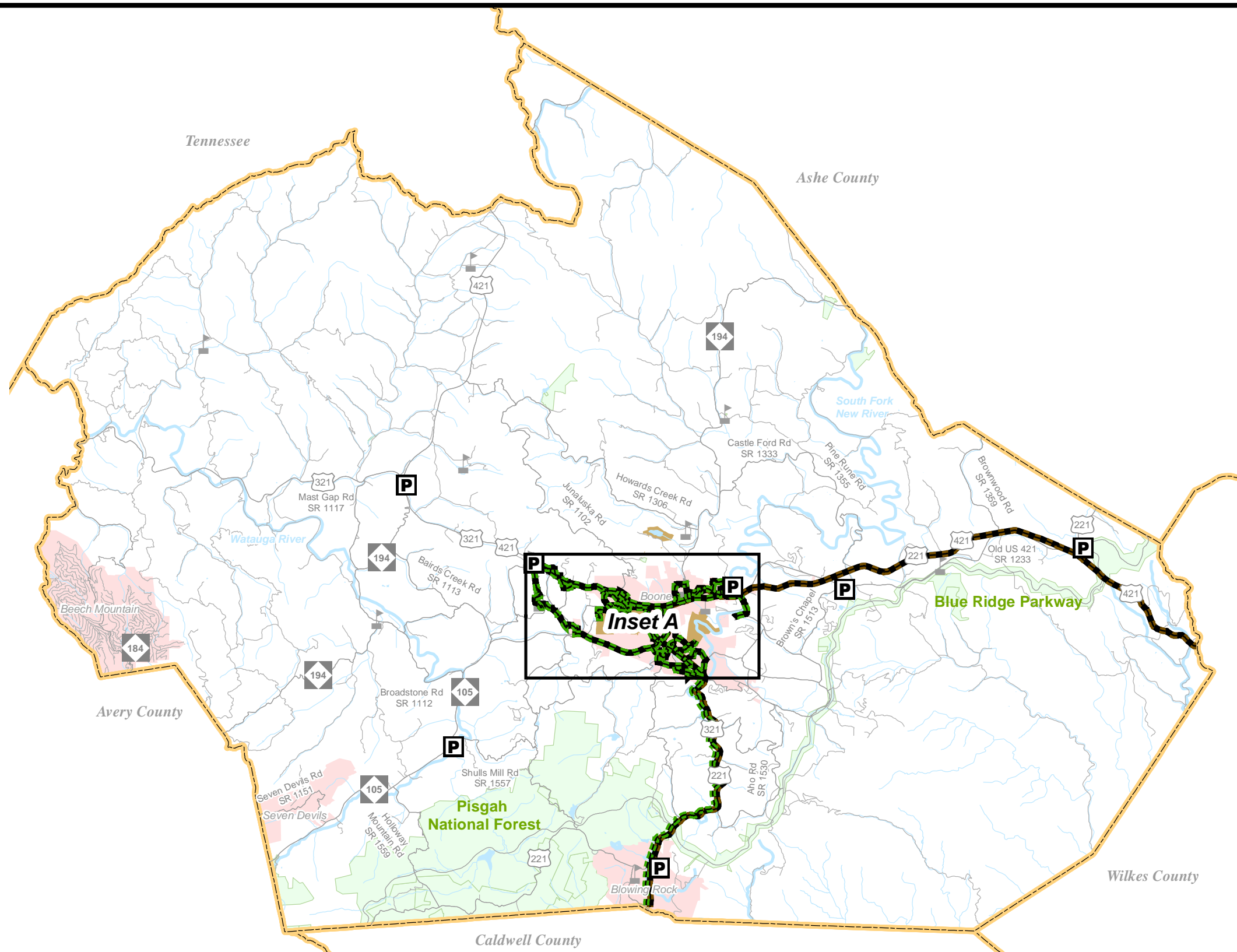


Sheet 2A of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details

# Highway Map Inset B Watauga County

## Comprehensive Transportation Plan

Plan Date: August 2, 2012



#### Bus Routes

- Existing
- Needs Improvement
- Recommended

#### Fixed Guideway

- Existing
- Needs Improvement
- Recommended

#### Operational Strategies

- Existing
- Needs Improvement
- Recommended

#### Rail Corridor

- Active
- Inactive
- Recommended

#### High Speed Rail Corridor

- Existing
- Recommended

#### Rail Stops

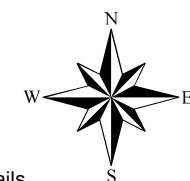
- Existing
- Recommended

#### Intermodal Connector

- Existing
- Recommended

#### Park and Ride Lot

- Existing
- Recommended



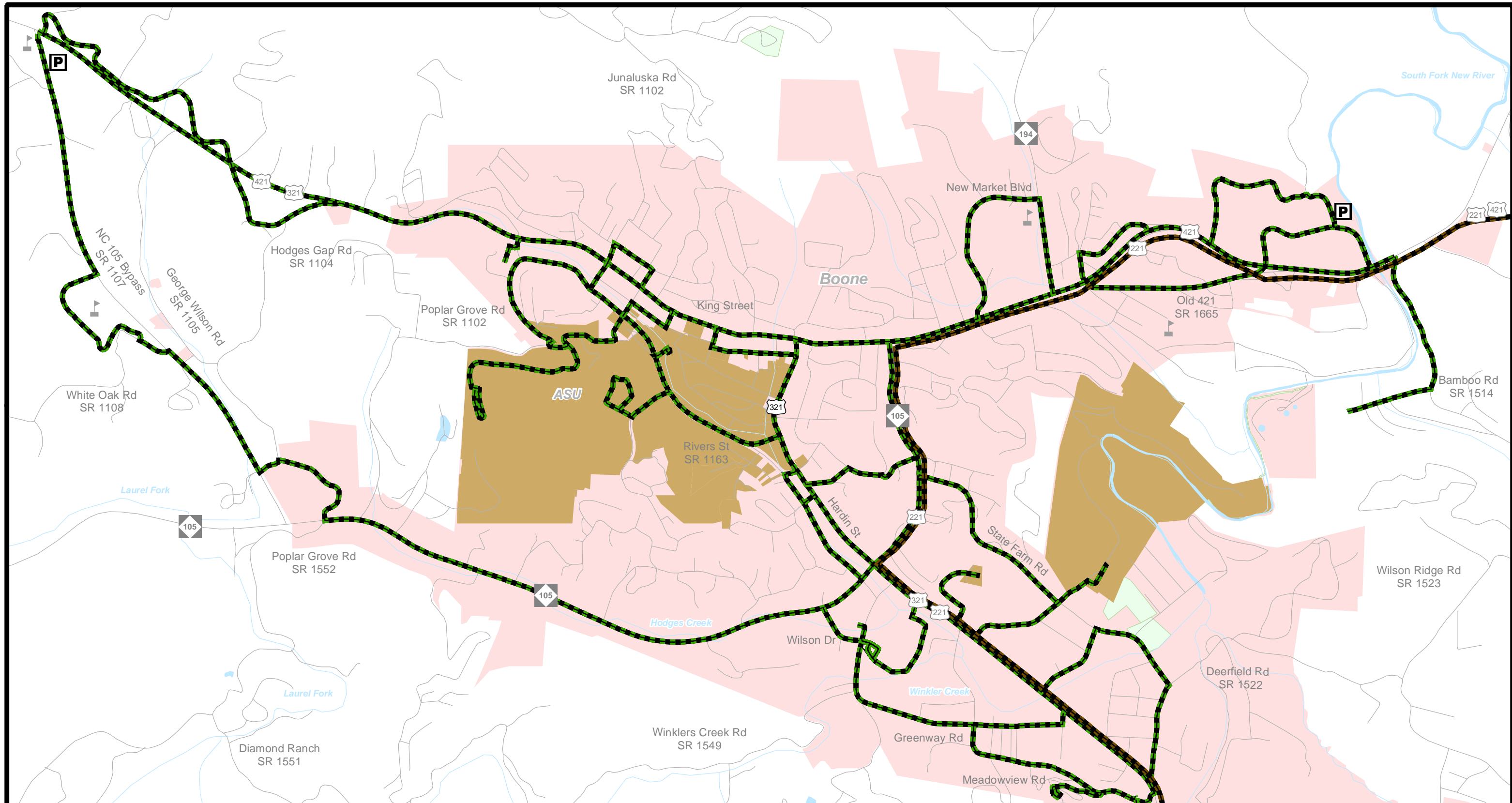
Sheet 3 of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details

## Public Transportation and Rail Map Watauga County

### Comprehensive Transportation Plan

Plan Date: August 2, 2012





#### Bus Routes

- Existing
- Needs Improvement
- Recommended

#### Fixed Guideway

- Existing
- Needs Improvement
- Recommended

#### Operational Strategies

- Existing
- Needs Improvement
- Recommended

#### Rail Corridor

- Active
- Inactive
- Recommended

#### High Speed Rail Corridor

- Existing
- Recommended

#### Rail Stops

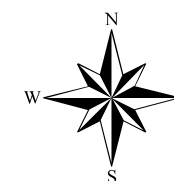
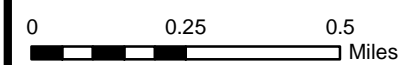
- Existing
- Recommended

#### Intermodal Connector

- Existing
- Recommended

#### Park and Ride Lot

- Existing
- Recommended



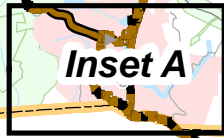
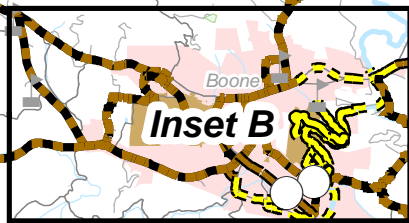
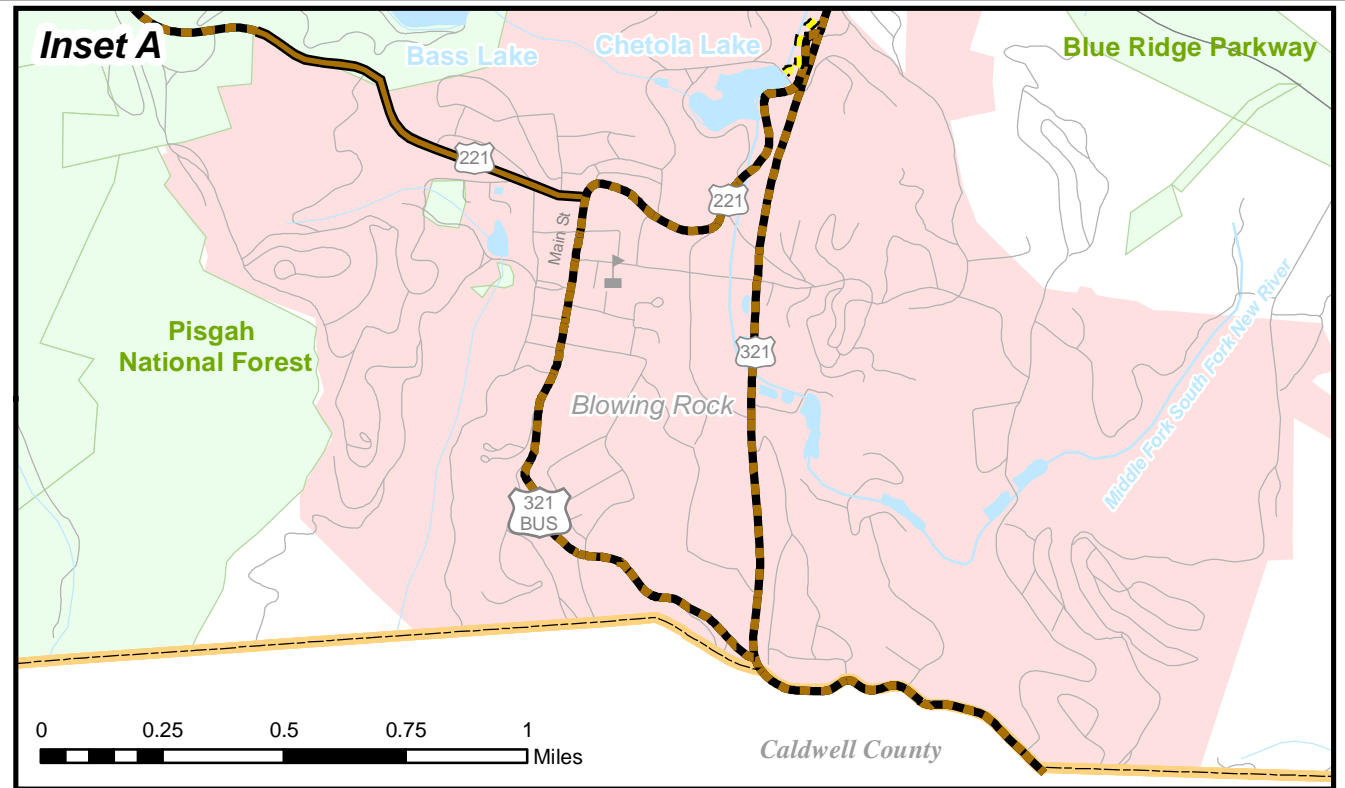
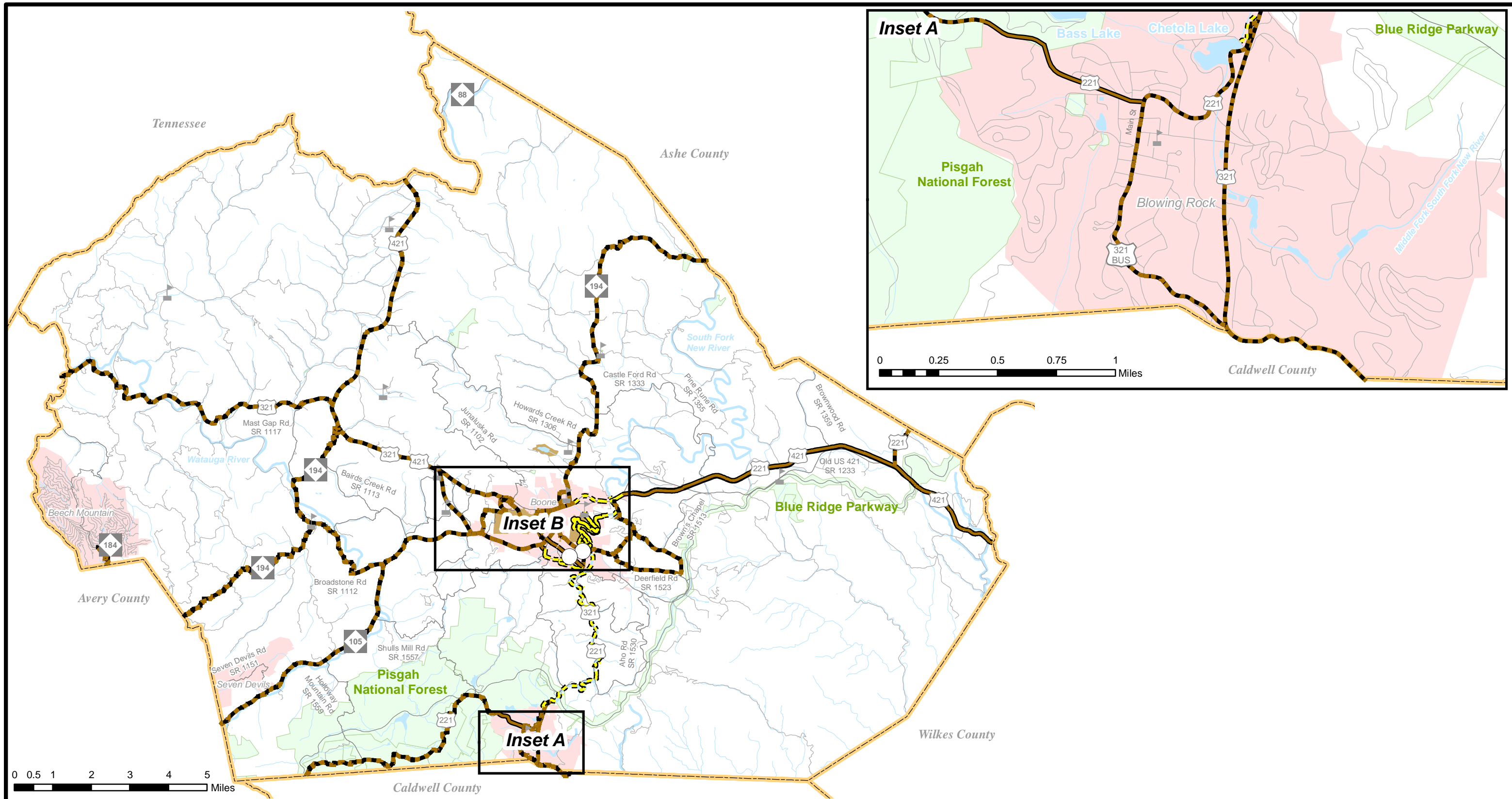
Sheet 3A of 5  
Base map date: October 4, 2012  
Refer to CTP document for more details

## Public Transportation and Rail Map - Inset A Watauga County

### Comprehensive Transportation Plan

Plan Date: August 2, 2012





## Legend

### On Road

- Existing
- Needs Improvement
- Recommended

### Off Road

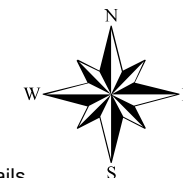
- Existing
- Needs Improvement
- Recommended

### Multi-Use Paths

- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

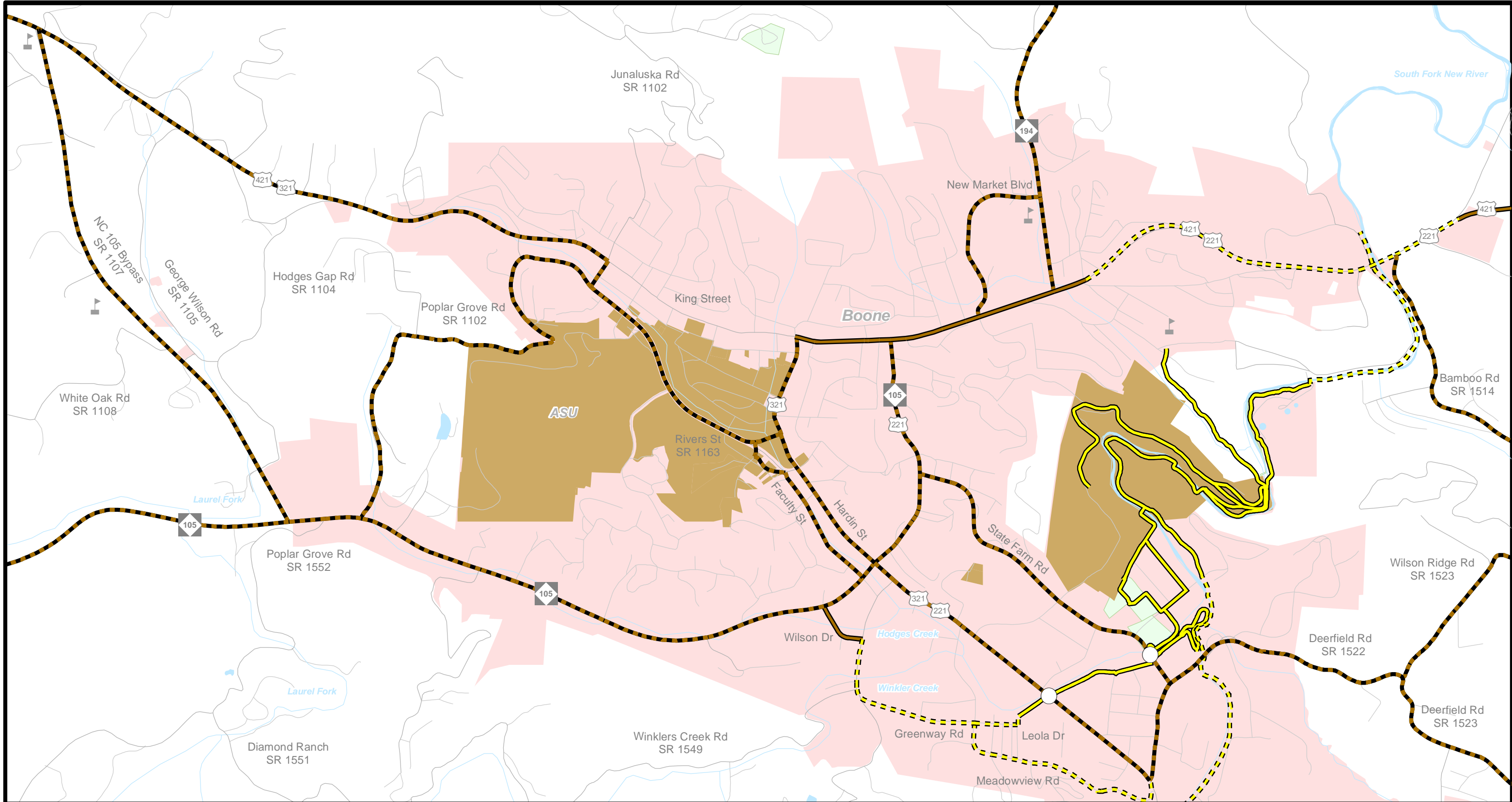
Sheet 4 of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details



## Bicycle Map Watauga County

## Comprehensive Transportation Plan

Plan Date: August 2, 2012



### Legend

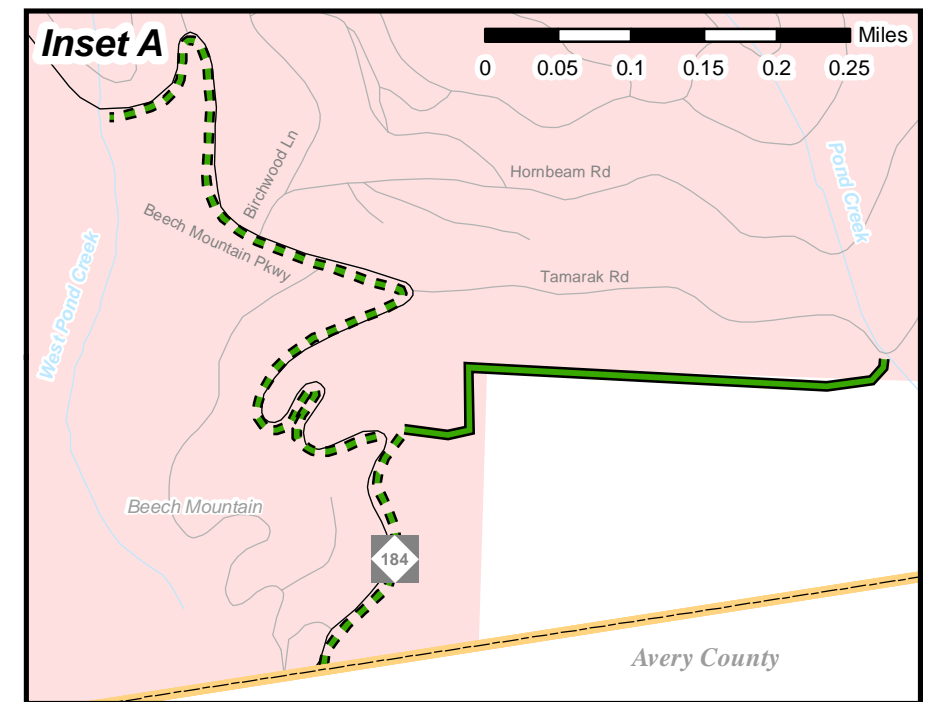
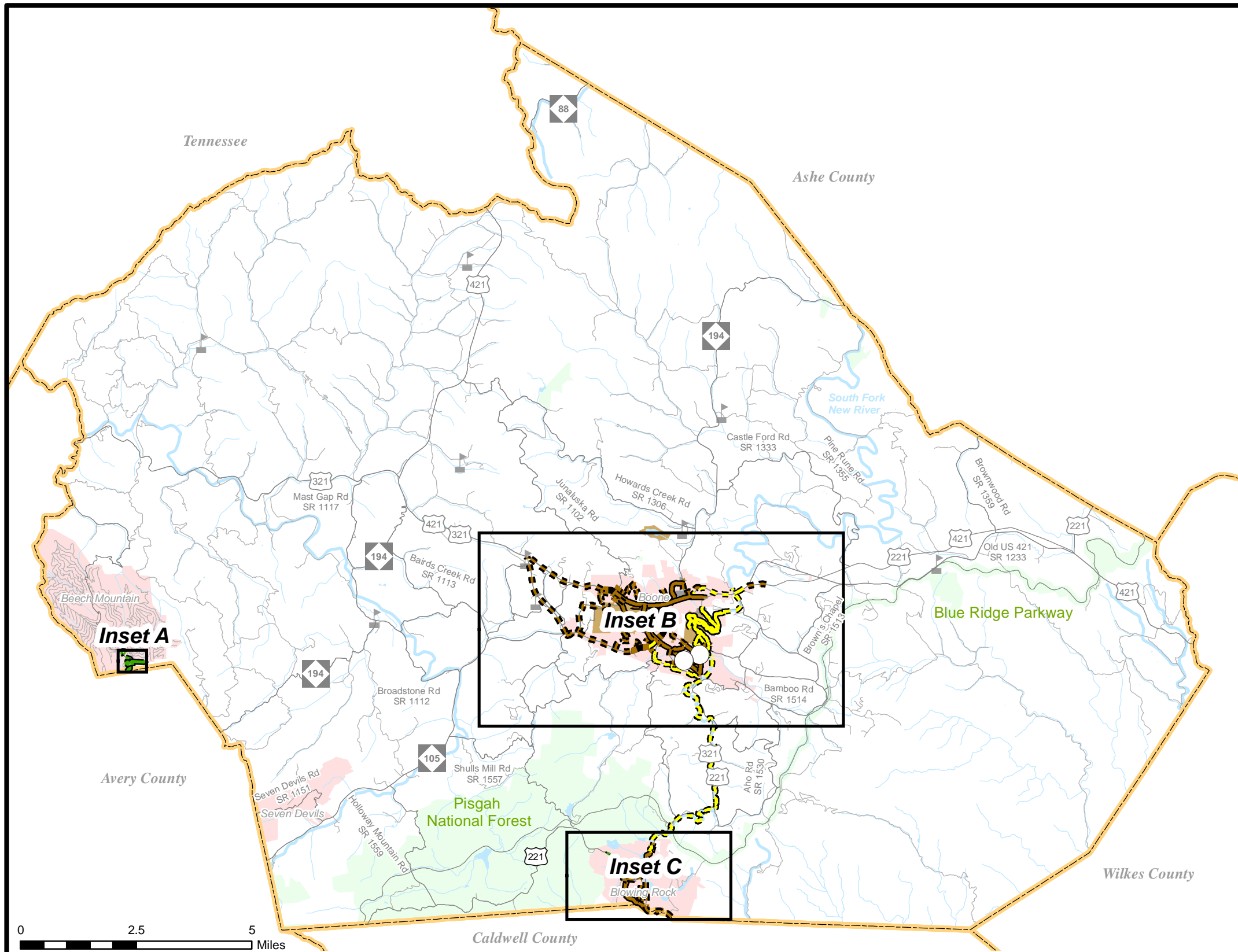
On Road		Off Road		Multi-Use Paths			
	Existing		Existing		Existing		Existing Interchange
	Needs Improvement		Needs Improvement		Needs Improvement		Proposed Interchange
	Recommended		Recommended		Recommended		Existing Grade Separation
							Proposed Grade Separation

## Bicycle Map Inset B Watauga County

### Comprehensive Transportation Plan

Plan Date: August 2, 2012





## Legend

### On Road

- Existing
- Needs Improvement
- Recommended

### Off Road

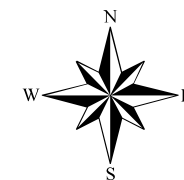
- Existing
- Needs Improvement
- Recommended

### Multi-Use Paths

- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

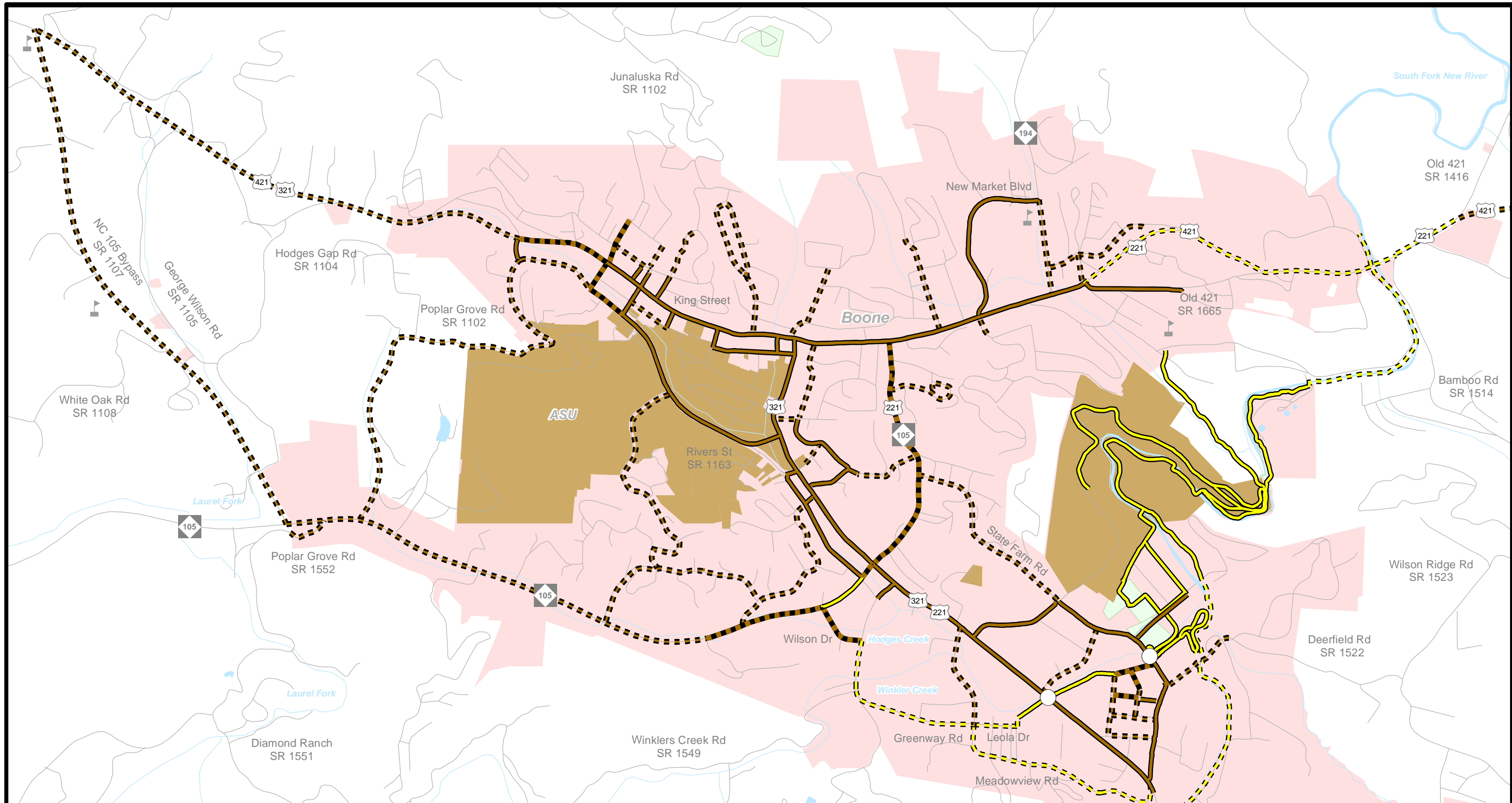
Sheet 5 of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details



## Pedestrian Map Watauga County

## Comprehensive Transportation Plan

Plan Date: August 2, 2012



## Legend

### On Road

- Existing
- Needs Improvement
- Recommended

### Off Road

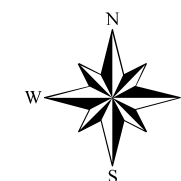
- Existing
- Needs Improvement
- Recommended

### Multi-Use Paths

- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

0 0.25 0.5 Miles

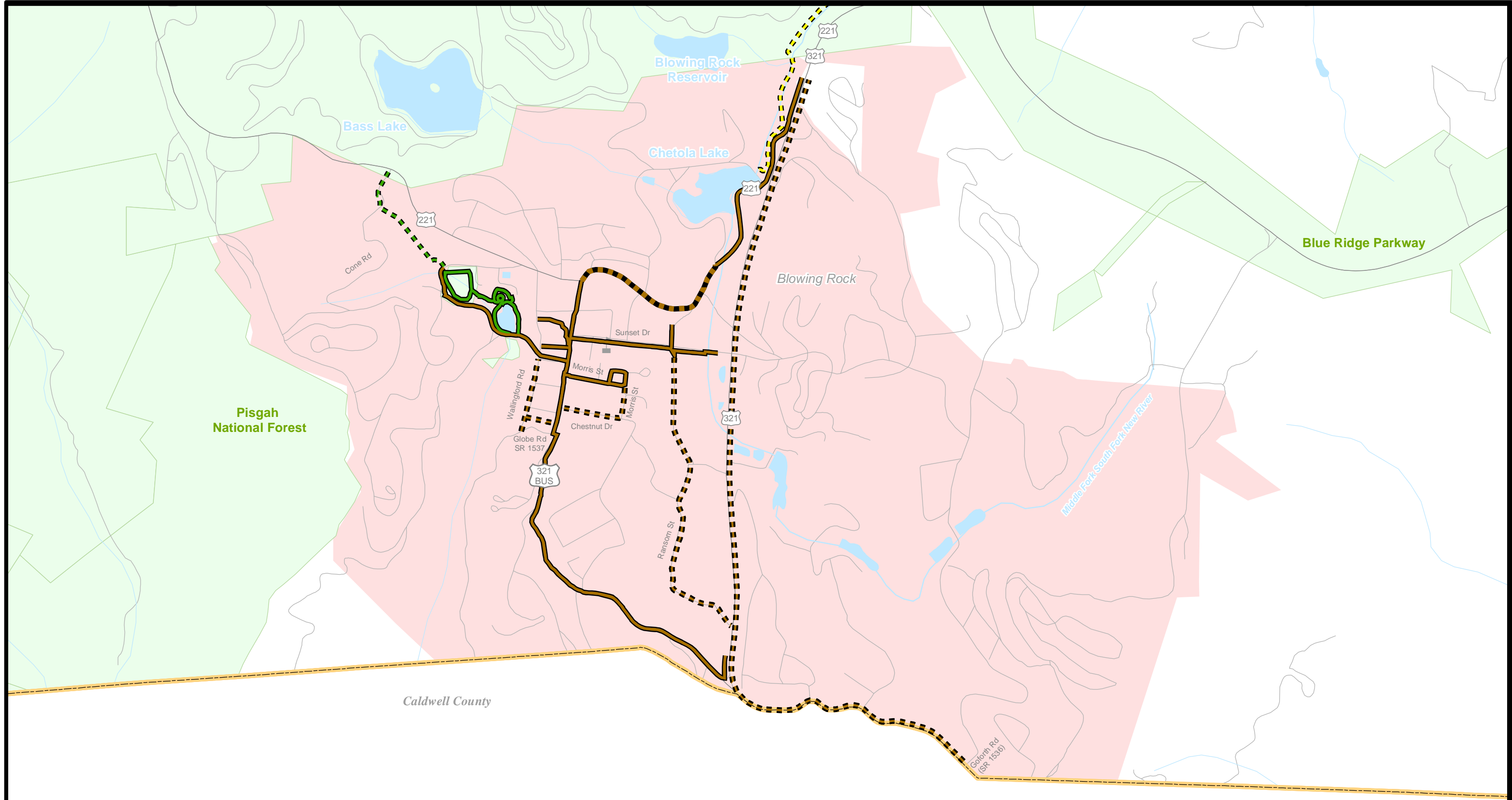


Sheet 5A of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details

## Pedestrian Map Inset B Watauga County

## Comprehensive Transportation Plan

Plan Date: August 2, 2012



## Legend

### On Road

- Existing
- Needs Improvement
- Recommended

### Off Road

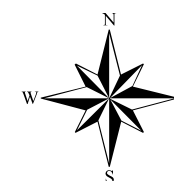
- Existing
- Needs Improvement
- Recommended

### Multi-Use Paths

- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

0  0.5 Miles



Sheet 5B of 5  
Base map date: October 4, 2010  
Refer to CTP document for more details

## Pedestrian Map Inset C Watauga County

## Comprehensive Transportation Plan

Plan Date: August 2, 2012



# **I. Analysis of the Existing and Future Transportation System**

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A Comprehensive Transportation Plan (CTP) is developed to ensure that the progressively developed transportation system will meet the needs of the region for the planning period. The CTP serves as an official guide to providing a well-coordinated, efficient, and economical transportation system for the future of the region. This document should be utilized by the local officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption to local residents, businesses, and environmental resources.

In order to develop a CTP, the following are considered:

- Analysis of the transportation system, including any local and statewide initiatives;
- Impacts to the natural and human environment, including natural resources, historic resources, homes, and businesses;
- Public input, including community vision and goals and objectives.

## ***Analysis Methodology and Data Requirements***

Reliable forecasts of future travel patterns must be estimated in order to analyze the ability of the transportation system to meet future travel demand. These forecasts depend on careful analysis of the character and intensity of existing and future land use and travel patterns.

An analysis of the transportation system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a capacity deficiency analysis, a traffic crash analysis, and a system deficiency analysis. This information, along with population growth, economic development potential, and land use trends, is used to determine the potential impacts on the future transportation system.

## ***Roadway System Analysis***

An important stage in the development of a CTP is the analysis of the existing transportation system and its ability to serve the area's travel desires. Emphasis is placed not only on detecting the existing deficiencies, but also on understanding the causes of these deficiencies. Roadway deficiencies may result from inadequacies in pavement widths, intersection geometry, or intersection controls. System deficiencies may result from missing travel links, bypass routes, loop facilities, radial routes or improvements to meet statewide initiatives.

One of those statewide initiatives is the Strategic Highway Corridor (SHC) Vision Plan<sup>1</sup> adopted by the Board of Transportation on September 2, 2004. The SHC Vision Plan is

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<sup>1</sup> For more information on the SHC Vision Plan, go to: <http://www.ncdot.gov/doh/preconstruct/tpb/SHC/>.

an initiative to protect and maximize the mobility and connectivity on a core set of highway corridors throughout North Carolina, while promoting environmental stewardship through maximizing the use of existing facilities to the extent possible, and fostering economic prosperity through the quick and efficient movement of people and goods.

The primary purpose of the SHC Vision Plan is to provide a network of high-speed, safe, reliable highways throughout North Carolina. The primary goal to support this purpose is to create a greater consensus towards the development of a genuine vision for each corridor – specifically towards the identification of a desired facility type (Freeway, Expressway, Boulevard, or Thoroughfare) for each corridor. Individual CTPs shall incorporate the long-term vision of each corridor. Refer to Appendix A for contact information for the SHC Vision Plan.

In the development of this plan, travel demand was projected from 2010 to 2040 using both a travel demand model and a trend line analysis. A travel demand model for the Boone urban area was developed to replicate travel patterns on the existing transportation system as well as to estimate travel patterns for 2040. Outside of the urban area travel demand was projected using a trend line analysis based on Annual Average Daily Traffic (AADT) from 1990 to 2010. In addition, local land use plans and growth expectations were used to develop future growth rates and patterns. The established future growth rates were endorsed by the Watauga County Commissioners (November 1, 2011), Boone Town Council (November 15, 2011), Blowing Rock Town Council (November 15, 2011), Seven Devils Town Council (November 14, 2011), and Beech Mountain Town Council (November 15, 2011). Refer to Appendix I for more detailed information on growth expectations and the socio-economic data forecasting methodology.

Existing and future travel demand is compared to roadway capacities. Capacity deficiencies occur when the traffic volume of a roadway exceeds the roadway's capacity. Roadways are considered near capacity when the traffic volume is at least eighty percent of the capacity. Refer to Figures 2 and 3 for existing and future capacity deficiencies. The 2040 traffic volume in Figure 3 is an estimate of the traffic volume in 2040 with only existing plus committed projects assumed to be in place, where committed is defined as projects programmed for construction in the 2012 – 2018 Transportation Improvement Program (TIP).

Capacity is the maximum number of vehicles which have a “reasonable expectation” of passing over a given section of roadway, during a given time period under prevailing roadway and traffic conditions. Many factors contribute to the capacity of a roadway including the following:

- Geometry of the road (including number of lanes), horizontal and vertical alignment, and proximity of perceived obstructions to safe travel along the road;
- Typical users of the road, such as commuters, recreational travelers, and truck traffic;

- Access control, including streets and driveways, or lack thereof, along the roadway;
- Development along the road, including residential, commercial, agricultural, and industrial developments;
- Number of traffic signals along the route;
- Peaking characteristics of the traffic on the road;
- Characteristics of side-roads feeding into the road; and
- Directional split of traffic or the percentages of vehicles traveling in each direction along a road at any given time.

The relationship of travel demand compared to the roadway capacity determines the level of service (LOS) of a roadway. Six levels of service identify the range of possible conditions. Designations range from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions.

LOS D indicates “practical capacity” of a roadway, or the capacity at which the public begins to experience delay. The practical capacity for each roadway was developed based on the 2000 Highway Capacity Manual using the Transportation Planning Branch’s *LOS D Standards for Systems Level Planning*. Recommended improvements and overall design of the transportation plan were based upon achieving a minimum LOS D on existing facilities and a LOS C for new facilities. Refer to Appendix E for detailed information on LOS.

### Traffic Crash Assessment

Traffic crashes are often used as an indicator for locating congestion and roadway problems. Crash patterns obtained from an analysis of crash data can lead to the identification of improvements that will reduce the number of crashes. A crash analysis was performed for the Watauga County CTP for crashes occurring in the planning area between January 1, 2006 and December 31, 2008. During this period, a total of seventy-two locations that experienced ten or more crashes and/or had a severity average greater than that of the state’s severity for an injury crash (8.4). These locations are illustrated in Figure 4. Refer to Appendix F for a detailed crash analysis.

