North Carolina Department of Transportation
Statewide Planning Branch
Small Urban Planning Unit

Thoroughfare Plan for the Towns of Franklinville & Ramseur

March 2001

Franklinville-Ramseur Thoroughfare Plan

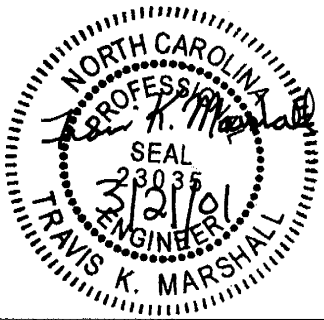
Prepared by the:

Statewide Planning Branch
Division of Highways
North Carolina Department of Transportation

In Cooperation With:

The Towns of Franklinville & Ramseur
The Federal Highway Administration
U.S. Department Of Transportation

March 2001



Travis K. Marshall, P.E.
Small Urban Planning Unit Head

Acknowledgments

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Executive Summary

This Plan documents the findings of a thoroughfare study for the Towns of Franklinville and Ramseur. Recommendations for this study are shown in Figure 3 and listed below with a brief description. A more detailed discussion of these recommendations can be found in Chapter 2.

Major Thoroughfares

- **US 64 (TIP Project R-2217)** - Widen US 64 from NC 22 in Ramseur to existing five lanes in Siler City. Widen roadway to four lanes with five lanes in Ramseur and replace existing Bridge No. 11 in Siler City. This improvement will improve safety conditions and increase the capacity of the roadway.

- **US 64 Bypass** - Construction on new location of a two-lane facility from Reed Creek Road (SR 2668) connecting NC 49, Brady Street (SR 2489), NC 22, US 64, and tying into NC 22. This facility would be constructed on multi-lane right-of-way in anticipation of future widening. It would serve as a bypass of US 64, thus reducing traffic on US 64 and NC 22. This route would reduce traffic on these facilities by moving local and through traffic out of the central business district.

- **NC 49** - Widen roadway to a multi-lane facility from the proposed US 64 Bypass to the northern planning boundary. This improvement would increase the capacity of the roadway with minimal damage to adjacent development.

- **NC 22** - Widen roadway to two 12-foot lanes from Sunrise Avenue in Franklinville to the Ramseur city limits. In anticipation of future widening, right of way should be reserved for a multi-lane facility. This improvement will improve safety conditions and increase the capacity of the roadway.

  Widen roadway to two 12-foot lanes from US 64 to the southern planning boundary and from the western Franklinville city limits to the northern planning boundary. These improvements will improve safety conditions and increase the capacity of the roadway.

- **Andrew Hunter Road (SR 2235)** - Widen roadway to two 12-foot lanes from NC 22 to US 64. This improvement will improve safety conditions and increase the capacity of the roadway.

Minor Thoroughfares

- **Foushee Road (SR 2621)** - Widen roadway to two 12-foot lanes from the Ramseur city limits to the eastern planning boundary. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Roundleaf Road (SR 2619)** - Widen roadway to two 12-foot lanes from Brooklyn Avenue (SR 2615) to the end of state maintenance. This improvement will improve safety conditions and increase the capacity of the roadway.

- **W. Jones Street (SR 2616)** - Widen roadway to two 12-foot lanes from Brooklyn Avenue (SR 2615) to the Ramseur City limits. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Brooklyn Avenue (SR 2615)** - Widen roadway to two 12-foot lanes from Roundleaf Road (SR 2619) to the southern planning boundary. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Clark Avenue (SR 2498)** - Widen roadway to two 12-foot lanes from NC 22 to Mulberry Academy Street (SR 2495). This improvement will improve safety conditions and increase the capacity of the roadway.

- **Mulberry Academy Street (SR 2495)** - Widen roadway to two 12-foot lanes from NC 22 to the Franklinville city limits. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Patterson Grove Road (SR 2491)** - Widen roadway to two 12-foot lanes from NC 22 to the northern planning boundary. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Brady Street (SR 2489)** - Widen roadway to two 12-foot lanes from the Ramseur city limits to the northern planning boundary. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Pentecostal Church Road (SR 2228)** - Widen roadway to two 12-foot lanes from Pleasant Cross Road (SR 2224) to Andrew Hunter Road (SR 2235). This improvement will improve safety conditions and increase the capacity of the roadway.

- **Cedar Falls Road (SR 2226)** - Widen roadway to two 12-foot lanes from NC 22 to the western planning boundary. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Faith Rock Road (SR 2207)** - Widen roadway to two 12-foot lanes from Andrew Hunter Road (SR 2235) to US 64. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Allred Street*** - Widen roadway to two 12-foot lanes from Clark Avenue (SR 2498) to NC 22. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Clark Street** - Widen roadway to two 12-foot lanes from Mulberry Academy Street (SR 2495) to Sunrise Avenue. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Depot Street*** - Widen roadway to two 12-foot lanes from NC 22 to the end of maintenance. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Kimrey Street** - Widen roadway to two 12-foot lanes from US 64 to Ridge Street. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Ridge Street/Elam Avenue** - Widen roadway to two 12-foot lanes US 64 to the end of maintenance. This improvement will improve safety conditions and increase the capacity of the roadway.

- **Sunrise Avenue** - Widen roadway to two 12-foot lanes from NC 22 to Clark Street. This improvement will improve safety conditions and increase the capacity of the roadway.

** Minimum upgrade of two 10-foot lanes required.*

Intersection Improvements

- **Andrew Hunter Road (SR 2235) & NC 22** - Realign intersection to improve horizontal and vertical deficiencies. This would improve safety conditions and improve the flow of traffic through the intersection.

- **Mulberry Academy Street (SR 2495) & NC 22** - Install left turn lane on NC 22. This would improve safety conditions and improve the flow of traffic through the intersection.

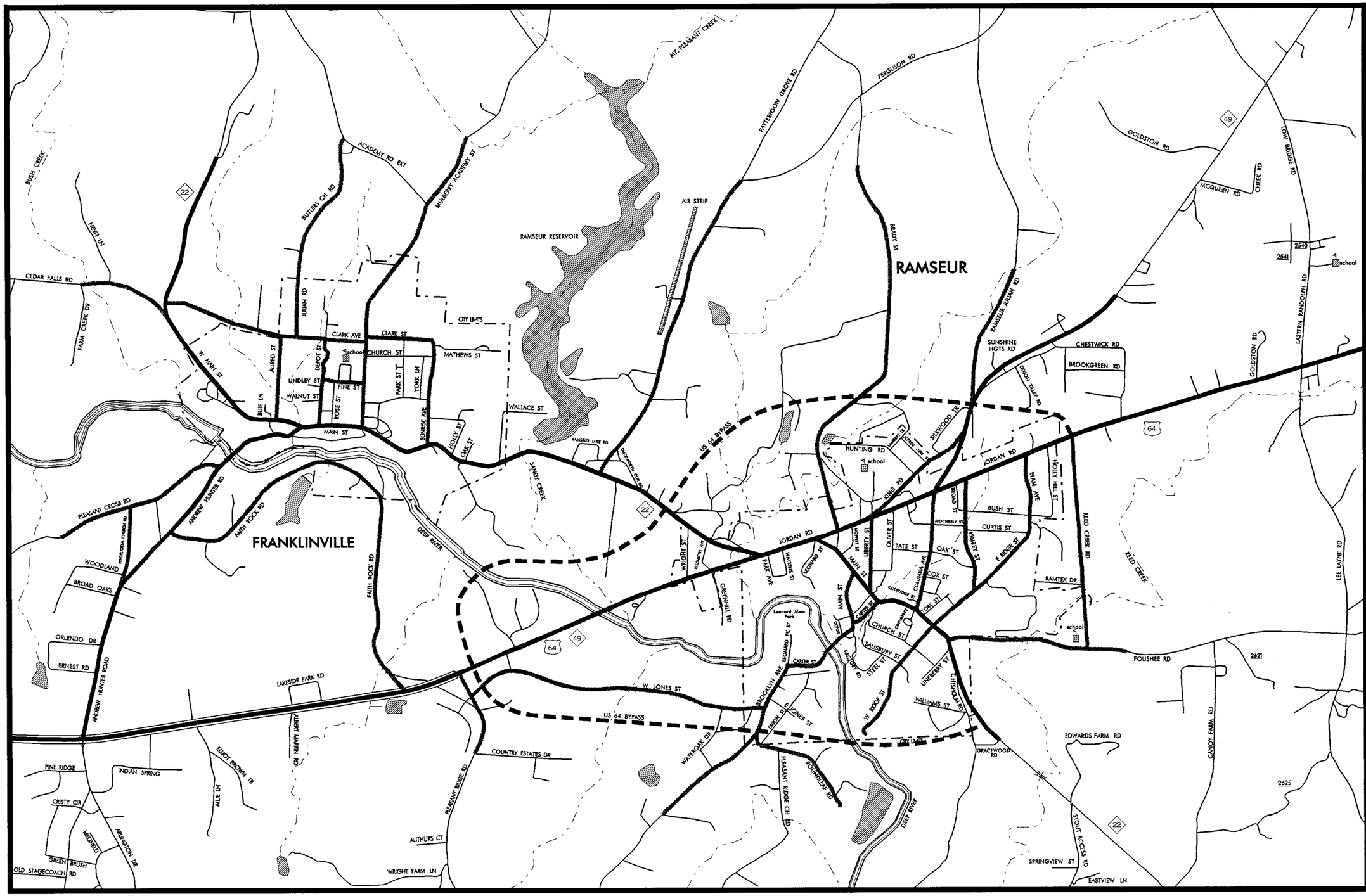
- **Clark Street, Clark Avenue (SR 2498) & Mulberry Academy Street (SR 2495)** - Realign roadway to provide one continuous roadway section from NC 22 to Sunrise Avenue. This would improve safety conditions and improve the flow of traffic through the intersection.

- **Cedar Falls Road (SR 2226) & NC 22** - Realign Cedar Falls Road to intersect with NC 22 at Clark Avenue (SR 2498). This would improve safety conditions and improve the flow of traffic through the intersection.

- **Foushee Road (SR 2621) & NC 22** - Install left turn lane on NC 22 and a right turn lane on Foushee Road. This would improve safety conditions and improve the flow of traffic through the intersection.

- **Columbia Avenue & NC 22** - Install left turn lane on NC 22. This would improve safety conditions and improve the flow of traffic through the intersection.

- **Liberty Street & NC 22** - Install left turn lane on NC 22 and realign the intersection to correct the current offsetting condition of Liberty Street. This would improve safety conditions and improve the flow of traffic through the intersection.



LEGEND

	EXISTING	PROPOSED
MAJOR THOROUGHFARE	———	- - -
MINOR THOROUGHFARE	———	- - -

ADOPTED BY:

TOWN OF FRANKLINVILLE	July 18 , 2000
PUBLIC HEARING	July 18 , 2000
TOWN OF RAMSEUR	December 4, 2000
PUBLIC HEARING	December 4, 2000
RECOMMENDED APPROVAL BY STATEWIDE PLANNING BRANCH	December 12, 2000
N. C. DEPARTMENT OF TRANSPORTATION	January 5 , 2001

JULY 18, 2000

THOROUGHFARE PLAN

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RAMSEUR & FRANKLINVILLE

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - STATEWIDE PLANNING BRANCH

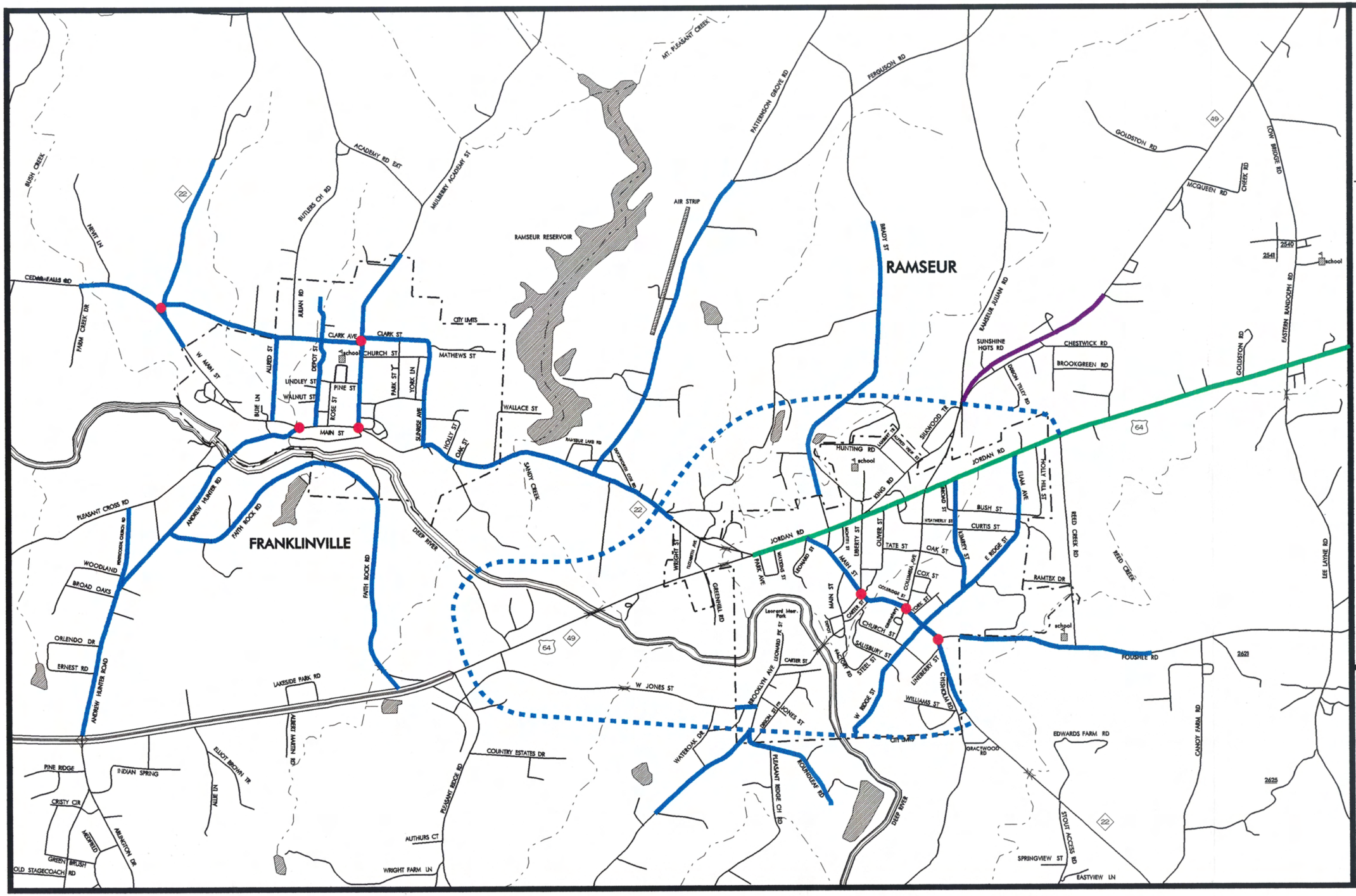
IN COOPERATION WITH THE

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 500 1000 1500 2000 feet

FIGURE 2



RECOMMENDATIONS

LEGEND

# OF LANES (12 FT. WIDE)	WIDENING	PROPOSED
2		
4		
TIP PROJECT		
INTRESECTION IMPROVEMENT		

N

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RAMSEUR & FRANKLINVILLE

NORTH CAROLINA

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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FEDERAL HIGHWAY ADMINISTRATION

SCALE
0 500 1000 1500 2000 feet

FIGURE 3

Priority List for Projects in Planning Area

Town of Franklinville

1. **Clark Avenue (SR 2498) / Clark Street** - Realign roadways at the intersection of Mulberry Academy Street (SR 2495) to provide one continuous roadway section from NC 22 to Sunrise Avenue. Also, widen roadways to two 12-foot lanes.

2. **Cedar Falls Road (SR 2226)** - Realign roadway to intersect with NC 22 at Clark Avenue (SR 2498).

   AND

   Sunrise Avenue - Widen roadway to two 12-foot lanes from NC 22 to Clark Street.

3. **NC 22** - Install turn lanes on roadway at the intersection of Mulberry Academy Street (SR 2495).

   AND

   Mulberry Academy Street (SR 2495) - Widen roadway to two 12-foot lanes from NC 22 to the Franklinville city limits.

4. **Andrew Hunter Road (SR 2235)** - Realignment of roadway at the intersection of NC 22 to improve horizontal and vertical alignment.

5. **Andrew Hunter Road (SR 2235)** - Widen roadway to two 12-foot lanes from NC 22 to US 64.

6. **NC 22** - Widen roadway to two 12-foot lanes from Sunrise Avenue to Patterson Grove Road (SR 2491). Reserve right-of-way for a multi-lane facility.

7. **NC 22** - Widen roadway to two 12-foot lanes from the western Franklinville city limits to the northern planning boundary.

8. **Patterson Grove Road (SR 2491)** - Widen roadway to two 12-foot lanes from NC 22 to the northern planing Boundary.

9. **Pentecostal Church Road (SR 2228)** - Widen roadway to two 12-foot lanes Pleasant Cross Road (SR 2224) to Andrew Hunter Road (SR 2235).

10. **Cedar Falls Road (SR 2226)** - Widen roadway to two 12-foot lanes from NC 22 to the western planning boundary.

11. **Faith Rock Road (SR 2207)** - Widen roadway to two 12-foot lanes from Andrew Hunter Road (SR 2235) to US 64.

12. **Allred Street** - Widen roadway to two 10-foot lanes (minimum) from Clark Avenue (SR 2498) to NC 22.

13. **Depot Street** - Widen roadway to two 10-foot lanes (minimum) from NC 22 to the end of maintenance.

Town of Ramseur

1. **Intersection Improvements:**

    a) **Liberty Street & NC 22** - Install left turn lane on NC 22 and realign the intersection to correct the current offsetting condition of Liberty Street.

    b) **Foushee Road (SR 2621) & NC 22** - Install left turn lane on NC 22 and a right turn lane on Foushee Road.

    c) **Columbia Avenue & NC 22** - Install left turn lane on NC 22.

2. **Widen to 24' pavement (2-12' lanes):**

    a) **Foushee Road (SR 2621)** - Widen roadway to two 12-foot lanes from the Ramseur city limits to the eastern planning boundary.

    b) **W. Jones Street (SR 2616)** - Widen roadway to two 12-foot lanes from Brooklyn Avenue (SR 2615) to the Ramseur City limits.

    c) **Brooklyn Avenue (SR 2615)** - Widen roadway to two 12-foot lanes from Roundleaf Road (SR 2619) to the southern planning boundary.

    d) **NC 22 (Coleridge Street)** - Widen roadway to two 12-foot lanes from US 64 to the southern planning boundary.

    e) **Ridge Street/Elam Avenue** - Widen roadway to two 12-foot lanes US 64 to the end of maintenance.

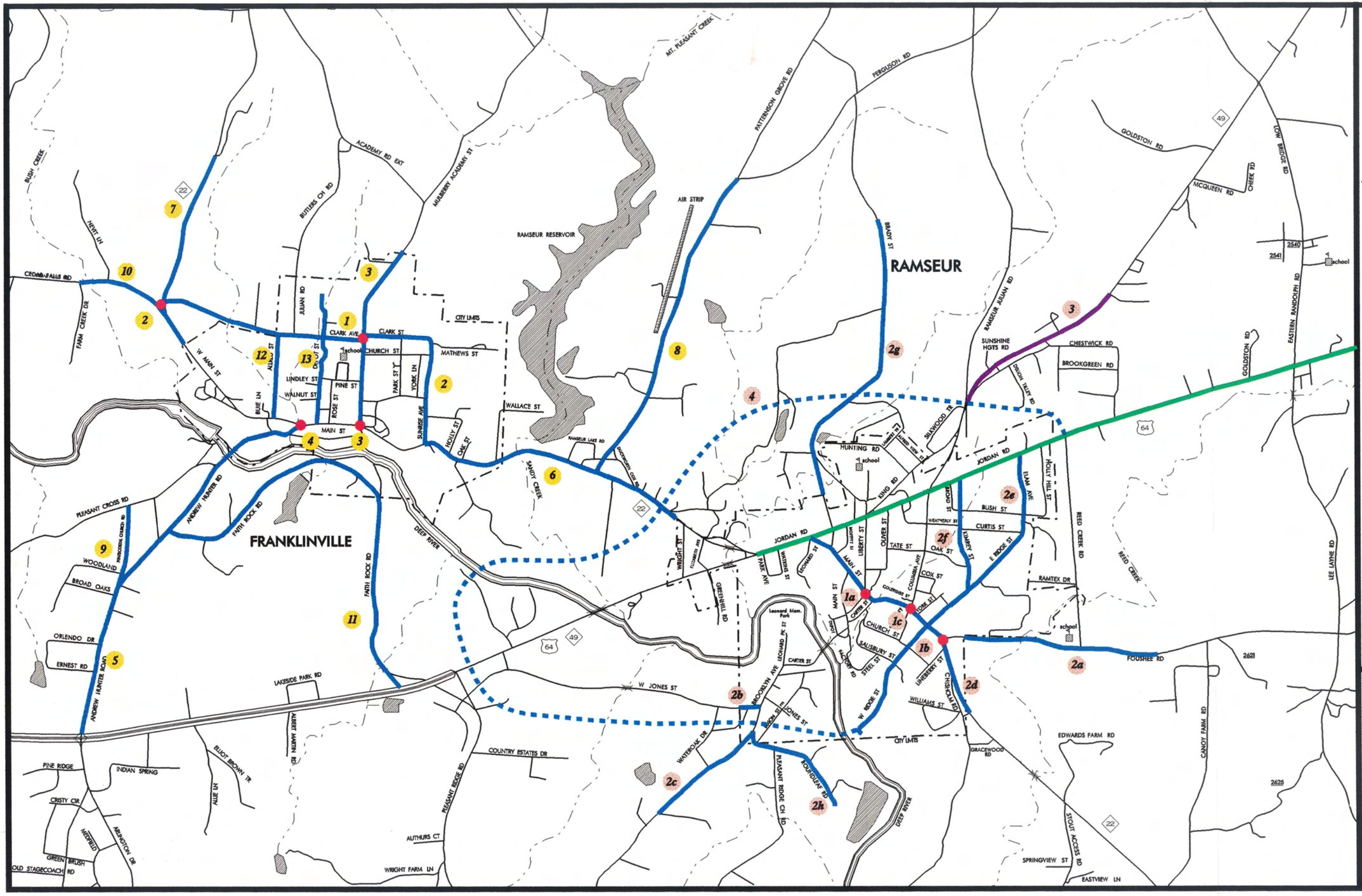
    f) **Kimrey Street** - Widen roadway to two 12-foot lanes from US 64 to Ridge Street.

    g) **Brady Street (SR 2489)** - Widen roadway to two 12-foot lanes from the Ramseur city limits to the northern planning boundary.

    h) **Roundleaf Road (SR 2619)** - Widen roadway to two 12-foot lanes from Brooklyn Avenue (SR 2615) to the end of state maintenance.

