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SR 365 Corridor Study
Final Report

March 20, 2009

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Final Report

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Georgia Department of Transportation

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1. Executive Summary

The purpose of the Georgia State Route (SR) 365 corridor study is to:

- Analyze existing transportation conditions and operations and limited-access potential of the corridor
- Assess the future transportation needs of the corridor
- Identify and prioritize projects in the study area that address safety and congestion, enhance mobility, and promote economic development

The SR 365 corridor study area includes the southernmost 23 miles of the corridor extending from Jesse Jewell Parkway (SR 369) in Hall County to Demorest – Mount Airy Highway in Habersham County. The portion of SR 365 included in the study area is a four-lane, median-divided rural highway.

The study team relied on observable facts and measurable objectives related to existing and future traffic conditions, safety, land use, environmental conditions, and demographics to assess existing conditions and future travel demands and to develop a strategic implementation plan. Public, stakeholder, and agency involvement was conducted to assist the study team in identifying and incorporating the issues, needs, concerns, and desires of these groups into the study.

Forecasting future transportation needs was a vital part of the study. To identify these needs, economic development, measured in terms of population and employment, was converted into vehicle trips and travel patterns. Population and total employment growth estimates were developed based on recent trends as reported in Georgia Department of Community Affairs data files. A future year planning horizon of 2030 was used to forecast demographic data and travel patterns. A base year of 2005 was used to benchmark the differences between current and future year 2030 travel patterns. Study findings and recommendations are summarized below.

1.1 Summary of Findings

From 2005 to 2030, the population of Hall and Habersham counties is projected to almost triple, increasing from 195,300 persons in 2005 to 577,090 persons in 2030. The rate of projected change in total employment is even higher. Base year 2005

employment is expected to increase by more than 3.5 times, rising from 81,400 workers to 307,048 workers by 2030.

The net impact of forecasted population and employment growth on SR 365 traffic volumes is significant. Based on future year 2030 traffic volumes, operating conditions on SR 365 south from Lula to Gainesville will be unsatisfactory and approaching gridlock conditions. A level of service (LOS) grade of F for failure is predicted. North of Lula, LOS grades computed for the year 2030 are also unsatisfactory but do not show as much deterioration in traffic flow in comparison with sections south of Lula.

Safety is also a vital concern when assessing the transportation needs of the corridor. The study team analyzed historical crash data to determine how the SR 365 crash experience compared with comparable highway facilities located throughout Georgia. Using a crash rate analysis, the overall crash rate for SR 365 in number of accidents per 100 million vehicle miles traveled was approximately the same as the statewide average. The portion of the corridor from the Hall County line to Crane Mill Road in Habersham County was identified by the study team as the most critical section in the corridor in terms of safety based on the number of fatal accidents, the severity ratio, and the total accident rate. During the public involvement process, study team members were also informed that an unusually high incidence of injury and fatal crashes had occurred at the intersection of SR 365 at Demorest – Mount Airy Highway since 2003.

Another important consideration when assessing the safety and future transportation needs of a corridor is the number of at-grade access points. At-grade intersections and driveways increase the number of potential vehicle conflict points, which reduce mobility, capacity, and safety in any corridor. There are currently 108 access points in the study corridor, of which 49 percent are driveways, 44 percent are at-grade intersections, and 7 percent are at interchanges. The Georgia Department of Transportation (DOT) is being solicited by property owners and local governments for new driveway and cross-street access points onto and off of SR 365 as a consequence of developments adjacent to SR 365 and overall growth in and near the corridor.

Safety and access also surfaced as the most important factors for the general public and technical advisory committee during the public involvement process. However, the definition of “appropriate access” varied. Some people participating in the public meetings believed that appropriate access meant direct or nearly direct access on and off of SR 365. Others believed that appropriate access meant that cross streets and driveways intersecting with SR 365 at grade should be spaced over long distances. The final determination of the study team was that the number of driveways and cross

streets providing access will need to be limited to enhance corridor operations and improve safety in the study area.

1.2 Recommendations

The long-range recommendation is to reconstruct SR 365 into a six-lane, limited-access freeway with frontage roads and/or local roads to connect users with intersecting cross streets. The new freeway would extend over the length of the study corridor from Jesse Jewell Parkway in Gainesville to Demorest – Mount Airy Highway at the northern end of the study corridor. Frontage roads are an integral component of the plan's recommendations because properties located between interchanges and alongside the freeway's alignment need reasonable vehicle access. A list of existing cross streets that would be redesigned to provide grade-separated access onto and off of SR 365 is listed below by county.

Cross Street (Hall County)	Cross Street (Habersham County)
Jesse Jewell Parkway	Alto Mud Creek Road
White Sulphur Road	Duncan Bridge/SR 384
Whitehall/Bill Minor	Level Grove Road
SR 52	U.S. 441 Bypass
Belton Bridge Road	Cannon Bridge Road/SR 105
Mud Creek Road	Demorest – Mount Airy Highway

With a total estimated projected cost of $700 million and 23 miles of proposed improvements, the recommended improvements should be split into several projects. SR 365 can be subdivided into three primary sections for construction phasing with further subdivisions if necessary. These primary sections are:

Phase I: Jesse Jewell Parkway – Belton Bridge Road in Hall County (9.5 miles)
Phase II: Level Grove Road – Demorest – Mount Airy Highway in Habersham County (4.5 miles)
Phase III: Belton Bridge Road – Level Grove Road in Hall and Habersham Counties (9.0 miles)

In addition, an access management program is recommended in the corridor. Access management should be an ongoing transportation and land use planning program conducted by local governments in cooperation with Georgia DOT. The success of immediate and ongoing access management will directly impact the ultimate cost of corridor modifications and, therefore, will impact the length of time before the corridor upgrades can be completed.

Based on existing and future projected traffic volumes, only the section of SR 365 between Jesse Jewell Parkway and SR 52 in Hall County has an immediate need for widening. Therefore, the entire corridor should be upgraded to a limited-access facility first and widened to provide additional lanes at a later phase. North of SR 52, the build-out from a four-lane arterial to a six-lane, limited-access freeway could also be delayed as necessary. However, to preserve satisfactory service levels and limit the number of conflict points north of SR 52, steady progress will need to be made on acquiring rights-of-way and access rights. Access management program strategies will also need to be implemented.

2. Introduction

2.1 Background

The State Route (SR) 365 study area passes through parts of Hall and Habersham counties. Throughout the 1990s and early 2000s, both population and employment increased substantially in both counties. Population and employment growth in Hall County has been driven by Gainesville's status as a regional center for northeast Georgia and the growth of metro Atlanta northward up I-985. Habersham County's scenic beauty, rural ambiance, and mild climate are contributing factors to its population growth. SR 365 is also a factor because it provides access southward to metro Atlanta. Current growth trends are expected to continue, and population and employment are forecasted to increase in the future.

As a primary route to recreational opportunities in northern Georgia for people traveling from the metro Atlanta area and other points south, SR 365 serves substantial recreational travel. As evidence of this, SR 365 routinely experiences higher daily traffic volumes on Saturday than on an average weekday. However, the corridor also provides access for local and regional travel needs. These functions are somewhat contradictory. For example, for a corridor to serve the local trip function, it must provide a relatively high level of local access, while a corridor serving as a principal arterial must provide higher speeds for longer-distance trips, typically at the expense of additional local access.

The SR 365 corridor begins where I-985 ends at SR 369/Jesse Jewell Parkway in Gainesville. The corridor continues to Demorest – Mount Airy Highway just beyond U.S. 441, east of the City of Demorest. SR 365 serves as many as 31,000 vehicles per day (vpd) in the southern portion of the study corridor. These data indicate that the corridor is near design capacity and suggests that strategies to increase capacity are warranted.

2.2 Purpose

The purpose of the SR 365 corridor study is to analyze existing transportation conditions, operations, and limited-access potential and to assess the future transportation needs of the SR 365 corridor. This comprehensive study will result in the identification and prioritization of projects along the SR 365 corridor to address safety, congestion, mobility enhancement, and the economic development potential of the corridor through the proactive use of community involvement and technical analysis.

An analysis of travel safety is equally important and directly related to access management because access limitation strategies can improve corridor safety. In comparing strategies, the relative safety of each strategy must be assessed based not only on current travel, but also on future anticipated travel.

2.3 Approach

The study approach for the SR 365 corridor study includes both technical and non-technical elements to identify and implement realistic transportation solutions. Technical elements of the approach rely on observable facts and measurable objectives related to existing and future traffic conditions, safety, land use, environmental conditions, and demographics. Non-technical elements used in this approach rely on public, stakeholder, and agency involvement to include the issues, needs, concerns, and desires of these groups. Although feedback from public involvement is used throughout the study, specific involvement efforts are detailed in Appendix A of this report.

2.4 Report Outline

The report is broken into the following sections:

- Existing Conditions Analysis – This section includes an overview of current roadway network, bridge, traffic, and crash data, as well as current and future corridor land use, demographic data, and environmental/cultural features. Additionally, the section contains a review of previously conducted plans in the counties surrounding the study corridor. These findings serve as a baseline for assessing possible transportation improvements in the study area.

- Assessment of Future Travel Demands – This section provides an assessment of future travel needs. Future travel demand is based on population and employment projections for the model area.

- Corridor Expansion Scenarios – This section describes each potential scenario analyzed. The analysis includes a summary of how well each scenario performs relative to study goals and objectives.

- Strategic Improvement Plan – This section includes a summary of recommended actions and scheduling, prioritization, engineering, and policy considerations.

3. Existing Conditions Analysis

This section contains descriptions of the existing conditions in the SR 365 study corridor. Existing conditions are important because they allow for the identification of current challenges and opportunities and they create a baseline against which to compare future projections, stakeholder input, and potential improvement scenarios. This section provides the existing conditions for a variety of features of the SR 365 corridor, including roadway network, traffic, level of service (LOS), safety, land use, physical environment, and socioeconomic data. It also summarizes current stakeholder input and previous studies conducted along the corridor. Various data sources are used to describe the existing conditions, including Census data, field observations, Georgia Department of Transportation (DOT) road network and safety data, and county comprehensive plans.

3.1 Roadway Network Conditions

Existing roads in the study area can be classified by area type and the transportation function they serve in terms of mobility and accessibility. Their functional classification is important for analyzing existing and future travel demand and LOS because acceptable LOS typically varies by area type and classification. Additionally, functional classification provides guidance for right-of-way needs, design standards, and design speeds. Appendix B provides definitions of standard roadway classifications.

3.1.1 Functional Classification

Roadways intersecting SR 365 in the study corridor are functionally classified as collector and arterial facilities. The primary purpose or function of collector facilities is to provide access to property. Their secondary role is to provide connectivity to the arterial road system. In contrast, the primary function of arterial roads is to provide motorists with a facility that enables them to travel from one place to another.

Roadway area types are mostly classified as rural. However, the southernmost section of SR 365 straddles the Gainesville urban area where it interchanges with Jesse Jewell Parkway.

Figure 1 identifies the functional classification network for the SR 365 study corridor. SR 365 is classified as an urban principal arterial from Jesse Jewell Parkway to White Sulphur Road in Hall County. North of White Sulphur Road, SR 365 is classified as a rural principal arterial.

A summary of the functional classifications of key roadways intersecting with SR 365 is depicted in Table 1 below. Roads classified as arterials include Jesse Jewell Parkway, SR 52, U.S. 441 Bypass, and U.S. 441. Intersecting local roads are not included.

Table 1 Functional Classification of Intersecting State Routes

Functional Classification	No. of Intersecting Routes	Percent of Intersecting Routes
Urban Minor Arterial	1	7
Urban Principal Arterial	1	7
Rural Principal Arterial	1	7
Rural Minor Arterial	2	14
Rural Major Collector	6	43
Rural Minor Collector	3	22
Total	14	100

Source: Georgia DOT Functional Classification Maps, Lumpkin, Dawson, and Forsyth Counties

3.1.2 Corridor Access

Inclusive of the study corridor boundaries, SR 365 has 108 total access points. Of these, 53 (49 percent) are driveways, 47 (44 percent) are at roads, and eight (7 percent) are at interchanges. Roads and interchanges that provide access to/from both sides of SR 365 count as two points of access. Table 2 presents the number of access points to and from SR 365 by type and county jurisdiction. Figure 2 displays the location of driveway and road access points to SR 365.

Table 2 Access Points by Type and County

	Access Type			
County	Driveway	Road	Interchange	Total
Hall	39	23	2	64
Habersham	14	24	6	44
Total	53	47	8	108

Source: Field surveys (2006)

3.1.3 Pavement Condition

Georgia DOT updates and maintains its Pavement Condition Evaluation System, which provides an objective score with a maximum value of 100 based on quality of roadway pavement. Roadways scoring below 70 are evaluated to determine preservation action (e.g., resurfacing or rehabilitation). The entire portion of SR 365 in Hall County has an average pavement rating below 70. However, because these data were provided by Georgia DOT as an average at the county level, it is not possible to determine if any specific segments of SR 365 in Hall County have a rating above 70.

3.1.4 Bridge Conditions

Bridge sufficiency ratings of bridges in the corridor were identified to assess the status of existing bridge infrastructure. Deficient bridges are defined as those with a sufficiency rating less than or equal to 50 based on bridge condition reports provided by Georgia DOT. Because of load limits, deficient bridges in a corridor are obstacles that restrict traffic flow and commercial shipments.

With proper maintenance, any structure with a sufficiency rating above 75 should maintain an acceptable rating for the next 20 years. Bridges with a rating between 65 and 75 may or may not keep an acceptable rating over the next 20 years. Structures with a rating lower than 65 will likely require major rehabilitation or reconstruction during the next 20 years. Georgia DOT's sufficiency ratings for bridges on SR 365 are presented in Table 3.

Table 3 Bridge Sufficiency Ratings

Bridge No.	Structure ID	Description	Sufficiency Rating
1	137-0041-0	SR 365 at Business U.S. 41	91.82
2	137-0005-0	SR 365 at Old Cleveland Road	97.95
3	137-0001-0	SR 365 at Level Grove Road	99.00
4	137-0029-0	SR 365 Northbound at A Wilbanks Road	98.52
5	137-0028-0	SR 365 Southbound at A Wilbanks Road	98.52
6	137-0053-0	SR 365 at Minor Stream North of Alto Mud Creek Road	95.90
7	139-0053-0	SR 365 Northbound at Norfolk Southern Railway	93.61
8	139-0054-0	SR 365 Southbound at Norfolk Southern Railway	93.61

Source: Georgia DOT

Sufficiency ratings of bridges on SR 365 in the study corridor range from 91.82 to 99.00. Therefore, it is anticipated that existing bridges in the corridor will maintain an acceptable rating over the next 20 years.

3.2 Traffic Conditions

Current traffic conditions in the study corridor provide an understanding of how the existing transportation system operates and a baseline against which to compare potential improvements. The following information describes the methodology used in the analysis, discusses traffic conditions in the study corridor, and details key findings. This section contains detailed tables, including average annual daily traffic volumes, intersection turning movement counts, a.m. and p.m. peak-hour delays for both signalized and unsignalized intersections, travel times between points on the study corridor, and speeds by segment of the study corridor.

3.2.1 Methodology

Traffic volume data were gathered at 18 intersections from Jesse Jewell Parkway to Demorest – Mount Airy Highway along SR 365. Intersection volumes were recorded by turning movements for two-hour a.m. and p.m. peak periods at each intersection. In addition, 24-hour traffic volume counts were gathered at 14 locations along the study corridor and intersecting roadways (a list of these locations is provided in Appendix C). Vehicle classification counts that split total traffic into separate passenger car and truck volumes were also recorded at two of the 24-hour traffic volume count locations. Additional information gathered in the field consisted of the number of lanes (midblock), intersection turn-lane configurations, speed limits, and traffic signal phasing. This information was used to quantify the existing LOS provided on SR 365.

Traffic count, traffic signal, and geometric data are used in combination with existing demographic data, roadway network files, and household travel behavior characteristics to create a travel demand model with boundaries that are broader than those of the SR 365 corridor study area. Because Georgia DOT conducted a concurrent study of the SR 400 corridor, which is approximately 15 miles west and parallel to the SR 365 corridor, the travel demand model area was designed to include both facilities. A brief description of the travel demand model is included later in this report, and a full description of its development is presented in a separate technical memorandum titled “SR 400 and SR 365 Travel Demand Model.” While the model was built and validated using existing data, its real value in the SR 400 and SR 365 corridor studies was its ability to evaluate future traffic conditions that would result from testing assumed transportation improvement scenarios.

The cross-sectional design of SR 365 over the 23.1-mile study corridor is generally homogeneous. From Jesse Jewell Parkway outside of Gainesville to Demorest – Mount Airy Highway in Habersham County, SR 365's design includes the following cross-sectional characteristics:

- Two through lanes in each direction of travel
- A flush, grassy median approximately 60 feet wide
- A paved, 10-foot shoulder adjacent to outside travel lanes
- No shoulder adjacent to inside travel lanes

The topography is generally defined by rolling hills, and travel speeds average between 60 miles per hour (mph) and 65 mph between signalized intersections. Two sections of SR 365 in the study area are built to freeway standards with grade-separated access. At the southern end of the corridor, SR 365 in Hall County operates as a freeway for approximately 0.5 mile north of Jesse Jewell Parkway. The remaining sections of SR 365 in Hall County (nearly 13 miles) are not currently under controlled access. Farther north in Habersham County, approximately 2.5 miles of SR 365 are built to freeway standard. Intersecting cross streets are grade-separated at Level Grove Road, U.S. 441 Bypass, and Cannon Bridge Road/SR 105 along the western edge of the City of Cornelia.

Peak-hour traffic conditions for a typical weekday were benchmarked using LOS grades that were computed by means of a traffic simulation analysis. A CORSIM microsimulation model was selected as the analysis tool to evaluate peak traffic operations. CORSIM is one of the traffic analysis programs in the Traffic Software Integrated System Version 5.1 suite of analysis tools. It was developed by the U.S. Federal Highway Administration (FHWA) to evaluate the relative effectiveness of different transportation system improvements. Traffic flow was analyzed for a.m. and p.m. peak-hour conditions, resulting in the determination of existing peak-hour delays and corresponding LOS. Speed and travel time measurements for the corridor were additional measures obtained from the simulation model. These results were used as benchmarks for comparisons with future traffic conditions under various improvement scenarios.

3.2.2 Average Daily Traffic Volumes

Two-way, 24-hour traffic volumes on SR 365 vary from a high of 31,000 vpd on two sections south of White Sulphur Road in Hall County to a low of approximately 18,000 vpd north of Cannon Bridge Road/SR 105 in Habersham County. These daily volumes represent typical weekday traffic conditions. They do not factor spikes produced by recreational travel oriented to and from north Georgia and North Carolina on the weekends.

In Hall County, traffic volumes on SR 365 peak on the southernmost sections between Jesse Jewell Parkway and SR 52. North of SR 52 and Lula in Hall County, traffic drops significantly until reaching the Alto area of Habersham County. In Habersham County, daily traffic on SR 365 peaks at 29,500 vpd between the U.S. 441 Bypass and Cannon Bridge Road/SR 105. There is a lesser peak on the section of SR 365 located just north of the City of Alto between Alto Mud Creek Road and SR 384. Average daily traffic (ADT) exceeds 25,000 vpd at this spot. North of Cannon Bridge Road/SR 105 and south of Alto Mud Creek Road, however, traffic volumes fall.

There were other vital traffic characteristics measured by the study team on SR 365. Trucks comprise a significant portion of daily traffic but account for a relatively small share of traffic in the peak hour and peak direction of travel. Approximately 10 percent of daily vehicles, varying slightly by location, were identified as trucks. In this case, trucks are defined to include single-unit delivery trucks, buses, and tractor-trailer combinations. Trucks did not include sport utility vehicles, pick-ups, and vans. In the peak hour and peak direction of travel, approximately 5 percent of total traffic was classified as trucks.

During the a.m. peak hour, the peak direction of travel was southbound from Demorest – Mount Airy Highway to Jesse Jewell Parkway. On typical weekdays, a.m. peak-hour traffic in the SR 365 corridor was predominantly oriented toward Gainesville and southern Hall County. A lesser but notable group of work places in the Clarksville-Demorest-Cornelia area also draws commuters, but this attraction is not as powerful as the pull from work places in Gainesville and southern Hall County.

During the p.m. peak hour, the peak direction of travel was northbound on all sections of SR 365 through the study area. Traffic peaking is more pronounced on sections of SR 365 in Hall County than on sections in Habersham County. Just south of SR 52 in Hall County, the computed percent of daily two-way traffic occurring during the peak hour was 9.3 percent. In Habersham County north of SR 384, the percent of daily two-way traffic in the peak hour was 8.5 percent. Directionally, 70 percent of traffic

traveled in the peak direction at the count station south of SR 52 in Hall County. At the count station north of SR 384 in Habersham County, the directional split was only 60 percent.

3.2.3 Peak-Hour Traffic Volumes

Existing peak hour traffic volumes were collected and are presented by segment and intersection. Traffic volumes are used in identifying potential issues and determining LOS along a facility or at intersections.

3.2.3.1 Freeway Segments

Table 4 displays traffic volumes in the peak travel direction on 16 segments of SR 365. As expected, traffic volumes are highest at the southern end of the corridor where the majority of commute trips end in the morning and begin in the evening. Traffic volumes also tend to decrease incrementally at each intersection moving from south to north. However, two exceptions to this pattern occur. Traffic volumes increase during both a.m. and p.m. peak periods on the segment between Alto Mud Creek Road and Duncan Bridge/SR 384 and the segment between U.S. 441 and SR 105.