### Bridge Deficiency Assessment

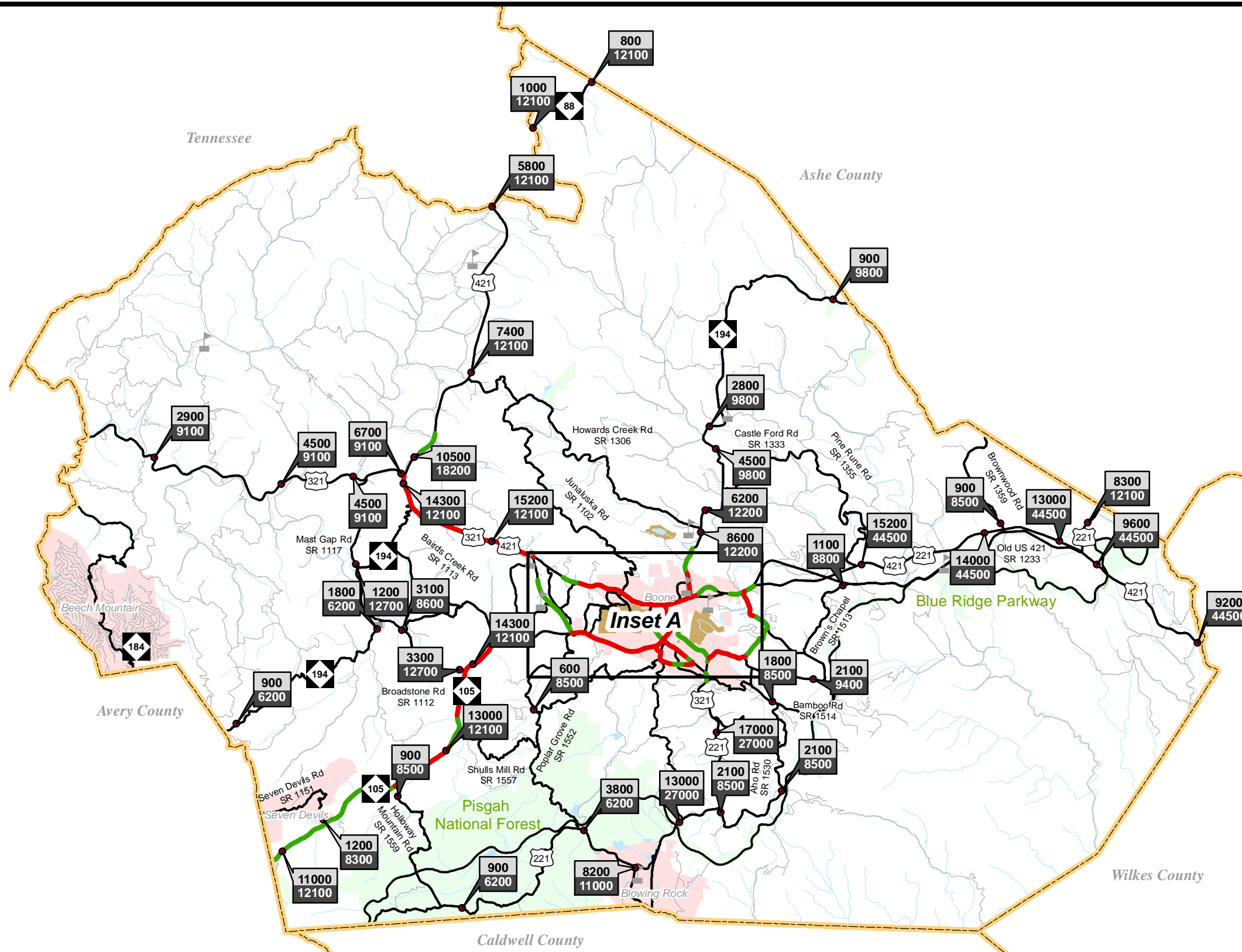
Bridges are a vital and unique element of a highway system. First, they represent the highest unit investment of all elements of the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity of all potential highway failures for disruption of community welfare. Finally, and most importantly, a bridge represents the greatest opportunity of all highway failures for loss of life. For these reasons, it is imperative that bridges be constructed to the same design standards as the system of which they are a part.



The NCDOT Structures Management Unit inspects all bridges in North Carolina at least once every two years. Bridges having the highest priority are replaced as federal and state funds become available. Nineteen deficient bridges were identified on roads evaluated as part of the CTP and are illustrated in Figure 5. Of these, three are scheduled for replacement in the 2012 – 2018 State Transportation Improvement Program<sup>2</sup> (STIP/TIP). Additionally, one is located along a roadway recommended for improvement in the CTP. As deficient bridges are replaced, every consideration should be given to proposed CTP recommendation and cross section associated with the recommendation. Table 5 in Appendix G gives a listing of the deficient bridges identified in the CTP and the ID number associated with CTP project proposal. Refer to Appendix G for more detailed bridge deficiency information.

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<sup>2</sup> For more information on the STIP, go to: <https://connect.ncdot.gov/projects/planning/Pages/default.aspx>



## Legend

2010 Volumes  
2010 Capacity

Near Capacity  
Over Capacity  
Network Roads

County Boundary

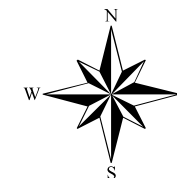
Rivers and Streams  
Other Roads  
Schools

Municipal Boundary  
Conservation Land  
Appalachian State University

0 1 2 4 6 Miles

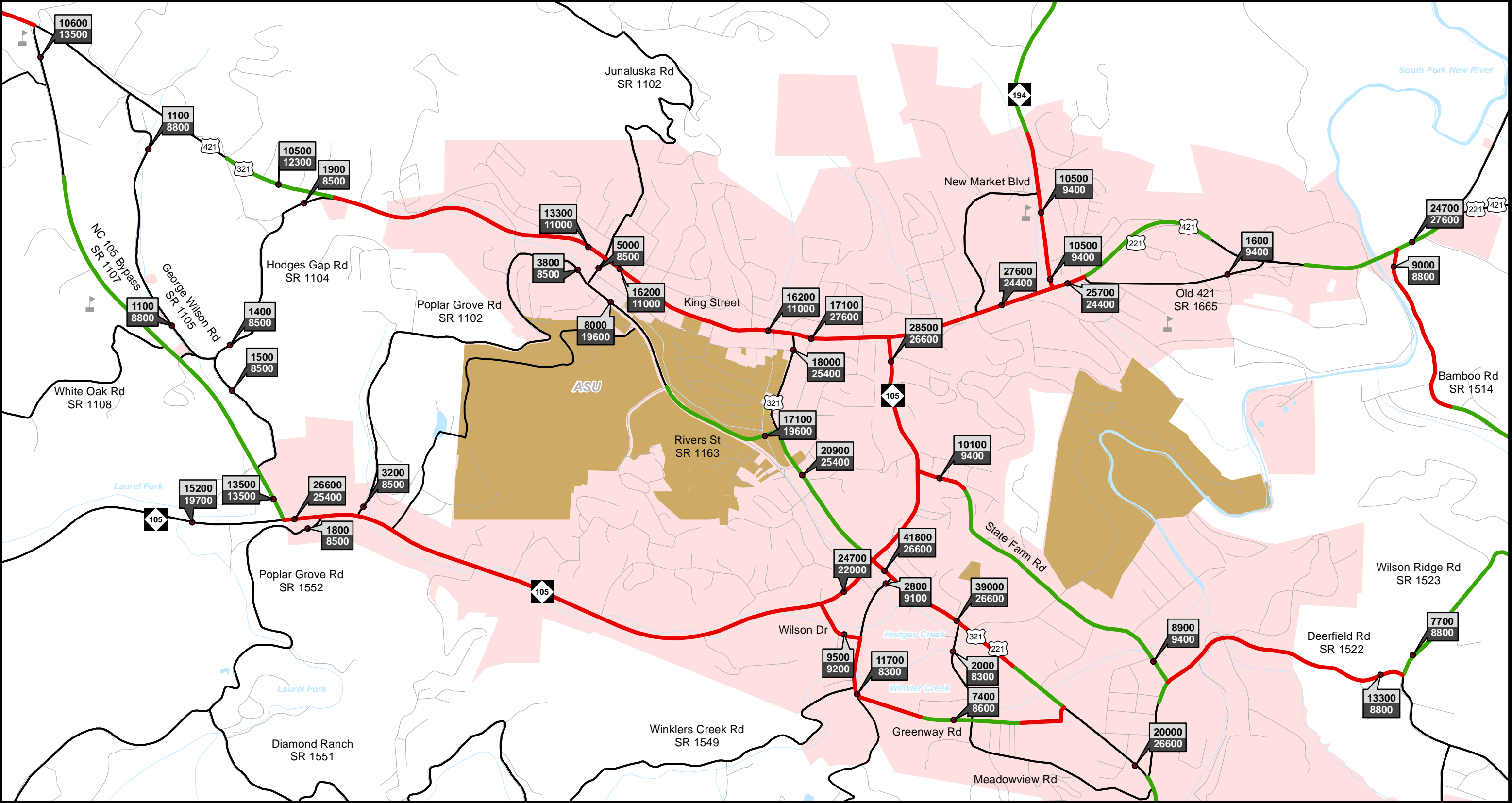
## Figure 2

Sheet 1 of 2  
Existing Network  
Base map date: October 4, 2010



## 2010 Volumes and Capacity Deficiencies

## Watauga County Comprehensive Transportation Plan



**Legend**

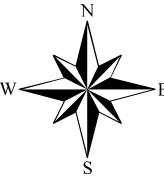
2010 Volumes  
2010 Capacity

- Near Capacity
- Over Capacity
- Network Roads

- County Boundary
- Rivers and Streams
- Other Roads
- Schools

- Municipal Boundary
- Conservation Land
- Appalachian State University

0 0.25 0.5 Miles



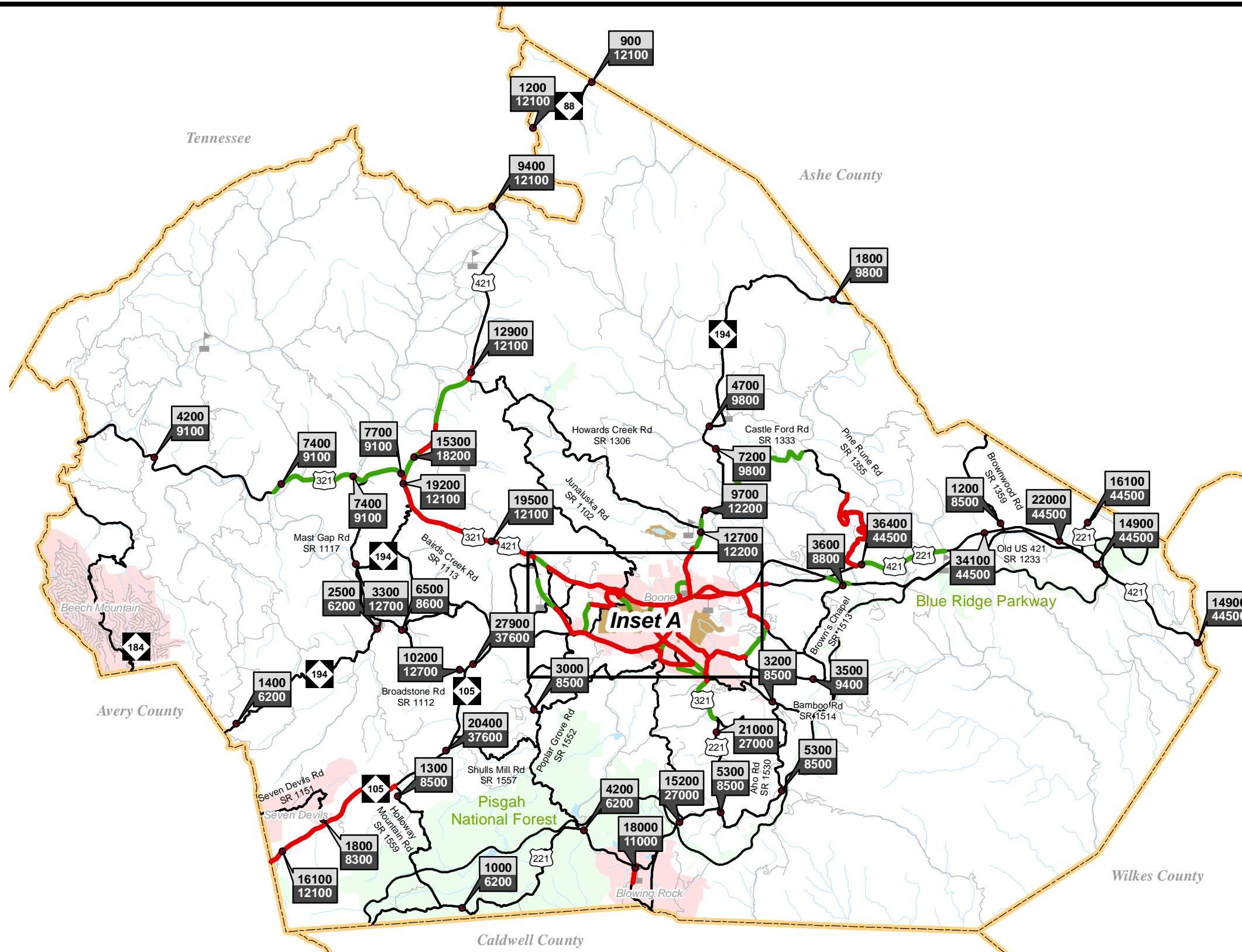
**Figure 2**

Sheet 2 of 2  
Existing Network  
Base map date: October 4, 2010

**2010 Volumes and Capacity Deficiencies  
Inset A**

**Watauga County  
Comprehensive  
Transportation Plan**





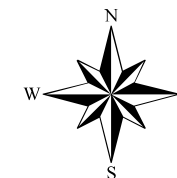
### Legend

- |  |  |   |
|--|--|---|
| <div style="background-color: black; color: white; padding: 2px; display: inline-block;">2040 Volumes</div>  | <div style="border: 2px dashed orange; width: 20px; height: 10px; display: inline-block;"></div> County Boundary   | <div style="background-color: #f8d7da; width: 20px; height: 10px; display: inline-block;"></div> Municipal Boundary           |
| <div style="background-color: black; color: white; padding: 2px; display: inline-block;">2010 Capacity</div> | <div style="border-bottom: 1px solid blue; width: 20px; display: inline-block;"></div> Rivers and Streams  | <div style="background-color: #d4edda; width: 20px; height: 10px; display: inline-block;"></div> Conservation Land            |
| <div style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></div> Near Capacity        | <div style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></div> Other Roads   | <div style="background-color: #c6e0b4; width: 20px; height: 10px; display: inline-block;"></div> Appalachian State University |
| <div style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></div> Over Capacity          | <div style="display: inline-block; width: 0; height: 0; border-left: 5px solid transparent; border-right: 5px solid transparent; border-bottom: 8px solid black;"></div> Schools |   |
| <div style="border-bottom: 2px solid black; width: 20px; display: inline-block;"></div> Network Roads        |  |   |

0 1 2 4 6 Miles

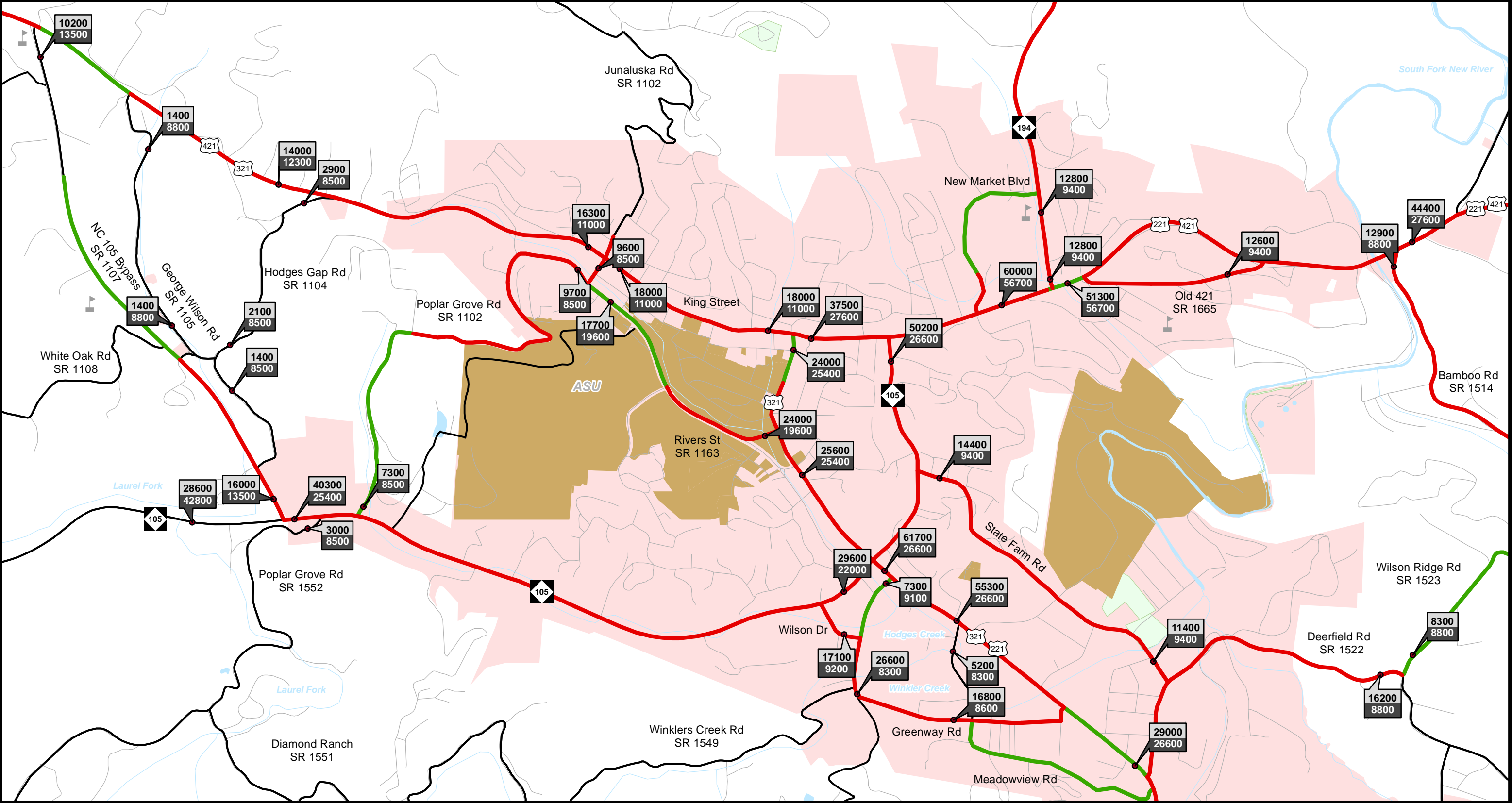
### Figure 3

Sheet 1 of 2  
Existing Plus Committed Network  
Base map date: October 4, 2010



### 2040 Volumes and Capacity Deficiencies

### Watauga County Comprehensive Transportation Plan



**Legend**

2040 Volumes  
2010 Capacity

Near Capacity  
Over Capacity  
Network Roads

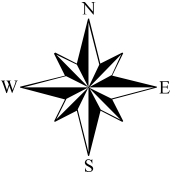
County Boundary  
Rivers and Streams  
Other Roads  
Schools

Municipal Boundary  
Conservation Land  
Appalachian State University

0 0.25 0.5 Miles

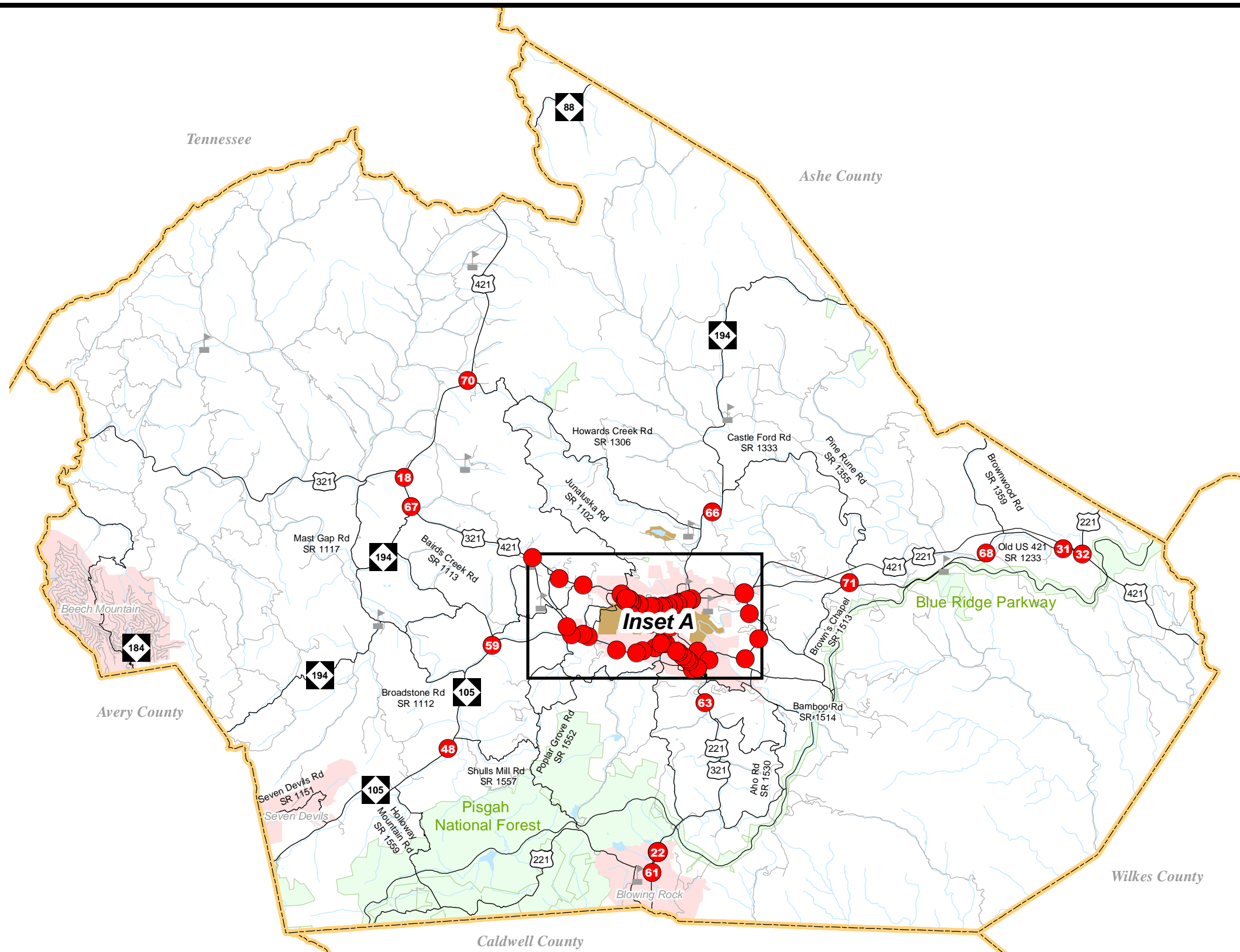
**Figure 3**

Sheet 2 of 2  
Existing Plus Committed Network  
Base map date: October 4, 2010



**2040 Volumes and Capacity Deficiencies  
Inset A**

**Watauga County  
Comprehensive  
Transportation Plan**



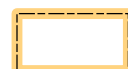
## Legend



### Crash Locations (# Map Index)



## Schools



County Boundary



- Network Roads



### Other Roads

## Rivers and Streams

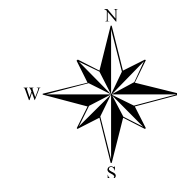
Municipal Boundary

Conservation Land

Appalachian  
State University

## Figure 4

Sheet 1 of 2  
Base map date: October 4, 2010  
Refer to Appendix F for more details

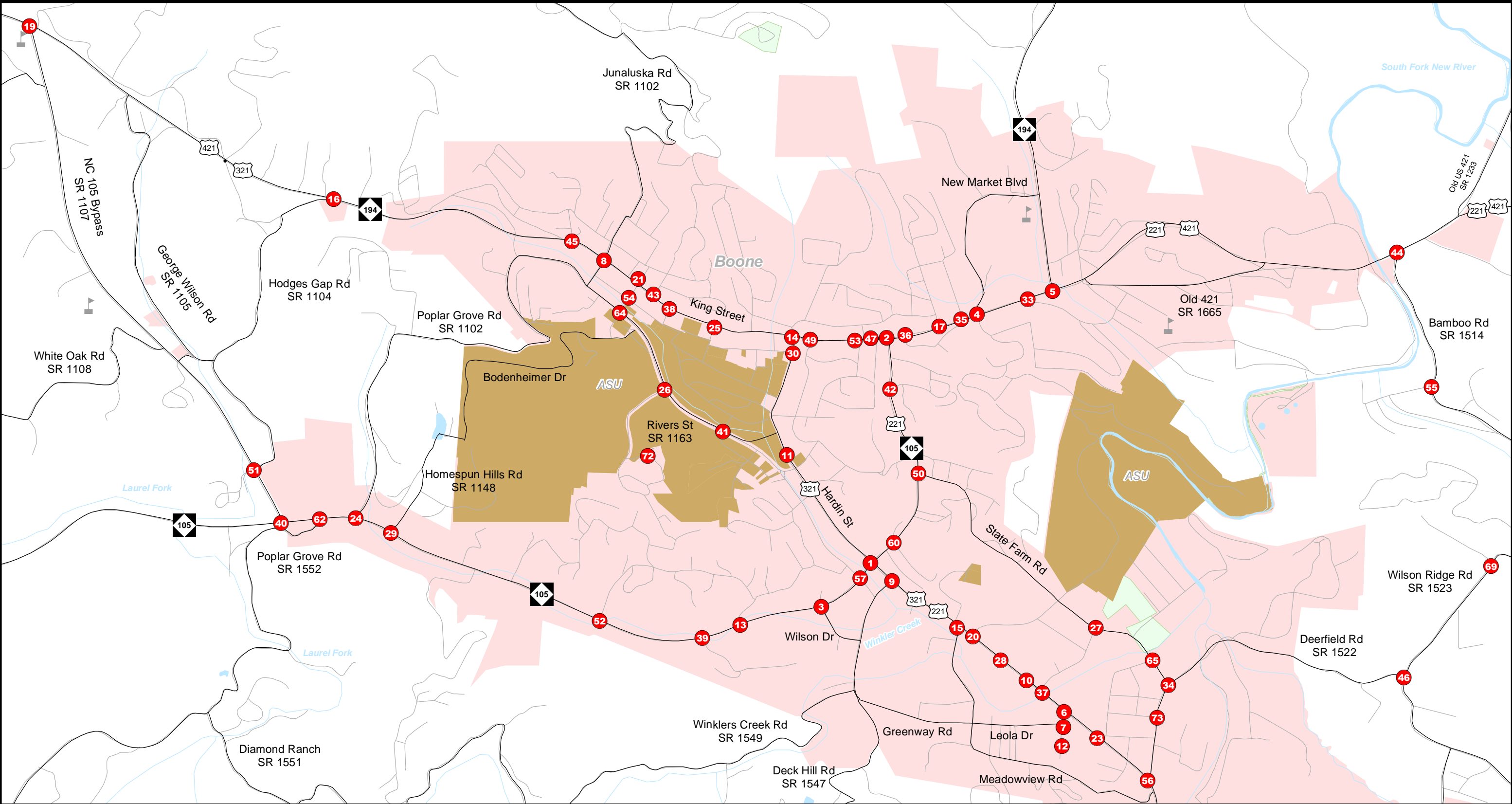


## Crash Locations

(January 1, 2006 and December 31, 2008)

# Watauga County Comprehensive Transportation Plan





**Legend**



Crash Locations  
(# Map Index)



Schools



County Boundary



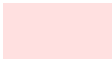
Network Roads



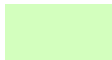
Other Roads



Rivers and Streams



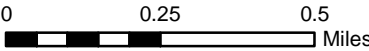
Municipal Boundary



Conservation Land

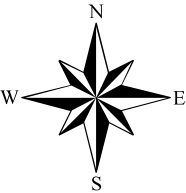


Appalachian  
State University



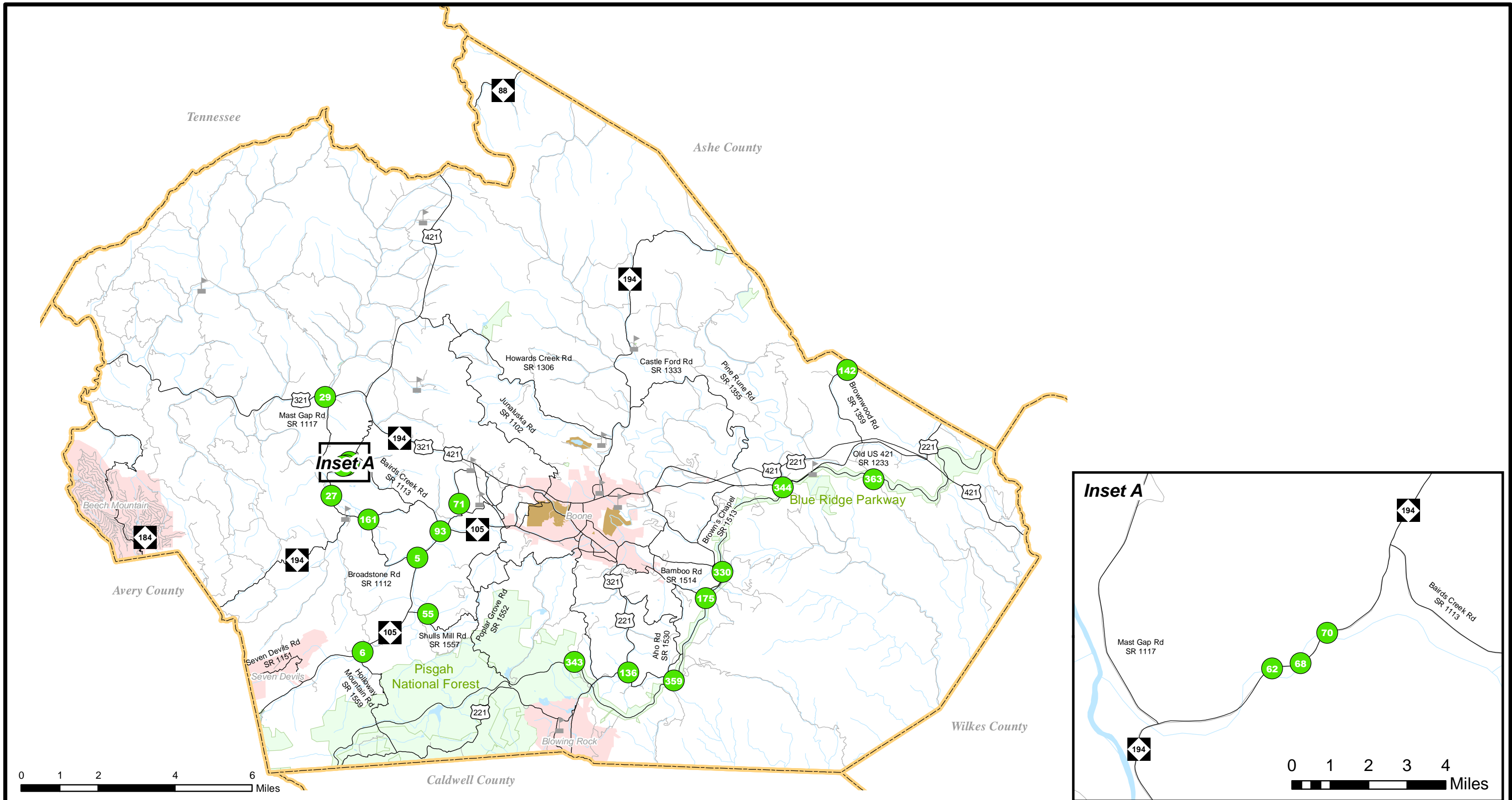
**Figure 4**

Sheet 2 of 2  
Base map date: October 4, 2010  
Refer to Appendix F for more details



**Crash Locations  
Inset A**  
(January 1, 2006 and December 31, 2008)

**Watauga County  
Comprehensive  
Transportation Plan**

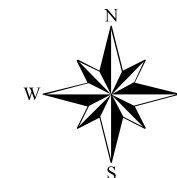


## Legend

- |  |                                   |  |                    |  |                              |
|--|-----------------------------------|--|--------------------|--|------------------------------|
|  | Deficient Bridge<br>(# Map Index) |  | Network Roads      |  | Municipal Boundary           |
|  | Schools                           |  | Other Roads        |  | Conservation Land            |
|  | County Boundary                   |  | Rivers and Streams |  | Appalachian State University |

## Figure 5

Sheet 1 of 1  
Base map date: October 4, 2010  
Refer to Appendix G for more details



## Deficient Bridges

## Watauga County Comprehensive Transportation Plan



## ***Public Transportation and Rail***

Public transportation and rail are vital modes of transportation that give alternative options for transporting people and goods from one place to another.

### Public Transportation

North Carolina's public transportation systems serve more than 50 million passengers each year. Five categories define North Carolina's public transportation system: community, regional community, urban, regional urban and intercity.

- Community Transportation - Local transportation efforts formerly centered on assisting clients of human service agencies. Today, the vast majority of rural systems serve the general public as well as those clients.
- Regional Community Transportation - Regional community transportation systems are composed of two or more contiguous counties providing coordinated / consolidated service. Although such systems are not new, the NCDOT Board of Transportation is encouraging single-county systems to consider mergers to form more regional systems.
- Urban Transportation – There are currently nineteen urban transit systems operating in North Carolina, from locations such as Asheville and Hendersonville in the west to Jacksonville and Wilmington in the east. In addition, small urban systems are at work in three areas of the state. Consolidated urban-community transportation exists in five areas of the state. In those systems, one transportation system provides both urban and rural transportation within the county.
- Regional Urban Transportation - Regional urban transit systems currently operate in three areas of the state. These systems connect multiple municipalities and counties.
- Intercity Transportation - Intercity bus service is one of a few remaining examples of privately owned and operated public transportation in North Carolina. Intercity buses serve many cities and towns throughout the state and provide connections to locations in neighboring states and throughout the United States and Canada. Greyhound/Carolina Trailways operates in North Carolina. However, community, urban and regional transportation systems are providing increasing intercity service in North Carolina.

An inventory of existing and planned fixed public transportation routes for the planning area is presented on Sheet 3 of Figure 1. AppalCART<sup>3</sup> is the primary transit provider in the county. It operates a free fixed route service in and around Boone that has approximately 100,000 boardings per month. AppalCART also operates an on demand service for the rest of the county. Out of county bus service is also available through the Mountaineer Express which connects to nearby major urban centers like Hickory/Charlotte and Winston-Salem/Greensboro. All recommendations for public

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<sup>3</sup> For more information, visit: <http://appalcart.com/>.

transportation were coordinated with the local governments and the Public Transportation Division of NCDOT. Refer to Appendix A for contact information for the Public Transportation Division.

## Rail

Today North Carolina has 3,684 miles of railroad tracks throughout the state. There are two types of trains that operate in the state, passenger trains and freight trains.

Intercity passenger service is provided by a partnership between NCDOT and Amtrak. Amtrak currently operates six passenger services daily in or through North Carolina serving 16 cities across the state. Five of the services are interstate (Crescent, Palmetto, Silver Meteor, Silver Star, and Carolinian passenger trains) and one service (Piedmont passenger train) operates exclusively within North Carolina. In addition to the six passenger services mentioned, Amtrak also operates its Auto Train service which passes through North Carolina but does not make any stops. Amtrak ridership demand has been on a rise in the state. In 2010 ridership was 840,000 and increased to 893,000 passengers in 2011.

The North Carolina Department of Transportation sponsors two passenger trains, the Carolinian and Piedmont. The Carolinian runs between Charlotte and New York City, while the Piedmont train carries passengers from Raleigh to Charlotte and back everyday. Combined, the Carolinian and Piedmont carry more than 200,000 passengers each year.

There are two major freight railroad companies that operate in North Carolina, CSX Transportation and Norfolk Southern Corporation. Also, there are more than 20 smaller freight railroads, known as shortlines.

An inventory of existing and planned rail facilities for the planning area is presented on Sheet 3 of Figure 1. The only rail line in the county is the Tweetsie Rail Road. This rail line is a closed loop, recreation facility and therefore was not included in the transportation analysis.

## ***Bicycles & Pedestrians***

Bicyclists and pedestrians are a growing part of the transportation system in North Carolina. Many communities are working to improve mobility for both cyclists and pedestrians.

NCDOT's Bicycle Policy, updated in 1991, clarifies responsibilities regarding the provision of bicycle facilities upon and along the 77,000-mile state-maintained highway system. The policy details guidelines for planning, design, construction, maintenance, and operations pertaining to bicycle facilities and accommodations. All bicycle improvements undertaken by the NCDOT are based upon this policy.

The 2000 NCDOT Pedestrian Policy Guidelines specifies that NCDOT will participate with localities in the construction of sidewalks as incidental features of highway improvement projects. At the request of a locality, state funds for a sidewalk are made available if matched by the requesting locality, using a sliding scale based on population.

NCDOT's administrative guidelines, adopted in 1994, ensure that greenways and greenway crossings are considered during the highway planning process. This policy was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction.

Inventories of existing and planned bicycle and pedestrian facilities for the planning area are presented on Sheets 4 and 5 of Figure 1. The Walk Boone 2011 and the 2010 Town of Beech Mountain Streetscape Plan were utilized in the development of these elements of the CTP. All recommendations for bicycle and pedestrian facilities were coordinated with the local governments and the NCDOT Division of Bicycle and Pedestrian Transportation. Refer to Appendix A for contact information for the Division of Bicycle and Pedestrian Transportation.

### ***Land Use***

G.S. §136-66.2 requires that local areas have a current (less than five years old) land development plan prior to adoption of the CTP. For this CTP, the Citizens Plan for Watauga<sup>4</sup> (2010) and the Boone 2030 Land Use Plan<sup>5</sup> (2009) were used to meet this requirement. The future land development plans are illustrated in Figure 6.

Land use refers to the physical patterns of activities and functions within an area. Traffic demand in a given area is, in part, attributed to adjacent land use. For example, a large shopping center typically generates higher traffic volumes than a residential area. The spatial distribution of different types of land uses is a predominant determinant of when, where, and to what extent traffic congestion occurs. The travel demand between different land uses and the resulting impact on traffic conditions varies depending on the size, type, intensity, and spatial separation of development. Additionally, traffic volumes have different peaks based on the time of day and the day of the week. For transportation planning purposes, land use is divided into the following categories:

- **Residential**: Land devoted to the housing of people, with the exception of hotels and motels which are considered commercial.
- **Commercial**: Land devoted to retail trade including consumer and business services and their offices; this may be further stratified into retail and special retail classifications. Special retail would include high-traffic establishments,

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<sup>4</sup> The 2010 Citizens Plan for Watauga can be viewed at:  
[http://www.wataugacounty.org/main/App\\_Pages/Dept/Planning/citizensplan.aspx](http://www.wataugacounty.org/main/App_Pages/Dept/Planning/citizensplan.aspx)

<sup>5</sup> The 2009 Boone 2030 Land Use Plan can be viewed at:  
<http://www.thelawrencegroup.com/boone2030/finalDocs/CoverTOC.pdf>

such as fast food restaurants and service stations; all other commercial establishments would be considered retail.

- Industrial: Land devoted to the manufacturing, storage, warehousing, and transportation of products.
- Public: Land devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.
- Agricultural: Land devoted to the use of buildings or structures for the raising of non-domestic animals and/or growing of plants for food and other production.
- Mixed Use: Land devoted to a combination of any of the categories above.

Anticipated future land development is, in general, a logical extension of the present spatial land use distribution. Locations and types of expected growth within the planning area help to determine the location and type of proposed transportation improvements. The majority of growth in Watauga County is expected to occur in the vicinity of Boone and along the US 421 corridor to Deep Gap. For detailed information on how land use and growth projections were developed for and applied in the CTP, refer to Appendix I.

### ***Consideration of Natural and Human Environment***

Environmental features are a key consideration in the transportation planning process. Section 102 of the National Environmental Policy Act<sup>6</sup> (NEPA) requires consideration of impacts on wetlands, wildlife, water quality, historic properties, and public lands. While a full NEPA evaluation was not conducted as part of the CTP, efforts were made to minimize potential impacts to these features utilizing the best available data. Any potential impacts to these resources were identified as a part of the project recommendations in Chapter 2 of this report. Prior to implementing transportation recommendations of the CTP, a more detailed environmental study would need to be completed in cooperation with the appropriate environmental resource agencies.

A full listing of environmental features that are typically examined as a part of a CTP study is shown in the following tables. Environmental features occurring within Watauga County are shown in Figure 7 and highlighted in Tables 1 and 2.

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<sup>6</sup> For more information on NEPA, go to: <http://ceq.hss.doe.gov/>.

