



**Comprehensive Transportation Plan
Study Report for
Pitt County**

June 2009

**Comprehensive Transportation Plan
Study Report
for
Pitt County**

Prepared by the: Transportation Planning Branch
N.C. Department of Transportation

In Cooperation with: Pitt County Planning Department
The Federal Highway Administration
U.S. Department of Transportation

June 2009

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Acknowledgments

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Executive Summary

In September of 2004, the Transportation Planning Branch of the North Carolina Department of Transportation agreed to begin the progress of developing a new Comprehensive Transportation Plan to replace the 1993 Pitt County Thoroughfare Plan with cooperation and partnership of Pitt County Planning Department. The Pitt County Comprehensive Transportation Plan, as shown in Sheets 1 through 4, resulted from the implementation of the transportation planning principles.

A Comprehensive Transportation Plan includes the following sheets:

Sheet 1 of 4:	Adoption sheet;
Sheet 2 of 4:	Highway Map;
Sheet 3 of 4:	Public Transportation and Rail Map; and
Sheet 4 of 4:	Bicycle Map

The Comprehensive Transportation Plan for Pitt County currently includes recommendations for three planning elements: the Highway Map, Public Transportation and Rail Map, and the Bicycle Map. The Highway Map was determined by a historic Annual Average Daily Traffic trend analysis and through discussions with the Pitt County planners and planning board concerning their overall goals for the area. The document also offers a recommendation for the County to pursue an access management policy.

This report documents the findings of this study along with the resulting recommendations for improvements. In addition, the report presents transportation cross-section recommendations, cost estimates for the recommended improvements, and environmental features found in the study area.

Implementation of the plan rests largely with the policy boards and citizens of the planning area. Transportation needs throughout the State exceed the available funding; therefore, local areas should aggressively pursue funding for the projects they desire.

It is important to realize that the recommended transportation plan is based upon anticipated growth and development of the planning area reflecting current zoning trends as provided by the planning area. Prior to the construction of specific projects, a more detailed study will be required to reconsider development trends and determine specific design requirements.

Adopted by:
Pitt County
Date: October 17, 2005

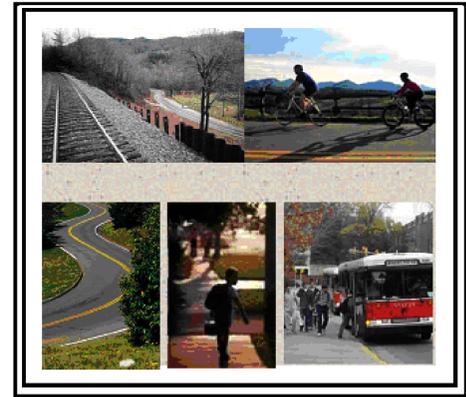
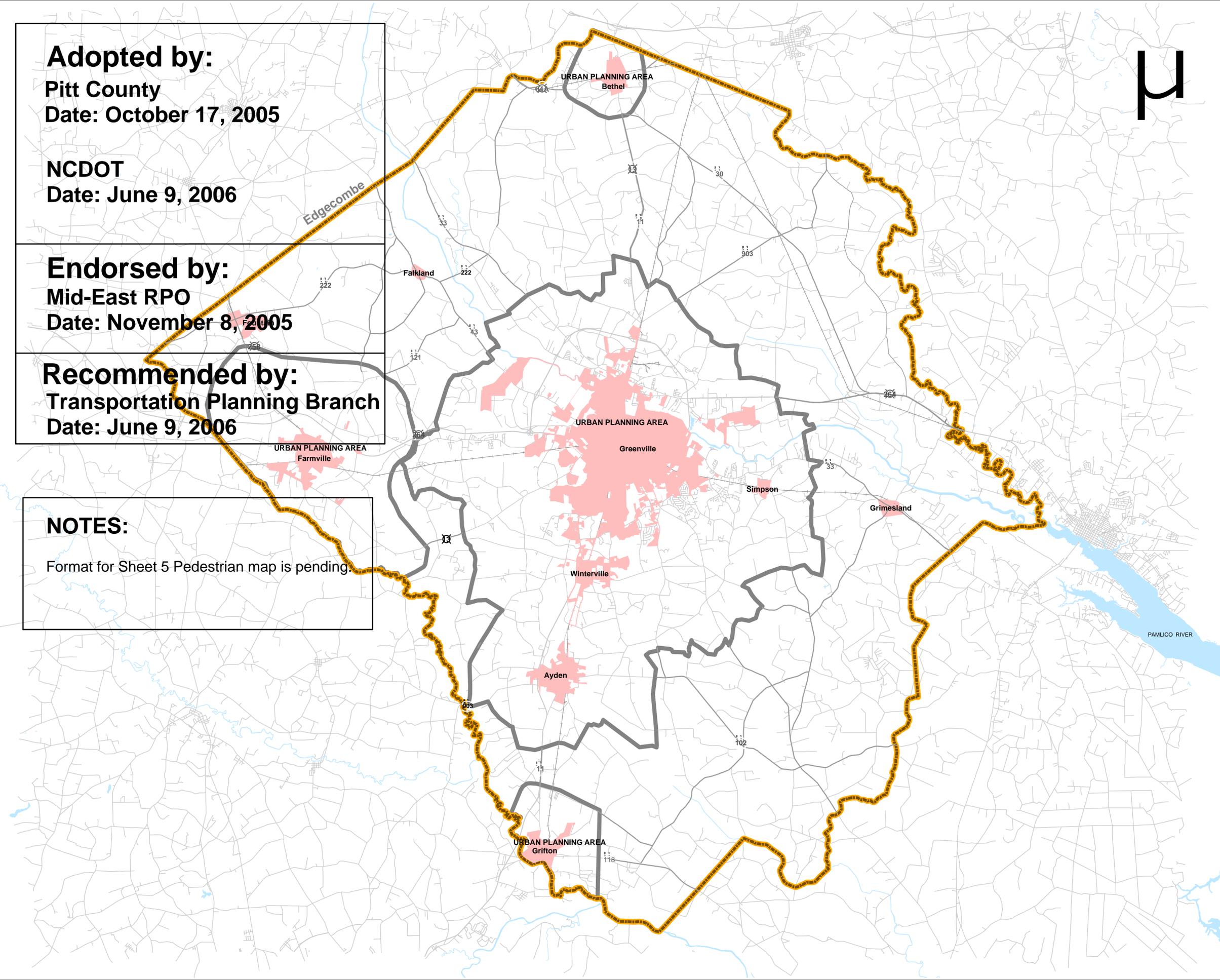
NCDOT
Date: June 9, 2006

Endorsed by:
Mid-East RPO
Date: November 8, 2005

Recommended by:
Transportation Planning Branch
Date: June 9, 2006

NOTES:

Format for Sheet 5 Pedestrian map is pending.



PITT COUNTY North Carolina

Comprehensive Transportation Plan

Plan date: 09/21/2005

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

Legend

- Pitt County Planning Boundary
- Municipal Boundaries
- Urban Planning Area
- DOT Roads
- County Boundary

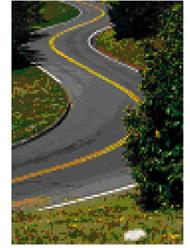


Sheet 1 of 4

Base map date: 3/01/05

Refer to CTP document for more details

Highway Map



PITT COUNTY North Carolina

Comprehensive Transportation Plan

Plan date: 9/21/2005

- 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

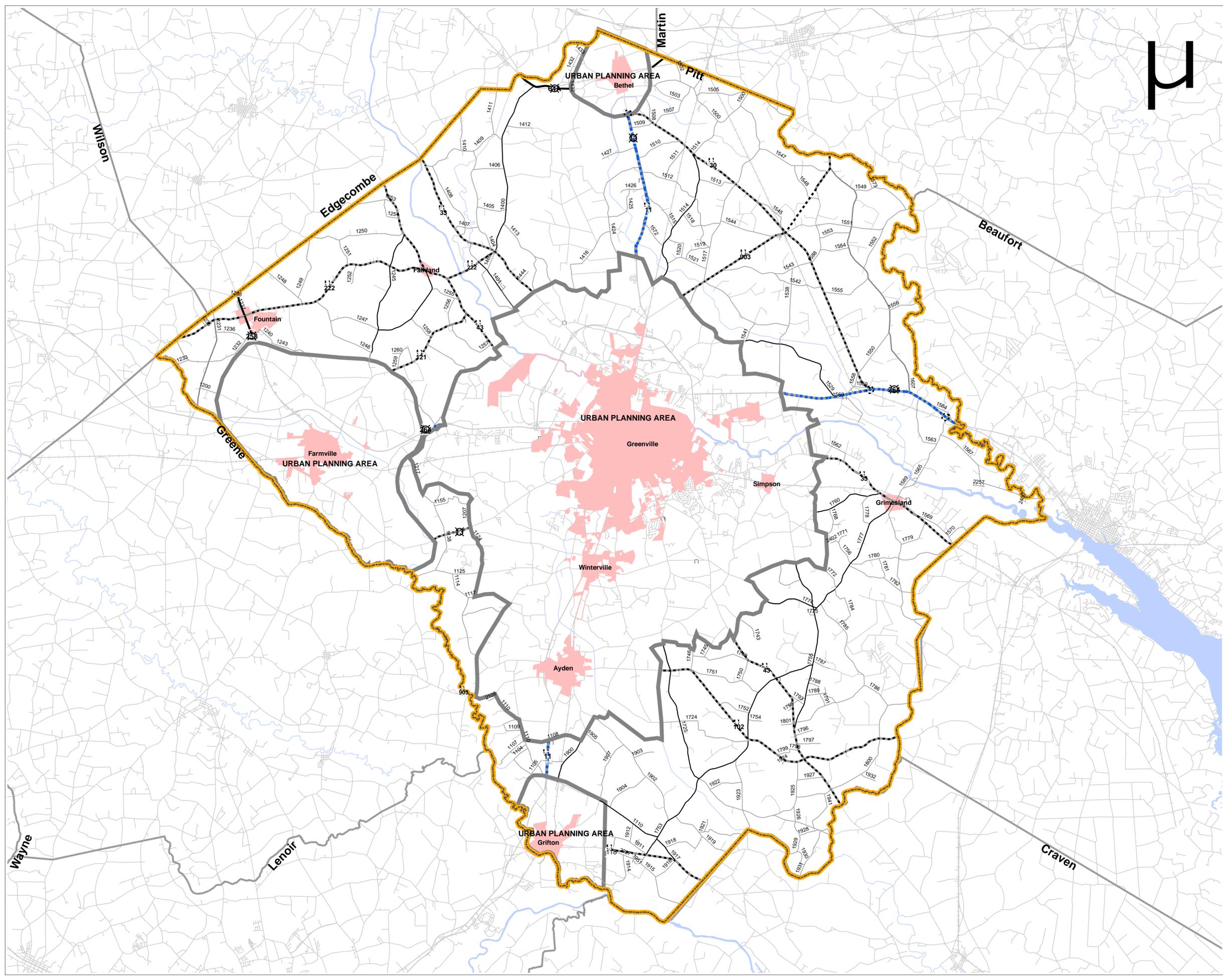
- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation
- Pitt County Planning Boundary
- Urban Planning Area