Table 4 Peak-Hour Directional Volumes on SR 365

Segment		A.M.		P.M.	
Cross Street 1	**Cross Street 2**	**Peak-Hour Traffic Volume**	**Peak Dir. of Travel**	**Peak-Hour Traffic Volume**	**Peak Dir. of Travel**
Hall County					
Jesse Jewell Parkway	Ramsey Road	1,974	Southbound	1,785	Northbound
Ramsey Road	White Sulphur	1,800	Southbound	1,662	Northbound
White Sulphur Road	Whitehall/Bill Minor	1,849	Southbound	1,995	Northbound
Whitehall/Bill Minor	Cagle Road	1,845	Southbound	1,955	Northbound
Cagle Road	SR 52	1,739	Southbound	1,762	Northbound
SR 52	Athens Street	1,502	Southbound	1,700	Northbound
Athens Street	Belton Bridge Road	1,294	Southbound	1,349	Northbound
Belton Bridge Road	Habersham County	1,232	Southbound	1,274	Northbound
Habersham County					
Hall County	Crane Mill Road	1,112	Southbound	1,195	Northbound
Crane Mill Road	Mt. Zion Road	1,053	Southbound	1,179	Northbound
Mt. Zion Road	Alto Mud Creek Road	1,134	Southbound	1,185	Northbound
Alto Mud Creek Road	Duncan Bridge/ SR 384	1,424	Southbound	1,443	Northbound
Duncan Bridge/ SR 384	Level Grove Road	1,188	Southbound	1,147	Northbound
Level Grove Road	U.S. 441	1,028	Southbound	984	Northbound
U.S. 441	SR 105	1,324	Southbound	1,124	Northbound
SR 105	Demorest – Mount Airy Highway	1,024	Southbound	1,113	Northbound

Source: Field data collection (2006)

3.2.3.2 Intersections

Based on the number of vehicles entering an intersection, the intersection with the highest volume in the SR 365 corridor was SR 365 at Ramsey Road in Hall County. At this intersection, 2,919 vehicles were counted during the p.m. peak hour. The second-highest volume was observed at SR 365 at SR 52, where 2,900 vehicles

entered the intersection during the p.m. peak hour. Total entering volumes at all SR 365 intersections are dominated by traffic on SR 365. More than 90 percent of total traffic entering the Ramsey Road intersection came from SR 365. At the SR 52 intersection, 86 percent of total traffic enters the intersection from the SR 365 approaches. A.m. and p.m. peak-hour intersection volumes in the SR 365 corridor are displayed in Table 5.

Peak-hour traffic volumes are generally proportional to daily volumes. In light of where the highest daily traffic volumes occur on SR 365, it follows that the intersections with the highest volumes would be located between Jesse Jewell Parkway and SR 52 in Hall County. Overall, more traffic was counted in the p.m. peak hour than during the a.m. peak hour, which is expected. Approximately 11 percent more traffic was observed during the p.m. peak hour.

Table 5 Peak-Hour Intersection Volumes

No.	Intersection	A.M.	P.M.
	SR 365 at Jesse Jewell Parkway (northbound ramps)	2,323	2,365
	SR 365 at Jesse Jewell Parkway (southbound ramps)	2,847	2,564
	SR 365 at Ramsey Road	2,820	2,919
	SR 365 at White Sulphur Road	2,631	2,642
	SR 365 at Whitehall/Bill Minor	2,579	2,856
	SR 365 at Cagle Road	2,533	2,782
	SR 365 at SR 52	2,674	2,900
	SR 365 at Athens Street	2,241	2,489
	SR 365 at Belton Bridge Road	2,033	2,141
	SR 365 at Crane Mill Road	1,861	2,034
	SR 365 at Mt. Zion Road	1,779	1,979
	SR 365 at Alto Mud Creek Road	2,030	2,115
	SR 365 at Duncan Bridge/SR 384	2,396	2,649
	SR 365 at Level Grove Road (northbound ramps)	612	872
	SR 365 at Level Grove Road (southbound ramps)	504	664
	SR 365 at Cannon Bridge Road/SR 105 (northbound ramps)	1,156	2,042
	SR 365 at Cannon Bridge Road/SR 105 (southbound ramps)	1,395	2,288
	SR 365 at Demorest – Mount Airy Highway	1,909	2,148
	Total	36,323	40,449

Source: Field data collection (2006)

Not all peak-hour volumes listed in the table reflect the full measure of traffic on SR 365. Six of the 18 intersections listed above correspond to freeway ramp termini at interchanges. Through travel movements on SR 365 are not reflected in these totals because motorists traveling through an interchange stay on the mainline. Cross-street traffic, therefore, comprises a much larger share of total entering traffic at grade-separated intersections than at other SR 365 intersections. Grade-separated intersections are located at Jesse Jewell Parkway, Level Grove Road, and Cannon Bridge Road/SR 105.

3.2.4 Level of Service

LOS analysis is commonly used in transportation planning to identify existing and predicted future operational deficiencies in the transportation network. Currently, Georgia DOT policy is to provide LOS C (or better) operating conditions statewide.

3.2.4.1 Freeway Segments

Operating conditions on SR 365's segments were evaluated using LOS grades for basic freeway segments even though SR 365 is functionally classified as a multilane, rural principal arterial throughout most of the study area. The basic freeway segment LOS methodology was employed because the current cross-sectional design, design speed, and accessibility characteristics are more similar to a freeway than to a multilane, rural principal arterial facility.

LOS grade descriptions for basic freeway segments are provided in Table 6. Grades range from A through F with LOS A representing the best conditions and LOS F representing the worst conditions. Sustained grades of LOS D, LOS E, and LOS F are not desirable.

Table 6 LOS Grade Descriptions for Basic Freeway Segments

Grade	Description
A	Completely free-flow conditions. Operation of motor vehicles is virtually unaffected by the presence of other vehicles. Drivers are constrained only by the geometric features of the highway and his/her personal driving preferences. Minor disruptions to traffic flow are easily absorbed without a change in travel speed. Vehicles are spaced at an average of 465 feet, and the maximum density does not exceed 10 passenger cars per mile per lane.
B	Free-flow conditions, but the presence of other vehicles begins to be noticeable. Average travel speeds should still be the same as LOS A, but drivers have slightly less room to maneuver. Minor disruptions to traffic flow are still easily absorbed without a change in travel speed. Nevertheless, there could be some brief, localized deterioration in flow. Vehicles are spaced at an average of 260 feet, and the maximum density does not exceed 16 passenger cars per mile per lane.
C	Represents a range of driving conditions where the influence of traffic density becomes very noticeable. Average travel speeds begin showing some reduction. Drivers' ability to maneuver is clearly affected by the presence of other vehicles. Minor disruptions can be expected to cause queuing and serious, localized deterioration in traffic flow. Vehicles are spaced at an average of 192 feet, and the maximum density does not exceed 24 passenger cars per mile per lane.
D	Represents a range of driving conditions where the ability to maneuver is severely restricted because of traffic congestion. Average travel speeds are reduced because of increased volumes. Only minor disruptions can be absorbed without the formation of extensive queuing and deteriorating traffic flow. Vehicles are spaced at an average of 156 feet, and the maximum density does not exceed 32 passenger cars per mile per lane.
E	Represents driving conditions at or near capacity and is quite unstable. Vehicles can operate with minimum spacing at which uniform flow can be maintained. Disruptions cannot be damped or readily dissipated. Disruptions will likely cause queues to form and service to deteriorate to LOS F. On most multilane highways with free-flow travel speeds between 45 mph and 60 mph, passenger car mean speeds at capacity range from 41 mph to 53 mph. They are highly variable and unpredictable within that range.
F	Represents forced or breakdown flow. Occurs either at a point where vehicles arrive at a rate greater than the rate at which they are discharged or at a point on a planned facility where forecasted demand exceeds computed capacity. Although operations at such points and on sections immediately downstream will appear to be at capacity, queues will form behind these breakdowns. Operations within queues are highly unstable with vehicles experiencing brief periods of movement followed by stoppages. Travel speeds within queues are generally less than 30 mph.

Source: Highway Capacity Manual 2000, Transportation Research Board

Approximately 3 miles of the SR 365 study corridor are built to freeway standards: 0.5 mile in Hall County and 2.5 miles in Habersham County. The methodology for computing LOS on SR 365's freeway sections is different than for those sections where at-grade intersections dictate the LOS. On freeway sections, traffic density, measured in vehicles per lane per mile (vehicles/lane/mile), is the factor that

determines LOS. A different traffic density formula is used on freeway sections where a ramp merge/diverge area is present than on basic segments, which are those sections of the freeway that link merge/diverge areas.

During a.m. and p.m. peak hours, all freeway sections on SR 365 operate at LOS C or better. Therefore, traffic conditions on freeway sections are currently satisfactory in regard to Georgia DOT's minimum LOS standard. Only one portion of SR 365 operates at LOS C. The basic freeway segment between Ramsey Road and Jesse Jewell Parkway operates at LOS C in the southbound direction of travel during the a.m. peak hour. A.m. and p.m. peak-hour travel densities in vehicles/lane/mile are presented in Table 7 with their corresponding LOS.

Table 7 A.M. and P.M. Freeway Section LOS (2005)

Segment		Direction Of Travel	Analysis Type	A.M.			P.M.		
Cross Street 1	Cross Street 2			Model Simulation Volume	Density (vehs/lane/mi.)	LOS	Model Simulation Volume	Density (vehs/lane/mi.)	LOS
Hall County									
Athens Highway/U.S. 129	Jesse Jewell Parkway	Northbound	Merge/Diverge	1,350	7.4	A	2,290	14.7	B
Jesse Jewell Parkway	Jesse Jewell Parkway	Northbound	Basic Segment	570	4.4	A	1,560	12.1	B
Jesse Jewell Parkway	Ramsey Road	Northbound	Merge/Diverge	800	6.6	A	1,950	15.6	B
Jesse Jewell Parkway	Ramsey Road	Northbound	Basic Segment	800	6.2	A	1,950	15.4	B
Ramsey Road	Jesse Jewell Parkway	Southbound	Basic Segment	1,870	18.7	C	910	8.4	A
Ramsey Road	Jesse Jewell Parkway	Southbound	Merge/Diverge	1,870	13.6	B	910	6.7	A
Jesse Jewell Parkway	Jesse Jewell Parkway	Southbound	Basic Segment	1,330	10.5	B	730	5.7	A
Jesse Jewell Parkway	Athens Highway/U.S. 129	Southbound	Merge/Diverge	1,670	13.5	B	940	7.4	A
Habersham County									
Duncan Bridge/SR 384	Level Grove Road	Northbound	Merge/Diverge	740	7.1	A	1,090	8.4	A
Level Grove Road	Level Grove Road	Northbound	Basic Segment	590	4.6	A	860	6.7	A
Level Grove Road	U.S. 441 Bypass	Northbound	Merge/Diverge	610	4.9	A	940	6.1	A
Level Grove Road	U.S. 441 Bypass	Northbound	Basic Segment	610	4.8	A	940	7.4	A
U.S. 441 Bypass	Cannon Bridge/SR 105	Northbound	Merge/Diverge	870	7.4	A	1,290	7.7	A
U.S. 441 Bypass	Cannon Bridge/SR 105	Northbound	Basic Segment	870	6.8	A	1,290	10.3	B
U.S. 441 Bypass	Cannon Bridge/ SR 105	Northbound	Merge/Diverge	870	6.8	A	1,290	8.4	A
Cannon Bridge/SR 105	Cannon Bridge/ SR 105	Northbound	Basic Segment	570	4.5	A	580	4.5	A
Cannon Bridge/SR 105	Demorest – Mount Airy Highway	Northbound	Merge/Diverge	670	5.4	A	750	4.9	A
Demorest – Mount Airy Highway	Cannon Bridge/SR 105	Southbound	Merge/Diverge	910	8.2	A	770	5.1	A
Cannon Bridge/SR 105	Cannon Bridge/SR 105	Southbound	Basic Segment	790	6.2	A	670	5.2	A
Cannon Bridge/SR 105	U.S. 441 Bypass	Southbound	Merge/Diverge	970	8.1	A	1,100	7.2	A
Cannon Bridge/SR 105	U.S. 441 Bypass	Southbound	Basic Segment	970	7.6	A	1,100	8.7	A
Cannon Bridge/SR 105	U.S. 441 Bypass	Southbound	Merge/Diverge	970	7.6	A	1,100	8.7	A
U.S. 441 Bypass	Level Grove Road	Southbound	Basic Segment	900	7.1	A	740	5.8	A
U.S. 441 Bypass	Level Grove Road	Southbound	Merge/Diverge	900	7.0	A	740	4.8	A
Level Grove Road	Level Grove Road	Southbound	Basic Segment	860	6.8	A	700	5.4	A
Level Grove Road	Duncan Bridge/SR 384	Southbound	Merge/Diverge	1,050	8.4	A	890	5.8	A

Source: CORSIM model

3.2.4.1.1 Corridor Travel Speeds

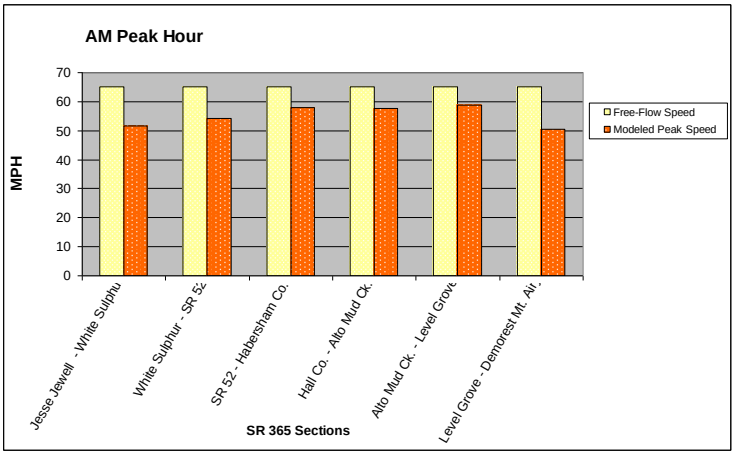
To gain a more comprehensive understanding of travel conditions in the study corridor, SR 365 was split into six sections to benchmark average peak-hour travel speeds in the peak direction of travel. Three sections were selected in each county. Sections were delineated using intersecting cross streets as follows:

Hall County	Habersham County
Jesse Jewell Parkway – White Sulphur Road	Hall County Line – Alto Mud Creek Road
White Sulphur Road – SR 52	Alto Mud Creek Road – Level Grove Road
SR 52 – Habersham County Line	Level Grove Road – Demorest – Mount Airy Highway

Despite several traffic signals and numerous cross streets and driveways, peak-period traffic moves through the study corridor with minimal delays in both directions of travel. Average travel speeds computed by the simulation model for the peak direction of travel are consistent with LOS grades, reflecting little delay beyond what would be expected from the presence of occasional signalized intersections. A comparative bar chart showing free-flow speeds alongside modeled a.m. peak-hour travel speeds is presented on Chart 1 for the southbound direction of travel.

During the a.m. peak hour, average travel speeds computed in the model were 10 percent to 20 percent below the model's assumed free-flow travel speed of 65 mph. The lowest average speed, 51 mph, occurred on the northernmost section of SR 365 between Level Grove Road and Demorest – Mount Airy Highway. Factors contributing to this 22 percent average reduction in speed in comparison with the free-flow speed include a traffic signal at Demorest – Mount Airy Highway, a high ramp volume entering southbound SR 365 from Cannon Bridge Road/SR 105, and lane-

Chart 1 Peak Travel Speeds (A.M.)



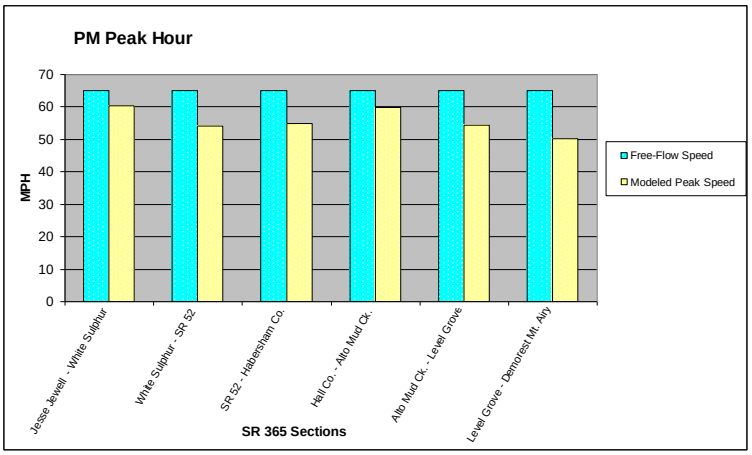
Source: CORSIM model

changing maneuvers on southbound SR 365 upstream from the exit ramp to the U.S. 441 Bypass.

In the center portions of the study corridor, modeled speeds were a little higher. From SR 52 in Hall County to Level Grove Road in Habersham County, modeled speeds ranged from 58 mph to 59 mph, which is 10 percent below the 65 mph free-flow speed. The chief reason average travel speeds were higher on these sections was because only two intersections with traffic signals exist, and these signals are spaced relatively far from each other. Furthermore, land uses in this portion of the SR 365 corridor are predominantly rural residential, agricultural, or forest land.

Overall, modeled travel speeds computed in the northbound direction of travel for the p.m. peak hour were similar to modeled a.m. peak speeds. The lowest average travel speed, 50 mph, was computed on the section from Level Grove Road to Demorest – Mount Airy Highway in Habersham County. A comparative bar chart showing free-flow travel speeds alongside their modeled p.m. peak-hour speeds is presented on Chart 2 for the northbound direction of travel.

Chart 2 Peak Travel Speeds (P.M.)



Source: CORSIM model

3.2.4.2 Intersections

LOS descriptions for intersections are provided in Table 8. The descriptions presented in the table are for signalized intersections only. (LOS grades for unsignalized intersections are essentially the same, but the threshold values for control delay are different.) Whether an intersection is signalized or unsignalized, it is assigned an LOS grade of A through F with LOS A representing the best conditions and LOS F representing the worst conditions.

Table 8 LOS Descriptions for Intersections

Grade	Description
A	Low control delay on average, not exceeding 10 seconds per vehicle. Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Generally, all stopped vehicles clear the intersection during a cycle.
B	Relatively low average control delay (above 10 seconds and not more than 20 seconds per vehicle). Occurs when there is good progression and/or short cycle lengths. Generally, all stopped vehicles clear the intersection during a cycle. More vehicles stop in comparison with LOS A.
C	Control delay above 20 seconds and not more than 35 seconds per vehicle. Occurs when there is good progression and/or short cycle lengths. Cycle failures may begin to appear. A significant number of vehicles stop although many pass through the intersection without stopping.
D	Control delay above 35 seconds and not more than 55 seconds per vehicle. Influence of congestion becomes noticeable. Longer delays result from combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Cycle failures become apparent. Many vehicles stop and the proportion of vehicles not stopping declines.
E	Control delay above 55 seconds and not more than 80 seconds per vehicle. These long delay values can result from a combination of the following factors: poor progression, long cycle lengths, and high volume-to-capacity ratios. Cycle failures are frequent.
F	Control delay above 80 seconds per vehicle. These extremely long delay values can result from a combination of the following factors: poor progression, long cycle lengths, and excessive volume-to-capacity ratios.

Source: Highway Capacity Manual 2000, Transportation Research Board

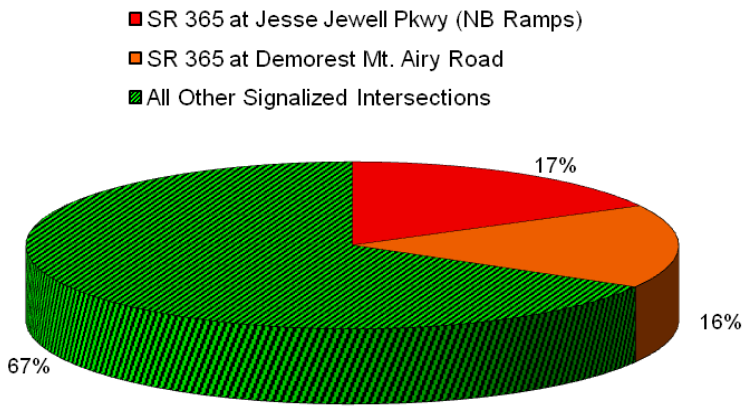
Currently, there is minimal delay at intersections in the SR 365 corridor during a.m. and p.m. peak hours on a typical weekday. All intersections operate at LOS C or better in the SR 365 corridor, which meets or exceeds Georgia DOT's minimum LOS threshold. A.m. and p.m. peak-hour average delay at intersections in seconds per vehicle are presented in Table 9 with their corresponding LOS. Figure 3 displays existing intersection LOS.

Table 9 Intersection LOS (A.M. and P.M.)