3. **NC 49** - Widen roadway to a multi-lane facility from the proposed US 64 Bypass to the northern planning boundary.

4. **US 64 Bypass** - Construction on new location of a two-lane facility from Reed Creek Road (SR 2668) connecting NC 49, Brady Street (SR 2489), NC 22, US 64, and tying into NC 22. This facility would be constructed on multi-lane right-of-way in anticipation of future widening.



PRIORITY LIST FOR RECOMMENDED PROJECTS

LEGEND

# OF LANES (12 FT. WIDE)	WIDENING	PROPOSED
2		
4		
TIP PROJECT		
INTRESECTION IMPROVEMENT		
FRANKLINVILLE PRIORITIES		#
RAMSEUR PRIORITIES		#

N

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RAMSEUR & FRANKLINVILLE

NORTH CAROLINA

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SCALE

0 500 1000 1500 2000 feet

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Chapter 1
Introduction

This report documents the findings of a study by the North Carolina Department of Transportation (NCDOT) to update the 1979 Franklinville-Ramseur Thoroughfare Plan. This study was initiated in July of 1998 in response to a request from local officials to evaluate the increased congestion on NC 22 and US 64 in the Central Business District. The study culminated in the mutual adoption of an updated thoroughfare plan. The geographic location of the Towns of Franklinville and Ramseur is shown in Figure 1.

Thoroughfare planning enables a transportation system to be progressively developed to adequately meet the transportation needs of a community, as land development and traffic volumes increase. Planning for future transportation needs prevents unnecessary costs and impacts to the physical, social, and economic environment. Thoroughfare plan studies are conducted based on the principles outlined in Appendix A.

The purpose of this study is to reexamine the present and future transportation needs of the planning area in order to develop a revised thoroughfare plan. The recommendations proposed herein are based on existing roadway conditions and projected growth for the area over a thirty-one year planning period. Since actual growth rates and patterns may differ from those anticipated, it may become necessary to accelerate or retard the implementation of recommendations or to revise the proposals. It is therefore desirable to have the thoroughfare plan updated regularly in order to revise growth projections and amend the thoroughfare plan, as necessary. In addition, a more detailed analysis will be conducted prior to construction of any project, in order to determine the specific location and design requirements.

The Towns of Franklinville and Ramseur* and the NCDOT share responsibility for the proposed thoroughfare improvements. The mutually adopted Franklinville-Ramseur Thoroughfare Plan serves as a guide for providing a coordinated, adequate, and economical major street system. For the planning efforts to be effective, the town and the state must procure in advance or protect, by various legal means, the rights-of-way needed for future roadway improvements. Local officials and citizens are also responsible for initiating the implementation of improvements. Since transportation needs throughout the state exceed available funding, local areas should aggressively pursue funding for desired projects.

* *For the remainder of this report, the Town of Franklinville and the Town of Ramseur will be referred to as the Town or the Planning Area.*

GEOGRAPHIC LOCATION FOR FRANKLINVILLE & RAMSEUR NORTH CAROLINA

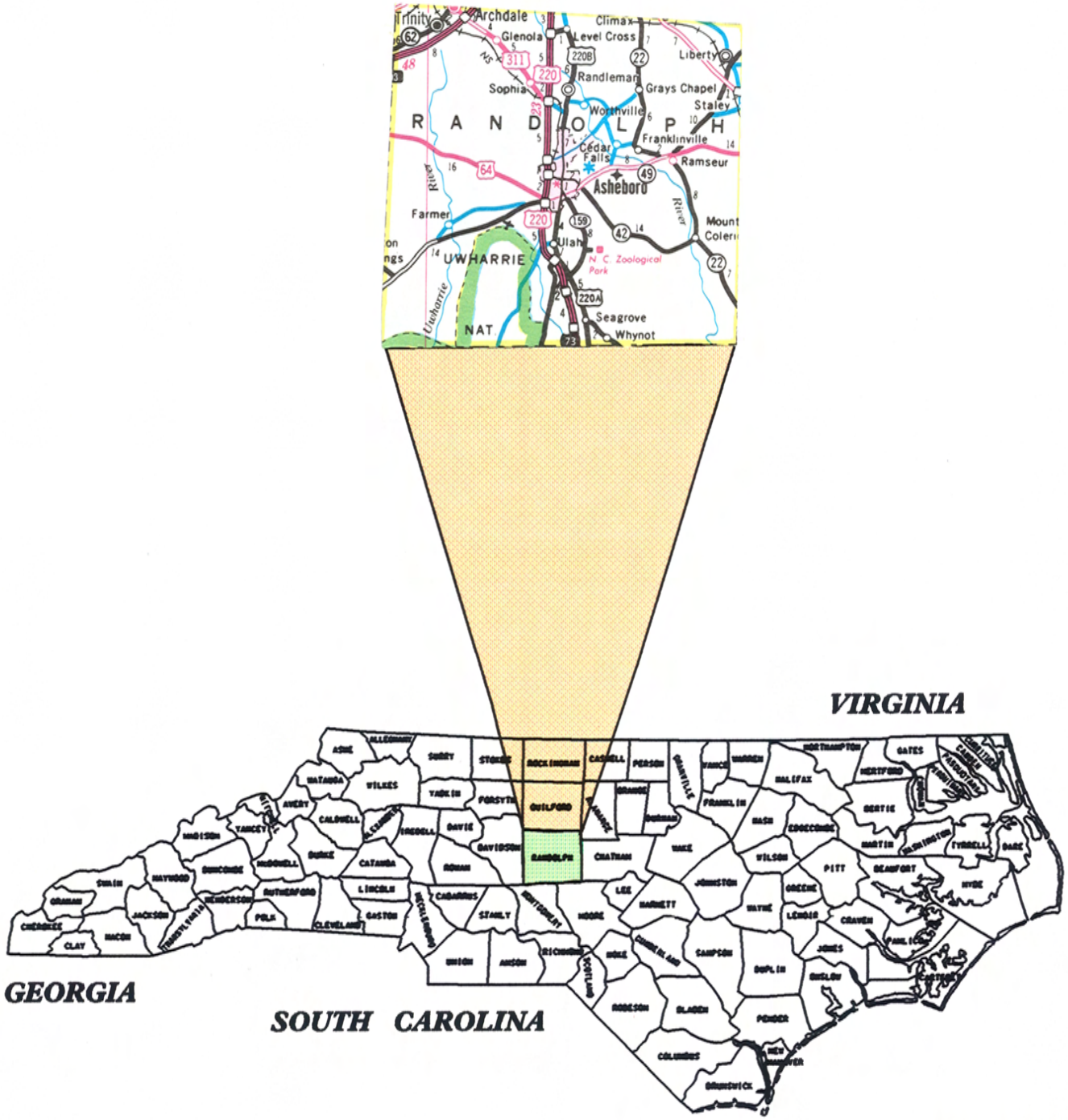


FIGURE 1

Chapter 2
Recommended Thoroughfare Plan

Intent of the Thoroughfare Plan

A thoroughfare plan study uncovers the need for new facilities, plus identifies existing and future deficiencies in the transportation system. The thoroughfare plan is a representation of the existing highway system by functional use, e.g., major thoroughfares, minor thoroughfares plus any new facilities that are needed (Refer to Figure 2 for Thoroughfare Plan map). The planning methodology enables identification of deficiencies in the existing system, allowing compilation of a list of needed improvements (Refer to Figure 3 for Recommendations map).

This chapter presents an analysis and makes recommendations based on the ability of the existing street system to serve the present and future travel desires as the area continues to grow. The usefulness of transportation planning is in the analysis of different highway configurations for their efficiency in serving the area. The recommended plan sets forth a system of thoroughfares to serve the anticipated traffic and land development needs for the planning area. The need to eliminate existing and projected system deficiencies that cause traffic congestion is the primary objective of the plan.

This plan is an updated version of the March 1979 Thoroughfare Plan. The recommended revisions are based on the results of a traffic forecast model that uses data such as traffic counts, population, housing, employment, and vehicle ownership to simulate travel patterns. With this model, each major street and highway in the planning area is analyzed to determine its ability to serve existing and future traffic demands. In the development of an updated thoroughfare plan some proposals from the old thoroughfare plan have been implemented, some were found inadequate for current problems and were dropped and some new proposals were added.

Major Thoroughfares

Major thoroughfares are designed to provide for the expeditious movement of high volumes of traffic within and through urban areas. This system of thoroughfares includes interstates, other freeways, expressways, and parkways, as well as major streets. Listed below are the major thoroughfares, as designated in the 2001 Franklinville-Ramseur Thoroughfare Plan.

- US 64
- NC 49
- NC 22
- Proposed US 64 Bypass
- SR 2235 - Andrew Hunter Road

Minor Thoroughfares

Minor thoroughfares function as collectors for traffic from local access streets to major thoroughfares. Minor thoroughfares supplement the major thoroughfare system by facilitating minor through traffic movements and by providing access to abutting property. The minor thoroughfares in the planning area are listed below.

- SR 2668 - Reed Creek Road
- SR 2621 - Foushee Road
- SR 2620 - Columbia Avenue
- SR 2619 - Roundleaf Road
- SR 2616 - Jones Street Extension
- SR 2615 - Brooklyn Avenue Extension
- SR 2499 - Butlers Chapel Road
- SR 2498 - Clark Avenue
- SR 2495 - Mulberry Academy Road
- SR 2491 - Patterson Grove Road
- SR 2489 - Brady Street Extension
- SR 2488 - King Road
- SR 2442 - Ramseur Julian Road
- SR 2228 - Pentecostal Church Road
- SR 2226 - Cedar Falls Road
- SR 2224 - Pleasant Cross Road
- SR 2207 - Faith Rock Road
- SR 2179 - Pine Street
- SR 1003 - Holly Spring Erect
- Allred Street
- Clark Street
- Depot Street
- Elam Avenue / Ridge Street
- Kimrey Street
- Liberty Street
- Sunrise Avenue

Thoroughfare Plan Recommendations

The process of developing and evaluating thoroughfare plan recommendations involves many considerations, including the goals and objectives of the area, identified roadway deficiencies, environmental impacts, existing and anticipated land development, and travel services. Refer to Chapter 7 for documentation of the analysis involved in developing the recommendations for the Franklinville-Ramseur planning area. A detailed description of the purpose and need for the recommended improvements that were cooperatively developed are given below. Refer to Figure 3 for a depiction of the thoroughfare plan recommendations.

Major Thoroughfares

US 64 - Purpose and Need

- **Project Recommendation:** It is recommended that US 64 be widened from NC 22 in Ramseur to the existing five lanes in Siler City. The roadway should be widened to a four-lane divided facility, with five lanes in the Town of Ramseur. Bridge No. 11, in Siler City, is also scheduled to be replaced as a part of this project. The total project limits is approximately 10.5 miles. This project is included in the 2000 - 2006 Transportation Improvement Program (TIP) as project R-2217. Construction is currently in progress for this project. The estimated cost of the project is $38.0 million, as reported in the 2002 - 2008 TIP.

- **Transportation Demand:** US 64 is functionally classified as a principal arterial, primarily serving statewide and interstate travel. It is an east-west route through the central part of the state, connecting cities such as Hendersonville, Morganton, Statesville, Asheboro, Raleigh, and

Rocky Mount. In Randolph County, US 64 serves as the primary east-west route in the central part of the county, connecting Ramseur and Asheboro.

- **Roadway Capacity and Deficiencies:** The current average daily traffic (ADT) on US 64 ranges from 9,000 to 23,400 vehicles per day (vpd). The capacity of the existing roadway ranges from 10,400 to 35,000 vpd. Additionally, US 64 carries 3 percent truck traffic, which further impedes the flow of traffic. The 2030 projected average daily traffic of 18,000 to 44,600 vpd will result in sections of US 64 being over capacity. US 64 is currently operating at level of service (LOS) of C to E. (Refer to Chapter 4 for an explanation of level of service). Without any improvements, the level of service by 2030 will range from E to F, if traffic growth continues as expected. The proposed cross section, a four-lane facility with five lanes in Ramseur, along with the proposed US 64 bypass will provide a capacity of approximately 32,200 to 35,000 vpd and will improve the level of service on US 64 to range from A to B.

- **Safety Issues:** The intersection of US 64 with NC 22 is among the highest accident intersections in the planning area. The accidents on this section of US 64 are predominantly due to accidents involving vehicles making left turns. If no improvements are made, the resulting increase in congestion will result in the potential for increased accident rates. However, the proposed widening of this facility will provide US 64 with increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Social Demands and Economic Development:** The Town identifies the US 64 corridor as one of their industrial growth focuses. Residential and commercial/retail development is also expected in the vicinity of US 64. The proposed US 64 widening, in addition to accommodating the expected traffic increase, may also help to spur further economic development in this area. Economic development in any portion of the planning area will increase the tax base, which can be used to improve public services throughout the area, thereby inducing other industries to locate in the area.

  Due to the current lack of access control, there is a significant amount of development along several sections of US 64. Most of the development has direct driveway access to US 64, thus reducing the capacity of the facility and creating the potential for increased accident rates. This type of strip development is expected to continue to degrade the ability of the road to carry traffic safely and smoothly. Therefore, it is recommended that access control be implemented to the extent possible and that any bypass facilities provide some control of access. A bypass of the Town of Ramseur is more beneficial than extensive widening of the existing US 64 in this area, in part due to the disruption and high cost that would be incurred in relocating businesses along the facility. In addition, a bypass will provide improved safety by controlling driveway access points. Bypasses provide safe, efficient travel for through traffic by separating it from the local traffic that will continue to use the existing US 64.

- **System Linkage:** Improving US 64 to a four-lane divided facility is part of an objective in North Carolina to provide an adequate intrastate system, as specified in State Law 136-178. This provision by the NC Legislature designates US 64 as an intrastate system highway, designed to "provide high-speed... safe, convenient, through travel for motorists". According to the criteria set forth by this legislation, all intrastate system facilities are proposed to be widened to at least four lanes. The improvements proposed for US 64, an intrastate system project, are to complete the four-laning from the Tennessee Line to the North Carolina Coast. Improvements to US 64 are also part of the Governor's Transportation Plan for the 21st century and the 1996 Highway Bond Program, a package designed to expedite funding to projects that are key to the economic development of the State of North Carolina.

Because of the significance of US 64 on a statewide and national basis, it is imperative to insure the highway is kept in optimum operating condition. Further, US 64 plays a valuable role in providing continuous east-west travel across the county.

- **Relationship to Other Plans:** The proposed multilane widening of US 64 extends eastward into Randolph and Chatham Counties as Transportation Improvement Program Project R-2517.

US 64 Bypass - Purpose and Need

- **Project Recommendation:** It is recommended that a two-lane facility be constructed from US 64 at SR 2668 (Reed Creek Road) to NC 22 in the Town of Ramseur, for a total of approximately 5.3 miles. In anticipation of future widening, right-of-way should be reserved for a multi-lane facility.

- **Transportation Demand:** The proposed bypass facility will more than likely be functionally classified relative to its parallel counterpart (US 64), which is functionally classified as a principal arterial. Principal arterials primarily serve statewide and interstate travel. This proposed bypass facility is an east-west route in the central part of the Town of Ramseur. It would serve as an alternate route for US 64, which suffers from traffic congestion.

- **Roadway Capacity and Deficiencies:** The capacity of the proposed facility is 13,000 vpd. The projected average daily traffic of this facility ranges from 6,200 to 13,700 vpd for the year 2030. Based on traffic growth projections, this facility is expected to be operating at level of service (LOS) C to D in the year 2030. The construction of this facility also lowers the traffic volumes on its parallel counterpart, US 64, as well as NC 22, thereby increasing the capacity and level of service of these roadways.

- **Safety Issues:** If this facility is not constructed, increasing traffic congestion will result in the potential for increased accident rates along parallel routes. Further, the proposed facility will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Social Demands and Economic Development:** This facility would carry traffic east-west through the Town of Ramseur. Due to the current lack of access control, there is a significant amount of development along several sections of US 64. Most of the development has direct driveway access to US 64, thus reducing the capacity of the facility and creating the potential for increased accident rates. This type of strip development is expected to continue to degrade the ability of the road to carry traffic safely and smoothly. Therefore, it is recommended that access control be implemented to the extent possible and that this bypass facility provides partial control of access. A bypass of the Town of Ramseur is more beneficial than extensive widening of the existing US 64 in this area, in part due to the disruption and high cost that would be incurred in relocating businesses along the facility.

  With these things in mind, the proposed bypass is important for motorists seeking continuous, uninterrupted traffic flow. The anticipated future development in this area is substantial. Therefore, traffic will continue to increase, especially through traffic, as well as some local traffic. This proposed facility, in addition to accommodating the expected traffic increase, may also help to accommodate the spur in economic development. In addition, a bypass will provide improved safety by controlling driveway access points. Bypasses provide safe,

efficient travel for through traffic by separating it from the local traffic that will continue to use the existing US 64.

- **System Linkage:** Implementing a bypass of US 64 is imperative because of its significance in serving statewide and interstate travel and providing a connection between cities and larger towns. For the very same reason, it is important that the highway is kept in good operating condition. Further, US 64 plays a valuable role in providing continuous east-west travel across the county. The proposed facility plays a significant role in the street system within the Town of Ramseur, serving as an alternate route for US 64.

- **Relationship to Other Plans:** Recommendations for this facility are not directly connected to any other thoroughfare plans.

NC 49 - Purpose and Need

- **Project Recommendation:** It is recommended that NC 49 be widened to a four-lane divided facility from the proposed US 64 Bypass to the planning area boundary, for a total length of approximately 0.6 miles.

- **Transportation Demand:** Within the planning area, NC 49 is functionally classified as a major collector, which primarily serves intracounty travel and traffic generators in addition to providing access to the arterial system. NC 49 runs north south through the central portion of the state from the Virginia State Line in Granville County to the South Carolina State Line in Mecklenburg County. In Randolph County, NC 49 serves as a north-south route in the eastern part of the County, connecting the Towns of Liberty and Ramseur.

- **Roadway Capacity and Deficiencies:** The current average daily traffic on NC 49 ranges from 5,500 to 6,200 vpd. The capacity of the existing roadway ranges from 9,700 to 10,200 vpd. The projected average daily traffic of 11,000 to 12,500 vpd will result in a portion of NC 49 being over capacity by the year 2030. NC 49 is currently operating at level of service (LOS) B and, without any improvements, will be at LOS D by the year 2030 based on traffic growth projections. The proposed cross section, a four-lane divided facility, will provide a capacity of approximately 35,000 vpd and will improve the level of service to LOS A.

- **Safety Issues:** If no improvements are made to NC 49, increasing traffic congestion will result in the potential for increased accident rates. However, the recommended improvements to NC 49 will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Social Demands and Economic Development:** NC 49 carries traffic north-south through the central part of Randolph County. Development is currently rural along the route. The anticipated future development in this area is moderate. However, traffic will continue to increase, especially through traffic, as well as some local traffic due to the proposed construction of the US 64 Bypass. The recommended improvements to NC 49, in addition to accommodating the expected traffic increase, may also help to spur economic development.

- **System Linkage:** Because of the significance of NC 49 in serving intracounty travel, it is important that the highway is kept in good operating condition. Furthermore, NC 49 plays an extremely crucial role in providing continuous north-south travel across the planning area.

- **Relationship to Other Plans:** Recommendations for this facility are not directly connected to any other thoroughfare plans.

Widening Projects

The following roadway sections are recommended to be widened to improve safety and increase capacity. Each of the sections of roadway listed below currently has lane widths less than 12 feet and, based on the volume of traffic on the road, are recommended to be widened. Before any roadway improvements are made, the NCDOT Division 8 Office should be consulted on the most appropriate cross section and the availability of funding.

- **NC 22:**

    A. It is recommended that NC 22 be widened from two 10-foot lanes to two 12-foot lanes from the western Franklinville city limits to the northern planning boundary.

    B. It is recommended that NC 22 be widened from two 10-foot lanes to two 12-foot lanes from Sunrise Avenue to the Ramseur city limits. Right-of-way should be reserved for a multi-lane facility.

    C. It is recommended that NC 22 be widened from two 11-foot lanes to two 12-foot lanes from US 64 to the southern planning boundary.

- **SR 2621 (Foushee Road):** It is recommended that SR 2621 be widened from two 9-foot lanes to two 12-foot lanes from the Ramseur city limits to the eastern planning boundary.

- **SR 2619 (Roundleaf Road):** It is recommended that SR 2619 be widened from two 9-foot lanes to two 12-foot lanes from SR 2615 (Brooklyn Avenue) to the end of state maintenance.