0 1 2 4 6 8 Miles

Sheet 2 of 4

Base map date: 3/01/05

Refer to CTP document for more details



Public Transportation and Rail Map



PITT COUNTY North Carolina

Comprehensive Transportation Plan

Plan date: 9/21/2005

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

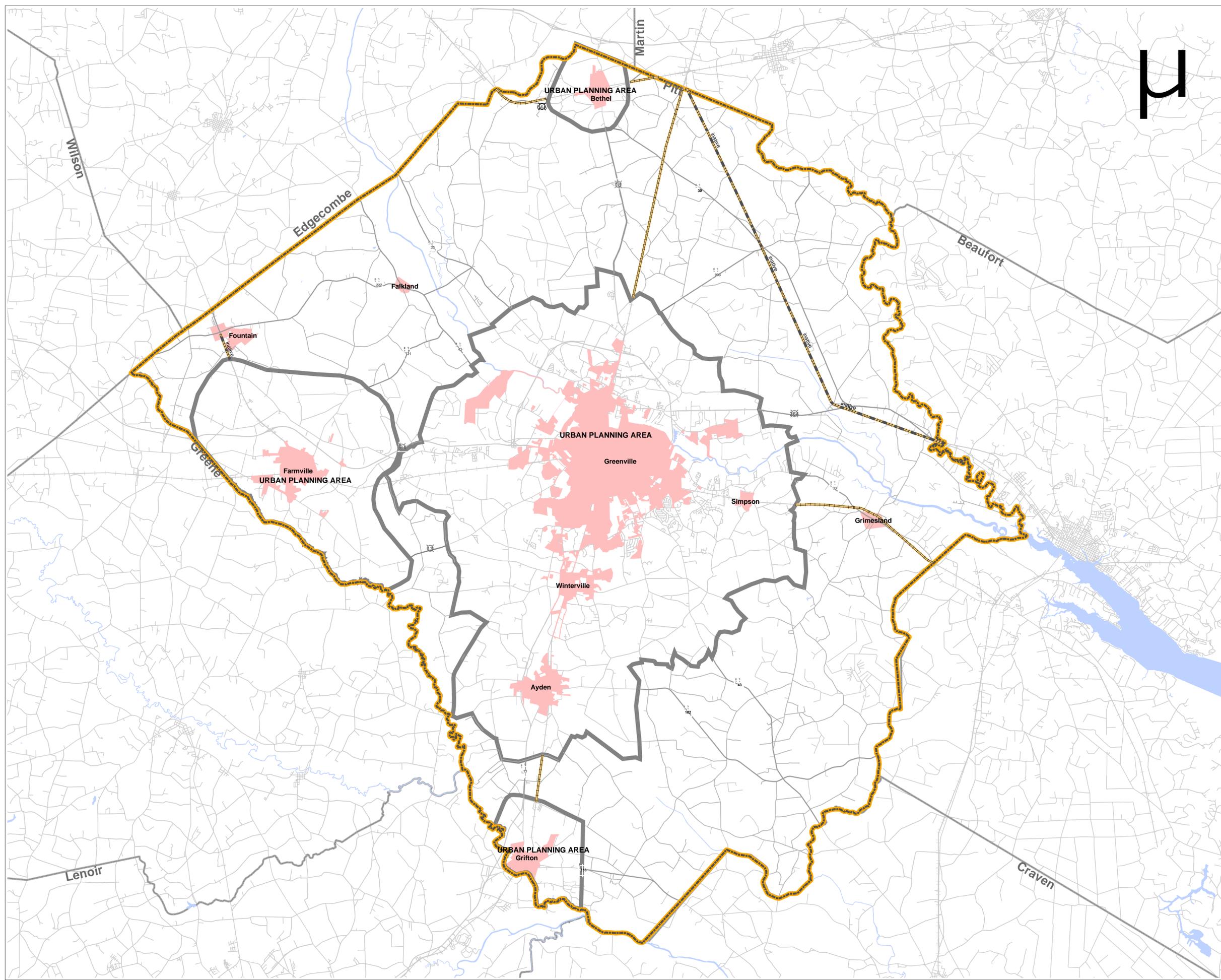
- Existing
- Recommended



Sheet 3 of 4

Base map date: 3/01/05

Refer to CTP document for more details



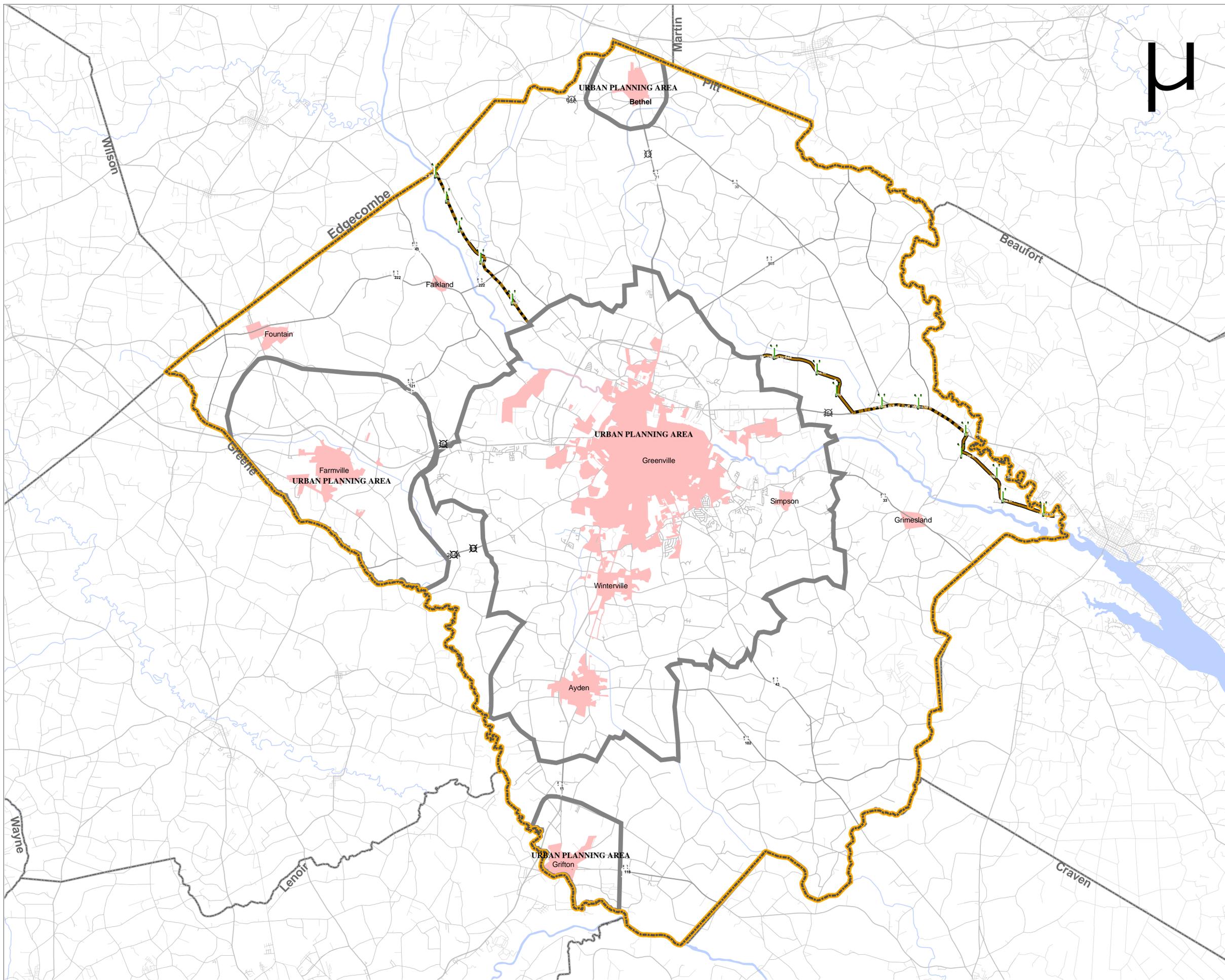
Bicycle Map



PITT COUNTY North Carolina

Comprehensive Transportation Plan

Plan date: 9/21/2005



On-road

- Existing
- Needs Improvement
- Recommended

Off-road

- Existing
- Needs Improvement
- Recommended



Sheet 4 of 4

Base map date: 3/01/05

Refer to CTP document for more details

I Introduction

An area's transportation system is its lifeline, contributing to its economic prosperity and social well being. The importance of a safe and efficient transportation infrastructure cannot be overstressed. This system provides a means of transporting people and goods from one place to another quickly, conveniently, and safely. A well-planned system will meet the existing travel demands, as well as keep pace with the growth of the region. Recognizing the importance of this process of planning for future transportation needs, Pitt County requested transportation planning assistance from the Transportation Planning Branch of the North Carolina Department of Transportation (NCDOT).

In June of 2003, the Transportation Planning Branch of the North Carolina Department of Transportation, with cooperation of Pitt County Planning Department, began an update of the 1993 Pitt County Thoroughfare Plan. The resulting Pitt County Comprehensive Transportation Plan, as shown in Figure 1, Sheets 1 through 4, resulted from the implementation of the transportation planning principles.

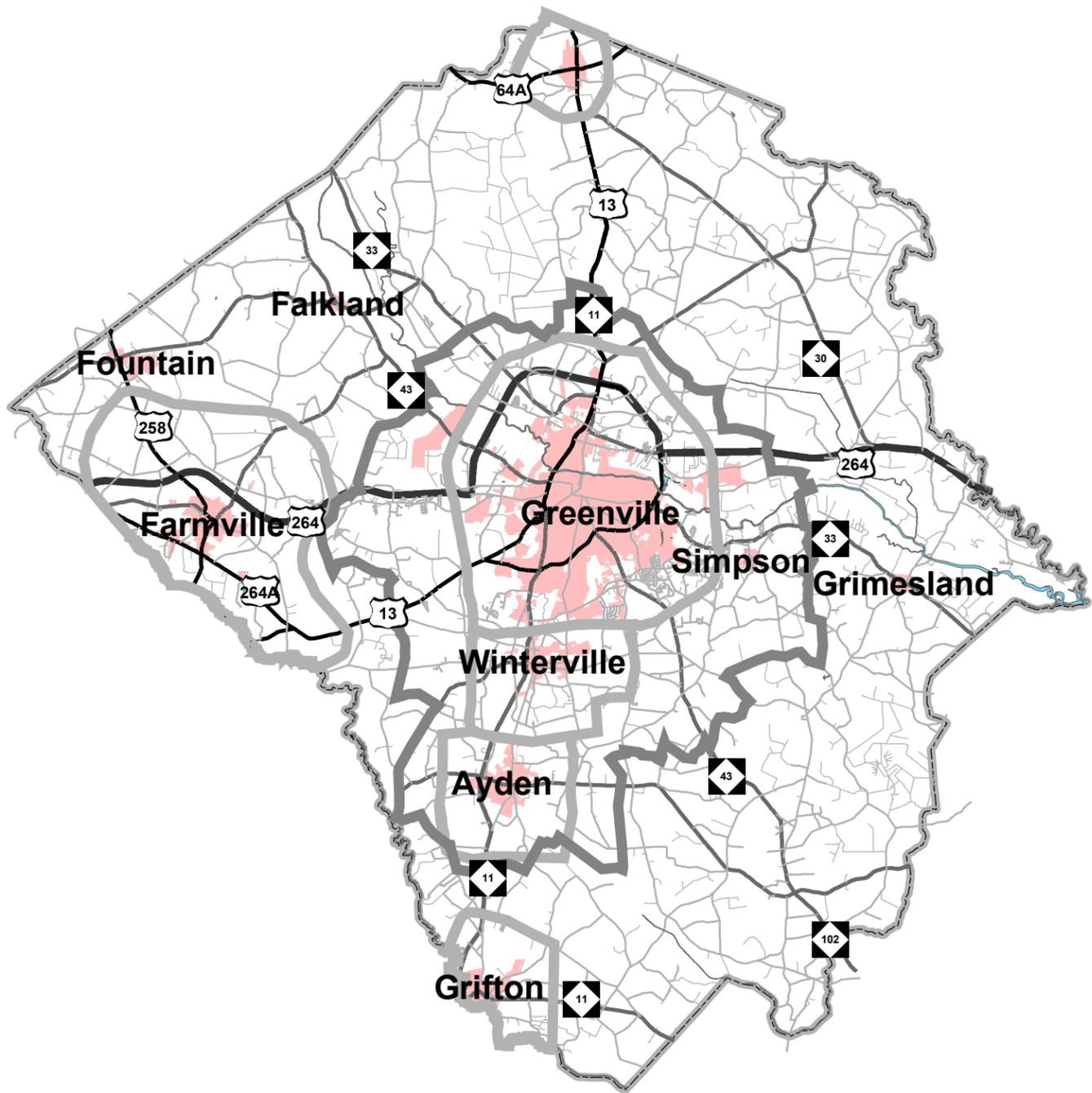
Pitt County (known throughout the document as the planning area) is located in the central coastal plain region of North Carolina and borders Edgecombe, Greene, Martin, Wilson, Lenoir, Craven and Beaufort Counties. The planning area is approximately 90 miles east of Raleigh. The geographical location of the planning area is shown in Figure 2.

The purpose of this study is to examine present and future transportation needs of the planning area and develop a comprehensive transportation plan to meet these needs. The plan recommends those improvements that are necessary to provide an efficient transportation system within the 2003-2030 planning period. The recommended cross-sections outlined in Appendix D for these improvements are based on existing conditions and projected traffic volumes.

This report documents the development of the 2005 Pitt County Comprehensive Transportation Plan shown in Figure 1, which replaces the 1993 Pitt County Thoroughfare Plan shown in Figure 3. In addition, this report presents recommendations for each mode of transportation. A comprehensive transportation plan is developed to ensure that the transportation system will be progressively developed, meeting the needs of the planning area. It will serve as an official guide to providing a well-coordinated, efficient, and economical transportation system utilizing all modes of transportation. This document will be utilized by local officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption to local residents, businesses, and the environment.

Initiative for the implementation of the transportation plan rests predominately with the policy boards and citizens of the planning area. Pitt County and the North Carolina Department of Transportation share the responsibility for proposals in this report.

The proposed transportation plan is based on the projected growth for the planning area as coordinated with the Greenville Metropolitan Planning Organization (MPO) and Pitt County planners. 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 development of some recommendations found in this plan. Some portions of the plan may require revisions in order to accommodate unexpected changes in urban development. The best use of this plan is to make sure that any changes made to one element of the transportation plan are consistent with the other elements.



PITT COUNTY

North Carolina

Legend

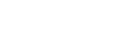
-  Urban Area Planning Boundary
-  I
-  US
-  NC
-  SR
-  Municipal Boundary



Figure 2

Geographical Location

Base map date: November 1, 2007

II Recommendations

Highway Map

The recommended highway plan for the planning area is presented in Sheet 2 of the Pitt County Comprehensive Transportation Plan. This plan includes roadways within the planning area that fall into five categories: Freeways, Expressways, Boulevards, Other Major Thoroughfares, and Minor Thoroughfares. See Appendix B for a more detailed description of each category, and Appendix C for an inventory of the highway recommendations.

The process of determining and evaluating recommendations for those roads in the comprehensive transportation plan involves many considerations including the goals and objectives of the public in the area, existing roadway properties, identified roadway deficiencies, environmental impacts and existing and anticipated land development. Consideration of these factors lead to the cooperative development of several recommended improvements.

The problem statements for each recommendation are given below:

US 264 East

- **Summary of Need**

US 264 is an existing expressway. It is recommended for US 264 to be upgraded from an Expressway to a Freeway in the Comprehensive Transportation Plan. This road is classified as a Freeway in the Strategic Highway Corridor plan adopted by NC Board of Transportation.

- **Summary of Purpose**

This road is a Freeway in the Strategic Highway Corridor plan adopted by NC Board of Transportation and will improve intrastate travel and access from the central part of state to coastal area.

- **Roadway Conditions**

Existing Characteristics

US 264 runs west to east through the planning area and serves as a major commuter route to I-95 and US-17. The speed limit varies from 45 mph to 65 mph. The roadway width varies from a 6-lane divided highway to a two-lane undivided cross-section with high volume of truck traffic. This road is part of the Strategic Highway Corridor plan, and provides a state bicycle route through the planning area.

Existing Conditions

The 2003 average daily traffic ranged from 15,000 vehicles per day (vpd) to 19,000 the practical capacity of the existing roadway is approximately 60,000 (vpd)

Projected Conditions

Growth in the area is expected to increase through the year 2030, resulting in increased travel within the area. By the year 2030, traffic along US 264 is projected to range from 40,000 to 60,000 vpd.

- **Safety Analysis**

The latest safety data was collected during the period from May 1, 2000 through May 31, 2003. During this period there were total of five hundred seventy nine (579) reported accidents in various locations along US 264.

- **System Linkage**

Existing Road Networks

With the construction of the NC 17 bypass through town of Washington, there will be a greater demand on US 264 and as volume increases the capacity needs to be addressed. US 264 provide connectivity for Greenville, Washington and the North Carolina coastal area. It will also connect to the new NC 17 bypass-carrying commuters from US 70, US 64 and the State of Virginia.

- **Social, Economic, and Environmental Conditions**

Demographics

Currently, there are several undeveloped land parcels and the future economic growth along this roadway will be mostly commercial developments.

US 13/ NC 11

- **Summary of Need**

US 13/ NC 11 is an existing Boulevard, it is recommended for US 13/ NC 11 to be upgraded from a Boulevard to a Freeway in the Comprehensive Transportation Plan. This road is a Freeway in the Strategic Highway Corridor plan adopted by the NC Board of Transportation.

- **Summary of Purpose**

This road is a Freeway in the Strategic Highway Corridor plan concept adopted by the NC Board of Transportation and will improve intrastate travel and access from I-40 to Virginia.

- **Roadway Conditions**

Existing Characteristics

US 13/NC 11 is a Minor Arterial on the Functional Classification System. This roadway, which runs from north to south through the planning area, links Bethel to Greenville and Kinston in Lenoir County. Portions of this roadway are a four-lane cross-section and the remaining portions are a two-lane cross-section. The speed limit along this roadway varies between 45 mph and 55 mph.

Existing Conditions

2003 average daily traffic ranged from 5,000 vehicles per day (vpd) to 9,000 (vpd). The practical capacity of the existing roadway ranges from 12,000 to 33,500 (vpd).

Projected Conditions

Growth in the area is expected to increase through the year 2030, resulting in increased travel within the area. Traffic projected on US 13/ NC 11 for the year 2030 ranges from 18,000 vpd to 30,000 vpd, which will exceed current practical capacity of portion of this roadway.

- **Safety Analysis**

For the period from May 1, 2000 to May 31, 2003, there were four hundred sixty two crashes reported along US 13/ NC 11. Three of these crashes were crashes with fatalities.

- **System Linkage**

Existing Road Networks

US 13 / NC 11 provides direct connectivity between Ayden, Greenville and Bethel. NC 11 Bypass is designated as a Strategic Highway Corridor (SHC). The designation of 55 SHCs in the state was an initiative intended to develop a network of high-speed, safe, reliable highways through North Carolina that would increase statewide mobility and regional connectivity.

Transportation Plans

US 13 / NC 11 is recommended to be upgraded from a Boulevard to a Freeway in the Comprehensive Transportation Plan. This road is a Freeway in the Strategic Highway Corridor concept that was adopted by NC Board of Transportation.

- **Social, Economic, and Environmental Conditions**

Demographics

The existing minority population along all of NC 11 Bypass is the county average, the income level is the county average.

Economic Data

Currently, there are several neighborhood centers and several top twenty industrial manufacturing employers along existing NC 11. Future growth along existing NC 11 as its anticipated to include compact neighborhood development and commercial developments, while the NC 11 Bypass would include neighborhood development along side of NC 11.

Environmental

There are no known natural environmental features in this area. The human environment along NC 11 corridor plan includes several churches and a school.

NC 33

- **Summary of Need**

NC 33 is a Major Thoroughfare in the Comprehensive Transportation Plan. Widening of this road to a 4-lane facility is recommended. There is a need to improve NC 33 to provide access to the planning area and relieve growing congestion.

- **Summary of Purpose**

The primary purpose of this recommendation is to improve NC 33 to provide the following: relief from the future congestion, a safer and more efficient roadway and connection to US 17.

- **Roadway Conditions**

Existing Characteristics

NC 33 is a major_collector on the Federal Functional Classification System. This roadway, which runs from southeast to northwest through the planning area, links Craven County and Edgecomb County to Greenville. The speed limit along this two-lane undivided roadway is 35-55 mph.

Existing Conditions

The 2003 AADT volumes along NC 33 ranged from 3,000 vpd to 6,000 vpd. With a current practical capacity of 12,000 vpd, the existing ratio of traffic volume to practical capacity ranges from 0.27 to 0.54, meaning that NC 33 is currently operating at levels satisfactory to users.

Projected Conditions

Traffic projected on NC 33 for the year 2030 ranges from 10,500 vpd to 15,300 vpd, which will exceed current practical capacity of this roadway.

- **Safety Analysis**

For the period from May 1, 2000 to May 31, 2003, there were three hundred seventy three crashes reported along NC 33. Six of these crashes were fatal crashes

- **System Linkage**

Existing Road Networks

NC 33 provides direct connectivity between Edgecomb County and Greenville and serves as an indirect link between Pitt County and other neighboring towns and counties Via US 264. NC 33 will also serve as a link to the planned NC 11 Bypass, providing better access to the City of Greenville.

Transportation Plans

NC 33 is designated as a Major Thoroughfare on the CTP. The existing roadway will need to be widened to a four-lane undivided roadway. There is a project for NC 33 that is included in the 2006-2012 Transportation Improvement Program (TIP) as Project R-3407. The recommended cross-section for this project is a multi-lane facility.

- **Social, Economic, and Environmental Conditions**

Demographics

The minority population along most of NC 33 is the county average. The income level along NC 33 is close to the county average.

Economic Data

There are several undeveloped land parcels along NC 33 with some commercial development. There are no proposed commercial developments in this area.

Environmental

There are no known natural environmental features in this area. The human environment along NC 33 corridor plan includes several churches and a school.

NC 43

- **Summary of Need**

NC 43 is a Other Major Thoroughfare in the Comprehensive Transportation Plan. There is a need to improve NC 43 to provide provide better access to the planning area and relieve growing congestion. Southern and northern sections of this road are recommended for widening to a 4-lane facility.

- **Summary of Purpose**

The primary purpose of this recommendation is to improve NC 43 to the current NCDOT roadway standards and provide a safer and more efficient roadway.

- **Roadway Conditions**

Existing Characteristics

NC 43 is a Major Collector on the Federal Functional Classification System. This roadway, which runs from North to South through the Central portion of the planning area, links Craven County, Pitt County, and Edgecomb County and provides access to US 264. The speed limit along this two-lane undivided roadway varies between 45 mph and 55 mph.