No.	Intersection	Traffic Control Type	Average Delay (secs/veh)	LOS (A.M.)	Average Delay (secs/veh)	LOS (P.M.)
1.	SR 365 at Jesse Jewell Parkway (northbound ramps)	Signalized	21.0	C	17.6	B
2.	SR 365 at Jesse Jewell Parkway (southbound ramps)	Signalized	12.6	B	15.2	B
3.	SR 365 at Ramsey Road	Stop	1.1	A	1.2	A
4.	SR 365 at White Sulphur Road	Signalized	13.9	B	13.0	B
5.	SR 365 at Whitehall/Bill Minor	Stop	0.3	A	0.4	A
6.	SR 365 at Cagle Road	Stop	1.0	A	0.4	A
7.	SR 365 at SR 52	Signalized	16.6	B	15.3	B
8.	SR 365 at Athens Street	Stop	2.7	A	1.8	A
9.	SR 365 at Belton Bridge Road	Stop	1.5	A	1.1	A
10.	SR 365 at Crane Mill Road	Stop	2.2	A	1.5	A
11.	SR 365 at Mt. Zion Road	Stop	0.5	A	0.5	A
12.	SR 365 at Alto Mud Creek Road	Stop	0.4	A	0.4	A
13.	SR 365 at Duncan Bridge/SR 384	Signalized	17.7	B	15.5	B
14.	SR 365 at Level Grove Road (northbound ramps)	Stop	1.5	A	1.9	A
15.	SR 365 at Level Grove Road (southbound ramps)	Stop	0.9	A	0.9	A
16.	SR 365 at Cannon Bridge Road/SR 105 (northbound ramps)	Signalized	10.8	B	19.9	B
17.	SR 365 at Cannon Bridge Road/SR 105 (southbound ramps)	Signalized	11.5	B	7.6	A
18.	SR 365 at Demorest – Mount Airy Highway	Signalized	20.1	C	20.1	C

Source: CORSIM model

Chart 3 SR 365 Signalized Intersection Delay (A.M. Peak Hour)



Source: Raw data from Georgia DOT, computed by PBS&J

To identify intersections with existing deficiencies along the study corridor, CORSIM was used to model traffic and calculate delay. Key findings include the following:

- The SR 365 northbound ramps at Jesse Jewell Parkway and SR 365 at Demorest – Mount Airy Highway account for 33 percent of the entire network delay during the a.m. peak hour.

- The SR 365 northbound ramps at SR 105 (Cannon Bridge Road) and Demorest – Mount Airy Highway at SR 365 account for 32 percent of the entire network delay during the p.m. peak hour.

- All intersections in the SR 365 corridor are currently operating at an acceptable LOS C or better and meet or exceed Georgia DOT's minimum LOS threshold.

Intersection delay during the a.m. peak hour was calculated to identify intersections operating at LOS C. During the a.m. peak hour, the SR 365 northbound ramps at Jesse Jewell Parkway and SR 365 at Demorest – Mount Airy Highway are the only two signalized intersections operating at LOS C. As shown on Chart 3 above, these two intersections alone account for 33 percent of the delay at signalized intersections in the SR 365 corridor during the a.m. peak hour. Improvements that reduce delay at these two intersections may maximize return on transportation investments.

Signalized intersections in the SR 365 corridor were sorted by delay during the a.m. peak hour in descending order to identify the five signalized intersections that experience the highest level of delay, as shown on Chart 4. Additionally, the chart shows that the five intersections with the longest delays all feature delays of similar lengths of approximately 15 seconds to approximately 20 seconds.

Chart 4 SR 365 Top Five Signalized Intersections by Delay (A.M. Peak Hour)

Source: Raw data from Georgia DOT, computed by PBS&J

Table 10 summarizes the existing delay and LOS during the a.m. peak hour at the five intersections in the study corridor with the highest amount of delay. As shown, only two signalized intersections in the study corridor, the SR 365 northbound ramps at Jesse Jewell Parkway and SR 365 at Demorest – Mount Airy Highway, are currently operating at LOS C during the a.m. peak hour. Average delays computed at both intersections, 21 seconds per vehicle and 20.1 seconds per vehicle, respectively, were significantly below the 35-second threshold needed to push the LOS into the undesirable grade D category. Although the intersection of SR 365 at SR 384 (Duncan Bridge Road) is currently operating at LOS B, it is approaching LOS C.

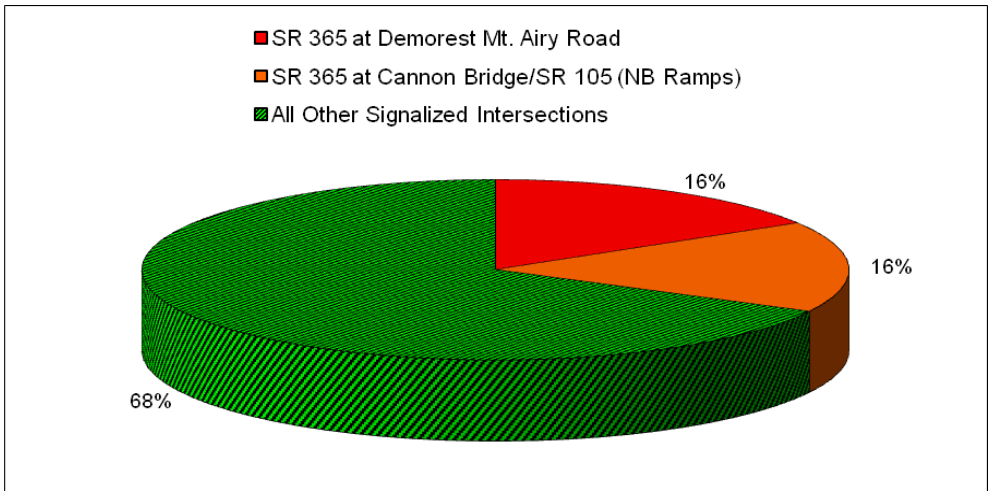
Table 10 SR 365 Top Five Signalized Intersections by Delay (A.M. Peak Hour)

Signalized Intersection	Delay (seconds)	LOS
SR 365 Northbound Ramps at Jesse Jewell Parkway	21.0	C
SR 365 at Demorest – Mount Airy Highway	20.1	C
SR 365 at Duncan Bridge/SR 384	17.7	B
SR 365 at SR 52	16.6	B
SR 365 at White Sulphur Road	13.9	B

Source: CORSIM model

Intersections operating at LOS C during the p.m. peak hour were determined based on the calculated delay. During the p.m. peak hour, the intersection of SR 365 at Demorest – Mount Airy Highway and SR 365 northbound ramps at Cannon Bridge/ SR 105 are the only two signalized intersections operating at or near LOS C. As shown on Chart 5, these two intersections account for approximately 32 percent of delay at signalized intersections in the SR 365 corridor during the p.m. peak hour. Demorest – Mount Airy Highway also accounts for a substantial amount of a.m. peak-hour delay. Therefore, transportation projects that reduce delay at these two intersections may provide benefits during both a.m. and p.m. peak hours.

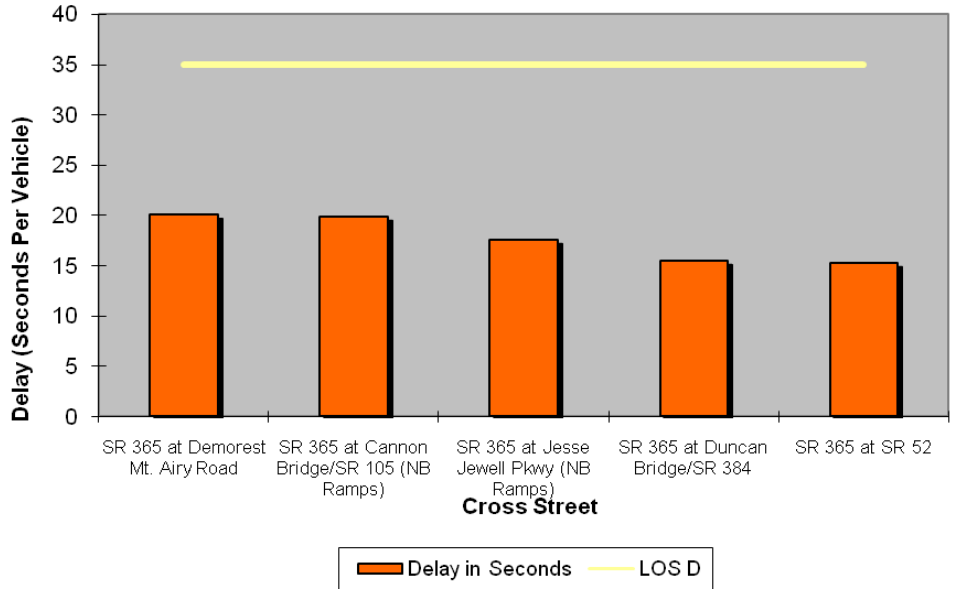
Chart 5 SR 365 Signalized Intersection Delay (P.M. Peak Hour)



Source: Raw data from Georgia DOT

Signalized intersections are sorted by p.m. peak-hour delay in descending order to identify the five intersections that experience the highest level of delay, which are shown on Chart 6. One of the five intersections currently operates at LOS C during the p.m. peak hour, while the other four intersections operate at LOS B. As shown in the chart, intersection delay would have to roughly double before any of the five intersections would operate at LOS D.

Chart 6 SR 365 Top Five Intersections by Delay (P.M. Peak Hour)



Source: Raw data from Georgia DOT

Table 11summarizes the existing delay and LOS at the five intersections in the study corridor with the highest amount of delay during the p.m. peak hour. As shown, only SR 365 at Demorest – Mount Airy Highway operates at LOS C. The other four intersections are currently operating at LOS B. In contrast to the a.m. peak hour, operations are slightly better with only one intersection operating at LOS C.

Table 11 SR 365 Top Five Signalized Intersections by Delay (P.M. Peak Hour)

Signalized Intersection	Delay (Seconds)	LOS
SR 365 at Demorest – Mount Airy Highway	20.1	C
SR 365 at Cannon Bridge Road/SR 105 (northbound ramps)	19.9	B
SR 365 at Jesse Jewell Parkway (northbound ramps)	17.6	B
SR 365 at Duncan Bridge/SR 384	15.5	B
SR 365 at SR 52	15.3	B

Several unsignalized intersections in the study corridor were also evaluated using CORSIM. All unsignalized intersections are operating at LOS A during a.m. and p.m. peak hours based on calculated delay. The unsignalized intersection with the most delay has less than 3 seconds of delay; therefore, no further analysis was undertaken.

3.3 Safety

Safety issues along SR 365 are a major concern because of high traffic volumes, high speeds, and at-grade intersections. The following analysis describes the conditions of the corridor with respect to safety and compares the corridor to similar facilities throughout the state. Locations exhibiting substantially higher crash rates than the statewide average are analyzed in more detail to isolate the types and potential causes of crashes.

While the absolute number of crashes that occur on a given corridor is one indicator of safety, crash rates are better for establishing relative levels of safety among similar facility types. Therefore, the analysis presented relies on crash rates to identify segments of SR 365 that appear most susceptible to crashes. Crash rates take traffic volume and road section length into consideration to create a ratio expressed as number of crashes per 100 million vehicle miles traveled (vmt). Crash rates can highlight areas that may appear to have a low or average number of crashes, but, when compared to other segments of the same functional class, actually exhibit a higher degree of crash danger.

Injury and fatal crashes have disproportionately higher associated monetary and social costs and are therefore highlighted independently in this analysis. Consideration of fatal, injury, and total crashes on a particular road segment is referred to in terms of the

severity at a location. Road sections with especially high total crash rates or with high injury and/or fatal crash rates were identified and categorized as “critical” sections.

3.3.1 Methodology

For the purpose of establishing crash rates for individual segments of the SR 365 corridor, the corridor was subdivided into 17 sections ranging in length from 0.5 mile to 2.75 miles (see Figure 4). Segment labels were assigned in ascending order from south (Jesse Jewell Parkway in Hall County) to north (Demorest – Mount Airy Highway in Habersham County). For example, Segment 1 is located at the southern end of the study corridor, and Segment 17 is located at the northern end. A table of segment attributes, including segment lengths, is available in Appendix D.

As expected, a disproportionate amount of crashes occur at or near intersections as opposed to the midblock area between intersections. Because intersection crashes can be assigned to one side of the intersection or another, a decision must be made when assigning these intersection crashes to a corridor segment to calculate a crash rate. For the purposes of this analysis, crashes located at or near an intersection were included in the calculation of the crash rates for the segment directly to the south of the intersection.

Each segment of the SR 365 corridor was assigned a relative score for three crash statistics, and those with the highest relative scores were identified as critical. The three statistics are:

- Total crash rate
- Severe crash rate
- Fatal crash frequency

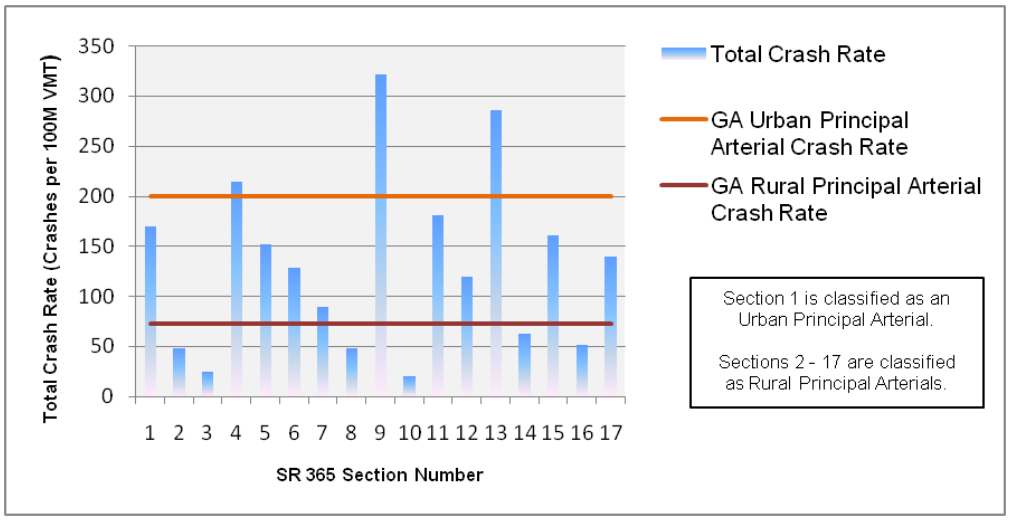
Additional detail regarding methodology and crash history is provided in Appendix D.

3.3.2 Total Crash Rate

Overall, the level of safety on SR 365 is similar to levels experienced on comparable roads of the same functional class throughout Georgia. Between 2000 and 2003, the corridor crash rate of 139 crashes per 100 million vmt was slightly lower than the statewide average total crash rate of 142 crashes per 100 million vmt. Chart 7 displays

the total crash rate for each of the 17 segments of SR 365. The chart also displays the statewide average crash rates for facilities of the same functional class (200 crashes per 100 million vmt on urban principal arterials and 73 crashes per 100 million vmt on rural principal arterials).

Chart 7 Total Crash Rates by Analysis Section



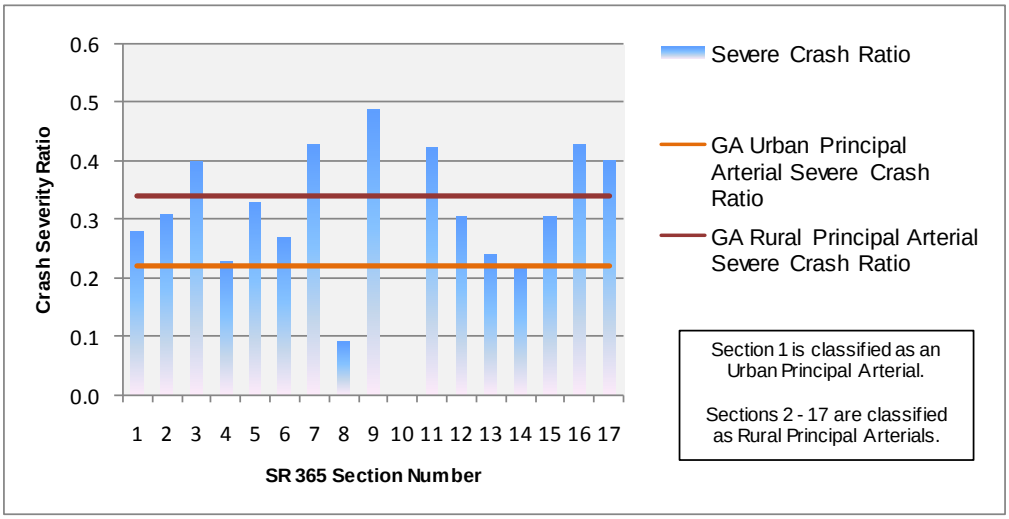
Source: Raw data from Georgia DOT

Total crash rates computed for individual sections varied widely. Several sections experienced crash rates significantly above the statewide average, while others were far below the statewide average. The highest total crash rate from 2000 to 2003 occurred on Section 9 in Habersham County, which includes the Crane Mill Road intersection. There were 322 crashes per 100 million vmt on this section, which is almost 4.5 times the statewide average for rural principal arterials. This particular section has several characteristics that may contribute to its high crash rate, including its relatively short length, relatively light traffic volume, and a large number of crashes. One other section, located approximately 3 miles north in Habersham County, also had a particularly high total crash rate. Section 13, which includes the Duncan Bridge Road/SR 384 intersection, experienced 286.4 crashes per 100 million vmt. This rate is four times the statewide average for rural principal arterials. In addition to Sections 9 and 13, Sections 4, 5, 6, 7, 11, 12, 15, and 17 all have crash rates higher than the statewide average for rural principal arterials.

3.3.3 Severe Crash Ratio

Severe crashes are those that result in an injury or fatality. The severe crash ratio was computed by dividing the sum of injury and fatal crashes by the total number of crashes. Based on corridor crash characteristics from 2000 to 2003, the overall severity of crashes on the SR 365 corridor is slightly below the statewide severity for roads of the same functional classification. Overall, the corridor's severe crash rate of 0.31 injury or fatal crashes per crash was below the statewide average of 0.35. Chart 8 displays the severe crash ratio on each roadway segment with ratios computed for roads of the same functional classification (0.22 on urban principal arterials and 0.34 on rural principal arterials).

Chart 8 Severe Crash Ratio by Analysis Section



Source: Raw data from Georgia DOT

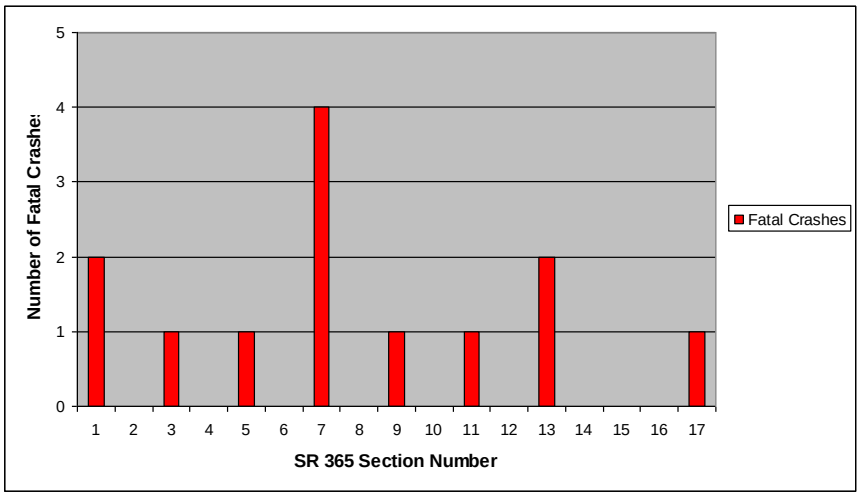
There were six roadway sections with computed severe crash rates above the statewide average for rural principal arterials (0.34). The highest severe crash ratio, 0.49, occurred on Section 9 (between the Hall County border and Crane Mill Road). Other sections with ratios above 0.34 include: Section 7 in Hall County with 0.43 (Belton Bridge Road – Mud Creek), Section 16 in Habersham County with 0.43 (U.S. 441/SR 15 – Cannon Bridge Road/SR 105), Section 11 in Habersham County with 0.42 (Mt. Zion Road – Alto Mud Creek), Section 17 in Habersham County with 0.40 (Cannon Bridge Road/SR 105 – Demorest – Mount Airy Highway), and Section 3 in Hall County with 0.40 (Bill Minor/Whitehall – Cagle Road).

Section 1, which is classified as urban principal arterial, has a severe crash ratio of 0.28, which is slightly higher than the statewide severe crash ratio average of 0.22 for urban principal arterials.

3.3.4 Fatal Crash Frequency

The third screening statistic used to identify critical sections is called the fatal crash frequency, which is the number of fatal crashes that occurred on a particular roadway section from 2000 to 2003. Overall, the SR 365 corridor fatal crash rate of 2.10 crashes per 100 million vmt was higher than the 1.78 crashes per 100 million vmt statewide average fatal crash rate. Chart 9 displays the number of fatal crashes per section.

Chart 9 Frequency of Fatal Crashes by Analysis Section (2000–2003)



Source: Raw data from Georgia DOT

Fatal crashes occurred on less than half of the individual sections between 2000 and 2003. No fatal crashes occurred on the three sections around Cornelia with limited-access freeway design. The section with the most fatal crashes between 2000 and 2003 was Section 7 (Belton Bridge Road to Mud Creek Road) in Hall County, where four fatal crashes occurred. Two fatal crashes occurred in both Section 1 (Jesse Jewell Parkway – White Sulphur Road) in Hall County and in Section 13 (Wilbanks – Duncan Bridge/SR 384) in Habersham County.

It was brought to the study team's attention during public involvement sessions that an unusually high number of fatal and injury crashes have occurred on Section 17 in

Habersham County since 2003. Specifically, the at-grade intersection between SR 365 and Demorest – Mount Airy Highway has been cited by the public as a severe crash location. During the 2000 to 2003 time frame, there was one fatal crash, and the section's injury crash ratio was 0.40 (compared to the statewide average of 0.35). This supports the public input that crashes tend to be more severe in this section.

3.3.5 Section Rankings

The three crash statistics presented above were combined to create a composite safety score for each of the 17 analysis sections of SR 365. The composite safety score of each section was computed as the sum of the rankings that were assigned for each vital safety statistic; the lower the sum of the three rankings for a given segment, the greater the severity of the crash characteristics observed there.

Since more than half of the sections did not have any fatal crashes between 2000 and 2003, the same fatal crash rank was assigned to these nine sections. For these nine sections, a ranking of 9 was applied.