- **SR 2616 (W. Jones Street):** It is recommended that SR 2616 be widened from two 9-foot lanes to two 12-foot lanes from SR 2615 (Brooklyn Avenue) to the Ramseur city limits.

- **SR 2615 (Brooklyn Avenue):** It is recommended that SR 2615 be widened from two 10-foot lanes to two 12-foot lanes from SR 2619 (Roundleaf Road) to the southern planning boundary.

- **SR 2498 (Clark Avenue):** It is recommended that SR 2498 be widened from 9-foot and 10-foot lanes to two 12-foot lanes from NC 22 to SR 2495 (Mulberry Academy Street).

- **SR 2495 (Mulberry Academy Street):** It is recommended that SR 2495 be widened from 9-foot and 10-foot lanes to two 12-foot lanes from NC 22 to the Franklinville city limits.

- **SR 2491 (Patterson Grove Road):** It is recommended that SR 2491 be widened from two 10-foot lanes to two 12-foot lanes from NC 22 to the northern planning boundary.

- **SR 2489 (Brady Street):** It is recommended that SR 2489 be widened from two 9-foot lanes to two 12-foot lanes from the Ramseur city limits to the northern planning boundary.

- **SR 2235 (Andrew Hunter Road):** It is recommended that SR 2235 be widened from two 10-foot lanes to two 12-foot lanes from NC 22 to US 64.

- **SR 2228 (Pentecostal Church Road):** It is recommended that SR 2228 be widened from two 10-foot lanes to two 12-foot lanes from SR 2224 (Pleasant Cross Road) to SR 2235 (Andrew Hunter Road).

- **SR 2226 (Cedar Falls Road):** It is recommended that SR 2226 be widened from two 10-foot lanes to two 12-foot lanes from NC 22 to the western planning boundary.

- **SR 2207 (Faith Rock Road):** It is recommended that SR 2207 be widened from two 8-foot lanes to two 12-foot lanes from SR 2235 (Andrew Hunter Road) to US 64.

- **Allred Street:** It is recommended that this facility be widened from two 9-foot lanes to two 12-foot lanes from SR 2498 (Clark Avenue) to NC 22. *Minimum upgrade of 2-10' lanes required.*

- **Clark Street:** It is recommended that this facility be widened from two 8-foot lanes to two 12-foot lanes from SR 2495 (Mulberry Academy Street) to Sunrise Avenue.

- **Depot Street:** It is recommended that this facility be widened from two 8-foot lanes to two 12-foot lanes from NC 22 to the end of maintenance. *Minimum upgrade of 2-10' lanes required.*

- **Kimrey Street:** It is recommended that this facility be widened from two 9-foot lanes to two 12-foot lanes from US 64 to Ridge Street / Elam Avenue.

- **Ridge Street / Elam Avenue:** It is recommended that this facility be widened from two 8-foot lanes to two 12-foot lanes from US 64 to the end of maintenance.

- **Sunrise Avenue:** It is recommended that this facility be widened from two 8-foot lanes to two 12-foot lanes from NC 22 to Clark Street.

Intersection Improvements

The following intersections are recommended for safety improvements.

- **Intersection of NC 22 and SR 2235 (Andrew Hunter Road):** Due to horizontal and vertical alignment deficiencies, it is recommended that improvements be made to correct these deficiencies. These improvements will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Intersection of NC 22 and SR 2495 (Mulberry Academy Street):** Due to the use of this facility as a major school bus route, it is recommended that a left turn lane be installed on NC 22 in order to accommodate the additional traffic. This improvement will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Intersection of NC 22 and SR 2226 (Cedar Falls Road):** Due to NC 22 being the primary route of travel, it is recommended that this intersection be realigned to give priority of travel to NC 22. Therefore, SR 2226 (Cedar Falls Road) would tee into NC 22 at SR 2498 (Clark

Avenue), thus creating a stop condition. This improvement will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Intersection of SR 2498 (Clark Avenue) and SR 2495 (Mulberry Academy Street):** Due to an insufficient intersection design, it is recommended that this intersection be realigned to provide one continuous roadway section from NC 22 to Sunrise Avenue. Eliminating the offset at this intersection is especially important for school bus traffic as well as emergency vehicles. These improvements will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Intersection of NC 22 and SR 2621 (Foushee Road):** Due to the use of this SR 2621 as a major school bus route, it is recommended that a left turn lane be installed on NC 22 and a right turn lane on SR 2621. These improvements will help to accommodate the peak hour school traffic and the industrial traffic from Ramtex, Inc. This improvement will also provide improved access for the proposed fire station to be constructed along this facility. Improving this facility will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Intersection of NC 22 and Liberty Street:** Since Liberty Street provides direct access to NC 22 for emergency vehicles, it is recommended that left turn lanes be installed on NC 22. It is also recommended that this intersection be realigned to correct its current offsetting condition. These improvements will also provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

- **Intersection of NC 22 and Columbia Avenue:** It is recommended that a left turn lane be installed on NC 22. This improvement will provide increased capacity, greater maneuverability, and more control of access, resulting in safer driving conditions.

Bicycle Routes

The Towns of Franklinville and Ramseur currently do not have any designated bicycle routes.

When considering the widening of facilities designated as bicycle routes, the NCDOT Division of Bicycle and Pedestrian Transportation should be consulted. This division can recommend the most appropriate cross section for the widening, in addition to providing assistance in identifying the need for improvements based on present and future bicycle traffic. For further consideration and assistance, the coordinator of this division can be contacted at the address below.

NC Department of Transportation
Division of Bicycle and Pedestrian Transportation
P.O. Box 25201
Raleigh, NC 27611

Public Involvement

Based on a request from the Towns of Franklinville and Ramseur, the study to develop a thoroughfare plan was officially started in July of 1998. NCDOT officials met with the Town Councils for each town in November and December of 1998. These meeting were held to present information on the thoroughfare planning process and to gather input on the transportation needs of the Towns.

Town of Franklinville

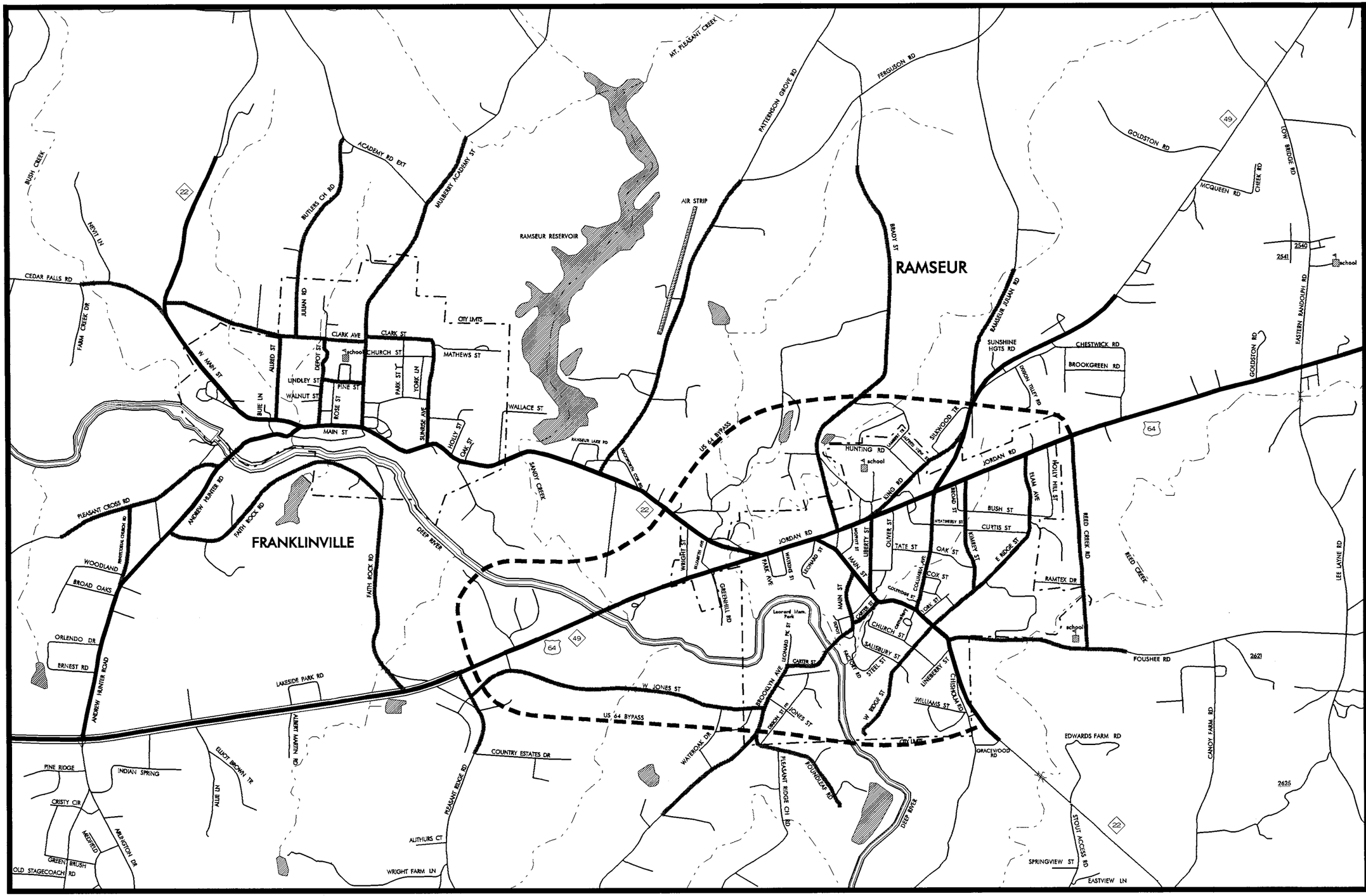
In December of 1998, Town Council members were given a presentation on the Town's role in the thoroughfare planning process. Several areas of interest were discussed for inclusion in the thoroughfare plan study. On May 10, 1999, a meeting was held with Mayor McKay Whatley. At this meeting, Mayor Whatley was presented with socioeconomic data projections and given a status report on the thoroughfare plan study. Another meeting with Mayor Whatley was held on February 7, 2000 to discuss and develop preliminary recommendations for the thoroughfare plan. These recommendations were presented to the Town Council members on March 14, 2000 for their review. A public information session was then scheduled for April 6, 2000. The public information session yielded a high turnout and resulted in further review of the thoroughfare plan recommendations. During this review process, it was discovered that an error was made in the modeling process, thereby underestimating the amount design year traffic. This portion of the model was reanalyzed and revisions were made in order to accommodate this additional traffic. These revisions were discussed with the Town Council at its April 11, 2000 meeting. On June 6, 2000, NCDOT representatives met with the Planning Board in order to discuss and develop recommendations for the thoroughfare plan update. These recommendations were presented to the public on June 22, 2000 during a public drop-in session, with no opposition. A public hearing was held on July 18, 2000 where the Town Council officially adopted the Franklinville-Ramseur Thoroughfare Plan.

Town of Ramseur

On November 3, 1998, Town Council members were given a presentation on the Town's role in the thoroughfare planning process. Several areas of interest were discussed for inclusion in the thoroughfare plan study. On May 7, 1999, a meeting was held with Mayor Hampton Spivey. At this meeting, Mayor Spivey was presented with socioeconomic data projections and given a status report on the thoroughfare plan study. NCDOT representatives met with the Town Council on April 3, 2000 to discuss and develop preliminary recommendations for the thoroughfare plan. Due to the aforementioned modeling error, NCDOT officials revised these recommendations and forwarded the revised information to Mayor Spivey to be further reviewed by the Town Council. A special planning session with the Ramseur Town Council was held on October 16, 2000 to further develop the recommendations. On November 14, 2000 a public drop-in session was held, where information on the proposed thoroughfare plan was distributed and NCDOT representatives were available to answer questions and take comments on the recommendations. The proposed thoroughfare plan was presented at the December 4, 2000 Ramseur Town Council meeting, with members of the public present. After a public hearing, the Town Council unanimously adopted the Franklinville-Ramseur Thoroughfare Plan.

N. C. Board of Transportation

The 2001 Franklinville-Ramseur Thoroughfare Plan was adopted by the North Carolina Board of Transportation on January 5, 2001.



LEGEND

	EXISTING	PROPOSED
MAJOR THOROUGHFARE	———	- - -
MINOR THOROUGHFARE	———	- - -

ADOPTED BY:

TOWN OF FRANKLINVILLE	July 18 , 2000
PUBLIC HEARING	July 18 , 2000
TOWN OF RAMSEUR	December 4, 2000
PUBLIC HEARING	December 4, 2000
RECOMMENDED APPROVAL BY STATEWIDE PLANNING BRANCH	December 12, 2000
N. C. DEPARTMENT OF TRANSPORTATION	January 5 , 2001

JULY 18, 2000

THOROUGHFARE PLAN

RAMSEUR & FRANKLINVILLE

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE
0 500 1000 1500 2000 feet

FIGURE 2

RECOMMENDATIONS

LEGEND

# OF LANES (12 FT. WIDE)	WIDENING	PROPOSED
2		
4		
TIP PROJECT		
INTRESECTION IMPROVEMENT		

RAMSEUR & FRANKLINVILLE

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS – STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE
0 500 1000 1500 2000 feet

FIGURE 3

Chapter 3
Implementation of the Thoroughfare Plan

Implementation is one of the most important aspects of the transportation plan. Unless implementation is an integral part of this process, the effort and expense associated with developing the plan will be lost. There are several tools available for use by the Town to assist in the implementation of the thoroughfare plan. They are described in detail in this chapter.

State-Municipal Adoption of the Thoroughfare Plan

The Towns of Franklinville and Ramseur and the North Carolina Department of Transportation have mutually approved the thoroughfare plan shown in Figure 2. The mutually adopted plan can now serve as a guide for the Department of Transportation in the development of the transportation system for the Town. The approval of this plan by the Town also enables standard road regulations and land use controls to be used effectively in the implementation of this plan. As part of the plan, the Town and Department of Transportation shall reach agreement on the responsibilities for existing and proposed streets and highways. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways. Facilities which are designated a municipal responsibility will be constructed and maintained by the municipality.

Methods Used to Protect the Adopted Thoroughfare Plan

Subdivision Regulations

Subdivision regulations require every subdivider to submit to the Town Planning Commission a plan of any proposed subdivision. It also requires that subdivisions be constructed to meet certain standards. Through this process, it is possible to require the subdivision streets to conform to the thoroughfare plan and to reserve or protect necessary right-of-way for proposed roads and highways that are to become a part of the thoroughfare plan.

The construction of subdivision streets to adequate standards reduces maintenance costs and simplifies the transfer of streets to the State Highway System. Appendix D outlines the recommended subdivision design standards as they pertain to road construction.

Since some of the proposed thoroughfares are outside the existing Town Limits, it is recommended that additional building setbacks and/or right-of-way reservation conforming to the thoroughfare plan also be applied in the Randolph County Thoroughfare Plan. This will allow for the orderly implementation of the plan in the fringe areas of the towns without disrupting adjoining landowners.

Zoning Ordinances

A zoning ordinance can be beneficial to thoroughfare planning by designating appropriate locations of various land use and allowable densities of residential development. This provides a degree of stability on which to make future traffic projections and to plan streets and highways. Other benefits of good zoning ordinance are: (1) the establishment of standards of development which will aid traffic operations on major thoroughfares and (2) the minimization of strip commercial development which creates traffic friction and increases the traffic accident potential.

Future Street Line Ordinances

A municipality with legislative approval may amend its charter to be empowered to adopt future street line ordinances. This ordinance, enacted for selected streets, is particularly beneficial for planned future improvements, such as roadway widening. Through a metes-and-bounds description of a street's future right-of-way requirements, the municipality may prohibit new construction or reconstruction of structures within the future right-of-way. This approach requires specific design hearings to be held as an opportunity for affected property owners to obtain information about what to expect and to make necessary adjustments without undue hardship.

Roadway Corridor Official Maps

A Roadway Corridor Official Map (Official Map) is a document adopted by the North Carolina Board of Transportation which allows the reservation of roadway corridors as provided by General Statutes 136-44.5 through 136-44.53. Official Maps place temporary restrictions on private property rights by prohibiting the issuance of a building permit or the approval of a subdivision on property within an adopted alignment, for up to a three-year period beginning when a request for development is denied. The Official Map in effect serves as notice to developers that the State or Municipality intends to acquire specific property. This process is a beneficial tool in directing development so that sites can be reserved for public improvements in anticipation of actual need.

Development Reviews

The District Engineer's Office and the Traffic Engineering Branch of the North Carolina Department of Transportation review driveway access to any state-maintained road. In addition, any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) should be comprehensively studied by the Traffic Engineering Branch, the Project Development and Environmental Analysis Branch, and/or the Roadway Design Unit of NCDOT. If reviewed at an early stage, it is often possible to significantly improve the development's accessibility while preserving the integrity of the thoroughfare plan.

Funding Sources

Capital Improvements Program

A capital improvement program makes it easier to build a planned thoroughfare system. It consists of two lists of projects. The first is a list of highway projects that are designated as a municipal responsibility and are to be implemented with municipal funds. The second is a list of local projects designated as State responsibility to be included in the Transportation Improvement Program.

Transportation Improvement Program

North Carolina's Transportation Improvement Program (TIP) is a document that lists all major transportation projects, and their funding sources, planned by the NCDOT for a seven-year period. Every two years, when the TIP is updated, completed projects are removed, programmed projects are advanced, and new projects are added.

During biannual TIP public hearings, municipalities, local citizens groups, and other interested parties request projects to be included in the TIP. The group requesting a particular project(s) should submit to the NCDOT Board of Transportation Member representing their area the following: a letter with a prioritized summary of requested projects, TIP candidate project request forms, and project location maps with a description of each project. Refer to Appendix G for an example of a TIP project request packet. The Board of Transportation reviews all of the project requests from each area of the state. Based on the technical feasibility, need, and available funding, the board decides which projects will be included in the TIP. In addition to highway construction and widening, TIP funds are available for bridge replacement, highway safety projects, public transit projects, railroad projects and bicycle facilities.

Industrial Access Funds

If certain economic conditions are met, Industrial Access Funds are available for construction of access roads for industries that plan to develop property that does not have access to any state-maintained road. The NCDOT Secondary Roads Office should be contacted for information on Industrial Access Funds.

Small Urban Funds

Small Urban Funds are annual discretionary funds that are made available to municipalities with qualifying projects on the state system. The maximum amount is one million dollars per year per division. Requests for Small Urban Fund assistance should be directed to the Division Engineer or to the Program Development Branch of NCDOT.

The North Carolina Highway Trust Fund Law

The Highway Trust Fund Law was established in 1989 as a plan with four major goals for North Carolina's roads and highways. These goals are:

1. To complete the remaining 1,716 miles of four lane construction on the 3,600 mile North Carolina Intrastate System.

2. To construct a multilane connector in Asheville and portions of multilane loops in Charlotte, Durham, Greensboro, Raleigh, Wilmington, and Winston-Salem.

3. To supplement the secondary roads appropriation in order to pave, by 1999, 10,000 miles of unpaved secondary roads carrying 50 or more vehicles per day, and all other unpaved secondary roads by 2006.

4. To supplement the Powell Bill Program.

Over the thirty-one year planning period, the Town should look forward to the paving of most, if not all, of its unpaved roads on the state maintained system. Also, there will be an increase in Town's Powell Bill Funds if these newly paved roads are in the Town's Corporate Limits.

For more information on the Highway Trust Fund Law, contact the Program Development Branch of the North Carolina Department of Transportation.

Implementation Recommendations

The following table gives recommendations for the most suitable funding sources and methods of implementation for the major project proposals of the Franklinville-Ramseur Thoroughfare Plan.

Table 1

Funding Sources and Recommended Methods of Implementation

Projects	Funding Sources				Methods of Implementation				
	Local Funds	TIP Funds	Indust. Access	Small Urban	T-fare Plan	Subdiv. Ord.	Zoning Ord.	Future Street Lines	Develop. Review
US 64 Widening		X			X		X	X	X
US 64 Bypass		X			X	X	X		X
NC 49 Widening		X			X	X	X	X	X
SR 2226 Intersection Improvement	X			X	X			X	
SR 2235 Intersection Improvement		X			X			X	
SR 2495 Intersection Improvement	X			X	X			X	
SR 2498 Intersection Improvement	X			X	X			X	
SR 2621 Intersection Improvement	X			X	X			X	
Liberty Street Intersection Imp.	X			X	X			X	
Columbia Avenue Intersection Imp.	X			X	X			X	

Construction Priorities and Cost Estimates

Construction priorities will vary depending on what criteria are considered and what weight is attached to the various criteria. Most people agree that improvements to the major thoroughfare system and major traffic routes are more important than minor thoroughfares where traffic volumes

are lower. For inclusion in the North Carolina Transportation Improvement Program, a project must show favorable benefits relative to costs and should not be prohibitively disruptive to the environment. For the major project proposals of the Franklinville-Ramseur Thoroughfare Plan, cost estimates have been developed with respect to user benefits. Additionally, probabilities have been estimated for stimulation of economic development and environmental impact.

Reduced user cost should result from any roadway improvement, from simple widening to construction of a new roadway. Roadway improvements should also relieve congested or unsafe conditions. Comparisons of the existing and the proposed facilities are made in terms of vehicle operating costs, travel time costs, and accident costs. These user benefits are computed as total dollar savings, over the thirty-one year design period, using data such as project length, base year and design year traffic volumes, traffic speed, type of facility, and volume to capacity ratio.

The impact of a project on economic development potential is shown as the probability that it will stimulate the economic development of an area by providing access to developable land and by reducing transportation costs. This is a subjective estimate based on knowledge of the proposed project, local development characteristics, and land development potential. The probability is rated on a scale from 0 (representing no development potential) to 1.00 (representing excellent development potential).