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**Table 1 – Environmental Features**

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- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Airport Boundaries</li><li>• Anadromous Fish Spawning Areas</li><li>• Beach Access Sites</li><li>• Bike Routes (NCDOT)</li><li>• Coastal Marinas</li><li>• <b>Colleges and Universities</b></li><li>• <b>Conservation Tax Credit Properties</b></li><li>• Emergency Operation Centers</li><li>• <b>Federal Land Ownership</b></li><li>• Fisheries Nursery Areas</li><li>• <b>Geology (including Dikes and Faults)</b></li><li>• <b>Hazardous Substance Disposal Sites</b></li><li>• <b>Hazardous Waste Facilities</b></li><li>• <b>High Quality Water and Outstanding Resource Water Management Zones</b></li><li>• Hospital Locations</li><li>• Hydrography (1:24,000 scale)</li><li>• Land Trust Priority Areas</li><li>• Natural Heritage Element Occurrences</li><li>• <b>National Wetlands Inventory</b></li></ul> | <ul style="list-style-type: none"><li>• North Carolina Coastal Region Evaluation of Wetland Significance (NC-CREWS)</li><li>• Paddle Trails – Coastal Plain</li><li>• Railroads (1:24,000 scale)</li><li>• <b>Recreation Projects – Land and Water Conservation Fund</b></li><li>• <b>Sanitary Sewer Systems – Discharges, Land Application Areas, Pipes, Pumps and Treatment Plants</b></li><li>• <b>Schools – Public and Non-Public</b></li><li>• Shellfish Strata</li><li>• <b>Significant Natural Heritage Areas</b></li><li>• <b>State Parks</b></li><li>• Submersed Rooted Vasculars</li><li>• Target Local Watersheds - EEP</li><li>• <b>Trout Streams (DWQ)</b></li><li>• <b>Trout Waters (WRC)</b></li><li>• <b>Water Distribution Systems – Pipes, Pumps, Tanks, Treatment Plants, and Wells</b></li><li>• <b>Water Supply Watersheds</b></li><li>• Wild and Scenic Rivers</li></ul> |
|---|--|

Additionally, the following environmental features were considered but are not mapped due to restrictions associated with the sensitivity of the data.

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**Table 2 – Restricted Environmental Features**

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- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Archaeological Sites</li><li>• <b>Historic National Register Districts</b></li><li>• <b>Historic National Register Structures</b></li></ul> | <ul style="list-style-type: none"><li>• <b>Macrosite Boundaries</b></li><li>• <b>Managed Areas</b></li><li>• Megasite Boundaries</li></ul> |
|---|--|

## ***Public Involvement***

Public involvement is a key element in the transportation planning process. Adequate documentation of this process is essential for a seamless transfer of information from systems planning to project planning and design.

A meeting was held with the Watauga County Board of Commissioners in August 2010 to formally initiate the study, provide an overview of the transportation planning process, and to gather input on area transportation needs.

Throughout the course of the study, the NCDOT Transportation Planning Branch cooperatively worked with the Watauga County CTP Committee, which included a representative from each municipality, county staff, the RPO, and others. The committee provided information on current local plans, developed transportation vision and goals, discussed population and employment projections, and developed proposed CTP recommendations. Refer to Appendix H for detailed information on the vision statement, the goals and objectives survey, and a listing of committee members.

The public involvement process included holding a public drop-in session in Watauga County to present the transportation deficiencies and to solicit ideas for addressing the deficiencies. The meeting was held on April 12, 2012 at the Watauga County Courthouse. Four comment forms were submitted during this session.

A second public drop-in session was held on November 8, 2012 at the High Country Council of Governments building. The purpose of this session was to present the proposed Comprehensive Transportation Plan to the public and solicit comments. Through survey responses and emails, 157 comments were received after this session.

A public hearing was held on March 12, 2013 during the Blowing Rock Town Council meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during this meeting.

A public hearing was held on March 19, 2013 during the Watauga County Commissioners meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public.

A public hearing was held on April 9, 2013 during the Beech Mountain Town Council meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during this meeting.

A public hearing was held on April 9, 2013 during the Seven Devils Town Council meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during this meeting.

A public hearing was held on April 16, 2013 during the Watauga County Commissioners meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during this meeting.

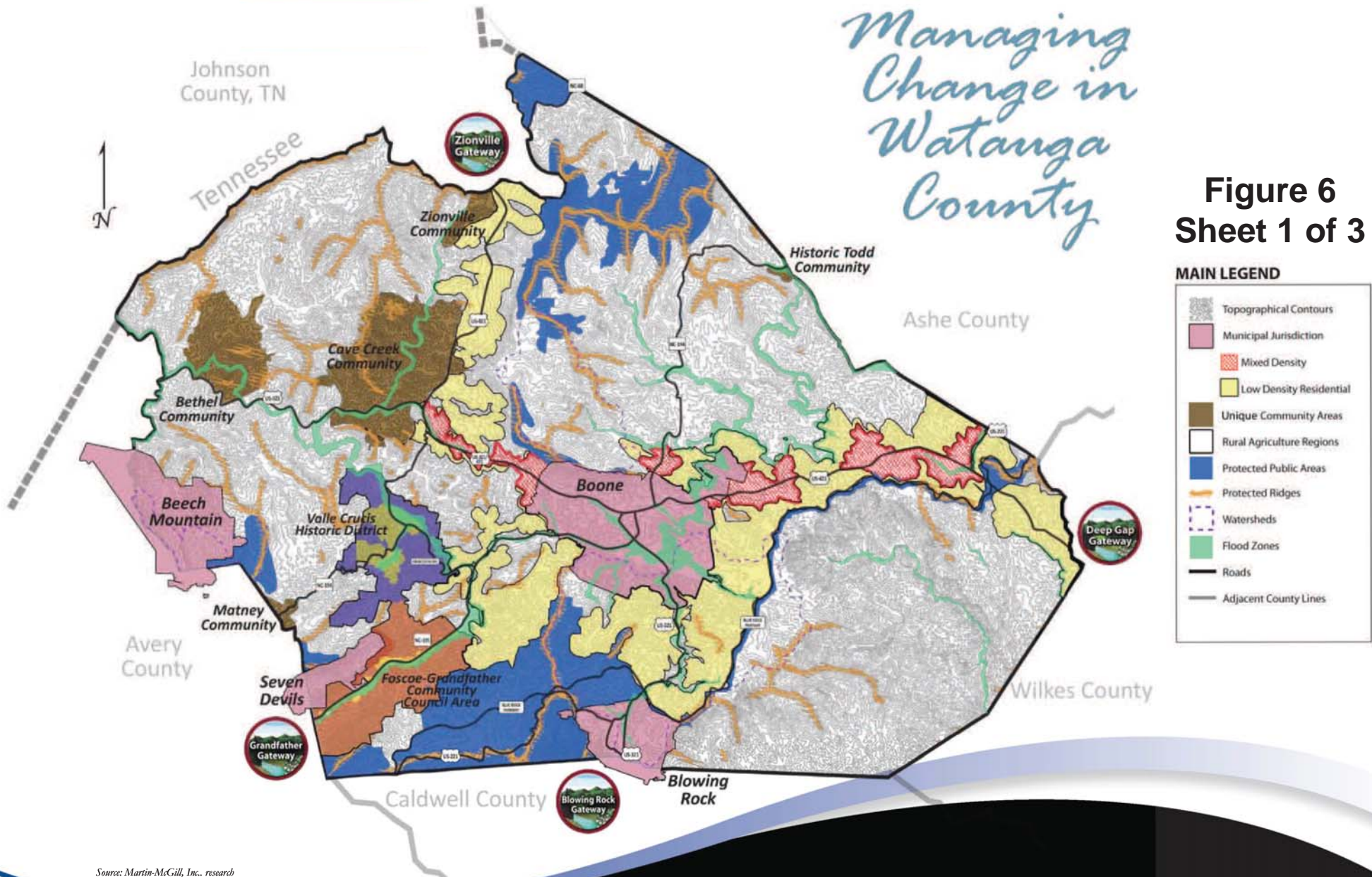
A public hearing was held on April 19, 2013 during the Boone Town Council meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public.

A public hearing was held on June 18, 2013 during the Boone Town Council meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during this meeting.

The High Country RPO endorsed the CTP on August 21, 2013. The North Carolina Department of Transportation mutually adopted the Watauga County CTP on September 5, 2013.

# Managing Change in Watauga County

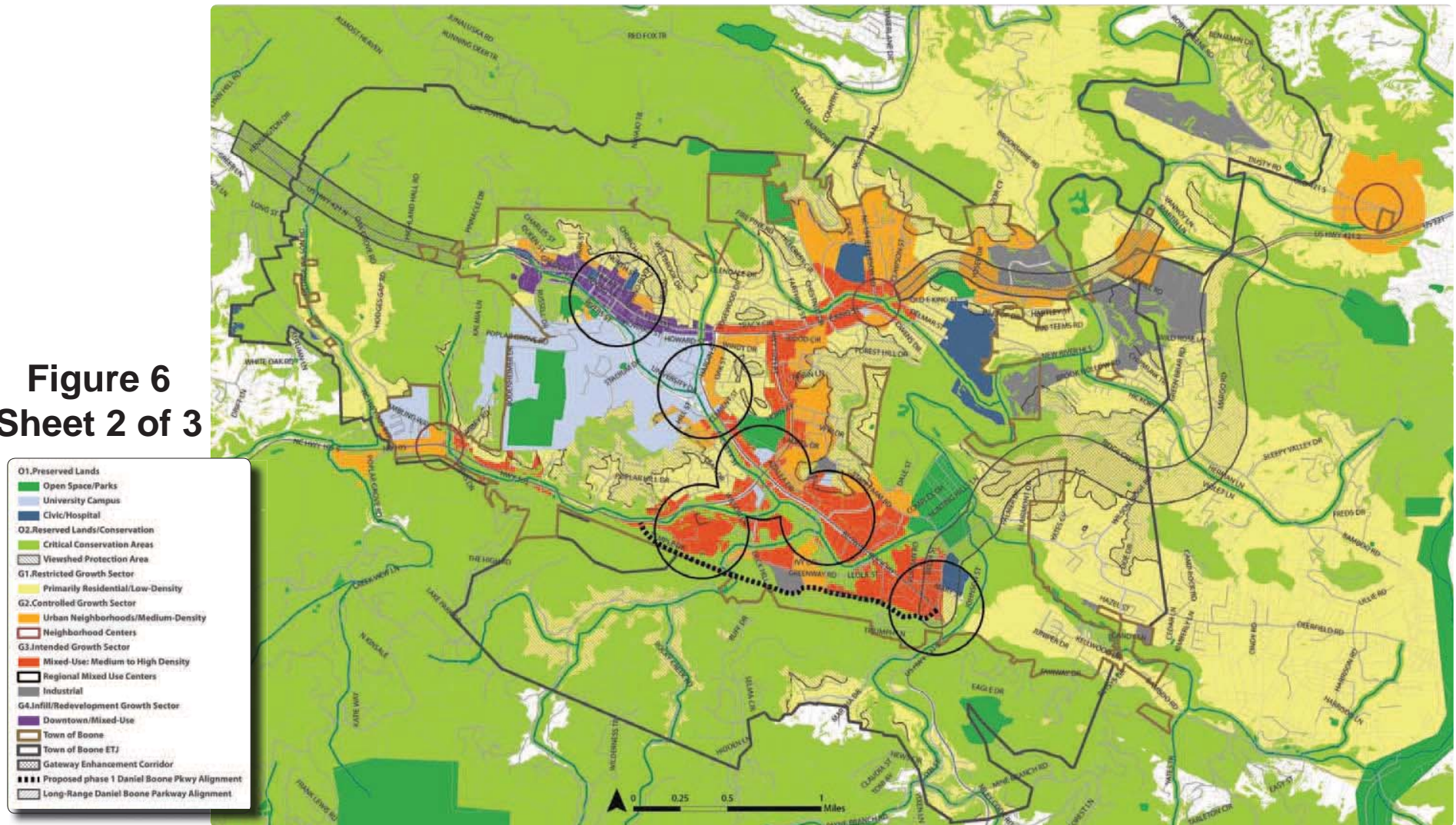
**Figure 6**  
**Sheet 1 of 3**





# THE FRAMEWORK PLAN

**Figure 6**  
**Sheet 2 of 3**

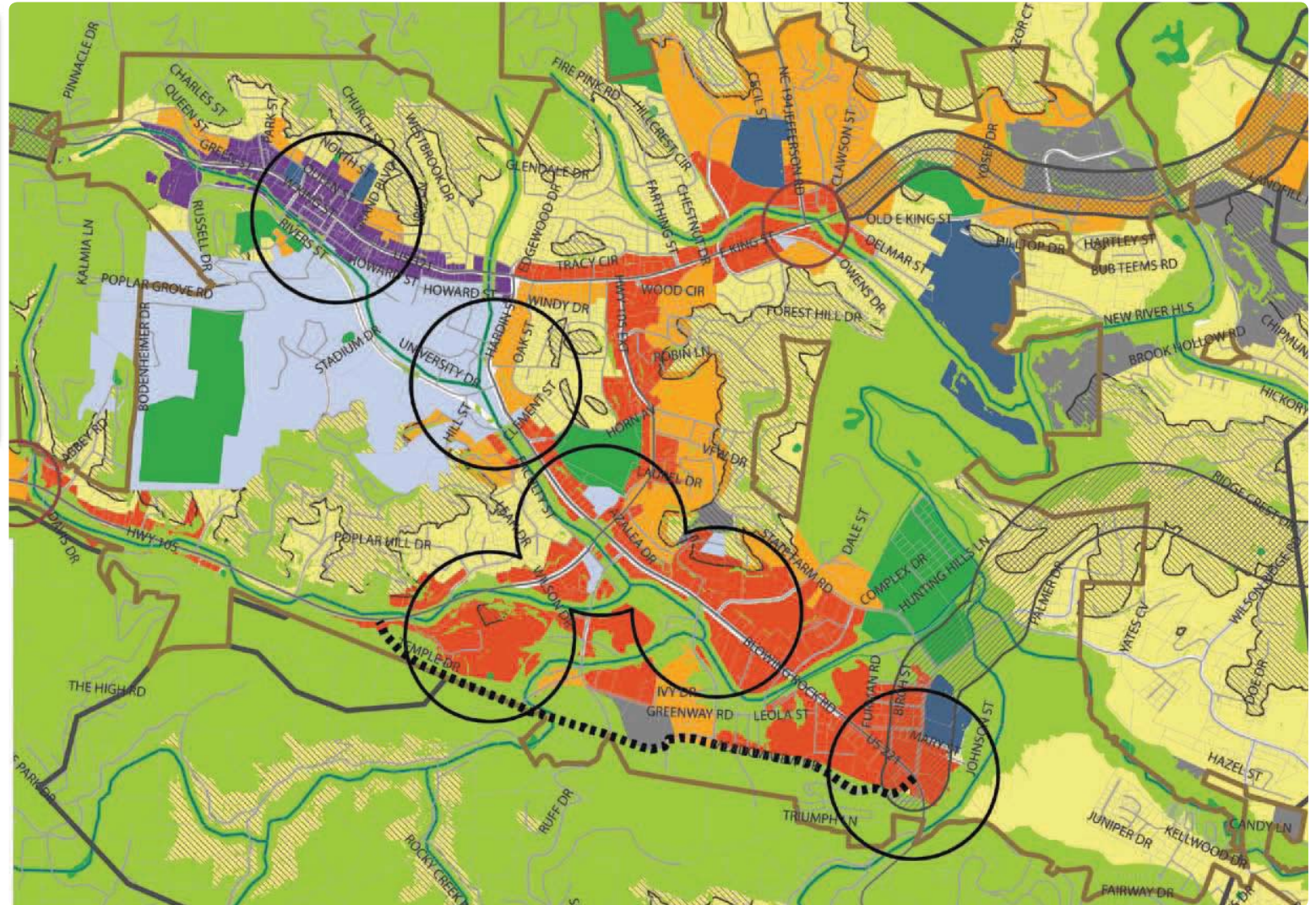




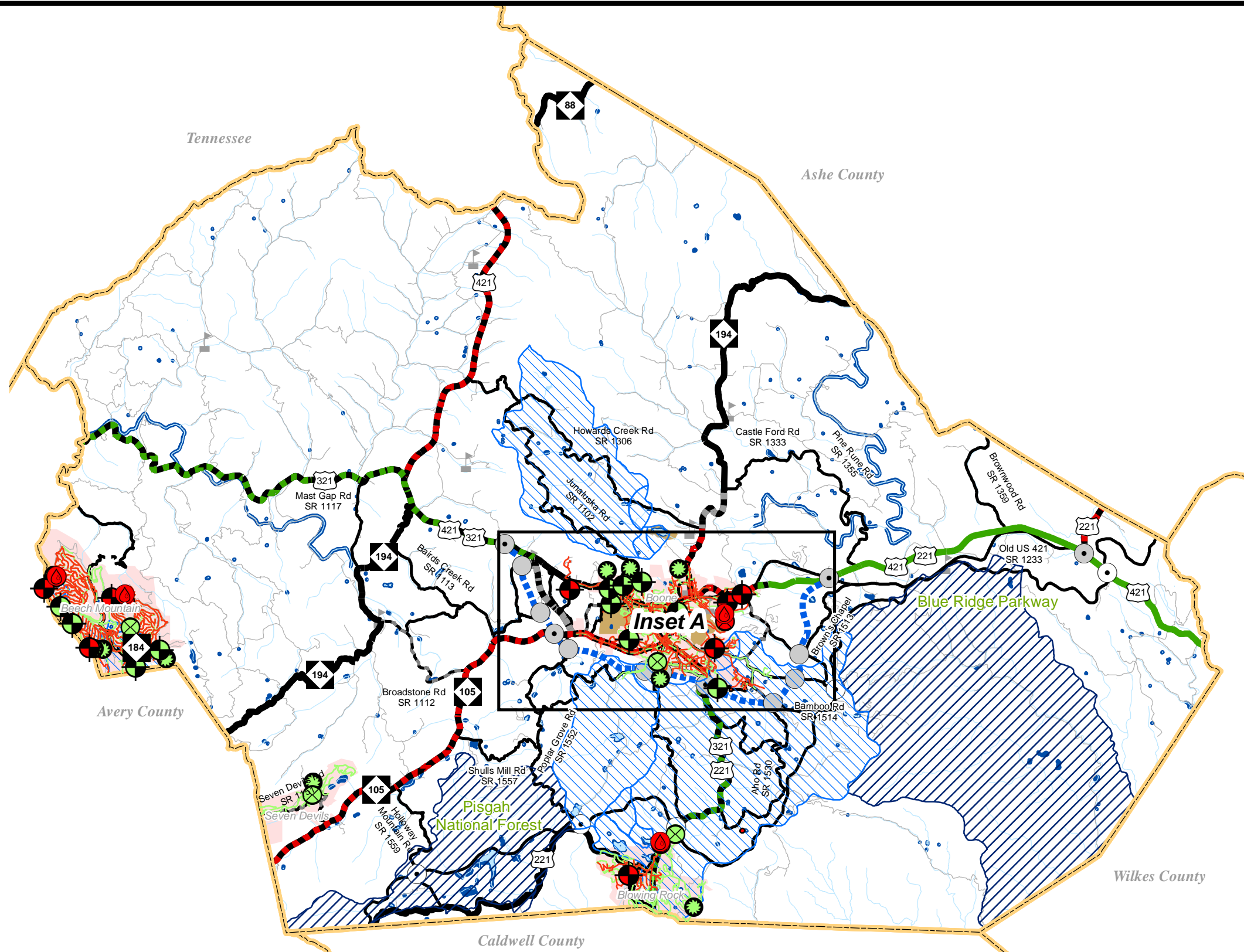
## THE FRAMEWORK PLAN: TOWN LIMITS



**Figure 6**  
**Sheet 3 of 3**







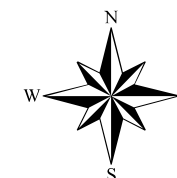
### Legend

- |                    |                                  |                                       |                             |
|--------------------|----------------------------------|---------------------------------------|-----------------------------|
| County Boundary    | Sewer Systems - Discharges       | Water Distribution - Tanks            | Trout Streams               |
| Municipal Boundary | Sewer Systems - Pumps            | Water Distribution - Pumps            | Water Bodies                |
| Roads              | Sewer Systems - Treatment Plants | Water Distribution - Treatment Plants | Wetlands                    |
| Schools            | Sewer Systems - Pipes            | Water Distribution - Pipes            | Water Supply Watersheds     |
|                    | Hazard Substance Disposal Sites  |                                       | Outstanding Resource Waters |

0 1 2 4 6 Miles

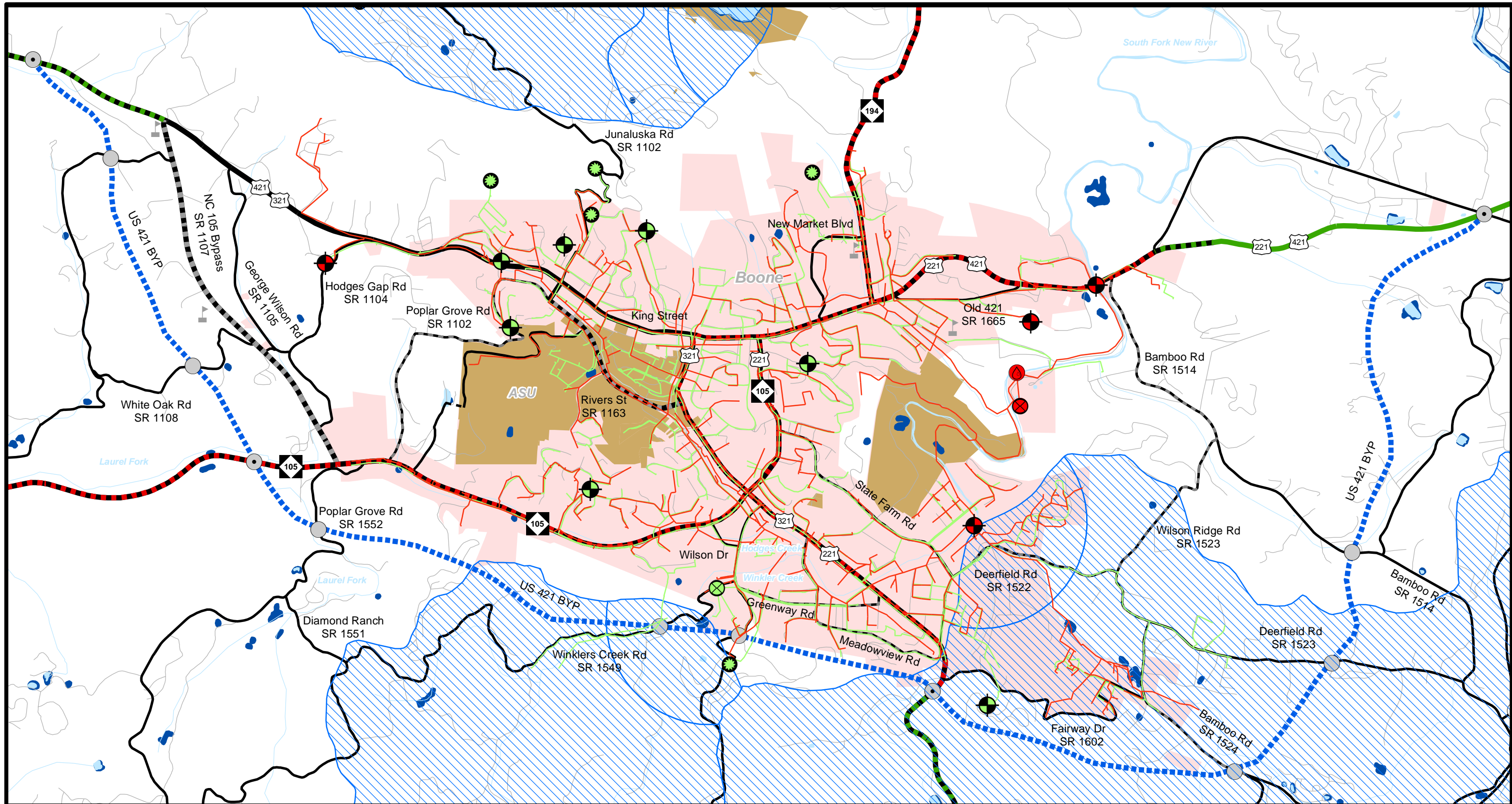
### Figure 7

Sheet 1 of 4  
Base map date: October 4, 2010



### Enviromental Features

## Watauga County Comprehensive Transportation Plan



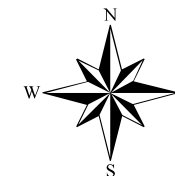
### Legend

- |                    |                                  |                                       |                             |
|--------------------|----------------------------------|---------------------------------------|-----------------------------|
| County Boundary    | Sewer Systems - Discharges       | Water Distribution - Pumps            | Trout Streams               |
| Municipal Boundary | Sewer Systems - Pumps            | Water Distribution - Treatment Plants | Water Bodies                |
| Roads              | Sewer Systems - Treatment Plants | Water Distribution - Tanks            | Wetlands                    |
| Schools            | Sewer Systems - Pipes            | Water Distribution - Pipes            | Water Supply Watersheds     |
|                    | Hazard Substance Disposal Sites  |                                       | Outstanding Resource Waters |

0 0.5 1 Miles

### Figure 7

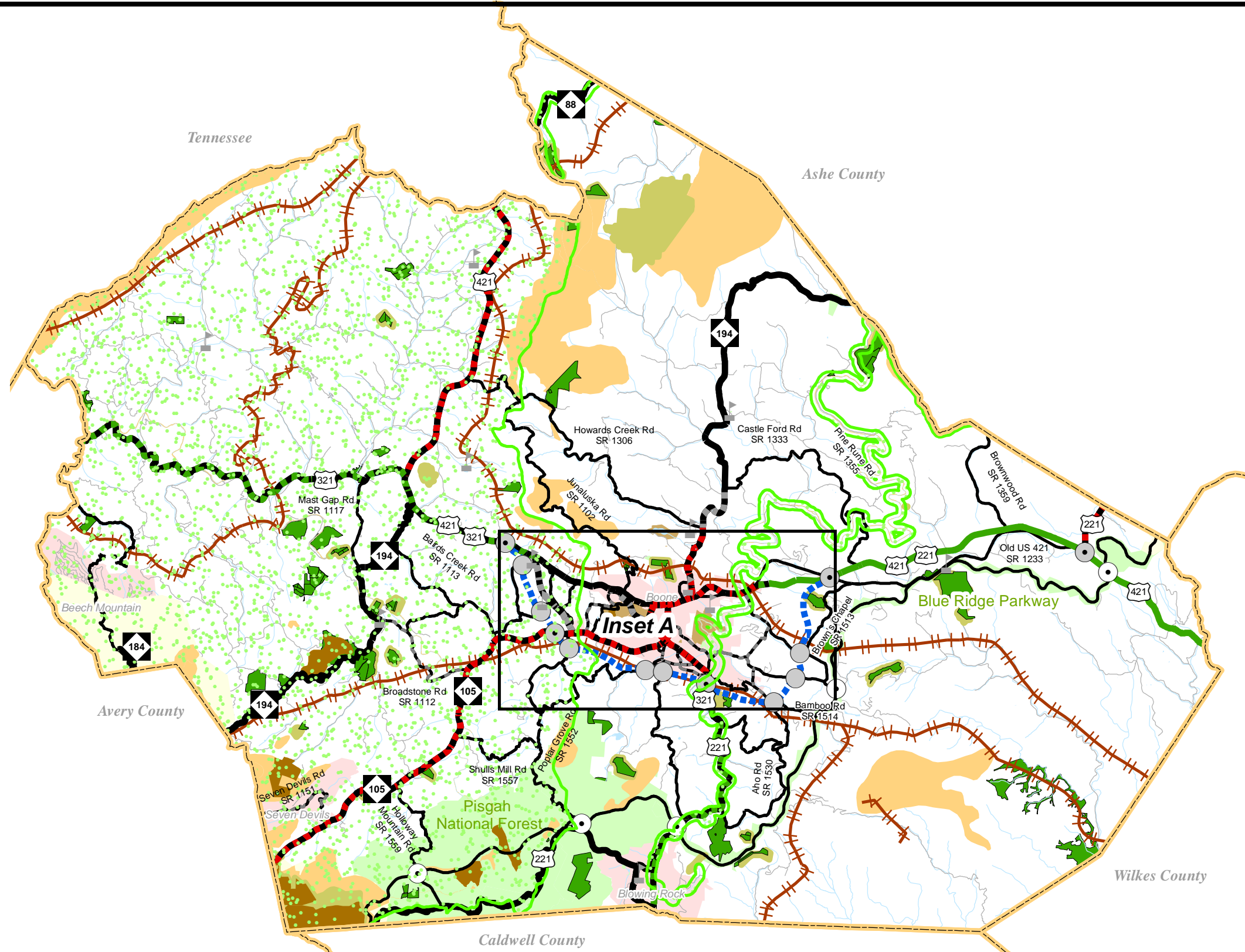
Sheet 2 of 4  
Base map date: October 4, 2010



### Enviromental Features

## Watauga County Comprehensive Transportation Plan





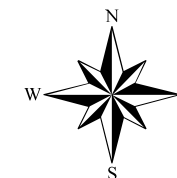
## Legend

- |                    |                                      |                                    |
|--------------------|--------------------------------------|------------------------------------|
| County Boundary    | Dedicated and Registered Areas       | Lands Managed For Conservation     |
| Municipal Boundary | Natural Heritage Areas               | Land Trust Conservation Properties |
| Fault Lines        | Natural Heritage Element Occurrences | Conservation Tax Credit Properties |
| Roads              | Land Trust Priority Areas            |                                    |

0 1 2 4 6 Miles

## Figure 7

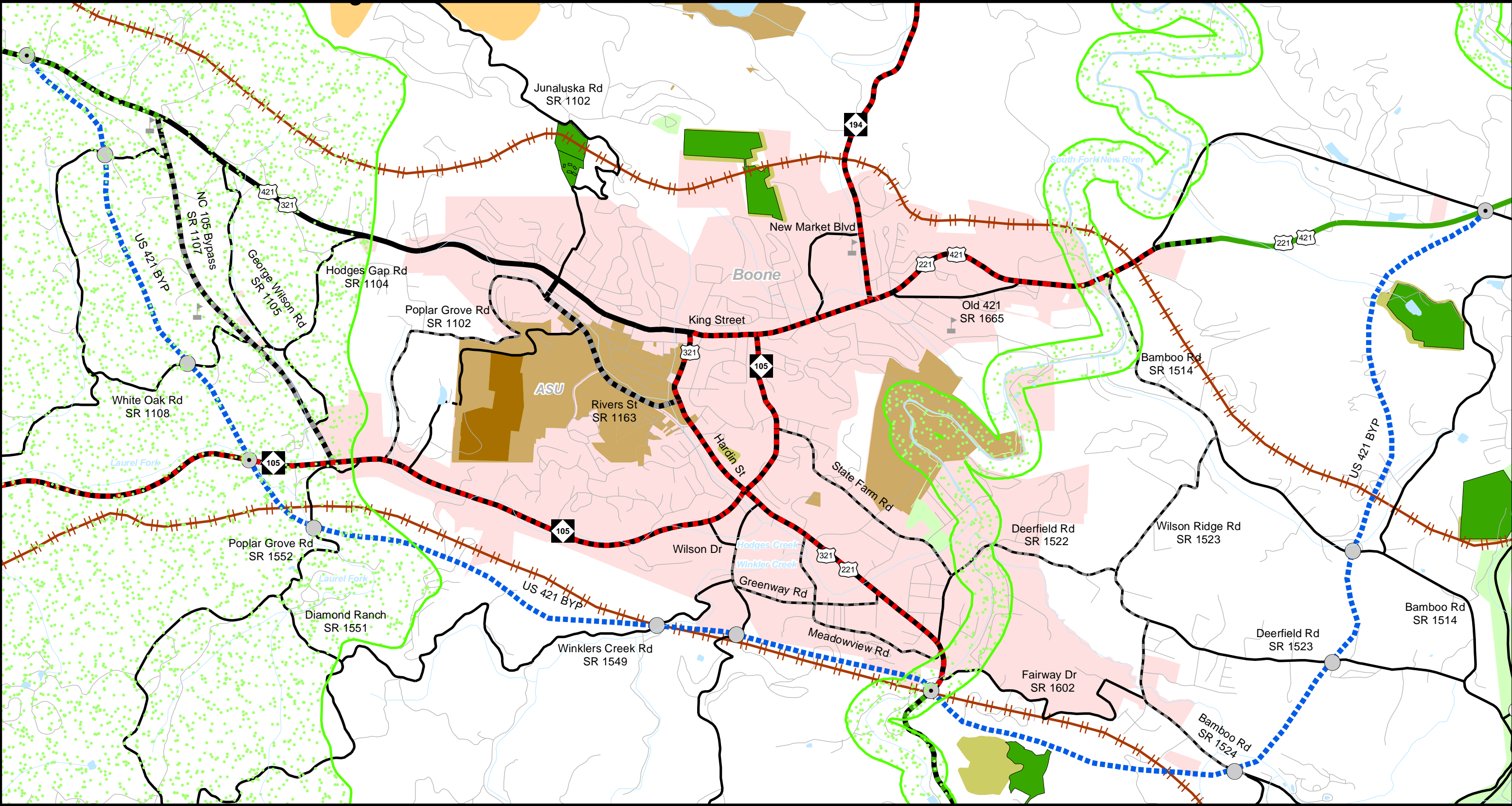
Sheet 3 of 4  
Base map date: October 4, 2010














## Enviromental Features

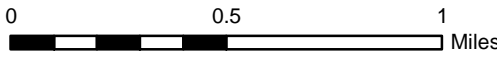
## Watauga County

## Comprehensive Transportation Plan



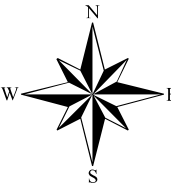
**Legend**

- |  |  |  |
|--|--|--|
|  County Boundary    |  Dedicated and Registered Areas       |  Lands Managed For Conservation     |
|  Municipal Boundary |  Natural Heritage Areas               |  Land Trust Conservation Properties |
|  Fault Lines        |  Natural Heritage Element Occurrences |  Conservation Tax Credit Properties |
|  Roads              |  |  Land Trust Priority Areas          |



**Figure 7**

Sheet 4 of 4  
Base map date: October 4, 2010



**Enviromental Features**

**Watauga County  
Comprehensive  
Transportation Plan**

## II. Recommendations

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This chapter presents recommendations for each mode of transportation in the 2013 Watauga County CTP as shown in Figure 1. More detailed information on each recommendation is tabulated in Appendix C. Refer to Appendix J for documentation of project alternatives and scenarios that were studied, but are not included in the adopted CTP.

### ***Unaddressed Deficiencies***

The following deficiencies were identified during the development of the CTP, but they remain unaddressed.

- US 321-421 (King Street) from US 321 (Hardin Street) to Hodges Gap Road (SR 1104) in downtown Boone is currently over capacity. Because of physical constraints, no method of improvement was found to be acceptable to Boone at this time. Central business district storefront development prevents any additions to the current pavement width. While the existing pavement width would be sufficient to provide four travel lanes, Boone prefers to keep the existing arrangement of two 12 foot travel lanes and roadside parking.
- US 321 BUS from US 221 to Globe Road (SR 1537) in downtown Blowing Rock is projected to be over capacity by 2040. Because of physical constraints, no method of improvement was found to be acceptable to Blowing Rock at this time. Central business district storefront development prevents any additions to the current pavement width. While the existing pavement width would be sufficient to provide four travel lanes, Blowing Rock prefers to keep the existing arrangement of two 12 foot travel lanes and roadside parking.
- A small section of Deerfield Road (SR 1522) is projected to be over capacity by 2040. This section begins at the intersection with State Farm Road, and extends 250 feet to the northeast. The primary cause of this congestion is the reduced capacity resulting from a 25 mph speed limit around Watauga County Hospital. At this time, locals prefer to maintain the speed limit zone.
- Seven Devils is located in southwest Watauga County and has an elevation of 3,944 feet. The only access point to Seven Devils from the surrounding road network is via Seven Devils Road (SR 1151). In recent years there has been growing concern about wild fires in the area. In the event that Seven Devils Road (SR 1151) is closed because of wild fire or other natural disaster, an alternative access route between Seven Devils and the surrounding road network would be needed. Two possible locations for such a route were studied as part of this CTP; however, neither proved feasible at this time. Additional study is required to select an appropriate alternative.



## ***Implementation***

The CTP is based on the projected growth for the planning area. It is possible that actual growth patterns will differ from those logically anticipated. As a result, it may be necessary to accelerate or delay the implementation of some recommendations found within this plan. Some portions of the plan may require revisions in order to accommodate unexpected changes in development. Therefore, any changes made to one element of the CTP should be consistent with the other elements.

Initiative for implementing the CTP rests predominately with the policy boards and citizens of the county and its municipalities. As transportation needs throughout the state exceed available funding, it is imperative that the local planning area aggressively pursue funding for priority projects. Projects should be prioritized locally and submitted to the High Country RPO for regional prioritization and submittal to NCDOT. Refer to Appendix A for contact information for regional prioritization and funding. Local governments may use the CTP to guide development and protect corridors for the recommended projects. It is critical that NCDOT and local government coordinate on relevant land development reviews and all transportation projects to ensure proper implementation of the CTP. Local governments and the North Carolina Department of Transportation share the responsibility for access management and the planning, design and construction of the recommended projects.

Prior to implementing projects from the CTP, additional analysis will be necessary to meet the National Environmental Policy Act<sup>1</sup> (NEPA) or the North Carolina State Environmental Policy Act<sup>2</sup> (SEPA). This CTP may be used to provide information in the NEPA/SEPA process.

## ***Problem Statements***

The following pages contain problem statements for each recommendation, organized by CTP modal element. The information provided in the problem statement is intended to help support decisions made in the NEPA/SEPA process. A full, minimum or reference problem statement is presented for each recommendation, with full problem statements occurring first in each section. Full problem statements are denoted by a gray shaded box containing project information. Minimum problem statements are more concise and less detailed than full problem statements, but include all known or readily available information. Reference problem statements are developed for TIP projects where the purpose and need for the project has already been established.

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<sup>1</sup> For more information on NEPA, visit: <http://ceq.hss.doe.gov/>

<sup>2</sup> For more information on SEPA, visit: <http://www.doa.nc.gov/clearing/faq.aspx>



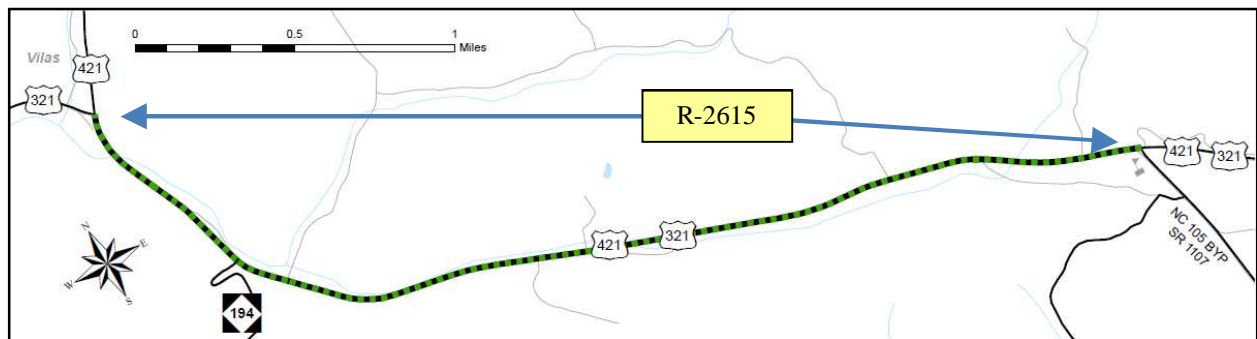
## **HIGHWAY**

### **US 321-421**

### **Proposed Improvements from US 321 at Vilas to NC 105 BYP (SR 1107)**

**Local ID: R-2615**

**Last updated: 9/7/2012**



### **Identified Problem**

US 321-421 is currently over capacity and is projected to remain over capacity in 2040 from NC 105 BYP (SR 1107) to US 321 in Vilas. The purpose of this project is to relieve congestion on the existing facility and to accommodate projected traffic volumes in order to maintain a Level of Service (LOS) D on the facility.

### **Justification of Need**

US 321-421 is the primary route between Boone and the western portions of the county. It is currently a two lane facility with a speed limit of 55 miles per hour (mph). Lane widths vary from 11 to 12 feet. The facility is currently over capacity with an Average Annual Daily Traffic (AADT) volume of 15,200 vehicles per day (vpd), compared to a LOS D capacity of 12,100 vpd. Approximately 19,500 vpd are projected in 2040.

### **Community Vision and Problem History**

US 321-421 is designated an economic “Gateway” in the 2010 Citizens Plan for Watauga<sup>3</sup>. The plan describes the aesthetic quality of such facilities as “vitally important to the economic future of the community.” US 321-421 was identified as being over capacity in the 2002 Watauga County Thoroughfare Plan.

### **CTP Project Proposal**

#### **Project Description and Overview**

The CTP proposes improving this section of US 321-421 to a boulevard. This would be accomplished by widening to four lanes, adding a median, and 4 foot paved shoulders to accommodate bicycles. These improvements can serve as a stepping stone to achieving the Strategic Highway Corridor (SHC) vision for US 321-421 to be an expressway.

<sup>3</sup> The 2010 Citizens Plan for Watauga can be viewed at:  
[http://www.wataugacounty.org/main/App\\_Pages/Dept/Planning/citizensplan.aspx](http://www.wataugacounty.org/main/App_Pages/Dept/Planning/citizensplan.aspx)

Additionally, from 2006 through 2008 the intersection of US 321 and US 421 experienced 21 crashes with an average severity of 4.29, compared to the state's average of 4.73 for the same period.

### **Natural & Human Environmental Context**

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of the following environmental features: trout streams and a land trust priority area.

### **Relationship to Land Use**

Current land use is low density rural. There are some roadside shops along the route. Residential developments are not directly off US 321-421 but are instead accessed from cross streets. The 2010 Citizens Plan for Watauga proposes mixed use development along US 321-421. The plan also identifies Cove Creek at the western end of the project as a historic community.