Section-level rankings and composite safety scores for each section in the SR 365 corridor are presented in Table 12. Section 9, from the Hall County border to Crane Mill Road, is the most critical portion, placing first in the total crash rate, first in the injury crash rate, and sharing sixth in the number of fatal crashes with four other sections. Two segments tied for the second most critical section with composite scores of 14: Section 7 (Belton Bridge Road to Mud Creek Road) and Section 11 (Mt. Zion Road to Alto Mud Creek Road).

Table 12 Crash Severity Scores by Segment

Section No.	Description	Ranks			
		Total Crash Rate	Severe Crash Rate	Fatal Crash Frequency	Composite Total
1	Jesse Jewell Parkway – White Sulphur	5	11	2	18
2	White Sulphur – Bill Minor/Whitehall	15	8	9	32
3	Bill Minor/Whitehall – Cagle Road	16	6	6	28
4	Cagle Road – SR 52	3	14	9	26
5	SR 52 – Athens Street	7	17	6	30
6	Athens Street – Belton Bridge Road	9	12	9	30
7	Belton Bridge Road – Mud Creek Road	11	2	1	14
8	Mud Creek Road – Habersham County	14	16	9	39
9	Hall County Line – Crane Mill Road	1	1	6	8
10	Crane Mill Road – Mt. Zion Road	17	15	9	41
11	Mt. Zion Road – Alto Mud Creek Road	4	4	6	14
12	Alto Mud Creek Road – Wilbanks Road	10	9	9	28
13	Wilbanks Road – Duncan Bridge/SR 384	2	13	2	17
14	Duncan Bridge/SR 384 – Level Grove/SR 13	12	15	9	36
15	Level Grove/SR 13 – U.S. 441/SR 15	6	10	9	25
16	U.S. 441/SR 15 – Cannon Bridge Road/SR 105	13	3	9	25
17	Cannon Bridge Road/SR 105 – Demorest – Mount Airy Highway	8	5	6	19

Most critical rank
2nd most critical rank
3rd most critical rank
4th most critical rank
5th most critical rank

Source: Raw data from Georgia DOT

Six sections were assigned composite total scores below 20. Each of these sections has one or more crash statistics associated with it that merits consideration in the formulation of short-term and long-range road safety improvement strategies. These sections are highlighted on Figure 5.

3.3.6 Crash Type and Location

Crash type is an additional characteristic to consider when assessing the safety of a corridor. Crash type indicates the nature of the crash with respect to the physical positions of the cars involved (e.g., rear-end, head-on, etc.).

Crash type as a proportion of total crashes varies significantly between the crash analysis sections of SR 365 (see Table 13). Crash types can be suggestive of the physical characteristics of a given segment because road configuration may have an effect on crash occurrences. The crash types that account for the highest proportion of crashes on individual crash analysis sections are rear-end crashes, angle crashes, and crashes with objects other than motor vehicles. It should be noted that Sections 8 and 10 exhibited very small total crash figures for the study period (11 crashes and five crashes, respectively), which exaggerate the percentages of individual crash types.

Angle crashes suggest the presence of unsignalized intersections where vehicles turning left, entering, or crossing the mainline have potential to make contact with moving vehicles traveling in the through direction. Segments with the highest relative proportion of angle crashes include Sections 1, 9, 11, 16, and 17. There are 11 unsignalized intersections on SR 365, but only four are connected to these sections (Sections 1, 9, and 11). The five sections with relatively high proportions of angle crashes have comparatively fewer total access points than most sections. This may suggest that on SR 365, angle crashes represent a higher proportion of crashes in sections with fewer access points because through vehicles and turning/crossing vehicles interact less frequently.

Head-on crashes suggest a roadway that does not adequately separate bidirectional traffic. Given that SR 365 is median-separated, the head-on crashes that occurred in Sections 1, 4, 6, 11, 13, and 17 likely resulted from random occurrences of extreme driver error such as crossing the grass median or traveling in the wrong direction.

Crashes with objects other than motor vehicles are likely crashes with wildlife such as deer. These types of crashes may be more likely through areas of undeveloped land, which may serve as deer habitat. It should be noted that these types of crashes represent the highest proportion of crashes on analysis sections more frequently than any other crash type. Segments with the highest relative proportion of crashes with objects other than motor vehicles include Sections 2, 3, 8, and 10. While there is a significant amount of undeveloped land adjacent to this portion of SR 365, this type of adjacent land use is common to much of the SR 365 study corridor (especially in

Hall County). Without knowing exactly what the struck objects were, a determination cannot be made as to why these sections feature relatively high proportions of crashes with objects other than motor vehicles.

Rear-end crashes may occur in relatively higher proportions on sections of SR 365 that feature signalized intersections because drivers at a complete stop at red lights are vulnerable to conflicts with vehicles behind them potentially traveling at high speeds. Sections 4, 5, and 13 feature the highest relative proportions of rear-end crashes, and all of these sections feature signalized intersections, which likely contribute to the relatively high proportion of rear-end crashes. These intersections may be more prone than other signalized intersections in the corridor because of shorter sight distances, longer intersection queues, and/or higher vehicle speeds.

Sideswipe accidents may occur in relatively higher proportions on sections of SR 365 that feature a higher number of access points, particularly driveways, right-only road intersections, or interchanges. These features require entering and exiting drivers to perform merging and weaving maneuvers, thereby increasing the likelihood of same-direction sideswipes. Because SR 365 is median-separated, it is likely that opposite-direction sideswipe crashes are a result of extreme driver error. Sections 5, 10, 12, and 14 feature the highest relative proportions of same-direction sideswipe crashes. However, only Section 14 has an interchange, and none of the other segments contain a particularly high number of access points. Given that other crash analysis sections with more access points have a relatively low proportion of same-direction sideswipe crashes, it is likely that these types of crashes are generally a result of driver error in merging and changing lanes rather than the physical characteristics of SR 365.

Table 13 SR 365 Crash Types by Section

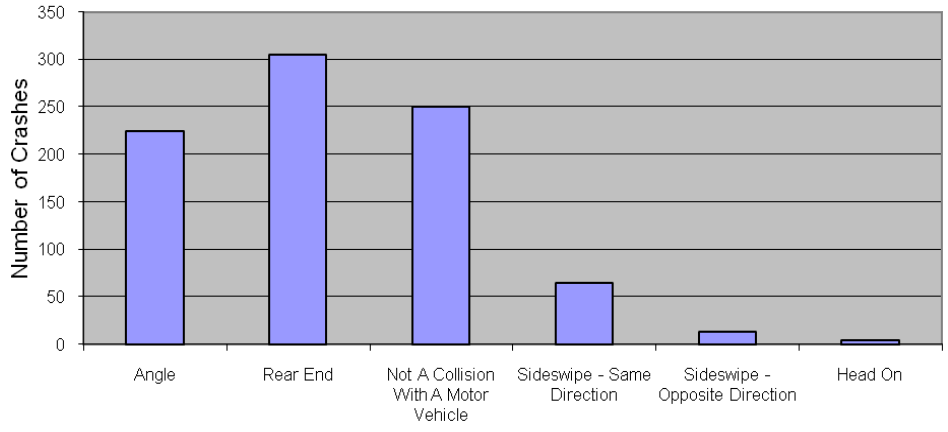
Section ID	Total No. of Crashes	Angle	Head-On	Not a Collision w/ a Motor Vehicle	Rear-End	Sideswipe (opposite direction)	Sideswipe (same direction)
1	209	33% (69)	0.5% (1)	28.5% (59)	30% (63)	2% (4)	6% (13)
2	29	7% (2)	0% (0)	55% (16)	38% (11)	0% (0)	0% (0)
3	20	0% (0)	0% (0)	75% (15)	25% (5)	0% (0)	0% (0)
4	115	7% (8)	1% (1)	7% (8)	80% (92)	0% (0)	5% (6)
5	46	17% (8)	0% (0)	20% (9)	50% (23)	0% (0)	13% (6)
6	33	25% (8)	3% (1)	33% (11)	30% (10)	3% (1)	6% (2)
7	76	25% (19)	0% (0)	41% (31)	24% (18)	4% (3)	6% (5)

Table 13 SR 365 Crash Types by Section

Section ID	Total No. of Crashes	Angle	Head-On	Not a Collision w/ a Motor Vehicle	Rear-End	Sideswipe (opposite direction)	Sideswipe (same direction)
8	11	9% (1)	0% (0)	82% (9)	0% (0)	0% (0)	9% (1)
9	47	55% (26)	0% (0)	13% (6)	21% (10)	0% (0)	11% (5)
10	5	0% (0)	0% (0)	60% (3)	20% (1)	0% (0)	20% (1)
11	45	33% (15)	2% (1)	25% (11)	38% (17)	0% (0)	2% (1)
12	39	21% (8)	0% (0)	31% (12)	33% (13)	0% (0)	15% (6)
13	120	19% (23)	1% (1)	13% (16)	58% (70)	3% (3)	6% (7)
14	32	19% (6)	0% (0)	34% (11)	34% (11)	0% (0)	13% (4)
15	26	22% (6)	0% (0)	35% (9)	35% (9)	0% (0)	8% (2)
16	28	43% (12)	0% (0)	32% (9)	11% (3)	7% (2)	7% (2)
17	67	33% (22)	1% (1)	27% (18)	28% (19)	0% (0)	11% (7)

Chart 10 displays a summary of crash type frequency for SR 365 in the study area. Rear-end crashes are by far the most frequent along the SR 365 study corridor. The next most frequent crash type is crashes that involve collisions with something other than a motor vehicle. Angle crashes are the third most frequent. By comparison, sideswipe and head-on crashes are relatively infrequent.

Chart 10 Crash Type Frequency



Source: Raw data from Georgia DOT

Locations in the SR 365 corridor with the highest concentration of crashes were also identified. The areas in the corridor with the highest concentration of crashes are:

- SR 365 at SR 69
- SR 365 at Lula Road
- U.S. 441 at J. Warren Road
- SR 365 at Duncan Bridge Road
- U.S. 441 Bypass at Level Grove Road

It is important to note that the locations of crash concentrations cannot be described in precise terms. All that can be said of a cluster of crashes is that they are in the general vicinity of a particular location. Therefore, while the locations in the list above are precise, it is not necessarily true that the crashes occurred precisely in the middle of the intersection. Figure 6 displays the spatial distribution of crashes along the SR 365 corridor and areas of high crash concentrations.

3.4 Land Use, Environment, and Economic Development

It is important to assess current and future land use in the study corridor not only to plan for the future, but also to understand how existing land use patterns interact with the transportation network to create observed transportation conditions. Environmental and economic development resources must also be assessed to identify potential issues or opportunities for infrastructure improvements.

3.4.1 Existing Land Use

The southern portion of the SR 365 study corridor in Hall County is primarily undeveloped land with small, scattered areas of residential and industrial use adjacent to the corridor. In the central portion of Hall County, residential land use adjacent to SR 365 increases, although there are still large areas of undeveloped land. Commercial use occurs in small, scattered areas along this portion of the corridor. Small areas of institutional use also occur along roads intersecting SR 365. The SR 365 corridor in the northern portion of Hall County consists primarily of undeveloped land and agricultural and residential uses with small areas of commercial use, particularly at intersections.

The extreme southern portion of the SR 365 corridor in Habersham County is primarily of residential and agricultural use with small areas of commercial use around intersections with SR 365. Some undeveloped land also occurs along this portion of SR 365 adjacent to the SR 365 corridor. Undeveloped land becomes more prominent in the vicinity of the corridor north of the SR 365/Alto Mud Creek Road intersection, where it is mixed primarily with agricultural and commercial uses and, to a much lesser extent, residential use. In the vicinity of the SR 365/Level Grove Road and SR 365/Old Cleveland/U.S. 441 Bypass interchanges, land use is mixed and consists of residential, commercial, agricultural, industrial, and institutional uses. Farther north, commercial use surrounds the SR 365 at Cannon Bridge Road/SR 105 interchange and consists of big-box retailers, restaurants, and hotels. In the northern portion of the corridor in Habersham County, land is almost entirely undeveloped with institutional and a small amount of residential use occurring at the northern study terminus at Demorest – Mount Airy Highway.

Table 14 displays the distribution of existing land uses in the SR 365 corridor area. Figure 7 displays the spatial orientation of existing land use.

Table 14 Existing Land Use in the SR 365 Corridor

Existing Land Use	Total Acres	Percent
Undeveloped	10,037	53
Residential	6,018	31
Agricultural	1,536	8
Commercial	765	4
Industrial/Utility	582	3
Institutional/Government	204	1
Total	19,142	100

Source: Field survey (2006)

3.4.1.1 Churches and Institutions

Several land uses are considered more sensitive land uses, including churches or other religious institutions, schools, and public facilities. These uses are usually closely associated with the quality of life within a community. Therefore, these locations within the study area are inventoried. The planning and implementation of large-scale corridor transportation improvements will include a public involvement process to include

representatives of these institutions so that consideration of potential impacts on their location and operation is reflected in the decision-making process.

A windshield survey for churches, schools, and other institutions was conducted along the SR 365 study corridor. A list of identified institutions can be found in Appendix E.

3.4.1.2 Cemeteries

Several cemeteries were located within the SR 365 study corridor during the windshield survey. A list can be found in Appendix E.

The Official Code of Georgia Annotated, Section 36-72, addresses the conversion of land from cemeteries. In instances where a cemetery (or potential grave site) is located within the study area, a boundary must be established. The tax record and land deed should be obtained to determine if the cemetery boundary is legally defined. If the land records do not denote the cemetery boundary, an archaeologist should be consulted to determine the number and location of graves and establish a boundary. The archaeologist should also oversee any potential disinterment and disposition of human remains. In addition, Section 36-72-5 requires that a genealogist be consulted to prepare a plan for identification of descendants. It is recommended that a thorough search of cemeteries be conducted within the corridor and that all cemeteries be avoided during design.

3.4.1.3 Park Lands

No public parks were identified in the vicinity of the SR 365 corridor during the windshield survey.

3.4.1.4 Farmland

Agricultural land use occurs in scattered areas throughout the SR 365 corridor on both sides of the existing roadway. Two large farms occur along the study corridor: Big Hickory Farms, located on the eastern side of SR 365 beginning at Cagle Road, and Jaemor Farmers Market, located off SR 365 just south of its intersection with Tribble Gap Road. Numerous poultry houses were also identified along the study corridor on both sides of the roadway.

It is probable that any transportation investments in the SR 365 corridor would convert farmland to non-agricultural uses. The National Farmland Protection Policy Act of 1981

(7 CFR 658) requires that all federal or federally assisted agencies consider the potential impacts of proposed action to prime, statewide, and locally important farmland. In accordance with the National Farmland Protection Policy Act, criteria will need to be applied during project development to determine the effects of project implementation to farmland and to determine whether the proposed farmland conversion is consistent with the Farmland Protection Policy Act. Form AD-1006, Farmland Conversion Impact Rating, or Form NRCS-CPA-106, Farmland Conversion Impact Rating for Corridor Type Projects, will need to be completed and submitted to the Natural Resources Conservation Service for review and concurrence.

3.4.1.5 Potential Environmental Justice Concerns

In accordance with Executive Order 12898, improvements to the study corridor will need to be analyzed to avoid disproportionate adverse effects to minority and low-income populations and communities. Minority persons include citizens or lawful, permanent residents of the United States who are African-American, Hispanic, Asian-American, American Indian, or Alaskan Native. Low-income persons are those whose median household income is below the United States Department of Health and Human Services' poverty guidelines. Minority or low-income communities are groups of minority or low-income persons who live in reasonably close proximity to one another.

2000 Census data were evaluated to identify potential areas along the study corridor where environmental justice issues may be a concern for project implementation. According to these data, the entire SR 365 corridor could potentially raise environmental justice concerns because of lower than average income levels (extreme southern and northern portions of the study corridor), higher than average minority populations (entire portion of the corridor located in Habersham County), or lower than average education levels (entire study corridor). During a windshield survey of the SR 365 corridor, several areas of potential environmental justice concern were identified in both Hall and Habersham counties. In Hall County, these areas were located near Mud Creek Road on both sides of its intersection with SR 365 and along Pless Road, which parallels SR 365 to the east. In Habersham County, these areas were located along Crane Mill Road just east of its intersection with SR 365 and along Old Level Grove Road to the west of its intersection with SR 365, where a large mobile home park exists.

Potential environmental justice communities and the potential for disproportionate adverse impacts on any such communities should be more fully identified during project development. If it is determined that there may be a disproportionately high and

adverse impact to an environmental justice community, additional public involvement should be conducted. Such public involvement should further define the community, identify the needs and wishes of the community, determine project strategies, and identify mitigation efforts.

3.4.1.6 Historic Structures and Archaeology

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.

No historic markers were noted along the corridor during a windshield survey. One property currently listed on the National Register of Historic Places (NRHP) exists in the vicinity of SR 365 in Hall County. This site, Head's Mill, was listed in 1990 and is located on the North Oconee River on Whitehall Road approximately 1,200 feet east of the existing SR 165 corridor. Given this distance, this site is unlikely to be affected by any potential widening of SR 365.

Georgia's Natural, Archaeological, and Historic Resources Geographic Information System (NAHRGIS) database was queried to determine if there are any known or listed resources eligible for NRHP listing within the vicinity of the SR 365 corridor. According to these data, potentially eligible properties exist within the vicinity of the SR 365 corridor. Figure 9 displays the approximate locations of potential historic structures identified through field observation. All of these properties are residential properties and should be considered during design. Appendix E contains data on the potential historic structures, including NARHGIS ID (if applicable), street location, county, and structure type. However, it should be noted that some of the properties listed in the NAHRGIS database may not be considered eligible for the NRHP or may no longer exist (some properties could not be verified in the field). In addition, the NAHRGIS database does not contain a complete listing of all potential historic properties within the project area. Exact locations and descriptions of potential historic structures should be identified by a qualified architectural historian during preliminary engineering.

Based on previous roadway construction and residential and commercial construction, it is not likely that any intact archeological sites would remain within the immediate vicinity of the SR 365 corridor. However, an assessment by a qualified archaeologist should be completed.

3.4.2 Future Land Use

The SR 365 corridor study area spans Hall and Habersham counties, and projected land use patterns are strikingly different for each. Hall County is characterized by a relatively non-diverse set of projected land uses dominated by commercial development adjacent to the roadway. In contrast, Habersham County has a patchwork of diverse land uses.

The majority of the SR 365 study corridor within Hall County is projected to be commercial land use, particularly on the land directly adjacent to the roadway. An exception to this is a significant swathe of industrial land use to the west of the roadway in the central portion of the county. The study area is projected to have several narrow tracts of conservation land. These are of irregular shape and appear to follow the natural form of rivers or other natural features. Low-density residential land use is projected beyond the commercial buffer along the roadway. Finally, there are very small patches of institutional and medium- and high-density residential land uses projected. These are primarily located at the southern portion of the SR 365 study area.

There is little or no spatial pattern to the patchwork of projected land uses in the SR 365 study corridor in Habersham County. Unlike the other counties in the SR 400 and SR 365 corridors, the land adjacent to SR 365 is not dominated by commercial land uses or any other single land use. Many land uses are planned along the roadside, including commercial, industrial, institutional, low-density residential, high-density residential, conservation, and rural uses.

While the future land use along the SR 365 corridor may not be defined by a particular type, two major intersections in the study area reveal unique spatial patterns. First, the intersection of SR 365 at Duncan Bridge Road is dominated by high-density residential land use. Second, the intersection of SR 365 at Cannon Bridge Road/SR 105 is dominated by commercial land use. Other commercial and low-density residential areas tend to be concentrated at either end of the SR 365 study area.

Overall, future land use projections along the SR 365 corridor represent significant changes when compared to current land use. Most notably, commercial land use increases from 4 percent to 32 percent, and undeveloped or agricultural land decreases from 60 percent to 19 percent. Residential land uses in the area are not projected to change significantly, while industrial land use increases considerably from 3 percent to 17 percent.

As seen in Table 15, projected land uses along SR 365 are diverse. Commercial uses are projected to occupy the largest amount of land at 32 percent of the study area. Low-density residential land use is the second-largest land use at 23 percent, followed by industrial and conservation land uses. Figure 8 displays the spatial orientation of projected future land use along the SR 365 corridor.

Table 15 Projected Future Land Use in the SR 365 Corridor

Projected Land Use	Total Acres	Percent
Commercial	4,935	32
Low-Density Residential	3,540	23
Industrial	2,617	17
Conservation	1,676	11
Rural	1,217	8
High-Density Residential	1,133	7
Institutional	336	2
Total	15,454*	100

Source: Hall County and Habersham County Comprehensive Plans

*Note: This future land use total acreage is larger than the existing land use total acreage due to larger corridor boundaries used for data analysis.

3.4.3 Physical Environment

3.4.3.1 Water Quality and Streams

A review of the State of Georgia Hydrologic Map Cataloging Unit (HUC) indicates that the SR 365 corridor is located within the Upper Chattahoochee River (HUC 03130001) and Upper Oconee River (HUC 03070101) watersheds. The SR 365 corridor crosses five named streams: Belton Creek, Camp Creek, Hagen Creek, Mud Creek (north and south forks), and the North Oconee River. Neither the portions of these streams that SR 365 crosses nor their downstream segments are designated trout streams. The Draft Georgia 2006 305(b)/303(d) List documents indicate that portions of four water bodies do not fully support their designated uses. Little Mud Creek does not fully support its designated use for fishing because of excessive biota levels and non-point pollution. The North Oconee River does not fully support its designated use for fishing because of excessive fecal coliform levels from non-point pollutant sources. Camp Creek does not fully support its designated use for fishing because of fecal coliform

and urban runoff. Mud Creek does not support its designated use for fishing because of fecal coliform, biota, and non-point pollution.

The Georgia Department of Natural Resources (DNR) has not issued fish consumption guidance for any of the listed streams in its *Guidelines for Eating Fish from Georgia Waters, 2006 Update*. These guidelines prescribe safe human consumption limits of certain fish species and information about the handling and preparation of all fish from listed waters.