The environmental impact analysis considers the effect of a project on the physical, social/cultural, and economic environment. Below are listed the thirteen items that are considered when evaluating the impacts of the environment. They are: (1) air quality, (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) parks and recreational facilities, (11) historic sites and landmarks, (12) public health and safety and (13) aesthetics.

Environmental impact analysis also uses a probability rating from 0 (representing no benefit to the environment) to 1.00 (representing a positive impact to the environment.) Negative values are assigned to probabilities to indicate negative impact. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impact of a project. Table 2 shows the probability scale used in the analysis. This table can be used as a guideline for interpreting the "Economic Development" and "Environmental Impact" values given in Table 3.

Table 2

Probability Estimation Guide

Subjective Evaluation	Impact Probability
Excellent - very substantial	1.00
Very good - substantial	0.75
Good - considerable	0.50
Fair - some	0.25
Poor - none	0.00

Table 3

Benefits Evaluation for Major Projects

Projects	Benefits (millions)	Cost (millions)	Length mi	Benefits Per Mile	Economic Development	Environmental Impact
US 64 Bypass	71.8	13.8	5.3	13.5	0.50	0.23
NC 49 Widening	16.0	1.4	0.6	26.7	0.25	0.15

Offsetting the benefits derived from any project is the cost of construction. A new facility, despite high projected benefits, might prove to be unjustified due to excessive right-of-way and construction costs. Construction costs are estimated by comparison to average statewide construction costs per mile for similar project types. Anticipated right-of-way costs are based on average property costs per acre for the project area. Table 4 gives the breakdown of the total project cost into construction and right-of-way costs for the major project proposals of the Franklinville-Ramseur Thoroughfare Plan.

Table 4

Project Cost Estimates for Major Projects

Projects	Construction Cost	Right-of-Way Cost	Total Cost
US 64 Widening*	-	-	37,955,000
US 64 Bypass	12,819,000	1,007,000	13,826,000
NC 49 Widening	1,341,000	80,500	1,421,500

* Cost estimates taken from the 2002-2008 Transportation Improvement Program. US 64 designated as project R-2217, which is currently under construction.

Chapter 4
Travel Deficiency Analysis of Existing System

This chapter presents an analysis of the ability of the existing street system to serve the area's travel desires. Emphasis is placed not only on detecting the deficiencies, but also on understanding their cause. Travel deficiencies may be localized and the result of substandard highway design, inadequate pavement width, or intersection controls. Alternately, the underlying problem may be caused by a system deficiency such as a need for a bypass, loop facility, construction of missing links, or additional radials.

Capacity Analysis of the Existing System

An indication of the adequacy of the existing street system is a comparison of traffic volumes versus the ability of the streets to move traffic freely at a desirable speed. In an urban area, a street's ability to move traffic is generally controlled by the spacing of major intersections, access control, width of pavement, and the traffic control devices (such as signals) utilized.

Capacity is the maximum number of vehicles which has a "reasonable expectation" of passing over a given section of a roadway, during a given time period under prevailing roadway and traffic conditions. The relationship of traffic volumes to the capacity of the roadway determines the level of service (LOS) provided. Six levels of service identify the range of possible conditions. They are given letter designations from A to F with LOS A representing the best operating conditions and LOS F the worst. Figure 4 shows the levels of congestion associated with the various levels of service. The following page gives a description of each LOS in accordance with the 1994 Highway Capacity Manual.

Design requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each road or highway section must be individually analyzed and its design requirements determined by the amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way. The recommended improvements and overall design of the thoroughfare plan were based on achieving a minimum of LOS D on existing facilities, and LOS C on new facilities. LOS D is considered the "practical capacity" of a facility, or that at which the public begins to express dissatisfaction.

Level of Service

LOS A

Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents of breakdown are easily absorbed. Even at the maximum density, the average spacing between vehicles is about 528 ft, or 26 car lengths.

LOS B

Represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted. The lowest average spacing between vehicles is about 330 ft, or 18 car lengths.

LOS C

Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage. Minimum average spacings are in the range of 220 ft, or 11 car lengths.

LOS D

Borders on unstable flow. Density begins to deteriorate somewhat more quickly with increasing flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. At the limit, vehicles are spaced at about 165 ft, or nine car lengths.

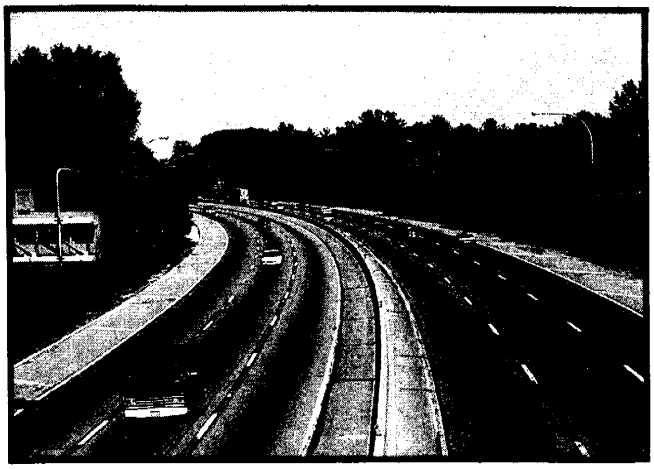
LOS E

Describes operation at capacity. Operations at this level are extremely unstable, because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing. Vehicles are spaced at approximately six car lengths, leaving little room to maneuver.

LOS F

Describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.

Source: 1994 Highway Capacity Manual



LOS A.

LOS D.

LOS B.

LOS E.

LOS C.

LOS F.

LEVELS OF SERVICE

FIGURE 4

Traffic Accidents

Traffic accident statistics are often used as an indicator for locating congestion problems. This data is reviewed to identify problem locations or deficiencies such as poor design, inadequate signing, ineffective parking, or poor sight distance. Accident patterns identified from analysis of accident data can lead to improvements that will reduce the number of accidents.

Both severity and the number of accidents should be considered when investigating accident data. The severity of every accident is measured with a series of weighting factors developed by NCDOT's Division of Highways. In terms of these factors, a fatal or incapacitating accident is 47.7 times more severe than one involving only property damage, and an accident resulting in minor injury is 11.8 times more sever 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.

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

Table 5 is a summary of the accidents occurring in the planning area between January 1996 and December 1998. This table only includes locations with 10 or more accidents. The "Total" column indicates the total number of accidents reported within 200-ft of the intersection during the study period indicated. The severity listed is the average accident severity for that location.

Table 5

Accident Summary January 1, 1996 to December 31, 1998

Locations	Angle	Rear End	Ran Off Road	Left Turn	Right Turn	Other	Total	Severity
US 64/NC 22	1	3	2	5			11	2.48

To request a more detailed accident analysis for the above mentioned intersection, or other intersection of concern, the Town should contact the Division 8 Traffic Engineer.

Traffic Capacity Analysis

Capacity Deficiencies – Figure 5 depicts the base year (1999) major street system, and the anticipated design year **VPD** (Vehicles Per Day). A comparison of the base year VPD to capacities reveals several roadways that are expected to be near or over practical capacity (LOS D) by the year 2030. These areas are highlighted in Figure 6, and include:

> **US 64** - Several sections of US 64 are currently operating near or over capacity. By the year 2030, if no improvements are made to the existing system, the entire roadway within the planning area will be near or over capacity.

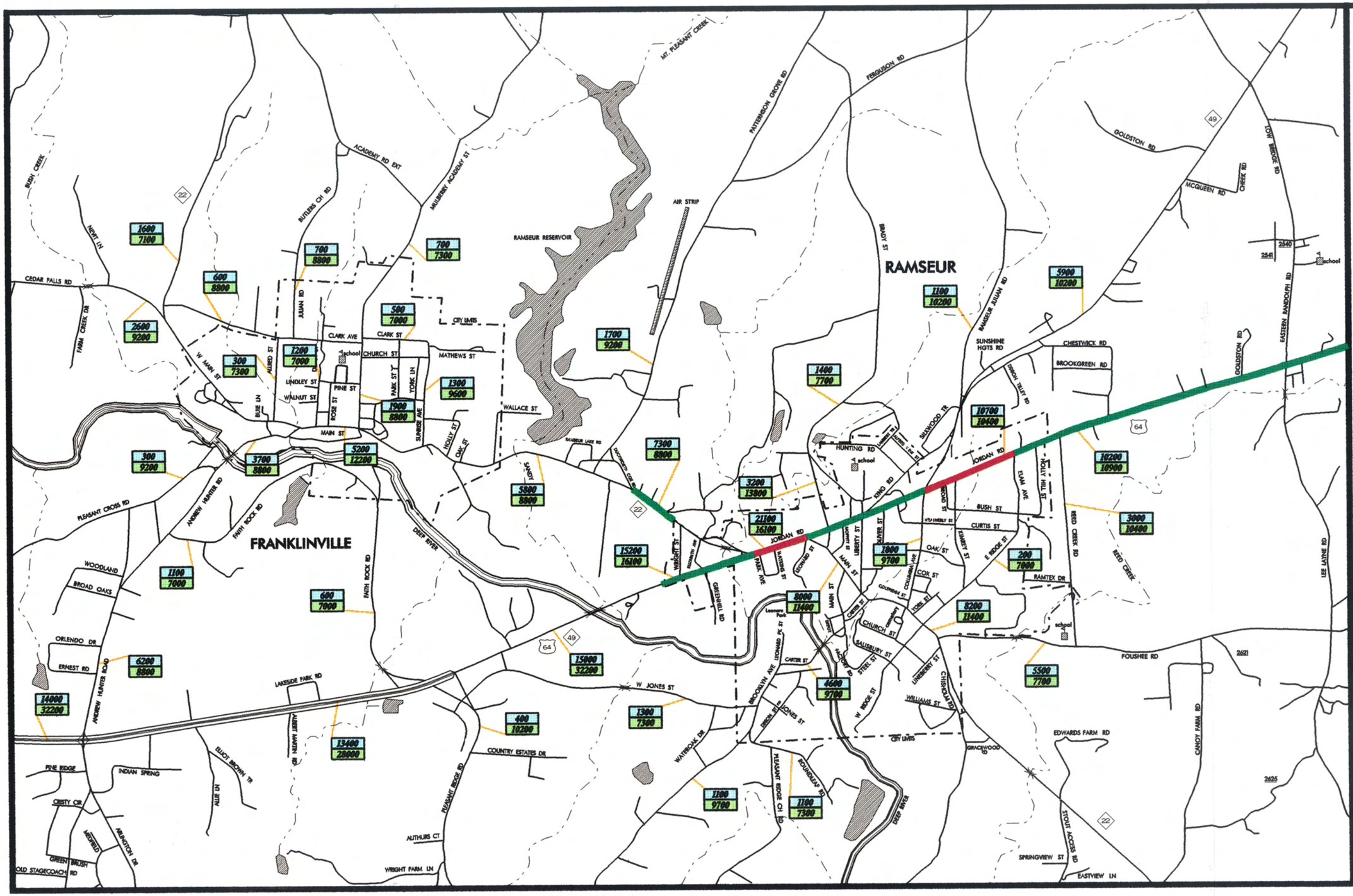
NC 49 - NC 49 is currently operating within its capacity. The capacity of the roadway ranges from 9,700 - 10,200 vpd, with approximately 6,200 vpd using the roadway. By the year 2030, if no improvements are made to the existing system, the NC 49 corridor will be over capacity within the planning area.

NC 22 - NC 22, from Duckworth Cox Road to the western Ramseur City Limit, is currently operating near capacity. The capacity on this section is 8,800 vpd, with approximately 6,600 vpd using the section of roadway. By the year 2030, if no improvements are made to the existing system, the NC 22 corridor from Sunrise Avenue in Franklinville to SR 2621 (Foushee Road) in Ramseur will be over capacity.

Andrew Hunter Road (SR 2235) - SR 2235 is operating within its capacity. The capacity on this roadway is 8,800 vpd, with an average daily traffic volume of 2,800 - 4,700 vpd. By the year 2030, if no improvements are made to the existing system, a section of this corridor will be operating near capacity.

No Build Alternative - Not implementing a thoroughfare plan or elements of it could be called a No-Build Alternative. This means that there would be no new construction or roadway improvements to the Franklinville-Ramseur thoroughfare system except for routine maintenance. If no improvements are made, primarily a bypass route for US 64, during the planning period, the increase traffic volumes and normal growth will result in a dramatic reduction in transportation quality through the central business district. At LOS E the operating speed will drop significantly, and the queues of traffic currently experienced behind slow moving vehicles will get considerably longer.

The absence of adequate highway improvements in the town could negatively impact economic growth in industry. Figure 6 shows the existing system assuming that no improvements from the thoroughfare plan are made by the design year.



1999 VOLUMES
&
ROADWAY DEFICIENCIES

LEGEND

NEAR CAPACITY
OVER CAPACITY
1999 VOLUME
CAPACITY

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RAMSEUR
&
FRANKLINVILLE
NORTH CAROLINA

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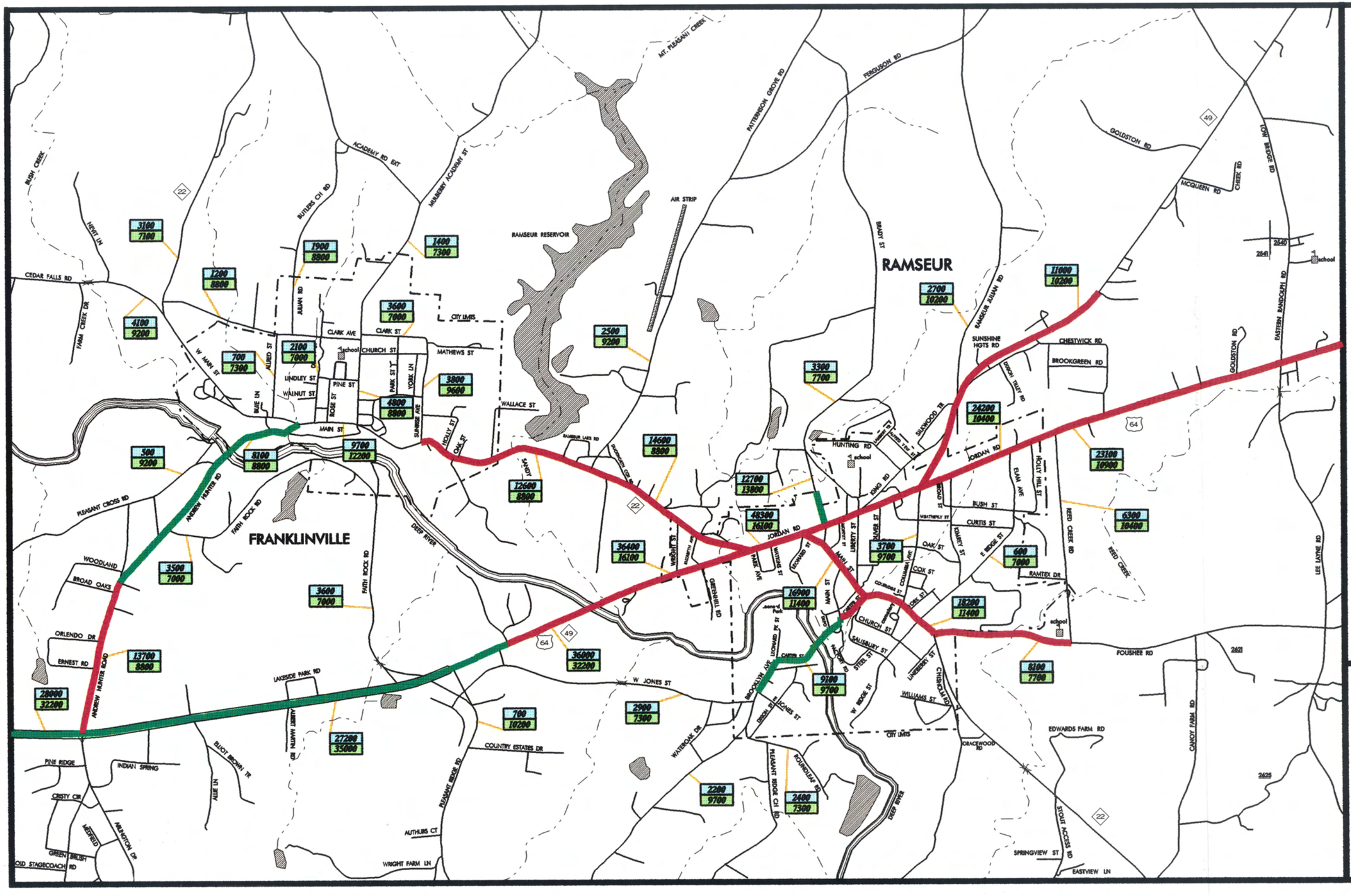
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE
0 500 1000 1500 2000 feet

FIGURE 5


RAMSEUR
FRANKLINVILLE
RAMSEUR RESERVOIR
MT. PLEASANT CREEK
AIR STRIP
RUSH CREEK
NEWT LN
CEDAR FALLS RD
FARM CREEK DR
ACADEMY RD EXT
MULBERRY ACADEMY ST
BUTLERS CH RD
JULIAN RD
CLARK AVE
CLARK ST
CHURCH ST
MATHEWS ST
CITY LIMITS
LINDLEY ST
PINE ST
WALNUT ST
MARK ST
YORK LN
ROSE ST
SUNRISE AVE
HOLLY ST
OAK ST
W MAIN ST
BLUE LN
MAIN ST
WALLACE ST
RAMSEUR LAKE RD
SANDY
PATTERSON GROVE RD
FERGUSON RD
BRADY ST
GOLDSTON RD
McQUEEN RD
CHEEK RD
LOW BRIDGE RD
EASTERN RANDOLPH RD
RAMSEUR JULIAN RD
SUNSHINE HOTS RD
CHESTWICK RD
BROOKGREEN RD
DIXON TRUST RD
JORDAN RD
HUNTING RD
KING RD
SILKWOOD TR
HUNTER CT
HUNTER TRL
BUSH ST
CURTIS ST
WORTHLY ST
OAK ST
COOK ST
COLUMBIA AVE
COLUMBUS ST
ELAM AVE
HOLLY HILL ST
REED CREEK RD
REED CREEK
RAMTEX DR
E RIDGE ST
QUARRY ST
LIBERTY ST
MAIN ST
CHURCH ST
SALISBURY ST
LINDSBURY ST
CHISHOLM RD
FOUSHEE RD
W RIDGE ST
WILLIAMS ST
GRACEWOOD RD
EDWARDS FARM RD
CANOY FARM RD
LEE LAYNE RD
SPRINGVIEW ST
STOUT ACCESS RD
EASTVIEW LN
school
2540
2541
2621
2625
ANDREW HUNTER RD
PLEASANT CROSS RD
PATH ROCK RD
WOODLAND
BROAD OAKS
ORLENDO DR
ERNEST RD
LAKESIDE PARK RD
LIBERTY MARTIN RD
ELLIOT BROWN TR
ALLIE LN
PINE RIDGE
INDIAN SPRING
CRISTY CIR
WESTFIELD
GREEN BRUSH
OLD STAGECOACH RD
HUNTINGTON DR
COUNTRY ESTATES DR
PLEASANT RIDGE RD
AUTHURS CT
WRIGHT FARM LN
W JONES ST
JONES ST
BROOKLYN AVE
LEONARD ST
CARTER ST
DIXON ST
WATEROAK DR
PLEASANT RIDGE CH RD
ROUNDTREE RD
DEEP RIVER
GREENHILL RD
MORRISON ST
ELIZABETH AVE
PARK AVE
MATTHEWS ST
HOWARD ST
MAIN ST
LIBERTY ST
JACKSON ST
STEEL ST
3100 7100
1200 8000
4100 9200
700 7300
2100 7000
1900 8800
1400 7300
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4800 8800
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9700 12200
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12700 13800
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36400 16100
16900 11400
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ROADWAY DEFICIENCIES
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NEAR CAPACITY
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SCALE
0 500 1000 1500 2000 feet

FIGURE 6

Chapter 5
Population, Land Use, and Traffic

Factors Affecting the Future Roadway System

The factors that play a vital role in determining the transportation needs of a municipality are population, land use and traffic. Examination of these factors help to explain historic travel patterns and lays the groundwork for thoroughfare planning.

In order to formulate an adequate year 2030 thoroughfare plan, reliable forecasts of future travel characteristics must be achieved. Population, vehicle usage trends, economy and land use play a significant role in determining the transportation needs of the area and must be carefully analyzed. Additional items may include the effects of legal controls such as subdivision regulations and zoning ordinances, the availability of public utilities and the physical features of the area.

The first step in the development of the thoroughfare plan is to define the planning period and the planning area. The planning period is typically on the order of 30 years. The base year for the Franklinville-Ramseur study was 1999, and the year 2030 was chosen to be the end point of the study period (31 years). The planning area is generally the limits to which urbanization is expected to occur during the planning period. The planning area is then subdivided into traffic analysis zones. Figure 7 shows the planning area boundary and zones.

Population

Travel is directly related to population. The volume of traffic on any given section of roadway is closely related to the size and distribution of the population that it serves. Because of this relationship, one of the basic steps in planning a transportation system is an in-depth population study. Population trends for the Towns and Randolph County are shown in Table 6.

Table 6

Population Trends for the Franklinville-Ramseur Planning Area

Year	Franklinville	Ramseur	Randolph County	Planning Area
1970	794	1,328	76,358	-
1980	607	1,162	91,300	-
1990	666	1,186	106,546	-
1999	732	1,546	126,665	4,197

The most important population estimate for development of the thoroughfare plan is that of the planning area. Even though government census data is not available for the transportation planning area, other methods of estimation of population are available. The 1999 housing "windshield" survey for this study area gave a final count of 1,727 homes inside the Franklinville-Ramseur Planning Area. The housing count was then multiplied by the average persons per

dwelling unit for the planning area (2.43), to give a total planning area population of 4,197. Population projections are shown in Table 7.