Existing Conditions

The 2003 AADT volumes along NC 43 ranges from 500 vpd to 5,000 vpd and the current practical capacity on this road is 12,000 vpd. The existing ratio of traffic volume to practical capacity ranges from 0.04 to 0.42 which indicates that NC 43 is currently operating at required level of service.

Projected Conditions

Traffic projected on NC 43 for the year 2030 ranges from 1,000 vpd to 17,000 vpd, which exceeds current practical capacity for a portion of NC 43.

- **Safety Analysis**

For the period from May 1, 2000 to May 31, 2003, there were four hundred twenty (420) crashes reported along NC 43. Three of these crash fatal, while one hundred seventy four (174) collisions were crashes with injury.

- **System Linkage**

Existing Road Networks

NC 43 provides direct connectivity between Craven County, Edgecomb County and Pitt County and serves as an indirect link between Pitt County and other neighboring towns and counties via 264.

Transportation Plans

Depending on the location, this two-lane undivided facility is designated as an Other Major Thoroughfare on the CTP. The existing roadway will need to be widening to a four-lane roadway with 11 feet wide outside lanes in order to achieve Cross section required by NCDOT standards for this Other Major collector facility in the future. The proposed speed limit along this roadway varies from 35 mph to 55 mph. Future economic growth along NC 43 is anticipated to include mostly residential developments.

- **Social, Economic, and Environmental Conditions**

Demographics

The minority population along most of NC 43 is the county average. The income level along NC 43 is close to the county average.

Economic Data

There are several undeveloped land parcels along NC 33 with some commercial development. There are no proposed commercial developments in this area.

Environmental

There are no known natural environmental features in this area. The human environment along NC 43 corridor plan includes several school and Golf course.

NC 903 EAST

- **Summary of Need**

NC 903 is a Other Major Thoroughfare in the Comprehensive Transportation Plan. There is a need to improve NC 903 to provide access to the planning area and relieve growing congestion.

- **Summary of Purpose**

The primary purpose of this recommendation is to improve NC 903 to current roadway standards and to provide a connection from Greenville to the northeast part of the planning area. The improvement would also provide a safer and more efficient roadway by realigning the existing left turn lane on the eastern side of NC 30.

- **Roadway Conditions**

Existing Characteristics

NC 903 is a major collector on the Federal Functional Classification System. This roadway, which runs from northeast to southwest through the southern portion of the planning area, links Green county and Martin County to Greenville. The speed limit along this two-lane undivided roadway is 35-45 mph. Currently, there is little access control along NC 903.

Existing Conditions

The 2003 AADT volumes along NC 903 ranged from 600 vpd to 4,000 vpd. With a current practical capacity of 12,000 vpd, the existing ratio of traffic volume to practical capacity ranges from 0.20 to 0.76, meaning that NC 903 is currently operating at levels satisfactory to users.

Projected Conditions

Traffic projected on NC 903 for the year 2030 ranges from 600 vpd to 5,000 vpd, which will not exceed current practical capacity of this roadway.

- **Safety Analysis**

For the period from May 1, 2000 to May 31, 2003, there were two hundred five crashes reported along NC 903. Four of these crashes were crashes with fatalities.

- **System Linkage**

Existing Road Network

NC 903 provides direct connectivity between Green and Martin counties to the City of Greenville, and serves as an indirect link between Pitt County and other neighboring counties via US 264.

Transportation Plans

NC 903 is a Major Thoroughfare on the CTP. The existing roadway will need to be improved at it intersection with NC 30.

- **Social, Economic, and Environmental Conditions**

Demographics

The minority population along most of NC 903 is the county average. The income level along NC 903 is close to the county average.

Economic Data

There are several undeveloped land parcels along NC 903 with mostly commercial development in northeast part of Pitt County.

Environmental

There are no known natural environmental features in this area. The human environment along NC 903 corridor plan includes a church and a recycling center.

Other Recommendations

Widening Projects

The following facilities have been identified as having travel lanes less than 12-feet wide:

NC 30

NC 118

NC 222

NC 102

NC 121

SR 1565

As travel volume on this roadway increases, it may be necessary to widen these facilities to a two 12-foot lanes.

Access Management

Given the rate of growth in Pitt County and the limited amount of funding available to improve existing roadways, Pitt County should consider adopting an access management policy. This policy, at a minimum, should promote development design that adequately manages accesses and reduces congestion levels on roads. Samples of access management guidelines are included in Appendix E.

III Population, Land Use, and Traffic

In order to fulfill the objectives of an adequate thirty-year transportation plan, reliable forecasts of future travel patterns must be achieved. Such forecasts depend on careful analysis of the following items: historic and potential population changes; significant economic trends, character and intensity of land development; and the ability of the existing transportation system to meet existing and future travel demand. Secondary items that influence forecasts include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the Planning area.

Population

Since the volume of traffic on a roadway is related to the size and distribution of the population that it serves, population data is used to aid in the development of the transportation plan. Future population estimates typically rely on the observance of past population trends and counts. While statistics show that the population within the planning area has been increasing at a steady rate, the County has suggested that the population will have a significant increase in the next ten to fifteen years. The Pitt County population will be growing at a slower rate than the Greenville area, but the southeastern part of the county should see an increase in population. Table 1 presents the population trends for Pitt County, and North Carolina.

Table 1					
Population Growth					
Location	1970	1980	1990	2000	2030
North Carolina	5,082,059	5,881,766	6,628,637	8,046,485	12,274,433
Pitt County	73,900	90,149	108,950	134,090	198, 889

The projected population is based on average growth rates that were stronger in the first twenty years and decreased for the last ten years. The typical range for growth is between 2 – 3 %. Because of the population growth in the southeastern part of the Pitt County and after discussion with the Pitt County Planning Department, a 4% growth rate was used for southeastern part of the Pitt County.

Land Use

Land use refers to the physical patterns of activities and functions within an area. The generation and attraction of a particular road and other modes of transportation is related to the land uses adjacent to that facility and the intensity of land use affects the traffic patterns for multi-modal facilities. For example, a shopping center generates larger

traffic volumes than a residential area. The spatial distribution of varying land uses is the predominant determinant of when, where, and why congestion occurs. The attraction between different land uses and their association with travel varies with the size, type, intensity, and spatial separation of each land use. When dealing with transportation planning, land use is divided into the following classifications:

- Residential – All land is devoted to the housing of people, with the exception of hotels and motels.
- Commercial – All land is 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, such as fast-food restaurants and service stations; all other commercial establishments would be considered retail.
- Industrial – All land is devoted to the manufacturing, storage, warehousing, and transportation of products.
- Public – All land is devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.

Figure 7 shows the existing zoned areas for Pitt County. Figure 8 shows the future land use plan for Pitt County prepared by the Wooten Company and Pitt County Planning staff in 2002. The anticipated land use development for the planning area is predominantly residential, with limited industrial and commercial. Noticeable residential growth is expected in the planning area with the highest growth in the southeastern portion of the planning area. The areas of highest employment growth are expected along the major roadway corridor plans throughout the planning area.

Existing Transportation System

An important stage in the development of a transportation plan is the analysis of the existing roadway 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. Travel deficiencies may be localized, resulting from problems with inadequate pavement width, intersection geometry, or intersection controls. Travel deficiencies may also result from system problems, such as the need to construct missing travel links, bypass routes, loop facilities, or additional radial routes.

An analysis of the roadway system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a traffic collision analysis, roadway capacity deficiency analysis, and a system deficiency analysis. This information is used to analyze factors that will impact the future system, including population growth, economic development potential, and land use trends.

Zoning

Legend

General Zoning Districts

ZONE

-  GC (General Commercial)
-  GI (General Industrial)
-  LI (Light Industrial)
-  R-40 (Low Density Residential)
-  RA (Rural Agricultural)
-  RR (Rural Residential)

 City Limit

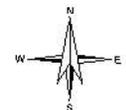
 ETJ

 Major Roads

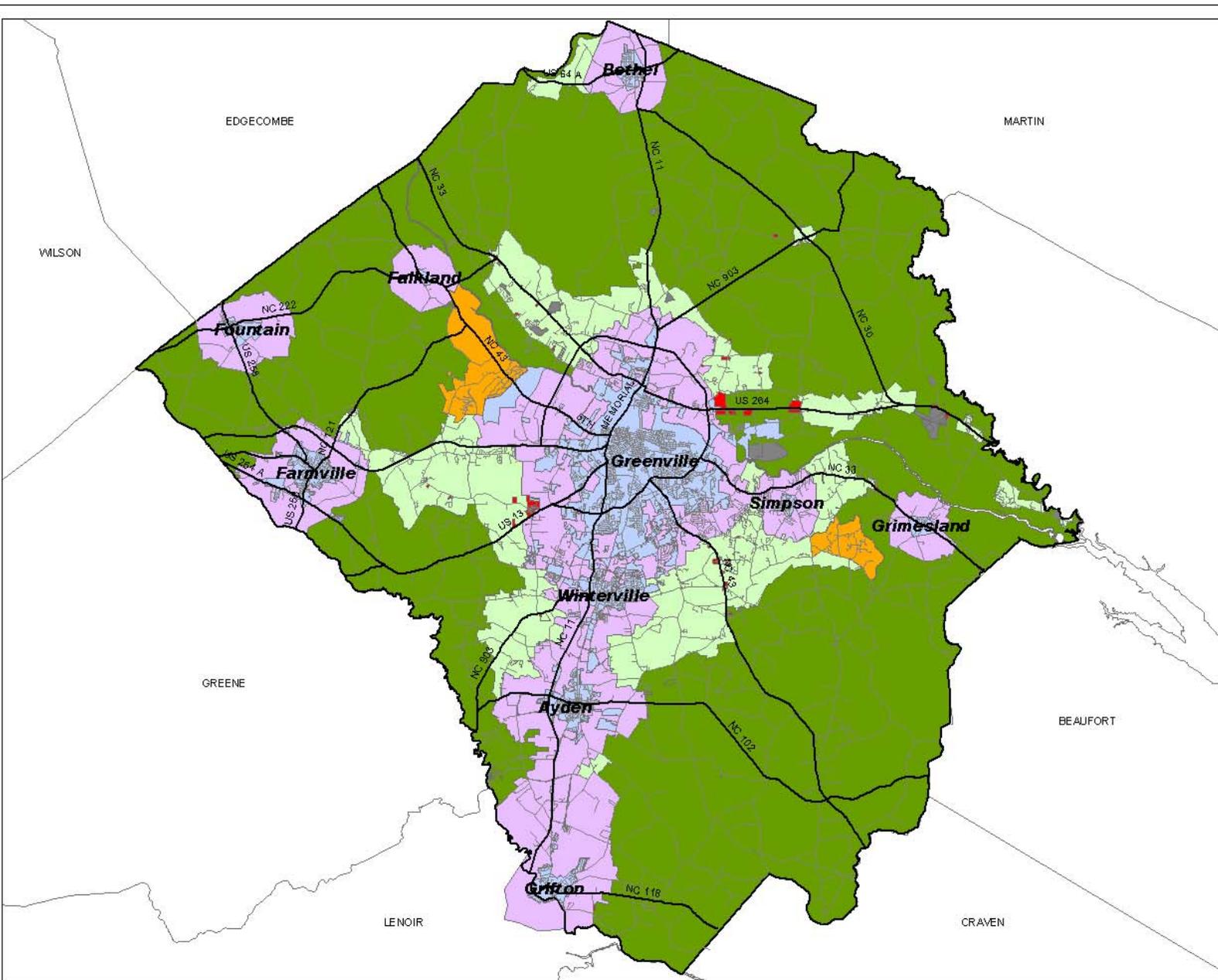
 Secondary Roads

 Pitt County

 County Lines



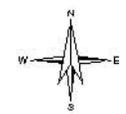
Map Scale:
1 inch represents 3.5 miles
Map Produced By:
Pitt County Planning Department



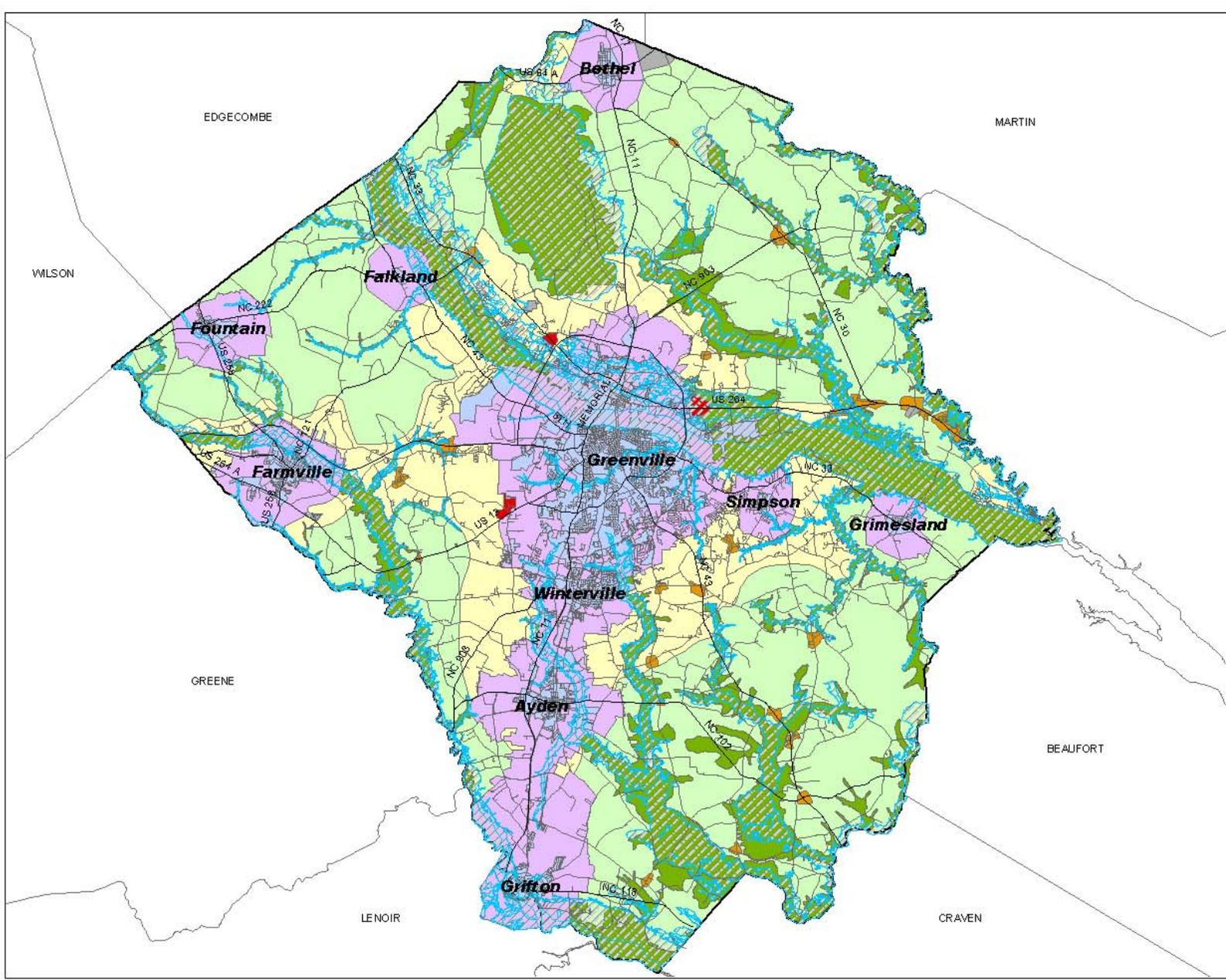
Future Land Use

Legend

- Commercial/ Light Industrial
- Industrial
- Agricultural/ Open/ Natural Resource
- Rural Residential/ Agricultural
- Suburban Residential
- Rural Commercial/ Crossroad Community
- Flood Zone
- Major Roads
- Secondary Roads
- City Limit
- Pitt County
- ETJ
- County Lines



Map Scale:
1 inch represents 3.5 miles
Map Produced By:
Pitt County Planning Department



Roadway System

An important stage in the development of a CTP is the analysis of the existing roadway system and its ability to serve the area's travel needs. Emphasis is placed not only on detecting the existing deficiencies, but also in understanding the causes of these deficiencies. Roadway deficiencies may result from inadequacies such as pavement widths, intersection geometry, or intersection controls. Deficiencies may also result from system problems, such as the need to construct missing travel links, bypass routes, loop facilities, or additional radial routes.

An analysis of the roadway system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a traffic crash analysis, roadway capacity deficiency 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 of the future system.

Traffic Collision Analysis

Traffic collisions or "crashes" are often used as an indicator for locating congestion problems. While often the result of drivers or vehicle performance, crashes may also be a result of the physical characteristics of the roadway. Roadway conditions and obstructions, traffic conditions, and weather may all lead to a crash. While some crashes are the fault of the driver, others may be prevented with physical design changes or traffic control changes such as the installations of stop signs or traffic signals.