There are no known drinking water intakes on the North Oconee River or any waterways that transect SR 365. The closest water intake is for the City of Gainesville, which is located downgradient of the study area at Lake Sidney Lanier.

3.4.3.2 Wetlands/Waters of the United States

Federal jurisdictional authority over Waters of the United States is derived from Section 404 of the Clean Water Act of 1972, as amended in 1979. Section 404 relates to the discharge of fill material in Waters of the United States, including wetlands, and establishes the U.S. Army Corps of Engineers (USACE) as the federal agency responsible for permitting wetland impacts with oversight by the U.S. Environmental Protection Agency (USEPA). Executive Order 11990, Protection of Wetlands, establishes a national policy to "avoid to the extent possible the long-term and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative."

A preliminary and informal investigation for areas that are likely to contain wetlands and/or non-wetland waters (i.e., streams, rivers, and areas of open water) was conducted within an approximately 1,000-foot buffer along each side of SR 365. The initial inspection identified the occurrence of aquatic resources associated with and in the vicinity of crossings at Camp Creek, Hagen Creek, Mud Creek, and the North Oconee River.

Additional and potential aquatic resources, including unnamed streams, branches, and discharges of groundwater and/or stormwater runoff, were also observed within the Chattahoochee and Upper Oconee watersheds.

Any improvements to the SR 365 corridor that would involve construction activities in these aquatic environments would require authorization of an impact permit pursuant

to Section 404 of the Clean Water Act. Additionally, impacts to the North Oconee River may also require authorization pursuant to Section 10 of the Rivers and Harbors Act. Throughout Georgia, the Section 404 program is administered by the USACE Savannah Regulatory District.

In Georgia, there are three levels of permitting under USACE's program: regional, nationwide, and individual permitting. The type of permit coordination and authorization involved depends on the extent of proposed impacts on wetlands/waters of the United States.

A regional permit for minor discharges for the construction of roads and bridges within the geographic limits of Georgia (RGP 001) authorizes a maximum impact resulting in the cumulative loss of less than 1 acre of waters of the United States, including wetlands, and/or 300 linear feet of intermittent or perennial stream for a single-road project with logical termini. Following submittal of a completed pre-construction notification (PCN) to USACE, use of RGP 001 can be authorized following as little as a 25-day review by cooperating resource agencies.

Nationwide permit 14 (NWP 14), linear transportation projects, is regionally conditioned by USACE to authorize individual roadway projects in Georgia with cumulative impacts to a maximum of 10 acres of wetland and/or 1,500 linear feet of stream within each HUC. However, these regional conditions also limit impacts at each individual crossing not to exceed 0.5 acre of wetlands or 300 linear feet of perennial stream. NWP 14 is generally authorized after a 45-day review following submittal of a completed PCN to USACE.

For all other impacts, authorization of an individual permit (IP) must be sought, which is only issued following a full public interest review that may be conducted concurrently with other public involvement procedures. Anticipated time for authorization of impacts under an IP generally range upward from 180 days.

Whichever permit level is deemed appropriate, cumulative project impacts to greater than 1/10 acre of wetlands and/or 100 linear feet of stream within each HUC require compensatory mitigation for all impacts to wetlands and streams within that HUC. Permit applications are not considered complete and, therefore, are not subject to prescribed review time frames without inclusion of a compensatory mitigation plan.

3.4.3.3 Endangered/Threatened Species

Under the provisions of the Endangered Species Act of 1973, as amended, federal law requires that any action likely to adversely affect a species or designated critical habitat classified as federally protected be subject to review by the U.S. Fish and Wildlife Service (USFWS). Current lists of threatened and endangered species potentially occurring in Hall and Habersham counties were obtained from Georgia DNR and USFWS. Based on background research and a preliminary survey of the study corridor, the potential for each federally listed or candidate species or their associated habitats to exist within the SR 365 corridor was identified. As this study progresses to preliminary engineering, field investigations for biological resources will be necessary to ensure that the entire study corridor is carefully surveyed and documented for potential impacts to natural resources. If the proposed changes to SR 365 involve alignment changes that veer from the existing corridor onto new locations, the chances may be greater for encountering potential threatened and endangered species and/or their habitats.

Table 16 lists the federally threatened and endangered species potentially occurring in Hall and Habersham counties, their associated habitats, and their potential to occur within the study area.

Table 16 Federal Listed Species and their Habitats in Hall and Habersham Counties and their Potential to Occur within the Study Area

Common Name	Scientific Name	Fed. Status	State Status	Habitat	County	Potential to Occur in Study Area?
Persistent trillium	*Trillium persistens*	E	E	Either in mixed pine-hemlock-hardwood forests (growing with *Violahastata* and *Rhododendron maximum*) or in mixed oak-beech forests; restricted to Tallulah-Tugaloo river system	Haber.	No
Small whorled pogonia	*Isotria medeoloides*	T	T	Partially shaded gaps in mixed deciduous-conifer woods with an open understory and sparse herbaceous layer. Red maple, chestnut oak, tuliptree, and white pine or Virginia pine are dominant canopy trees.	Haber.	Yes
Smooth coneflower	*Echinacea laevigata*	E	E	Meadows and open woodlands on basic or circumneutral soils; often with eastern red cedar (*Juniperus virginiana*) and button snakeroot (*Eryngium yuccifolium*); Habersham County population discovered in 1994.	Haber.	Yes
Georgia aster	*Symphyotrichum georgianum*	C	T	Upland oak-hickory-pine forests and openings; sometimes with *Echinacea laevigata* or over amphibolite	Both	Yes

Legend: E = Endangered; T = Threatened; C = Candidate

Sources: USFWS Listed Species in Hall and Habersham Counties, updated May 2004; Georgia DNR Locations of Special Concern Animals, Plants, and Natural Communities in Hall and Habersham Counties, Georgia, 10/22/04

In addition to the information presented above, the study corridor also includes distributional ranges for several state-protected species listed in Hall and Habersham counties that could occur in the vicinity of the study corridor. It is Georgia DOT policy to notify the Georgia DNR Freshwater Wetlands and Heritage Inventory Program of any possible impacts to these species.

3.4.3.4 Floodplains

A review of the National Flood Insurance Program's flood insurance rate maps for Hall and Habersham counties (Panel Nos. 13139C0183E, 13139C0185E, 13139C0225E, 13139C0125E, 13139C0110E, 1304580115B, 1304580110B, and 130329A) indicate

that the SR 365 corridor encounters flood hazard areas subject to inundation by 100-year flood events at five streams: Hagen Creek, Belton Creek, Mud Creek, Camp Creek, and the North Oconee River.

Depending upon the level of proposed involvement in floodplains and regulatory floodways, appropriate coordination may be required between the project proponent and the Federal Emergency Management Agency in compliance with relevant federal statutes and Executive Order 11988 for floodplain management and avoidance of increased impacts from flooding that would be attributed to a reconstructed roadway and/or its secondary and cumulative impacts.

3.4.3.5 Invasive Species

Executive Order 13112, Invasive Pest Species, requires that federal actions not contribute to the spread of invasive species. Georgia DOT identifies the following 16 species as being invasive pest species: tree of heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), water hyacinth (*Eichhornia crassipes*), autumn olive (*Elaeagnus umbellata*), cogongrass (*Imperata cylindrical*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), amur honeysuckle (*Lonicera maakii*), princess tree (*Paulownia tomentosa*), common reed (*Phragmites australis*), kudzu (*Pueraria montana*), multiflora rose (*Rosa multiflora*), Chinese tallowtree (*Sapium sebiferum*), johnsongrass (*Sorghum halepense*), Japanese wisteria (*Wisteria floribunda*), and Chinese wisteria (*Wisteria sinensis*).

In accordance with Executive Order 13112, if this project receives federal aid, a survey for populations of invasive species that may be spread during construction should be conducted. It was noted during a preliminary investigation that several invasive species occur along several portions of the study corridor, including kudzu, Chinese privet, and mimosa.

During the construction process, measures to prevent or minimize the spread of invasive species as appropriate for the time of year should be followed. These measures would include removing and disposing of vegetative parts in the soil that may reproduce by root raking, burning on site any such parts and aboveground parts that bear fruit, controlling or eradicating infestations prior to construction, and cleaning vehicles and other equipment prior to leaving the infested site. The measures used would be appropriate for the particular species and conditions that exist on the project site as described in Georgia Standard Specifications Section 201, Clearing and Grubbing of Right-of-Way.

3.4.3.6 Migratory Bird Habitat

The Migratory Bird Treaty Act (MBTA) of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected under this act. Approximately 850 species of birds are covered under the MBTA, except the house sparrow, starling, feral pigeon, and resident game birds such as pheasant, grouse, quail, dove, and wild turkey.

Because no formal guidance has been developed on how to enforce the MBTA, Georgia DOT has adopted a policy of identifying tracts of contiguous habitat of 100 or more acres that would be impacted by roadway construction. The 100-acre threshold is considered a minimum sufficient size to allow for sensitive species to avoid predation and parasitism from species that will only penetrate a certain distance within a given habitat.

While new suburban residential, commercial, and industrial development continues to occur throughout the SR 365 corridor, numerous areas containing more than 100 contiguous acres of undeveloped habitat and/or mature forested canopy were identified from areas adjacent to the existing roadway. Potential migratory bird habitat exists adjacent to SR 365 along nearly the entire study corridor. Exceptions include areas in the immediate vicinity of SR 365 and its intersections with Jesse Jewell Parkway, White Sulphur Road, SR 52, Belton Bridge Road, Mountain View Parkway, Tribble Gap Road (extending south approximately 1 mile on the eastern side of SR 365), Mud Creek Road (extending north to the SR 365/A Wilbanks Road intersection), and Level Grove Road (extending north to the SR 365/Demorest Lake Road intersection).

In addition, Georgia DOT protocol indicates surveying under bridges and in large culverts that would be subject to reconstruction or removal as part of any proposed construction activity. If birds, such as the barn swallow (*Hirundo rustica*), are observed nesting under bridges or in culverts, exclusionary devices such as bird netting should be installed and/or demolition or reconstruction of these structures should be scheduled to take place at a time when nests are not being used (between August 31 and April 1 in accordance with Georgia DOT's special construction contract provision 107.23G). Along SR 365 within the study area, bridge crossings occur at the overpasses of Jesse Jewell Parkway, Norfolk Southern Railroad at Lula, Level Grove Road (SR 13), the southbound U.S. 441 ramp, Old Cleveland Road, and Cannon Bridge Road/SR 105. In addition, potential migratory bird habitat could exist in culverts at each road-stream crossing within the SR 365 corridor.

Furthermore, should habitat be subject to removal as a result of corridor widening or design strategies, any open buildings, including barns, sheds, and similar structures, should also be inspected for the presence of migratory birds and raptors such as barn owls and roosting bats. Such buildings could include abandoned facilities associated with the former quarry operations on Ramsey Road (CR 882) to the southeast of SR 365 in Hall County.

3.4.3.7 Essential Fish Habitat

The Sustainable Fisheries Act (Public Law 104-297) became law on October 11, 1996 and amended the habitat provisions of the Magnuson Fishery Conservation and Management Act. The renamed Magnuson-Stevens Fishery Conservation and Management Act calls for direct action to stop or reverse the continued loss of fish habitats. The act requires cooperation among the National Marine Fisheries Service, the South-Atlantic Fisheries Management Council Site, the Mid-Atlantic Fisheries Management Council Site, fishing participants, and federal and state agencies to protect, conserve, and enhance essential fish habitat. Essential fish habitat is defined as habitat for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The conservation of essential fish habitat is an important component of building and maintaining sustainable fisheries. Essential fish habitat can be found in the following Georgia counties: Camden, Glynn, McIntosh, Liberty, Bryan, and Chatham. The proposed corridor would not impact any essential fish habitat because essential fish habitat is not found within Hall or Habersham counties.

3.4.3.8 Air Quality

Section 176 (c) of the Clean Air Act requires that federal transportation projects be consistent with state air quality goals found in the State Implementation Plan (SIP). The process to ensure this consistency is called transportation conformity. Conformity to the SIP means that transportation activities will not cause new violations of the National Ambient Air Quality Standards (NAAQS), worsen existing violations of the standards, or delay timely attainment of the relevant standard.

Transportation conformity is required for federal transportation projects in areas that have been designated by USEPA as not meeting the NAAQS. These areas are called nonattainment areas if they currently do not meet air quality standards or maintenance areas if they have previously violated air quality standards but currently meet them and have an approved maintenance plan. Habersham County is currently in attainment for

air quality standards. However, Hall County is located within the Atlanta Metropolitan Region's nonattainment area for ozone and particulate matter 2.5. Any proposed project will need to be evaluated for its consistency with state and federal air quality goals and compliance with air quality standards.

3.4.3.9 Construction/Utilities

There are aboveground and underground utilities along the SR 365 study corridor, particularly in areas of residential and commercial developments. A water tower is located in close proximity to the SR 365 corridor just northwest of its intersection with SR 52. In addition, one electrical substation was observed along the eastern side of SR 365 in close proximity to the road. This substation is located just south of the SR 365/U.S. 441 Bypass interchange. Coordination with utility companies should occur early during project development. Attention to alignment and construction methods that could avoid relocation of utilities will be incorporated in the project's design.

The roadway should remain open to traffic during construction; however, should this not be possible, a temporary detour plan should be developed.

3.4.3.10 Railroads

SR 365 crosses a Norfolk Southern rail line in one location within the study corridor. This crossing is a belowgrade crossing that passes under SR 365 just south of the SR 365/Cagle Road intersection. In addition, this Norfolk Southern rail line roughly parallels SR 365 at the southern terminus of the study area just over 1,000 feet west of the SR 365/Jesse Jewell Parkway interchange.

3.4.3.11 Energy/Minerals Resources

One abandoned quarry site exists along the SR 365 corridor. This site is located between the SR 365/Ramsey Road intersection and Ramsey-Fraser Lake to the east of SR 365. However, this site is located more than 1,000 feet from the existing SR 365 corridor and is not anticipated to be affected by any potential widening of the roadway.

3.4.3.12 Underground Storage Tanks/Hazmat Sites

A windshield survey for sites that may contain hazardous materials, including soil and/or water contaminated by leaking underground storage tanks, was conducted along the SR 365 corridor. Numerous gas stations containing underground storage

tanks were identified along the study corridor. A list of these and other potential hazardous materials sites can be found in Appendix E.

An intensive database search for sites known to contain leaking underground storage tanks should be completed prior to any right-of-way acquisition decisions. Figure 9 displays known physical features in the SR 365 corridor.

3.4.4 Socioeconomic Conditions

Understanding the geography of human activity and employment center concentrations inside the study area is a key factor in understanding how the travel demand model estimates base year traffic. Moreover, future year forecasts of socioeconomic data are key determinants underscoring future year travel demand and patterns.

Trip-making intensity and travel patterns are modeled from county-level estimates of socioeconomic data that are disaggregated into small areas known as traffic analysis zone (TAZ) geography. At the very bottom of the travel demand modeling process, trip ends are estimated for each TAZ in the model's study area by production and attraction ends. Production trip ends are usually associated with the number of households and average income in a TAZ. Attraction trip ends are typically associated with a combination of employment-related variables and school enrollment. A list of socioeconomic variables that were used in the travel demand model is provided below.

1. TAZ
2. Number of households
3. School enrollment
4. Population
5. Average zonal household income
6. Retail employment
7. Service employment
8. Manufacturing employment

9. Wholesale employment

10. Total employment

3.4.4.1 Current Demographic Profile of Study Area

Hall County dominates the study area in terms of population, housing, income, and employment. Gainesville, located in Hall County and situated just past the southern terminus of the SR 365 corridor, is a regional center in northeast Georgia with numerous employment opportunities and a substantial population.

An understanding of regional trends is required to provide context for current study area population estimates and to aid future predictions. Historical population data for Habersham and Hall counties from 1980 to 2005 were available from the U.S. Census Bureau and used in this analysis.

From 1980 to 2000, population in the two counties increased at a faster rate than the state of Georgia as a whole. However, variations in the growth rate of the two counties mirror statewide trends with one exception. Between 1980 and 1985 and between 1995 and 2000, the rate of population growth in the two counties and the state of Georgia increased. From 2000 to 2005, the trend reversed and the rate of population growth slowed from 26.1 percent to 17.2 percent in the two counties and from 15.0 percent to 11.6 percent at the state level. From 1985 to 1990, while the rate of increase in population at the state level slowed from 9.1 percent to 8.6 percent, the rate of growth for the two counties increased from 9.6 percent to 11.2 percent.

Population growth from 1980 to 2005 was not evenly distributed in the two counties. Habersham County grew much slower than Hall County in percentage terms and number of persons added.

The SR 365 study area includes all of Hall County and the southern part of Habersham County. The total estimated study area population in 2005 was 195,313 persons, an increase of 17.6 percent over the 2000 population. During this same time period, the statewide population increased 11.6 percent.

Study area population is concentrated in Gainesville and Hall County with the majority in the Hall district. Population density is highest in the two districts with the largest cities: the Cornelia and Gainesville districts. The Cornelia district is more than twice as dense as the study area average, while the Gainesville district is more than three times

denser than the study area average. Population density of the study area is low at 0.6 persons per acre. In comparison, the average statewide population density is 0.2 persons per acre. Figure 10 displays the spatial orientation of population density in the study area, and Table 17 summarizes population and density by district.

Table 17 SR 365 Population (2005) by District

District	Population	Persons per Acre	Percent of Total Population
Clarksville	1,300	0.9	0.7
Cornelia	6,777	1.3	3.5
Demorest	2,560	0.6	1.3
Habersham	13,818	0.3	7.1
Habersham 365	5,175	0.5	2.6
Hall	114,496	0.6	58.6
Gainesville	45,283	2.1	23.2
Hall 365	5,904	0.2	3.0
Study Area Total	195,313	0.6	100.0

Source: U.S. Census (2000)

Demographic figures are based on 2000 Census data because the smallest level of geography that the Census publishes 2005 estimates for are counties. The study area does not conform to county boundaries.

Within the study area, concentrations of minorities exist at the district level; however, no district exceeds the statewide percentage of 34.9 percent. The Gainesville district has the highest percentage of minority population at 1.8 times the study area average. The Cornelia and Habersham 365 districts also exceed the average study area percentage at 24.2 percent and 24.4 percent minority, respectively. In contrast, concentrations of Hispanic populations in four districts exceed the statewide percentage of 5.3 percent. The Gainesville district has the highest concentration of Hispanics at more than seven times the statewide percentage and more than twice the study area average percentage. The Cornelia district exceeds the study area percentage and has five times the statewide percentage, while the Clarksville and Hall districts have approximately double the statewide percentage but do not exceed the study area average percentage.

Table 18 details population by minority status and ethnicity for each district and the SR 365 study area as a whole.

Table 18 SR 365 Race and Ethnicity (2000) by District

District	Total Population	White	Percent White	Minority	Percent Minority	Hispanic	Percent Hispanic
Clarksville	1,178	1,030	87.4	148	12.6	142	12.1
Cornelia	6,072	4,604	75.8	1,468	24.2	1,632	26.9
Demorest	2,320	2,172	93.6	148	6.4	78	3.4
Habersham	12,608	11,799	93.6	809	6.4	515	4.1
Habersham 365	4,680	3,536	75.6	1,144	24.4	214	4.6
Hall	96,585	82,539	85.5	14,046	14.5	12,172	12.6
Gainesville	37,632	25,205	70.0	12,427	30.0	14,831	39.4
Hall 365	5,048	4,714	93.4	334	6.6	239	4.7
Study Area Total	166,123	135,599	81.6	30,524	18.4	29,823	18.0

Source: U.S. Census (2000)

On average, the SR 365 study area is slightly older than the state of Georgia. Statewide, 9.6 percent of the population is 65 years of age and older, while 10 percent of the study area falls into that age bracket. The Clarksville district has the highest concentration of persons 65 years and older, which is slightly more than double the study area average. Only two districts, Habersham 365 and Hall, are below the statewide average. They are also the only two districts below the study area average. Table 19 summarizes SR 365 age 65 and over population by district.

Table 19 SR 365 Age 65 and Over (2000) by District

District	Total Population	65 Years of Age and Over	Percent 65 Years of Age and Over
Clarksville	1,178	242	20.5
Cornelia	6,072	949	15.6
Demorest	2,320	378	16.3
Habersham	12,608	1,577	12.5
Habersham 365	4,680	385	8.2
Hall	96,585	8,116	8.4

Table 19 SR 365 Age 65 and Over (2000) by District

District	Total Population	65 Years of Age and Over	Percent 65 Years of Age and Over
Gainesville	37,632	4,305	11.4
Hall 365	5,048	646	12.8
Study Area Total	166,123	16,598	10.0

Source: U.S. Census (2000)

In 2005, the total estimated households in the study area numbered 68,326, an increase of 19.8 percent since 2000. Like population, most of the study area households are located in Hall County and Gainesville with the majority in the Hall district. Household size varies across the study area, ranging from a low of 2.2 persons per household to a high of 3.0 persons per household. The study area average is 2.9 persons per household. In comparison, the average household size for the state of Georgia is 2.6 persons.

Average household income in the study area ranges from a low of $36,274 per year in the Demorest district to a high of $55,118 per year in the Hall district. In comparison, the average annual household income in the state of Georgia is $61,540. Similar to population and households, approximately 62 percent of all income in the study area is concentrated in the Hall district. Table 20 summarizes households, household size, and household income by district.