Table 7

Population Projections for the Franklinville-Ramseur Planning Area

Year	Randolph County	Planning Area
1999	126,665	4,197
2000	128,540	4,238
2010	146,706	4,675
2020	152,662	5,157
2030	171,735	5,688

Economy and Employment

One of the more important factors to be considered in estimating the future traffic growth of an area is its economic base. The number of employers and the employee's income or purchasing power influences how much population can be supported in the area and the number of motor vehicles that will be locally owned and operated. Generally, as the family income increases so does the number of vehicles owned, as well as the number of vehicles trips generated per day by each household. An accurate projection of the future economy of the area is essential to estimating future travel demand.

Factors which will influence economic growth and development in the Franklinville-Ramseur Planning Area over the planning period is development along the NC 22 and US 64 corridors and in the downtown area. The working population of the Franklinville-Ramseur Planning Area is mainly a mixture of industrial, retail, and service industries. Table 8 was developed using the sum of the estimated jobs of each employer for the base year 1999. An employment to population ratio for the planning area is applied to the projected population to estimate the future amount of employment. The total employment is then distributed into employment categories based on the market share of each in the base year and expected trends in each industry. The employment categories, which are based on Standard Industrial Classification (SIC), are described below.

- **Industrial** - agriculture, construction, manufacturing, transportation
- **Retail** - all types of wholesale and retail trade
- **Special Retail** - gasoline service stations, restaurants
- **Office** - personal, business, health, legal, education, social services
- **Service** - finance, insurance, real estate, public administration

Table 8

Employment Data and Projections for the Franklinville-Ramseur Planning Area

Type of Employment	Employment 1999	Employment 2030
Industrial	1,000	1,502
Retail	168	237
Highway Retail	93	153
Office	55	175
Service	264	443
Total	1,580	2,510

Land Use

Land use refers to the physical patterns of activities and functions within a town, city or county. Nearly all traffic problems in a specific area are relative to the area's land use. The amount of traffic on a particular roadway is very closely related to its adjacent land use. For example, a large industrial plant might be the cause of congestion during shift change hours as its workers come and go. However, during the remainder of the day few problems, if any, may occur. The spatial distribution of different types of land use (sometimes referred to as traffic generators) is the predominant determinant of when, where, and why congestion occurs. The attraction between different land uses and their association with travel varies depending on the size, type, intensity, and spatial separation of each.

For use in transportation planning, land uses are grouped into four categories:

1. Residential - all land devoted to the housing of people (excludes hotels and motels)

2. Commercial - all land devoted to retail trade including consumer and business service and office

3. Industrial - all land devoted to manufacturing, storage, warehousing, and transportation of products, and

4. Public - all land devoted to social, religious, educational, cultural, and political activities.

Figure 8 shows the planning area's existing land use plan. With the assistance of the School of Design at North Carolina State University, The Town of Franklinville is developing an updated growth management plan. It is currently a work in progress that may be completed in the coming year.

Anticipated future land use is a logical extension of the present spatial distribution. Determination of where expected growth is to occur within the planning area facilitates the location of proposed thoroughfares or the improvements of existing thoroughfares. Areas of anticipated development and growth for Franklinville-Ramseur Planning Area are:

Residential - Residential development within the planning area is fairly evenly dispersed. Since the majority of the land within the planning jurisdiction is zoned for residential usage, residential development is expected to continue throughout the planning area.

Commercial/Retail - Commercial land use is concentrated along US 64 through the Town of Ramseur's Central Business District. This area has been developed with shopping centers and some strip commercialization. Future development is expected to continue along this corridor.

Industrial - Industrial development is concentrated in the planning area along US 64 (west) and NC 22 (south). Any future industrial development is expected to follow similar growth patterns.

Public - The planning area has numerous public areas and open spaces. The Towns own several parks, schools, open play spaces, and waterfront properties.

Future Travel Demand

Travel demand is generally reported in average daily traffic counts. Traffic counts are taken regularly in and around the planning area by the North Carolina Department of Transportation. To estimate future travel demand, traffic trends over the past twenty years were studied. The largest growth was noted on lower volume roads, where a given increase will result in a higher percentage. Figures 5 and 6 show existing and expected traffic volumes for the Franklinville-Ramseur Planning Area. The introduction of new residential and commercial developments in the planning area will cause increases in traffic growth in those immediate areas. Eventually, this increase will level off and follow the growth pattern of the surrounding area. For a summary of travel statistics for the planning area, refer to Table 9 in Chapter 7.

ZONE MAP

CORDON LINE

SCREEN LINE

ZONE LINE

ZONE NUMBERS 00

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SCALE
0 500 1000 1500 2000 feet

FIGURE 7

NORTH

FRANKLINVILLE & RAMSEUR STUDY AREA

RANDOLPH COUNTY, NORTH CAROLINA

SCALE IN FEET

0 1,000 2,000 4,000 6,000 8,000

PREPARED BY
PIEDMONT TRIAD COUNCIL OF GOVERNMENTS

JUNE 1979

THE PREPARATION OF THIS MAP WAS FINANCED IN PART THROUGH A COMPREHENSIVE PLANNING GRANT FROM THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, UNDER THE PROVISIONS OF SECTION 701 OF THE HOUSING ACT OF 1954, AS AMENDED.

Map 8
DEVELOPMENT PLAN

- Residential
- Commercial
- Industrial
- Public
- Conservation
- Potential Industrial Sites
- Proposed Thoroughfares

Figure 8

Chapter 6
Environmental Concerns

In recent years, environmental considerations associated with highway construction have come to the forefront of the planning process. The legislation that dictates the necessary procedures regarding environmental impacts is the National Environmental Policy Act. Section 102 of this act requires the execution of an environmental impact statement, or EIS, for road projects that have a significant impact on the environment. Included in an EIS would be the project's impact on wetlands, water quality, historic properties, wildlife, and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, preliminary research was done on several of these factors and is included below.

Wetlands

In general terms, wetlands are lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. The single feature that most wetlands share is soil or substrata that is at least periodically saturated with or covered by water. Water creates severe physiological problems for all plants and animals except those that are adapted for life in it or in saturated soil.

Wetlands are crucial ecosystems in our environment. They help regulate and maintain the hydrology of our rivers, lakes, and streams by slowly storing and releasing floodwaters. They help maintain the quality of our water by storing nutrients, reducing sediment loads, and reducing erosion. They are also critical to fish and wildlife populations. Wetlands provide an important habitat for about one third of the plant and animal species that are federally listed as threatened or endangered.

In this study, the impacts to wetlands were determined using the National Wetlands Inventory Mapping, available from the U. S. Fish and Wildlife Service. The locations of wetlands throughout the Franklinville-Ramseur Planning Area are shown in Figure 9.

Wetland impacts have been avoided or minimized to the greatest extent possible while preserving the integrity of the transportation plan.

Threatened and Endangered Species

A preliminary review of the Federally Listed Threatened and Endangered Species within the Franklinville-Ramseur Planning Area was done to determine the effects that new corridors could have on the wildlife. These species are identified using mapping from the North Carolina Department of Environment, Health, and Natural Resources.

The Threatened and Endangered Species Act of 1973 allows the U. S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impacts of a road project on endangered plants and animals and critical wildlife habitats. By locating rare species in the planning stage of road construction, we are able to avoid or minimize these impacts.

There were no threatened or endangered species identified in the Franklinville-Ramseur Planning Area, as shown in Figure 9. Nevertheless, a detailed field investigation is recommended prior to construction of any highway project in this area.

Historic Sites

The location of historic sites in the planning area was investigated to determine the possible impacts of the various projects studied. The federal government has issued guidelines requiring all State Transportation Departments to make special efforts to preserve historic sites. In addition, the State of North Carolina has issued its own guidelines for the preservation of historic sites. These two pieces of legislation are described below:

National Historic Preservation Act - Section 106 of this act requires the Department of Transportation to identify historic properties listed in the National Register of Historic Places and properties eligible to be listed. The DOT must consider the impacts of its road projects on these properties and consult with the Federal Advisory Council on Historic Preservation.

NC General Statute 121-12(a) - This statute requires the DOT to identify historic properties listed on the National Register, but not necessarily those eligible to be listed. DOT must consider impacts and consult with the North Carolina Historical Commission, but it is not bound by their recommendations.

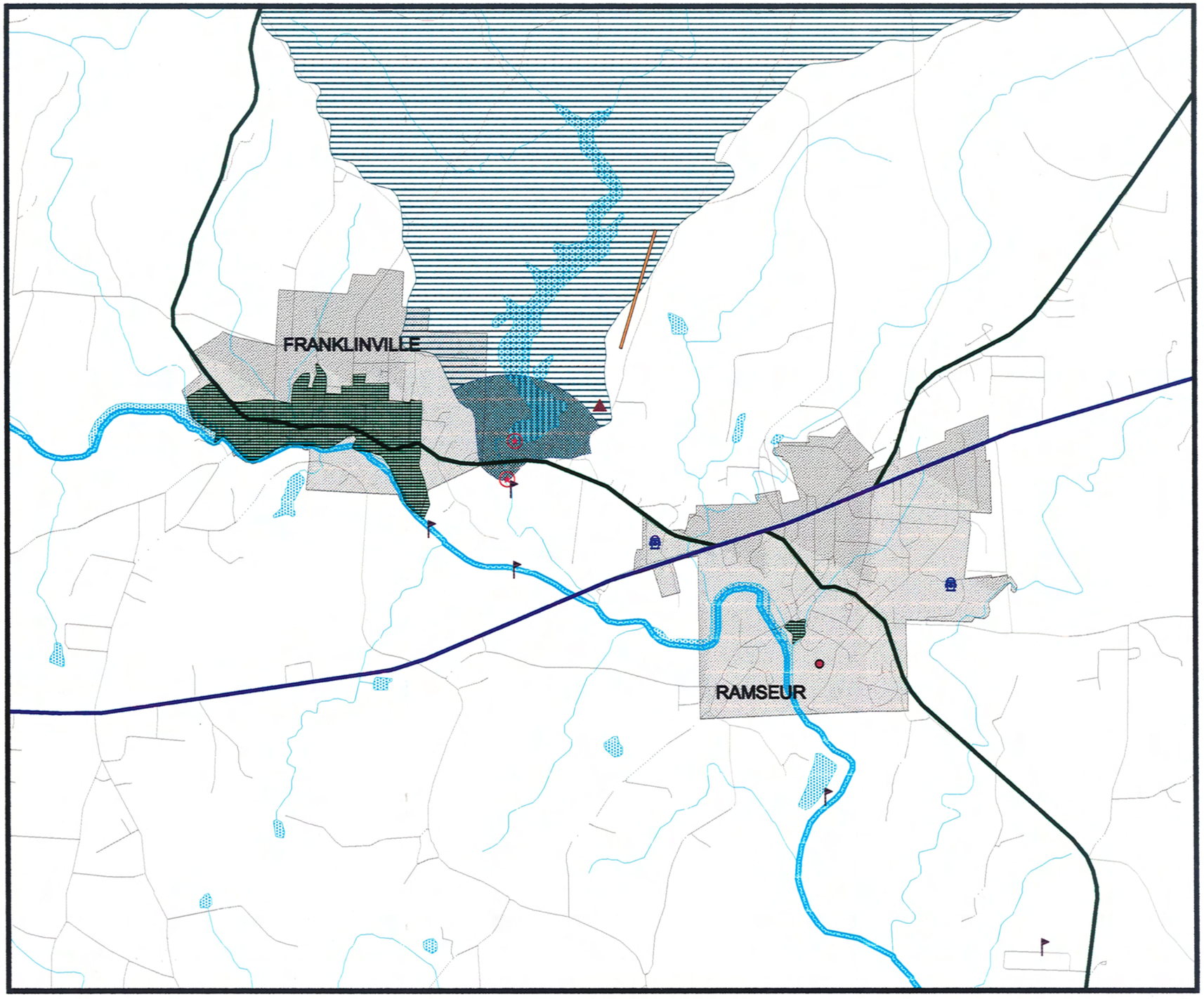
There are currently one historic property (Columbia Manufacturing Co.) and one historic district (Franklinville Historic District) in the Franklinville-Ramseur Planning Area that are listed on the National Register of Historic Places. These properties are shown in Figure 9.

Some of these properties may be affected by the projects proposed on the thoroughfare plan. However, care should be taken to make certain that all historic sites and natural settings are preserved. Therefore, a closer study should be done in regard to the local historic sites prior to the construction of any proposal.

Archaeology

There were numerous archaeology sites of significance located in the Franklinville-Ramseur Planning Area. These sites were mainly located along US 64, NC 22, and in several other sites. Therefore, a closer study should be done in regard to the archaeological sites prior to the roadway improvements or construction.

Environmental Data
Franklinville-Ramseur, NC



LEGEND

- Ambient Water Quality Monitoring Sites (100k)
- Citizen Water Quality Monitoring Sites (100k)
- NPDES - Non Discharge Systems (100k)
- NPDES - Point Source Dischargers (24k)
- Surface Water Intakes (100k)
- Groundwater Incidents (100k)
- Air Quality Pollution Discharge Points (24k)
- Nat. Heritage Occurence Sites (Restricted-100k)
- Hist. Struct.-NR (Restricted-100k)
- Hist. Dist. -NR (Restricted-100k)
- Hist. Struct.-SL(Restricted-100k)
- Hist. Dist.-SL(Restricted-100k)
- Solid Waste Facilities (24k)
- Hazardous Waste Facilities (Unverified 24k)
- Superfund Pts. (Haz. Subs. Dispos. Sites)
- Superfund Areas (Haz. Subs. Dispos. Sites)
- Artificial Marine Reefs(100k)
- Sub.Root Vasculars (point-24k)
- Sub. Root Vasculars (poly-24k)

National Highways System
- Interstate
- US
- NC
- SR
- City
- Other
- Roads (100k TIGER w/ attributes)

Airports / Substations
- Airport
- Power Substation
- Prop. Critical Habitat Areas (1 mile buffer-24k)
- Trout Streams (WRC - 100k)
- Trout Streams (DWQ - 100k)
- Anadromous Fish Spawning Areas (100k)
- Fish Nursery Areas (24k)
- Shellfish Strata (12k)

DCM Wetlands
- High Quality Wetlands
- Pocosin (High)
- Medium Quality Wetlands
- Low Quality Wetlands
- Hydro - Rivers/Streams (100k)
- Hydro -Water Bodies (100k)
- Hydro - Major Rivers/Streams (100k)
- Hydro - Major Water Bodies (100k)
- HQW Zones (100k)

Water Supply Watersheds (24k)
- Critical
- Protected
- Natural Areas (Restricted-24k)
- Municipal Boundaries (24k)

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FIGURE 9

Chapter 7
Traffic Model Development

In order to develop an efficient thoroughfare plan for the Franklinville-Ramseur Planning Area, it was necessary to develop and calibrate a traffic model of the area. Developing a traffic model requires the following steps: defining the study area, collecting traffic counts and socioeconomic data, determining the trip generation characteristics of the study area, calibrating the traffic model so that it duplicates patterns of the study area, and projecting the socioeconomic data to the design year. Once the socioeconomic data has been projected, the model may be used to evaluate various street system problems and alternate solutions to the problems.

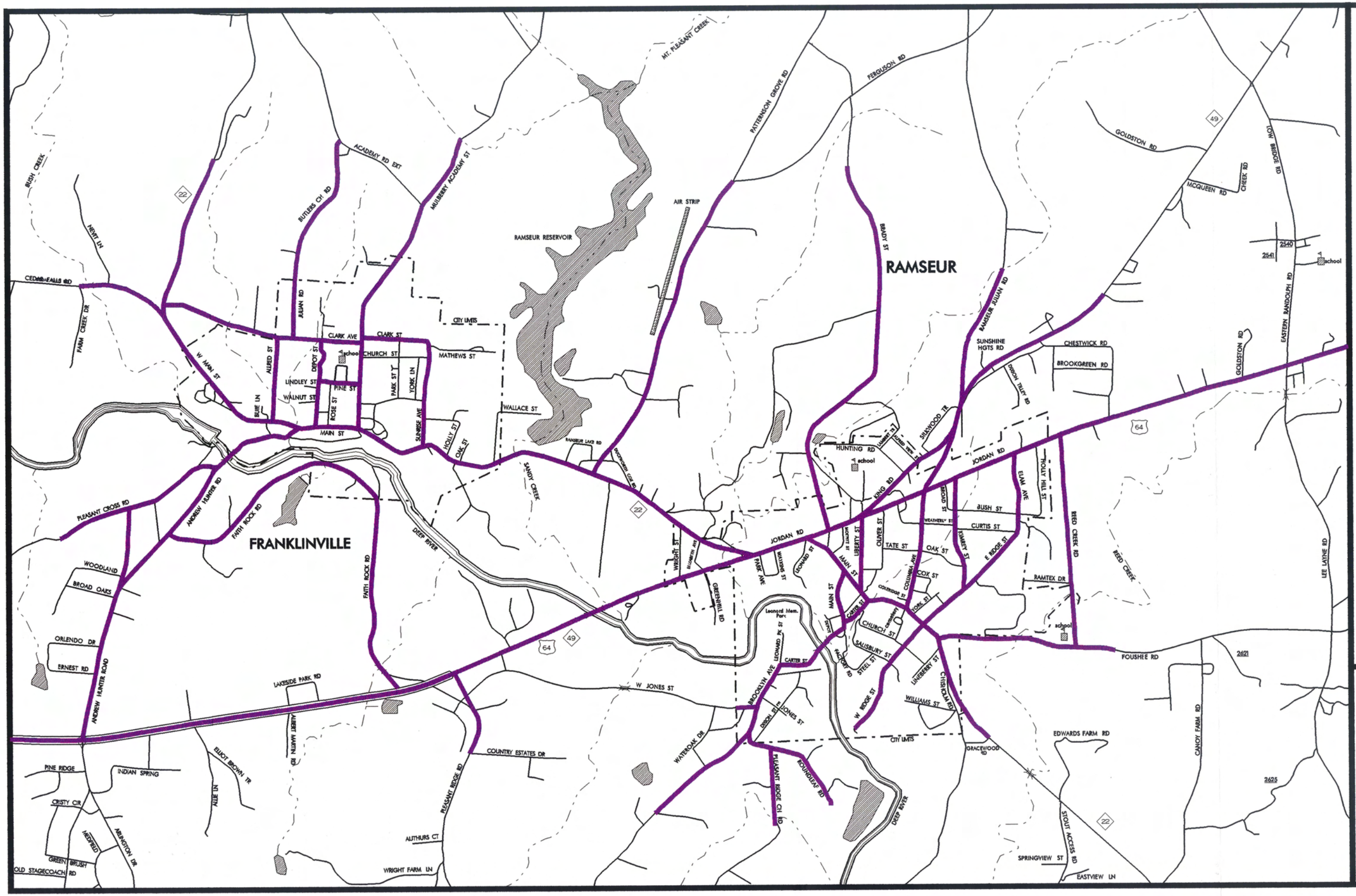
The Study Area

The study area consists of the Town of Franklinville, the Town of Ramseur, and some additional outlying areas (Figure 7). This area was divided into 54 zones for data collection and aggregation. These zones reflect similar land use throughout the planning area.

The Base Year Network

The purpose of the traffic model is to replicate the conditions of the street system. Therefore, it is necessary to represent the existing street system in the model. There is a balance between having too many streets on the model to allow it to be calibrated and not having enough streets to realistically duplicate existing conditions. Generally, all the major arterials and some of the major land access or collector streets need to be represented. Figure 10 shows the modeled network overlaid on the actual street system.

Street capacity is an important component of the model. The volume to capacity ratio (v\c) gives us our best indication of present and future traffic congestion. Speed and distance are the major factors that define the minimum time paths from zone to zone. The model uses the minimum time paths as the basis for assigning traffic to streets. Generally in the Franklinville-Ramseur model the speeds assigned to links of the street system are at or slightly below the posted speed limit.



Tranplan Network

LEGEND

Network Links ——

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SCALE

0 500 1000 1500 2000 feet

FIGURE 10

Data Requirements

In order to produce an adequate traffic model of the study area, two additional types of data are required. First, traffic counts on routes used in the model provide a basis for calibrating the model. These traffic counts show a snapshot of traffic conditions in the study area. Second, socioeconomic data (housing counts and an employment survey) is necessary in order to generate traffic on the model. Housing and socioeconomic data for the model are shown in Appendix E.

Traffic Counts

The model must be calibrated against existing conditions in the study area. In order to calibrate the model traffic counts must be taken at various locations around the study area. In addition, volumes on all routes crossing the planning area boundary were counted. These counts show how much traffic is entering and exiting the study area. Traffic counts for the study area were collected during December of 1998 and their locations are shown in Figure 11.

Socioeconomic Data

The required data consists of a housing count and an employment survey. The housing counts are used in the model as the generator of trips and employment is used as the attractor of trips.

The best indicator of the average number of trips made from a household during the course of a day is household income. Since there is no adequate method for determining household income, the type and quality of housing was used as an indicator of household income. The Statewide Planning staff conducted a windshield survey to collect housing and employment data. The housing inventory was divided into five categories: excellent, above average, average, below average and poor. Each of these categories was assigned a slightly different trip generation rate. Appendix E shows the housing counts for each traffic zone.

The employment data that was collected was broken out by Standard Industrial Code classification and grouped into five categories: Industry, Special Retail, Retail, Office and Services. This data was used with a regression equation developed from an origin and destination survey of a similar size city to produce an attraction factor for each zone. Appendix E shows total employment by traffic analysis zone.

Commercial Vehicles

Commercial vehicles have somewhat different trip generation characteristics than do privately owned vehicles. An inventory of commercial vehicles was done at the same time as the employment and housing inventory for the study area.