Crash data for the period from May 1, 2000 to May 31, 2003 were studied as part of the development for this report. The collision analysis considered both collision frequency and severity. Collision frequency is the total number of reported collisions, while collision severity is the collision rate based upon injuries and property damage incurred. These two factors helped to determine the worst intersections throughout Pitt County and these are summarized in Table 2 and shown in Figure 6.

The severity of every accident 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 an accident 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 accidents. 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

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 2, or other intersections of concern, the planning area should contact the Regional Traffic Engineer. Contact information for the Regional Traffic Engineer is included in Appendix A.

Table 2
Crash Data
Roadway Segments in Pitt County
with 20 or More Reported Accidents
For the Reporting Period of May 1, 2000 to May 31, 2003

<i>Roadway Segment</i>	<i>Fatal Crashes</i>	<i>Injury Crashes</i>	<i>Property Damage Only Crashes</i>	<i>Total Crashes</i>
<i>US 264</i>	3	241	335	<i>579</i>
<i>NC 11</i>	3	177	282	<i>462</i>
<i>NC 43</i>	3	174	243	<i>420</i>
<i>NC 33</i>	6	176	191	<i>373</i>
<i>US 13</i>	2	98	120	<i>220</i>
<i>NC 903</i>	4	73	128	<i>205</i>
<i>US 264A</i>	1	51	60	<i>112</i>
<i>SR 1200</i>	3	48	58	<i>109</i>
<i>SR 1725</i>	1	49	51	<i>101</i>
<i>US 258</i>	0	43	44	<i>87</i>
<i>NC 102</i>	0	32	49	<i>81</i>
<i>SR 1401</i>	0	53	27	<i>80</i>
<i>NC 121</i>	3	25	42	<i>70</i>
<i>SR 1565</i>	1	28	39	<i>68</i>
<i>SR 1774</i>	0	30	29	<i>59</i>
<i>SR 1711</i>	0	25	31	<i>56</i>
<i>SR 1203</i>	0	21	31	<i>52</i>
<i>SR 1755</i>	0	24	28	<i>52</i>
<i>SR 1753</i>	0	18	33	<i>51</i>
<i>SR 1110</i>	2	22	26	<i>50</i>
<i>SR 1514</i>	0	11	34	<i>45</i>
<i>NC 222</i>	0	13	27	<i>40</i>
<i>SR 1760</i>	0	14	26	<i>40</i>
<i>SR 1127</i>	0	19	20	<i>39</i>
<i>SR 1567</i>	1	18	17	<i>36</i>
<i>SR 1128</i>	0	14	20	<i>34</i>
<i>SR 1415</i>	1	13	20	<i>34</i>
<i>SR 1726</i>	0	15	19	<i>34</i>
<i>SR 1400</i>	0	10	23	<i>33</i>
<i>SR 1126</i>	0	17	15	<i>32</i>
<i>NC 30</i>	0	8	23	<i>31</i>
<i>SR 1529</i>	0	20	10	<i>30</i>
<i>SR 1131</i>	0	11	17	<i>28</i>

<i>Roadway Segment</i>	<i>Fatal Crashes</i>	<i>Injury Crashes</i>	<i>Property Damage Only</i>	<i>Total Crashes</i>
<i>NC 118</i>	0	11	15	26
<i>SR 1221</i>	1	10	15	26
<i>SR 1517</i>	0	11	15	26
<i>SR 1523</i>	0	10	16	26
<i>SR 2241</i>	0	12	14	26
<i>SR 1206</i>	0	13	12	25
<i>SR 1551</i>	0	7	18	25
<i>SR 1534</i>	0	5	19	24
<i>SR 1708</i>	0	8	15	23
<i>SR 1139</i>	0	8	14	22
<i>SR 1550</i>	0	8	14	22
<i>SR 1700</i>	1	7	14	22
<i>SR 1723</i>	0	12	10	22
<i>Total Crashes</i>	40	3,848	5,963	9,851

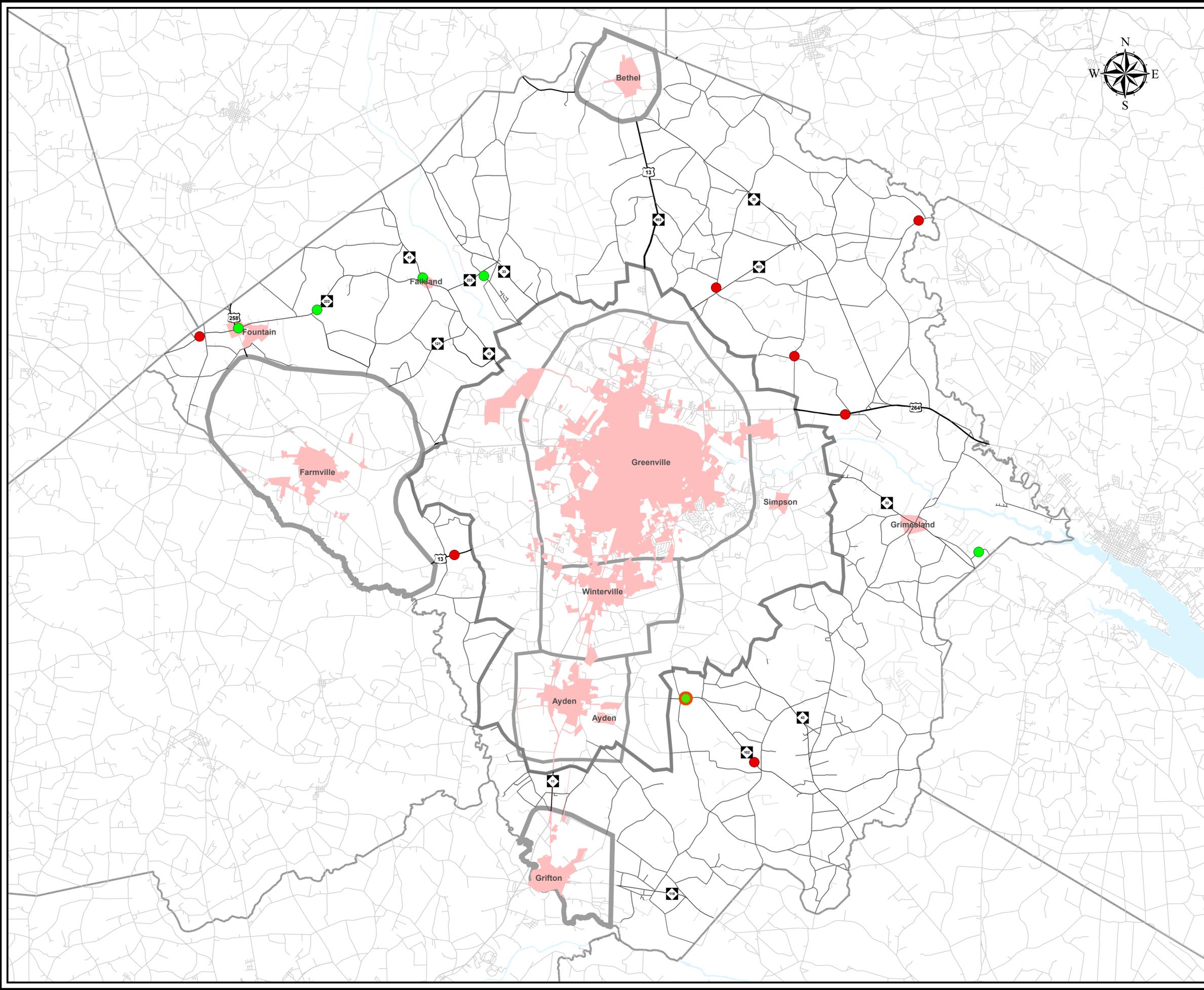
Crash Locations Map

2003 Crash Statistic

FIGURE 6

LEGEND

- Fatal Accidents
- Fatal and Injury accidents
- Injury accidents
- Urban Area Planning Boundary
- Municipal Boundary
- DOT Roads

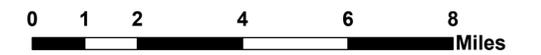


PITT COUNTY

NORTH CAROLINA

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FEDERAL HIGHWAY ADMINISTRATION



BASE MAP DATE: NOVEMBER 2005

Roadway Capacity Deficiencies

Capacity deficiencies occur when the traffic volume of a roadway is eighty percent or more of roadway's capacity. Travel volumes are based on the total number of vehicles that use a roadway on a typical day. These volumes are based on annual average daily traffic (AADT) counts taken annually by the NCDOT Traffic Survey Group.

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:

The existing roadway current and future AADT and capacity shown in Appendix C .

Capacity is the maximum number of vehicles that can pass over a given section of roadway during a given time period under prevailing roadway and traffic conditions while still maintaining a service level that is acceptable to drivers. Many factors contribute to the capacity of a roadway, including:

- 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 of the road, including residential, commercial, 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.

2003 Traffic Capacity Analysis

A comparison of the 2003 travel demand volumes for the major roadways in the planning area and their respective capacities did not identify any major existing deficiencies for the Pitt County planning area.

2030 Traffic Capacity Analysis

The capacity deficiency analysis for the 2030 design year is based upon a "no build" scenario. This analysis revealed several roadways within the planning area will exceed capacity by the design year. Table 3 and Figure 7B present the capacity deficiencies for the design year. Complete recommendations for these facilities are included in Chapter 2 of this report.

Table 3 – 2030 Capacity Deficiencies

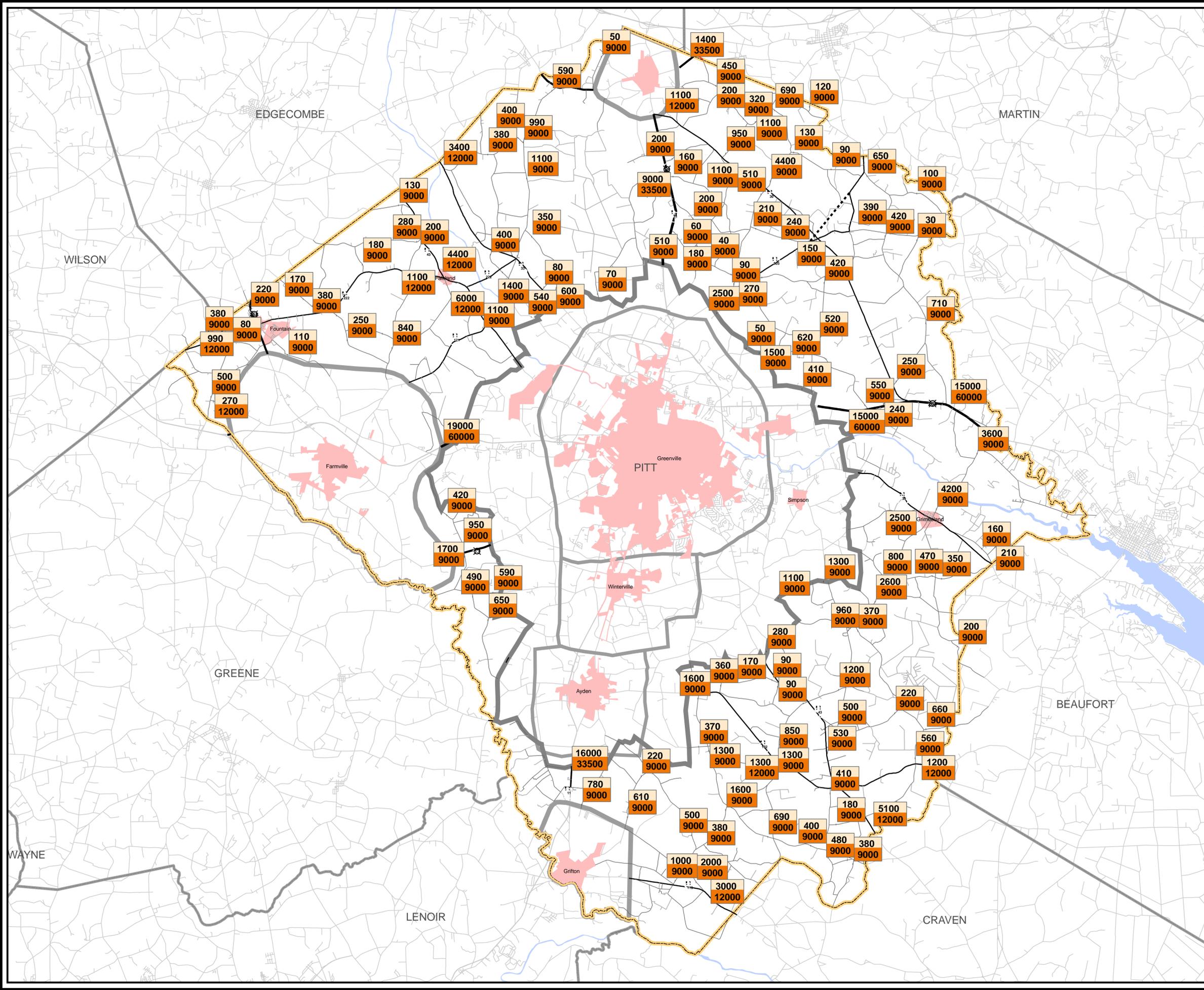
Roadway / Description	Deficiency
US 264- From Farmville Planning area Boundary to Wilson County line	Near Capacity
US 264- From SR1564 to Beaufort County line	Near Capacity
US 258- From Farmville planning area boundary to Wilson county line.	Near capacity
NC 11- From Grifton planning Area boundary to Greenville planning area boundary.	Over Capacity
NC 33- From Greenville planning area boundary to Wilson county line	Over capacity
NC 33- from Greenville planning area boundary to Beaufort County line	Over capacity
NC 44- From Greenville planning boundary area to Wilson County line.	Over Capacity
NC 903- From Greenville Planning boundary Area to Martin County line.	Over capacity
NC 222- East of NC43 in Town of Fountain.	Near Capacity
NC 118- From Craven County line to SR 1916	Near capacity
SR 1565- From NC 33 to US 264	Over Capacity
SR 1917- From NC 118 to 1753	Near capacity
SR 1400- From NC 33 to SR 1413	Near Capacity

2003 Volumes and Roadway Deficiencies

FIGURE 7A

LEGEND

- 0000 2003 AADT
- 0000 Capacity
- Near Capacity
- Over Capacity
- Planning Area Excluded from Study
- Pitt County Boundary



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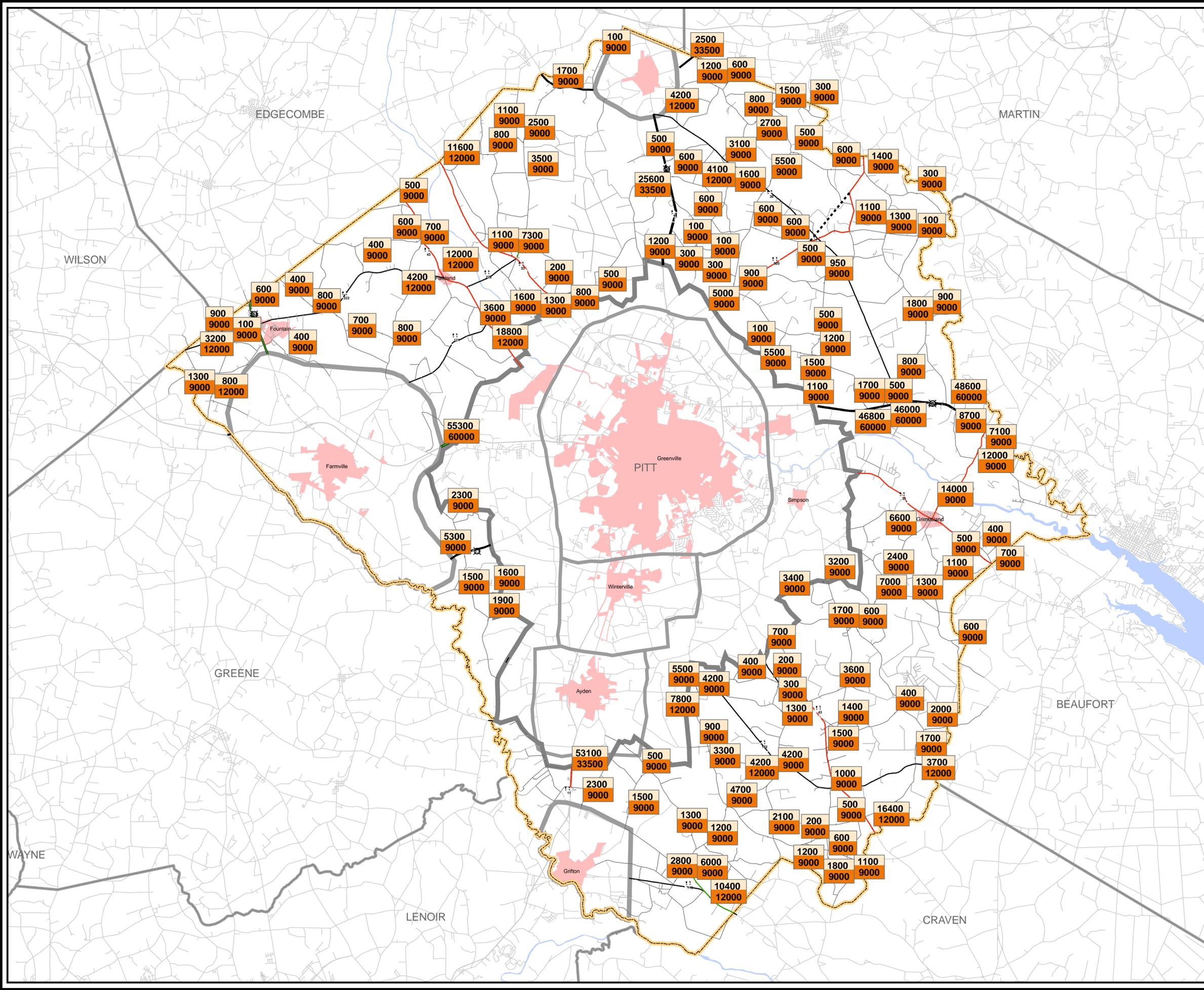
BASE MAP DATE: NOVEMBER 2005

2030 Volumes and Roadway Deficiencies

FIGURE 7B

LEGEND

- 2030 AADT
- Capacity
- Near Capacity
- Over Capacity
- Planning Area Excluded from Study
- Pitt County Boundary

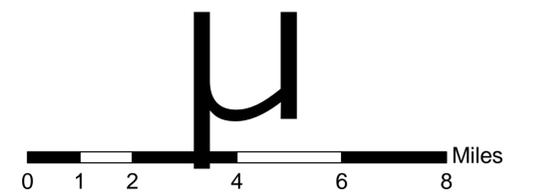


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BASE MAP DATE: NOVEMBER 2005

Bridge Conditions

Bridges are an important element of a highway system. Any bridge deficiency will affect the efficiency of the entire transportation system. In addition, bridges present the greatest potential highway failures for disruption of community welfare and loss of life. Therefore, bridges must be constructed to the same or higher design standards as the system of which they are a part of and must be inspected regularly to ensure the safety of the traveling public.