Table 20 SR 365 Households (2005) and Income (2000) by District

District	Households	Average Household Size	Percent of Total Households	Average Household Income	Percent of Aggregate Household Income
Clarksville	520	2.5	0.8	$40,472	0.6
Cornelia	2,496	2.7	3.7	$40,374	2.9
Demorest	927	2.8	1.4	$36,274	1.0
Habersham	5,280	2.6	7.7	$44,808	6.7
Habersham 365	2,320	2.2	3.4	$50,622	3.3
Hall	39,497	2.9	57.8	$55,118	61.8
Gainesville	15,096	3.0	22.1	$48,335	20.7
Hall 365	2,190	2.7	3.2	$47,606	3.0
Study Area Total	68,326	2.9	100.1	$51,523	100.0

Source: U.S. Census (2000)

The vacancy rate of the study area, 7.3 percent, is slightly lower than the state of Georgia's rate of 8.4 percent. Vacancy rates in the study area are highest in the Demorest district (10.5 percent), which is also the only district in the study area that exceeds the statewide rate. Table 21 summarizes occupancy status by district.

Table 21 SR 365 Housing Occupancy Status by District (2000)

District	Housing Units	Occupied Housing Units	Vacant Housing Units	Vacancy Rate (percent)
Clarksville	499	471	28	5.6
Cornelia	2,432	2,239	193	7.9
Demorest	939	840	99	10.5
Habersham	5,208	4,819	389	7.5
Habersham 365	1,422	1,306	116	8.2
Hall	36,005	33,288	2,717	7.5
Gainesville	13,004	12,217	787	6.1
Hall 365	2,030	1,873	157	7.7
Study Area Total	61,539	57,053	4,486	7.3

Source: U.S. Census (2000)

3.4.4.2 Economy and Employment

Because the economy and employment rate play a significant role in generating travel demand, historic trends in industry and employment at the county level and current estimates at the study area level are detailed in this section.

An understanding of regional trends is required to provide context for current study area employment estimates and to inform future predictions. Historical employment data for Habersham and Hall counties from 1990 to 2005 were acquired from the Georgia Department of Labor and used in this analysis.

From 1990 to 1995 and from 1995 to 2000, employment rates in the two counties grew faster than the state of Georgia as a whole. Between 2000 and 2005, the growth rate of the two counties was slower than the state average. Variations in the growth rate of the two counties do not reflect statewide trends. Between 1990 and 1995, employment in the two counties grew 23 percent, while statewide growth was 12.6 percent. Employment growth in the two counties decelerated to 16.3 percent between 1995 and 2000 with employment growth at the state level accelerating to 16.2 percent. Between 2000 and 2005, growth in the two counties continued dropping to 3.5 percent, while statewide growth decreased to 6.1 percent.

Employment growth from 1990 to 2005 was not evenly distributed in the two counties. Habersham County grew much slower than Hall County in percentage terms and number of employees added during all three five-year periods.

From 1990 to 2005, employment increased in both counties. During this same period, employment share by industry sector changed significantly as the two counties shifted toward a service-oriented economy. Some sectors grew slower than others, which accounts for the shift in share. Wholesale trade added the fewest number of jobs, retail trade lost a small amount of jobs, manufacturing added a medium amount of jobs, and services added the largest number of jobs. Industry mix is important because some industry types generate more trips than others and impact the transportation system differently. Table 22 shows industry mix by sector for Habersham and Hall Counties.

Table 22 SR 365 Two-County Industry Mix by Sector (1990–2005)

	Percent Share of Total Jobs			
Sector	**1990**	**1995**	**2000**	**2005**
Wholesale	5.0	4.2	4.9	4.4
Manufacturing	39.8	37.4	36.4	31.8
Retail	16.2	16.6	15.9	10.9
Services	39.0	41.8	42.8	52.9
Total	100.0	100.0	100.0	100.0

Source: U.S. Department of State: InfoUSA

The SR 365 study area includes all of Hall County and the southern part of Habersham County. The total estimated study area employment in 2005 was 87,876 persons. Similar to population and households, the Hall district contains a significant share of study area employment. In contrast to population and households, the Hall district does not contain the majority of study area employment or even the largest share. The Gainesville district has the most employment in the study area. Together, the Hall and Gainesville districts account for 84 percent of study area employment.

Employment density is at least double the study area average in districts that include cities (Clarksville, Cornelia, Demorest, and Gainesville) than in the other districts. The Gainesville district has an employment density that is roughly six times higher than the study area average, while other districts that include cities are roughly twice as dense as the study area average.

The jobs-to-housing ratio provides insight on the flow of workers into and out of the study area. The jobs-to-housing ratio is calculated by dividing the number of jobs in a geographic area by the number of households in the same area.

Statewide, an average of 1.3 persons per household have jobs. Therefore, when the jobs-to-housing ratio is below 1.3, commuters are leaving an area. Conversely, when the ratio is above 1.3, the area has a surplus of jobs and commuters are entering the area.

The ratio of jobs to households for the study area is 1.3, which is the same as the statewide ratio. Based on the low ratio of jobs to households in the study area, on average, commuters are traveling within the study area during the a.m. and p.m. peak periods. Commuters living and working in the study area are likely commuting to districts that include Clarksville, Demorest, and Gainesville, which are the three districts with a jobs-to-households ratio over 1.3. Figure 10 displays the spatial orientation of employment density in the study area, and Tables 23 and 24 provide 2005 and 2030 employment data by district, respectively.

Table 23 SR 365 Employment (2005) by District

District	Jobs	Jobs per Acre	Percent of Total Jobs	Jobs to Households
Clarksville	1,049	0.7	1.2	2.0
Cornelia	3,087	0.6	3.5	1.2
Demorest	2,706	0.6	3.1	2.9
Habersham	4,631	0.1	5.3	0.9
Habersham 365	685	0.1	0.8	0.3
Hall	35,004	0.2	39.8	0.9
Gainesville	39,089	1.8	44.5	2.6
Hall 365	1,625	0.1	1.8	0.7
Study Area Total	87,876	0.3	100.0	1.3

Source: U.S. Department of State: InfoUSA

Table 24 SR 365 Employment (2030) by District

District	Employment	Percent Change 2005—2030	Jobs per Acre	Percent of Total Jobs	Jobs to Households
Clarksville	1,540	46.8	1.1	0.5	1.6
Cornelia	5,789	87.5	1.1	1.9	1.0
Demorest	4,036	49.2	0.9	1.3	2.3
Habersham	7,887	70.3	0.1	2.6	0.7
Habersham 365	2,065	201.5	0.2	0.7	0.4
Hall	126,335	260.9	0.6	41.8	1.1
Gainesville	146,416	274.6	6.9	48.5	3.1
Hall 365	8,041	394.8	0.3	2.7	1.0
Study Area Total	302,109	243.8	0.9	100.0	1.5

Source: U.S. Department of State: InfoUSA

3.5 Stakeholder Input

The public was given the opportunity to convey what it believed were the key issues and concerns for the study area. The issues and concerns expressed for the SR 365 corridor were used in the development of goals/objectives and performance measures and are summarized in the paragraph below and by intersection in Table 25.

The most common challenges and issues expressed by meeting attendees at intersections throughout the SR 365 corridor are safety and traffic congestion on the roadway. Signage/informational devices were also an issue, specifically in locations where vehicles travel at high speeds with little warning of a traffic signal or where citizens felt a traffic signal or other warning signal was needed. Safe access to businesses was noted as a concern, particularly where businesses front SR 365 and have access points that are not at signalized intersections. Overall, participants noted significant major issues near Belton Bridge Road, Mud Creek Road, Crane Mill Road, and Demorest – Mount Airy Highway.

Table 25 SR 365 Transportation Issues As Expressed by Public Input

Corridor Intersection SR 365 at:	Challenges and Issues	
	Major Issue(s)	**Minor Issue(s)**
Jesse Jewell Parkway	• None	• Safe access to businesses
Ramsey Road	• Safety on roadway (trucks) • Traffic congestion	• Signage/informational devices • Condition of pavement
White Sulphur Road	• Traffic congestion • Safety on roadway	• Signage/informational devices • Condition of pavement • Safe access to businesses
Cagle Road	• Traffic congestion • Safety on roadway	• Signage/informational devices • Condition of pavement • Safe access to businesses
SR 52	• Traffic congestion • Safety on roadway	• Signage/informational devices • Condition of pavement • Safe access to businesses • Bike and pedestrian safety
Athens Street	• None	• Traffic congestion • Safety on roadway
Belton Bridge Road	• Traffic congestion • Safety on roadway • Signage/informational devices	• Longer acceleration lanes needed
Tribble Gap	• None	• Safety on roadway
Mud Creek Road	• Traffic congestion • Safety on roadway • Signage/informational devices	• None
Crane Mill Road	• Safety on roadway	• Traffic congestion • Signage/informational devices (yield signs should be stop signs) • Longer acceleration lanes needed
Mt. Zion Road	• Safety on roadway	• None
Alto Mud Creek Road	• Safety on roadway	• Signage/informational devices (yield signs should be stop signs) • Longer acceleration lanes needed

Table 25 SR 365 Transportation Issues As Expressed by Public Input

Corridor Intersection SR 365 at:	Challenges and Issues	
	Major Issue(s)	**Minor Issue(s)**
Old Mud Creek Road	• Safety on roadway • Safe access to businesses	• Traffic congestion
Charley David Road	• Safety on roadway	• Traffic congestion
LC Turner Road	• None	• Safe access to businesses
Duncan Bridge Road	• Safety on roadway	• Traffic congestion • Signage/informational devices (yield signs should be stop signs) • Longer acceleration lanes needed
Kudzu Hill	• None	• None
J Warren Road	• None	• None
Level Grove Road	• None	• None
Historic 441	• Traffic congestion • Safety on roadway (southbound off-ramp)	• Signage/informational devices • Condition of pavement • Safe access to businesses • Bike and pedestrian safety
Demorest – Mount Airy Highway	• Safety on roadway • Traffic congestion	• Signage/informational devices (need school zone flashing lights) • Condition of pavement • Safe access to businesses • Longer acceleration lanes needed

Source: Public information open house (2006)

Stakeholders also identified preferred roadway treatments and favored the freeway followed by the limited-access roadway.

3.6 Review of Previous Studies and Plans

Within Hall and Habersham counties, the SR 365 corridor has been included in several prior and ongoing planning studies. A review of these studies was undertaken to catalog recommended improvements and issues and opportunities identified previously. Key findings are summarized by county.

3.6.1 Hall County

Prior studies regarding land use, transportation, and economic development were reviewed for information relevant to the SR 365 corridor. Studies reviewed included the Gainesville Hall Metropolitan Planning Organization's (GHMPO's) 2030 Long Range Transportation Plan and Development Potential of the SR 365 Corridor in Hall County, Georgia.

3.6.1.1 Key Findings

- The population will increase 145 percent between 2000 and 2030.
- Employment is forecasted to increase 330 percent during the same time period.
- Traffic volumes on SR 365 have increased 61 percent between 1992 and 2002.
- Traffic volumes are forecasted to increase 126 percent by 2030 on SR 365.
- Under both the 2030 existing plus committed and build scenarios, traffic operations on SR 365 will be significantly worse than present conditions.
- Hall County is implementing a plan to extend sewer service along the SR 365 corridor north of Gainesville.
- Traffic and safety issues in the SR 365 corridor present economic development concerns.
- Access management in the SR 365 corridor will support economic development and mitigate traffic and safety concerns.

3.6.2 Habersham County

Georgia DOT conducted a multimodal transportation study for Habersham, Rabun, Stephens, and White counties to assess current travel conditions and identify future needs. Findings from this study relevant to the SR 365 corridor are summarized below.

3.6.2.1 Key Findings

- The population is projected to increase 110 percent by 2025.
- Population density is concentrated in the U.S. 441 corridor from Alto to Tallulah Falls.
- Traffic volumes on SR 365 are forecasted to increase significantly by 2025.
- By 2025, LOS along SR 365 will decline from LOS B to LOS C and LOS E.
- There are six high-frequency crash locations in the SR 365 corridor.
- The multimodal study recommended access management along SR 365.

4. Assessment of Future Travel Demands

Forecasts of future travel demand are used to approximate the performance of the transportation network over the next 25 years based on expected changes in the study area. Future travel demand is calculated using the CORSIM model, which uses future population and employment figures, projected land uses, planned transportation projects, and trip-making behavior on the network to predict LOS. The model results are used to prioritize the transportation policies and projects that can best mitigate the likely challenges on the network. This section explains the methodology used to develop the travel demand model and its future inputs and discusses the future travel demand results.

Because travel sheds for the SR 365 and SR 400 corridors partially overlap, one travel demand model including both corridors was developed. Additionally, because both corridors were studied at the same time, creating one model resulted in cost reductions compared to building two separate travel demand models. The travel demand model, including a description of the model study area, is discussed later in this section.

4.1 Growth Outlook

The study team made projections of population and employment growth at the TAZ level in five-year increments from 2010 to the horizon year 2030 for use in the travel demand model. Assignments of future year 2030 traffic onto the baseline future year road network were used to formulate alternate road improvement scenarios that would adequately address future travel demand. Subsequently, travel demand output from model runs of the improvement scenarios were summarized in combination with other performance measures in the strategies evaluation process to identify which improvement strategy would most likely maximize Georgia DOT's investment in the SR 365 corridor.

4.1.1 Data Sources

The model inputs were developed from Georgia Department of Community Affairs (DCA) population and employment projections in five-year increments to 2030. This data source was selected for several reasons. First, the Georgia DCA projection methodology is the same for each county in the study area, providing consistent population and employment forecasts. Additionally, Georgia DCA projections are readily available for all counties in the study area. Finally, Georgia DCA is the state agency that provides comprehensive planning, technical, and research assistance to

local governments and is the expert at producing population and employment projections.

A methodology based on the average rate of population change for each five-year period between 1980 and 2005 was used to project the future countywide population. Data sources used include:

- U.S. Census
- Existing land use maps from adopted county comprehensive plans
- Future land use plans from adopted county comprehensive plans
- Existing year 2005 population and employment estimates previously produced as part of this study

Population and employment control totals used for each county are shown in Table 26.

Table 26 Forecasted Population and Employment Control Totals

			2010	2015	2020	2025	2030
SR 365	Habersham	Population	46,458	54,500	63,934	75,001	87,984
		Employment	19,937	21,516	23,096	24,676	26,256
	Hall	Population	205,842	255,599	317,383	394,102	489,106
		Employment	139,558	180,910	220,732	253,885	280,792
SR 400	Dawson	Population	24,225	29,743	36,518	44,836	55,049
		Employment	9,729	11,808	14,170	16,827	19,982
	Forsyth	Population	172,537	212,041	260,590	320,255	393,581
		Employment	76,459	94,985	117,999	146,589	182,393
	Lumpkin	Population	31,296	40,267	51,810	66,661	85,769
		Employment	13,094	14,576	16,058	17,540	19,022
	White	Population	30,724	39,241	50,120	64,014	81,760
		Employment	12,336	13,670	15,004	16,338	17,672

Source: Raw data from U.S. Census (2000)

4.1.2 Disaggregation Methodology

Because Georgia DCA projections are available only at the county level and because the travel demand modeling process requires socioeconomic data for a much smaller geography, the following two-part strategy was developed to disaggregate the countywide projections to the individual TAZ level based on existing conditions and future land use plans.

Using 2005 estimates reviewed by the technical advisory committee, the share of existing population for each TAZ was calculated by dividing 2005 estimates for the TAZ by the total county estimate in 2005.

The share of future land use growth for each TAZ was calculated using the following steps. First, the expected percentage future land use maps for each county were overlaid with the TAZ structure. Next, based on the planned land uses and knowledge of existing conditions and development trends in the study area, a growth rating of 1 through 5 (1 representing no change or limited growth and 5 representing explosive growth) was manually assigned to each TAZ. Population and employment were rated separately. Finally, for each county, the ratings were summed. For each TAZ within the county, the rating was divided by the total to determine percentage of population and employment growth relative to the entire county.

The existing share of population and employment and the expected share of population and employment growth were then averaged to determine a composite future share percentage for each TAZ. Population and employment forecasts for each TAZ were then determined by multiplying the countywide population total for each year by the composite future share percentage to determine the population and employment forecast for each TAZ for each forecast year.

A limitation of the above-described procedure is the inability to account for projects currently in the planning process or in the development pipeline because the procedure relies exclusively on general countywide forecasts. To mitigate this, a manual adjustment step was built into the forecast methodology that relies on the local knowledge of technical advisory committee members and key stakeholders.

The results of the disaggregation procedure outlined above were compared to development information gathered at previous technical advisory committee meetings and stakeholder interviews to incorporate development projects and trends not yet available through conventional sources.

4.1.2.1 Households

Average household size is very close to 2.0. For the purpose of the travel demand model, household sizes are assumed to remain relatively constant over time. For each TAZ, the number of households in 2005 was divided by the estimated 2005 population. This factor was then multiplied by the projected population for each of the forecast years to determine the number of future households for individual TAZs.

4.1.3 Issues and Solutions

Because the Forsyth County Comprehensive Plan appeared to underestimate population and employment projections, Georgia DOT and the study team decided to use population and employment projections for Forsyth County from the Forsyth County Major Transportation Plan – 2006 Update. The Forsyth County Comprehensive Plan predicts 227,819 persons in 2025, which is the horizon year of the plan. Based on Census data and recent trends, the 2025 forecast would be exceeded between 2010 and 2015.

No comprehensive plan was available for Habersham County, so the Georgia DOT Multimodal Transportation Study: Habersham, Stephens, Rabun, and White Counties (2003) was used as a source of population projections. The Georgia DOT study was used because it was the most recent countywide study available. However, that study did not include employment projections; therefore, Georgia DCA data were used.

The Lumpkin County Comprehensive Plan included population projections only. Because no other source of data was available, Georgia DCA employment projections were used.

Part of White County falls within the travel demand model area. However, no part of the county falls within the SR 400 or SR 365 corridors, and a comprehensive plan for the county was not available. Therefore, Georgia DCA projections were used for both forecasted population and employment.

4.1.4 Exceptions

A portion of White County falls in the travel demand model boundary. However, no part of White County falls within the SR 400 or SR 365 corridors. Therefore, a simplified disaggregation methodology was used. Additionally, a comprehensive plan for White

County was not available. For TAZs in White County, the disaggregation is based on the 2005 population and employment share only.

4.1.5 County Comprehensive Plan Population and Employment Projections

For comparison purposes, population and employment projections from county comprehensive plans are included in the following tables.

Table 27 SR 365 Comprehensive Plan Population Projections

	SR 365 Population						
County	**1980**	**1990**	**2000**	**2010**	**2020**	**2025**	**2030**
Habersham	25,020	27,622	35,902	47,800	63,820	75,001	N/A
Hall	76,101	95,984	139,277	237,332	376,329	437,609	489,366
Total	101,121	123,606	175,179	285,132	440,149	512,610	N/A

Sources: Historic and current population figures are from the Census. Future projections are from county comprehensive plans (Hall) and the Multimodal Transportation Study (Habersham).

Table 28 SR 365 Comprehensive Plan Employment Projections

	SR 365 Employment						
County	**1980**	**1990**	**2000**	**2010**	**2020**	**2025**	**2030**
Habersham	10,458	13,384	16,777	19,937	23,096	24,676	26,256
Hall	N/A	55,743	80,964	139,558	220,732	253,885	280,792
Total	N/A	69,127	97,741	159,495	243,828	278,561	307,048

Sources: Historic and current employment figures are from the U.S. Census (2000). Future projections are from county comprehensive plans.

4.2 Travel Demand Model

The travel demand model integrates land use and zonal socioeconomic data with household travel behavior. A brief description of the travel demand model used to study SR 365 is provided below. A full description of the model's development, calibration, and validation is disclosed in a technical memorandum supplementary to this report titled "SR 400 and SR 365 Travel Demand Model." The model employed for the SR 365 corridor study was also used in the SR 400 corridor study.

The model study area includes all of Forsyth and Hall counties but only the southern portions of Lumpkin, White, and Habersham counties. Figure 11 shows the geographic area used for travel demand modeling, as well as the two study corridors and the highway network links for which current and future traffic volumes were computed by the model. For Dawson County, only the eastern third of the county falls inside the model's study area. The SR 365 corridor runs northeasterly from Gainesville in Hall County to the Cornelia-Demorest area of Habersham County. The SR 400 corridor is oriented northeasterly from north of Cumming in Forsyth County to SR 60 southeast of Dahlonega in Lumpkin County.

4.2.1 Base Year Travel Patterns

The final product of the SR 400 and SR 365 travel demand model is the assignment of daily traffic volumes onto a model road network. Along with the assignment of daily traffic onto the highway network, the model computes daily trip tables by trip purpose, interzonal free-flow travel time matrices, and interzonal travel time matrices that reflect lower travel speeds from capacity limitations that exist on specific network links during peak hours of a typical weekday.

Some of the most prominent travel behavior data and patterns input to the base year (2005) model are reported in the following sections.

4.2.2 External Station Traffic

In addition to daily traffic generated within the 445 TAZs inside the study area, there is a significant amount of traffic comes in and out of the study area by way of external stations. Within the model, external stations are represented by those network links that are located on the edge of the SR 400 and SR 365 travel sheds. There are 51 external stations in the SR 400 and SR 365 travel demand model. A list of modeled external stations and their corresponding 2005-level ADT volume estimates is provided in Table 29.