TRAFFIC COUNT LOCATION MAP

LEGEND

- CLASSIFICATION COUNT(1–8)
- DAILY COUNT(9–46)
- HOURLY COUNT(46–51)

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SCALE
0 500 1000 1500 2000 feet

FIGURE 11

Trip Generation

The trip generation process is the process in which external station volumes, housing data, and employment data are used to generate traffic volumes that duplicate the traffic volumes on the street network. The technical definition of a trip is slightly different than the definition of a trip used by the general public. Technically a trip only has one origin and one destination while the layman will often group, or chain, several short trips together as one longer trip.

Traffic inside the study area has three major components: through trips, internal-external trips, and internal trips. Through trips are produced outside the planning area and pass through en-route to a destination outside the planning area. Internal-external trips have one end of the trip outside of the planning area. Internal trips have both their origin and destination inside the planning area. For clarity, the internal trips are further subdivided into trip purposes. The trip purposes for this study are home-based work, other-home based, and non-home based.

Table 9 gives a summary of each trip purpose and Table 10 illustrates the variables that are considered when determining trip percentages.

Table 9

Travel Data Summary

Type		1999	2030
Average Daily Trips per DU		4.71	5.24
Internal Trips		6,107	9,726
Home Based Work		1,527	2,432
Other Home Based		3,237	5,155
Non-Home Based, Internal		1,344	2,140
NHB Secondary		5,975	11,702
Internal <-> External		21,952	42,248
Through Trips		11,024	21,861
	Total Daily Trips	45,058	85,537

Table 10

Travel Model Input Variables

Trip Percentages by Purpose		Year	Persons/DU	Persons/Veh
Internal of Total	75%			
HBW	25%	1999	2.43	1.17
OHB	53%			
NHB	22%	2030	2.30	1.10

Composite Factor:

$$\text{Composite Factor} = \frac{\text{1999 Persons/Veh}}{\text{2030 Persons/Veh}} \times \text{Usage Factor} \times \frac{\text{2030 Persons/DU}}{\text{1999 Persons/DU}}$$

$$\text{Composite Factor} = \frac{1.17}{1.10} \times .95 \times \frac{2.43}{2.30} = 1.07$$

Increase For Design Year Generation Rates:

Generation Rates = Average 1999 Trip Rate X Composite Factor - Average 1999 Trip Rate

Increase for 2030 Generation Rates (4.71 X 1.07) - 4.71 = 0.33 (Use 0.30)

Secondary NHB Trip Development

Secondary NHB Trips = Total Ext-Int Trips - Ext-Int Trips Garaged Inside Planning Area X NHBS Factor*

1999 Secondary Trips = (21,952 - 2,035) X 0.30 = 5,975

2030 Secondary Trips = (42,248 - 3,242) X 0.30 = 11,702

The breakdown of internal trips by purpose and total of non-home based trips generated externally are shown in Table 9.

*Assumed NHB trip making rate per each one-way external-internal trip by vehicles garaged outside the planning area.

Through Trips

The Through Trip Table for this study was developed based on Statewide Planning Technical Report Number 3 (Synthesized Through Trip Table for Small Urban Areas By Dr. David G. Modlin, Jr.).

Once these volumes were developed, the Fratar balancing method was then used to balance the trip interchanges so that the total number of through trips at each external station was consistent with

the total number of through trips at every other station. Generally five iterations are sufficient to balance the estimate between external zones.

External - Internal

The external-internal trip volume was determined by subtracting the through trip volume at each station from the total traffic volume at that station. Table 11 lists the external-internal and through trip values.

Table 11

Cordon Station Travel

Computer Station	Base Year - 1999			Future Year - 2030		
	Total ADT	Thru Trip End	Ext - Int Trips	Total ADT	Thru Trip End	Ext - Int Trips
61	1,600	400	1,200	3,200	800	2,400
62	400	64	336	800	128	672
63	300	46	254	600	92	508
64	900	158	742	1,800	316	1,484
65	900	104	796	1,800	208	1,592
66	900	156	744	1,800	312	1,488
67	5,500	2,476	3,024	11,000	4,952	6,048
68	9,000	6,760	2,240	18,000	13,520	4,480
69	1,000	150	850	1,700	256	1,444
70	4,200	1,256	2,944	8,400	2,512	5,888
71	300	48	252	600	96	504
72	1,100	134	966	2,200	268	1,932
73	700	74	626	1,400	148	1,252
74	400	46	354	680	78	602
75	14,000	9,676	4,324	28,000	19,352	8,648
76	500	50	450	1,000	100	900
77	2,300	450	1,850	2,990	586	2,404

Internal Data Summary (IDS)

IDS is the process that takes the external-internal traffic volumes, housing data, employment data, generation rates, and regression equations and generates the trip productions and trip attractions required by the gravity model. Housing units were stratified to account for differing trip generation rates for each classification. The individual trip generation rates give an average trip generation rate for the study area of 4.71 trips per dwelling unit (du). This is not within the state average of 7 to 8 trips per dwelling unit due to the characteristics of the study area.

Trip attractions were produced using regression equations. The regression equations consider trip attractions to be related to the employment characteristics of the traffic zones. The regression equations for the Franklinville-Ramseur study area are:

HBW $Y = 1.0X_1 + 1.0X_2 + 1.0X_3 + 1.0X_4 + 1.0X_5$
OHB $Y = 0.1X_1 + 2.0X_2 + 8.3X_3 + 2.6X_4 + 2.5X_5 + 0.5X_{12}$
NHB $Y = 0.2X_1 + 2.0X_2 + 8.3X_3 + 2.6X_4 + 2.5X_5 + 0.2X_{12}$
EXT $Y = 0.5X_1 + 2.0X_2 + 8.3X_3 + 2.6X_4 + 2.5X_5 + 2.1X_{12}$

Where:
- Y = Attraction factor for each zone
- X_1 = Industry (SIC codes 1-49)
- X_2 = Retail (SIC codes 55,58)
- X_3 = Special Retail (SIC codes 50-54, 56, 57, 59)
- X_4 = Office (SIC codes 60-67, 91-97)
- X_5 = Services (SIC codes 70-76, 78-89, 99)
- X_{12} = Attraction caused by housing

The output of the IDS program are trip productions and trip attractions for each zone divided into four trip purposes: home-based work, home-based other, non-home based and external-internal. The trips are segregated into trip purposes because different trip lengths are associated with each trip purpose.

Internal Trip Distribution

Once the number of trips per traffic zone is determined, the trips must still be distributed to other traffic zones. The preferred method of distributing internal and external-internal trips, called the 'Gravity Model', states that the number of trips between Zone A and Zone B is multiplied by a travel time factor. The gravity model takes the form:

$$T_{ij} = \frac{P_i * A_j * F_{ij}}{\text{Sum } x=1,n \text{ of } A_x F_{t,x}}$$

- T_{ij} = The number of trips produced in zone i and attracted to zone j.
- P_i = The number of trips produced in zone i.
- A_j = The number of trips attracted to zone j.
- F_{ij} = The travel time factor.
- n = The total number of zones.
- i = The origin zone number.
- j = The destination zone number.
- x = Any zone number.

The travel time factor or friction factor (F) is critical to the gravity model distribution and must be derived empirically. The friction factor is dependent on the distance between the traffic zones and the time necessary to travel these distances. This factor is also dependent on the trip purpose. In order to derive this factor, a gravity model calibration program is run with an initial friction factor and trip length frequency curve for each trip purpose. The initial friction factors used in the model were 100 for all trip purposes and time increments. Table 12 shows the actual values used for the friction factors and trip length frequency curves.

Table 12

Friction Factors & Travel Curve Data
Franklinville-Ramseur

	Friction Factors				Travel Curves			
					% Trips Distributed			
Time Interval	HBW	OHB	NHB	Ext - Int	HBW	OHB	NHB	Ext-Int
1	2661	2721	2135	3298	1.56	2.47	4.45	6.04
2	4098	3348	4496	4283	13.59	6.79	12.51	14.26
3	4113	3498	4659	4330	26.66	27.31	48.06	26.95
4	3008	3239	2867	3647	24.77	24.75	21.63	24.52
5	1794	2773	1265	2737	16.32	18.30	8.20	11.82
6	975	2291	483	1959	17.10	20.39	5.16	16.41

Model Calibration

The purpose of a traffic model is to predict the traffic on a street system at some future point in time. However, if the model is not accurate, it is useless for this purpose. Therefore, the model must duplicate the existing traffic pattern. The actual calibration of the model is an iterative process in which incremental changes are made either in the trip generation, trip distribution, or the street network. The purpose of each change is to allow the model to more accurately reflect the real world conditions upon which it is based. Only when the model can adequately reflect the existing traffic pattern should it be used to predict traffic in the future.

Accuracy Checks

There are three checks made on the model. The first is to follow trips through all the steps involved in the model. The purpose of this check is to insure that no trips have been accidentally added to or subtracted from the model, and that no trips have been counted twice.

The second check is to compare the model-generated trips on the screenlines with the ground counts taken at the screenlines. A model is considered to accurately reflect the overall patterns if the trips it generates are from 95% to 105% of the ground counts on the screenlines. Table 13 compares the ground counts with the model traffic volumes on the screenlines.

Table 13

Actual vs. Modeled Screenline Totals

Screenline	Ground Count	Model Volume	Percent
A (NS)	23300	23212	1.00
B (EW)	23200	24456	1.05

The final check for the model is to match the traffic volumes on the links in the model with the ADT at the same locations. The 'link counts' can be used to find particular places in the network

where there are problems. Comparing the link counts with the ground counts for those links did not reveal any significant problems with the model.

Data Projections to the Design Year

In order to make use of the model, the base year data must be modified to reflect assumed conditions in the design year. These projections and the previously developed regression equations were used to produce trip productions and attractions in the same manner as the base year.

Dwelling Unit Projections

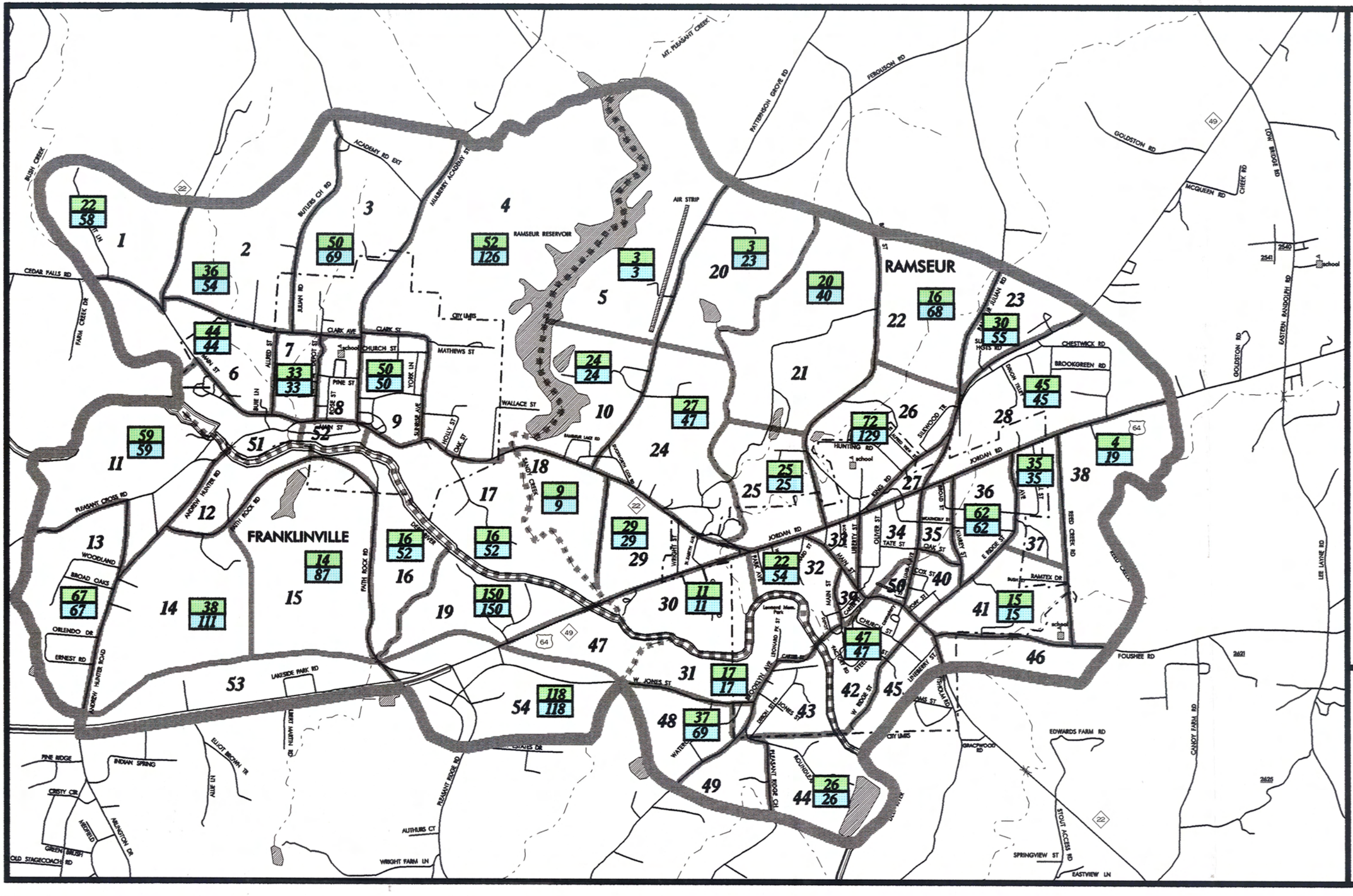
Future dwelling units were determined by extending person per dwelling unit trends for Randolph County and the Towns linearly to the design year. The number of dwelling units is projected to increase by 43%. The Statewide Planning Branch projected residential growth and with the help of each Town's mayor distributed these houses throughout the planning area. Figure 12 compares the stratification of dwelling units in 1999 with the assumed stratification in 2030.

Employment Projections

The Statewide Planning Branch and the Town mayors projected and distributed the 2030 employment to the zones they anticipated employment growth. Those projections were added to the 1999 data. Employment projections throughout the planning area indicated steady growth. Figure 13 compares the stratification of employment data in 1999 with the assumed stratification in 2030.

External and Through Trips

For the design year, external and through trips were projected from the base year using a linear projection of the past growth rate at each external station. Cordon Station Data can be found in Table 11.



HOUSING DATA BY ZONE

CORDON LINE

SCREEN LINE

ZONE LINE

ZONE NUMBERS 00

1999 HOUSING 00

2030 HOUSING 00

Data Not Shown On Map

ZONE	1999 HOUSING	2030 HOUSING
8	21	21
12	14	14
27	3	3
33	9	9
34	51	51
35	22	22
39	6	6
40	33	33
43	58	73
45	56	71
46	21	67
47	3	3
49	24	56
50	20	20
51	16	16
52	4	4
53	22	22

N

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RAMSEUR & FRANKLINVILLE

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS – STATEWIDE PLANNING BRANCH

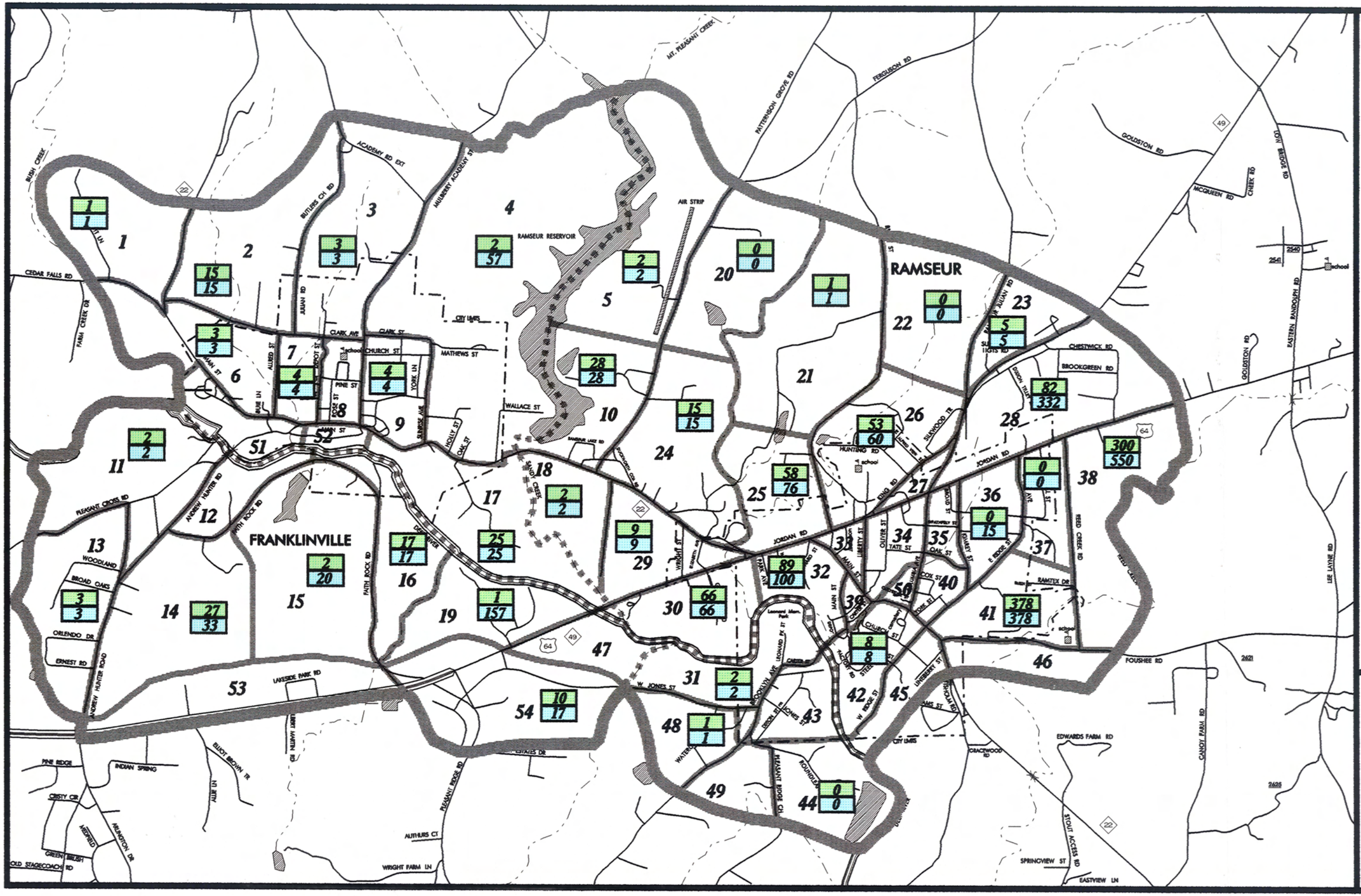
IN COOPERATION WITH THE

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 500 1000 1500 2000 feet

FIGURE 12



EMPLOYMENT DATA BY ZONE

CORDON LINE

SCREEN LINE

ZONE LINE

ZONE NUMBERS 00

1999 EMPLOYMENT 00

2030 EMPLOYMENT 00

Data Not Shown On Map

ZONE	1999 EMPLOYMENT	2030 EMPLOYMENT
8	35	41
12	20	20
27	4	4
33	55	101
34	48	93
35	3	17
39	42	53
40	0	0
43	0	0
45	2	2
46	80	80
47	0	10
49	0	0
50	0	0
51	2	2
52	7	7
53	64	69

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SCALE

0 500 1000 1500 2000 feet

FIGURE 13

APPENDICES

Appendix A
Thoroughfare Planning Principles

There are many advantages to thoroughfare planning, but the primary mission is to assure that the road system will be progressively developed to serve future travel desires. Thus, the main consideration in thoroughfare planning is to make provisions for street and highway improvements so that, when the need arises, feasible opportunities to make improvements exist.

Benefits of Thoroughfare Planning

There are two major benefits derived from thoroughfare planning. First, each road or highway can be designed to perform a specific function and provide a specific level of service. This permits savings in right-of-way, construction, and maintenance costs. It also protects residential neighborhoods and encourages stability in travel and land use patterns. Second, local officials are informed of future improvements and can incorporate them into planning and policy decisions. This will permit developers to design subdivisions in a non-conflicting manner, direct school and park officials to better locate their facilities, and minimize the damage to property values and community appearance that is sometimes associated with roadway improvements.

Objectives of Thoroughfare Planning

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, much care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and it helps eliminate unnecessary improvements, so needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring a minimum amount of land for street purposes. In addition to providing for traffic needs the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population along with commercial and industrial development affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

- Providing for the orderly development of an adequate major street system as land development occurs;
- Reducing travel and transportation costs;
- Reducing the cost of major street improvements to the public through the coordination of the street system with private action;

- Enabling private interest to plan their actions, improvements, and development with full knowledge of public intent;
- Minimizing disruption and displacement of people and businesses through long range advance planning for major street improvements;
- Reducing environmental impacts, such as air pollution, resulting from transportation, and
- Increasing travel safety.

Thoroughfare planning objectives are achieved through improving both the operational efficiency of thoroughfares, and the system efficiency through system coordination and layout.

Operational Efficiency

A roadway's operational efficiency is improved by increasing the capability of the roadway to carry more vehicular traffic and people. In terms of vehicular traffic, a roadway's capacity is defined by the maximum number of vehicles that can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

Physical ways to improve vehicular capacity include:

- **Roadway widening** - Widening of a road from two to four lanes more than doubles the capacity of the road by providing additional maneuverability for traffic.
- **Intersection improvements** - Increasing the turning radii, adding exclusive turn lanes, and channelizing movements can improve the capacity of an existing intersection.
- **Improving vertical and horizontal alignment** - Alignment improvements reduce the congestion caused by slow moving vehicles.
- **Eliminating roadside obstacles** - Improving lateral clearance reduces side friction and improves a driver's field of sight.