### **Linkages to Other Plans and Proposed Project History**

US 321-421 is classified as a principal arterial on the Federal Functional Classification System, and this stretch of US 321-421 is on the statewide tier of the North Carolina Multimodal Investment Network<sup>4</sup> (NCMIN). Statewide tier facilities serve long-distance trips, connect regional centers, have the highest usage, and mostly serve a mobility need. Additionally, US 321-421 is designated as an expressway on NCDOT's SHC Vision Plan.

The 2002 Thoroughfare Plan for Watauga County identified US 321-421 as over capacity and recommended widening US 321-421 to four lanes. This improvement (R-2615) has been in the TIP as an unfunded intrastate project since the 1990-1996 TIP.

The 2010 Citizens Plan for Watauga identified the widening of US 321-421 as one of five priority projects.

### **Multi-modal Considerations**

Bicycle accommodations are recommended along the entire facility.

### **Public/ Stakeholder Involvement**

Results from the Goals & Objectives (G&O) survey conducted for this CTP revealed that US 321-421 was the most identified area described as commonly used, and was also repeatedly identified as "difficult to access." However, respondents often did not specify which portion of US 421 was the target of those responses. Either US 321 or US 421 between Boone and Tennessee was specifically identified 65 times as a commonly used facility. This section of US 321-421 was also identified as a "transportation challenge," as "difficult to access," and as a route avoided because of congestion. Comments received from the public workshop on November 8, 2012 included support for bike accommodations along this facility.

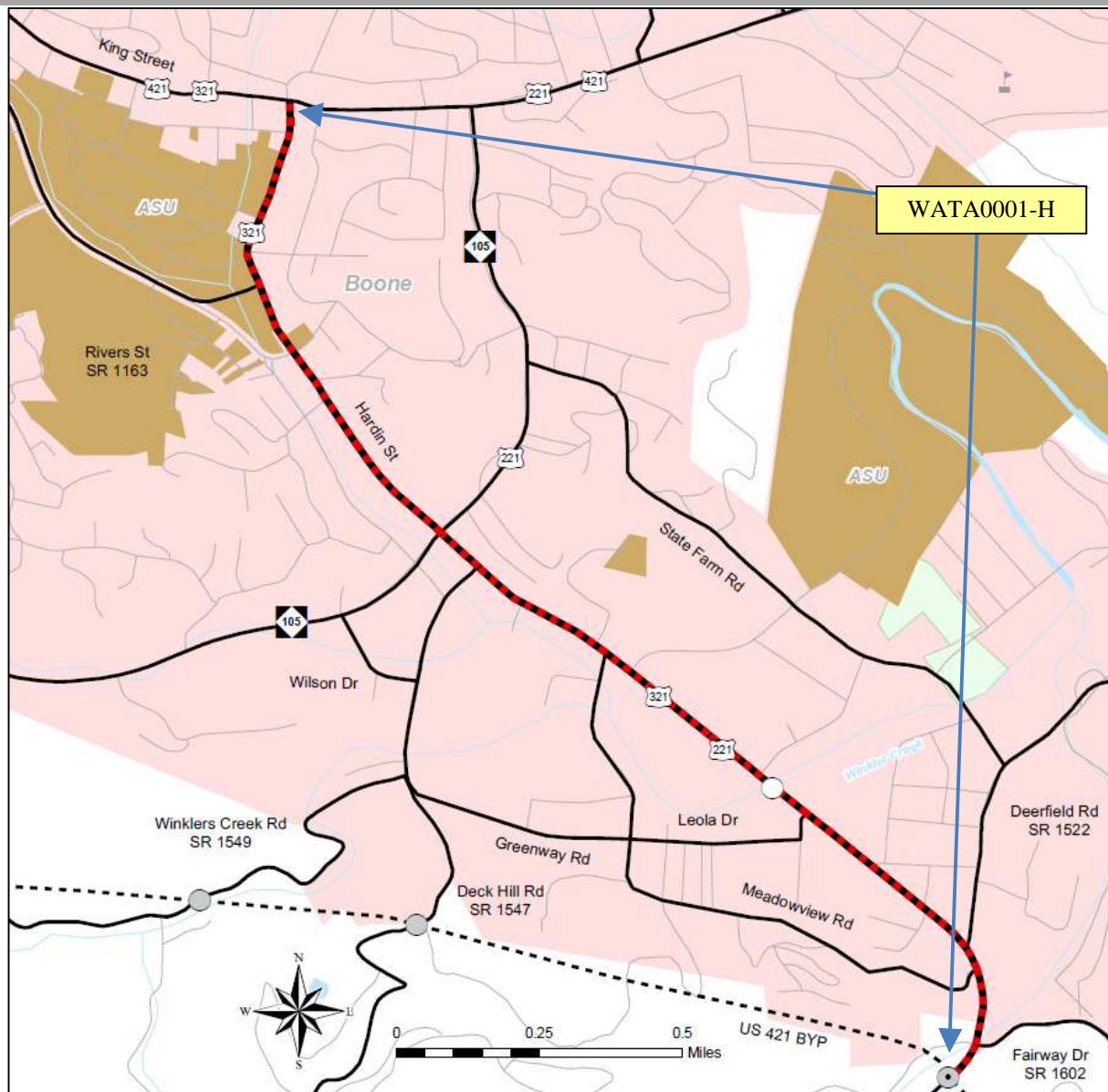
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<sup>4</sup> For more information on NCMIN, visit: <http://www.ncdot.gov/performance/reform/NCMINmaps/>

**US 321 (Hardin Street / Blowing Rock Road)  
Proposed Improvements from US 421 (King Street) to  
the proposed US 421 BYP**

**Local ID: WATA0001-H**

**Last updated: 9/7/2012**



**Identified Problem**

US 321 is projected to be near or over capacity in 2040 from US 421 (King Street) to the proposed US 421 BYP. The purpose of this project is to accommodate projected traffic volumes in order to maintain a Level of Service (LOS) D on the facility.

**Justification of Need**

Existing US 321 from US 421 (King Street) in Boone to Fairway Drive (SR 1602) has four 12 foot wide through lanes, a speed limit of 35 mph, and a center turn lane. From Fairway Drive (SR 1602) to the proposed US 421 BYP, US 321 changes to a 4 lane undivided cross section. The 2010 Average Annual Daily Traffic (AADT) volume ranges

from 18,000 vehicles per day (vpd) north of NC 105 to 41,800 vpd south of NC 105, compared to a LOS D capacity of 25,400 vpd and 26,600 vpd respectively. Approximately 24,000 to 61,700 vpd are projected in 2040.

### **Community Vision and Problem History**

The Boone 2030 Land Use Plan (2009)<sup>5</sup> identified US 321, and especially the intersection with NC 105, as the “worst” traffic congestion in Boone. The plan proposed a multi-prong approach to addressing the issues. The 1991 Boone Thoroughfare Plan identified US 321 from Fairway Drive (SR 1602) to NC 105 as having a “serious capacity problem”, defined as a volume to capacity ratio over 1.25 and from NC 105 to near Rivers Street (SR 1163) as over capacity.

### **CTP Project Proposal**

#### **Project Description and Overview**

The CTP proposes converting US 321 to a boulevard by removing the center turn lane, providing a median, and bicycle accommodations.

Additionally, from 2006 through 2008, thirteen intersections along this corridor were identified as having 10 or more crashes, none of which had a severity index above the state’s average of 8.4 for an injury crash. There are an additional four high crash locations along cross streets in the vicinity. Refer to Appendix F for more detailed information on these locations.

#### **Natural & Human Environmental Context**

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of trout streams, water distribution pipes, sewer system pipes, and water supply watershed. The proposed project also crosses within a land trust priority area.

#### **Relationship to Land Use**

Current land use along US 321 is primarily business. Being within the Boone city limits, land along US 321 has high density and continues to develop. Five of the top twenty employers in the county have direct access to US 321 with an additional two within half a mile. These five employers are Appalachian State University (ASU), Belk Inc. (located in Boone Mall), A F Bank, Lowe’s Home Centers Inc., and Wal-Mart Stores Inc. The other two nearby are the International Resistance Company on Greenway Road and Watauga Medical Center on Deerfield Road (SR 1522). After the development and approval of socio-economic data for the CTP, the International Resistance Company began the process of closing its facility. This change will be reflected in future CTP updates.

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<sup>5</sup> The 2009 Boone 2030 Land Use Plan can be viewed at:  
<http://www.thelawrencegroup.com/boone2030/finalDocs/CoverTOC.pdf>

The Boone 2030 Land Use Plan (2009) categorizes future land use along US 321 as either “Mixed Use: Medium to High Density” development or as belonging to ASU, and identifies four “Regional Mixed Use Centers” along this section of US 321.

### **Linkages to Other Plans and Proposed Project History**

While the Boone 2030 Land Use Plan (2009) recommended a non-typical cross section to address the capacity deficiency, many of the characteristics of the cross section align with NCDOT’s criteria of a boulevard. Some of the overlapping characteristics include dividing the facility with a raised median and limiting or consolidating driveway access. The primary difference is that the Boone 2030 Plan (2009) proposes utilizing 4 through lanes and additional low speed parallel lanes (effectively service roads) while the CTP proposes utilizing U-turn bulbs. The 1991 Boone Thoroughfare Plan identified US 321 as over capacity, but thought a solution of a proposed “US 421 bypass and a widening [of] State Farm Road should be adequate to the design year” of 2020.

Future congestion on US 321 will be highly dependent on the impacts of the proposed US 421 BYP, whether using new location or utilizing parts of existing facilities. See U-2703 for more information.

US 321 is classified as a principal arterial on the Federal Functional Classification System from the proposed US 421 BYP to NC 105 and as a minor arterial from NC 105 to US 421 (King Street). This stretch of US 321 is on the statewide tier of the North Carolina Multimodal Investment Network<sup>6</sup> (NCMIN). Statewide tier facilities serve long-distance trips, connect regional centers, have the highest usage, and mostly serve a mobility need.

### **Multi-modal Considerations**

AppalCART operates a fixed route bus service along US 321. Pedestrian facilities currently exist along US 321, and no improvements are recommended. Bicycle accommodations are also recommended along the entire project.

### **Public/ Stakeholder Involvement**

Results from the Goals & Objectives (G&O) survey conducted for this CTP revealed that US 321, known as “Blowing Rock Road,” was the most identified “often used facility for the county”. It was also the second most identified area described as “difficult to access” after King Street.

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<sup>6</sup> For more information on NCMIN, visit: <http://www.ncdot.gov/performance/reform/NCMINmaps/>



## Proposed Improvements from NC 105 to US 321-421

**Local ID: WATA0002-H**

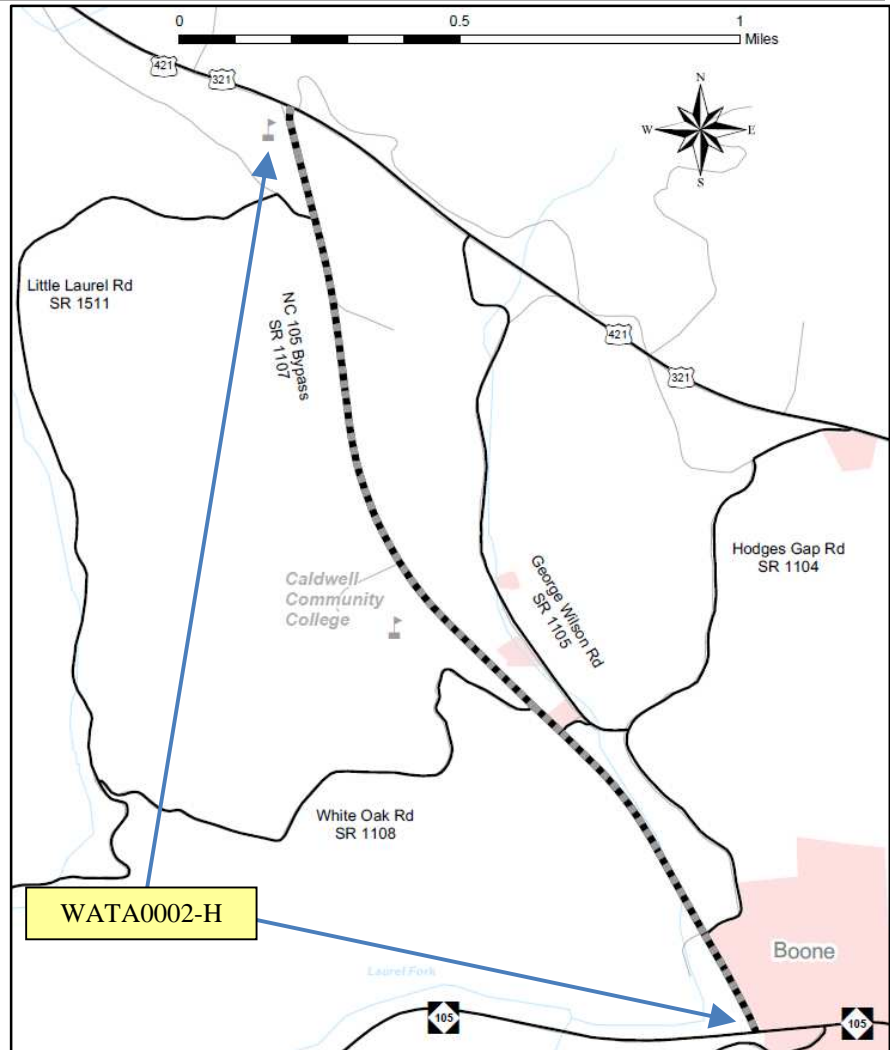
**Last updated: 9/7/2012**

### Identified Problem

NC 105 BYP (SR 1107) is projected to be near or over capacity in 2040 from NC 105 to Caldwell Community College. The purpose of this project is to accommodate projected traffic volumes in order to maintain a Level of Service (LOS) D on the facility.

## Justification of Need

NC 105 BYP (SR 1107) from NC 105 to US 321-421 has two 12 foot lanes and a speed limit of 55 miles per hour (mph). The 2010 Annual Average Daily Traffic (AADT) volume ranges from 10,600 to 13,500 vpd, and has a capacity of 13,500 vpd (LOS D). The estimated 2040 traffic volume ranges from 10,200 to 16,000 vpd.



## Community Vision and Problem History

The 1991 Boone Thoroughfare Plan identified NC 105 BYP (SR 1107) as having a “serious capacity problem” defined as a volume to capacity ratio over 1.25 in the forecasted year of 2020.

## CTP Project Proposal

## Project Description and Overview

The CTP proposes improving NC 105 BYP (SR 1107) to a three lane major thoroughfare with 4 foot paved shoulders to accommodate bicycles.

Additionally, from 2006 through 2008, three intersections along this corridor were identified as having 10 or more crashes or had a severity index above the state's average of 8.4 for an injury crash. Those intersections included: US 321-421, Hodges Gap Road (SR 1104) and NC 105. Refer to Appendix F for more detailed information on these locations.

### **Natural & Human Environmental Context**

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of trout streams and Caldwell Community College. It is also within a land trust priority area.

### **Relationship to Land Use**

Current land use along NC 105 BYP (SR 1107) is a mixture of business and residential. Being at the edge of the Boone Extraterritorial Jurisdiction (ETJ), NC 105 BYP (SR 1107) is low density but is experiencing development. The southern intersection of NC 105 BYP (SR 1107) and NC 105 is dominated by University Highlands Apartments which provides housing for students attending Appalachian State University. Caldwell Community College is just north of White Oak Road (SR 1106). There are also three churches in the vicinity; Westview Baptist Church, Alliance Bible Fellowship, and Bibleway Baptist Church.

The 2010 Citizens Plan for Watauga<sup>7</sup> identified “Key Community Services” along NC 105 BYP (SR 1107) including Caldwell Community College. The plan also proposes mixed use development along NC 105 BYP (SR 1107), from the Boone ETJ to US 321-421. The Boone 2030 Land Use Plan (2009) categorizes future land use along NC 105 BYP (SR 1107) as “Primary Residential” and “Low Density” development.

### **Linkages to Other Plans and Proposed Project History**

The Boone 2030 Land Use Plan<sup>8</sup> (2009) recommended widening NC 105 BYP (SR 1107) to a “three-lane alignment with spot medians.” The 1991 Boone Thoroughfare Plan identified NC 105 BYP (SR 1107) as part of the then planned alignment for the US 421 BYP; as such, it was recommended to be widened to a 5 lane cross section. The CTP's project proposal is based on a planning horizon year of 2040, further than previous plans. Future congestion on NC 105 BYP (SR 1107) will be highly dependent on the impacts of the proposed US 421 BYP, whether using new location or utilizing parts of existing facilities. See U-2703<sup>9</sup> for more information. Level of Service on NC 105 BYP (SR 1107) is also impacted by the signal with US 321-421 and the corresponding TIP project, R-2615.

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<sup>7</sup> The 2010 Citizens Plan for Watauga can be viewed at:  
[http://www.wataugacounty.org/main/App\\_Pages/Dept/Planning/citizensplan.aspx](http://www.wataugacounty.org/main/App_Pages/Dept/Planning/citizensplan.aspx)

<sup>8</sup> The 2009 Boone 2030 Land Use Plan can be viewed at:  
<http://www.thelawrencegroup.com/boone2030/finalDocs/CoverTOC.pdf>

<sup>9</sup> The U-2703 project website can be viewed at:  
<http://www.ncdot.gov/doh/preconstruct/tpb/planning/DanielBooneStudy.html>

This stretch of NC 105 BYP (SR 1107) is on the subregional tier of the North Carolina Multimodal Investment Network<sup>10</sup> (NCMIN). Subregional tier facilities serve localized movements. They provide more of an access function than mobility, and are of a higher interest to cities and counties than the state.

### **Multi-modal Considerations**

AppalCART operates a fixed route bus service along NC 105 BYP (SR 1107). Pedestrian facilities are recommended from NC 105 to US 321-421. Bicycle accommodations are also recommended from NC 105 to US 321-421 to improve access to Caldwell Community College.

### **Public/ Stakeholder Involvement**

NC 105 BYP (SR 1107) serves Caldwell Community College which was identified in the 2010 Citizens Plan for Watauga as a “Key Community Service” and subsequently included in the CTP’s Goals and Objectives as a key “Activity Center.” One of the objectives established for the CTP stated the preference for road designs that promote multimodal services, interconnectivity, and accessibility to “Activity Centers.” NC 105 BYP (SR 1107) from NC 105 to US 321-421 is recommended to have highway, transit, pedestrian, and bicycle improvements.

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<sup>10</sup> For more information on NCMIN, visit: <http://www.ncdot.gov/performance/reform/NCMINmaps/>

## NC 194

### Proposed Improvements from US 221-421 to Howards Creek Road (SR 1306)

Local ID: WATA0003-H

Last updated: 9/7/2012

#### Identified Problem

NC 194 is currently near or over capacity and is projected to be over capacity in 2040 from US 221-421 to Howards Creek Road (SR 1306). The purpose of this project is to accommodate projected traffic volumes in order to maintain a Level of Service (LOS) D on the facility.

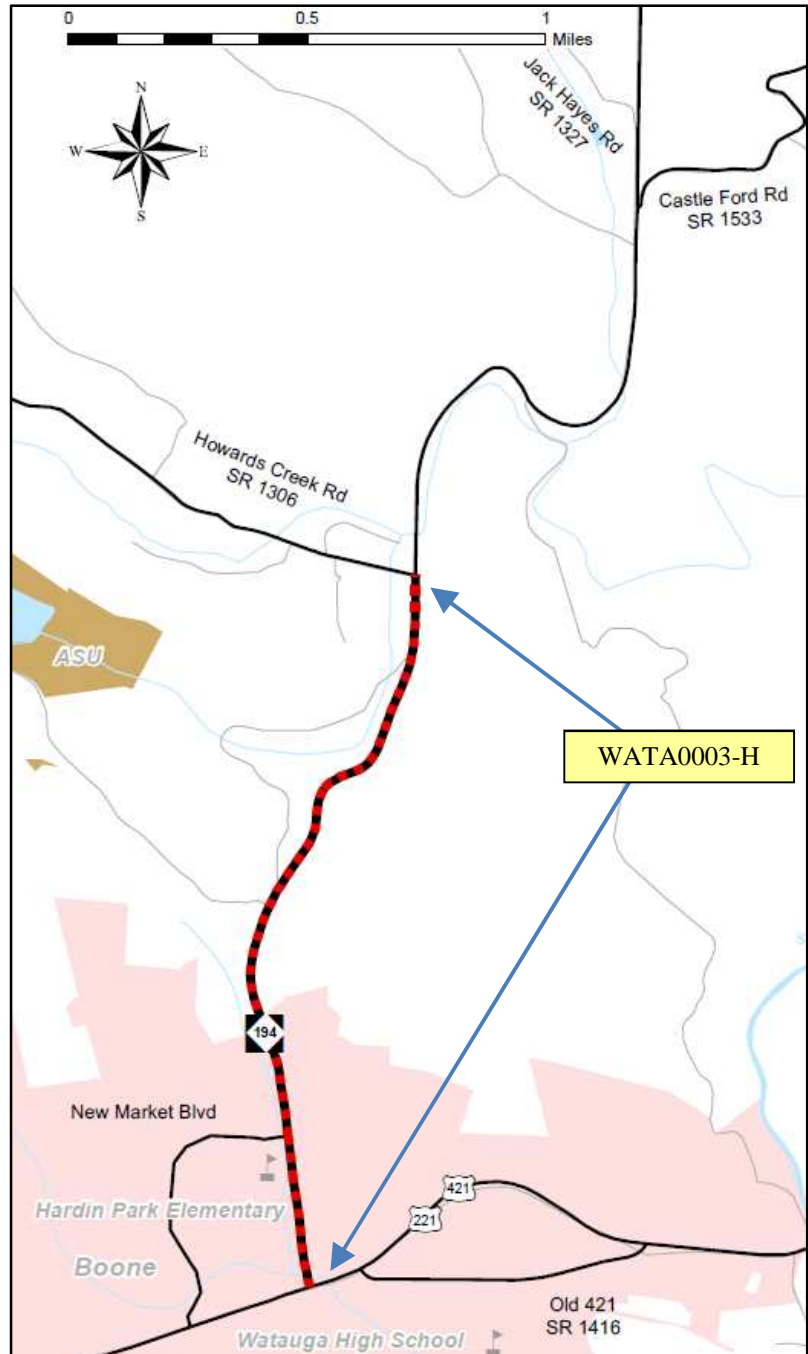
#### Justification of Need

Within the Boone municipal limits, NC 194 is a two lane facility with a speed limit of 35 miles per hour (mph), lane widths of 10 feet, an Average Annual Daily Traffic (AADT) volume of 10,500 vehicles per day (vpd) and a capacity (LOS D) of 9,400 vpd.

Outside the Boone municipal limits, NC 194 is a two lane facility with a speed limit of 55 mph, lane widths of 9 feet, an AADT volume of 8,600 vpd and a capacity (LOS D) of 12,200 vpd. NC 194 is the primary route between Boone and the northern portions of the county. Approximately 12,800 vpd are projected in 2040.

#### Community Vision and Problem History

The 2010 Citizens Plan for Watauga identified the widening of NC 194 as one of five priority projects. The 2002 Thoroughfare Plan for Watauga County projected NC 194 from the Boone Planning Area Boundary (PAB) to Jack Hayes Road (SR 1327) to be over capacity by 2030. The 1991 Boone Thoroughfare Plan identified NC 194 as being





“slightly over capacity” in 1990 and having a “serious capacity problem,” defined as a volume to capacity ratio over 1.25 in the forecasted year of 2020.

## **CTP Project Proposal**

### **Project Description and Overview**

The CTP proposes improving this section of NC 194 to a boulevard. This would be accomplished by widening to four lanes and adding a median. Bicycle and pedestrian accommodations are also recommended along the proposed project.

Additionally, from 2006 through 2008 the intersection of NC 194 and US 221-421 experienced 38 crashes with an average severity of 2.9, compared to the state’s average of 4.73 for the same period.

### **Natural & Human Environmental Context**

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of the following: natural heritage sites, natural heritage element occurrences, trout streams, Hardin Park Elementary School, water distribution pipes and sewer systems pipes.

### **Relationship to Land Use**

Current land use varies from medium density development at the NC 194 and US 221-421 intersection to low density rural development north of the Boone town limits. The development at the corner of NC 194 and US 221-321 is anchored by a Lowe’s Foods, and it includes restaurants, a cinema, a bank, and other strip development. Further north at the intersection of NC 194 and New Market Boulevard is Hardin Park Elementary School which has driveway access to both roads. At Pioneer Drive is the Watauga County School central office. At the northern end of the project, the intersection of NC 194 and Howards Creek Road (SR 1306), is an NCDOT depot and district office. Just off NC 194 on Howards Creek Road (SR 1306), is Mountain Pathways School. The outstanding balance of land with access to NC 194 is primarily residential in nature. The 2010 Citizens Plan for Watauga<sup>11</sup> identified the “Key Community Services” along NC 194 as Hardin Park Elementary School and Mountain Pathways School. The plan proposes mixed use development along NC 194 from the Boone Extraterritorial Jurisdiction (ETJ) to Howards Creek Road (SR 1306). According to the Boone 2030 Land Use Plan (2009)<sup>12</sup>, future land use on the south end of NC 194 is categorized as “Urban Residential” and “Mixed-Use” development.

### **Linkages to Other Plans and Proposed Project History**

NC 194 is a major collector on the Federal Functional Classification System, and is on the regional tier of the North Carolina Multimodal Investment Network<sup>13</sup> (NCMIN).

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<sup>11</sup> The 2010 Citizens Plan for Watauga can be viewed at:

[http://www.wataugacounty.org/main/App\\_Pages/Dept/Planning/citizensplan.aspx](http://www.wataugacounty.org/main/App_Pages/Dept/Planning/citizensplan.aspx)

<sup>12</sup> The 2009 Boone 2030 Land Use Plan can be viewed at:

<http://www.thelawrencegroup.com/boone2030/finalDocs/CoverTOC.pdf>

<sup>13</sup> For more information on NCMIN, visit: <http://www.ncdot.gov/performance/reform/NCMINmaps/>

Regional tier facilities can serve statewide transportation, but they usually connect major population centers and provide a more localized function including land access.

The 2010 Citizens Plan for Watauga identified the widening of NC 194 as one of five priority projects. The 2002 Watauga County Thoroughfare Plan recommended widening NC 194 to a four lane divided cross section from US 221-421 to Howards Creek Road (SR 1306) and widening to a three lane cross section north of Howards Creek Road (SR 1306) to Jack Hayes Road (SR 1327). For this CTP, the section of the project from Howards Creek Road (SR 1306) to Jack Hayes Road (SR 1327) has been replaced with a new project (WATA0015-H) to widen to 12 foot lanes and 4 foot paved shoulders from Howards Creek Road (SR 1306) to Castle Ford Road (SR 1333).

### **Multi-modal Considerations**

AppalCART operates a fixed route bus service along NC 194 from US 221-421 to New Market Boulevard. Pedestrian facilities are recommended from US 221-421 to New Market Boulevard to improve access to Hardin Park Elementary School. NC 194 does not currently accommodate bicycles. Bicycle accommodations are recommended from US 221-421 to Ashe County to improve access to Hardin Park Elementary School, Green Valley Elementary School, and the Todd Community.

### **Public/ Stakeholder Involvement**

Results from the Goals & Objectives (G&O) survey conducted for this CTP revealed that NC 194 was the fifth most identified “often used facility for the county”.

### **US 221, TIP No. R-2915**

US 221 from US 421 in Deep Gap to NC 88 in Ashe County is projected to be over or near capacity in the Ashe County section. Please see the 2010 Ashe County CTP for more details. The 2012 – 2018 Transportation Improvement Program (TIP) includes project R-2915 that is intended to address this deficiency.

The TIP project includes widening US 221 to a four lane boulevard with bicycle accommodations. This project is currently scheduled for construction in 2015 according to the 2012-2018 TIP. For additional information about this project, including the Purpose and Need, contact NCDOT's Project Development and Environmental Analysis Branch (PDEA) or visit the project website.

### **US 321, TIP No. R-5016**

US 321 from Avery County to US 421 in Vilas does not meet the future mobility needs in western North Carolina and into Tennessee. This facility is intended to provide mobility in Watauga County and, ultimately, connectivity between Johnson City, TN and Gastonia, NC. Additionally, US 321 from US 421 in Vilas to Rominger Road (SR 1121) is projected to be near capacity by 2040.

US 321 is designated as an expressway on NCDOT's the Strategic Highway Corridor (SHC) Vision Plan adopted on September 2, 2004. US 321 is a two lane facility with a speed limit of 55 miles per hour (mph), and lane widths of 11 feet, except for the Cove Creek community where it has a 35 mph speed limit. The 2010 Annual Average Daily Traffic (AADT) volume ranges from 2,900 to 6,700 vpd, and has a capacity of 9,100 vpd (LOS D). The estimated 2040 traffic volume ranges from 4,200 to 7,700 vpd. Additionally, from 2006 through 2008 the intersection of US 321 and US 421 experienced 21 crashes with an average severity of 4.29, compared to the state's average of 4.73 for the same period.

US 321 from Avery County to US 421 in Vilas is recommended to be upgraded to an expressway with bicycle accommodations. As development occurs along this corridor every effort should be made to limit access in order to maintain mobility. R-5016 is currently unfunded in the 2012 – 2018 Transportation Improvement Program (TIP) and is scheduled for reprioritization by NCDOT's Strategic Prioritization Office of Transportation (SPOT) – refer to Appendix A for contact information.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of trout streams, wetlands, and natural heritage areas. Additionally, NCDOT's Structures Management Unit has identified bridge #29 over Cove Creek as functionally obsolete, which is scheduled for replacement under TIP project B-4668.

The 2002 Watauga County Thoroughfare Plan recommended widening US 321 from Vilas to Avery County to two 12 foot lanes.

### **US 321-221, Local ID: WATA0004-H**

US 321-221 from the proposed US 421 BYP south of Boone to US 221 north of Blowing Rock does not meet the future mobility needs in western North Carolina and into Tennessee. This facility is intended to provide mobility in Watauga County and, ultimately, connectivity between Johnson City, TN and Gastonia, NC. Additionally, a portion of this facility between the proposed US 421 BYP and Niley Cook Road (SR 1532) will be near capacity by 2040.

US 321-221 is designated as an expressway on the Strategic Highway Corridor (SHC) Vision Plan adopted by NCDOT on September 2, 2004 and last updated on July 10, 2008. US 321-221 between the proposed US 421 BYP south of Boone to US 221 north of Blowing Rock is currently a four lane undivided facility with 11 foot lanes. The 2010 Annual Average Daily Traffic (AADT) volume is 18,100 vpd, and capacity is 26,200 vpd (LOS D). The estimated 2040 volume is 22,800 vpd. Additionally, from 2006 through 2008 the intersection of US 321-221 and US 321 BUS (Main Street) experienced 10 crashes with an average severity of 1.00, compared to the state's average of 4.73 for the same period. The intersection of US 321-221 and Payne Branch Road (SR 1541) experienced 5 crashes and had a severity index of 19.12, above the state's average of 8.4 for an injury crash.

This section of US 321-221 is recommended to be upgraded to an expressway. As development occurs along this corridor every effort should be made to limit access in order to maintain mobility and connectivity.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of water supply watershed, water treatment plants, sewer system discharge points, sewer treatment plants, sewer systems water distribution pipes, trout streams, lakes, wetlands, land trust priority areas, land trust conservation properties, lands managed for conservation, and conservation tax credit properties.

The 2002 Watauga County Thoroughfare Plan did not previously identify US 321-221 between Boone city limits and Blowing Rock as needing improvements.

### **US 321, TIP No. R-2237**

US 321 from US 221 north of Blowing Rock to Caldwell County does not meet the future mobility needs in western North Carolina and into Tennessee. This facility is intended to provide mobility in Watauga County and, ultimately, connectivity between Johnson City, TN and Gastonia, NC. The 2012 – 2018 TIP includes project R-2237 that is intended to address this problem.

US 321 is designated as an expressway on NCDOT's Strategic Highway Corridor (SHC) Vision Plan adopted by NCDOT on September 2, 2004 and last updated on July 10, 2008. TIP project R-2237 includes widening US 321 to multi-lanes. This project is currently under construction and is scheduled to be complete in 2015. For additional



information about this project, including the Purpose and Need, contact NCDOT's Project Development and Environmental Analysis Branch (PDEA).

### **US 421 Bypass, TIP No. U-2703**

Currently, US 421, US 321, and NC 105 in Boone experience congestion. This is a result of the mix of through traffic trying to connect between NC 105 to the southwest and US 421 to the east and heavy traffic to destinations downtown (King Street) and along US 321. TIP project U-2703, the proposed US 421 Bypass, is intended to address this deficiency.

The proposed project includes constructing a bypass south of Boone. The proposed bypass is recommended as a multi-lane, divided facility. The Strategic Highway Corridor (SHC) Vision Plan adopted by NCDOT on September 2, 2004 and last updated on July 10, 2008 identifies the proposed bypass as a freeway. The Boone 2030 Land Use Plan<sup>14</sup> (2009), identifies the proposed bypass as a "two-lane parkway with a design speed of 40 mph, with recreational parking (such as pull-offs for views), and bike lanes/shoulders."

NCDOT issued a report in August 2008 documenting a study which followed the National Environmental Policy Act (NEPA)/ Section 404 of the Clean Water Act Interagency Merger Process. This study, "Pre-TIP Study Report US 421 Improvements TIP Project U-2703<sup>15</sup>," reached concurrence on the first two points (Purpose and Need, and Alternatives to be Carried Forward for Detailed Study). The report identifies these four primary purposes for the project:

- "Reduce the mixed use of US 421 (King Street) through downtown Boone by local and through traffic
- Improve system linkage for US 421 and other major facilities
- Improve traffic flow along US 421 and other major facilities
- Improve safety along US 421"

For additional information about this project, including the Purpose and Need, contact NCDOT's Project Development and Environmental Analysis Branch (PDEA) or visit NCDOT's project website for the study.

During the development of this CTP, several additional alternatives were evaluated at the request of the locals. Refer to Appendix J for detailed information on the additional alternatives evaluated. The location selected for recommendation in the CTP combines alternatives 3 and 4 from the Pre-TIP study, and then modifies them slightly based on currently available GIS data.

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<sup>14</sup> The 2009 Boone 2030 Land Use Plan can be viewed at:

<http://www.thelawrencegroup.com/boone2030/finalDocs/CoverTOC.pdf>

<sup>15</sup> The study report can be viewed at: <http://www.ncdot.gov/doh/preconstruct/tpb/planning/DanielBooneStudy.html>.

### **US 421, TIP No. U-4020**

US 421 (King Street) from NC 194 to US 321 (Hardin Street) is currently over capacity. The 2012 – 2018 Transportation Improvement Program (TIP) included project U-4020 that is intended to address this deficiency.

The TIP project includes widening this section of US 421 (King Street) to a four to six lane boulevard with bicycle and pedestrian accommodations. This project was under construction when the CTP was started, and was completed prior to the adoption of the CTP. For additional information about this project, including the Purpose and Need, contact NCDOT's Project Development and Environmental Analysis Branch (PDEA) or visit the project website<sup>16</sup>.

### **US 421, Local ID: WATA0005-H**

US 421 from US 321 in Vilas to Tater Hill Road (SR 1306) is projected to be near or over capacity by 2040. Improvements are needed to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

US 421 has two 12 foot lanes and a speed limit of 55 mph from US 321 in Vilas to Tater Hill Road (SR 1306). Portions of the facility also have a climbing lane. The 2010 AADT ranges from 7,400 to 10,500 vpd, compared to a LOS D capacity of 12,100 to 18,200 vpd. The estimated 2040 traffic volume is 12,900 to 15,300 vpd. Additionally, from 2006 through 2008 the intersection of US 321 and US 421 experienced 21 crashes with an average severity of 4.29, compared to the state's average of 4.73 for the same period. The intersection of US 421 and Tater Hill Road (SR 1306) experienced 1 crash and had a severity index above the state's average 8.4 for an injury crash.

The CTP proposes widening US 421 to a four lane boulevard with bicycle accommodations from US 321 in Vilas to Tennessee. The CTP Committee also recommended and intends to pursue the inclusion of US 421 from US 321 in Vilas to Tennessee as a boulevard on NCDOT's SHC Vision Plan.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of trout streams and wetlands.

The 2002 Thoroughfare Plan for Watauga County identified US 421 as over capacity and recommended widening US 421 to four lanes from the Boone Planning Area Boundary (PAB) to Tennessee. This improvement (R-2615) has been in the TIP as an unfunded intrastate project since the 1990-1996 TIP. In the 2007-2013 TIP, the project limits for R-2615 changed to no longer include this portion of US 421.

### **US 421, Local ID: WATA0006-H**

US 421 from the end of the existing divided section east of Old US 421 (SR 1416) to NC 194 is projected to be over capacity by 2040. Improvements are needed to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

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<sup>16</sup> The U-4020 project website can be viewed at: <http://www.ncdot.gov/projects/US421Widening/>.

US 421 from the end of the existing divided section east of Old US 421 (SR 1416) to NC 194 is a five lane undivided facility with four 12 foot through lanes, a speed limit of 45 mph, and a center turn lane. The 2010 AADT volume ranges from 24,700 to 25,700 vpd, compared to a LOS D capacity of 27,600 vpd. The estimated range of 2040 traffic volume is 44,400 to 51,300 vpd. Additionally, from 2006 through 2008 the intersection of NC 194 and US 221-421 experienced 38 crashes with an average severity of 2.9, compared to the state's average of 4.73 for the same period.

The CTP proposes improving US 421 to a boulevard from NC 194 to Old 421 (SR 1416) and to an expressway from Old 421 (SR 1416) to the end of the existing divided section by removing the center turn lane and providing a median.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of sewer system pipes, sewer system pumps, water distribution pipes, trout streams, wetlands, and land trust priority areas. The 1991 Boone Thoroughfare Plan recommended improving US 421 from NC 194 to the proposed US 421 BYP from 2 to 5 lanes. In that plan the proposed US 421 BYP tied in at approximately Bamboo Road (SR 1514). From the proposed US 421 BYP to the Planning Area Boundary (PAB), the 1991 Boone Thoroughfare Plan proposed widening to a 4 lane divided cross section.

#### **NC 105, Local ID: WATA0007-H**

NC 105 from NC 105 BYP (SR 1107) to US 221-421 is currently over capacity. Improvements are needed to relieve existing congestion and to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

NC 105 from NC 105 BYP (SR 1107) to US 221-421 is a five lane facility with four 12 foot thru lanes and a speed limit of 35 mph. This stretch of NC 105 has a center turn lane except for the portion between US 321 and Dogwood Road. The 2010 AADT volume ranges from 24,700 to 28,500 vpd, compared to a LOS D capacity of 22,000 to 26,600 vpd. The estimated range of 2040 traffic volume is 29,600 to 50,200 vpd. Additionally, from 2006 through 2008, fourteen intersections along this corridor were identified as having 10 or more crashes or had a severity index above the state's average of 8.4 for an injury crash. Refer to Appendix F for more detailed information on these locations.

The CTP proposes improving this section of NC 105 to a boulevard by removing the center turn lane, providing a median, and bicycle accommodations.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of water distribution pipes, sewer system pipes, trout streams, and land trust priority areas. The 1991 Boone Thoroughfare Plan recommended improving NC 105 to a 5 lane cross section. This improvement has been completed.

**NC 105, TIP No. R-2566**

NC 105 from NC 105 BYP (SR 1107) to Linville in Avery County is projected to be over capacity by 2040. TIP project R-2566 is intended to address this deficiency. The TIP project includes widening NC 105 to a four lane boulevard with bicycle accommodations. For additional information about this project, including the Purpose and Need, contact NCDOT's Project Development and Environmental Analysis Branch (PDEA) or visit the project website<sup>17</sup>.

**Bamboo Road (SR 1514), Local ID: WATA0008-H**

Bamboo Road (SR 1514) from Wilson Ridge Road (SR 1523) to US 221-421 is currently over capacity. Improvements are needed to relieve existing congestion and to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

Bamboo Road (SR 1514) from Wilson Ridge Road (SR 1523) to US 221-421 has two 10 foot lanes and a speed limit of 35 mph. The 2010 AADT along this facility is 9,000 vpd compared to a LOS D capacity of 8,800 vpd. The estimated 2040 traffic volume is 12,900 vpd. Additionally, from 2006 through 2008, three intersections along this corridor were identified as having 10 or more crashes or had a severity index above the state's average of 8.4 for an injury crash. Those intersections included: US 221-421, Brookhollow Road (SR 1614), and Wilson Ridge Road (SR 1523). Refer to Appendix F for more detailed information on these locations.

In 2009, NCDOT Division 11 contracted Rummel, Klepper & Kahl, LLP (RK&K) to study the possibility of corridor improvements along Wilson Ridge Road (SR 1523), Deerfield Road (SR 1522), and Bamboo Road (SR 1514). Several alignment and intersection alternatives were studied, but no final recommendation was made.

The CTP proposes widening Bamboo Road (SR 1514) to 12 foot lanes with 4 foot paved shoulders to accommodate bicycles. Additionally, intersection improvements are recommended at Wilson Ridge Road (SR 1523). Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of sewer system pipes, sewer system pumps, water distribution pipes, trout streams, and land trust priority areas.

The 1991 Boone Thoroughfare Plan did not recommend any improvements to Bamboo Road (SR 1514).

**Deerfield Road (SR 1522), Local ID: WATA0009-H**

Deerfield Road (SR 1522) from State Farm Road to Bamboo Road (SR 1524) is currently over capacity. Improvements are needed to relieve existing congestion and to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

Deerfield Road (SR 1522) from State Farm Road to Bamboo Road (SR 1524) has two 10 foot lanes and a speed limit of 35 mph. The 2010 AADT along this facility is 13,300 vpd compared to a LOS D capacity of 8,800 vpd. The estimated 2040 traffic volume is

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<sup>17</sup> The R-2566 project website can be viewed at: <http://www.ncdot.gov/projects/nc105widening/>.