Table 29 External Stations

External Station No.	Route Name	County	Est. 2005-Level Daily Traffic	External Station No.	Route Name	County	Est. 2005-Level Daily Traffic
446	Yonah Homer	Hall	2,320	472	SR 9/Cumming Highway	Forsyth	21,980
447	SR 51	Hall	2,610	473	Midway	Forsyth	1,530
448	SR 323	Hall	1,100	474	Drew Campground	Forsyth	1,530
449	SR 52	Hall	3,580	475	SR 20	Forsyth	15,800
450	SR 82	Hall	1,140	476	SR 369	Forsyth	8,230
451	U.S. 129	Hall	10,040	477	Dawson Forest	Dawson	390
452	SR 332	Hall	1,070	478	SR 53	Dawson	6,760
453	SR 60	Hall	2,100	479	SR 136	Dawson	1,400
454	SR 53	Hall	7,910	480	SR 52	Lumpkin	2,860
455	SR 211	Hall	4,910	481	SR 9/U.S. 19/SR 60	Lumpkin	3,730
456	Spout Springs/Thompson Mill	Hall	5,250	482	SR 11/U.S. 129	White	6,050
457	Ridge	Hall	290	483	SR 75	White	8,090
458	N Bogan	Hall	980	484	SR 384	White	2,940
459	I-985	Hall	58,950	485	SR 17	Habersham	2,910
460	SR 13	Hall	8,440	486	SR 197	Habersham	4,530
461	Peachtree Industrial	Hall	12,170	487	SR 385	Habersham	7,000
462	Buford Dam	Hall	1,210	488	SR 365/U.S. 23	Habersham	9,240
463	Buford Dam	Forsyth	11,630	489	Glade Creek	Habersham	390
464	SR 20	Forsyth	23,920	490	SR 17	Habersham	8,930
465	Old Atlanta	Forsyth	5,870	491	SR 13	Habersham	1,270
466	SR 141	Forsyth	34,000	492	Lake Russell	Habersham	200
467	Jones Bridge	Forsyth	3,920	493	U.S. 441	Habersham	8,400
468	Old Alpharetta	Forsyth	7,545	494	Apple Pie Ridge	Habersham	4,590
469	McFarland	Forsyth	10,830	495	SR 347	Hall	4,250
470	SR 400	Forsyth	74,400	496	Bald Ridge Marina	Forsyth	3,350
471	Union Hill	Forsyth	1,530				

Source: SR 400 and SR 365 Travel Demand Model

The external station with the highest volume is SR 400 in Forsyth County with an ADT of 74,400 vpd in both directions of travel. I-985 in Hall County is also a high-volume entry/exit point with an estimated 2005 ADT of 58,950 vpd. On the northern fringe of the SR 365 corridor travel shed, SR 365 splits into two highways before exiting the study area. U.S. 23/SR 365, with an external station ADT of 9,240 vpd, continues north through Habersham County toward Tallulah Falls. The other branch of SR 365 becomes SR 17 and is oriented in an eastward direction toward Toccoa, Georgia. The external station volume at the Toccoa branch of SR 17 is 8,930 vpd.

4.2.3 Census 2000 Journey to Work Data

The United States Bureau of Census collects place of residence and place of work data on the decennial Census' long form, which is distributed to approximately 15 percent of the nation's households. It is referred to as the Census Journey to Work Sample (JTW Sample). The Census 2000 JTW Sample reported herein captures the place of residence and place of work patterns of residents who live in counties inside the model study area. The major limitation of this data set is that it only accounts for work trips and excludes trips made for any other purpose. This is significant because work trips only account for approximately 15 percent to 20 percent of total daily household travel. Therefore, several other trip type patterns are left unrepresented.

Hall County resident workers dominate the composition of commuters in the SR 365 corridor north of Gwinnett County. However, they may not predominate on sections of SR 365 north of Gainesville. Place of residence to place of work tabulations are shown in Table 30 for Hall and Habersham County residents.

Table 30 2000-Level JTW Sample

	Place of Residence	
Workplace Locations	**Hall**	**Habersham**
Metro Atlanta	11,705	605
Hall County	46,420	1,965
Habersham County	465	11,160
Forsyth County	1,575	25
Dawson County	360	35
Lumpkin County	645	90
White County	430	735

Source: U.S. Census Bureau – Census 2000

The most dominant combination of residences and workplaces in 2000 was Hall County, where 46,420 residents also work in Hall County. The next largest commute pattern for Hall County's resident workers was to metro Atlanta (11,705). Very few Hall County commuters travel north to a workplace in Habersham County (465).

However, nearly 2,000 Habersham residents travel to a workplace in Hall County. People who live in Habersham County tend to work in Habersham County (11,160). No other Habersham County commuting pattern approaches the magnitude of internal commute travel. A significant number of workers living in Hall County commuted to workplaces in Forsyth County (1,575). These data support the significant directional split in peak-hour traffic on SR 365 in Hall County.

4.2.4 Trip Generation

The SR 400 and SR 365 travel demand model uses seven trip purposes to generate trip ends as listed below.

No.	Purpose Name	No.	Purpose Name
1.	Home-Based Work (HBW)	5.	Commercial Vehicles
2.	Home-Based Other (HBO)	6.	Internal-External Passenger Cars
3.	Home-Based Shopping (HBSh)	7.	Internal-External Trucks
4.	Non-Home-Based (NHB)		

Vehicle trips traveling from outside the model study area to outside the model study area (e.g., from Atlanta to Asheville, North Carolina) are referred to as external-external (E-E) trips. E-E trips were estimated for both passenger cars and trucks in separate data files outside of the trip generation process. Origin-destination survey data from roadside surveys provided the study team with a basis for these data sets. The Atlanta Regional Commission (ARC) conducted an external station survey in 1994 to update travel patterns in its travel demand model. ARC's origin-destination survey included taking samples of motorists on I-985 at the Gwinnett/Hall County border as well as at the Forsyth/Dawson County border. In addition, Census 2000 JTW data provided background into splitting total external station trips between E-E type trips and internal-external (I-E) trips.

The relative share of 2005-level modeled trip ends for each county is closely related to the level of human activity within that county's boundary. Modeled production and attraction trip ends by county for the base year 2005 are presented in Table 31. As expected, Hall County has the highest number of production (365,882) and attraction (429,863) trip ends in the combined SR 400 and SR 365 travel demand model area. Hall County's relative share of productions for the model study area is 39.3 percent for productions and 46.2 percent for attractions. In terms of production trip ends, Forsyth County is second to Hall County. An estimated 349,849 production trip ends were computed for Forsyth County, which is approximately 16,000 less than Hall County.

Attraction trip ends in Forsyth County were approximately 150,000 fewer than in Hall County because employment-related developments in Forsyth County are not as well-developed as in Hall County.

Table 31 Modeled Total Trip Ends by County (2005)

County	Productions	Percent of Total	Attractions	Percent of Total
Dawson	39,964	4.3	50,516	5.4
Forsyth	349,849	37.5	286,418	30.7
Habersham	94,836	10.2	87,667	9.4
Hall	365,882	39.3	429,863	46.2
Lumpkin	39,370	4.2	42,119	4.5
White	42,181	4.5	35,485	3.8
Study Area	932,082	100.0	932,068	100.0

Source: Georgia 400 and SR 365 trip generation application – PBS&J

Notes: Forsyth County and Hall County include trips generated for entire county. Dawson, Habersham, Lumpkin, and White County trips include trips generated for parts of the county.

Of the northern counties in the model's study area, Habersham County produced and attracted more trip ends than Lumpkin, Dawson, or White counties. There were 94,836 production trip ends and 87,667 attraction trip ends computed in Habersham County. Most production and attraction trip ends in Hall and Habersham counties are ultimately converted into travel demand oriented between zonal trip interchanges in or near the SR 365 corridor. Some long-distance trips produced in or attracted to White County will be oriented to the SR 365 and SR 400 corridors.

Table 32 Travel Time and Trip Length by Trip Purpose

Trip Purpose	Mean Travel Time (minutes)	Mean Trip Length (miles)
HBW	20.6	10.3
HBO	10.8	5.0
HBSh	15.6	7.7
NHB	10.7	4.9
Commercial	10.0	4.3
I-E Passenger Car	22.8	14.2
I-E Truck	25.2	17.0

Sources: Georgia 400 and SR 365 daily trip tables, congested time, free-flow time, and distance skim files from loaded network.

4.2.5 Trip Distribution Patterns

Of all seven trip purposes, the longest trips computed in the travel demand model were I-E passenger car trips and I-E truck trips. These patterns are not unexpected because trips entering a model study area from outside the study area are work-related and have relatively long trip lengths in comparison with other common trip purposes or trip types. For the five internal-internal (I-I) trip purposes, HBW trips had the longest computed trip lengths, as expected. Average travel times (in minutes) and average trip lengths (in miles) by trip purpose are displayed in Table 32.

I-E truck trip lengths for time and distance were 25.2 minutes and 17.0 miles. The I-E passenger car pattern was slightly shorter, having a computed average time of 22.8 minutes and average distance of 14.2 miles. Average trip times and trip distances were lower for HBW trips than for I-E trip types. The average trip time was 20.6 minutes and the average trip distance was 10.3 miles for HBW trips. Average trip distances and travel times for HBSh trips were relatively long (15.6 minutes and 7.7 miles). In contrast, HBO, commercial, and NHB trip purposes exhibited relatively low trip lengths.

4.2.6 Daily Traffic Assignment

The SR 400 and SR 365 travel demand model was built and subsequently calibrated to produce accurate ADT volumes for 2005. ADT numbers represent the two-way volume of 24-hour traffic on a section of road for an average weekday. Base year 2005-level ADT outputs by the travel demand model for the SR 365 corridor are displayed using bandwidth sizes on Figure 12.

Base year 2005-level ADT estimates for the SR 365 corridor range from a high of 31,000 vpd between Lula and Gainesville in Hall County to a low point of 19,000 vpd west of Alto in Habersham County. There is a localized high ADT on SR 365 between U.S. 441 and SR 105 outside of Cornelia where SR 365 is already a limited-access facility. Daily traffic volumes drop significantly north and south of this section. The distribution of 2005-level ADT volumes, indicated by varying thicknesses of the band overlaying sections of SR 365, closely matches the observed daily traffic volumes that were measured for this study.

Another important design objective of the SR 400 and SR 365 travel demand model was to identify major intersecting cross streets that contribute a significant amount of daily traffic onto and off of SR 365. Presently, the major intersecting cross streets

contributing a significant level of traffic to SR 365 are: Jesse Jewell Parkway in Hall County, SR 52 in Hall County, Duncan Bridge Road (SR 384) in Habersham County, Old Level Road in Habersham County, U.S. 441 in Habersham County, Cannon Bridge Road (SR 105) in Habersham County, and Demorest – Mount Airy Highway in Habersham County. In the bandwidth map, only Jesse Jewell Parkway, Old Level Road, U.S. 441, Cannon Bridge Road, and Demorest – Mount Airy Highway are shown with thick bandwidths associated with an ADT range between 10,001 vpd and 20,000 vpd.

4.3 Future Corridor Travel Demands

Basic elements of the SR 400 and SR 365 travel demand model were assembled, calibrated, and tested during development of the base year 2005 modeling scenario. To project travel demand to the future planning horizon of 2030, several new data files were prepared to replace their counterparts in the 2005 version of the model. These files are:

- 2030 zonal socioeconomic data file
- 2030 estimates of external station volumes
- Baseline existing plus committed (E+C) highway network

After the new files were input into the calibrated base year travel demand model, future year travel demand for the baseline 2030 modeling scenario was forecasted. Each data file is described later in this section with a summary of the traffic assignment output by the future year 2030 baseline model run.

4.3.1 Socioeconomic Data

The SR 400 and SR 365 travel demand model's study area is located immediately north of metro Atlanta's fast-growing suburban areas. The SR 400 corridor is situated immediately north of northern Fulton County, southern Forsyth County, and the City of Cumming. Northeast of the SR 400 corridor, the SR 365 corridor lies north of northern Gwinnett County, southern Hall County, and the City of Gainesville. As a result of the residential and commercial development patterns that have occurred in these areas over the last 20 years, the level of new construction, redevelopment, and overall human activity is anticipated to grow substantially between 2005 and 2030. Increased levels of human activity directly translate to additional travel demand.

Table 33 displays the county-level projections of population and total employment that were incorporated in the travel demand model to forecast travel demand in the SR 400 and SR 365 corridors. To get a sense of the amount of growth projected, population and total employment were projected to increase to nearly 1.1 million persons and 508,000 employees, respectively, throughout the entire SR 400 and SR 365 corridor study areas. The 2030 population projection is nearly three times more than the 378,000 persons residing in the study area in 2005. The rate of growth is even higher for commercial development with the 2030 total employment forecast at almost four times more than 2005 numbers.

The relative distribution of socioeconomic data by county in 2030 does not change substantially in comparison with 2005. The highest concentrations of population and total employment are expected to remain in Forsyth and Hall counties in the future. Hall County currently has approximately 50 percent of the study area's total employment and 44 percent of the study area's population. Those shares are essentially the same in the 2030 projections. Forsyth County's share of population remains virtually the same between 2005 and 2030, but its proportion of total employment increases from 25 percent in 2005 to 35 percent in 2030.

Table 33 2030 Population and Total Employment by County

County	Population	Percent of Total	Total Employment	Percent of Total
Dawson[1]	34,439	3.2	13,462	2.6
Forsyth	393,581	36.2	182,393	35.9
Habersham[1]	67,164	6.2	25,190	4.9
Hall	487,826	44.9	260,389	51.3
Lumpkin[1]	53,755	4.9	15,513	3.0
White[1]	49,919	4.6	11,944	2.3
Total	1,086,684	100.0	508,891	100.0

[1]Population and total employment figures for only that portion of county inside the model study area.

Sources: Raw data from U.S. Census (2000); projections made by ARCADIS

While this amount of growth may seem large, the projected socioeconomic numbers used to forecast 2030 travel demand are similar to planning demographics on record with Georgia DCA and those being used by Forsyth, Hall, Habersham, Dawson, Lumpkin, and White counties in their comprehensive planning processes.

Projected growth from 2005 to 2030 was not allocated uniformly throughout the study area or within county boundaries. The spatial allocation of 2005–2030 increases in population and total employment for 17 subareas inside the model study area are shown on Figures 13 and 14, respectively. The South Forsyth and South Hall subareas received the largest increases in population growth with more than 100,000 new persons expected to reside in each of these subareas by 2030. Several subareas in North Forsyth and North Hall were expected to gain between 50,000 additional persons and 100,000 additional persons. The SR 365 corridor in North Hall is forecasted to receive 30,000 new persons to 50,000 new persons by the horizon year 2030.

In terms of the total employment forecast, Figure 14 indicates that the Gainesville subarea in Hall County is projected to receive the highest concentration of employment-related growth. Subareas in South Forsyth, North Forsyth, and South Hall are projected to receive 50,000 to 100,000 total employment increases. The area along the SR 365 corridor in northern Hall County is forecasted to receive 10,000 to 20,000 new employees by the horizon year 2030.

4.3.2 External Station Data

Overall, external traffic coming into, out of, and through the SR 400 and SR 365 travel demand model study area is forecasted to grow by 119 percent from 2005 to 2030. This rate of traffic growth was considered to be consistent with the amount of forecasted growth in human activity inside the study area. Forecast year 2030 external station traffic volumes are listed in Table 34. Not surprisingly, the two highway facilities with the highest daily 2030 volumes are the same roadway facilities as in 2005. SR 400, at the border between North Fulton and South Forsyth, was projected to have the highest 2030 volume with 175,800 vpd, which represents 136 percent of cumulative growth over 2005 numbers. I-985, where North Gwinnett meets South Hall, has the second-highest volume of 2030 traffic entering and leaving the study area at 139,300 vpd, which also represents 136 percent growth over 2005-level traffic.

Table 34 2005 and 2030 Daily Traffic at External Stations

Model External Station Number	Road Name	County	Est. 2005 Daily Volume	Est. 2030 Daily Volume	Daily Traffic Change (2005–2030)
446	Yonah Homer	Hall	2,320	4,600	98%
447	SR 51	Hall	2,610	5,100	95%
448	SR 323	Hall	1,100	2,200	100%
449	SR 52	Hall	3,580	7,100	98%
450	SR 82	Hall	1,140	2,200	93%
451	U.S. 129	Hall	10,040	23,700	136%
452	SR 332	Hall	1,070	2,100	96%
453	SR 60	Hall	2,100	4,400	110%
454	SR 53	Hall	7,910	18,700	136%
455	SR 211	Hall	4,910	11,600	136%
456	Spout Springs/Thompson Mill	Hall	5,250	17,800	239%
457	Ridge	Hall	290	500	72%
458	N Bogan	Hall	980	1,600	63%
459	I-985	Hall	58,950	139,300	136%
460	SR 13	Hall	8,440	19,900	136%
461	Peachtree Industrial	Hall	12,170	32,400	166%
462	Buford Dam	Hall	1,210	2,500	107%
463	Buford Dam	Forsyth	11,630	16,900	45%
464	SR 20	Forsyth	23,920	56,500	136%
465	Old Atlanta	Forsyth	5,870	11,700	99%
466	SR 141	Forsyth	34,000	71,200	109%
467	Jones Bridge	Forsyth	3,920	8,200	109%
468	Old Alpharetta	Forsyth	7,545	14,000	86%
469	McFarland	Forsyth	10,830	22,700	110%
470	SR 400	Forsyth	74,400	175,800	136%
471	Union Hill	Forsyth	1,530	9,300	508%
472	SR 9/Cumming Highway	Forsyth	21,980	46,000	109%
473	Midway	Forsyth	1,530	5,200	240%

Table 34 2005 and 2030 Daily Traffic at External Stations

Model External Station Number	Road Name	County	Est. 2005 Daily Volume	Est. 2030 Daily Volume	Daily Traffic Change (2005–2030)
474	Drew Campground	Forsyth	1,530	5,200	240%
475	SR 20	Forsyth	15,800	37,300	136%
476	SR 369	Forsyth	8,230	17,200	109%
477	Dawson Forest	Dawson	390	4,200	977%
478	SR 53	Dawson	6,760	11,100	64%
479	SR 136	Dawson	1,400	2,300	64%
480	SR 52	Lumpkin	2,860	4,700	64%
481	SR 9/U.S. 19/SR 60	Lumpkin	3,730	6,100	64%
482	SR 11/U.S. 129	White	6,050	9,900	64%
483	SR 75	White	8,090	13,300	64%
484	SR 384	White	2,940	4,800	63%
485	SR 17	Habersham	2,910	4,800	65%
486	SR 197	Habersham	4,530	7,400	63%
487	SR 385	Habersham	7,000	11,500	64%
488	SR 365/U.S. 23	Habersham	9,240	19,300	109%
489	Glade Creek	Habersham	390	600	54%
490	SR 17	Habersham	8,930	17,800	99%
491	SR 13	Habersham	1,270	2,100	65%
492	Lake Russell	Habersham	200	300	50%
493	U.S. 441	Habersham	8,400	15,600	86%
494	Apple Pie Ridge	Habersham	4,590	7,500	63%
495	SR 347	Hall	4,250	7,000	65%
496	Bald Ridge Marina	Forsyth	3,350	6,200	85%
Total			434,065	949,400	119%

Source: SR 400 and SR 365 travel demand model

Traffic growth from 2005 to 2030 at other stations on the perimeter of the model's study area were generally consistent with differences in human activity that were represented by the 2005 to 2030 changes in socioeconomic data by subarea. Two external stations

were projected to have unusually high percentage growth changes between 2005 and 2030. Station no. 471 in Forsyth County (Union Hill Road) had a forecasted 508 percent growth. That percentage represents growth in daily traffic from a base of 1,530 vpd in 2005 to 9,300 vpd in 2030. In absolute terms, that is an increase of 7,770 vpd over 25 years, which is consistent with the level of residential and commercial growth anticipated in that portion of the model study area. Moreover, most road facilities parallel to Union Hill Road are already nearing their design capacity during peak hours of typical weekdays.

Farther north in Dawson County, station no. 477 (Dawson Forest Road) was projected to experience 977 percent growth. That percentage represents growth in daily traffic from a base of 390 vpd in 2005 to 4,200 vpd in 2030, which is 3,810 vpd in absolute terms. Once again, this traffic growth is consistent with the level of residential and commercial growth anticipated in that portion of south Dawson County around the intersection of Dahlonega Highway/SR 9 at Dawson Forest Road.

4.3.3 E+C Network Assumptions

A new, updated highway network was built from the base year 2005 network file to better reflect "committed" improvements that are assumed to be built over the next 10 years. In the travel demand modeling environment and the real world environment, any capacity or accessibility changes in the highway network could trigger significant shifts in the routing decisions of vehicles travelling between certain origin-destination zone pairs. These routing shifts are particularly sensitive for those motorists who travel in highway networks where congestion is present.

Committed roadway improvements were defined by the study team as those planned highway improvements that will be under construction or at least in the right-of-way acquisition stage of project implementation within the 2007–2011 time frame. The list of "committed" projects assembled by the study team was obtained from the following sources: GHMPO 2006–2011 Transportation Improvement Program (TIP); ARC 2006–2011 TIP; Georgia DOT's Construction Work Program (CWP) (June 2006); Georgia DOT's CWP (April 2007); and Georgia DOT's 2007–2009 State Transportation Improvement Program (STIP).

Projects selected to be coded into the future year E+C network were those that could significantly improve capacity or accessibility or change motorist routings. Figure 15 displays a network map of the study area, highlighting sections of the road system where "committed" projects were identified. Brief descriptions of individual projects are

included in Appendix F of this report, according to the label numbers shown on the figure.

The committed projects map highlights only those planned improvements that meet the previously specified criteria. County public works departments and Georgia DOT have many more improvements in various stages of the project development process. However, because of existing funding constraints and the possibility of prioritization shifts, only these planned projects were coded into the future year highway network to represent a reasonable baseline condition.