The Transportation Improvement Program (TIP) 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 represent 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 Bridge Maintenance 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. A bridge at least ten years old is considered structurally deficient if it is in relatively poor condition or has insufficient load-carrying capacity, due to either the original design or to deterioration. The bridge is considered to be functionally obsolete if it is narrow, has inadequate under-clearances, has insufficient load-carrying capacity, is poorly aligned with the roadway, and can no longer adequately serve existing traffic. A bridge must be classified as deficient in order to qualify for Federal replacement funds. In addition, the bridge must have a certain sufficiency rating to qualify for these funds. To qualify for replacement, the sufficiency rating must be less than 50%; for rehabilitation, the sufficiency rating must be less than 80%. Deficient bridges within the planning area are given in Table 4 and the location of these bridges are shown in Figure 8.

Table 4
Structural Deficient & Functionally
Obsolete Bridges in Pitt County

County	Number	Route	Across	STRUCT DEF	FUNC OBS	Sufficiency Rating
PITT	730001	NC903	BR.LITTLE CONTENTNEA CR.	N	FO	71.5
PITT	730005	SR1777	CHICOD CREEK	SD	N	47.1
PITT	730007	NC33	CREEK	SD	FO	11.0
PITT	730009	NC903	SWIFT CREEK	N	FO	41.3
PITT	730012	SR1755	CLAYROOT CREEK	SD	N	52.4
PITT	730013	SR1753	INDIAN WELLS SWAMP	SD	N	38.9
PITT	730014	US258	LITTLE CONTENTNEA CREEK	N	FO	67.6
PITT	730015	SR1565	CHICOD CREEK	SD	N	52.5
PITT	730016	US13	LITTLE CONTENTNEA CREEK	N	FO	59.8
PITT	730017	SR1780	CHICOD CREEK	SD	N	46.6
PITT	730023	NC43	CLAYROOT SWAMP	SD	FO	7.0
PITT	730024	NC222	TAR RIVER	N	FO	47.8
PITT	730025	SR2241	FORK SWAMP	SD	N	29.1
PITT	730028	SR1711	FORK SWAMP	N	FO	54.8
PITT	730029	SR1715	FORK SWAMP	SD	N	9.6
PITT	730032	SR1750	INDIAN WELLS SWAMP	N	FO	72.8
PITT	730037	SR1724	EAST BRANCH SWIFT CREEK	SD	N	44.1
PITT	730038	US13	TAR RIVER	SD	FO	10.6
PITT	730043	SR1923	SWIFT CREEK	SD	N	26.2
PITT	730049	SR1126	SWIFT CREEK	SD	N	47.7
PITT	730053	NC102	SWIFT CREEK	SD	FO	7.0
PITT	730056	US13	TAR RIVER OVERFLOW	N	FO	65.6
PITT	730061	NC903	TRANTERS CREEK	SD	N	28.0
PITT	730063	NC102	FORK SWAMP	N	FO	65.3
PITT	730064	SR1214	PINELOG CREEK	SD	FO	21.1
PITT	730065	SR1200	PINELOG BRANCH	SD	FO	13.6
PITT	730066	US13	TAR RIVER OVERFLOW	N	FO	65.6
PITT	730087	NC33	NORFOLK SOUTHERN RR	N	FO	54.6
PITT	730089	US13BUS/N C11BUS	GRINDLE CREEK	SD	N	44.1
PITT	730093	SR1255	LAWRENCE RUN OVERFLOW	SD	FO	22.3
PITT	730095	SR1401	JOHNSON'S MILL RUN	SD	FO	36.9
PITT	730098	SR1407	CONETOE CREEK	SD	N	56.1
PITT	730111	SR1588	BRIERY SWAMP	SD	FO	29.9
PITT	730118	SR1538	GRINDLE CREEK	SD	N	28.2
PITT	730121	SR1541	GRINDLE CREEK	SD	N	42.1
PITT	730125	SR1565	HUNTING RUN	N	FO	62.7
PITT	730127	SR1565	TAR RIVER OVERFLOW	SD	FO	4.0
PITT	730129	SR1565	TAR RIVER	N	FO	40.1

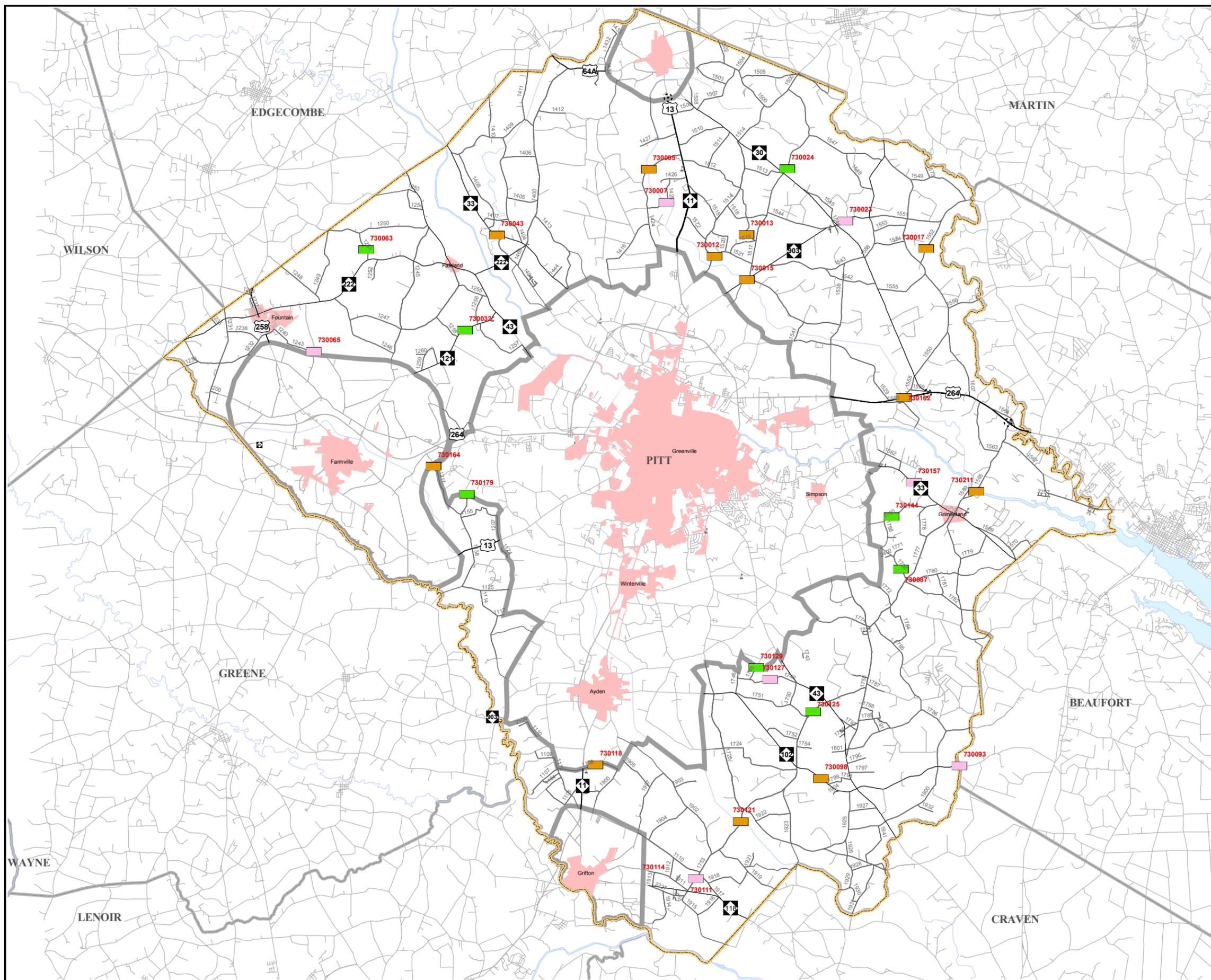
Table 4
Structural Deficient & Functionally
Obsolete Bridges in Pitt County

County	Number	Route	Across	STRUCT DEF	FUN COBS	Sufficiency Rating
PITT	730144	SR1517	CREEK	N	FO	42.2
PITT	730154	SR1900	FORK OF SWIFT CREEK	SD	FO	28.1
PITT	730157	SR1255	LAWRENCE RUN	SD	FO	24.3
PITT	730162	SR1427	GRINDLE CREEK	SD	N	48.0
PITT	730164	SR1424	GRINDLE CREEK	SD	N	40.9
PITT	730171	SR1418	JOHNSON MILL RUN	SD	N	20.8
PITT	730179	SR1755	STREAM	N	FO	46.3
PITT	730211	SR1753	BUCKLEBERRY CREEK	SD	N	21.7
PITT	730219	SR1726	HARDEE CREEK	SD	FO	7.0
PITT	730411	SR1531	TAR RIVER	N	FO	75.7
PITT	730451	SR1202	US264	N	FO	79.4
PITT	730470	SR1611	TAR RIVER	N	FO	91.1

SD= Structural Deficient

FO= functionally obsolete

FIGURE 8
DEFICIENT BRIDGE LOCATIONS



LEGEND

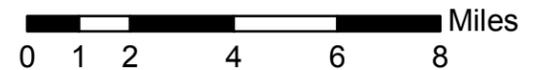
- FUNCTIONALLY OBSOLETE
- STRUCTURALLY DEFICIENT & FUNCTIONALLY OBSOLETE
- STRUCTURALLY DEFICIENT
- DOT Roads
- Hydrology
- Pitt County Boundary

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BASE MAP DATE: NOVEMBER 2005

IV Public Involvement

Overview

Since the passage of the Federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the emphasis on public involvement in transportation has taken on a new role. Although public participation has been an element of long range transportation planning in the past, these regulations call for a much more proactive approach. The NCDOT's Transportation Planning Branch has a long history of making public involvement a key element in the development of any long-range transportation plan, no matter the size of the city and/or planning area. This chapter is designed to provide an overview of the public involvement elements implemented into the development of the transportation plan for the planning area (see attached project schedule).

Study Initiation

The Pitt County Comprehensive Transportation Plan study was requested in August 2002 by way of an official letter from Pitt County. In this letter, the County outlined some specific needs and concerns related to the 1993 Thoroughfare Plan. The Transportation Planning Branch met with the County on September 14, 2004 to identify the primary transportation concerns and to define the scope of the study. The planning effort was initiated in January of 2005.

Public Meetings

Two public meetings were held during the development of the Pitt County Comprehensive Transportation Plan on March 16, 2005 and July 20, 2005 in the Pitt County Commissioners Auditorium prior to the Planning Board meetings. Twenty-six citizens attended the meeting in March and twenty citizens attended the meeting in July. The purpose of these meetings was to discuss the findings from the study including deficiencies, needed improvements, and recommendations, and to solicit public input. Comments received included the following:

- There was concern with community and environmental preservation of the study area.
- Building additional traffic lanes on major county roads.
- Needs for controlled access roads
- Widening of NC 33

V Conclusion

Pitt County is a growing community that will require improvements to its transportation systems over the next 25 years. It is the responsibility of the County to take the initiative for the implementation of the Comprehensive Transportation Plan. It is imperative that the local areas aggressively pursue funding for desired projects. Questions regarding funding, projects, planning, and modes of transportation should be addressed to the appropriate branch within NCDOT. Appendix A includes contact information for many of these branches. If changes are required for any element of the Comprehensive Transportation Plan, then all other elements must be reviewed for resulting impacts.

APPENDIX A

NCDOT Resources And Contacts

Appendix A

Resources & Contacts

North Carolina Department of Transportation

Customer Service Office

1-877-DOT4YOU
(1-877-368-4968)

Secretary of Transportation

1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 733-2520

Board of Transportation Member

Contact information for the current Board of Transportation Member may be accessed from the NCDOT homepage on the worldwide web (<http://www.ncdot.org/board/>) or by calling 1-877-DOT4YOU.

Highway Division 2

Division Engineer

Contact the Division Engineer with general questions concerning NCDOT activities within Division 2 or information on Small Urban Funds.

C.E. (Neil) Lassiter, Jr., PE
105 Pactolus Hwy.
Greenville, NC 27835
(252)830-3490

Division Construction Engineer

Contact the Division Construction Engineer for information concerning major roadway improvements under construction.

Ed Eatmon, PE
105 Pactolus Hwy.
Greenville, NC 27835
(252)830-3490

Regional Traffic Engineer

Contact the Regional Traffic Engineer for information concerning high-collision locations.

P. Haywood Daughtry, III, PE
509 SW Ward Blvd.
Wilson, NC 27895
(252)830-3490

District Engineer

Contact the District Engineer for information regarding Driveway Permits, Right of Way Encroachments, and Development Reviews.

E. Jarvis
1701 W.5th Street
Washington, NC 27889
(252)946-3689

Division Maintenance Engineer

Contact the County Maintenance Engineer regarding any maintenance activities, such as drainage.

John Rouse, PE
105 Pactolus Hwy
Greenville, NC 27835
(252)830-3490

Centralized Personnel

Transportation Planning Branch

Contact the Transportation Planning Branch with long-range planning questions.

1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-47057

Secondary Roads Office

Contact the Secondary Roads Officer for information regarding the Industrial Access Funds Program.

1535 Mail Service Center
Raleigh, NC 27699-1535
(919) 733-3250

Program Development Branch

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

1542 Mail Service Center
Raleigh, NC 27699-1542
(919) 733-2031

Project Development & Environmental Analysis Branch

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

1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-3141

Traffic Engineering & Safety Systems Branch

Contact the Traffic Engineering & Safety Systems Branch for information regarding Development Reviews.

1561 Mail Service Center
Raleigh, 27699-1561
(919) 733-3915

Highway Design Branch

Contact the Highway Design Branch for information regarding alignments for projects that are included in the TIP.

1584 Mail Service Center
Raleigh, 27699-1584
(919) 250-4001

Bicycle and Pedestrian Division

Contact the Bicycle and Pedestrian Division for information regarding projects in the TIP, funding, and events.

1552 Mail Service Center
Raleigh, 27699-1552
(919) 733-2804

Public Transportation Division

Contact the Public Transportation Division for information regarding planning and funding for public transportation projects.

1550 Mail Service Center
Raleigh, 27699-1550
(919) 733-4713

Railroad Division

Contact the Railroad Division for information regarding engineering and safety, operations, and planning.

1553 Mail Service Center
Raleigh, 27699-1553
(919) 733-7245

Other departments

Contact information for other departments within the NCDOT not listed here are available at the NCDOT homepage on the worldwide web (<http://www.ncdot.org/board/>) or by calling 1-877-DOT4YOU.