16,200 vpd. Additionally, from 2006 through 2008 the intersections of Deerfield Road (SR 1522) with State Farm Road and Wilson Ridge Road (SR 1523) experienced 15 and 12 crashes, respectively, with average severities of 2.93 and 3.96, compared to the state's 4.73 average for the same period.

In 2009, NCDOT Division 11 contracted Rummel, Klepper & Kahl, LLP (RK&K) to study the possibility of corridor improvements along Wilson Ridge Road (SR 1523), Deerfield Road (SR 1522), and Bamboo Road (SR 1514). Several alignment and intersection alternatives were studied, but no final recommendation was made.

The CTP proposes widening Deerfield Road (SR 1522) to 12 foot lanes with 4 foot paved shoulders to accommodate bicycles from State Farm Road to Bamboo Road (SR 1524). Additionally, intersection improvements are recommended at Wilson Ridge Road (SR 1523).

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of sewer system pump, sewer system pipes, water distribution pipes, trout streams, water supply watershed, wetlands, and land trust priority areas.

The 1991 Boone Thoroughfare Plan recommended improving Deerfield Road (SR 1522) from State Farm Road to Bamboo Road (SR 1524) to a 4 lane, undivided cross section.

#### **Poplar Grove Road Bypass, Local ID: WATA0010-H**

At the request of Appalachian State University (ASU), Division 11 has begun an investigation into a new location facility connecting Homespun Hills Road (SR 1148) and Bodenheimer Drive west of ASU. This would require a minimum of 200 feet on new location to connect the two facilities creating a route parallel to Poplar Grove Road (SR 1102). Making this connection will open up a new access point between ASU and NC 105.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of lakes and wetlands. Land use in the vicinity is either residential along Homespun Hills Road (SR 1148) or institutional (ASU) along Bodenheimer Drive.

For more information about this project, please contact the NCDOT's Highway Division 11 office.

#### **Presnell School Road (SR 1125) Extension, Local ID: WATA0011-H**

Beech Mountain is the highest town in the eastern United States with an elevation of 5,506 feet. The only paved access point to Beech Mountain from the surrounding road network is via NC 184. In recent years there has been growing concern about wild fires in the area. In the event that NC 184 is closed because of wild fires or other natural disasters, an alternative access route between Beech Mountain and the surrounding network is desired for emergency purposes.



The CTP proposes extending Presnell School Road (SR 1125) to Cherry Gap Road in Beech Mountain. This new location facility would be 2 lanes. The proposed new location would attempt to utilize an existing local road bed. There is an unpaved facility (Buckeye Creek Road) connecting to Beech Mountain through Avery County. Buckeye Creek Road is a locally maintained facility in Watauga County and is SR 1312 in Avery County. Presnell School Road (SR 1125) was chosen as the preferred alternative because of the added benefits of a third connection.

Based on a planning level environmental assessment using available GIS data, the proposed project is contained in a land trust priority area.

According to the 2010 Citizens Plan for Watauga there is also a protected ridge line in the area including Egg Knob. The 2002 Watauga County Thoroughfare Plan did not previously identify any similar improvements.

#### **Seven Devils Road (SR 1151), Local ID: WATA0012-H**

Seven Devils is located in southwest Watauga County and has an elevation of 3,944 feet. The only access point to Seven Devils from the surrounding network is via Seven Devils Road (SR 1151). In recent years there has been growing concern about wild fires in the area. In the event that Seven Devils Road (SR 1151) is closed because of wild fires or other natural disasters, an alternative access route between Seven Devils and the surrounding network is desired for emergency purposes

Two new location facilities were evaluated during the course of the CTP. However neither proved adequately feasible to include in the plan. The first was a connection from western Seven Devils to Arnett Road (SR 1338) in Avery County. This facility has already been built but was not allowed to open due to a court injunction. This alternative was rejected for the CTP because of legal concerns over the court injunction. The second alternative was to connect eastern Seven Devils to Justus Road (SR 1137). This alternative would involve Rhobo Lane a private neighborhood road. This alternative was rejected because Rhobo Lane is not up to secondary road standards, and therefore not eligible for the Secondary Road Program. There was also a concern about the single property that would have to be purchased within Seven Devils to complete the facility. Further study is needed to select a location for the facility. The new facility is recommended to be constructed as a 2 lane minor thoroughfare.

Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline existing Seven Devils Road (SR 1151) of land trust priority areas, water distribution popes, and a water distribution treatment plant. According to the 2010 Citizens Plan for Watauga there is also the Foscoe-Grandfather Mountain Community Council Area in the vicinity.

The 2002 Watauga County Thoroughfare Plan did not previously identify any similar improvements.

**State Farm Road, Local ID: WATA0013-H**

State Farm Road from NC 105 to Deerfield Road (SR 1522) is projected to be over capacity by 2040. Improvements are needed to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

State Farm Road from NC 105 to Deerfield Road (SR 1522) has two 12 foot lanes and a speed limit of 35 mph. The 2010 AADT volume ranges from 10,600 to 8,900 vpd, compared to a LOS D capacity of 9,400 vpd. The estimated range of 2040 traffic volume is 11,400 to 14,400 vpd. Additionally, from 2006 through 2008, three intersections along this corridor were identified as having 10 or more crashes or had a severity index above the state's average of 8.4 for an injury crash. Those intersections included: NC 105, Deerfield Road (SR 1523) and Boone Heights Drive. Refer to Appendix F for more detailed information on these locations.

The CTP proposes improving State Farm Road to a three lane, curb and gutter, cross section with wide outside lanes to accommodate bicycles. Based on a planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of sewer system pipes, water distribution pipes, trout streams, water supply watershed, lands managed for conservation, and land trust priority areas.

The 1991 Boone Thoroughfare Plan recommended improving State Farm Road from Deerfield Road (SR 1522) US 221 to a 5 lane cross section.

**Wilson Ridge Road (SR 1523), Local ID: WATA0014-H**

Wilson Ridge Road (SR 1523) from Deerfield Road (SR 1522) to Bamboo Road (SR 1514) is projected to be near capacity by 2040. Improvements are needed to accommodate projected traffic volumes in order to maintain a LOS D on the facility.

Wilson Ridge Road (SR 1523) from Deerfield Road (SR 1522) to Bamboo Road (SR 1514) has two 10 foot lanes and a speed limit of 35 mph. The 2010 AADT along this facility is 7,700 vpd compared to a LOS D capacity of 8,800 vpd. The estimated 2040 traffic volume is 8,300 vpd. Additionally, from 2006 through 2008, two intersections along this corridor were identified as having 10 or more crashes or had a severity index above the state's average of 8.4 for an injury crash. Those intersections were with Deerfield Road (SR 1523) and Hickory Lane (SR 1626). Refer to Appendix F for more detailed information on these locations.

In 2009, NCDOT Division 11 contracted Rummel, Klepper & Kahl, LLP (RK&K) to study the possibility of corridor improvements along Wilson Ridge Road (SR 1523), Deerfield Road (SR 1522), and Bamboo Road (SR 1514). Several alignment and intersection alternatives were studied, but no final recommendation was made.

The CTP proposes widening Wilson Ridge Road (SR 1523) to 12 foot lanes with 4 foot paved shoulders to accommodate bicycles. Additionally, intersection improvements are recommended at Deerfield Road (SR 1522) and Bamboo Road (SR 1514). Based on a

planning level environmental assessment using available GIS data, the proposed project is in the vicinity (300ft from centerline) of water distribution pipes, wetlands, trout streams, and water supply watershed.

The 1991 Boone Thoroughfare Plan recommended improving Wilson Ridge Road (SR 1523) from Deerfield Road (SR 1522) to Bamboo Road (SR 1514) to 12 foot lanes.

### **MINOR WIDENING IMPROVEMENTS**

The following facilities within Watauga County do not have capacity issues, but were identified as candidates for upgrading to NCDOT design standards. Implementation of the proposed projects should be coordinated through NCDOT's Highway Division 11 office.

- **WATA0015-H:** NC 194 from Howards Creek Road (SR 1306) to Castle Ford Road (SR 1333) – Widen to 12 foot lanes with 4 foot paved shoulders to accommodate bicycles.
- **WATA0016-H:** Bamboo Road (SR 1524) from Deerfield Road (SR 1523) to Friendship Church Road (SR 1525) – Widen to 12 foot lanes with 4 foot paved shoulders to accommodate bicycles.
- **WATA0017-H:** Broadstone Road (SR 1112) from NC 194 to NC 105 – Widen to 12 foot lanes with 4 foot paved shoulders to accommodate bicycles.
- **WATA0018-H:** Greenway Road from Winklers Creek Road (SR 1549) to Leola Drive – Widen to 12 foot lanes.
- **WATA0019-H:** Meadowview Drive from US 221-321 to US 221-321 – Widen to 12 foot lanes.
- **WATA0020-H:** Leola Drive from Greenway Road to US 321 – Widen to 12 foot lanes.
- **WATA0021-H:** Poplar Grove Road (SR 1102) from Rivers Street (SR 1163) to NC 105 – Widen to 12 foot lanes.
- **WATA0022-H:** Rivers Street (SR 1163) from Poplar Grove Road (SR 1102) to US 321 (Hardin Street) – Widen to 12 foot lanes.
- **WATA0023-H:** Winklers Creek Road (SR 1547) from Greenway Road to Wilson Drive – Widen to 12 foot lanes.

### **PUBLIC TRANSPORTATION AND RAIL**

The transit element of the Watauga County CTP is shown in Figure 1, Sheets 3 and 3A. AppalCART currently operates fixed bus routes in the county. Out of county services are provided by the Mountaineer Express. During the development of the CTP, one new route was identified as a strategic new expansion for AppalCART. This is in addition to improving and expanding all current routes to keep pace with demand. Current strategies being explored by AppalCART include increasing the number of buses per route, providing reverse route services, and expanding operational hours to include more weekends and evenings. Please refer to the 2011 AppalCART Community Transportation Service Plan<sup>18</sup> (CTSP) for more details.

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<sup>18</sup> The 2011 AppalCART CTSP can be viewed at: <http://www.ncdot.gov/nctransit/download/CTSP/AppalCART.pdf>.

- **WATA0001-T:** New bus route between Boone and Blowing Rock utilizing US 321. Additionally, seven locations were identified for potential park and ride lots. They are proposed at the following intersections:

- **WATA0002-T:** US 221 and US 321 in Blowing Rock
- **WATA0003-T:** US 221-421 and Brookshire Road (SR 1328)
- **WATA0004-T:** US 321 and US 421 in Vilas
- **WATA0005-T:** US 321-421 and NC 105 BYP (SR 1107)
- **WATA0006-T:** US 421 and Old US 421 in Rutherford
- **WATA0007-T:** US 421 and US 221 in Deep Gap
- **WATA0008-T:** NC 105 and Shulls Mill Road (SR 1557) in Foscoe

Out of county services provided by the Mountaineer Express connect Boone with the regional hubs of Charlotte, and Greensboro. Both the East/West and the North/South routes are projected to need additional service capacity by 2040.

- **WATA0009-T:** From Boone to Lenoir, Hickory, Lincolnton, Gastonia, and Charlotte
- **WATA0010-T:** From Boone to North Wilkesboro, Hamptonville, Winston-Salem, and Greensboro

## **BICYCLE**

The bicycle element of the Watauga County CTP is shown in Figure 1, Sheets 4 and 4A. In accordance with American Association of State Highway and Transportation Officials (AASHTO), roadways identified as bicycle routes should incorporate the following standards as roadway improvements are made and funding is available:

- Curb and gutter sections require at minimum 5 foot bike lanes or 14 foot outside lanes.
- Shoulder sections require a minimum 4 foot paved shoulder.
- All bridges along roadways where bike facilities are recommended shall be equipped with 54 inch railings.

### **Improvement to Existing Facilities:**

- **WATA0001-B:** US 221 from Caldwell County to Blowing Rock municipal limits
- **WATA0002-B:** US 221 from US 321 Bus to US 321
- **R-2915:** US 221 from Ashe County to US 421
- **R-2237:** US 321 from Caldwell County to US 221
- **R-5016:** US 321 from Avery County to US 421 in Vilas
- **WATA0001-H:** US 321 from US 421 to Deerfield Road (SR 1522)
- **R-2615:** US 321-421 from Vilas to NC 105 BYP (SR 1107)
- **WATA0003-B:** US 321-421 from NC 105 BYP (SR 1107) to Junaluska Road (SR 1102)
- **WATA0004-B:** US 321 BUS from US 321 to US 221
- **WATA0005-H:** US 421 from Tennessee to US 321 in Vilas

- **R-2566:** NC 105 from Avery County to NC 105 BYP
- **WATA0007-H:** NC 105 from NC 105 BYP (SR 1107) to US 221-421
- **WATA0002-H:** NC 105 BYP (SR 1107) from US 321-421 to NC 105
- **WATA0005-B:** NC 184 from Beech Mountain to Avery County
- **WATA0003-H:** NC 194 from US 221-421 to Howards Creek Road (SR 1306)
- **WATA0015-H:** NC 194 from Howards Creek Road (SR 1306) to Castle Ford Road (SR 1333)
- **WATA0006-B:** NC 194 from Castle Ford Road (SR 1333) to Ashe County
- **WATA0007-B:** NC 194 from US 321-421 to Avery County
- **WATA0008-H:** Bamboo Road (SR 1514) from US 221-421 to Wilson Ridge Road (SR 1323)
- **WATA0008-B:** Bamboo Road (SR 1514) from Wilson Ridge Road (SR 1323) to Deerfield Road (SR 1522)
- **WATA0017-H:** Broadstone Road (SR 1112) from NC 194 to NC 105
- **WATA0009-B:** Deerfield Road (SR 1522) from US 221-321(Blowing Rock Road) to State Farm Road.
- **WATA0009-H:** Deerfield Road (SR 1522) from State Farm Road to Bamboo Road (SR 1524)
- **WATA0010-B:** Deerfield Road (SR 1523) from to Bamboo Road (SR 1514) to Bamboo Road (SR 1524).
- **WATA0011-B:** Faculty Street, from NC 105 to Holmes Drive
- **WATA0012-B:** Hill Street from Holmes Drive to Rivers Street (SR 1163)
- **WATA0013-B:** Holmes Drive from Faculty Street to Hill Street
- **WATA0014-B:** New Market Boulevard from NC 194 to US 221-421
- **WATA0021-H:** Poplar Grove Road (SR 1102) from NC 105 to Rivers Street (SR 1163)
- **WATA0022-H:** Rivers Street (SR 1163) from Poplar Grove Road (SR 1102) to US 321
- **WATA0013-H:** State Farm Road from NC 105 to Deerfield Road (SR 1522)
- **WATA0015-B:** Water Street from Poplar Grove Road (SR 1102) at Rivers Street (SR 1163) to US 321-421 at Junaluska Road (SR 1102)
- **WATA0014-H:** Wilson Ridge Road (SR 1523) from Deerfield Road (SR 1522) to Bamboo Road (SR 1514)

#### **Multi-Use Path Facilities:**

Multi-use paths are facilities physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way. Multi-use paths include bicycle paths, rail-trails, or other facilities built for bicycle and pedestrian traffic. Multi-use paths from the Boone pedestrian plan, Walk Boone 2011, were incorporated into the CTP. Additionally, the following multi-use path project was identified to serve the needs of Watauga County.



- **Middle Fork Greenway, Local ID: WATA0001-M**

The envisioned Middle Fork Greenway would run between Boone and Blowing Rock, a distance of about 6.5 miles. The greenway would connect the existing Boone Greenway with Shoppes on the Parkway at the intersection of US 221 and US 321 in Blowing Rock. The Middle Fork River is part of the headwaters of the New River and as such is important to watershed, trout streams, and wetlands found in the vicinity. Watauga County Pathways<sup>19</sup> is a non-profit organization working towards the preservation and eventual construction of this corridor.

## **PEDESTRIAN**

Boone has an existing pedestrian plan entitled “Walk Boone 2011” that was utilized in the development of the pedestrian element of the CTP. The Walk Boone 2011 plan was cooperatively developed by Boone and NCDOT’s Division of Bicycle and Pedestrian Transportation. The Town of Beech Mountain Streetscape Plan was developed in 2010. The information from these pedestrian plans was incorporated into the CTP. Additionally, the following projects were recommended during the development of the CTP.

### **New Facilities:**

- **R-2237 (Blowing Rock):** US 321 from US 221 to Goforth Road (SR 1536)
- **WATA0001-P (Blowing Rock):** Chestnut Drive from US 321 BUS (Main Street) to Morris Street
- **WATA0002-P (Blowing Rock):** Chestnut Street from Wallingford Road to US 321 BUS (Main Street)
- **WATA0003-P (Blowing Rock):** Morris Street from Chestnut Drive to Morris Street
- **WATA0004-P (Blowing Rock):** Ransom Street from Sunset Drive to US 321
- **WATA0005-P (Blowing Rock):** Wallingford Road from Laurel Lane to Globe Road (SR 1537)
- **WATA0006-P (Boone):** US 321-421 from NC 105 BYP (SR 1107) to Boone municipal limits
- **WATA0002-H (Boone):** NC 105 BYP (SR 1107) from NC 105 to US 321-421
- **WATA0021-H (Boone):** Poplar Grove Road (SR 1102) from NC 105 to Water Street

### **Improvement to Existing Facilities:**

- **WATA0007-P (Blowing Rock):** US 221 from US 321 BUS to Chetola Lake Drive

### **New Off Road Facilities:**

- **WATA0008-P (Blowing Rock):** from Clark Street at Old Stable Lane to US 221 at Cone Road (SR 1571) opposite the Bass Lake parking lot

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<sup>19</sup> For more information on Watauga County Pathways, visit: <http://highcountrypathways.org/>.

# APPENDICES

## Appendix A Resources and Contacts

### ***North Carolina Department of Transportation***

#### *Customer Service Office*

Contact information for other units within the NCDOT that are not listed in this appendix is available by calling the Customer Service Office or by visiting the NCDOT directory:

1-877-DOT-4YOU (1-877-368-4968)

<https://apps.dot.state.nc.us/dot/directory/authenticated/ToC.aspx>

#### *Secretary of Transportation*

1501 Mail Service Center Raleigh, NC 27699-1501 (919) 707-2800

<http://www.ncdot.org/about/leadership/secretary.html>

#### *Board of Transportation*

1501 Mail Service Center Raleigh, NC 27699-1501 (919) 707-2820

<http://www.ncdot.gov/about/board/>

#### *Highway Division*

801 Statesville Rd North Wilkesboro, NC 28659 (336) 667-9111

<https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=650>

#### *Contact the:*

- Division Engineer with general questions concerning NCDOT activities within each Division and for information on Small Urban Funds.
- Division Construction Engineer for information concerning major roadway improvements under construction.
- Division Traffic Engineer for information concerning traffic signals, highway signs, pavement markings, and crash history.
- Division Operations Engineer for information concerning facility operations.
- Division Maintenance Engineer information regarding maintenance of all state roadways, improvement of secondary roads and other small improvement projects. The Division Maintenance Engineer also oversees the District Offices, the Bridge Maintenance Unit and the Equipment Unit.
- District Engineer for information on outdoor advertising, junkyard control, driveway permits, road additions, subdivision review and approval, Adopt-A-Highway program, encroachments on highway right of way, issuance of oversize/overwidth permits, paving priorities, secondary road construction program and road maintenance.

PO Box 1460

Boone, NC 28607

(828) 265-5380

### Transportation Planning Branch (TPB)

Contact the Transportation Planning Branch for information on long-range multi-modal planning services.

1554 Mail Service Center                      Raleigh, NC 27699-1554                      (919) 707-0900  
<https://connect.ncdot.gov/projects/planning/Pages/default.aspx>

### High Country Rural Planning Organization (RPO)

Contact the RPO for information on long-range multi-modal planning services.

468 New Market Blvd                      Boone, NC 28607                      (828) 265-5434  
<http://www.regiond.org/rpo.htm>

### Strategic Planning Office

Contact the Strategic Planning Office for information concerning prioritization of transportation projects.

1501 Mail Service Center                      Raleigh, NC 27699-1501                      (919) 707-4740  
<http://www.ncdot.gov/performance/reform/prioritization/>

### Project Development & Environmental Analysis (PDEA)

Contact PDEA for information on environmental studies for projects that are included in the TIP.

1548 Mail Service Center                      Raleigh, NC 27699-1548                      (919) 707-6000  
<https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx>

### State Asset Management Unit

Contact the State Asset Management Unit for information regarding the status for unpaved roads to be paved, additions and deletions of roads to the State maintained system and the Industrial Access Funds program.

1535 Mail Service Center                      Raleigh, NC 27699-1535                      (919) 707-2500  
<https://connect.ncdot.gov/resources/stateroads/Pages/default.aspx>

### Program Development Branch

Contact the Program Development Branch for information concerning Roadway Official Corridor Maps, Feasibility Studies, and the Transportation Improvement Program (TIP).

1534 Mail Service Center                      Raleigh, NC 27699-1534                      (919) 707-4610  
<https://connect.ncdot.gov/projects/planning/Pages/default.aspx>

### Public Transportation Division

Contact the Public Transportation Division for information public transit systems.

1550 Mail Service Center                      Raleigh, NC 27699-1550                      (919) 707-4670  
<http://www.ncdot.org/transit/nctransit/>

### Rail Division

Contact the Rail Division for rail information throughout the state.

1553 Mail Service Center                      Raleigh, NC 27699-1553                      (919) 707-4700  
<http://www.bytrain.org/>

### Division of Bicycle and Pedestrian Transportation

Contact this Division for bicycle and pedestrian transportation information throughout the state.

1552 Mail Service Center                      Raleigh, NC 27699-1552                      (919) 707-2600  
<http://www.ncdot.gov/bikeped/>

### Structures Management Unit

Contact the Structures Management Unit for information on bridge management throughout the state.

1581 Mail Service Center                      Raleigh, NC 27699-1581                      (919) 707-6400  
[http://www.ncdot.gov/doh/operations/dp\\_chief\\_eng/maintenance/bridge/](http://www.ncdot.gov/doh/operations/dp_chief_eng/maintenance/bridge/)

### Roadway Design Unit

Contact the Roadway Design Unit for information regarding design plans and proposals for road and bridge projects throughout the state.

1582 Mail Service Center                      Raleigh, NC 27699-1582                      (919) 707-6200  
<https://connect.ncdot.gov/projects/Roadway/Pages/default.aspx>

### Transportation Mobility and Safety Division

Contact the Traffic Safety Unit for information regarding crash data throughout the state.

1561 Mail Service Center                      Raleigh, NC 27699-1561                      (919) 773-2800  
<https://connect.ncdot.gov/resources/safety/Pages/default.aspx>

## ***Other State Government Offices***

### Department of Commerce – Division of Community Assistance

Contact the Department of Commerce for resources and services to help realize economic prosperity, plan for new growth and address community needs.

<http://www.nccommerce.com/cd>



## Appendix B

# Comprehensive Transportation Plan Definitions

This appendix contains descriptive information and definitions for the designations depicted on the CTP maps shown in Figure 1.

### Highway Map

For visual depiction of facility types for the following CTP classification, visit <https://connect.ncdot.gov/projects/planning/TPB%20%20Strategic%20Highway%20Corridors/NCDOT%20Facility%20Types%20-%20Control%20of%20Access%20Definitions.pdf>

### Facility Type Definitions

- **Freeways**

- Functional purpose – high mobility, high volume, high speed
- Posted speed – 55 mph or greater
- Cross section – minimum four lanes with continuous median
- Multi-modal elements – High Occupancy Vehicles (HOV)/High Occupancy Transit (HOT) lanes, busways, truck lanes, park-and-ride facilities at/near interchanges, adjacent shared use paths (separate from roadway and outside ROW)
- Type of access control – full control of access
- Access management – interchange spacing (urban – one mile; non-urban – three miles); at interchanges on the intersecting roadway, full control of access for 1,000ft or for 350ft plus 650ft island or median; use of frontage roads, rear service roads
- Intersecting facilities – interchange or grade separation (no signals or at-grade intersections)
- Driveways – not allowed

- **Expressways**

- Functional purpose – high mobility, high volume, medium-high speed
- Posted speed – 45 to 60 mph
- Cross section – minimum four lanes with median
- Multi-modal elements – HOV lanes, busways, very wide paved shoulders (rural), shared use paths (separate from roadway but within ROW)
- Type of access control – limited or partial control of access;
- Access management – minimum interchange/intersection spacing 2,000ft; median breaks only at intersections with minor roadways or to permit U-turns; use of frontage roads, rear service roads; driveways limited in location and number; use of acceleration/deceleration or right turning lanes
- Intersecting facilities – interchange; at-grade intersection for minor roadways; right-in/right-out and/or left-over or grade separation (no signalization for through traffic)

- Driveways – right-in/right-out only; direct driveway access via service roads or other alternate connections
- **Boulevards**
  - Functional purpose – moderate mobility; moderate access, moderate volume, medium speed
  - Posted speed – 30 to 55 mph
  - Cross section – two or more lanes with median (median breaks allowed for U-turns per current NCDOT *Driveway Manual*)
  - Multi-modal elements – bus stops, bike lanes (urban) or wide paved shoulders (rural), sidewalks (urban - local government option)
  - Type of access control – limited control of access, partial control of access, or no control of access
  - Access management – two lane facilities may have medians with crossovers, medians with turning pockets or turning lanes; use of acceleration/deceleration or right turning lanes is optional; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
  - Intersecting facilities – at grade intersections and driveways; interchanges at special locations with high volumes
  - Driveways – primarily right-in/right-out, some right-in/right-out in combination with median leftovers; major driveways may be full movement when access is not possible using an alternate roadway
- **Other Major Thoroughfares**
  - Functional purpose – balanced mobility and access, moderate volume, low to medium speed
  - Posted speed – 25 to 55 mph
  - Cross section – four or more lanes without median (*US and NC routes may have less than four lanes*)
  - Multi-modal elements – bus stops, bike lanes/wide outer lane (urban) or wide paved shoulder (rural), sidewalks (urban)
  - Type of access control – no control of access
  - Access management – continuous left turn lanes; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
  - Intersecting facilities – intersections and driveways
  - Driveways – full movement on two lane roadway with center turn lane as permitted by the current NCDOT *Driveway Manual*
- **Minor Thoroughfares**
  - Functional purpose – balanced mobility and access, moderate volume, low to medium speed
  - Posted speed – 25 to 55 mph
  - Cross section – ultimately three lanes (no more than one lane per direction) or less without median

- Multi-modal elements – bus stops, bike lanes/wide outer lane (urban) or wide paved shoulder (rural), sidewalks (urban)
- ROW – no control of access
- Access management – continuous left turn lanes; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
- Intersecting facilities – intersections and driveways
- Driveways – full movement on two lane with center turn lane as permitted by the current NCDOT *Driveway Manual*

#### Other Highway Map Definitions

- **Existing** – Roadway facilities that are not recommended to be improved.
- **Needs Improvement** – Roadway facilities that need to be improved for capacity, safety, operations, or system continuity. The improvement to the facility may be widening, increasing the level of access control along the facility, operational strategies (including but not limited to traffic control and enforcement, incident and emergency management, and deployment of Intelligent Transportation Systems (ITS) technologies), or a combination of improvements and strategies. “Needs improvement” does not refer to the maintenance needs of existing facilities or the replacement or rehab of structures.
- **Recommended** – Roadway facilities on new location that are needed in the future.
- **Interchange** – Through movement on intersecting roads is separated by a structure. Turning movement area accommodated by on/off ramps and loops.
- **Grade Separation** – Through movement on intersecting roads is separated by a structure. There is no direct access between the facilities.
- **Full Control of Access** – Connections to a facility provided only via ramps at interchanges. No private driveway connections allowed.
- **Limited Control of Access** – Connections to a facility provided only via ramps at interchanges (major crossings) and at-grade intersections (minor crossings and service roads). No private driveway connections allowed.
- **Partial Control of Access** – Connections to a facility provided via ramps at interchanges, at-grade intersections, and private driveways. Private driveway connections shall be defined as a maximum of one connection per parcel. One connection is defined as one ingress and one egress point. These may be combined to form a two-way driveway (most common) or separated to allow for better traffic flow through the parcel. The use of shared or consolidated connections is highly encouraged.
- **No Control of Access** – Connections to a facility provided via ramps at interchanges, at-grade intersections, and private driveways.

## ***Public Transportation and Rail Map***

**Bus Routes** – The primary fixed route bus system for the area. Does not include demand response systems.

- **Fixed Guideway** – Any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. The term includes heavy rail, commuter rail, light rail, monorail, trolleybus, aerial tramway, included plane, cable car, automated guideway transit, and ferryboats.
- **Operational Strategies** – Plans geared toward the non-single occupant vehicle. This includes but is not limited to HOV lanes or express bus service.
- **Rail Corridor** – Locations of railroad tracks that are either active or inactive tracks. These tracks were used for either freight or passenger service.
  - Active – rail service is currently provided in the corridor; may include freight and/or passenger service
  - Inactive – right of way exists; however, there is no service currently provided; tracks may or may not exist
  - Recommended – It is desirable for future rail to be considered to serve an area.
- **High Speed Rail Corridor** – Corridor designated by the U.S. Department of Transportation as a potential high speed rail corridor.
  - Existing – Corridor where high speed rail service is provided (there are currently no existing high speed corridor in North Carolina).
  - Recommended – Proposed corridor for high speed rail service.
- **Rail Stop** – A railroad station or stop along the railroad tracks.
- **Intermodal Connector** – A location where more than one mode of transportation meet such as where light rail and a bus route come together in one location or a bus station.
- **Park and Ride Lot** – A strategically located parking lot that is free of charge to anyone who parks a vehicle and commutes by transit or in a carpool.
- **Existing Grade Separation** – Locations where existing rail facilities and are physically separated from existing highways or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where rail facilities are recommended to be physically separated from existing or recommended highways or other transportation facilities. These may be bridges, culverts, or other structures.

## ***Bicycle Map***

- **On Road-Existing** – Conditions for bicycling on the highway facility are adequate to safely accommodate cyclists.
- **On Road-Needs Improvement** – At the systems level, it is desirable for an **existing** highway facility to accommodate bicycle transportation; however, highway improvements are necessary to create safe travel conditions for the cyclists.

- **On Road-Recommended** – At the systems level, it is desirable for a **recommended** highway facility to accommodate bicycle transportation. The highway should be designed and built to safely accommodate cyclists.
- **Off Road-Existing** – A facility that accommodates only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way.
- **Off Road-Needs Improvement** – A facility that accommodates only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way that will not adequately serve future bicycle needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment.
- **Off Road-Recommended** – A facility needed to accommodate only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way.
- **Multi-use Path-Existing** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Needs Improvement** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic that will not adequately serve future needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Recommended** – A facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that is needed to serve bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Existing Grade Separation** – Locations where existing “Off Road” facilities and “Multi-use Paths” are physically separated from existing highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where “Off Road” facilities and “Multi-use Paths” are recommended to be physically separated from existing or recommended highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

## ***Pedestrian Map***

- **Sidewalk-Existing** – Paved paths (including but not limited to concrete, asphalt, brick, stone, or wood) on both sides of a highway facility and within the highway right-of-way that are adequate to safely accommodate pedestrian traffic.
- **Sidewalk-Needs Improvement** – Improvements are needed to provide paved paths on both sides of a highway facility. The highway facility may or may not need improvements. Improvements do not include re-paving or other maintenance activities but may include: filling in gaps, widening sidewalks, or meeting ADA (Americans with Disabilities Act) requirements.
- **Sidewalk-Recommended** – At the systems level, it is desirable for a recommended highway facility to accommodate pedestrian transportation **or** to add sidewalks on an existing facility where no sidewalks currently exist. The highway should be designed and built to safely accommodate pedestrian traffic.
- **Off Road-Existing** – A facility that accommodates only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way.
- **Off Road-Needs Improvement** – A facility that accommodates only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way that will not adequately serve future pedestrian needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), improved horizontal or vertical alignment, and meeting ADA requirements.
- **Off Road-Recommended** – A facility needed to accommodate only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way.
- **Multi-use Path-Existing** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Needs Improvement** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic that will not adequately serve future needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Recommended** – A facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that is needed to serve bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.



- **Existing Grade Separation** – Locations where existing “Off Road” facilities and “Multi-use Paths” are physically separated from existing highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where “Off Road” facilities and “Multi-use Paths” are recommended to be physically separated from existing or recommended highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

## Appendix C

### CTP Inventory and Recommendations

#### Assumptions/ Notes:

- **Local ID:** This Local ID is the same as the one used for the Prioritization Project Submittal Tool. If a TIP project number exists it is listed as the ID. Otherwise, the following system is used to create a code for each recommended improvement: the first 4 letters of the county name is combined with a 4 digit unique numerical code followed by '-H' for highway, '-T' for public transportation, '-R' for rail, '-B' for bicycle, '-M' for multi-use paths, or '-P' for pedestrian modes. If a different code is used along a route it indicates separate projects will probably be requested. Also, upper case alphabetic characters (i.e. 'A', 'B', or 'C') are included after the numeric portion of the code if it is anticipated that project segmentation or phasing will be recommended.
- **Jurisdiction:** Jurisdictions listed are based on municipal limits, county boundaries, and MPO Metropolitan Planning Area Boundaries (MAB), as applicable.
- **Existing Cross-Section:** Listed under '(ft)' is the approximate width of the roadway from edge of pavement to edge of pavement. Listed under 'lanes' is the total number of lanes, with the letter 'D' if the facility is divided.
- **Existing ROW:** The estimated existing right-of-way is based on NCDOT's Roadway Characteristics Database. These right-of-way amounts are approximate and may vary.
- **Existing and Proposed Capacity:** The estimated capacities are given in vehicles per day (vpd) based on LOS D for existing facilities and LOS C for new facilities. These capacity estimates were the 2000 Highway Capacity Manual using the Transportation Planning Branch's LOS D Standards for Systems Level Planning, as documented in Chapter 1.
- **Existing and Proposed AADT** (Annual Average Daily Traffic) volumes, given in vehicles per day (vpd), are estimates only based on a systems-level analysis. The '2040 AADT E+C' is an estimate of the volume in 2040 with only existing plus committed projects assumed to be in place, where committed is defined as projects programmed for construction in the 2012 - 2018 Transportation Improvement Program (TIP). The '2040 AADT with CTP' is an estimate of the volume in 2040 with all proposed CTP improvements assumed to be in place. The '2040 AADT with CTP' is shown in bold if it exceeds the proposed capacity, indicating an unmet need. For additional information about the assumptions and techniques used to develop the AADT volume estimates, refer to Chapter I.
- **Proposed Cross-section:** The CTP recommended cross-sections are listed by code; for depiction of the cross-section, refer to Appendix D. An entry of 'ADQ' indicates the existing facility is adequate and there are no improvements recommended as part of the CTP.
- **CTP Classification:** The CTP classification is listed, as shown on the adopted CTP Maps (see Figure 1). Abbreviations are F= freeway, E= expressway, B= boulevard, Maj= other major thoroughfare, Min= minor thoroughfare.

- **Tier:** Tiers are defined as part of the North Carolina Multimodal Investment Network (NCMIN). Abbreviations are Sta= statewide tier, Reg= regional tier, Sub= subregional tier.
- **Other Modes:** If there is an improvement recommended for another mode of transportation that relates to the given recommendation, it is indicated by an alphabetic code (H=highway, T= public transportation, R= rail, B= bicycle, and P= pedestrian).

**Table 3 - CTP INVENTORY AND RECOMMENDATIONS**

HIGHWAY																			
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System						CTP Classification	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT E+C	2040 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)				
					(ft)	lanes													
	US 221	Caldwell County to Shulls Mill Rd (SR 1556)	Watauga County	6.4	18	2	60	55	6200	500	1000	1000	6200	ADQ	60	Maj	Reg	B	
	US 221	Shulls Mill Rd (SR 1556) to US 321 BUS	Blowing Rock	1.6	24	2	150	35	11600	2000	4200	4200	11600	ADQ	150	Maj	Reg	B	
	US 221	US 321 BUS to US 321	Blowing Rock	0.8	24	2	60	35	11600	4500	7600	7600	11600	ADQ	60	Maj	Reg	B	
	US 221	US 321 to NC 105	Concurrent with US 321																
	US 221	NC 105 to US 421	Concurrent with NC 105																
	US 221	US 421 to US 221 (Deep Gap)	Concurrent with US 421																
R-2915	US 221	US 421 to Ashe County	Watauga County	1.1	20	2	50	55	12100	8600	16100	16100	44500	4 B	150	B	Reg	B	
R-5016	US 321	Avery County to Phillip's Branch Rd (SR 1211)	Watauga County	6.6	22	2	100	55	9100	4500	7400	7400	58800	4 A	180	E	Sta	B	
R-5016	US 321	Phillip's Branch Rd (SR 1211) to US 421	Watauga County	2.2	22	2	100	55	12100	6700	12100	9600	58800	4 A	180	E	Sta	B	
R-2615	US 321 - US 421	US 421 to Ward-Greene Rd (SR 1177)	Watauga County	2.9	22	2	100	55	12100	15200	12100	25900	58800	4 A	180	E	Sta	B	
R-2615	US 321 - US 421	Ward-Greene Rd (SR 1177) to US 421 BYP	Watauga County	2.9	24	2	100	55	12100	15200	12100	25900	58800	4 A	180	E	Sta	B	
R-2615	US 321 - US 421	US 421 BYP to NC 105 BYP	Watauga County	0.7	24	2	100	55	15100	15200	18800	15000	58800	4 A	100	Maj	Reg	B	
	US 321 - US 421	NC 105 BYP to Boone Town Limits	Watauga County	1.2	22	2	100	45	12300	10500	14600	10600	12300	ADQ	100	Maj	Reg	B	
	US 321 - US 421	Boone Town Limits to Speed Limit Change	Boone	0.6	22	2	100	45	12300	12900	18300	13900	11000	ADQ	100	Maj	Reg	B	
	US 321 - US 421	Speed Limit Change to Water St (SR 1102)	Boone	0.3	18	2	100	35	9900	12700	17700	13900	9900	ADQ	100	Maj	Reg	B	
	US 321 - US 421	Water St (SR 1102) to US 321	Boone	0.7	24	2	0	20	11000	16200	24900	17000	11000	ADQ	0	Maj	Reg		
WATA0001-H	US 321	US 421 (King St) to River St (SR 1163)	Boone	0.3	60	5	60	35	25400	18000	28800	20200	50000	4 D	110	B	Reg	B	
WATA0001-H	US 321	River St (SR 1163) to NC 105	Boone	0.5	60	5	60	35	25400	22400	30600	30900	50000	4 D	110	B	Reg	B	
WATA0001-H	US 321 - US 221	NC 105 to Boone Heights Dr	Boone	0.4	60	5	100	35	26600	41800	61700	45700	50000	4 D	110	B	Reg		
WATA0001-H	US 321 - US 221	Boone Heights Dr to Deerfield Dr (SR 1522)	Boone	0.4	60	5	100	35	26600	20000	26400	45400	50000	4 D	110	B	Reg		
WATA0001-H	US 321 - US 221	Deerfield Dr (SR 1522) to US 421 BYP	Boone	0.2	60	5	150	45	26600	20000	26000	29100	50000	4 D	110	B	Reg		
WATA0004-H	US 321 - US 221	US 421 BYP to Niley Cook Rd (SR 1523)	Watauga County	0.9	44	4	150	45	24800	18100	22800	24900	27000	4 B	110	E	Reg		

HIGHWAY																			
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System						CTP Classifi- cation	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT E+C	2040 AADT with CTP	Proposed Capacity (vpd)	Cross- Section	ROW (ft)				
					(ft)	lanes													
WATA0004-H	US 321 - US 221	Niley Cook Rd (SR 1523) to Edmisten Rd (SR 1547)	Watauga County	3.0	44	4	150	55	27000	17100	21000	23400	27000	4 B	110	E	Reg		
WATA0004-H	US 321 - US 221	Edmisten Rd (SR 1547) to US 221	Watauga County	0.4	48	4	150	55	27000	15100	17000	17000	27000	4 B	110	E	Reg		
R-2237	US 321	US 221 to Avery County	Blowing Rock	1.8	24	2	100	35	11600	14000	15200	15200	27000	4 B	110	E	Reg		
WATA0005-H	US 421	Tennessee to Howards Creek Rd-Tater Hill Rd (SR 1306)	Watauga County	4.2	24	2	150	55	12100	7400	12900	12900	44500	4 A	180	B	Reg	B	
WATA0005-H	US 421	Howards Creek Rd-Tater Hill Rd (SR 1306) to beginning 3-lane	Watauga County	2.1	24	2	150	55	12100	7700	11600	12900	44500	4 A	180	B	Reg	B	
WATA0005-H	US 421	Beginning of 3-lane to US 321	Watauga County	0.6	36	3	150	55	18150	10500	14900	17500	44500	4 A	180	B	Reg	B	
	US 421	US 321 to US 321 (Hardin Street)	Concurrent with US 321																
U-4020	US 421	US 321 (Hardin St) to NC 105	Boone	0.3	24	2	100	35	11000	17100	41600	<b>28600</b>	28100	4 D	110	B	Reg	B	
U-4020	US 421 - US 221	NC 105 to NC 194	Boone	0.3	48	4	60	35	24400	27600	64500	49900	56700	6 B	150	B	Reg	B	
WATA0006-H	US 421 - US 221	NC 194 to King St (SR 1665)	Boone	0.8	48	4	60	45	26600	25700	51300	38100	38100	4 D	110	B	Reg	B M	
WATA0006-H	US 421 - US 221	King Street (SR 1665) to Old 421 (SR 1416)	Boone	0.7	48	5	180	45	27600	24700	45300	34300	41400	4 D	110	B	Reg	B M	
WATA0006-H	US 421 - US 221	Old 421 (SR 1416) to Begin Expressway	Watauga County	0.3	48	5	200	45	27600	19100	35000	22700	41400	4 D	110	E	Reg	B M	
	US 421 - US 221	Begin Expressway to US 421 BYP	Watauga County	1.3	48	4D	200	55	43800	17800	32200	22700	43800	ADQ	200	E	Reg		
	US 421 - US 221	US 421 BYP to US 221	Watauga County	5.5	48	4D	200	55	44500	15200	36400	36400	44500	ADQ	200	E	Sta		
	US 421	US 221 to Wilkes County	Watauga County	3.4	60	5	200	55	44500	8300	14900	14900	44500	ADQ	200	E	Sta		
	US 321 BUS	US 321 to Johns River Rd (SR 1537)	Blowing Rock	0.9	24	2	60	35	11600	3300	2600	2600	11600	ADQ	60	Maj	Reg	B	
	US 321 BUS	Johns River Rd (SR 1537) to US 221	Blowing Rock	0.4	24	2	60	20	11000	8200	18000	<b>18000</b>	11000	ADQ	60	Maj	Reg	B	
U-2703	US 421 BYP	US 421 to US 321	Watauga County	4.8	--	--	--	--	--	--	--	19400	58800	4 A	250	F	Sta		
U-2703	US 421 BYP	US 321 to NC 105	Watauga County	3.6	--	--	--	--	--	--	--	21700	58800	4 A	250	F	Sta		
U-2703	US 421 BYP	NC 105 to US 421	Watauga County	2.3	--	--	--	--	--	--	--	9400	58800	4 A	250	F	Sta		