Operational ways to improve roadway capacity include:

- **Control of Access** - A roadway with complete access control can often carry three times the traffic handled by a non-controlled access road with identical width and number of lanes.
- **Parking removal** - Increases capacity by providing additional roadway width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.
- **One-way operation** - The capacity of a road can sometimes be increased 20 -50%, depending upon turning movements and overall roadway width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.
- **Reversible lane** - Reversible traffic lanes may be used to increase roadway capacity in situations where heavy directional flows occur during peak periods.
- **Signal phasing and coordination** - Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing roads. Travel demand can be reduced or altered in the following ways:

- **Carpools** - Encouraging the formation of carpools and vanpools for journeys to work and other trip purposes reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.

- **Alternate mode** - Encouraging the use of transit and bicycle reduces vehicular congestion.

- **Work hours** - Programs by industries, businesses, and institutions to stagger work hours or establish variable work hours for employees spreads peak travel over a longer time period and thus reduces peak hour demand.

- **Land use** - Planning land use can control development or redevelopment in a more travel efficient manner.

System Efficiency

Another means for altering travel demand is the development of a more efficient system of roads that will better serve travel desires. A more efficient transportation system can reduce travel distances, time, and user costs. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Thoroughfare Classification Systems

Streets perform two primary functions, traffic service and land service, which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely developed abutting property lead to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets that permits travel from origins to destinations with directness, ease and safety. Different streets in this system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict.

Urban Classification

In the urban thoroughfare plan, elements are classified according to the function they serve. Roadways may be classified as major thoroughfares, minor thoroughfares, or local access streets.

Local Access Streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with origins and destinations of the streets could be served. Local streets may be further classified as residential, commercial, and/or industrial depending upon the type of land use that they serve.

Minor Thoroughfares are more important streets on the city system. They collect traffic from the local access streets and carry it to the major thoroughfares. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function that may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

Major Thoroughfares are the primary traffic arteries of the city. Their function is to move intra-city and inter-city traffic. The streets that comprise the major thoroughfare system may also serve abutting property; however, their principle function is to carry traffic. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare to carry traffic and each driveway is a danger and impediment to traffic flow. Major thoroughfares may range from a two-lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted on major thoroughfares.

Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system that is most adaptable to desire lines of travel within an urban area is the radial-loop system. It permits movement between various areas of the city within maximum directness. This system consists of several functional elements: radial streets, cross-town streets, loop system streets, and bypasses (Figure A-1).

Radial streets provide for traffic movement between points located on the outskirts of the city and the central area. This is a major traffic movement in most cities, and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of cross-town streets that form a loop around the central business district. This system allows traffic moving from origins on one side of the central area to destinations on the other side to follow the area's border. It also allows central area traffic to circle and then enter the area near a given destination. The effect of a good cross-town system is to free the central area of cross-town traffic, thus permitting the central area to function more adequately in its role as a business or pedestrian shopping area.

Loop system streets move traffic between suburban areas of the city. Although a loop may completely encircle the city, a typical trip may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not necessarily carry heavy volumes of traffic, but they function to help relieve central areas. There may be one or more loops, depending on the size of the urban area. They are generally spaced one-half mile to one mile apart, depending on the intensity of land use.

A **bypass** is designed to carry traffic through or around the urban area, thus providing relief to the city street system by removing traffic that has no desire to be in the city. Bypasses are usually designed to standards for highways supporting large volumes of high-speed traffic, including control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the city. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

Figure A-1
Idealized Thoroughfare Plan

Back of Figure

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, system efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice thoroughfare planning is done for established urban areas and is constrained by existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these and the many other factors that affect major street locations.

Throughout the thoroughfare planning process it is necessary from a practical viewpoint that certain basic principles be followed as closely as possible. These principles are as follows:

- The plan should be derived from a thorough knowledge of today's travel - its component parts, and the factors that contribute to it, limit it, and modify it.
- Traffic demands must be sufficient to warrant the designation and development of each major street. The thoroughfare plan should be designed to accommodate a large portion of major traffic movements on relatively few streets.
- The plan should conform to and provide for the land development plan for the area.
- Certain considerations must be given to urban development beyond the current planning period. Particularly in outlying or sparsely developed areas that have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect right-of-way for future thoroughfare development.
- While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible.

Appendix B

Thoroughfare Plan Street Tabulation and Recommendations

This appendix includes a detailed tabulation of all streets identified as elements of the Franklinville-Ramseur Thoroughfare Plan. The table includes a description of each section, as well as the length, cross section, and right-of-way for each section. Also included are existing and projected average daily traffic volumes, roadway capacity, and the recommended ultimate lane configuration. Due to space constraints, these recommended cross sections are given in the form of an alphabetic code. A detailed description of each of these codes and an illustrative figure for each can be found in Appendix C.

The following index of terms may be helpful in interpreting the table:

ADQ - Adequate

EPB - Eastern Planning Boundary

FCL - Franklinville City Limits

NPB - Northern Planning Boundary

RCL - Ramseur City Limits

SPB - Southern Planning Boundary

WPB - Western Planning Boundary

ZL - Zoning Limits

Appendix B

Thoroughfare Plan Street Tabulation and Recommendations

FACILITY & SECTION	DIST. (mi)	EXISTING CONDITIONS RDWY (ft)	ROW (ft)	NO. OF LANES	CAPACITY (vpd)	ADT 1999 (vpd)	2030 (vpd)	RECOMMENDATIONS CROSS SECT.	ROW (ft)	CAPACITY (vpd)	2030 ADT
US 64											
EPB - ERCL[2]	0.50	24	60	2	10,900	9,000	18,000	F	110	35,000	18,000
ERCL - NC 49[2]	0.70	24	60	2	10,400	11,400	21,500	C	90	32,200	15,700
NC 49 - NC 22[2]	0.60	46	80	3	16,100	23,400	44,600	C	90	32,200	23,200
NC 22 - WRCL	0.30	46	80	5	32,200	18,100	35,500	ADQ			20,200
WRCL - EFCL	1.10	60	200	5	32,200	17,800	35,300	ADQ			20,000
EFCL - WFCL	0.30	60	100	5	32,200	16,200	30,900	ADQ			30,500
WFCL - SR 2235	2.00	48	100	4	35,000	15,200	26,600	ADQ			28,100
SR 2235 - WPB	0.50	60	100	5	32,200	14,000	28,000	ADQ			28,000
NC 49											
US 64 - RCL	0.30	22	100	2	9,700	6,200	12,500	ADQ			3,000
RCL - Silkwood Trail	0.50	22	100	2	10,200	6,200	12,500	ADQ			3,000
Silkwood Trail - EPB	0.60	22	100	2	10,200	5,500	11,000	F	110	35,000	11,000
NC 22											
NPB - WFCL	1.00	20	100	2	7,100	1,600	3,200	K	100	12,500	3,200
WFCL - Rose Street	0.90	24	100	2	12,200	3,600	6,200	ADQ			6,000
Rose Street - SR 2495	0.20	40	100	2	12,200	4,600	6,800	ADQ			7,500
SR 2495 - Sunrise Avenue	0.30	24	60	2	12,200	5,400	9,500	ADQ			11,100
Sunrise Avenue - EFCL	0.40	24	60	2	12,200	5,400	9,500	K (C)	100	32,200	11,100
EFCL - SR 2491	0.50	20	60	2	8,800	5,500	9,600	K (C)	100	32,200	11,300
SR 2491 - WRCL	0.40	20	60	2	8,800	6,600	11,500	K (C)	100	32,200	3,000
WRCL - US 64	0.50	24	130	2	12,200	6,500	11,400	ADQ			2,900
US 64 - SPB	1.00	22	100	2	11,400	7,900	13,900	K	100	12,500	5,300
SR 2668 - Reed Creek Road											
SR 2621 - US 64	0.90	24	80	2	10,400	2,800	4,500	ADQ			5,900
SR 2621 - Foushee Road											
NC 22 - RCL	0.40	24	60	2	10,400	5,500	8,200	ADQ			7,700
RCL - EPB	1.00	18	60	2	7,700	1,000	1,700	K	100	12,500	1,700
SR 2620 - Columbia Avenue											
NC 22 - US 64	0.50	22	50	2	9,700	1,700	2,700	ADQ			2,100
SR 2619 - Roundleaf Road											
SR 2615 - End State Maintenance	1.50	18	50	2	7,300	1,000	1,700	K	100	12,500	1,700
SR 2618 - Pleasant Rdg Ch Road											
SR 2615 - SPB	0.50	20	60	2	8,500	600	1,400	ADQ			1,400
SR 2616 - Jones Street Ext											
SR 2615 - RCL	0.40	18	80	2	7,300	1,200	2,300	K	100	12,500	1,600
RCL - End State Maintenance	1.10	20	80	2	8,500	700	1,400	ADQ			1,400

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FACILITY & SECTION	DIST. (mi)	EXISTING CONDITIONS RDWY (ft)	ROW (ft)	NO. OF LANES	CAPACITY (vpd)	ADT 1999 (vpd)	2030 (vpd)	RECOMMENDATIONS CROSS SECT.	ROW (ft)	CAPACITY (vpd)	2030 ADT
SR 2615 - Brooklyn Avenue Ext											
NC 22 - Leonard Street	0.30	28	60	2	10,400	800	1,000	ADQ			1,000
Leonard Street - RCL	0.40	22	80	2	9,700	3,800	7,200	ADQ			2,200
RCL - SPB	0.80	20	80	2	8,800	1,100	2,200	K	100	12,500	2,200
SR 2500 - Academy Road Ext											
SR 2495 -NPB	0.80	18	60	2	7,700	200	400	ADQ			400
SR 2499 - Butler's Chapel Road											
SR 2500 - FCL	0.70	20	60	2	9,200	400	800	ADQ			800
FCL - SR 2498	0.21	20	60	2	8,800	800	1,500	ADQ			1,500
SR 2498 - Clark Avenue											
NC 22 - FCL	0.30	18	60	2	7,300	500	1,000	K	100	12,500	1,000
FCL - SR 2495	0.60	20	60	2	8,800	1,100	2,000	K	100	12,500	2,000
SR 2495 - Mulberry Academy Rd											
NC 22 - SR 2498	0.40	20	60	2	8,800	1,700	2,900	K	100	12,500	2,900
SR 2498 - FCL	0.60	18	60	2	7,300	600	1,100	K	100	12,500	1,100
FCL - NPB	2.00	20	60	2	9,200	300	600	ADQ			600
SR 2491 - Patterson Grove Road											
NC 22 - NPB	1.40	20	60	2	9,200	1,600	2,800	K	100	12,500	2,800
SR 2489 - Brady Street Ext											
US 64 - RCL	0.10	36	60	3	13,800	4,800	8,300	ADQ			4,800
RCL - NPB	1.00	18	60	2	7,700	1,000	2,100	K	100	12,500	2,100
SR 2488 - King Road											
NC 49 - US 64	0.50	22	60	2	9,700	1,900	2,600	ADQ			1,900
SR 2442 - Ramseur Julian Road											
NC 49 - NPB	0.50	22	60	2	10,200	1,000	2,400	ADQ			2,400
SR 2235 - Andrew Hunter Road											
US 64 - FCL	1.50	20	60	2	8,800	4,700	8,500	K	100	12,500	7,200
FCL - NC 22	0.30	20	150	2	8,800	2,800	5,500	K	100	12,500	4,100
SR 2228 - Pentecostal Church Rd											
SR 2224 - SR 2235	0.40	20	60	2	9,200	1,000	1,400	K	100	12,500	1,400
SR 2226 - Cedar Falls Road											
NC 22 - WPB	0.40	20	60	2	9,200	2,500	3,700	K	100	12,500	3,700
SR 2224 - Pleasant Cross Road											
US 64 - SR 2235	1.30	20	60	2	9,200	700	900	ADQ			900

Appendix B

Thoroughfare Plan Street Tabulation and Recommendations

FACILITY & SECTION	DIST. (mi)	EXISTING CONDITIONS RDWY (ft)	ROW (ft)	NO. OF LANES	CAPACITY (vpd)	ADT 1999 (vpd)	2030 (vpd)	RECOMMENDATIONS CROSS SECT.	ROW (ft)	CAPACITY (vpd)	2030 ADT
SR 2207 - Faith Rock Road											
US 64 -SR 2235	2.00	16	90	2	7,000	1,000	2,300	K	100	12,500	2,300
SR 2179 - Pine Street											
Depot Street - SR 2495	0.20	20	60	2	8,800	300	300	ADQ			300
SR 1003 - Holly Spring Erect											
US 64 - SPB	1.50	22	80	2	0	400	700	ADQ			700
Town of Franklinville											
Allred Street											
SR 2498 - NC 22	0.40	18	60	2	7,300	200	500	K	100	12,500	500
Clark Street											
Sunrise Avenue - SR 2495	0.30	16	60	2	7,000	400	2,200	K	100	12,500	2,200
Depot Street											
Clark Avenue (SR 2498) - NC 22	0.40	16	60	2	7,000	1,200	1,700	K	100	12,500	1,700
Sunrise Avenue											
NC 22 - Clark Street	0.50	16	60	2	7,000	1,100	3,100	K	100	12,500	3,100
Town of Ramseur											
Carter Street											
NC 22 - Main Street	0.10	22	60	2	9,700	4,400	7,700	ADQ			3,000
Kimrey Street											
US 64 - Elam Avenue	0.50	18	60	2	7,300	100	100	K	100	12,500	100
Liberty Street											
NC 22 - US 64	0.30	28	60	2	8,800	1,700	2,800	ADQ			2,000
Ridge Street / Elam Avenue											
US 64 - End State Maintenance	1.30	16	60	2	7,000	600	800	K	100	12,500	800
NEW LOCATION											
US 64 Bypass[1]											
US 64E - NC 49	0.50							K (F)	110	13,000	6,200
NC 49 - SR 2489	0.70							K (F)	110	13,000	10,700
SR 2489 - NC 22	0.90							K (F)	110	13,000	13,700
NC 22 - US 64W	1.00							K (F)	110	13,000	10,700
US 64W - SR 2615	1.30							K (F)	110	13,000	8,400
SR 2615 - NC 22	0.90							K (F)	110	13,000	7,200

Notes: [1] 2-lane on 4-lane right of way

[2] TIP Project

Appendix C
Typical Cross Sections

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each street section must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacities, desired level of service, and available right-of-way.

Typical cross section recommendations are shown in Figure C-1. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way. The recommended typical cross sections for the thoroughfares are given in Appendix B, Table B-1 along with other pertinent information.

On all existing and proposed major thoroughfares delineated on the thoroughfare plan, adequate right-of-way should be protected or acquired for the ultimate cross sections. Ultimate desirable cross sections for each of the thoroughfares are listed as part of the Street Inventory in Appendix B. Recommendations for "ultimate" cross sections are provided for the following:

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

Recommended design standards relating to maximum and minimum grades, minimum sight distances, maximum degree of curve and related super elevation, and other considerations for thoroughfares are given in Appendix D.

A - Four Lanes Divided with Median - Freeway

Cross-section "A" is typical for four lane divided highways in rural areas that may have only partial or no control of access. The minimum median width for this cross section is 46 feet, but a wider median is desirable.

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 and 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.

C - Five Lanes - Curb & Gutter

Typical for 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 major thoroughfares where left turns and intersection 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 special cases, grassed or landscaped medians result in greatly increased maintenance costs and an increase in danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

F - Four Lanes Divided - Boulevard, Grass Median

Cross-section "F" is typically recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 ft is recommended with 30 ft being desirable.

G - Four Lanes - Curb & Gutter

Cross section "G" is recommended for 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 probably be required at major intersections. This cross section should be used only if the above criterion is 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 & Gutter

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

I - Two Lanes - C&G, Parking both sides: J - Two Lanes - C&G, Parking one side

Cross sections "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 multi-lane cross section. On some thoroughfares, 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 future widening will be necessary, 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 - Freeway

Cross section "L" is typical for controlled access freeways. The 46 ft grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Right-of-way requirements would typically vary upward from 228 ft depending upon cut and fill requirements.

M - Eight Lanes Divided with Raised Median - Curb & Gutter

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

N - Five Lanes/C&G, Widened Curb Lanes; O - Two Lane/Shoulder Section; P - Four Lanes Divided/Raised Median, C&G, Widened Curb Lanes

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities. Cross sections "N", "O", and "P" are typically used to accommodate bicycle travel.

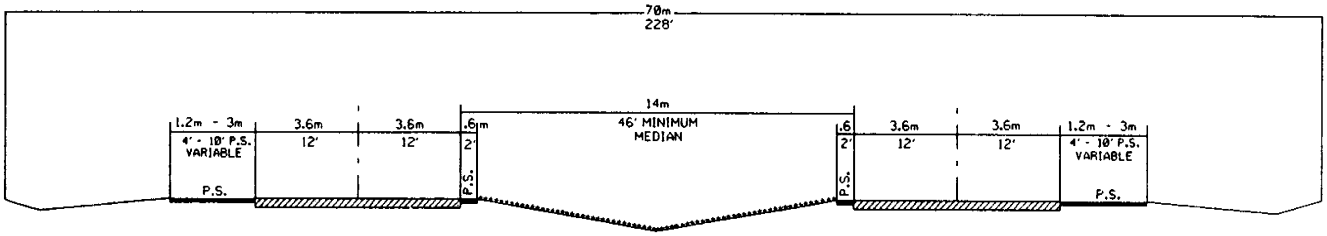
General

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. 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 setback for utility poles.

The right-of-ways shown for the typical cross sections are the minimum right-of-way 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 thoroughfare construction.

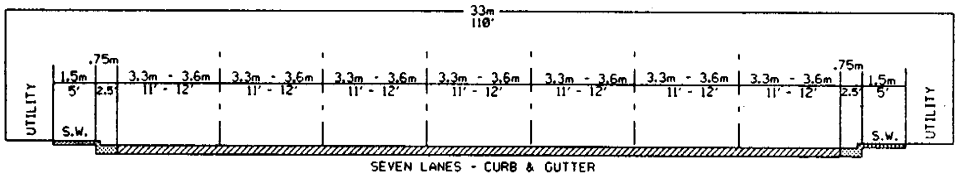
TYPICAL THOROUGHFARE CROSS SECTIONS

A.



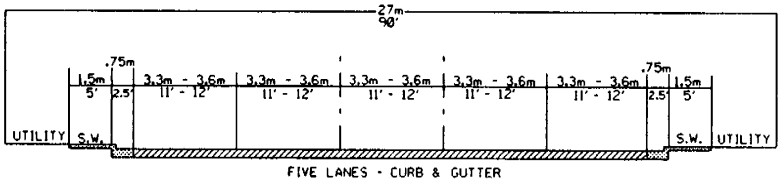
FOUR LANES DIVIDED WITH MEDIAN - FREEWAY

B.



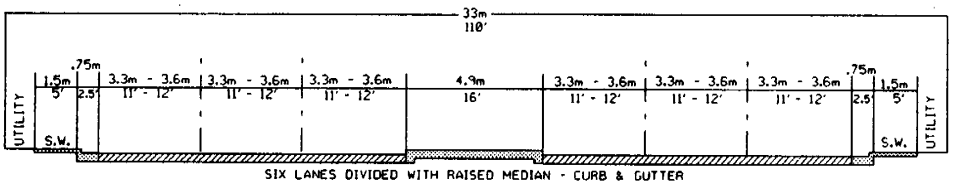
SEVEN LANES - CURB & GUTTER

C.



FIVE LANES - CURB & GUTTER

D.

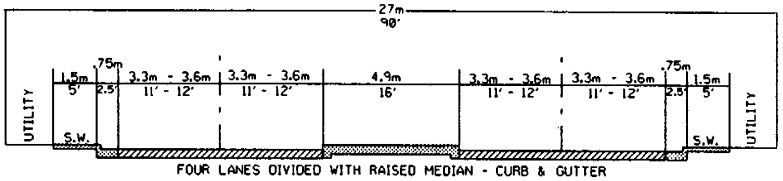


SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

FIGURE C-1

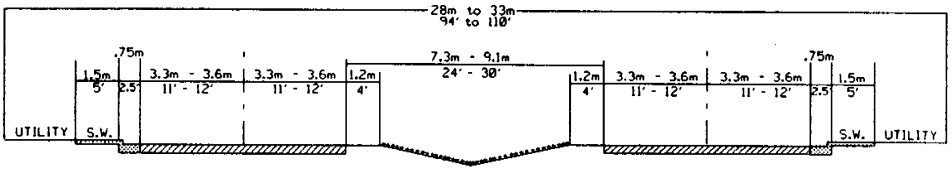
TYPICAL THOROUGHFARE CROSS SECTIONS

E.



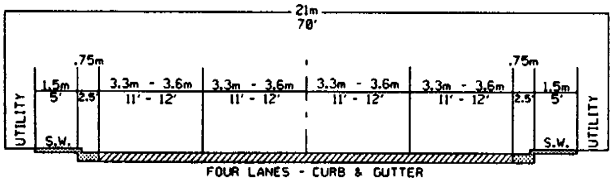
FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

F.



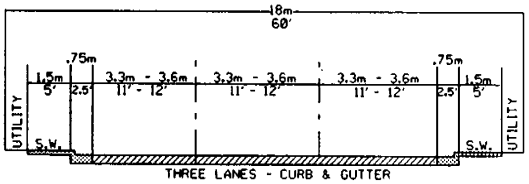
FOUR LANES DIVIDED - BOULEVARD
GRASS MEDIAN

G.



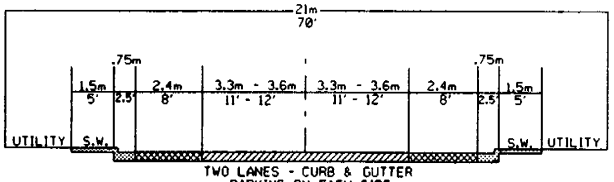
FOUR LANES - CURB & GUTTER

H.