APPENDIX B

Comprehensive Transportation Plan Definitions

Appendix B

Definitions of Categories

- **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 vehicle (HOV)/high occupancy toll (HOT) lanes, busways, truck lanes, park-and-ride facilities at or 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 1,000’ or for 350’ plus 650’ 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 2,000 feet; 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; will include all US and NC routes not designated as freeway, expressway, or boulevard
 - 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 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 45 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 roadway with center turn lane as permitted by the current *NCDOT Driveway Manual*

APPENDIX C

Street Tabulation & Recommendations

Appendix C

PITT COUNTY CTP

Street Tabulation and Recommendation

Facility & Section		Current Conditions					Recommended Improvement				
		Current year AADT 2003	Existing		Existing Capacity (VPD)	Existing Functional Class	Future year ADDT 2030	Proposed		Proposed Capacity (VPD)	CTP Class
			No of Lanes	Lane Width (ft)				No of lanes	Lane Width(ft)		
ROUTE NUMBER	DESCRIPTION										
US 13/ NC 11											
13	S OF US 264 A	4,300	2	24	12,000	Minor Arterial	7,600	4	48	60,000	Freeway
13/NC 11	N OF SR 1500	8,600	4	48	33,500	Minor Arterial	27,800	4	48	60,000	Freeway
US 13-264A											
13-264 A	E OF SR 1138	11,000	2	24	12,000	Minor Arterial	32,000	4	48	33,500	Major Thoroughfare
13-264 A	E OF US 13	10,000	2	24	12,000	Minor Arterial	26,000	4	48	33,500	Major Thoroughfare
US 64A											
64	W OF NC 11	1,900	4	48	33,500	Major Collector	8,100	4	48	60,000	Freeway
64	E OF SR 1429	1,800	4	48	33,500	Major Collector	9,200	4	48	60,000	Freeway
64 A	E OF SR 1400	2,200	4	48	33,500	Major Collector	2,200	4	48	33,500	Major Thoroughfare
13-64A	N OF NC 11	1,400	4	48	33,500	Major Collector	3,400	4	48	33,500	Major Thoroughfare
US 258											
258	N OF SR 1241	3,800	2	24	12,000	Minor Arterial	6,800	4	48	33,500	Major Thoroughfare
258	N OF NC 222	2,900	3	36	12,000	Minor Arterial	9,400	4	48	33,500	Major Thoroughfare
258	S OF NC 222	3,100	3	36	12,000	Minor Arterial	11,000	4	48	33,500	Major Thoroughfare
258	N OF SR 1200	3,500	2	22	12,000	Minor Arterial	6,200	4	48	33,500	Major Thoroughfare
258	N OF US 264	4,900	2	22	12,000	Minor Arterial	11,000	4	48	33,500	Major Thoroughfare
258	S OF US 264	4,100	4	48	33,500	Minor Arterial	13,000	4	48	33,500	Major Thoroughfare
258	S OF US 264	4,600	3	30	12,000	Minor Arterial	14,700	4	48	33,500	Major Thoroughfare
258	S of US 258/NC 121	5,500	3	38	12,000	Minor Arterial	18,300	4	48	33,500	Major Thoroughfare
258	S of US 258/NC 121	5,800	3	38	12,000	Minor Arterial	21,000	4	48	33,500	Major Thoroughfare
258	N OF US 264 A	7,000	3	38	12,000	Minor Arterial	24,000	4	48	33,500	Major Thoroughfare
258/NC 121	S OF SR 1304	2,900	2	22	12,000	Minor Arterial	9,600	4	48	33,500	Major Thoroughfare
258/NC 121	W OF NC 121	4,200	2	22	12,000	Minor Arterial	12,600	4	48	33,500	Major Thoroughfare
US 264											
264	W OF SR 1563	15,000	4	48	60,000	Principal Arterial	48,600	4	48	60,000	Freeway
264	E OF NC 30	16,000	4	48	60,000	Principal Arterial	50,200	4	48	60,000	Freeway

PITT COUNTY CTP

Street Tabulation and Recommendation

Facility & Section		Current Conditions					Recommended Improvement				
		Current year AADT 2003	Existing		Existing (VPD)	Existing Functional Class	Future year ADDT 2030	Proposed		Proposed Capacity (VPD)	CTP Class
			No of lanes	Lane Width (ft)				No of lanes	Lane Width(ft)		
264	W OF SR 1529	15,000	4	48	60,000	Principal Arterial	46,800	4	48	60,000	Freeway
264	W OF US 258	14,000	4	48	60,000	Principal Arterial	36,700	4	48	60,000	Freeway
264	W OF SR 1214	19,000	4	48	60,000	Principal Arterial	55,300	4	48	60,000	Freeway
264	E OF NC 121	15,000	4	48	60,000	Principal Arterial	35,700	4	48	60,000	Freeway
264	E OF SR 1221	19,000	4	48	60,000	Principal Arterial	54,000	4	48	60,000	Freeway
264	W OF NC 30	14,000	4	48	60,000	Principal Arterial	46,000	4	48	60,000	Freeway
264	S OF US 264 A	5,800	4	48	60,000	Principal Arterial	17,000	4	48	60,000	Freeway
264	E OF SR 1564	16,000	4	48	60,000	Principal Arterial	52,000	4	48	60,000	Freeway
US 264A											
264 A	W OF US 258	8,700	2	24	12,000	Major Collector	28,200	4	48	33,500	Major Thoroughfare
264 A	W of SR 1143	4,600	2	24	12,000	Major Collector	14,600	4	48	33,500	Major Thoroughfare
264 A	E OF US 258	8,800	2	24	12,000	Major Collector	26,500	4	48	33,500	Major Thoroughfare
264 A	E of SR 1141	4,400	2	24	12,000	Major Collector	11,000	4	48	33,500	Major Thoroughfare
264 A	E OF SR 1139	5,700	2	24	12,000	Major Collector	19,000	4	48	33,500	Major Thoroughfare
NC 11											
11	N OF US 13-64	3,200	4	48	33,500	Minor Arterial	14,000	4	48	60,000	Freeway
11	S OF SR 1501	6,000	4	48	33,500	Minor Arterial	17,000	4	48	60,000	Freeway
11	S OF SR 1429	9,100	4	48	33,500	Minor Arterial	21,000	4	48	60,000	Freeway
11	S OF SR 1515	9,000	4	48	33,500	Minor Arterial	14,000	4	48	60,000	Freeway
11	S OF SR 1108	16,000	4	48	33,500	Minor Arterial	24,500	4	48	60,000	Freeway
11	S OF SR 1110	15,000	4	48	33,500	Minor Arterial	22,000	4	48	60,000	Freeway
11	N OF NC 30	9,000	4	48	33,500	Minor Arterial	15,000	4	48	60,000	Freeway
11	N OF SR 1426	9,000	4	48	33,500	Minor Arterial	12,100	4	48	60,000	Freeway
NC30											
30	E OF NC 11	1,100	2	22	12,000	Major Collector	4,200	2	24	12,000	Major Thoroughfare
30	S OF SR 1543	1,300	2	22	12,000	Major Collector	5,200	2	24	12,000	Major Thoroughfare
30	N OF US 264	1,400	2	22	12,000	Major Collector	4,900	2	24	12,000	Major Thoroughfare
30	E OF SR 1514	1,100	2	22	12,000	Major Collector	4,100	2	24	12,000	Major Thoroughfare
30	N OF SR 1545	4,400	2	22	12,000	Major Collector	7,900	2	24	12,000	Major Thoroughfare
30	S OF SR 1545	4,600	2	22	12,000	Major Collector	8,600	2	24	12,000	Major Thoroughfare
30	E OF NC 903	2,700	2	22	12,000	Major Collector	6,600	2	24	12,000	Major Thoroughfare

PITT COUNTY TCP

Street Tabulation and Recommendation

Facility & Section		Current Conditions					Recommended Improvement					
		Current year AADT 2003	Existing		Existing (VPD)	Existing Functional Class	Future year ADDT 2030	Proposed		Proposed Capacity (VPD)	CTP Class	
			No of lanes	Lane Width (ft)				No of lanes	Lane Width(ft)			
NC 33												
33	N OF SR 1409	3,400	2	24	12,000	Major Collector	11,000	4	48	33,500	Major Thoroughfare	
33	E OF SR 1565	5,500	2	22	12,000	Major Collector	14,000	4	48	33,500	Major Thoroughfare	
33	W OF SR 1760	6,700	2	22	12,000	Major Collector	16,500	4	48	33,500	Major Thoroughfare	
33	W OF SR 1569	4,900	2	20	12,000	Major Collector	13,000	4	48	33,500	Major Thoroughfare	
33	W OF NC 222	5,000	2	24	12,000	Major Collector	14,500	4	48	33,500	Major Thoroughfare	
33	E OF NC 222	5,500	2	24	12,000	Major Collector	17,500	4	48	33,500	Major Thoroughfare	
33	W OF SR 1565	7,600	2	22	12,000	Major Collector	20,500	4	48	33,500	Major Thoroughfare	
NC 43												
43	S OF NC 121	6,100	2	22	12,000	Major Collector	19,000	4	48	33,500	Major Thoroughfare	
43	N OF SR 1253	4,000	2	24	12,000	Major Collector	13,100	4	48	33,500	Major Thoroughfare	
43	S OF SR 1801	5,100	2	22	12,000	Major Collector	16,300	4	48	33,500	Major Thoroughfare	
43	S OF SR 1755	5,800	2	22	12,000	Major Collector	18,400	4	48	33,500	Major Thoroughfare	
43	E OF SR 1800	5,100	2	22	12,000	Major Collector	14,000	4	48	33,500	Major Thoroughfare	
43	N OF NC 222	4,400	2	22	12,000	Major Collector	12,000	4	48	33,500	Major Thoroughfare	
43	W OF NC 121	6,000	2	22	12,000	Major Collector	11,000	4	48	33,500	Major Thoroughfare	
43	E OF SR 1750	7,000	2	22	12,000	Major Collector	17,500	4	48	33,500	Major Thoroughfare	
43	N OF SR 1793	5,700	2	22	12,000	Major Collector	16,000	4	48	33,500	Major Thoroughfare	
43	N OF NC 102	5,900	2	22	12,000	Major Collector	15,500		48	33,500	Major Thoroughfare	
NC 102												
102	E OF SR 1725	2,200	2	20	12,000	Major Collector	4,600	2	24	12000	Major Thoroughfare	
102	W OF SR 1725	2,400	2	20	12,000	Major Collector	5,100	2	24	12000	Major Thoroughfare	
102	W OF SR 1753	1,300	2	20	12,000	Major Collector	2,200	2	24	12000	Major Thoroughfare	
102	E OF SR 1800	1,200	2	20	12,000	Major Collector	1,900	2	24	12000	Major Thoroughfare	
102	E OF SR 1753	2,000	2	20	12,000	Major Collector	3,900	2	24	12000	Major Thoroughfare	
102	E OF NC 43	1,800	2	22	12,000	Major Collector	2,600	2	24	12000	Major Thoroughfare	
NC 118												
118	E OF SR 1910	3,100	2	20	12,000	Major Collector	6,700	2	24	12,000	Major Thoroughfare	

PITT COUNTY CTP

Street Tabulation and Recommendation

Facility & Section		Current Conditions					Recommended Improvement				
		Current year AADT 2003	Existing		Existing Capacity (VPD)	Existing Functional Class	Future year ADDT 2030	Proposed		Proposed capacity (VPD)	CTP Class
			No of lanes	Lane Width (ft)				No of lanes	Lane Width (ft)		
118	E OF SR 1914	2,300	2	20	12,000	Major Collector	2,600	2	24	12,000	Major Thoroughfare
118	W OF SR 1910	3,900	2	20	12,000	Major Collector	7,500	2	24	12,000	Major Thoroughfare
118	E OF SR 1753	1,200	2	20	12,000	Major Collector	2,900	2	24	12,000	Major Thoroughfare
118	E OF SR 1916	3,000	2	20	12,000	Major Collector	5,500	2	24	12,000	Major Thoroughfare
118	W OF SR 1939	5,000	2	20	12,000	Major Collector	11,000	2	24	12,000	Major Thoroughfare
118	E OF SR 1939	5,600	2	20	12,000	Major Collector	11,800	2	24	12,000	Major Thoroughfare
NC 121											
121	S OF NC 43	1,100	2	20	12,000	Major Collector	24,000	2	24	12,000	Major Thoroughfare
121	N OF SR 1200	2,000	2	20	12,000	Major Collector	4,400	2	24	12,000	Major Thoroughfare
121	W OF SR 1226	1,200	2	24	12,000	Major Collector	2,500	2	24	12,000	Major Thoroughfare
121	W OF US 258	1,400	2	24	12,000	Major Collector	3,600	2	24	12,000	Major Thoroughfare
121	N OF US 258	4,700	2	24	12,000	Major Collector	7,800	2	24	12,000	Major Thoroughfare
NC 222											
222	E OF NC 43	6,100	2	20	12,000	Major Collector	16,700	2	24	12,000	Major Thoroughfare
222	W OF SR 1245	1,100	2	20	12,000	Major Collector	4,200	2	24	12,000	Major Thoroughfare
222	N OF SR 1246	940	2	20	12,000	Major Collector	2,300	2	24	12,000	Major Thoroughfare
222	W OF SR 1248	800	2	20	12,000	Major Collector	2,900	2	24	12,000	Major Thoroughfare
222	E OF US 258	1,100	2	20	12,000	Major Collector	3,300	2	24	12,000	Major Thoroughfare
222	E OF SR 1231	1,100	2	20	12,000	Major Collector	3,500	2	24	12,000	Major Thoroughfare
222	S OF SR 1231	990	2	20	12,000	Major Collector	2,300	2	24	12,000	Major Thoroughfare
222	W OF NC 43	1,500	2	20	12,000	Major Collector	3,800	2	24	12,000	Major Thoroughfare
222	W OF US 258	1,100	2	20	12,000	Major Collector	4,400	2	24	12,000	Major Thoroughfare
NC 903											
903	N OF SR 1550	4,700	2	20	33,500	Major Collector	14,200	4	48	33,500	Major Thoroughfare
903	E OF SR 1546	5,200	2	20	33,500	Major Collector	21,000	4	48	33,500	Major Thoroughfare
903	S OF SR 1544	5,200	2	22	33,500	Major Collector	21,000	4	48	33,500	Major Thoroughfare
903	E OF SR 1543	6,900	2	22	33,500	Major Collector	20,000	4	48	33,500	Major Thoroughfare
903	N OF NC 30	1,300	2	20	33,500	Major Collector	1,800	4	48	33,500	Major Thoroughfare
903	N OF SR 1551	2,000	2	20	33,500	Major Collector	11,300	4	48	33,500	Major Thoroughfare

APPENDIX D

Typical Cross Sections

Typical Transportation 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. The 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.

Recommended design standards relating to grades, sight distances, degree of curve, superelevation, and other considerations for roadways are given in Appendix D. The typical cross sections are described below and are shown on D-5 – D-7.

On all existing and proposed roadways delineated on the comprehensive transportation plan, 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 D 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, and
- roadways where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.

A: Four Lanes Divided with Median

Cross section "A" is recommended for freeways/expressways in rural areas. The minimum median width for this cross section is 46 feet, but a wider median is desirable. This cross section could apply to freeways or expressways.

B: Seven Lanes - Curb & Gutter

Cross section "B" is typically not recommended for new projects. When the conditions warrant six lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as when widening from a five-lane section where right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "D" is the final cross section. This cross section applies to other major thoroughfares.

C: Five Lanes - Curb & Gutter

Typical for other major thoroughfares, cross section "C" is desirable where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

D: Six Lanes Divided with Raised Median - Curb & Gutter

E: Four Lanes Divided with Raised Median - Curb and Gutter

Cross sections "D" and "E" are typically used on expressways/boulevards where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections. The 16-ft median is the minimum recommended for an urban boulevard-type

cross section. In most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In certain cases, grass or landscaped medians result in greatly increased maintenance costs and an increase danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

F: Four Lanes Divided – Grass Median

Cross section "F" is typically recommended for expressways/boulevards to enhance the urban environment and to improve the compatibility of expressways/boulevards with residential areas. A minimum median width of 24 ft is recommended, with 30 ft being desirable.

G: Four Lanes - Curb and Gutter

Cross section "G" is recommended for other major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would likely be required at major intersections. This cross section should be used only if the above criteria are met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

H: Three Lanes - Curb and Gutter

In urban environments, minor thoroughfares that are proposed to function as one-way traffic carriers would typically require cross section "H".

I: Two Lanes – Curb and Gutter, Parking both sides

J: Two Lanes – Curb and Gutter, Parking one side

Cross section "I" and "J" are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross-section "I" would be used on those minor thoroughfares where parking on both sides is needed as a result of more intense development.

K: Two Lanes - Paved Shoulder

Cross section "K" is used in rural areas or for staged construction of a wider multilane cross section. On some minor thoroughfares or US/NC routes, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time. For areas that are growing and that will require future widening, the full right-of-way of 100 ft should be required. In some instances, local ordinances may not allow the full 100 ft. In those cases, 70 ft should be preserved with the understanding that the full 70 ft will be preserved by use of building setbacks and future street line ordinances.

L: Six Lanes Divided with Grass Median

Cross section "L" is typical for controlled access freeways/expressways. The 46-ft grass median is the minimum desirable width, but variation from this may be permissible depending upon design considerations. Right-of-way requirements are typically 228 ft or greater, depending upon cut and fill requirements.