HIGHWAY																			
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System						CTP Classifi- cation	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT E+C	2040 AADT with CTP	Proposed Capacity (vpd)	Cross- Section	ROW (ft)				
					(ft)	lanes													
R-2566	NC 105	Avery County to Shulls Mill Rd (SR 1556)	Watauga County	4.8	22	2	100	55	12100	12400	20400	20400	37600	4 B	110	B	Sta	B	
R-2566	NC 105	Shulls Mill Rd (SR 1556) to Bairds Creek Rd (SR 1113)	Watauga County	1.7	24	2	100	55	12100	12400	19600	20400	37600	4 B	110	B	Sta	B	
R-2566	NC 105	Bairds Creek Rd (SR 1113) to US 421 BYP	Watauga County	1.4	36	3	100	45	19700	15200	28600	26000	42800	4 B	110	B	Sta	B	
R-2566	NC 105	US 421 BYP to NC 105 BYP	Watauga County	1.4	36	3	100	45	19700	15200	28600	16800	42800	4 B	110	B	Reg	B	
WATA0007-H	NC 105	NC 105 BYP to End 5-lane	Boone	0.7	60	5	105	35	25400	28700	40300	26700	38100	4 D	110	B	Reg	B	
WATA0007-H	NC 105	End 5-lane to US 321/221	Boone	1.4	48	4	105	35	22000	25700	33300	28800	38100	4 D	110	B	Reg	B	
WATA0007-H	NC 105 - US 221	US 321 to US 421	Boone	0.8	60	5	100	35	25400	36700	53100	33200	38100	4 D	110	B	Reg	B	
WATA0002-H	NC 105 BYP (SR 1107)	US 321-421 to NC 105	Watauga County	1.8	24	2	100	55	13500	13500	16000	15900	15900	3 B	80	Maj	Reg	B P	
	NC 184	Avery County to Beech Mountain	Beech Mountain	1.0	22	2	60	35	9100	2500	2500	2500	9100	ADQ	60	Maj	Reg	B	
	NC 194	Avery County to Broadstone Rd (SR 1112)	Watauga County	5.3	18	2	60	55	6200	1800	2500	2400	6200	ADQ	60	Maj	Reg	B	
	NC 194	Broadstone Rd (SR 1112) to US 321/421	Watauga County	3.3	18	2	60	55	9800	1700	3400	2800	9800	ADQ	60	Maj	Reg	B	
	NC 194	US 321/421 to US 321 (Hardin St)	Concurrent with US 321																
	NC 194	US 321 (Hardin St) to NC 194	Concurrent with US 421																
WATA0003-H	NC 194	US 421 to Boone Town Limits	Boone	0.3	20	2	60	35	9400	10500	13700	18600	23400	4 D	110	B	Reg	B	
WATA0003-H	NC 194	Boone Town Limits to Howards Creek Rd (SR 1306)	Watauga County	1.1	18	2	60	55	12100	9200	13200	14300	31100	4 D	110	B	Reg	B	
WATA0015-H	NC 194	Howards Creek Rd (SR 1306) to Castle Ford Road (SR 1335)	Watauga County	1.2	18	2	60	55	12100	6200	9600	9400	12100	2 A	60	Maj	Reg	B	
	NC 194	Castle Ford Road (SR 1335) to Ashe County	Watauga County	7.9	18	2	60	55	9800	4500	7200	7200	9800	ADQ	60	Maj	Reg	B	
	Aho Rd (SR 1530)	US 321 to Blue Ridge Pkwy	Watauga County	2.4	18	2	60	55	8500	2100	5200	3400	8500	ADQ	60	Min	Loc		
WATA0016-H	Bamboo Rd (SR 1524)	Deerfield Rd (SR 1523) to Fairway Dr (SR 1602)	Watauga County	0.3	18	2	0	35	8500	2800	4500	5900	8500	2 C	50	Min	Loc		



HIGHWAY																			
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System						CTP Classifi- cation	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT with CTP	Proposed Capacity (vpd)	Cross- Section	ROW (ft)					
					(ft)	lanes													
WATA0016-H	Bamboo Rd (SR 1524)	Fairway Dr (SR 1602) to Friendship Church Road (SR 1525)	Watauga County	0.5	18	2	0	55	8500	3300	4500	2500	8500	2 A	60	Min	Loc		
	Bamboo Rd (SR 1524)	Friendship Church Road (SR 1525) to Deerfield Rd (SR 1523)	Watauga County	1.6	18	2	60	55	8500	1800	4400	3500	8500	ADQ	60	Min	Loc		
	Bamboo Rd (SR 1514)	Deerfield Rd (SR 1523) to Browns Chapel Rd (SR 1513)	Watauga County	0.9	16	2	60	55	8000	1700	4600	1700	8000	ADQ	60	Min	Loc	B	
	Bamboo Rd (SR 1514)	Browns Chapel Rd (SR 1513) to Wilson Ridge Rd (SR 1523)	Watauga County	1.0	20	2	60	45	10600	2800	4800	3800	10600	ADQ	60	Min	Loc	B	
WATA0008-H	Bamboo Rd (SR 1514)	Wilson Ridge Rd (SR 1523) to US 221-421	Watauga County	1.0	20	2	60	35	8800	9000	12800	<b>11500</b>	10600	2 A	60	Min	Loc	B	
	Bairds Creek Rd (SR 1113)	NC 194 to Dewitt Barnett Rd (SR 1114)	Watauga County	2.4	18	2	60	55	8500	400	1800	900	8500	ADQ	60	Min	Loc		
	Bairds Creek Rd (SR 1113)	Dewitt Barnett Rd (SR 1114) to NC 105	Watauga County	1.3	20	2	60	55	8800	4100	6700	2700	8800	ADQ	60	Min	Loc		
WATA0017-H	Broadstone Rd (SR 1112)	NC 194 to Dewitt Barnett Rd (SR 1114)	Watauga County	0.6	20	2	60	25	8600	3100	6500	4300	8900	2 D	90	Min	Loc	B	
WATA0017-H	Broadstone Rd (SR 1112)	Dewitt Barnett Rd (SR 1114) to NC 105	Watauga County	2.3	20	2	60	55	12700	3300	10100	4500	13100	2 D	90	Min	Loc	B	
	Browns Chapel Rd (SR 1513)	Bamboo Rd (SR 1514) to US 421	Watauga County	2.2	20	2	60	55	8800	1700	3900	1400	8800	ADQ	60	Min	Loc		
	Brownwood Rd (SR 1359)	US 421 to Ashe County	Watauga County	2.8	16	2	60	55	8000	900	1200	1200	8000	ADQ	60	Min	Loc		
	Castle Ford Rd (SR 1533)	NC 194 to Pine Run Rd (SR 1535)	Watauga County	2.2	18	2	60	55	8500	2700	8100	2200	8500	ADQ	60	Min	Loc		
	Deerfield Rd (SR 1522)	US 321 to State Farm Rd	Boone	0.3	22	2	40	25	8900	7400	10900	7800	8900	ADQ	40	Min	Loc	B	
WATA0009-H	Deerfield Rd (SR 1522)	State Farm Rd to Bamboo Rd (SR 1514)	Watauga County	0.8	20	2	60	35	9400	13300	16100	11500	14600	2 A	60	Min	Loc	B	
	Deck Hill (SR 1547)	Winklers Creek Rd (SR 1547) to US 321/221	Watauga County	4.5	20	2	60	35	8800	-	-	-	8800	ADQ	60	Min	Loc		
	Dewitt Barnett Rd (SR 1114)	Broadstone Rd (SR 1112) to Bairds Creek Rd (SR 1113)	Watauga County	1.0	18	2	50	55	8500	1700	600	1500	8500	ADQ	50	Min	Loc		

HIGHWAY																			
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System						CTP Classification	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT E+C	2040 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)				
					(ft)	lanes													
	Fairway Dr (SR 1602)	US 321 to Bamboo Rd (SR 1524)	Watauga County	1.5	20	2	60	35	8600	1400	2400	2400	8600	ADQ	60	Min	Loc		
	Friendship Church Rd (SR 1525)	Aso Rd (SR 1530) to Bamboo Rd (SR 1524)	Watauga County	2.5	18	2	60	55	8500	1800	4800	500	8500	ADQ	60	Min	Loc		
	George Wilson Rd (SR 1104)	US 321/421 to Hodges Gap Rd (SR 1104)	Watauga County	0.4	20	2	60	55	8800	600	700	1300	8800	ADQ	60	Min	Loc		
	George Wilson Rd (SR 1105)	Hodges Gap Rd (SR 1104) to NC 105 BYP	Watauga County	0.3	18	2	60	55	8500	1500	1400	500	8500	ADQ	60	Min	Loc		
WATA0018-H	Greenway Rd	Winklers Creek Rd (SR 1547) to Leola Dr	Boone	0.4	20	2	0	20	8600	7400	16800	7800	8600	2 C	0	Min	Loc	M	
	Hodges Gap Rd (SR 1104)	NC 105 BYP to US 321/421	Watauga County	0.7	18	2	60	55	8500	2800	4000	2200	8500	ADQ	60	Min	Loc		
	Holloway Mountain Rd (SR 1559)	NC 105 to US 221	Watauga County	3.9	14	2	60	55	8000	1000	1300	1300	8000	ADQ	60	Min	Loc		
	Howards Creek Rd (SR 1306)	US 421 to NC 194	Watauga County	8.1	18	2	60	55	8300	2300	3500	3400	8300	ADQ	60	Min	Loc		
	Junaluska Rd (SR 1102)	US 321/421 to Howards Creek Rd (SR 1306)	Watauga County	7.5	18	2	60	55	8500	2500	6700	3700	8500	ADQ	60	Min	Loc		
	King St, East (SR 1665)	US 421 to US 421	Boone	0.5	24	2	0	35	9400	2000	13000	3700	9400	ADQ	0	Min	Loc		
	Laurel Fork Rd (SR 1109)	Bairds Creek Rd (SR 1113) to NC 105 BYP	Watauga County	1.7	18	2	0	55	8500	400	400	400	8500	ADQ	0	Min	Loc		
WATA0020-H	Leola Dr	Greenway Rd to US 321/221	Boone	0.6	20	2	0	20	8600	13400	19800	7800	8600	2 C	0	Min	Loc	M	
	Little Laurel Rd (SR 1511)	Laurel Fork Rd (SR 1109) to NC 105 BYP	Watauga County	1.6	18	2	0	55	8300	700	1000	1000	8300	ADQ	0	Min	Loc		
WATA0019-H	Meadowview Dr	US 321 to Greenway Rd	Boone	0.3	18	2	0	25	8300	2000	5200	3300	8300	2 E	0	Min	Loc		
WATA0019-H	Meadowview Dr	Greenway Rd to US 321	Boone	0.8	16	2	0	25	7800	1500	4800	4000	7800	2 E	0	Min	Loc	M	
	Mist Gap Rd (SR 1117)	NC 194 to US 321	Watauga County	2.2	20	2	60	55	12700	1200	3300	1400	12700	ADQ	60	Min	Loc		
	New Market Blvd	US 421/221 to NC 194	Boone	0.6	22	2	0	35	9100	6500	10700	7400	9100	ADQ	0	Min	Loc		

HIGHWAY																			
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System						CTP Classifi- cation	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT E+C	2040 AADT with CTP	Proposed Capacity (vpd)	Cross- Section	ROW (ft)				
					(ft)	lanes													
	Old US 421 (SR 1416)	US 421 to US 421	Watauga County	2.0	22	2	60	45	11000	2700	5200	5200	11000	ADQ	60	Min	Loc		
	Old US 421 (SR 1672)	US 421 to US 421	Watauga County	6.2	22	2	60	45	11000	5600	10200	5400	11000	ADQ	60	Min	Loc		
	Pine Run Rd (SR 1535)	Castle Ford Rd (SR 1533) to US 421	Watauga County	5.2	16	2	60	55	8000	3000	8500	4700	8500	ADQ	60	Min	Loc		
WATA0021-H	Poplar Grove Rd (SR 1102)	NC 105 to Rivers St	Watauga County	1.7	18	2	60	35	8500	3800	9700	3200	8500	2 E	60	Min	Loc	B	
WATA0010-H	Poplar Grove Rd BYP	Homespun Hills Rd (1148) to Bodenheimer Dr	Boone	0.1	--	--	--	--	--	--	--	--	9500	2 C	50	Min	Loc		
	Poplar Grove Rd (SR 1552)	Shulls Mill Rd (SR 1558) to NC 105	Watauga County	3.4	18	2	60	55	8500	1700	4200	2400	8500	ADQ	60	Min	Loc		
WATA0011-H	Presnell School Road Extension	Cherry Gap Road to Presnell School Road (SR 1125)	Beech Mountain	0.5	--	--	--	--	--	--	--	--	9500	2 C	50	Min	Loc		
WATA0022-H	Rivers St (St 1163)	Poplar Grove Rd (SR 1102) to US 321 (Hardin St)	Boone	0.9	44	4	70	35	19600	17100	22900	19700	21200	**	**	Min	Loc	B	
	Russ Cornett Rd (SR 1550)	Poplar Grove Rd (SR 1552) to Winklers Creek Rd (SR 1549)	Watauga County	2.6	18	2	60	55	8500	1200	4700	1200	8500	ADQ	60	Min	Loc		
	Shulls Mill Rd (SR 1556)	NC 105 to US 221	Watauga County	5.5	16	2	60	55	8500	1100	2800	2800	8500	ADQ	60	Min	Loc		
WATA0012-H	Seven Devils Rd (SR 1151)	NC 105	Seven Devils	2.8	22	2	60	35	8300	1100	1800	1800	8300	ADQ	60	Min	Loc		
WATA0013-H	State Farm Rd	US 221/NC 105 to Deerfird Rd (SR 1522)	Boone	1.1	24	2	0	35	9400	10100	14400	11000	11500	3 B	80	Min	Loc	B	
	Water Rd (SR 1102)	Poplar Grove Rd (SR 1102) to US 321/421	Boone	0.1	18	2	60	35	8200	6300	14100	5700	8200	ADQ	60	Min	Loc	B	
	Wilson Dr	Winklers Creek Rd (SR 1547) to NC 105	Boone	0.2	24	2	0	25	10000	9600	17300	<b>10200</b>	10000	ADQ	60	Min	Loc	B	

HIGHWAY																		
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	2010 Existing System						2040 Proposed System					CTP Classification	Tier	Other Modes
					Cross-Section		ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2010 AADT	2040 AADT E+C	2040 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)			
					(ft)	lanes												
WATA0014-H	Wilson Ridge Rd (SR 1523)	Deerfield Rd (SR 1522) to Bamboo Rd (SR 1524)	Watauga County	0.9	20	2	60	35	8800	7700	8300	6000	14600	2 A	60	Min	Loc	B
	Winklers Creek Rd (SR 1549)	Russ Cornett Rd (SR 1550) to Greenway Rd	Boone	1.3	16	2	60	35	8000	1200	4700	1200	8000	ADQ	60	Min	Loc	
WATA0023-H	Winklers Creek Rd (SR 1547)	Greenway Rd to Wilson Dr	Boone	0.2	20	2	60	35	8800	13400	26600	8700	9500	2 E	60	Min	Loc	M
	Winklers Creek Rd (SR 1547)	Wilso Dr to US 321	Boone	0.2	22	2	60	35	9100	2800	7300	5000	9500	ADQ	60	Min	Loc	

## PUBLIC TRANSPORTATION AND RAIL

PUBLIC TRANSPORTATION <sup>1</sup>							
ID	Facility/ Route	Section (From - To)	Speed Limit (mph)	Distance (mi)	Existing System	Proposed System	Other Modes
					Type	Type	
WATA0001-T	Town of Boone to Town of Blowing Rock Route	US 321	55	5.8	--	Bus	H

<sup>1</sup>Only major public transportation routes and proposals are shown here. For further documentation of the public transportation system, refer to the 2011 AppICART Community Transportation Service Plan or the Mountaineer Express.

## BICYCLE AND PEDESTRIAN <sup>1</sup>

PEDESTRIAN								
ID	Facility/ Route	Section (From - To)	Distance (mi)	Existing System		Proposed System		Other Modes
				Type	Side of Street	Type	Side of Street	
R-2237	US 321	US 221 to Goforth Road (SR 1536)	2.1	--	--	Sidewalk	Both	H
WATA0001-P	Chestnut Drive	US 321 BUS (Main Street) to Morris Street	0.1	--	--	Sidewalk	Both	
WATA0002-P	Chestnut Drive	Wallingford Road to US 321 BUS (Main Street)	0.1	--	--	Sidewalk	Both	
WATA0003-P	Morris Street	Chestnut Drive to Morris Street		--	--	Sidewalk	Both	
WATA0004-P	Ransom Street	Sunset Drive to US 321	0.8	--	--	Sidewalk	Both	
WATA0005-P	Wallingford Road	Laurel Lane to Globe Road (SR 1537)	0.2	--	--	Sidewalk	Both	
WATA0006-P	US 321-421	NC 105 BYP (SR 1107) to Boone municipal limits	1.4	--	--	Sidewalk	Both	H B
WATA0002-H	NC 105 BYP (SR 1107)	NC 105 to US 321-421	1.9	--	--	Sidewalk	Both	H B
WATA00021-H	Poplar Grove Road (SR 1102)	NC 105 to Water Street	1.8	--	--	Sidewalk	Both	H B
WATA0007-P	US 221	US 321 BUS to Chetola Lake Drive	0.4	Sidewalk	South	Sidewalk	Both	B
WATA0008-P	Off Road Path	Clark Street at Old Stable Lane to US 221 at Cone Road (SR 1571) opposite the Bass Lake parking lot	0.3	--	--	Off Road	--	
BICYCLE								
ID	Facility/ Route	Section (From - To)	Distance	Existing System		Proposed System		Other Modes
				Cross-Section		Type	Cross-Section	
			(mi)	(ft)	lanes			
WATA0001-B	US 221	Caldwell County to Shulls Mill Road (SR 1556)	6.4	18	2	On Road	PS <sup>2</sup>	
WATA0001-B	US 221	Shulls Mill Road (SR 1556) to Blowing Rock municipal limits	0.8	24	2	On Road	2 A	
WATA0002-B	US 221	US 321 BUS to US 321	0.8	24	2	On Road	BL <sup>3</sup>	P
R-2915	US 221	Ashe County to US 421	Concurrent With US 221 - See Highway Table					H
R-2237	US 321	Caldwell County to US 221	Concurrent With US 321 - See Highway Table					H
R-5016	US 321	Avery County to US 421	Concurrent With US 321 - See Highway Table					H
WATA0001-H	US 321	US 421 to Deerfield Road (SR 1522)	Concurrent With US 321 - See Highway Table					H



BICYCLE								
ID	Facility/ Route	Section (From - To)	Distance (mi)	Existing System Cross-Section		Proposed System		Other Modes
				(ft)	lanes	Type	Cross-Section	
R-2615	US 321-421	US 321-421 from Vilas to NC 105 BYP	Concurrent With US 321-421 - See Highway Table					H
WATA0003-B	US 321-421	NC 105 BYP to Junaluska Rd (SR 1102)	2.8	18-24	2	On Road	BL <sup>3</sup>	P
WATA0004-B	US 321 BUS	US 321 to US 221	1.3	24	2	On Road	BL <sup>3</sup>	
WATA0005-H	US 421	Tennessee to US 321 in Vilas	Concurrent With US 421 - See Highway Table					H
WATA0007-H	NC 105	NC 105 BYP to US 221-421	Concurrent With NC 105 - See Highway Table					H P
R-2566	NC 105	Bairds Creek Rd (SR 1113) to NC 105 BYP	Concurrent With NC 105 - See Highway Table					H
R-2566	NC 105	Avery County to Bairds Creek Rd (SR 1113)	Concurrent With NC 105 - See Highway Table					H
WATA0002-H	NC 105 BYP	US 321-421 to NC 105	Concurrent With NC 105 BYP - See Highway Table					H P
WATA0003-H	NC 194	US 221-421 to Howard Creek Rd (SR 1306)	Concurrent With NC 194 - See Highway Table					H P
WATA0015-H	NC 194	Howard Creek Rd (SR 1306) to Castle Ford Rd (SR 1335)	Concurrent With NC 194 - See Highway Table					H
WATA0006-B	NC 194	Castle Ford Rd (SR 1335) to Ashe County	7.9	18	2	On Road	PS <sup>2</sup>	
WATA0007-B	NC 194	US 321-421 to Avery County	8.6	18	2	On Road	PS <sup>2</sup>	
WATA0005-B	NC 184	Beech Mountain to Avery County	1	22	2	On Road	2 B	
WATA0008-H	Bamboo Rd (SR 1514)	US 221-421 to Wilson Ridge Road (SR 1323)	Concurrent With Bamboo Rd (SR 1514) - See Highway Table					H
WATA0008-B	Bamboo Rd (SR 1514)	Wilson Ridge Road (SR 1523) to Deerfield Rd (SR 1523)	1.9	16-20	2	On Road	PS <sup>2</sup>	
WATA0017-H	Broadstone Road (SR 1112)	NC 194 to NC 105	Concurrent With Broadstone Road (SR 1112) - See Highway Table					H
WATA0009-B	Deerfield Road (SR 1522)	US 221-321 to State Farm Road	0.3	22	2	On Road	BL <sup>3</sup>	
WATA0010-H	Deerfield Road (SR 1523)	Wilson Ridge Road (SR 1523) to Bamboo Road (SR 1514)	Concurrent With Deerfield Road (SR 1523) - See Highway Table					H

BICYCLE								
ID	Facility/ Route	Section (From - To)	Existing System			Proposed System		Other Modes
			Distance	Cross-Section		Type	Cross-Section	
				(mi)	(ft)			
WATA0011-B	Faculty Street	NC 105 to Holmes Drive	0.4	20	2	On Road	2 E	
WATA0012-B	Holmes Drive	Faculty Street to Hill Street	<0.1	20	2	On Road	2 E	
WATA0013-B	Hill Street	Holmes Drive to Rivers Street	<0.1	20	2	On Road	2 E	
WATA0014-B	New Market Boulevard	NC 194 to US 321-421	0.6	22	2	On Road	2 E	
WATA0021-H	Poplar Grove Road (SR 1102)	NC 105 to Rivers Street (SR 1163)	Concurrent With Poplar Grove Road (SR 1102) - See Highway Table					H P
WATA0022-H	River Street (SR 1163)	Poplar Grove Road (SR 1102) to US 321	Concurrent With River Street (SR 1163) - See Highway Table					H
WATA0013-H	State Farm Road	NC 105 to Deerfield Road (SR 1522)	Concurrent With State Farm Road - See Highway Table					H P
WATA0011-B	Water Street	Poplar Grove Road (SR 1102) to US 321-421	0.1	18	2	On Road	BL <sup>3</sup>	P
WATA0014-H	Wilson Ridge Road (SR 1523)	Deerfield Road (SR 1523) to Bamboo Road (SR 1514)	Concurrent With Wilson Ridge Road (SR 1523) - See Highway Table					H
MULTI-USE PATH								
ID	Facility/ Route	Section (From - To)	Distance	Existing System		Proposed System		Other
				Type	Side of Street	Type	Cross-Section	
WATA0001-M	Middle Fork Greenway	Boone to Blowing Rock	6.4	--	--	Multi-use Path	MA	

<sup>1</sup>Only major routes and proposals are shown here. For further documentation of bicycle and pedestrian facilities and proposals, refer to Walk Boone 2011 Plan and the Town of Beech Mountain Streetscape Plan (2010).

<sup>2</sup>**PS** Paved Shoulder proposed with a width of at least 4 feet.

<sup>3</sup>**BL** Bike Lane proposed with a width of at least 5 feet.

<sup>4</sup>**WOL** Wide Outside Lane proposed with a width of at least 14 feet.

## Appendix D

### Typical Cross Sections

Cross section requirements for roadways vary according to the capacity and level of service to be provided. Universal standards in the design of roadways are not practical. Each roadway section must be individually analyzed and its cross section determined based on the volume and type of projected traffic, existing capacity, desired level of service, and available right-of-way. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

The typical cross sections were updated on December 7, 2010 to support the Department's "Complete Streets"<sup>1</sup> policy that was adopted in July 2009. This guidance established design elements that emphasize safety, mobility, and accessibility for multiple modes of travel. These "typical" cross sections should be used as preliminary guidelines for comprehensive transportation planning, project planning and project design activities. The specific and final cross section details and right of way limits for projects will be established through the preparation of the National Environmental Policy Act (NEPA) documentation and through final plan preparation.

On all existing and proposed roadways delineated on the CTP, adequate right-of-way should be protected or acquired for the recommended cross sections. In addition to cross section and right-of-way recommendations for improvements, Appendix C may recommend ultimate needed right-of-way for the following situations:

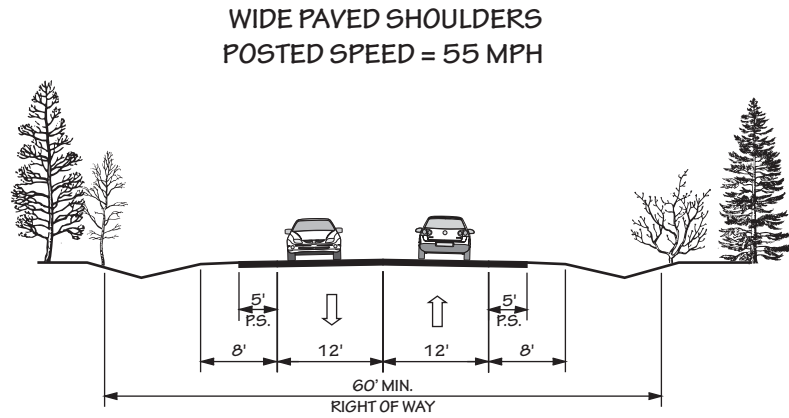
- ❖ roadways which may require widening after the current planning period,
- ❖ roadways which are borderline adequate and accelerated traffic growth could render them deficient,
- ❖ roadways where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment, and
- ❖ roadways which may need to accommodate an additional transportation mode.

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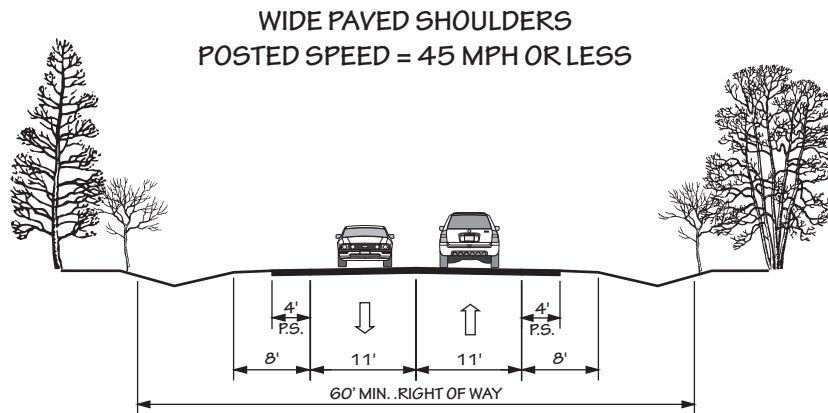
<sup>1</sup> For more information on Complete Streets, go to: <http://www.completestreetsnc.org/>.

# FIGURE 8 TYPICAL HIGHWAY CROSS SECTIONS 2 LANES

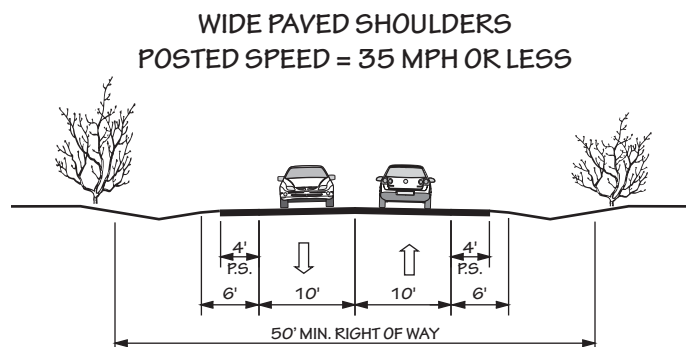
2 A



2 B



2 C

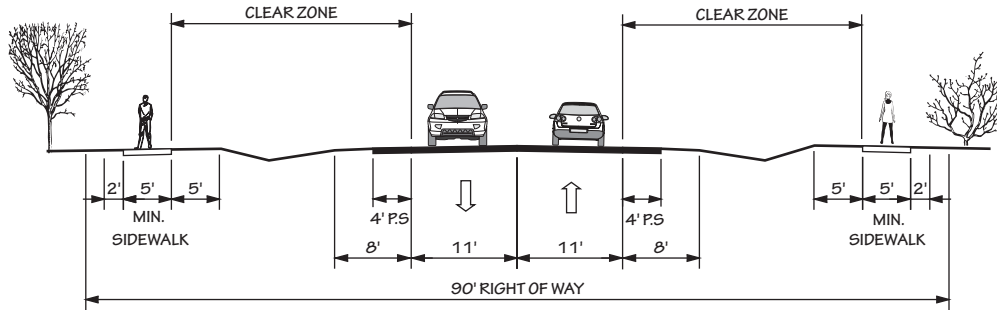


# TYPICAL HIGHWAY CROSS SECTIONS

## 2 LANES

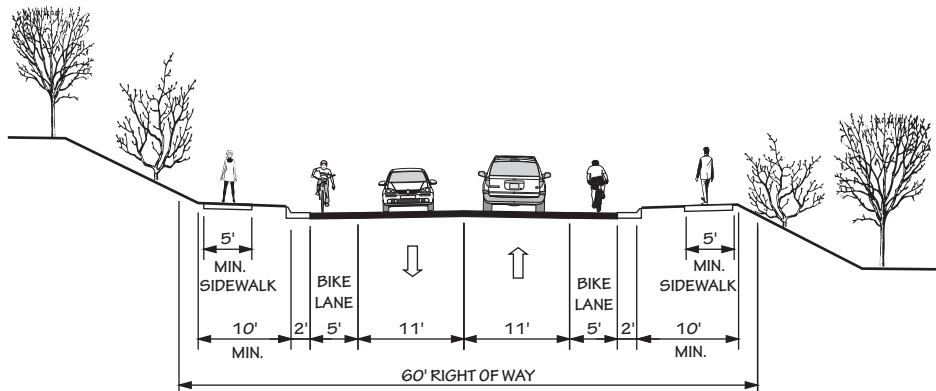
2 D

SIDEWALK PLACEMENT BEHIND A ROADWAY DITCH



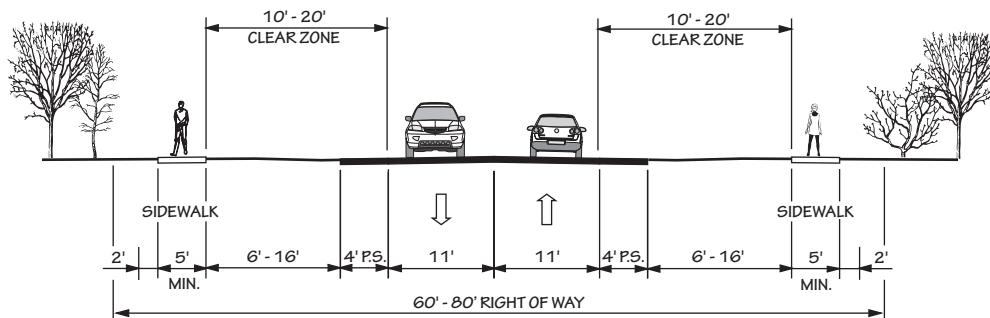
2 E

CURB AND GUTTER  
WITH BIKE LANES AND SIDEWALKS



2 F

BUFFERS AND SIDEWALKS WITHOUT A ROADWAY DITCH  
(20 MPH TO 45 MPH)  
(TYPICALLY COASTAL AREA MANAGEMENT ACT COUNTIES)