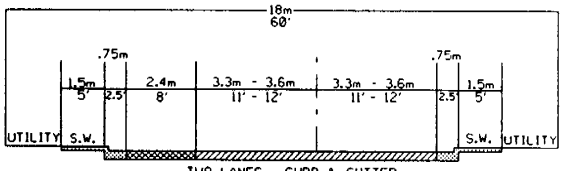
THREE LANES - CURB & GUTTER

I.



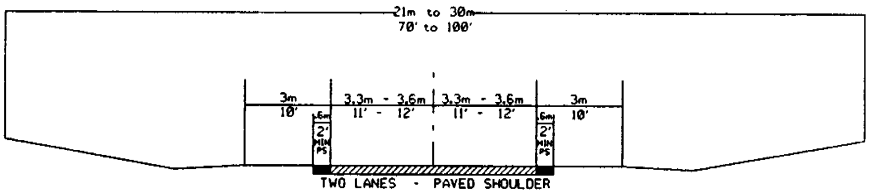
TWO LANES - CURB & GUTTER
PARKING ON EACH SIDE

J.



TWO LANES - CURB & GUTTER
PARKING ON ONE SIDE

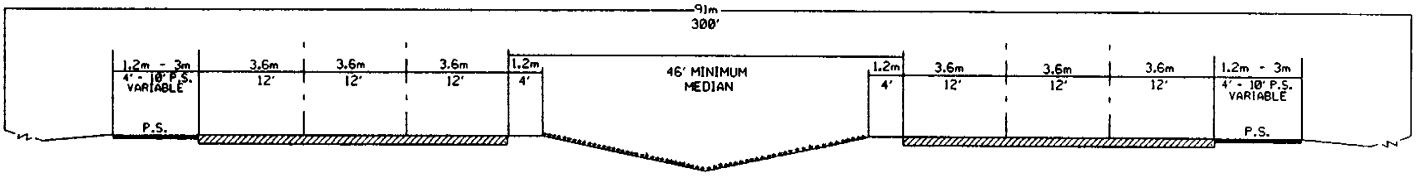
K.



TWO LANES - PAVED SHOULDER

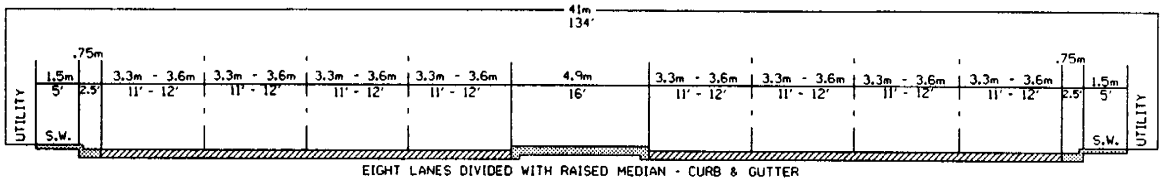
TYPICAL THOROUGHFARE CROSS SECTIONS

L.



SIX LANES DIVIDED WITH GRASS MEDIAN - FREEWAY

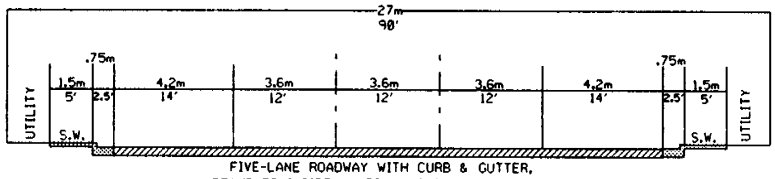
M.



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

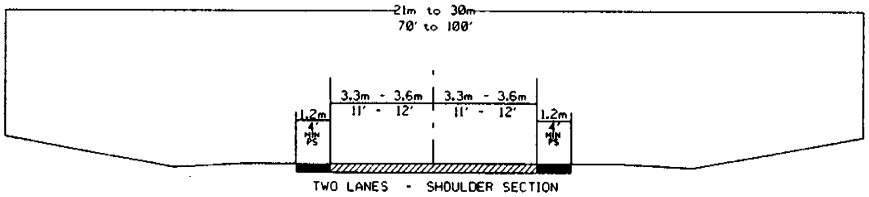
TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

N.



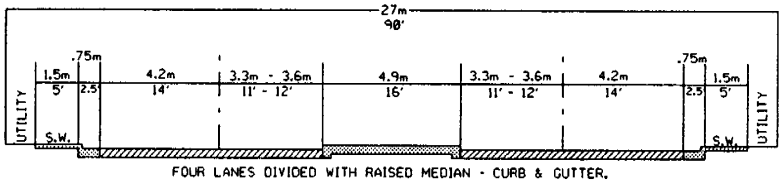
FIVE-LANE ROADWAY WITH CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES

O.



TWO LANES - SHOULDER SECTION

P.



FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER.
STANDARD INSIDE LANES & WIDENED CURB LANES

Appendix D
Recommended Subdivision Ordinances

Definitions

Streets and Roads

Rural Roads

1. *Principal Arterial* - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of interstate routes and other routes designated as principal arterials.

2. *Minor Arterial* - A rural roadway joining cities and larger towns and providing intrastate and intercounty service at relatively high overall travel speeds with minimum interference to through movement.

3. *Major Collector* - A road which serves major intracounty travel corridors and traffic generators and provides access to the arterial system.

4. *Minor Collector* - A road which provides service to small local communities and traffic generators and provides access to the major collector system.

5. *Local Road* - A road which serves primarily to provide access to adjacent land, over relatively short distances.

Urban Streets

1. *Major Thoroughfares* - Major thoroughfares consist of interstate, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.

2. *Minor Thoroughfares* - Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through traffic movements and may also serve abutting property.

3. *Local Street* - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

Specific Type Rural or Urban Streets

1. *Freeway, expressway, or parkway* - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A *freeway* provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An *expressway* is a facility with full or partial control of access and generally

with grade separations at major intersections. A *parkway* is for non-commercial traffic, with full or partial control of access.

2. *Residential Collector Street* - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.

3. *Local Residential Street* - Cul-de-sacs, loop streets less than 2500 feet in length, or streets less than 1.0 miles in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.

4. *Cul-de-sac* - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.

5. *Frontage Road* - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.

6. *Alley* - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

Property

1. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.

2. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

3. Lot - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

Subdivision

- Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

- Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets.

  The following shall not be included within this definition nor subject to these regulations:

  * the combination or re-combination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein,
  * the division of land into parcels greater then 10 acres where no street right-of-way dedication is involved,
  * the public acquisition, by purchase, of strips of land for the widening or the opening of streets, and

* the division of a tract in single ownership whose entire area is no greater than 2 acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

- Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.

- Reservation - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

Roadway Design Standards

The design of all roads within a planning area shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway & Transportation Officials' (AASHTO) manuals.

The provision of right-of-way for roads shall conform and meet the recommendations of the thoroughfare plan, as adopted by the municipality or county. The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally, the proposed streets should be the extension of existing streets if possible.

Right-of-Way Widths

Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out in the thoroughfare plan.

The subdivider will only be required to dedicate a maximum of 100 feet of ROW. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. In all cases in which ROW is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width ROW, not less then 60 feet, may be dedicated when adjoining undeveloped property is owned or controlled by the subdivider. This is provided that the width of a partial dedication is such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is sub-divided, the remainder of the full required right-of-way shall be dedicated.

Table D-1

Minimum Right-of-way Requirements

Area Classification	Functional Classification	Minimum ROW
RURAL	Principle Arterial	Freeways- 350 ft Other- 200 ft
	Minor Arterial	100 ft
	Major Collector	100 ft
	Minor Collector	80 ft
	Local Road	60 ft[1]
URBAN	Major Thoroughfare	90 ft
	Minor Thoroughfare	70 ft
	Local Street	60 ft[1]
	Cul-de-sac	variable[2]

[1] The desirable minimum ROW is 60 ft. If curb and gutter is provided, 50 ft of ROW is adequate on local residential streets.

[2] The ROW dimension will depend on radius used for vehicular turn around. Distance from edge of pavement of turn around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn around.

Street Widths

Widths for street and road classifications other than local shall be as recommended by the thoroughfare plan. Width of local roads and streets shall be as follows:

- ***Local Residential***
  - * Curb and Gutter section: 26 feet, face to face of curb
  - * Shoulder section: 20 feet to edge of pavement, 4 feet for shoulders

- ***Residential Collector***
  - * Curb and Gutter section: 34 feet, face to face of curb
  - * Shoulder section: 20 feet to edge of pavement, 6 feet for shoulders

Geometric Characteristics

The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under the 'Right-of-Way Widths' section shall apply.

1. *Design Speed* - The design speed for a roadway should be a minimum of 5 mph greater than the posted speed limit. The design speeds for subdivision type streets are shown in Table D-2.

2. *Minimum Sight Distance* - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the parameters set forth in Table D-3.

3. *Superelevation* - Table D-4 shows the minimum radius and the related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

4. *Maximum and Minimum Grades* - The maximum grades in percent are shown in Table D-5. Minimum grade should not be less then 0.5%. Grades for 100 feet each way from intersections (measured from edge of pavement) should not exceed 5%.

Table D-2

Design Speeds

Facility Type	Design Speed (mph) Desirable	Minimum Level	Minimum Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	60	50	40
Local Roads[1] (ADT Over 400)	50	*50	*40
URBAN			
Major Thoroughfares[2]	60	50	40
Minor Thoroughfares	40	30	30
Local Streets	30	**30	**20

Note: *Based on ADT of 400-750. Where roads serve a limited area and small number of units, can reduce minimum design speed. **Based on projected ADT of 50-250. (Reference NCDOT Roadway Design Manual page 1-1B)

[1] Local Roads including Residential Collectors and Local Residential.

[2] Major Thoroughfares other than Freeways or Expressways.

Table D-3

Sight Distance

Design Speed (mph)	Stopping Sight Distance (feet)		Minimum K[1] Values (feet)		Passing Sight Distance (feet)
	Desirable	Minimum	Crest Curve	Sag Curve	For 2-lanes
30	200	200	30	40	1100
40	325	275	60	60	1500
50	475	400	110	90	1800
60	650	525	190	120	2100

Note: General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case. (Reference NCDOT Roadway Design Manual page 1-12 T-1)

[1]K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve, which will provide the desired sight distance. Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1990".

Table D-4

Superelevation

Design Speed (mph)	Minimum Radius of Maximum e[1]			Maximum Degree of Curve		
	e=0.04	e=0.06	e=0.08	e=0.04	e=0.06	e=0.08
30	302	273	260	19 00'	21 00'	22 45'
60	573	521	477	10 00'	11 15'	12 15'
80	955	955	819	6 00'	6 45'	7 30'
100	1,637	1,432	1,146	3 45'	4 15'	4 45'

[1] e = rate of roadway superelevation, foot per foot

Note: (Reference NCDOT Roadway Design Manual page 1-12 T-6 thru T-8)

Table D-5

Maximum Vertical Grade

Facility Type and Design Speed (mph)		Minimum Grade in Percent		
		Flat	Rolling	Mountainous
RURAL				
Minor Collector Roads*				
	20	7	10	12
	30	7	9	10
	40	7	8	10
	50	6	7	9
	60	5	6	8
	70	4	5	6
Local Roads*[1]				
	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-
URBAN				
Major Thoroughfares[2]				
	30	8	9	11
	40	7	8	10
	50	6	7	9
	60	5	6	8
Minor Thoroughfares*				
	20	9	12	14
	30	9	11	12
	40	9	10	12
	50	7	8	10
	60	6	7	9
	70	5	6	7
Local Streets*				
	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-

Note: *For streets and roads with projected annual average daily traffic less than 250 or short grades less than 500 ft long, grades may be 2% steeper than the values in the above table. (Reference NCDOT Roadway Metric Design Manual page 1-12 T-3)

[1] Local Roads including Residential Collectors and Local Residential.

[2] Major Thoroughfares other than Freeways or Expressways.

Intersections

1. Streets shall be laid out so as to interest as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees.

2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.

3. Offset intersections are to be avoided. Intersections that cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

Cul-de-sacs

Cul-de-sacs shall not be more than 500 feet in length. The distance from the edge of pavement on the vehicular turn around to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provisions are made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least 20 feet.

3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn around as may be required by the planning board.

Permits for Connection to State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet form the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Horizontal Width on Bridge Deck

The clear roadway widths for new and reconstructed bridges serving two-lane, two-way traffic should be as follows:

- shoulder section approach:
    * under 800 ADT design year - minimum 28 feet width face to face of parapets, rails, or pavement width plus 10 feet, whichever is greater,
    * 800 - 2000 ADT design year - minimum 34 feet width face to face of parapets, rails, or pavement width plus 12 feet, whichever is greater,
    * over 2000 ADT design year - minimum width of 40 feet, desirable width of 44 feet width face to face of parapets or rails;
- curb and gutter approach:
    * under 800 ADT design year - minimum 24 feet face to face of curbs,
    * over 800 ADT design year - width of approach pavement measured face to face of curbs,
    * where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face curbs, and in crown drop; the distance from face of curb to face of parapet or rail shall be a minimum of 1.5 feet, or greater if sidewalks are required.

The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

- shoulder section approach - width of approach pavement plus width of usable shoulders on the approach left and right. (shoulder width 8 feet minimum, 10 feet desirable)
- curb and gutter approach - width of approach pavement measured face to face of curbs.

Appendix E
Planning Area Housing and Employment Data

Zone	1999 Employment	2030 Employment	1999 Housing	2030 Housing
1	1	1	22	58
2	15	15	36	54
3	3	3	50	69
4	2	57	52	126
5	2	2	3	3
6	3	3	44	44
7	4	4	33	33
8	35	41	21	21
9	4	4	50	50
10	28	28	24	24
11	2	2	59	59
12	20	20	14	14
13	3	3	67	67
14	27	33	38	111
15	2	20	14	87
16	17	17	16	52
17	25	25	16	52
18	2	2	9	9
19	1	157	150	150
20	0	0	3	23
21	1	1	20	40
22	0	0	16	68
23	5	5	30	55
24	15	15	27	47
25	58	76	25	25
26	53	60	72	129
27	4	4	3	3
28	82	332	45	45
29	9	9	29	29
30	66	66	11	11
31	2	2	17	17
32	89	100	22	54
33	55	101	9	9
34	48	93	51	51
35	3	17	22	22

Appendix E (Continued)
Planning Area Housing and Employment Data

Zone	1999 Employment	2030 Employment	1999 Housing	2030 Housing
36	0	15	62	62
37	0	0	35	35
38	300	550	4	19
39	42	53	6	6
40	0	0	33	33
41	378	378	15	15
42	8	8	47	47
43	0	0	58	73
44	0	0	26	26
45	2	2	56	71
46	80	80	21	67
47	0	10	3	3
48	1	1	37	69
49	0	0	24	56
50	0	0	20	20
51	2	2	16	16
52	7	7	4	4
53	64	69	22	22
54	10	17	118	118

Appendix F
Pedestrian Policy Guidelines

These guidelines provide a procedure for implementing the Pedestrian Policy adopted by the Board of Transportation in August 1993. The pedestrian Policy addresses TIP projects and makes an important distinction between "considering the needs of pedestrians to avoid creating hazards to pedestrian movements" and the concept of "facilitating pedestrian movements for other reasons."

Hazards

A hazard in this context is defined as a situation when pedestrian movements are physically blocked in a manner which forces pedestrians to use another mode of transportation or walk in an automobile traffic lane (parallel with the automobile traffic) to pass a barrier. The concept of "not creating a hazard" is intended to allow municipalities to have the flexibility to add pedestrian facilities as part of the project, or in the future after the TIP project is complete. Our current standard cross sections generally do not create barriers for pedestrian movements. One exception is on urban bridges where the bridge rail is at the back of the curb.

Quantifying the need for Pedestrian Facilities

Planning studies should evaluate the need for pedestrian facilities based on the degree to which the following criteria are met.

1. Local Pedestrian Policy
2. Local Government Commitment
3. Continuity and Integration
4. Locations
5. Generators
6. Safety
7. Existing or Projected Pedestrian Traffic

Requirements for DOT Funding

Replacing Existing Sidewalks

The DOT will pay 100% of the cost to replace an existing sidewalk that is removed to make room for a widening project.

Preventing Hazards

If there is evidence that a TIP project would create a hazard to existing pedestrian movements, the DOT will take the initiative not to create the hazard. However, if there is not evidence that a TIP project would create a hazard to existing pedestrian movements, the municipality will need to prove that there will be pedestrian movements, which would be affected within five years by the hazard created by the TIP project.

Incidental Projects

Due to the technical difficulty of describing justification for pedestrian facilities, the committee chose a cost sharing approach to provide cost containment for the pedestrian facilities. The DOT may share the incremental cost of constructing the pedestrian facilities if the "intent of the criteria" is met. The DOT will pay a matching share of incidental pedestrian facility total construction costs up to a cap of no more than 2% of total project construction cost. The matching share is a sliding scale based on population as follows:

Table F-1

Incidental Projects Cost Participation Break Down

Municipal Population	Participation	
	DOT	Local
> 100,000	50%	50%
50,000 to 100,000	60%	40%
10,000 to 50,000	70%	30%
< 10,000	80%	20%

Funding Caps

Under normal circumstances, the cumulative funding for preventing hazards and providing incidental pedestrian facilities should not exceed 2% of the total project construction cost.

Independent Projects

The DOT will have a separate category of money for all independent pedestrian facility projects in North Carolina. The independent pedestrian facility funds will be administered similar to the Bicycle Program.

Right-of-Way

In general, municipalities are responsible for providing any right-of-way needed to construct pedestrian facilities. However, the 8-foot berm the DOT generally provides on urban curb and gutter facilities can accommodate pedestrian facilities.

Maintenance

Local governments will be responsible for maintaining all pedestrian facilities.

For further information about the Pedestrian Policy Guidelines please contact the following:

Statewide Planning Branch
NC Department of Transportation
1554 Mail Service Center
Raleigh, NC 27699
(919) 733-4705

Appendix G

Transportation Improvement Program Project Process

The process for requesting projects to be included in the Transportation Improvement Program (TIP) is described briefly in this appendix.

The local representatives should first decide which projects from the thoroughfare plan they would like funded in the TIP. A TIP request for a few carefully selected projects is likely to be more effective than requesting all the projects proposed in the thoroughfare plan. These projects should be prioritized by the local representatives and summarized briefly, as shown on Appendix Page G-3.

After determining which projects are the highest priority for the area, a TIP project request should be sent to the Board of Transportation Member from the municipality's or county's respective district. The TIP project request should include a letter with a prioritized summary of requested projects, as well as a TIP candidate project request form and a project location map for each project. An example of each of these items is included in this appendix.

Example

* *Note: This is not an official request submitted to the Board of Transportation. This is intended to be an example of a Transportation Improvement Program (TIP) Request.*

Month ##, Year

North Carolina Board Member
N. C. Board of Transportation
N. C. Department of Transportation
P. O. Box 25201
Raleigh, NC 27611-5201

Dear Board Member:

SUBJECT: 2002-2008 TIP Project Requests for *Generic Town*

Enclosed find the projects requested by *Generic Town* for consideration in the next TIP update. The list is presented by priority, as approved by the *Generic Town* Council at their *Month* meeting.

Generic Town also endorsed the existing schedule of projects contained in the current TIP for the city, with one request. The City requests that TIP Project R-*XXXX* remain as a high priority and kept on the existing schedule.

We thank you for the opportunity to participate in development of the State TIP. Please contact us immediately if additional information is needed concerning any of the enclosed project requests.

Sincerely,

John Q. Public

cc: Division Engineer
Enclosure

Generic Town
Town Council
2001 Proposed Highway Projects (Final)

1) **SR 1111 (Town Street) & SR 1112 (Industry Drive) TIP Project R-XXXX**
   - From SR 1113 (Country Road) to NC 11
   - Widen roadway to a multilane facility, with some new location

2) **US 11**
   - From SR 1112 (Industry Drive) to SR 1113 (Country Road)
   - Widen roadway to a multilane facility

3) **NC 11**
   - From SR 1114 (Any Road) to the existing four lane section just south of I-85
   - Widen roadway to a multilane facility

4) **US 11 Business (Business Road)**
   - From SR 1115 (Some Road) to NC 12
   - Widen facility to a five lane cross section

5) **New Connector**
   - From US 11 to US 112 Business (City Street)
   - New Facility

Highway Program
TIP Candidate Project Request

(Please Provide Information if Available)

Date *##/##/##* Priority No. *#*

County *Generic* City/Town *Generic*

Requesting Agency *Generic Town Council* NCTIP No. *R-####* (if available)

Route (US, NC, SR/Local Name) *SR 1111(Town Street) and SR 1112(Industry Drive)*

Project Location (From/To/Length) *From SR 1113 (Country Road) to NC 11, #.# miles*

Type of Project (Widening, New Facility, Bridge Replacement, Signing, Safety, Rail Crossing, Bicycle, Enhancement, etc.)
Widen roadway to a multi-lane facility, with some new location.

Existing Cross Section *24* Feet, Type

Existing Row *60 to 80* Feet Existing ADT *8,000 (1997)*

Estimated Cost, ROW $ *900,000* Construction $ *4,000,000*

Brief Justification for Project *As a major thoroughfare, this facility carries increasing traffic volumes between the industial sites along this route to NC 11 and the I-85 corridor. In the adopted thoroughfare plan for Generic Town, it is recommended that this facility should be widened to a multi-lane cross section due to the increasing volume and the potential for more development in this area. The Town requests that this project continue to be funded.*

Project Supported By (Agency/Group)

Other Information/ Justification

- ☒ Part of Thoroughfare Plan
- ☐ Part of Comprehensive Plan
- ☐ Serves School
- ☐ Serves Hospital
- ☐ Obsolete Facility
- ☐ Serves Park
- ☐ High Accident (#)
- ☐

(Please Attach Map Showing Project Location)