M: Eight Lanes Divided with Raised Median - Curb and Gutter

Also used for controlled access freeways, cross section "M" may be recommended for expressway/boulevard going through major urban areas or for routes projected to carry very high volumes of traffic.

Bicycle Cross Sections

Cross sections B-1, B-2, B-3, B-4, and B-5 are typical bicycle cross sections. Contact the NCDOT Division of Bicycle and Pedestrian Transportation for more information regarding these cross sections.

B-1: Four Lanes Divided with Wide Outside Lanes

B-2: Five Lanes with Wide Outside Lanes

A widened outside lane is an effective way to accommodate bicyclists riding in the same lane with motor vehicles. With a wide outside lane, motorists do not have to change lanes to pass a bicyclist. The additional width in the outside lane also improves sight distance and provides more room for vehicles to turn onto the roadway. Therefore, on roadways with bicycle traffic, widening the outside lane can improve the capacity of that roadway. Also, by widening the outside lane by a few extra feet both motorists and bicyclists have more space in which to maneuver. This facility type is generally considered for use in urban, suburban, and occasionally rural conditions on roadways where there is a curb and gutter. Wide outside lanes can be applied to several different roadway cross sections.

B-3: Bicycle Lanes on Collector Streets

Bicycle lanes may be considered when it is desirable to delineate road space for preferential use by cyclists. Streets striped with bicycle lanes should be part of a connected bikeway system rather than being an isolated feature. Bicycle lanes function most effectively in mid-block situations by separating bicyclists from overtaking motor vehicles. Integrating bicyclists into complicated intersection traffic patterns can sometimes be problematic. Strip development areas, or roadways with a high number of commercial driveways, tend to be less suitable for bicycle lanes due to frequent and unpredictable motorist turning movements across the path of straight-through cyclists. Striped bike lanes can be effective as a safety treatment, especially for less-experienced bicyclists. Two-lane residential/collector streets with lower traffic volume, low-posted speed limit, adequate roadway width for both bike lanes and motor vehicle travel lanes, and an absence of complicated intersections. A median-divided multi-lane roadway with lower traffic volumes and a low volume of right and left turning traffic would be a more appropriate location for bicycle lanes than a high traffic volume undivided multi-lane roadway with a continuous center turn lane. Most bicyclists will choose a route that combines direct access with lower traffic volumes. An origin and destination of less than 4 miles is desirable to generate usage on a facility.

B-4: Wide Paved Shoulders

On urban streets with curb and gutter, wide outside lanes and bicycle lanes are usually the preferred facilities. Shoulders for bicycle use are not typically provided on roadways with curb and gutter. On rural roadways where bicycle travel is common, such as roads in coastal resort areas, wide paved shoulders are highly desirable. On secondary roadways without

curb and gutter where there are few commercial driveways and intersections with other roadways, many bicyclists prefer riding on wide, smoothly paved shoulders.

B-5: Multi-use Pathway

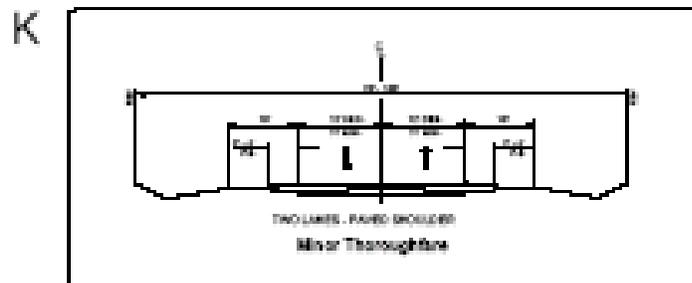
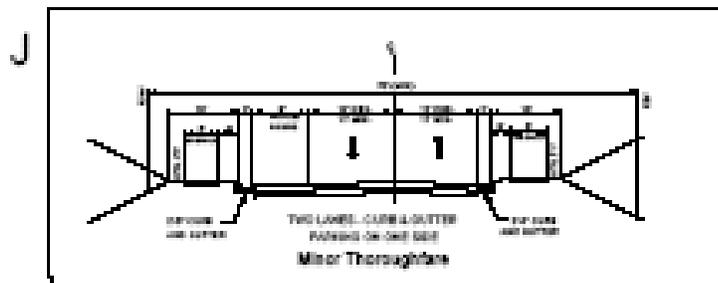
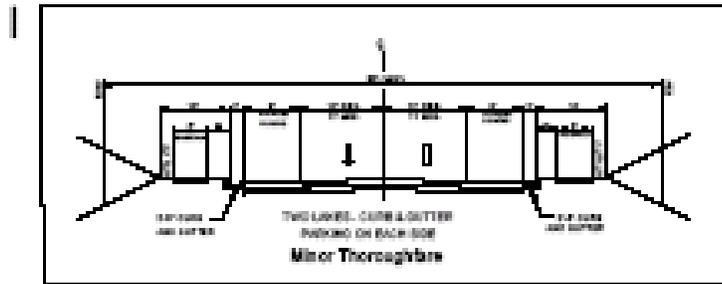
When properly located, multi-use pathway can be a safer type of facility for novice and child bicyclists because they do not have to share the path with motor vehicles. The design standards used for this cross section provides adequate width for two-directional use by both cyclists and pedestrians, provisions of good sight distance, avoidance of steep grades and tight curves, and minimal cross-flow by motor vehicles. A multi-use pathway can serve a variety of purposes, including recreation and transportation. This pathway should not be located immediately adjacent to a roadway because of safety considerations at intersections with driveways and roads. Sidewalks should never be used as a multi-use pathway.

General

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer such as a utility strip or landscaping between the sidewalk and the minimum right-of-way line. This permits adequate setbacks for the safety of the pedestrians while providing locations for utilities. If it is desired to move the sidewalk farther away from the street to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setbacks for the pedestrian's safety was accomplished while providing locations for utilities.

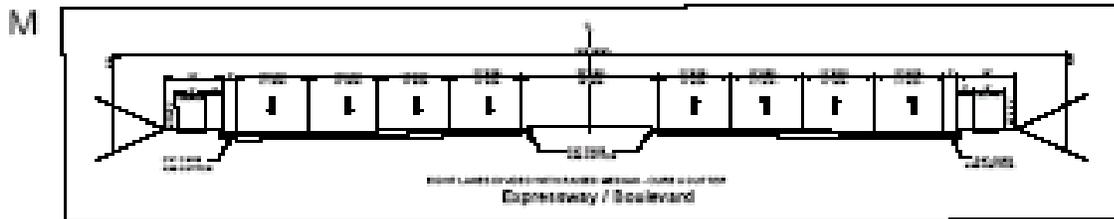
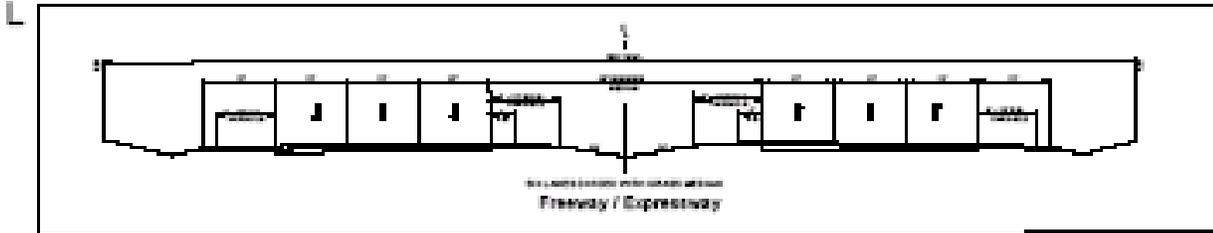
The right-of-way shown for each typical cross section is the minimum amount required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban transportation construction.

TYPICAL HIGHWAY CROSS SECTIONS



D-3

TYPICAL HIGHWAY CROSS SECTIONS

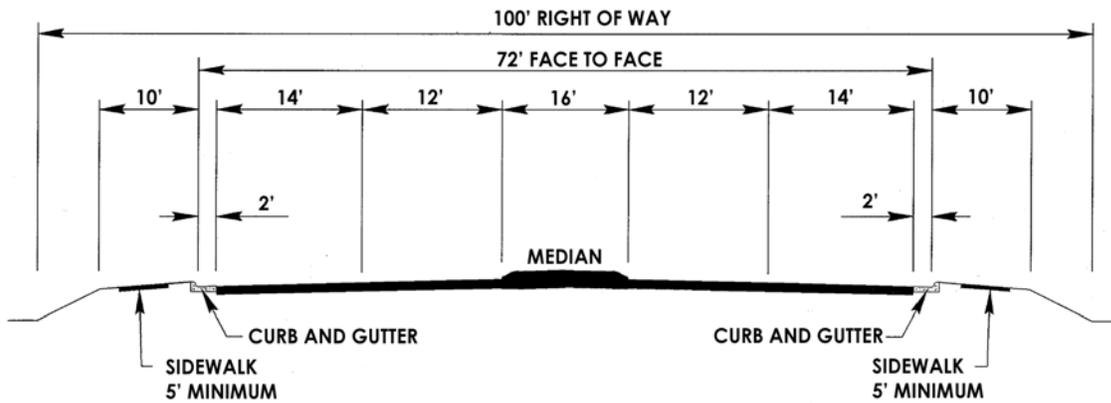


Typical Bicycle Cross Sections

WIDE CURB LANES

B-1 4-LANE MEDIAN DIVIDED TYPICAL SECTION

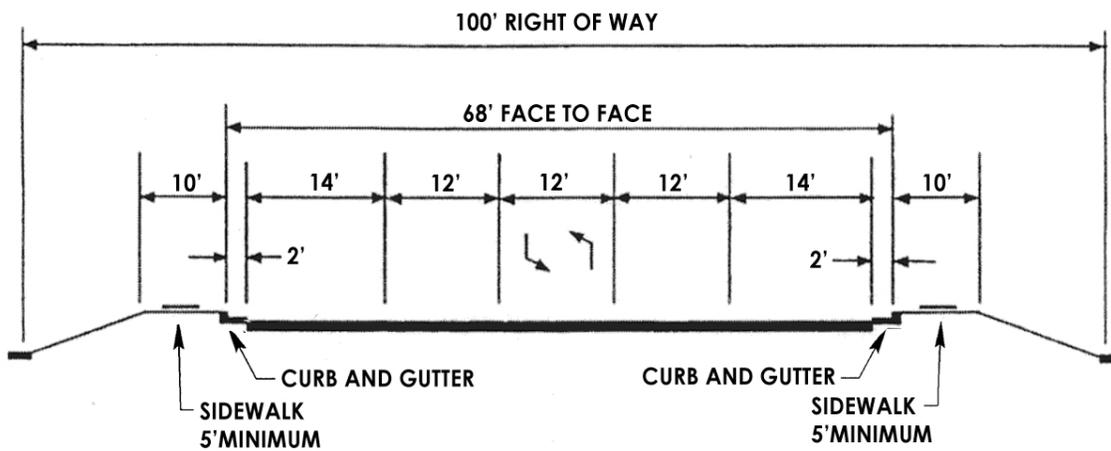
With Wide Outside Lanes



B-2

5-LANE TYPICAL SECTION

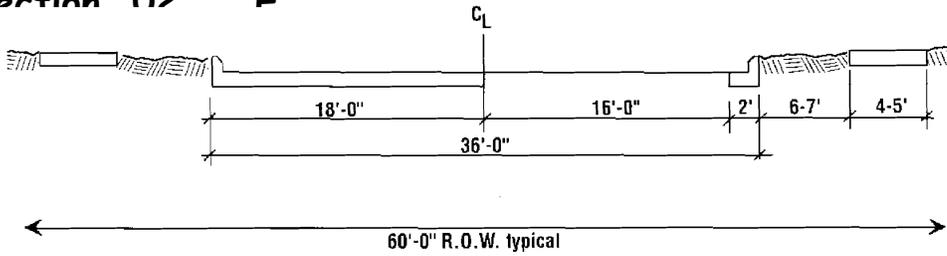
With Wide Outside Lanes



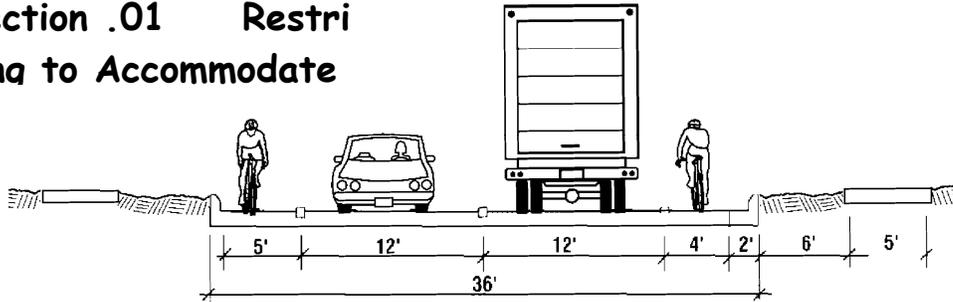
Typical Bicycle Cross Sections

B-3 BICYCLE LANES ON COLLECTOR STREETS

Section 02 F



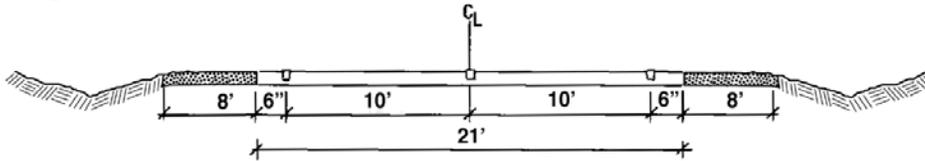
Section .01 Restricting to Accommodate



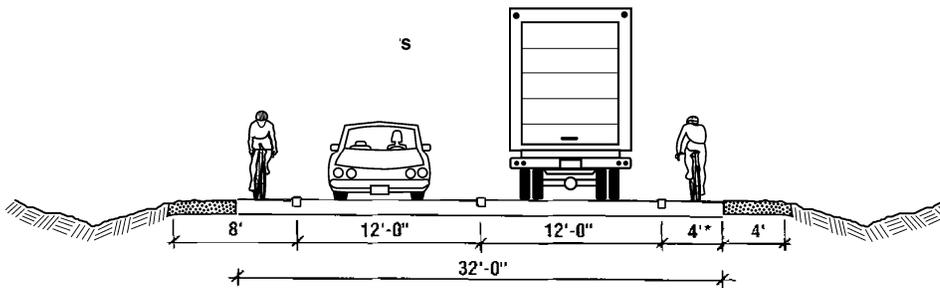
Typical Bicycle Cross Sections

B-4 WIDE PAVED SHOULDERS

Section .03 Existing Roadway



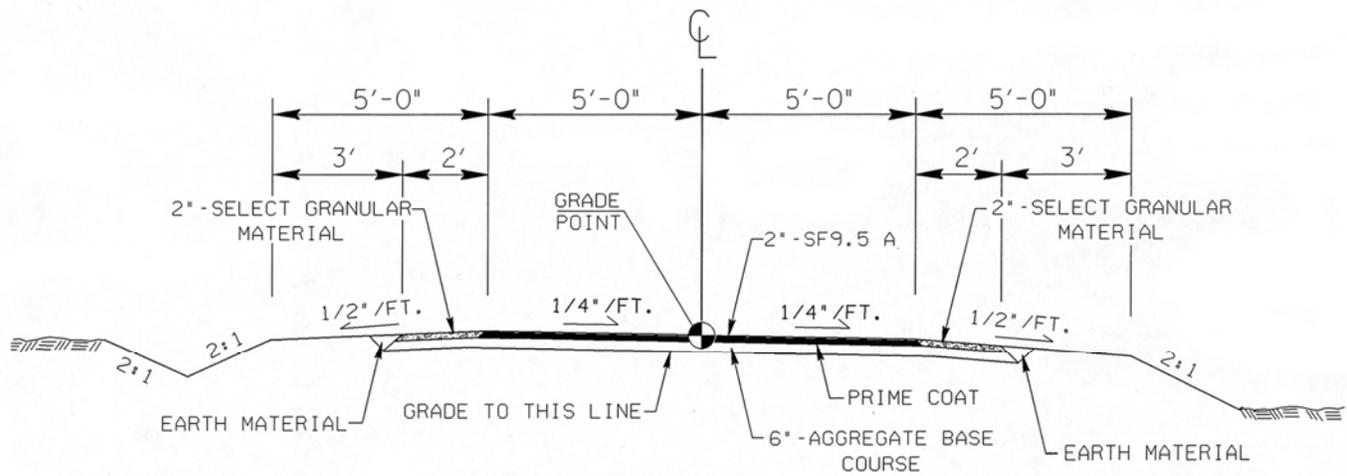
Roadway Retrofitted with 4-Ft Paved Shoulders



Section .04 * If speeds are higher than 40 mph, shoulder widths greater than 4' are recommended.