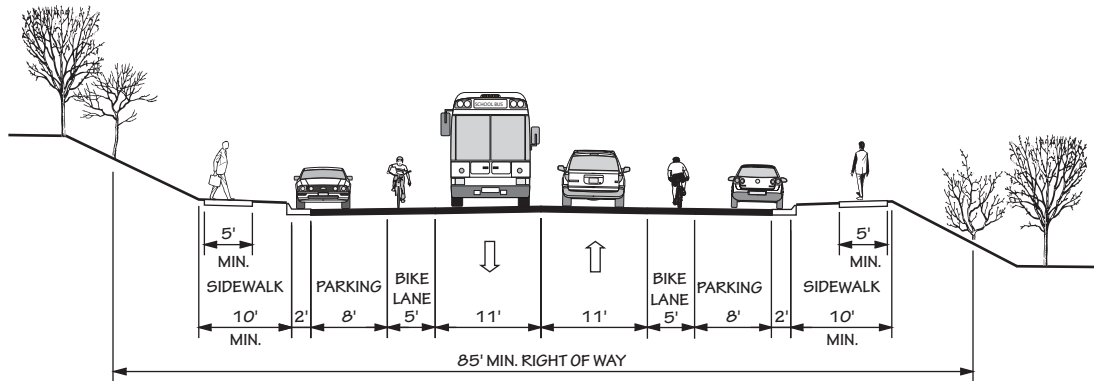


# TYPICAL HIGHWAY CROSS SECTIONS

## 2 LANES

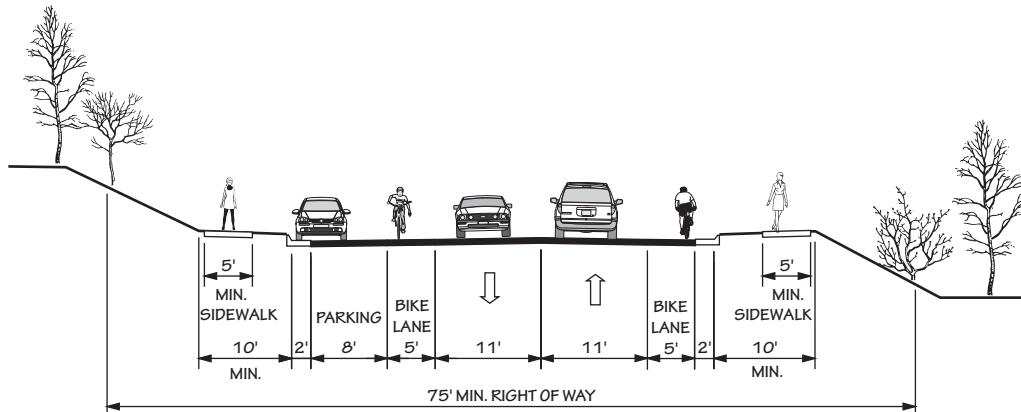
2 G

CURB & GUTTER - PARKING ON EACH SIDE



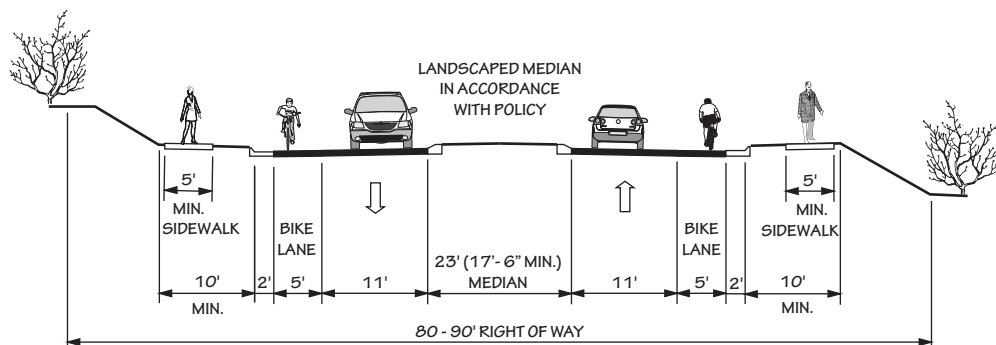
2 H

CURB & GUTTER - PARKING ON ONE SIDE



2 I

RAISED MEDIAN WITH CURB & GUTTER

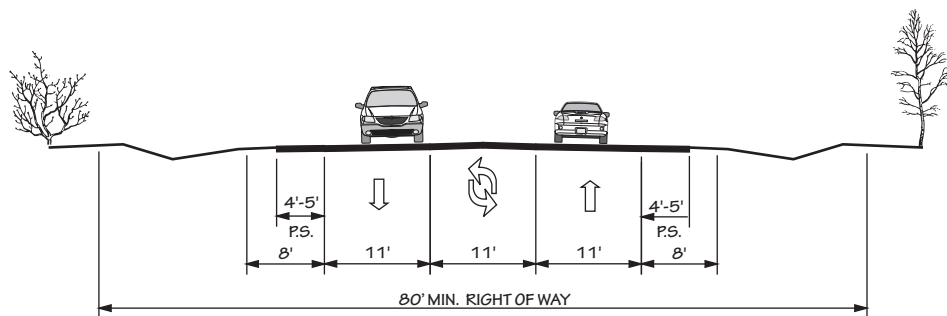


# TYPICAL HIGHWAY CROSS SECTIONS

## 3 LANES

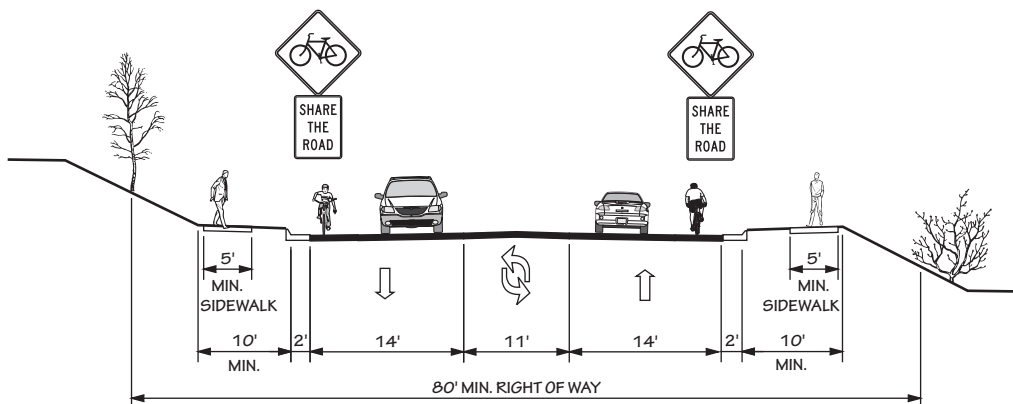
### 3 A

WIDE PAVED SHOULDERS



### 3 B

CURB & GUTTER WITH WIDE OUTSIDE LANES AND SIDEWALKS



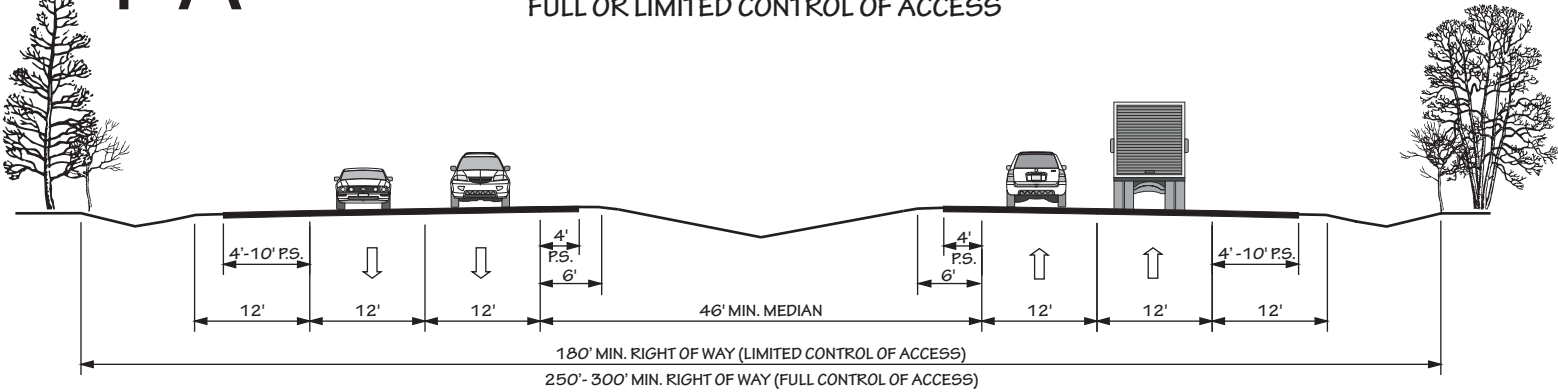


# TYPICAL HIGHWAY CROSS SECTIONS

## 4 LANES

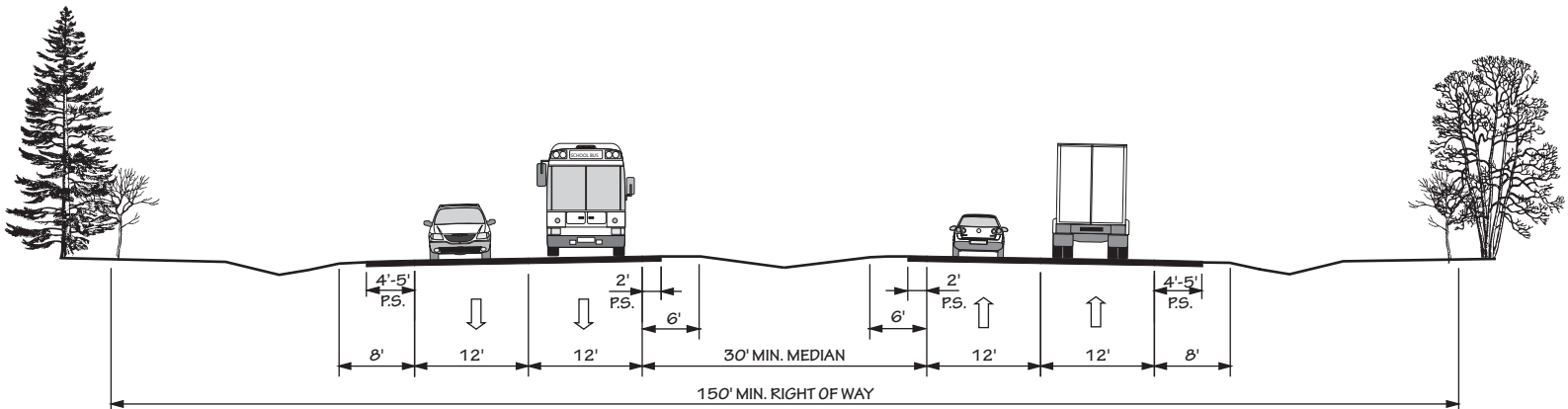
### 4 A

DIVIDED WITH MEDIAN  
FULL OR LIMITED CONTROL OF ACCESS



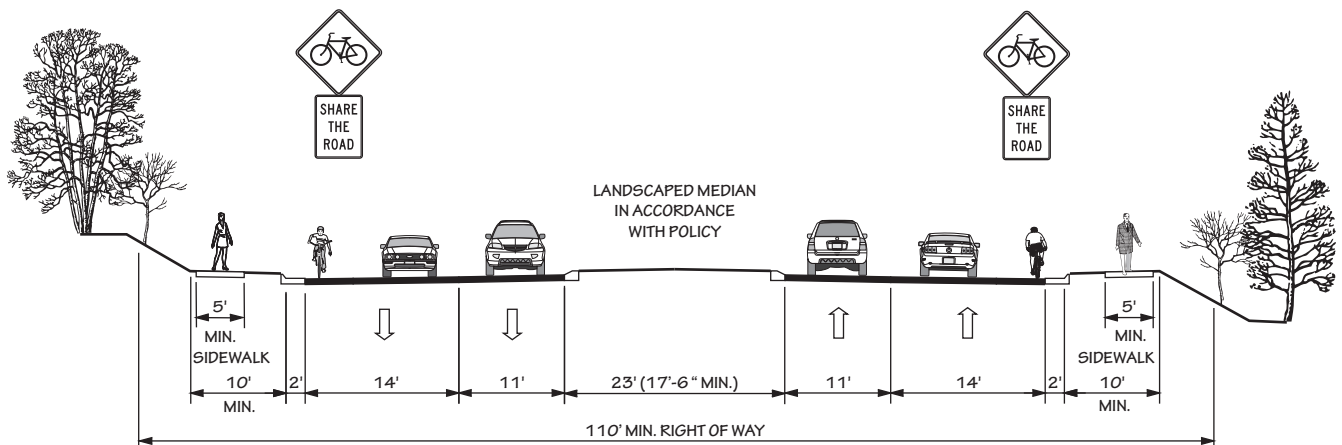
### 4 B

DIVIDED WITH MEDIAN - NO CURB & GUTTER  
PARTIAL CONTROL OF ACCESS



### 4 C

RAISED MEDIAN WITH WIDE OUTSIDE LANES AND SIDEWALKS

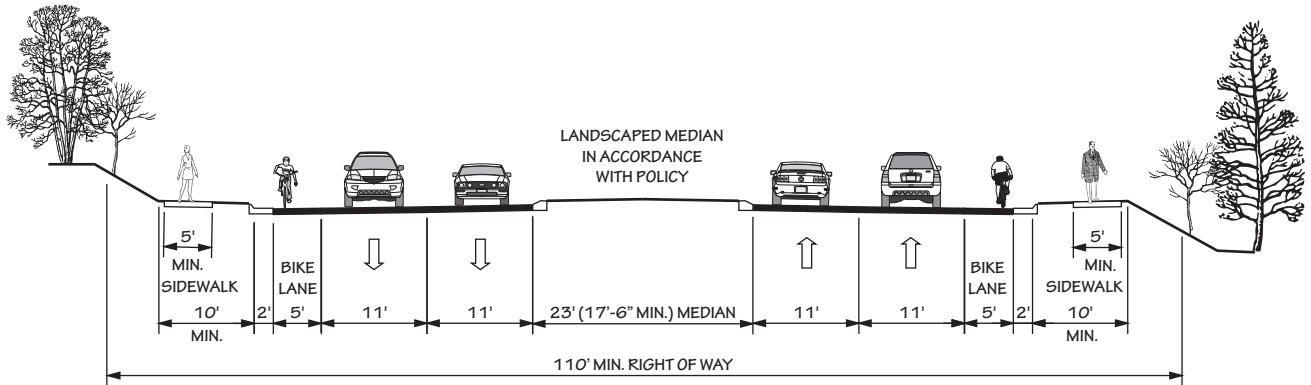


# TYPICAL HIGHWAY CROSS SECTIONS

## 4 LANES

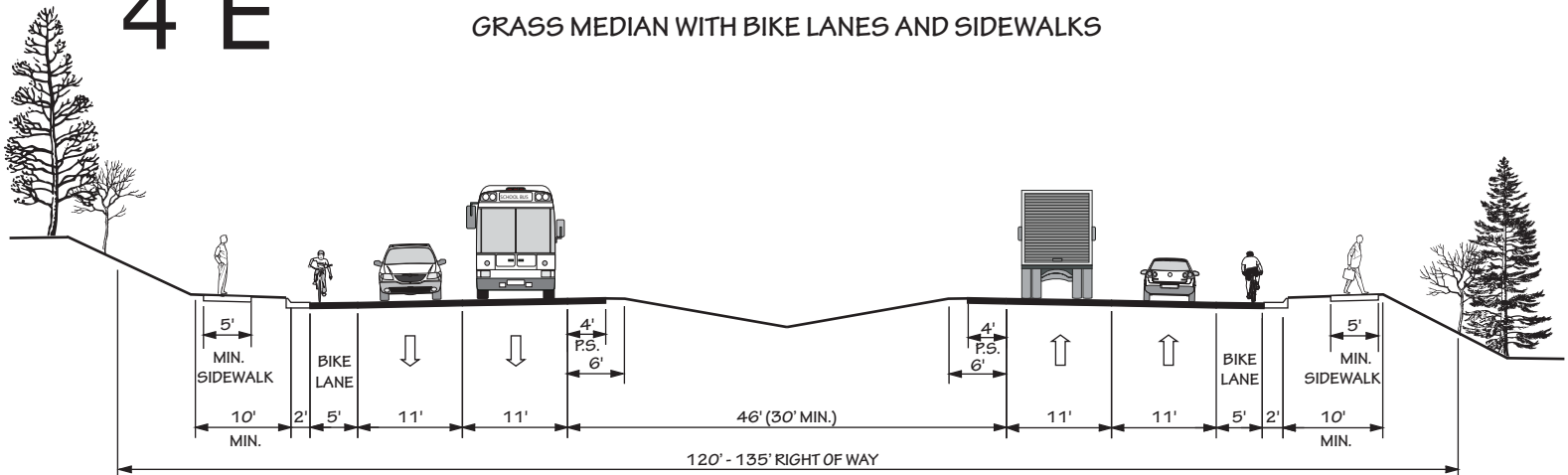
### 4 D

RAISED MEDIAN - CURB & GUTTER WITH BIKE LANES AND SIDEWALKS



### 4 E

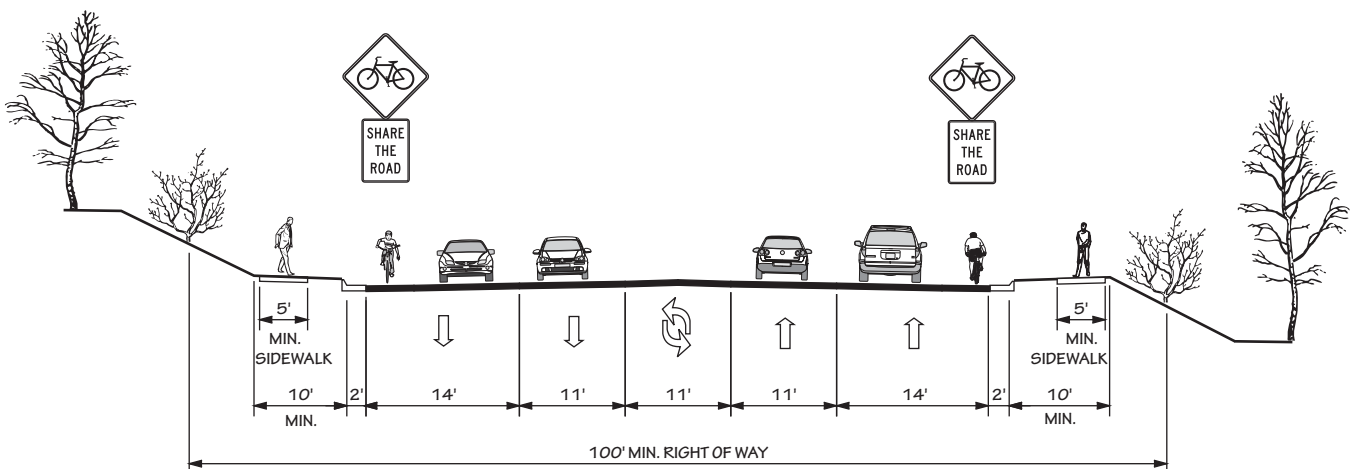
GRASS MEDIAN WITH BIKE LANES AND SIDEWALKS



## 5 LANES

### 5 A

WIDE OUTSIDE LANES

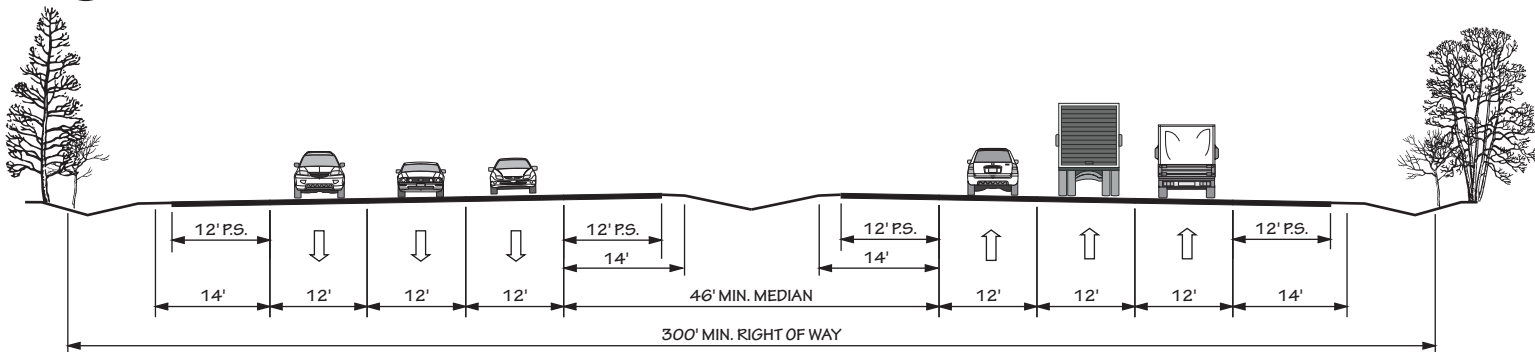


# TYPICAL HIGHWAY CROSS SECTIONS

## 6 LANES

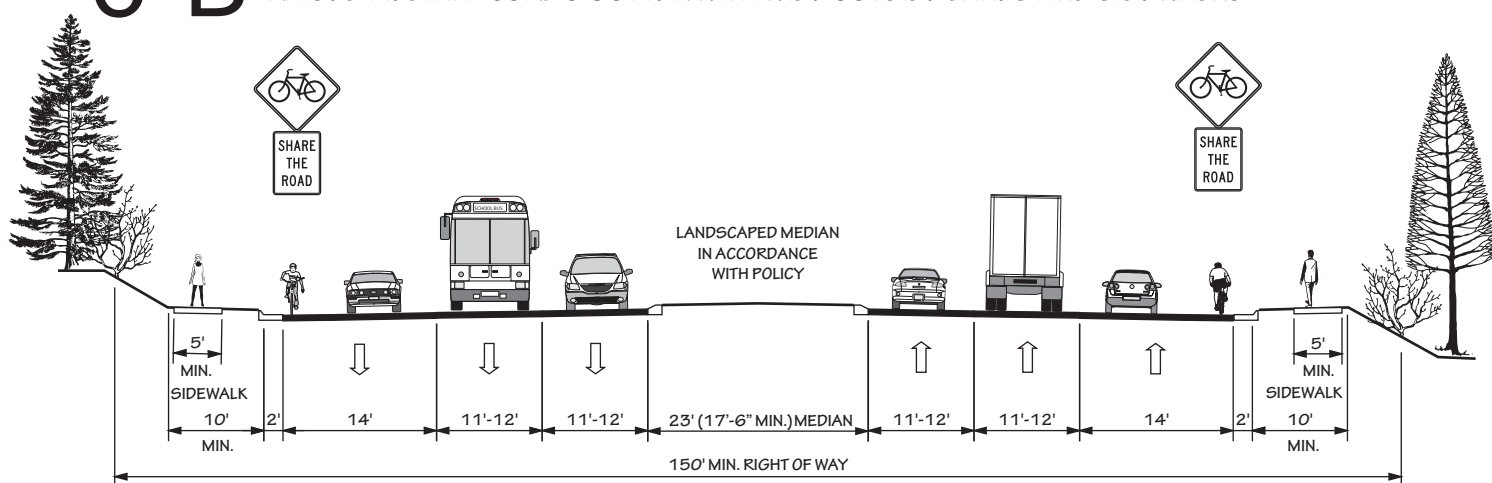
### 6 A

DIVIDED WITH GRASS MEDIAN



### 6 B

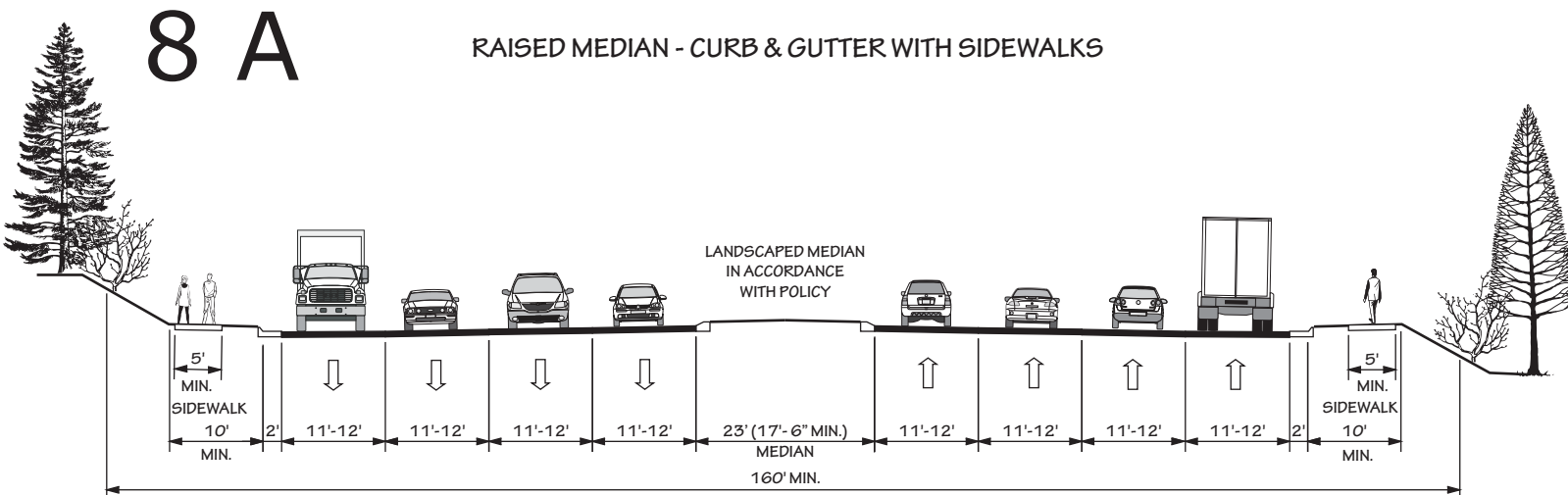
RAISED MEDIAN - CURB & GUTTER WITH WIDE OUTSIDE LANES AND SIDEWALKS



## 8 LANES

### 8 A

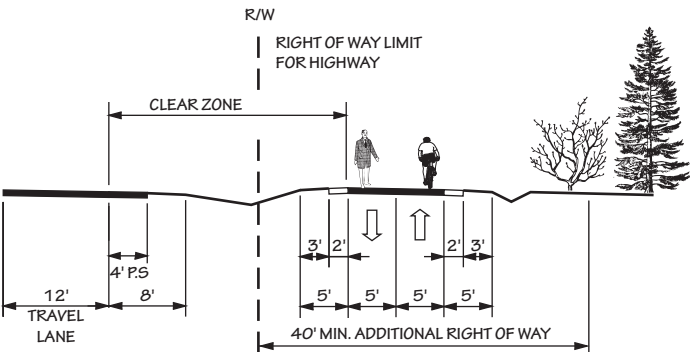
RAISED MEDIAN - CURB & GUTTER WITH SIDEWALKS



# TYPICAL MULTI - USE PATH

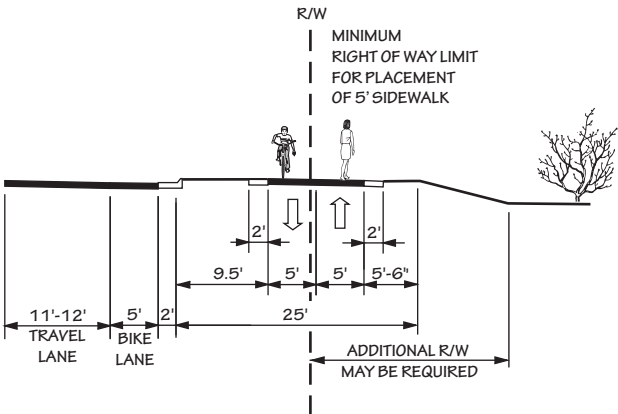
MULTI - USE PATH  
ADJACENT TO RIGHT OF WAY OR SEPARATE PATHWAY

M A



MULTI - USE PATH ADJACENT TO CURB AND GUTTER

M B



## Appendix E

### Level of Service Definitions

The relationship of travel demand compared to the roadway capacity determines the level of service (LOS) of a roadway. Six levels of service identify the range of possible conditions. Designations range from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions.

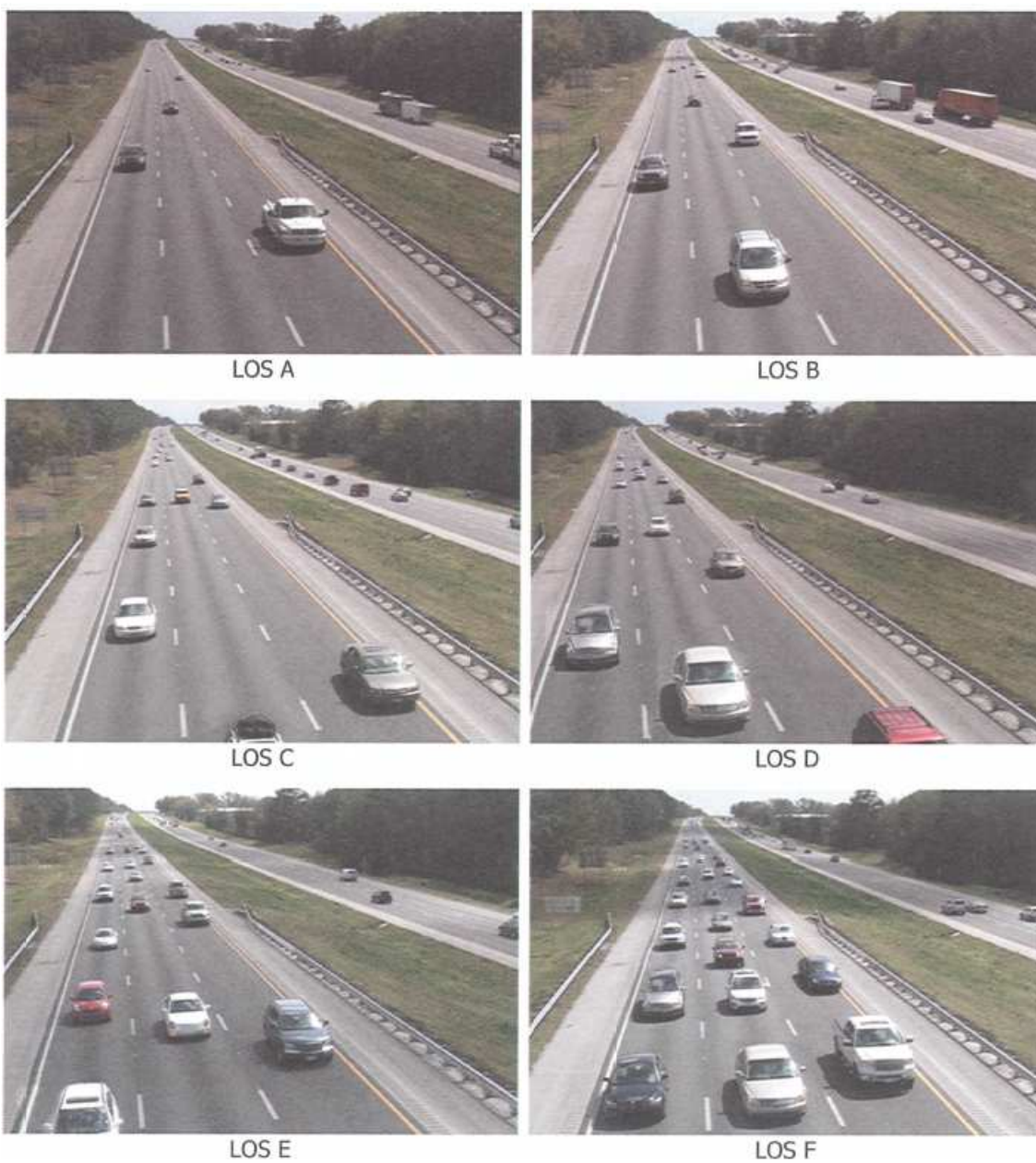
Design requirements for roadways vary according to the desired capacity and level of service. LOS D indicates “practical capacity” of a roadway, or the capacity at which the public begins to express dissatisfaction. Recommended improvements and overall design of the transportation plan were based upon achieving a minimum LOS D on existing facilities and a LOS C on new facilities. The six levels of service are described below and illustrated in Figure 9.

- **LOS A**: Describes free-flow operations. Free Flow Speed (FFS) prevails and vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The effects of incidents or point breakdowns are easily absorbed.
- **LOS B**: Represents reasonably free-flow operations, and FFS is maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.
- **LOS C**: Provides for flow with speeds near the FFS. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service quality will be significant. Queues may be expected to form behind any significant blockages.
- **LOS D**: The level at which speeds begin to decline with increasing flows, with density increasing more quickly. Freedom to maneuver within the traffic stream is seriously limited and drivers experience reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.
- **LOS E**: Describes operation at capacity. Operations at this level are highly volatile because there are virtually no usable gaps within the traffic stream, leaving little room to maneuver within the traffic stream. Any disruption to the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown and substantial queuing. The physical and psychological comfort afforded to drivers is poor.
- **LOS F**: Describes breakdown, or unstable flow. Such conditions exist within queues forming behind bottlenecks.

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Figure 9 - Level of Service Illustrations

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Source: 2010 Highway Capacity Manual, Exhibit 11-4

## Appendix F

### Traffic Crash Analysis

A crash analysis performed for the Watauga County CTP considered crash frequency, crash type, and crash severity. Crash frequency is the total number of reported crashes and contributes to the ranking of the most problematic intersections. Crash type provides a general description of the crash and allows the identification of any trends that may be correctable through roadway or intersection improvements. Crash severity is the crash rate based upon injuries and property damage incurred.

The severity of every crash is measured with a series of weighting factors developed by the NCDOT Division of Highways (DOH). These factors define a fatal or incapacitating crash as 47.7 times more severe than one involving only property damage and a crash resulting in minor injury is 11.8 times more severe than one with only property damage. In general, a higher severity index indicates more severe crashes. Listed below are levels of severity for various severity index ranges.

<u>Severity</u>	<u>Severity Index</u>
low	< 6.0
average	6.0 to 7.0
moderate	7.0 to 14.0
high	14.0 to 20.0
very high	> 20.0

Table 4 depicts a summary of the crashes occurring in the planning area between January 1, 2006 and December 31, 2008. The data represents locations with 10 or more crashes and/or a severity average greater than that of the state's severity for an injury crash (8.4). The "Total" column indicates the total number of crashes reported within 150-ft of the intersection during the study period. The severity listed is the average crash severity for that location.

**Table 4 – Crash Locations**

Map Index	Road A	Road B	Average Severity	Total Crashes
1	NC 105	BLOWING ROCK RD	2.48	79
2	NC 105	KING ST	2.48	42
3	NC 105	WILSON DR	2.23	40
4	KING ST	NEW MARKET BLVD	1.70	40
5	JEFFERSON RD	KING ST	2.90	38
6	BLOWING ROCK RD	WATAUGA VILLAGE DR	3.67	33
7	LEOLA ST	WATAUGA VILLAGE DR	1.80	32



Map Index	Road A	Road B	Average Severity	Total Crashes
8	KING ST	WATER ST	2.02	31
9	BLOWING ROCK RD	WINKLER CREEK RD	1.97	31
10	BLOWING ROCK RD	BOONE HEIGHTS DR	1.92	28
11	BLOWING ROCK RD	RIVERS ST	2.25	27
12	WATAUGA VILLAGE DR	WATAUGA VILLAGE DR	1.00	25
13	NC 105	HIGHLAND AVE	2.69	24
14	HARDEN ST	KING ST	1.31	24
15	BLOWING ROCK RD	MEADOW VIEW DR	5.39	24
16	US 421	SR 1104	2.27	24
17	FARTHING ST	KING ST	2.71	22
18	US 321	US 421	4.29	21
19	US 421	SR 1107	2.07	21
20	BLOWING ROCK RD	SHADOWLINE DR	1.64	20
21	DEPOT ST	KING ST	2.01	20
22	US 321	US 321 BUS	1.82	30
23	BLOWING ROCK RD	LONGVIEW	2.23	19
24	NC 105	POPLAR GROVE	8.56	19
25	COLLEGE ST	KING ST	2.11	19
26	RIVERS ST	STADIUM DR	3.78	18
27	BOONE HEIGHTS DR	STATE FARM RD	1.00	17
28	BLOWING ROCK RD	POSTELL ST	2.18	17
29	NC 105	HOMESPUN HILLS	2.84	17
30	HARDEN ST	HOWARD ST	1.70	17
31	US 421	SR 1672	3.47	16
32	US 221	US 421	8.00	16
33	DANIEL BOONE DR	KING ST	2.23	15
34	DEERFIELD RD	STATE FARM RD	2.93	15
35	CHESTNUT DR	KING ST	2.96	15
36	KING ST	WOOD Cr	2.41	15
37	BLOWING ROCK RD	PRIDE DR	3.64	14
38	APPALACHIAN ST	KING ST	1.67	14
39	NC 105	HIGH SCHOOL DR	2.48	14
40	NC 105	NC 105	2.48	14
41	CENTER ST	RIVERS ST	17.64	13
42	NC 105	QUAIL DR	1.87	13
43	GRAND BLVD	KING	2.14	13
44	US 421	SR 1514	8.49	13

Map Index	Road A	Road B	Average Severity	Total Crashes
45	KING	STRAIGHT	8.54	13
46	SR 1522	SR 1523	3.96	12
47	HORN IN THE WEST DR	KING	2.35	12
48	NC 105	SR 1568	2.35	12
49	KING	OAK ST	2.23	12
50	NC 105	STATE FARM	2.41	12
51	SR 1104	SR 1107	3.69	11
52	NC 105	POPLAR HILL	8.56	11
53	HILLSIDE DR	KING	1.82	10
54	DEPOT ST	HOWARD ST	2.35	10
55	SR 1514	SR 1614	6.92	10
56	BLOWING ROCK RD	DEERFIELD	2.85	10
57	NC 105	FACULTY ST	1.37	10
59	NC 105	SR 1113	3.31	10
60	US 321	SUNSET	11.54	10
61	US 321	CORNISH	14.87	6
62	NC 105	AMBLING	13.63	6
63	US 321	SR 1541	19.12	5
64	DEPOT	RIVER	21.80	4
65	FURMAN	STATE FARM	26.27	3
66	NC 194	SR 1328	42.60	2
67	NC 194	SR 1233	38.90	2
68	US 421	SR 1505	38.90	2
69	SR 1523	SR 1626	38.90	2
70	US 421	SR 1306	76.80	1
71	SR 1233	SR 1513	76.80	1
72	HEMLOCK	TANGLEWOOD	76.80	1
73	DEERFIELD	DOCTORS	76.80	1

The NCDOT is actively involved with investigating and improving many of these locations. To request a more detailed analysis for any of the locations listed in Table 4 or other intersections of concern, contact the Division Traffic Engineer. Contact information for the Division Traffic Engineer is included in Appendix A.

## **Appendix G**

### **Bridge Deficiency Assessment**

The State Transportation Improvement Program (STIP) development process for bridge projects involves consideration of several evaluation methods in order to prioritize needed improvements. A sufficiency index is used to determine whether a bridge is sufficient to remain in service, or to what extent it is deficient. The index is a percentage in which 100 percent represents an entirely sufficient bridge and zero represents an entirely insufficient or deficient bridge. Factors evaluated in calculating the index are listed below.

- structural adequacy and safety
- serviceability and functional obsolescence
- essentiality for public use
- type of structure
- traffic safety features

The NCDOT Structures Management Unit inspects all bridges in North Carolina at least once every two years. A sufficiency rating for each bridge is calculated and establishes the eligibility and priority for replacement. Bridges having the highest priority are replaced as federal and state funds become available.

A bridge is considered deficient if it is either structurally deficient or functionally obsolete. Structurally deficient means there are elements of the bridge that need to be monitored and/or repaired. The fact that a bridge is "structurally deficient" does not imply that it is likely to collapse or that it is unsafe. It means the bridge must be monitored, inspected, and repaired/replaced at an appropriate time to maintain its structural integrity. A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand or to meet the current geometric standards, or those that may be occasionally flooded.

A bridge must be classified as deficient in order to qualify for federal replacement funds. Additionally, the sufficiency rating must be less than 50% to qualify for replacement or less than 80% to qualify for rehabilitation under federal funding. Deficient bridges located on roads evaluated as a part of the CTP are shown in Table 5. For more information on deficient bridges within the planning area, contact the Structures Management Unit using the information in Appendix A.

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**Table 5 - Deficient Bridges**

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Bridge ID	Facility	Feature	Condition	Local ID
5	NC 105	Watauga River	Structurally Deficient	R-2566
6	SR 1559	Watauga River	Structurally Deficient	
27	NC 194	Watauga River	Functionally Obsolete	
29	US 321	Cove Creek	Functionally Obsolete	B-4688
55	SR 1557	Creek	Structurally Deficient	B-5118
62	NC 194	Bairds Creek	Functionally Obsolete	
68	NC 194	Bairds Creek	Structurally Deficient	
70	NC 194	Bairds Creek	Functionally Obsolete	
71	SR 1109	Creek	Structurally Deficient	
93	SR 1109	Creek	Structurally Deficient	
136	SR 1533	Middle Fork Creek	Functionally Obsolete	
142	SR 1359	Creek	Structurally Deficient	
161	SR 1114	Watauga River	Functionally Obsolete	
175	SR 1524	Goshen Creek	Functionally Obsolete	
330	Blue Ridge Pkwy	SR1510	Functionally Obsolete	
343	Blue Ridge Pkwy	SR1538	Functionally Obsolete	
344	Blue Ridge Pkwy	SR1508	Functionally Obsolete	
359	Blue Ridge Pkwy	SR1529	Functionally Obsolete	
363	Blue Ridge Pkwy	SR1505	Functionally Obsolete	

## **Appendix H**

### **Public Involvement**

This appendix documents the public involvement process and includes a listing of steering committee members, the goals and objectives survey results, and public meetings held throughout the development of the CTP.

#### **List of CTP Steering Committee Members**

At the start of a CTP study, a committee is formed that is comprised of individuals who represent the various needs, issues and populations of the community. These representatives are responsible for capturing the transportation needs of the community relative to all modes of transportation and for guiding the development of the CTP. A listing of committee members for the Watauga County CTP is given below.

- Blake Brown, Boone Public Works Director / Bicycle and Pedestrian Representative
- John Cooper, Watauga County Commissioner
- David Ehmig, Seven Devils Town Council
- Ed Evans, Seven Devils Town Manager
- Joe Furman, Watauga County Planning and Inspections Director
- Tim Futrelle, Watauga County Commissioner (Alternate)
- Mike Hall, Boone Chamber Trans. Comm. Chair / Economic Development Representative
- Dean Ledbetter, Division 11 Senior Planning Engineer
- Lynne Mason, Boone Town Council
- Dan Meyer, Boone Chamber President / Economic Development Representative (Alternate)
- Mike O'Connor, Director of Physical Plant ASU
- Rick Owen, Mayor of Beech Mountain
- Stephen Phillips, Boone Town Council (Alternate)
- Michael Poe, NCDOT Division 11 - District 2 Engineer
- Kevin Rothrock, Blowing Rock Planning Director
- Mike Salzono, Blue Ridge Conservancy Environmental Representative
- Jes Scott, Beech Mountain Planner
- Jim Steele, Blowing Rock Town Council
- Chris Turner, AppalCART Director
- Greg Young, Boone Town Manager

#### **CTP Vision, Goals, Objectives and MOEs**

The CTP vision, goals and objectives are developed as part of the public involvement process and help identify how the people within an area would like to develop the transportation system (all modes). The CTP committee develops the draft vision, goals, objectives, and MOEs which are further refined with input from citizens via the CTP

Goals & Objectives (G&O) survey. These products become the official guide for the CTP being developed.

The vision statement, goals and objectives reflect what is important for the area and defines any local preferences concerning the transportation system and community assets. The vision statement is the framework for the area's strategic planning. Goals and objectives document how the area plans to fulfill its vision. The goals break down the vision statement into themes, while the objectives document how the area plans to make progress towards achieving each goal. MOEs are established to enable the area to track the progress of each objective.

### **Watauga County CTP Vision (December 2, 2010)**

To develop and maintain a Comprehensive Transportation Plan that promotes and preserves the quality of life and economic vitality of Watauga County and all its municipalities while understanding there is a wide variety of stakeholders to consider. This will be accomplished by providing a financially responsible system that is safe, accessible, environmentally responsible, efficient, preserves the character of the area, and is multi-modal. The plan will promote connectivity both locally and regionally through vehicular and non-vehicular modes.

#### **Goals:**

1. Protect environmentally sensitive areas<sup>\*</sup>
  - A. Objective: Document public comments on transportation initiatives that could adversely affect ***sensitive areas of local importance***<sup>2</sup>
2. Be financially responsible with the transportation system
  - A. Objective: Be considerate of the potential life span of improvements

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<sup>\*</sup> There are several things that are automatically considered during a CTP process or project planning that do not necessarily have to be restated in the local goals and objectives.

1. NCDOT goals will be considered during the development of the CTP:
  - Make our transportation network safer.
  - Make our transportation network move people and goods more efficiently
  - Make our infrastructure last longer.
  - Make our organization a place that works well.
  - Make our organization a great place to work.
2. Strategic Highway Corridors: Per NCDOT guidance, individual Comprehensive Transportation Plans will incorporate the long-term vision of each Strategic Highway Corridor.
3. Minimizing human and environmental impacts will be considered during the study of alternatives for all state and federally funded projects.
4. All Construction projects, including Contract Construction, Road Maintenance, and Bridge Maintenance projects are reviewed on a monthly basis to check for compliance with the Sedimentation and Pollution Control Act (SPCA).

<sup>2</sup> ***sensitive areas of local importance:*** Specific areas for Watauga County include the NC 105 corridor and the night sky.



- i. Measure: Projects should maintain Level Of Service (LOS) D throughout the study horizon of 2040
  - B. Objective: Perform a planning level cost – benefit analysis over each project’s **life cycle**<sup>3</sup>
- 3. Enhance transportation elements that are important to economic vitality
  - A. Objective: Prefer road designs that promote multimodal service to commercial businesses and **activity centers**<sup>4</sup>
    - i. Measure: Number of businesses with **adequate access**<sup>5</sup>
  - B. Objective: Recognize regional connectivity as an economic driver
  - C. Objective: Recognize critical populations to economy and their needs
    - i. University students need **adequate access** to transit and non-vehicular modes
    - ii. Tourists need **adequate access** plus additional information, signs, and maps. Some areas are deficient in this.
- 4. Provide efficient movement of all transportation modes
  - A. Objective: All improvements identified with the adoption of this plan shall, where practical, encourage safe pedestrian, bicycle and vehicular travel; and provide access to public transportation
    - i. Measure: Reduce the overall annual average number of vehicular accidents for the county by **5%** by 2040. The most recent 3 year crash rate and number of accidents will be used to evaluate.
  - B. Objective: **Separate**<sup>6</sup>, where possible, pedestrian ways and bike routes from vehicular areas
    - i. Measure: Miles of bike trails and sidewalks
  - C. Objective: Consider alternative designs/treatments and access management options when evaluating projects included in the adoption of this plan
    - i. Measure: Number of vehicles stopped at a traffic signal for more than one cycle at an acceptable cycle length
    - ii. Measure: Percent of traffic able to flow at the posted speed
  - D. Objective: Get fixed routes down to 30 minute headways in the Town of Boone
- 5. Pursue measures that reduce vehicular traffic and dependence
  - A. Objective: Use park and ride lots at congested areas
    - i. Measure: Increase the number of park and ride spots by 800

<sup>3</sup> **Life cycle** cost will be construction cost plus 20 years unless otherwise determined

<sup>4</sup> **activity centers**: Key activity centers for Watauga County are ASU, schools, Blowing Rock, hospital, Cone Center, Price Park, Tweetsie, see list in Citizens Plan for Watauga County, Deep Gap, Senior Center, Valle Cruses, parks, Conference center, B&Bs, Todd, Foscoe, ski resorts,

<sup>5</sup> **adequate access** is defined as Sidewalk within 50 yards, designated Bike facilities within 100 yards, or transit stops within ¼ mile.

<sup>6</sup> **Separate** Bike and Pedestrian facilities will be those where bikes or pedestrians can travel at least 3 feet from the flow of traffic, therefore a 4ft shoulder satisfies but not a 2ft shoulder, even though both are connected to the road. Trails and Paths on their own right of way will of course qualify. Striped bike lanes are preferred versus just a paved shoulder in municipal areas. Paved shoulders on county primary roads are acceptable.

- B. Objective: Provide for alternative modes of transportation between towns of Boone, Blowing Rock, Seven Devils, and Beech Mountain
    - i. Measure: Develop **accessible**<sup>7</sup> public transportation systems between the county's municipalities by 2020
    - ii. Measure: 20 Miles of bike facilities and sidewalks connecting municipalities
    - iii. Measure: Non-vehicular connector routes between communities and destinations within communities
  - C. Objective: Provide a continuous and interconnected system of sidewalks in and around Boone and Blowing Rock.
    - i. Measure: Percent of streets with sidewalks on both sides of the street within **Central Business Districts**<sup>8</sup> (CBD) as topography allows
    - ii. Measure: Percent of streets with sidewalks on at least one side of the street in other areas, but both sides is preferable as topography allows
  - D. Objective: Develop a continuous, direct, and coordinated system of regional bicycle facilities in and throughout Watauga County by 2040
    - i. Measure: Add 25 new miles of total bike facilities in the county
    - ii. Measure: Interconnected all bike facilities in county
  - E. Objective: Projects included with the adoption of this plan shall, where possible, enhance interconnectivity and accessibility to **major local and regional destinations and activity centers**<sup>9</sup>
6. Ensure connectivity within the County and Region
    - A. Objective: Provide for alternative modes of transportation between towns
      - i. Measure: see 5-B above
    - B. Objective: Develop a continuous, direct, safe, and coordinated system of regional bicycle facilities in and throughout Watauga County by 2040
      - i. Measure: see 5-D above
    - C. Objective: Recognize regional connectivity as an economic driver
      - i. Measure: see 3-B above
  7. Ensure all construction and improvements are compatible with the local character of the area by minimizing **urban features**<sup>10</sup> of road projects
  8. Consider the needs and benefits of all stakeholders

## Goals and Objectives Survey

A G&O survey is a public involvement technique used to help identify an area's perception of transportation-related issues, identify concerns that should be addressed

<sup>7</sup> **accessible** is defined as Sidewalk within 50 yards, designated Bike facilities within 100 yards

<sup>8</sup> Central Business District for Boone will be "Primary Growth Area" and "Secondary Growth Area" from the "Boone 2030 Land Use Plan" adopted in 2009. For Blowing Rock it will be the "Town Center" as defined in chapter 1.D in the 2004 Comprehensive Plan.