Typical Bicycle Cross Sections

B-5 RECOMMENDED TYPICAL SECTION OF 10-FT ASPHALT PATHWAY



APPENDIX E

Control of Access Definition

LAND USE/ ACCESS MANAGEMENT POLICY GUIDELINES FOR MOBILITY PROTECTION^{1*}

- **Policy Guidelines**

In order to address the issues outlined with existing development patterns and begin achieving the characteristics identified as beneficial in the previous section, appropriate land use policies should be adopted throughout the corridor. The following land use policy guidelines address conditions associated with the many facets of the land use/mobility issue. Each policy statement is followed by a series of recommended actions for putting it into practice, which target various audiences from local planning staffs to the state's Department of Transportation. Some of these recommendations are followed by associated sub-recommendations or specific tools that may be used to carry them out. *These policies are not intended to be assigned to specific communities. The application and prioritization of the policies will vary in each, depending on the particular challenges a community faces.*

The policies and accompanying recommendations on the following pages outline ways to achieve a balance between land use and transportation along the highway and at interchanges.

Policy #1: Promote adherence to land development principles that minimize the need for local trips on the highway.

As stated previously, no particular land use can be described as suitable or unsuitable for areas adjacent to highways. Instead, it is the mixture of uses, the relationship between them, and the way each use is accessed that determines whether development will have a positive or negative impact on the highway. Thus, development should follow design principles that reduce numbers and lengths of local trips and provide alternatives to the new highway for those trips. Efficient travel behavior is positively associated with such land-use characteristics as density of development and a mix of complementary land uses within walkable distances. These land-use characteristics are in turn associated with transportation infrastructure and facilities that support efficient travel behavior, such as frequent transit service and complete sidewalk and bike lane networks. Development design must incorporate these elements effectively.

Recommended actions for putting this policy into practice:

- Encourage the concentration of a mixture of uses to minimize the number and length of local trips.
 - Locate auto-oriented businesses in a manner that does not conflict with the compact form of mixed-use development and can be accessed via the local street network.

^{1*} This Section has been added per Pitt County Planning department request.

- Allow vertical mixing of uses (such as residential above commercial/retail) by right in zoning. Cities such as Seattle, Orlando, and Washington, DC, use density bonuses to encourage mixed uses.
- Vary the intensity of development along a highway corridor by encouraging commercial/mixed-use activity centers near intersections of through streets that are well linked to the surrounding area.
- Establish site design standards to promote development patterns that make feasible a variety of transportation options for pedestrians, bicyclists, transit users, and automobile drivers. Not accommodating this variety of transportation choices encourages vehicular travel, thereby increasing local trips on a nearby highway.
 - Support human-scaled design and streetscape features that help enclose and define a more pedestrian-friendly environment by orienting buildings to the street and requiring building entrances to be placed close to the street. Also promote the incorporation of ground-floor windows, articulated facades, appropriately scaled signs and lighting, awnings and other weather protection, and landscaping, including buffering where appropriate.
 - Locate parking and vehicle drives away from building entrances and not between building entrances and streets with pedestrian activity. Orient surface parking behind or to the side of buildings.
 - Provide access from shared driveways or alleys to minimize the number of driveways pedestrians must cross. Driveways separate buildings; minimizing them tends to shorten the walk between uses.
 - Provide pedestrian walkways through sites, connecting building entrances and the public sidewalk with safe crossings of streets, drives, and parking lots.
 - One way to do this is to create an overlay zoning district that applies design principles across multiple zoning districts without rewriting entire zoning categories. Parcels affected by an overlay zone are subject to the standards of the underlying zone in addition to the standards of the overlay zone.
- Manage parking design, location, supply, and demand to help create more balanced auto and pedestrian environments. Surface lots should be small, on-street parking should be offered, and structured parking should be incorporated in order to avoid substantially separating uses and impeding pedestrian movement. Oversupply of parking should be avoided since it not only induces auto travel (including travel on the highway), but can discourage travel by foot or bicycle.
 - Reduce or waive minimum off-street parking standards.
 - Establish a maximum parking ratio based on land use.
 - Provide shared parking requirements in areas of mixed retail and commercial uses.
 - Allow “in-lieu” parking fees to be paid by a developer to forego providing on-site parking. These funds would combine in a fund for constructing off-site municipal parking facilities.

Policy #2: Support efforts to increase connectivity within and between developments.

Travel patterns within a road network are dynamic; they shift with each network improvement as motorists search for and find the optimal route: one that is the shortest in terms of travel time and distance between destinations. Many local roads are created through the subdivision of private property, but as developers strive to minimize costs, money spent on infrastructure is kept to a minimum. As a result, few streets, particularly through streets that could contribute to the local road network, are built; developers build only what is necessary to provide access *within* each development, leading to deficiencies in the transportation network. When the local street network is not sufficient, a highway or expressway can become the quickest route, reducing mobility for through traffic. Connectivity between and within developments not only encourages drivers to use the local street network for local trips without traveling on the highway, but also provides options for people to walk or bike to their local destinations instead of driving, further reducing the number of local trips made by vehicle.

Recommended actions for putting this policy into practice:

- Foster the creation of a dense and highly connected street system, including the development a collector street plan.
 - Require a continuous network of streets at the local level. While local transportation plans recommend critical connections, implementation occurs primarily through the development process.
 - Designate future street extensions to plan for connectivity. Stub-out connections to neighboring parcels may be constructed if cross-access is not feasible at time of permit approval.
 - Require the formation of blocks with a minimum street spacing standard. Local governments can plan ahead by stipulating maximum block lengths and perimeters in their zoning codes.
 - Limit closed street systems and cul-de-sac designs to situations where topography, environmental impacts, or existing development patterns prevent full street connections.
- Encourage connectivity for pedestrian and bicycle travel by requiring a continuous network of pedestrian and bicycle pathways that link to roadways and adjacent developments. These pathways need not coincide with street and driveway locations, making their creation more feasible and, often, their use more convenient than taking a vehicular route.
- Require multiple points of ingress and egress for new developments (such as planned urban developments or subdivisions), locating them on secondary roads in addition to or instead of the highway when possible. Encourage, require, or provide a density bonus for providing access points along more than one roadway, where appropriate, to distribute the trips to and from the development and reduce the burden on the main roadway.

Policy #3: Promote development design that adequately manages access and reduces congestion levels on roads.

Achieving transportation efficiency requires addressing potential conflicts between mobility on the highway and accessibility to the highway. As access to a highway is increased, mobility may be reduced. For example, when a highway has an excessive number of curb cuts, access is increased allowing multiple turning movements which slow traffic. Also, easy access facilitated by the many curb cuts encourages local trips on the highway. Access management is key to maintaining the mobility of the highway.

Recommended actions for putting this policy into practice:

The following access management recommendations should be applied to the highway, but may also be considered for intersecting roadways when access management could help reduce congestion on those roads. They may be applied by incorporating the techniques into the zoning code, creating an access management ordinance, or requiring the techniques' application during the subdivision and site plan review process.

- Minimize the number of driveways/curb cuts on the highway. Fewer driveways, appropriate driveway location, and design standards will allow for vehicular movement that will help minimize congestion.
 - Adopt minimum spacing requirements and maximum driveways per development.
 - Encourage shared driveway access through regulations and incentives.
 - Encourage cross-access agreements that allow one or more parcels to gain secondary access across the property of another, reducing the reliance on driveways onto the highway.
 - Because the width of lot frontage affects the spacing between driveways, set minimum lot frontage requirements high enough to prevent land along thoroughfares from being subdivided into small lot frontages. On major highways, minimum lot frontage requirements could be tied to minimum driveway spacing standards. Where there are alternatives to direct access onto the highway (such as access to a cross street or shared driveway), smaller lot frontages could be permitted².
 - At the intersection of arterial and local roads, require corner lot access from local roads in order to minimize access points on the highway.

- Encourage smooth traffic flow on the highway by regulating the nature of driveways and other access points.
 - Encourage driveway turn-around areas to improve the safety of vehicles that would otherwise be backing out on the highway.

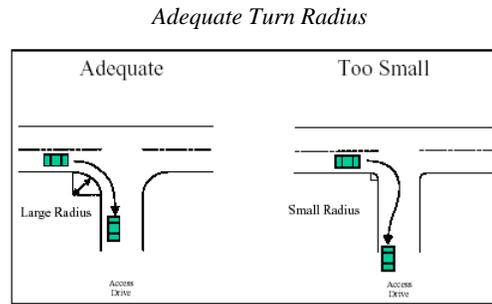
Landscaped Driveway



Source: Iowa Access Management Handbook

² Williams, K. & Marshall, M. (1996). *Managing Corridor Development: A Municipal Transportation Research*.

- Implement adequate sight distance policies based on posted speed limits to allow traffic to enter the highway safely and efficiently and to improve visibility of driveways.
- Establish guidelines for a minimum turn radius, minimum driveway width, and maximum driveway slope because they help slower, turning traffic move off the arterial more quickly, and help the traffic leaving a driveway turn and enter the stream of traffic more efficiently³.
- Require new developments to conduct traffic impact analyses to determine the need for turn lanes to allow entering and exiting traffic to move smoothly.
- Require bus pullout bays along transit routes.
- Establish a minimum offset between a local road intersection and the highway in order to give enough stacking distance for traffic to exit the highway and turn onto the local road without causing congestion on the highway.



- When access must be provided to small lot frontages, build a back road that can be integrated into the local street system more easily than a frontage road.
- Encourage or require a traffic impact study for all projects that would generate traffic above a certain level in order to lay the groundwork for effective access management.

Policy #4: Maintain the viability of existing development when new highways are constructed.

When a new highway is built parallel to an existing roadway, whether immediately adjacent or as a bypass around a town or city, the danger exists that the development along the original roadway can migrate toward the highway, drawing local trips onto the highway and leaving the original roadway to lose vitality and users. This can have a negative impact on the existing land uses, provided these uses remain. Fully utilizing an existing roadway as a parallel connection after the new highway is built advances connectivity goals and helps reduce congestion on the highway. A main factor in ensuring that the existing development thrives is a roadway that continues to be used for local trips. The treatment of the existing roadway (i.e. investment that enhances the appearance and function of the roadway as a local street and front door to the existing uses) and the distance between it and the highway are critical.

Recommended actions for putting this policy into practice:

³ Access Management Handbook (2000). Ames: Center for Transportation Research and Education, Iowa State University Research Park.

- Provide adequate space between the existing road and the new parallel highway for development to occur on both sides of the original roadway. The appropriate distance will vary depending on the municipality's size, type, and development pattern.
- Invest in streetscape and pedestrian amenities along the existing roadway to attract private investment and help convert it into a vibrant street with the look, feel, and function of a local street instead of a highway or commercial corridor.
- Encourage continuous local streets as development and redevelopment occurs, particularly those that may provide an alternative route paralleling the new highway.

Policy #5: Encourage redevelopment in the urban core to reduce pressure for greenfield development, which is likely to occur along the highway and attract local trips to it.

Development is often attracted to areas where construction is easiest and access is most convenient, such as greenfield sites along new and existing highways. However, development of these greenfield sites often has negative effects on the highway, attracting local trips and resulting congestion. If new development can be concentrated in areas that have already been developed, especially areas within the inner city and urban core of a municipality, there will be less pressure for the growth to occur in greenfield locations, and the increased number of local trips on the highway can be avoided.

Recommended actions for putting this policy into practice:

- Use brownfield redevelopment incentives as a catalyst to promote growth in inner city and urban areas. Give tax incentives to municipalities (ultimately passed on to the developer) for site assessment, clean-up, and redevelopment. In order to encourage reuse of brownfield sites, Department of Environment and Natural Resources (DENR) enters a "brownfields agreement" with a prospective developer that defines the clean-up and land management actions that are necessary for a particular brownfield site. With this agreement in place, the developer receives liability protection that opens the door to obtaining loans that would previously not have been offered for the project.

Policy #6: Manage development around highways, particularly the interchanges that pass through relatively undeveloped areas (greenfields) in order to minimize negative effects of highway-oriented development on mobility.

Introducing unfavorable development patterns around highways and highway interchanges often attracts development patterns that are highway-oriented. Such patterns are not desirable from a transportation standpoint. For example, interchanges can attract the development of large land parcels that are typically commercial or industrial, are destinations for local trips, and are typically not connected in any way to neighboring parcels, which are often vacant. Because of its isolation, this type of development encourages local vehicular trips, as travelers must drive between the parcel and almost any other destination. In addition, the nature and the isolation of these developments often combine to create a lack of

both pedestrian connections to neighboring parcels and transit links to more distant destinations, further promoting the number of local trips made by automobile. Thus, managing development in these high-impact areas is key to controlling the effects of land use on a new highway or expressway. The following recommendations show how this development may be managed.

Recommended actions for putting this policy into practice:

- Prepare small area plans at the local level prior to new highway construction. Interchange and other capacity expansions along the corridor should not take place until adequate land use preservation and facility access restrictions are put in place.
- Establish an additional layer of regulation for corridors and interchange areas to control the nature of this development.
 - Implement Interchange Zoning districts.
 - Implement Corridor Overlay Districts.
 - Establish conditional uses.
 - Require Planned Unit Developments (PUDs).
- Purchase land within a specified distance of such access points to prevent development in those locations.
- Provide incentives to stimulate development in target areas and to achieve desired design, intensity, and other characteristics.
 - Allow the transfer of development rights, when permitted in North Carolina.
 - Provide density bonuses.
- Establish easements (e.g. scenic easements) or employ other preservation tools that can be put in place around interchanges.
- Create multi-governmental interchange access agreements, which could ensure that development around interchanges is managed to meet the criteria agreed upon by the interested municipalities, counties, and state department of transportation. This type of agreement is allowed under North Carolina law section 160A-461 – Inter-local cooperation authorized.
- Utilize new technology to predict and understand the impact of different land use policies on growth around interchanges. The Interchange Development Model (IDM) is a computerized, multivariate regression model that helps in identifying the overall impact of current development and how an interchange may help or fall below development expectations. It also helps determine steps that can be taken to enhance or limit development and provide future alternative scenarios.

Policy #7: Encourage growth management initiatives that would manage the rate and direction of growth community-wide.

The pace and direction of growth directly affects road mobility and therefore congestion. If the rate of growth in a region outstrips the road mobility serving and connecting it, then any new improvements, including the new or improved highway, will immediately feel negative impacts such as congestion. One way to handle this problem is by assessing existing and future transportation improvements in light of the rate of growth. If it is determined that the transportation infrastructure planned, especially the highway, is not compatible with the growth rate, growth management efforts will be even more vital to protecting the mobility of the highway.

Recommended actions for putting this policy into practice:

- Restrict extension of services in areas where development should be limited.
- Conduct planning studies such as small area plans to guide development in areas in which growth should be directed.
- Adopt adequate public facility ordinances to make the connection between road mobility and the rate of growth.
- Create a program for protecting corridor mobility, incorporating an educational component that addresses land use policies.
- To reduce the number of workers driving on the highway to commute long distances to employment, reward communities that create a balance between jobs and housing. The state may do this by offering grants, tax incentives, or other advantages to communities that meet certain criteria.

Conclusions

Land uses along the highways range from agricultural in the rural areas to commercial and industrial in the relatively dense suburban and urban environments. Many of these uses depend on access to a major facility to be successful. However, the specific conditions surrounding development along highways are also varied, so the impact of land use on existing and future roadway mobility differs from one area to the next. Thus, the number and types of land use policies that should be applied vary throughout a highway.

One of the key issues in addressing the need for balance between land use and transportation priorities is how various authorities work at different levels. Most highway transportation improvements fall under the state's jurisdiction, while land use planning is a heavily guarded power of local jurisdictions. Thus, the power to directly control two closely connected issues is dealt with at two very different levels by two very different organizations. Both state and local jurisdictions will play important roles in preserving highway mobility, and all of these entities working together to achieve this goal will be as important as any efforts they make individually.

In conjunction with other planning and zoning activities, adoption of the policies discussed above at the local level may result in land use patterns that satisfy the needs of both the communities through which the roads pass and the agencies responsible for maintaining mobility for through traffic in a given area. Each jurisdiction may choose to adopt a subset of the policies described in this report, depending on the needs in the area and the input of citizens who are affected by the policies. While embracing these policies is an important first step in implementation, the true benefits will be realized when such policies are reflected in the regulatory frameworks of each municipality and county, ideally in a consistent manner.

Since land use is controlled at the local level, the state's ability to influence land use decisions is limited to communication and coordination with the units of local government. As a resource, the state can fill an educational role, giving the affected jurisdictions equal access to useful policy information, including helping to train local officials about land use and its impact on transportation. Providing consistent information opens the door for regional coordination, as neighboring jurisdictions consider the adoption of common policies

While efforts at the local level and the state level can be very effective, the best solution lies in bringing the two levels of government together and adopting an incentive-based approach in which road mobility and level of service (issues critical to NCDOT) are balanced with the intensity and nature of development (issues important to local jurisdictions). Balancing the needs and priorities of the two types of organization is part of the larger quest to balance land use and transportation needs and design principles. Successful land use/transportation programs are accomplished in states where inter-governmental cooperation thrives, such as California, Maryland, New Jersey, and Oregon. Such efforts, though difficult and complex undertakings, will provide the most effective solution, allowing both statewide and local needs to be met as goals for the relationship between transportation facilities and land use patterns are realized.