<sup>9</sup> **major local and regional destinations and activity centers** include the following ...

<sup>10</sup> **urban features**: include street lights, signs, billboards, concrete medians, retaining walls, and others that do not maintain the mountain character

during the development of a CTP, and to help develop a vision for the community. The G&O survey is most appropriately implemented at the beginning of the transportation planning study. In addition to determining up front what is important to the citizens of the planning area, initiating the G&O survey early in the planning process allows the survey to serve as an introduction to the transportation planning process. The survey usually includes a brief introduction explaining what a transportation plan is and how the area can benefit from having one. The survey also includes a wide variety of questions that is tailored to each area as appropriate. A summary of the Watauga County G & O survey is given below.

1. Please provide the zip code of your local residence.

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
28604	0.0%	7.4%
28605	3.4%	7.0%
28607	56.9%	62.4%
28608	24.1%	2.6%
28618	5.2%	3.1%
28679	1.7%	4.0%
28684	0.0%	2.5%
28692	8.6%	7.6%
28698	0.0%	3.5%

2. Which would you describe yourself as?

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
Resident (Full Time)	0.0%	88.6%
Resident (Part Time)	0.0%	3.8%
Student (living on campus)	22.6%	1.4%
Student (living off campus)	77.4%	4.9%
Visitor	0.0%	1.2%

3. On average, how many months do you spend in Watauga County each year?

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
Less than 1 month per year	0.0%	0.5%
1 to 3 months per year	8.2%	1.5%
3 to 6 months per year	3.3%	1.0%
6 to 9 months per year	29.5%	3.3%
9 to 12 months per year	49.2%	10.5%
I am a fulltime resident	9.8%	83.2%

4. On a normal day, approximately how much of your travel takes place within Watauga County?

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
25%	1.7%	2.2%
50%	8.3%	4.9%
75%	26.7%	15.3%
100%	63.3%	77.6%

5. Please select the destination of your typical daily commute (work, school, or shopping).

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
Town of Beech Mountain	0.0%	0.7%
Town of Blowing Rock	3.2%	2.8%
Town of Boone	17.7%	51.2%
Town of Seven Devils	0.0%	0.7%
Watauga County	11.3%	14.0%
Ashe County	1.6%	1.0%
Avery County	3.2%	1.4%
Caldwell County	3.2%	1.3%
Wilkes County	0.0%	1.0%
Tennessee	3.2%	0.5%
ASU	54.8%	21.6%
Unemployed / Does not apply	1.6%	1.4%
Other	0.0%	2.2%

6. How do you typically commute?

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
Bicycle	3.2%	2.0%
Bus	25.8%	3.7%
Car	45.2%	86.8%
Carpool	6.5%	2.5%
Walk	19.4%	5.0%

7. Approximately how far is your daily commute?

*Student*

<b>Answer Options</b>	<b>Less than Five</b>	<b>Six to Ten</b>	<b>Eleven to Fifteen</b>	<b>Sixteen to Twenty</b>	<b>More than Twenty</b>	<b>Response Count</b>
Miles	32 (52%)	17 (28%)	5 (8%)	2 (3%)	5 (8%)	61
Minutes	5 (9%)	19 (33%)	17 (29 %)	5 (9%)	12 (21%)	58

*Total*

<b>Answer Options</b>	<b>Less than Five</b>	<b>Six to Ten</b>	<b>Eleven to Fifteen</b>	<b>Sixteen to Twenty</b>	<b>More than Twenty</b>	<b>Response Count</b>
Miles	310 (33%)	286 (31%)	165 (18%)	71 (8%)	94 (10%)	926
Minutes	41 (6%)	144 (20%)	174 (25 %)	148 (21%)	203 (29%)	710

8. Please rate each of the transportation system goals from 1-Not Important to 5-Very Important.

*Student*

<b>Answer Options</b>	<b>1-Not Important</b>	<b>2-Less Important</b>	<b>3-Neutral</b>	<b>4-Important</b>	<b>5-Very Important</b>	<b>Response Count</b>
Service to Elderly and Disabled	2	6	18	19	15	60
Consistent Travel Times	0	3	12	18	27	60
Reduced Congestion	0	5	6	23	26	60
Transportation Mode Choice (Walking, Biking)	3	3	15	18	22	61
Expand Public Transit Options (AppalCART)	0	5	4	20	31	60
Economic Growth	2	6	21	22	9	60
Environmental Protection	1	8	5	26	20	60
Community and Cultural Preservation	1	3	12	29	15	60
Regional Connectivity	1	7	15	24	12	59

*Total*

<b>Answer Options</b>	<b>1-Not Important</b>	<b>2-Less Important</b>	<b>3-Neutral</b>	<b>4-Important</b>	<b>5-Very Important</b>	<b>Response Count</b>
Service to Elderly and Disabled	28	53	174	338	372	965
Consistent Travel Times	23	57	184	404	292	960
Reduced Congestion	15	28	99	342	481	965
Transportation Mode Choice (Walking, Biking)	45	59	183	245	421	953
Expand Public Transit Options (AppalCART)	28	51	190	312	384	965
Economic Growth	44	88	253	353	223	961
Environmental Protection	19	39	114	313	478	963
Community and Cultural Preservation	22	42	157	363	380	964
Regional Connectivity	20	80	186	387	275	948

9. Of the choices in the previous question (number 8), which is the single Most Important to you, and single Least Important to you?

<b>Most Important - Student</b>										
<b>Answer Options</b>	<b>Service of Elderly &amp; Disabled Needs</b>	<b>Consistent Travel Times</b>	<b>Reduce Congestion</b>	<b>Expand Public Transit</b>	<b>Economic Growth</b>	<b>Community and Cultural Preservation</b>	<b>Environmental Protection</b>	<b>Transportation Mode Choice (Walking &amp; Biking)</b>	<b>Regional Connectivity</b>	<b>Response Count</b>
Choose One of each	2	13	14	8	1	1	9	11	2	61



Least Important - Student										
Answer Options	Service of Elderly & Disabled Needs	Consistent Travel Times	Reduce Congestion	Expand Public Transit	Economic Growth	Community and Cultural Preservation	Environmental Protection	Transportation Mode Choice (Walking & Biking)	Regional Connectivity	Response Count
Choose One of each	6	8	4	1	11	3	3	13	11	60

Most Important - Total										
Answer Options	Service of Elderly & Disabled Needs	Consistent Travel Times	Reduce Congestion	Expand Public Transit	Economic Growth	Community and Cultural Preservation	Environmental Protection	Transportation Mode Choice (Walking & Biking)	Regional Connectivity	Response Count
Choose One of each	65	68	256	108	54	39	100	216	29	935

Least Important - Total										
Answer Options	Service of Elderly & Disabled Needs	Consistent Travel Times	Reduce Congestion	Expand Public Transit	Economic Growth	Community and Cultural Preservation	Environmental Protection	Transportation Mode Choice (Walking & Biking)	Regional Connectivity	Response Count
Choose One of each	70	149	34	77	171	67	35	125	186	914

10. In deciding where to live, which of the following do you prefer? (Check all that apply)

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
Rural/Country living	22.4%	57.2%
New residential areas	6.1%	6.6%
New areas with mix of uses	26.5%	12.0%
Access to Transit	57.1%	20.1%
In Town living	61.2%	30.0%
Older/established residential areas	14.3%	19.7%
Older/established areas with mix of uses	22.4%	15.5%
<b>49 answered question; 13 skipped question</b>		

11. What routes in Watauga County do you most commonly use?

<b>Students (60)</b>		<b>Commonly Used</b>	<b>Total Response (943)</b>	
<b>Number</b>	<b>Percentage</b>		<b>Number</b>	<b>Percentage</b>
23	38.3%	US 421	521	55.2%
28	46.7%	US 321	445	47.2%
1	1.7%	US 221	32	3.4%
0	0.0%	NC 194	106	11.2%
23	38.3%	NC 105	339	35.9%
2	3.3%	NC 105 Bypass	30	3.2%
16	26.7%	King Street	206	21.8%
0	0.0%	Wilson Ridge	29	3.1%
0	0.0%	Bamboo	60	6.4%
0	0.0%	Deerfield	58	6.2%
5	8.3%	River Street	54	5.7%
1	1.7%	Poplar	29	3.1%
0	0.0%	New Market	14	1.5%
3	5.0%	Blowing Rock Road	51	5.4%
11	18.3%	Blowing Rock	0	0.0%
0	0.0%	State Farm	37	3.9%
0	0.0%	Old 421	24	2.5%

12. When traveling in your area, do you find that you often have to go out of your way to get to your destination because the most direct route is too congested? If yes, please list specific locations of problems and alternate routes taken.

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
No	55.2%	42.1%
Yes	44.8%	57.9%
<b>answered question</b>	<b>58</b>	
<b>skipped question</b>	<b>4</b>	

13. What are the key transportation challenges you face in Watauga County?

Student (53)		Challenge	Total (851)	
Number	Percentage		Number	Percentage
6	11.3%	Bikes or Bicycles	181	21.3%
4	7.5%	Pedestrian or Sidewalk	100	11.8%
11	20.8%	Congestion	187	22.0%
2	3.8%	Safe or unsafe	70	8.2%
0	0.0%	Ice	38	4.5%
2	3.8%	Snow	49	5.8%
1	1.9%	Weather	28	3.3%
7	13.2%	King Street	121	14.2%
3	5.7%	Parking	29	3.4%
9	17.0%	Bus	38	4.5%

14. What destinations in Watauga County are difficult to access?

Student (36)		Destinations	Total (671)	
Number	Percentage		Number	Percentage
1	2.8%	Downtown	134	20.0%
6	16.7%	King St	114	17.0%
4	11.1%	NC 105	74	11.0%
5	13.9%	US 321	68	10.1%
4	11.1%	US 421	56	8.3%
4	11.1%	ASU	50	7.5%
0	0.0%	School	13	1.9%
0	0.0%	Valle Cruse	13	1.9%
2	5.6%	Wal-mart	1	0.1%
0	0.0%	Broadstone	0	0.0%
3	8.3%	Parking	29	4.3%
1	2.8%	Greenway	11	1.6%
6	16.7%	Campus	17	2.5%

15. To address the traffic problems in the area, which improvements should be considered? (Check all that apply)

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
Widen existing roads	34.7%	34.5%
Add turn lanes	38.8%	49.2%
Improve pavement and bridges	40.8%	35.1%
Increase bus service	61.2%	40.7%
Build new roadways	18.4%	19.9%
Access controls	10.2%	21.6%
Add on-road bike lanes	53.1%	59.2%
Expand sidewalks	46.9%	47.3%
Greenways and off-road paths	36.7%	50.5%
Park-and-Ride lots	44.9%	40.0%
Provide better information	22.4%	14.3%
Improving intersection design	61.2%	50.7%

16. Should we be spending more or less money on the following?

*Student*

<b>Answer Options</b>	<b>Much Less</b>	<b>Less</b>	<b>Same</b>	<b>More</b>	<b>Much More</b>	<b>Response Count</b>
Maintaining existing residential roads/streets	0	3	30	22	5	60
Building new major roads	6	17	20	15	2	60
Maintaining major streets, roads, and highways	0	7	21	18	14	60
Paving unpaved roads	5	10	30	11	4	60
Creating or expanding bus service	0	5	11	30	14	60
Expanding carpooling or vanpooling programs	2	7	21	23	7	60
Building new sidewalks	0	8	17	21	14	60
Building new bike lanes	1	9	17	21	12	60
Building new greenways	1	10	21	18	9	59
Providing streetlights	0	3	29	23	5	60
Providing signage	0	6	33	18	3	60

*Total*

<b>Answer Options</b>	<b>Much Less</b>	<b>Less</b>	<b>Same</b>	<b>More</b>	<b>Much More</b>	<b>Response Count</b>
Maintaining existing residential roads/streets	11	44	449	320	99	923
Building new major roads	183	226	265	151	94	919
Maintaining major streets, roads, and highways	6	27	377	391	139	940
Paving unpaved roads	130	157	359	177	90	913
Creating or expanding bus service	34	75	296	345	174	924
Expanding carpooling or vanpooling programs	67	133	336	276	96	908
Building new sidewalks	34	80	245	306	259	924
Building new bike lanes	49	69	192	272	355	937
Building new greenways	57	77	224	265	294	917
Providing streetlights	56	117	457	209	64	903
Providing signage	42	95	497	187	59	880

17. If additional money is needed to fund transportation projects, which of the following would you be willing to support?

<b>Answer Options</b>	<b>Student</b>	<b>Total</b>
A gasoline tax increase	27.1%	37.9%
A property tax increase	41.7%	20.7%
A sales tax increase	33.3%	39.7%
Charging transportation fees to develop properties	39.6%	44.2%
A local bond referendum	22.9%	36.4%
None	10.4%	13.3%
Other (please specify)	12	12

18. How did you find out about the survey?

Answer Options	Student	Total
Newspaper	0.0%	4.8%
Radio	0.0%	0.2%
Library	2.3%	3.8%
AppalNet	60.5%	10.6%
Internet	23.3%	30.3%
E-mail	11.6%	44.0%
Town Hall	2.3%	1.8%
Planning Department	2.3%	1.4%
Word of Mouth	7.0%	10.1%
Other (please specify)	21	21

## Public Meetings

Brief summaries of public meetings held within the planning area are given below.

### Public Workshop # 1

A public drop-in session was held in Watauga County to present the transportation deficiencies and to solicit ideas for addressing the deficiencies. The meeting was held on April 12, 2012 at the Watauga County Courthouse. Four comment forms were submitted during this session. These comments ranged in concern including noise impacts, turn lanes, student housing, and general contact information.

### Intergovernmental Retreat Briefing

An intergovernmental retreat was held on October 11, 2012 at Appalachian State University. Each town and county's elected officials were invited to attend. They heard a series of presentations including access management and a summary of each proposed project in the CTP. This retreat was informational only and began a thirty-day public comment period that concluded with the second public workshop.

### Public Workshop # 2

A public drop-in session was held on November 8, 2012 at the High Country Council of Governments building. The purpose of this session was to present the proposed Comprehensive Transportation Plan to the public and solicit comments. Through survey responses and emails, 157 comments were received after this session. Comments received covered the entire spectrum from support to opposition, including all modes of transportation. The CTP committee considered these comments at their

next meeting and revised the draft plan accordingly. The most significant change relates to the proposed US 421 Bypass. Details on alternatives analyzed and feedback from the public can be found in Appendix J.

### **Public Hearings**

The following public hearings were held for the adoption of the Watauga County CTP. The purpose of the meetings was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during these meetings.

<u>Date</u>	<u>Jurisdiction</u>	<u>Meeting</u>
April 16, 2013	Watauga County	Board of Commissioners
June 18, 2013	Boone	Town Council
April 9, 2013	Beech Mountain	Town Council
March 12, 2013	Blowing Rock	Town Council
April 9, 2013	Seven Devils	Town Council



## **Appendix I**

### **Socio-Economic Data Forecasting Methodology**

In the development of the Watauga County CTP, existing and anticipated deficiencies were determined through an analysis of the transportation system looking at both current and future travel patterns. Two analysis methods were used: one for the non-modeled/rural areas and another for the urbanized area around Boone.

For the non-modeled/rural portions of Watauga County, including Blowing Rock, Beech Mountain, and Seven Devils, travel demand was projected from 2012 to 2040 using a trend line analysis based on Annual Average Daily Traffic (AADT) from 1990 to 2010. In addition, local land use plans and growth expectations were used to further refine future growth rates and patterns.

It is more difficult to predict future travel patterns in urban areas where there are more alternative route options. Therefore, for Boone and the surrounding area, travel demand was projected from 2012 to 2040 using a computerized travel demand model. Travel demand models are developed to replicate travel patterns on the existing transportation system as well as to estimate travel patterns for 2040. Additionally, travel demand models require a broad range of socio-economic input data such as population and employment. These inputs are available from sources like the U.S. Census Bureau for the year 2010, but data for 2040 is also required.

The Watauga County CTP Committee worked with NCDOT to estimate population growth, economic development potential, and land use trends to determine the potential impacts on the future transportation system in 2040. This data was endorsed by the CTP Committee on October 6, 2011. The established future growth rates were endorsed by the Watauga County Commissioners (November 1, 2011), Boone Town Council (November 15, 2011), Blowing Rock Town Council (November 15, 2011), Seven Devils Town Council (November 14, 2011), and Beech Mountain Town Council (November 15, 2011).

Below is a description of the methodology used in the analysis.

#### **Population**

Population trends were estimated using available data from the Office of State Budget and Management (OSBM) and simple linear growth. Population counts and projections through the year 2030 were taken from the OSBM website. The 2040 population was projected by applying the same growth rate as 2025 to 2030. For those years, an annual growth rate of 1.4% was used in Watauga County. The final totals for population and employment as well as the equivalent compound annual growth rate are presented in Table 6 below.

The CTP steering committee identified areas in Watauga County that would experience growth rates higher and lower than the county average. These are displayed in the

Figure 10. Growth rates for each intensity category are shown on the map. The areas in the “Middle” category are areas expected to grow at the same rate as the county average. Growth for Appalachian State University was based on the 2010 Citizens Plan for Watauga<sup>1</sup> 2030 projection and grown at 1% per year to 2040.

## Employment

Future employment conditions within Watauga County were developed from the CTP steering committee input and discussions. This included approximate locations and intensity for proposed employment centers. Any anticipated heavy demand on the future transportation system as a result of these proposals is accounted for in projected traffic volumes. Areas of anticipated higher employment growth and traffic growth are identified in Figure 11. Growth rates for each intensity category are shown on the map and in Table 7. Growth for Appalachian State University was based on the same student-to-staff and student-to-faculty ratios as existed in 2010.

**Table 6 – Socio-Economic Data**

Year	2010	2040	Compound Annual Growth Rate
Population	51,079	80,511	1.713%
Employment	21,728	36,230	1.719%

**Table 7 – Compound Annual Growth Rate 2010-2040**

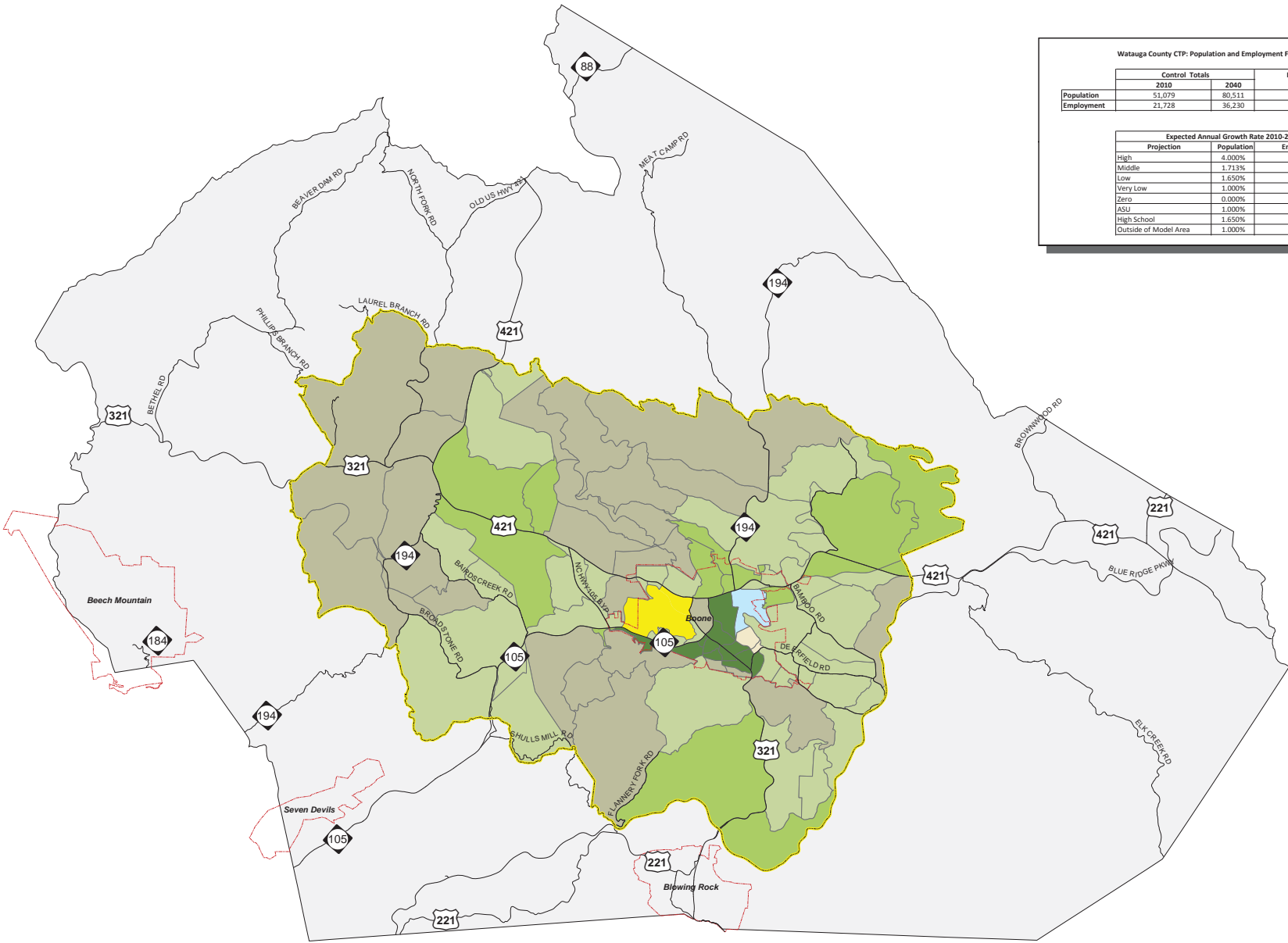
Projection	Population	Employment
High	4.000%	2.000%
Middle	1.713%	1.719%
Low	1.650%	0.500%
Very Low	1.000%	0.100%
Zero	0.000%	0.000%
ASU	1.000%	0.500%
High School	1.650%	0.500%
Outside Model Area	1.000%	0.100%

<sup>1</sup> The 2010 Citizens Plan for Watauga can be viewed at:  
[http://www.wataugacounty.org/main/App\\_Pages/Dept/Planning/citizensplan.aspx](http://www.wataugacounty.org/main/App_Pages/Dept/Planning/citizensplan.aspx)

Watauga County CTP: Population and Employment Forecast			
	Control Totals		Expected Annual Growth Rate
	2010	2040	
Population	51,079	80,511	1.713%
Employment	21,728	36,230	1.713%

Expected Annual Growth Rate 2010-2040		
Projection	Population	Employment
High	4.000%	2.000%
Middle	1.713%	1.713%
Low	1.650%	0.500%
Very Low	1.000%	0.100%
Zero	0.000%	0.000%
ASU	1.000%	0.500%
High School	1.650%	0.500%
Outside of Model Area	1.000%	0.100%



- Legend**
- Municipal Boundaries
  - Transportation Model Area
  - Projected Population Growth Rates**
    - ASU
    - High School
    - High
    - Middle
    - Low
    - Very Low
    - Zero
    - Outside of Transportation Model Area

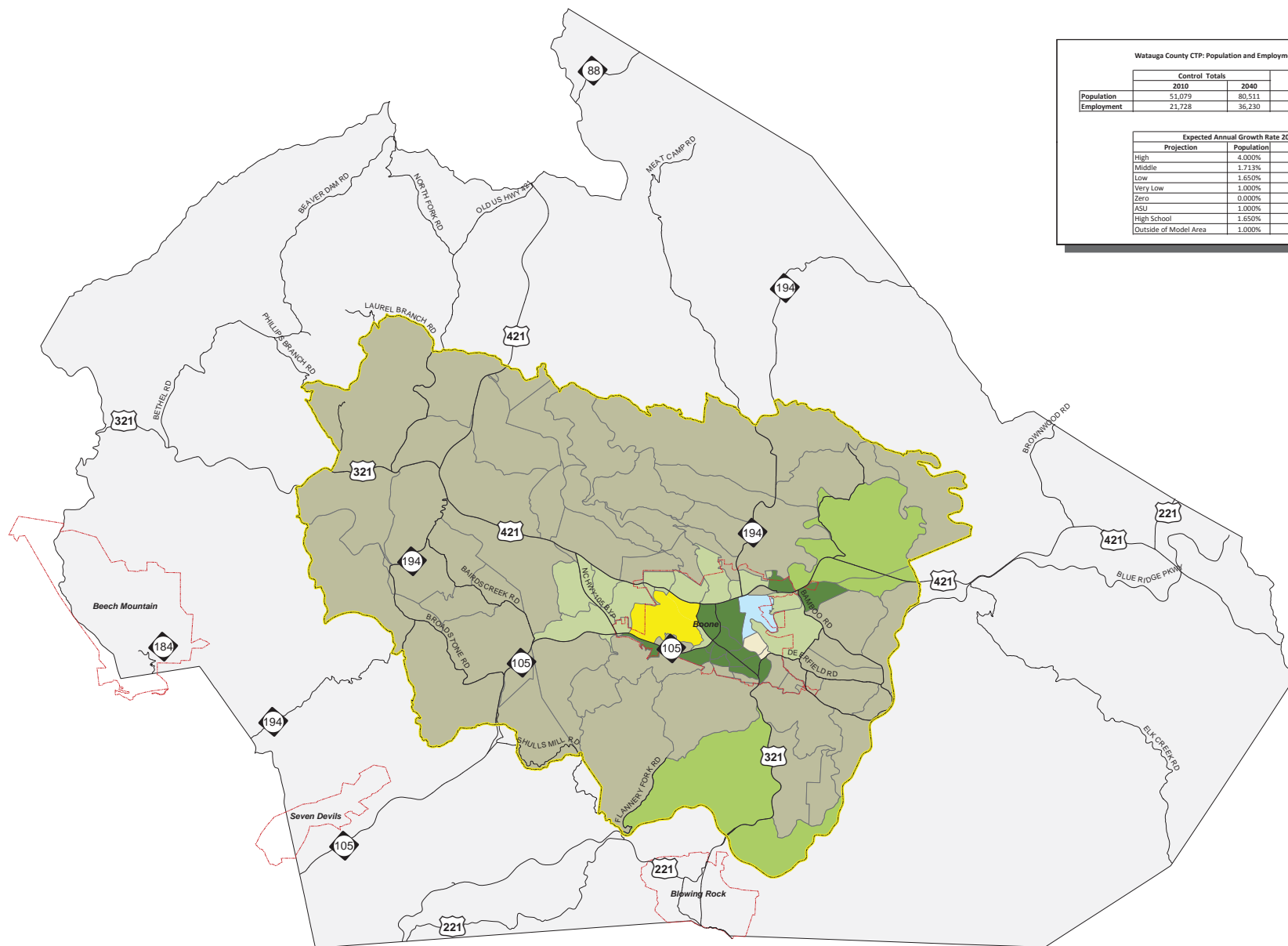
**Figure 10**  
**Watauga County**  
**Projected Population Growth**  
**for the Modeled Area**  
**2010-2040**

November 2011

Watauga County CTP: Population and Employment Forecast			
	Control Totals		Expected Annual Growth Rate
	2010	2040	
Population	53,079	80,511	1.713%
Employment	21,728	36,230	1.719%

Expected Annual Growth Rate 2010-2040		
Projection	Population	Employment
High	4.000%	2.000%
Middle	1.713%	1.719%
Low	1.650%	0.500%
Very Low	1.000%	0.100%
Zero	0.000%	0.000%
ASU	1.000%	0.500%
High School	1.650%	0.500%
Outside of Model Area	1.000%	0.100%



- Legend**
- Municipal Boundaries
  - Transportation Model Area
  - Projected Employment Growth Rates**
    - ASU
    - High School
    - High
    - Middle
    - Low
    - Very Low
    - Zero
    - Outside of Transportation Model Area

**Figure 11**  
**Watauga County**  
**Projected Employment Growth**  
**for the Modeled Area**  
**2010-2040**



November 2011



## Appendix J

### Alternative Analysis Methodology

In the development of the Watauga County CTP, the project that required the most extensive alternative analysis was U-2703, the proposed US 421 Bypass. The CTP process initially evaluated the prospect of addressing the volume deficiencies in Boone with improvements to existing facilities. A comparison of the projected traffic volumes and roadway capacities as shown in Figure 3 (see Chapter 1) led the CTP committee to conclude that many facilities would require widening to address the deficiencies. Among them are NC 105 from NC 105 BYP (SR 1107) to US 421, improve to six lanes; US 421 from NC 194 to the end of the expressway, improve to six lanes; and US 321 from NC 105 to Greenway Road, improve to eight lanes. The expected impacts from these and other improvements considered led the CTP committee to analyze additional alternatives that utilized alignments on new locations. Two previous studies proposed alignments that the CTP committee considered.

NCDOT issued a report in August 2008 documenting a study, which followed the National Environmental Policy Act (NEPA)/ Section 404 of the Clean Water Act Interagency Merger Process. This study, “Pre-TIP Study Report US 421 Improvements TIP Project U-2703<sup>1</sup>,” reached concurrence on the first two points (Purpose and Need, and Alternatives to be Carried Forward for Detailed Study). The Pre-Tip study considered fifteen alternatives including a northern route and widening existing roads. It reached concurrence on four alternatives to be carried forward for detailed study. During the development of the CTP, the alternatives to be carried forward from the Pre-Tip study were reevaluated, and additional alternatives were proposed.

The Boone 2030 Land Use Plan (2009)<sup>2</sup> identified a five-phase process for addressing traffic deficiencies in Boone. Phases one through four are collectively known as the “low-build alternative,” and this alternative includes improvements to existing roads, new short connections, medians, and turn lanes. Phase five is a future new location if warranted.

Each of the corridors extend from US 421 west of Boone in the vicinity of the NC 105 Bypass (SR 1107), intersects US 321/221 south of NC 105, and ends at US 421 east of Boone. Each corridor provides interchanges at US 421/321 west, NC 105, US 321/221 south, and US 421/221 east of Boone. The first four corridors were taken from the 2008 Pre-Tip study as shown in Figure 7 of the study report. The fifth corridor mimics the “low-build alternative” from the Boone 2030 Land Use Plan (2009). The sixth and seventh corridors were newly proposed during the development of the CTP.

- **Corridor 1** extends from US 421/321 east of NC 105 Bypass (SR 1107), on new location then utilizes part of the existing NC 105 Bypass (SR 1107). It continues on

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<sup>1</sup> The study report can be viewed at: <http://www.ncdot.gov/doh/preconstruct/tph/planning/DanielBooneStudy.html>.

<sup>2</sup> The 2009 Boone 2030 Land Use Plan can be viewed at:  
<http://www.thelawrencegroup.com/boone2030/finalDocs/CoverTOC.pdf>

new location, intersecting US 321/221 south of NC 105 and ending at US 421/221 east of Boone in the vicinity of the western intersection with US 421/221 and Old US 421.

*Corridor 1 was determined to be an **unreasonable**<sup>3</sup> solution during the CTP process because of the anticipated impacts to the human environment even though it carried comparable traffic volumes to the other corridors. Primary impacts are development along US 321/221 (Blowing Rock Road) and the location of the new Watauga County High School.*

- **Corridor 2** uses existing NC 105 Bypass (SR 1107), from US 421/321 west of Boone to NC 105. It continues on new location, intersecting US 321/221 in the vicinity of Deerfield Road (SR 1522) and ending at US 421/221 east of Boone (similar location to the end of Corridor 1).

*There were no issues identified with Corridor 2 that made it an unreasonable solution. This corridor should be considered in future studies. Approximately 20,900 vehicles per day (vpd) are projected to use this facility in 2040 if constructed. The proximity of Corridor 2 to the hospital was the primary concern raised during the CTP development.*

- **Corridor 3** extends from US 421/321 west of the NC 105 Bypass (SR 1107), on new location, intersecting NC 105 west of the NC 105 Bypass (SR 1107). It continues on new location, intersecting US 321/221 in the vicinity of Jordan V. Cook Road (SR 1543) and ending at US 421/221 east of the intersection of US 421 and Old US 421.

*There were no issues identified with Corridor 3 that made it an unreasonable solution. This corridor should be considered in future studies. Approximately 23,800 vpd are projected to use this facility in 2040 if constructed. The proximity of Corridor 3 to the hospital was the primary concern raised during the CTP development.*

- **Corridor 4** follows Corridor 2 from US 421/321 west of Boone to the interchange location on US 321/221. Then Corridor 4 deviates from Corridor 2, extending further south as it continues east of US 321/221 and ending at US 421/221 east of Boone in the vicinity of the eastern intersection with US 421/221 and Old US 421.

*There were no issues identified with Corridor 4 that made it an unreasonable solution. This corridor should be considered in future studies. Approximately 23,500 vpd are projected to use this facility in 2040 if constructed. Originally, Corridor 4 was to use part of Fairway Drive (SR 1602); this was not deemed practical at this time due to impacts on developed land. Additionally, based on available GIS data, it appears*

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<sup>3</sup> **Unreasonable:** A proposed project is determined to be unreasonable if it:

- Fails to meet the community's vision,
- Fails to address the transportation deficiency, OR
- Has an unacceptable level of impacts to the natural or human environment

Corridor 4 would impact property owned by the Blue Ridge Conservatory. To address these concerns Corridor 6 was developed.

- **Corridor 5** follows the proposed “low-build alternative” from the Boone 2030 Land Use Plan (2009). This proposal primarily uses existing facilities and is broken into four phases. Phase 1 consists of safety and alignment improvements to Bamboo Road (SR 1514), Wilson Ridge Road (SR 1523), and Deerfield Road (SR 1522). Phase 2 consists of a new parkway alignment between US 321 and NC 105 partially using existing Meadowview Road. Phase 3 consists of upgrading NC 105 from Phase 2 to the NC 105 BYP (SR 1107) to a 4 lane divided cross section. Phase 4 consists of upgrading the NC 105 BYP (SR 1107) to a three lane cross section.

*Corridor 5 was determined to be an unreasonable solution during the CTP process because congestion concerns along NC 105 and US 321 would not be addressed. Additionally, even with improvement, NC 105, the NC 105 BYP (SR 1107), Bamboo Road (SR 1514), Wilson Ridge Road (SR 1523), and Deerfield Road (SR 1522) would still be experiencing capacity issues. The 2010 census data showed substantial population growth beyond what was expected when the Boone 2030 Land Use Plan (2009) was developed. In addition, the CTP evaluated the transportation system in 2040 instead of 2030. This alternative is deemed to no longer be viable for the following two reasons: the Boone 2030 Land Use Plan (2009) was developed before 2010 census data was available, which showed substantial population growth in Watauga County over the last ten years at a 1.8% annual rate; and the change in the horizon year from 2030 to 2040.*

- **Corridor 6** follows Corridor 3 from US 421/321 west of Boone to the interchange location on NC 105 west of the NC 105 Bypass (SR 1107). It then uses new location to reach Corridor 2 and follows it to US 321/221 south of Boone. Between US 321/221 and US 421/321 east of Boone, Corridor 6 uses new location to address the concerns identified in Corridor 4. Corridor 6 is parallel and to the south of Fairway Drive (SR 1602), and it eventually loops west of the headwaters of the Rocky Branch Stream to avoid conservation land owned by the Blue Ridge Conservatory, see Figure 12.

*There were no issues identified with Corridor 6 that made it an unreasonable solution. This corridor should be considered in future studies. Approximately 21,700 vpd are projected to use this facility in 2040 if constructed.*

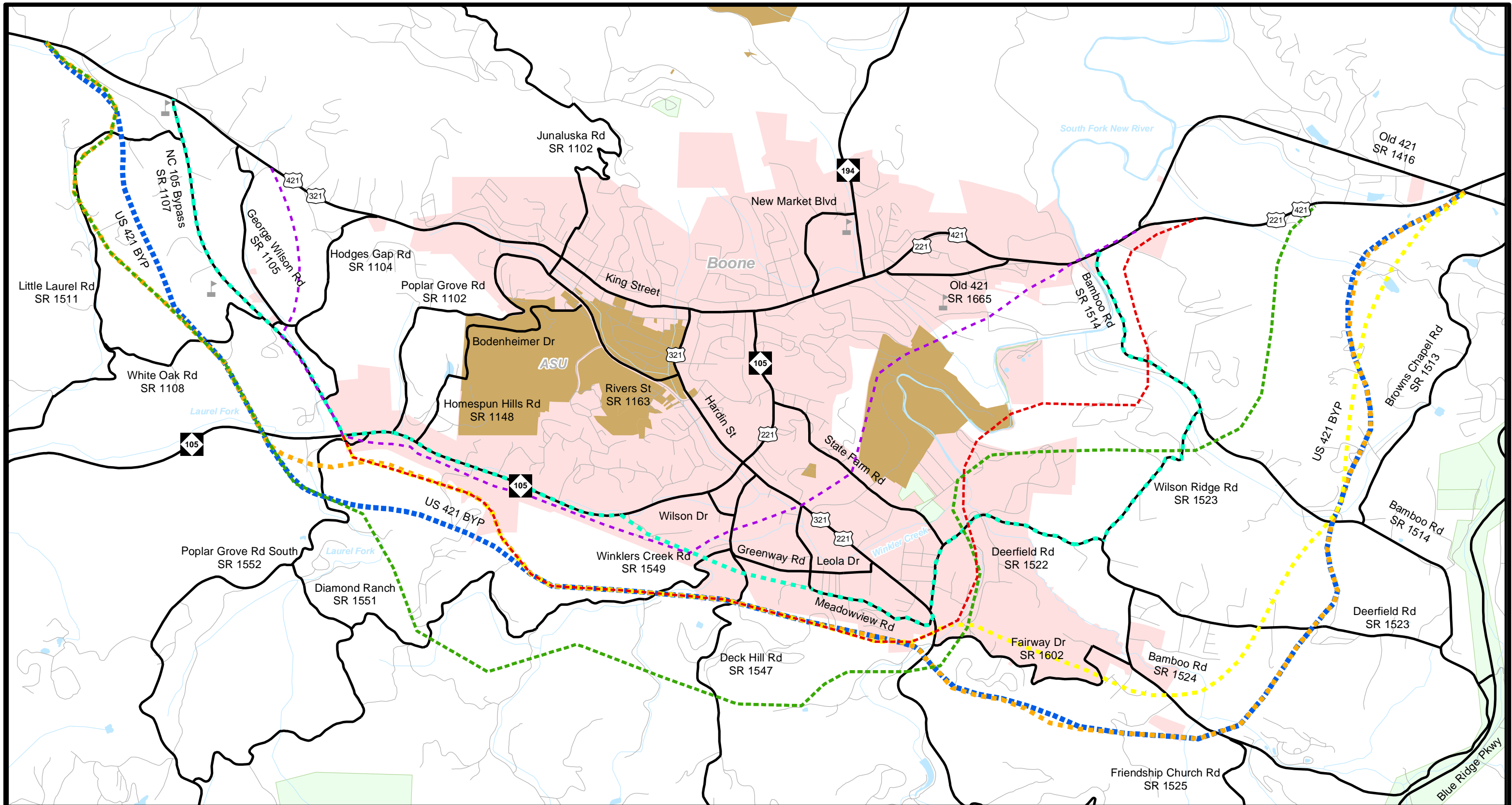
- **Corridor 7** follows Corridor 6 for the majority of its location. The section of road south of NC 105 was diverted to provide a more feasible crossing of Poplar Grove Road South (SR 1552). The location near Little Laurel Road (SR 1511) was relocated to reduce impacts on the human and natural environment. **This corridor was selected as the alternative proposed for inclusion in the CTP.**

*There were no issues identified with Corridor 7 that made it an unreasonable solution. This corridor should be considered in future studies. Approximately 21,700 vpd are*



projected to use this facility in 2040 if constructed. There are no apparent differences in traffic patterns between Corridor 6 and Corridor 7.

Corridor 7 was presented to the public on November 8, 2012 as part of the Draft CTP recommendations. Numerous comments were received opposing the project in its entirety, questioning the need for the project, and/or challenging the alignment. The CTP Committee discussed these concerns at their next meeting. Based on 2040 traffic projections, the need for the project is sound. The question of alignment was primarily focused on whether Corridor 7 should use the existing NC 105 BYP (SR 1107) location similar to Corridor 5. After consideration, the committee decided that the impacts anticipated from improving NC 105 BYP (SR 1107) to a 4 lane freeway facility were too great to attempt on the existing location. The recommendation on the Draft CTP presented to the public for NC 105 BYP (SR 1107) was to improve the facility to a boulevard. After further consideration of potential impacts and public feedback, the CTP committee decided to recommend a 3 lane cross section on NC 105 BYP (SR 1107) with the US 421 Bypass on new location.



## Legend

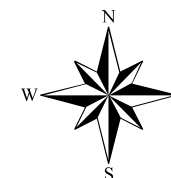
- County Boundary
- Rivers and Streams
- Other Roads
- Schools
- Municipal Boundary
- Conservation Land
- Appalachian State University

- Corridor #1 / Pre-TIP
- Corridor #2 / Pre-TIP
- Corridor #3 / Pre-TIP
- Corridor #4 / Pre-TIP
- Corridor #5 / Low-Build
- Corridor #6
- Corridor #7 / CTP Recommendation
- Network Roads

0 0.5 1 Miles

**Figure 12**

Base map date: October 4, 2010



**US 421 BYP  
Alternatives Map**

**Watauga County  
Comprehensive  
Transportation Plan**