Capacity and accessibility improvements were coded into the base year highway network file to provide infrastructure where current and projected levels of human activity are greatest. Most of the roads highlighted on Figure 15 are located in southern Forsyth County, Cumming, southern Hall County, and Gainesville. Not many committed improvements are situated directly in the SR 400 study corridor, except for the three listed below:

- Interchange improvement at SR 369/Browns Bridge Road in Forsyth County
- Interchange improvement at Dawsonville Highway/SR 53 in Dawson County
- Operational and safety improvement with some added capacity on Cannon Bridge Road/SR 105 at SR 365 in Habersham County

4.3.4 Traffic Assignment

The future year 2030 traffic assignment for the baseline scenario was composed from a loading of 2030 travel demand onto the E+C highway network. Forecasted 2030 travel demand was much greater than base year 2005 traffic as expected in light of the escalation in

Table 35 2005 and 2030 Total Trip Ends by County

County	Total Trip Ends 2005	Total Trip Ends 2030	Percent Change
Dawson[1]	75,467	212,798	182
Forsyth	708,204	2,524,704	256
Habersham[1]	169,134	490,379	190
Hall	648,171	2,517,692	288
Lumpkin[1]	63,778	274,137	330
White[1]	69,540	249,957	259
Total	1,734,294	6,269,667	262

[1]Trip ends for only those portions of the county inside the model study area.

Source: SR 400 and SR 365 Travel Demand Model

socioeconomic data between 2005 and 2030. A comparison of 2005 and 2030 total trip ends produced and attracted to zones inside the study area by county is presented in Table 35. More than 6.2 million daily trip ends were forecasted in the future year 2030. This number is 262 percent more than the 1.7 million total trip ends estimated for the base year 2005. In Hall County, the increase in trip ends grew from 648,171 in 2005 to 2.5 million in 2030. At the northern end of the SR 365 corridor, Habersham County's total trip ends were forecasted to increase by 190 percent, increasing from 169,134 trip ends in 2005 to 490,379 trip ends in 2030. Forsyth County also showed a prolific change in travel demand, growing from 708,204 trip ends in 2005 to 2.5 million trip ends in 2030.

Future year 2030 traffic volumes on SR 365 were projected to at least double in the future. A colored bandwidth map displaying 2030 modeled daily volumes on roadways in the SR 365 corridor is presented on Figure 16. The size of the 2030 daily traffic bandwidth clearly shows that in 2030, SR 365 will be the primary transportation conduit between Gainesville and Habersham County with substantially more traffic than in base year 2005.

On the highest-load section between White Sulphur Road and Jesse Jewell Parkway in Hall County, the 2030 projection on SR 365 is 70,000 vpd, which is 133 percent more than the 30,000 vpd traveling on that section of SR 365 in 2005. Modeled 2030 daily traffic assigned to SR 365 in Hall County remains high from Gainesville to Lula. North of Lula, daily traffic volumes fall from 53,000 vpd to 45,000 vpd. On the lowest-load section from Cannon Bridge Road/SR 105 to Demorest – Mount Airy Highway in Habersham County, modeled daily traffic increases 121 percent from 18,100 vpd in 2005 to 40,000 vpd in 2030. The highest-volume section of SR 365 in Habersham County was between the U.S. 441 Bypass and Cannon Bridge Road/SR 105 outside Cornelia, where the 2030 model forecast was 58,000 vpd.

4.3.5 Projected Traffic Conditions

Traffic conditions depicting peak-hour conditions were estimated for the 2030 no-build network scenario using the same analysis techniques as described earlier in the existing conditions analysis. The analysis does incorporate future year 2030 traffic, but the no-build scenario includes minor geometric and signalization improvements at intersections. Minor geometric and signalization improvements were needed to conduct the LOS analysis because without them, gridlock conditions would result, which would effectively prevent the analysis tool from computing average stop delays or per-lane densities.

Estimated a.m. and p.m. peak-hour traffic conditions at intersections are presented in Table 36 for the 2030 no-build condition using LOS grades. The longest average stop delays and lowest LOS grades were computed during the p.m. peak hour at the intersections of SR 365 at White Sulphur Road and SR 365 at Jesse Jewell Parkway (northbound ramps). LOS grades at both intersections were at LOS E, which denotes unsatisfactory operating conditions. Average computed stop delays at these locations were 77.6 seconds per vehicle at White Sulphur Road and 62.0 seconds per vehicle at Jesse Jewell Parkway. During the p.m. peak hour, LOS D conditions were estimated at the Ramsey Road, Duncan Bridge/SR 384, and SR 52 intersections.

In the a.m. peak-hour simulation, two intersections were projected to operate at LOS D: SR 365 at White Sulphur Road and SR 365 at SR 52. For comparison purposes, none of the intersections currently operate at LOS D or worse. The operating conditions reported in Table 36 assume the following kinds of intersection improvements and access management strategies:

- No new driveways or cross streets providing access onto or off SR 365
- Double through-movement lanes on cross street approaches at several intersections
- Traffic signals at all intersections with near-optimal signal timing

Table 36 A.M. and P.M. Intersection LOS (2030 No-Build Scenario)

No.	Intersection	Traffic Control Type	Average Delay (seconds/ veh.)	LOS (A.M.)	Average Delay (seconds/ veh.)	LOS (P.M.)
1.	SR 365 at Jesse Jewell Parkway (northbound ramps)	Signalized	28.1	C	62.0	E
2.	SR 365 at Jesse Jewell Parkway (southbound ramps)	Signalized	27.6	C	33.7	C
3.	SR 365 at Ramsey Road	Signalized	11.6	B	54.3	D
4.	SR 365 at White Sulphur Road	Signalized	50.5	D	77.6	E
5.	SR 365 at Whitehall/Bill Minor	Signalized	16.9	B	16.9	B
6.	SR 365 at Cagle Road	Signalized	25.3	C	27.0	C
7.	SR 365 at SR 52	Signalized	52.4	D	41.3	D
8.	SR 365 at Athens Street	Signalized	34.0	C	9.6	A

Table 36 A.M. and P.M. Intersection LOS (2030 No-Build Scenario)

No.	Intersection	Traffic Control Type	Average Delay (seconds/ veh.)	LOS (A.M.)	Average Delay (seconds/ veh.)	LOS (P.M.)
9.	SR 365 at Belton Bridge Road	Signalized	34.0	C	15.4	B
10.	SR 365 at Crane Mill Road	Signalized	11.9	B	7.5	A
11.	SR 365 at Mt. Zion Road	Signalized	14.0	B	7.3	A
12.	SR 365 at Alto Mud Creek Road	Signalized	12.2	B	12.9	B
13.	SR 365 at Duncan Bridge/ SR 384	Signalized	19.9	B	54.1	D
14.	SR 365 at Level Grove Road (northbound ramps)	Signalized	19.5	B	14.5	B
15.	SR 365 at Level Grove Road (southbound ramps)	Signalized	12.5	B	17.3	B
16.	SR 365 at Cannon Bridge Road/SR 105 (northbound ramps)	Signalized	20.2	C	26.2	C
17.	SR 365 at Cannon Bridge Road/SR 105 (southbound ramps)	Signalized	12.3	B	33.4	C
18.	SR 365 at Demorest – Mount Airy Highway	Signalized	34.4	C	31.5	C

Source: CORSIM model

Table 37 A.M. and P.M. Freeway Section LOS (2030 No-Build Scenario)

Segment		Direction of Travel	Analysis Type	A.M.			P.M.		
Cross Street 1	Cross Street 2			Model Simulation Volume	Density (vehs/lane/mi.)	LOS	Model Simulation Volume	Density (vehs/lane/mi.)	LOS
Hall County									
Athens Highway/U.S. 129	Jesse Jewell Parkway	Northbound	Merge/Diverge	2,830	17.6	C	4,310	64.4	F
Jesse Jewell Parkway	Jesse Jewell Parkway	Northbound	Basic Segment	1,760	13.9	B	4,310	76.6	F
Jesse Jewell Parkway	Ramsey Road	Northbound	Merge/Diverge	2,400	19.6	C	2,880	98.8	F
Jesse Jewell Parkway	Ramsey Road	Northbound	Basic Segment	2,400	19.6	C	3,880	98.8	F
Ramsey Road	Jesse Jewell Parkway	Southbound	Basic Segment	3,880	19.7	C	2,820	18.2	C
Ramsey Road	Jesse Jewell Parkway	Southbound	Merge/Diverge	3,880	19.7	C	2,820	18.2	C
Jesse Jewell Parkway	Jesse Jewell Parkway	Southbound	Basic Segment	2,880	15.7	B	2,070	14.3	B
Jesse Jewell Parkway	Athens Highway/U.S. 129	Southbound	Merge/Diverge	4,310	29.6	D	3,330	25.4	D
Habersham County									
Duncan Bridge/SR 384	Level Grove Road	Northbound	Merge/Diverge	2,040	16.3	C	2,430	20.0	C
Level Grove Road	Level Grove Road	Northbound	Basic Segment	1,480	11.3	B	1,840	14.5	B
Level Grove Road	U.S. 441 Bypass	Northbound	Merge/Diverge	1,810	13.9	B	2,000	15.9	B
Level Grove Road	U.S. 441 Bypass	Northbound	Basic Segment	1,810	13.9	B	2,000	15.8	B
U.S. 441 Bypass	Cannon Bridge Road/SR 105	Northbound	Merge/Diverge	2,480	20.3	C	2,700	22.1	C
U.S. 441 Bypass	Cannon Bridge Road/SR 105	Northbound	Basic Segment	2,480	20.3	C	2,700	22.8	C
U.S. 441 Bypass	Cannon Bridge Road/SR 105	Northbound	Merge/Diverge	2,480	17.4	C	2,700	19.0	C
Cannon Bridge Road/SR 105	Cannon Bridge Road/SR 105	Northbound	Basic Segment	1,600	11.7	B	1,660	12.6	B
Cannon Bridge Road/SR 105	Demorest – Mount Airy Highway	Northbound	Merge/Diverge	1,800	13.6	B	1,860	14.4	B
Demorest – Mount Airy Highway	Cannon Bridge Road/SR 105	Southbound	Merge/Diverge	2,040	16.9	C	2,100	16.0	B
Cannon Bridge Road/SR 105	Cannon Bridge Road/SR 105	Southbound	Basic Segment	1,830	14.3	B	1,840	13.3	B
Cannon Bridge Road/SR 105	U.S. 441 Bypass	Southbound	Merge/Diverge	2,650	22.4	C	2,840	23.0	C
Cannon Bridge Road/SR 105	U.S. 441 Bypass	Southbound	Basic Segment	2,650	21.7	C	2,840	22.1	C
Cannon Bridge Road/SR 105	U.S. 441 Bypass	Southbound	Merge/Diverge	2,650	22.5	C	2,840	22.7	C
U.S. 441 Bypass	Level Grove Road	Southbound	Basic Segment	2,000	15.9	B	2,130	16.3	C
U.S. 441 Bypass	Level Grove Road	Southbound	Merge/Diverge	2,000	15.5	B	2,130	15.1	B
Level Grove Road	Level Grove Road	Southbound	Basic Segment	1,840	14.7	B	1,720	13.0	B
Level Grove Road	Duncan Bridge/SR 384	Southbound	Merge/Diverge	2,430	20.1	C	2,400	18.9	C

Source: CORSIM model

LOS grades for SR 365's freeway segments in the 2030 no-build scenario were estimated using the same simulation technique utilized for existing conditions. A.m. and p.m. peak-hour operating conditions are shown in Table 37 using LOS grades for freeway segments only. The lowest LOS grades and highest traffic densities were projected to occur during the p.m. peak hour on freeway sections around Jesse Jewell Parkway. During the p.m. peak hour, northbound SR 365 traffic delayed at the Ramsey Road and White Sulphur Road intersections slows traffic upstream to Jesse Jewell Parkway. Thus, the per-lane density on SR 365 immediately north of Jesse Jewell Parkway is 98.8 passenger cars/per lane/per mile, which translates to LOS F. LOS F on the freeway signifies bottleneck conditions. Traffic conditions during the p.m. peak hour elsewhere on freeway sections are satisfactory. However, the satisfactory conditions only exist on the rest of the freeway sections in the 2030 no-build scenario because so much p.m. peak-hour traffic is trapped in the northbound SR 365 bottleneck between Jesse Jewell Parkway and White Sulphur Road.

In the a.m. peak hour, traffic conditions are better on SR 365's freeway sections than during the p.m. peak hour. The only freeway section operating in an unsatisfactory condition during the a.m. peak hour is a southbound segment of I-985 located immediately south of Jesse Jewell Parkway with an LOS of D. There are reasonable, but misleading, LOS grades for motorists traveling southbound on the section of freeway located immediately north of I-985. From Ramsey Road to Jesse Jewell Parkway, the reported a.m. LOS grade is C. Traffic operations on this short section of freeway will perform well, but only because traffic signals at SR 52 and White Sulphur Road will act as traffic control devices that meter southbound SR 365 traffic. Motor vehicle delays at SR 52 and White Sulphur Road, however, will be long.

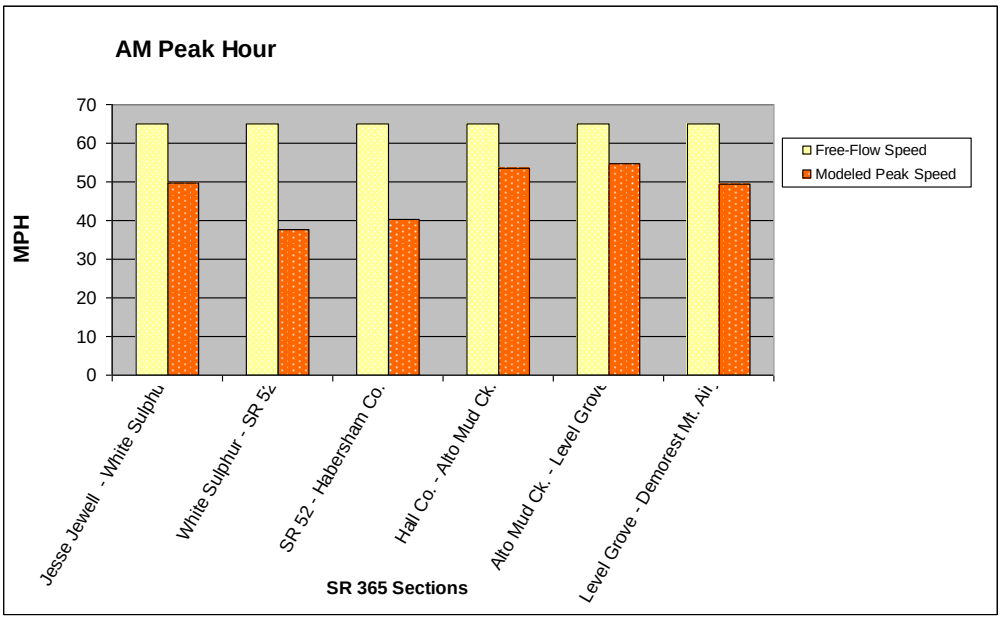
4.3.6 Corridor Traffic Conditions

Average peak-period travel speeds in the peak direction of travel were used to benchmark corridor traffic conditions on SR 365 using the same analysis approach as existing conditions. The corridor was split into six sections to benchmark average peak-hour travel speeds in the peak direction of travel.

Average peak-period speeds for the 2030 no-build scenario were significantly slower than for the base year but not on all sections of SR 365. A comparative bar chart showing free-flow speeds alongside modeled a.m. peak-hour travel speeds is presented on Chart 11 for motorists traveling southbound on SR 365. Peak-travel speeds on two sections in North Hall were noticeably lower than on other sections. On the section from SR 52 to White Sulphur Road, the simulated a.m. peak travel speed

was computed to be 38 mph, which is 27 mph below the assumed free-flow speed of 65 mph. The next section north, Habersham County line to SR 52, also had a relatively low a.m. peak travel speed of 40 mph. These speeds are consistent with the 2030 no-build LOS grades reported for intersections and freeway segments.

Chart 11 A.M. Peak-Hour Speeds (2030 No-Build Scenario)



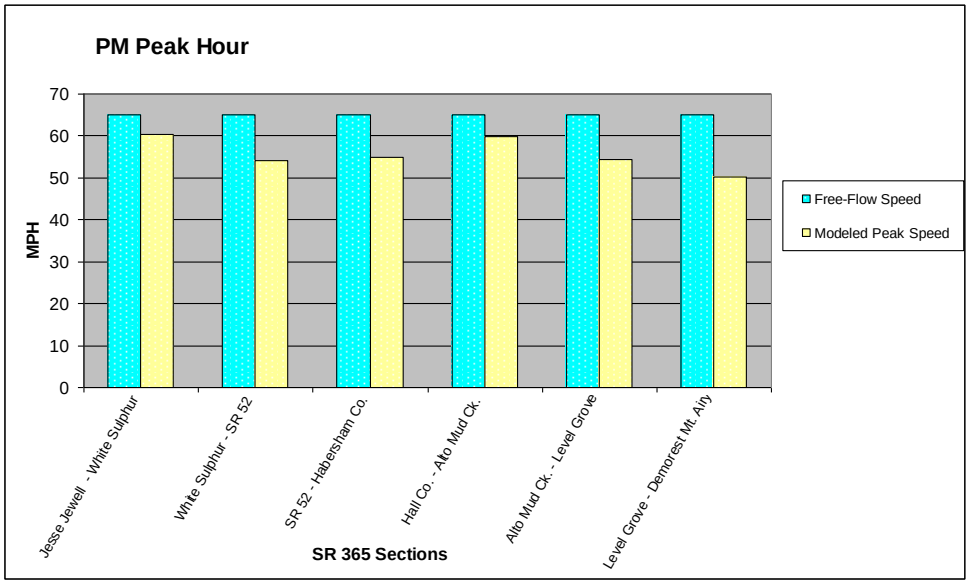
Source: CORSIM model

On Habersham County sections, average a.m. travel speeds for southbound motorists are closer to the assumed free-flow speed of 65 mph than on sections in Hall County. On the two southernmost sections, simulated a.m. peak speeds were close to 55 mph, which is only 10 mph lower than the assumed free-flow speed. On the northernmost section from Demorest – Mount Airy Highway to Level Grove Road, the average travel speed dropped to 50 mph.

Modeled travel speeds computed in the northbound direction of travel for the p.m. peak hour were different from those modeled during the a.m. peak hour. A comparative bar chart showing free-flow travel speeds alongside their modeled p.m. peak-hour speeds is presented on Chart 12 for the northbound direction of travel. The lowest simulated travel speed during the p.m. peak hour was 50 mph on the section from Level Grove Road to Demorest – Mount Airy Highway. Simulated p.m. peak-hour speeds on the other five sections of SR 365 were roughly uniform, falling between 55 mph and

60 mph. P.m. average travel speeds by section of SR 365 were consistent with LOS grades reported for intersection and freeway segment operating conditions earlier.

Chart 12 P.M. Peak-Hour Speeds (2030 No-Build Scenario)



Source: CORSIM model

5. Corridor Expansion Scenarios

5.1 Goals and Objectives

Specification of appropriate candidate corridor expansion scenarios and their subsequent evaluations are influenced by the goals and objectives established and affirmed by the study team in collaboration with study corridor stakeholders. The goals and objectives used to guide specification and evaluation of the candidate corridor expansion strategies are identified below.

To further assist the Georgia DOT study team with identifying and evaluating appropriate improvement strategies, SR 365 stakeholders were asked to prioritize the list of objectives associated with each goal. Under the broadly defined goal "improve safety," stakeholders unanimously decided that reducing the potential for vehicular crashes was the most important objective. For the goal "increase mobility," there was no unanimous decision. Stakeholders equally favored each of the objectives and added a fourth: better access and turn lanes to businesses. For "better manage access," the stakeholders unanimously preferred the "increase connectivity" objective. Under the goal "encourage transportation best practices," stakeholders indicated that two objectives were most important: maximizing benefit-cost value and promoting appropriate land use decision making.

Goal 1 – Improve Safety

- Reduce potential for vehicular conflicts
- Increase safe crossings for bicyclists and pedestrians

Goal 2 – Increase Mobility

- Reduce corridor trip times
- Reduce systemwide hours of delay
- Decrease corridor mileage operating at an unacceptable LOS

Goal 3 – Better Manage Access

- Reduce corridor access points

- Increase connectivity
- Increase average speed in congested conditions

Goal 4 – Encourage Transportation Best Practices

- Minimize environmental impacts
- Maximize benefit/cost relationship
- Promote appropriate land use decision making

5.2 Scenario Development

5.2.1 Guidelines

The project team considered the above goals and objectives in identifying potential corridor improvement strategies. The team also considered the following additional guidelines and data:

- Georgia DOT design guidelines
- Year 2030 daily traffic forecasted by the SR 400 and SR 365 travel demand model
- Findings from the crash rate analysis
- Existing and future land use maps

Specific planning criteria used in defining overall strategic plans for the corridor are listed below.

- Future traffic volumes were forecasted using travel demand modeling software. Additional travel lanes were proposed to handle future travel demand where volumes exceeded capacity using the following thresholds:
  - Up to 40,000 vpd: Four-lane freeway
  - Up to and exceeding 60,000 vpd: Six-lane freeway
  - Up to 30,000 vpd: Four-lane at grade

  - Up to 45,000 vpd: Six-lane at grade

- Interchange spacing standards: Current Georgia DOT interchange spacing guidelines were used when determining interchange locations. Spacing guidelines are as follows, according to Georgia DOT's Transportation Online Policy and Procedure System:

  - 1 mile in urban areas with an average spacing of 2 miles
  - 2 miles in suburban areas with an average spacing of 4 miles
  - 2 miles in rural areas with an average spacing of 8 miles

- Existing and future land use: Both existing and future land use maps were obtained from the counties in the study area as part of the existing conditions analysis and were used to determine appropriate intersection or interchange locations in concert with access, connectivity, and interchange spacing criteria.

- Travel patterns: Travel patterns along the corridor were through trips versus commuter trips. Treatments serving commuter trips may include managed lanes, such as high-occupancy vehicle lanes, while additional general-purpose lanes and a smaller number of interchanges favor through trips.

- Network access: Provides connections to adjacent land uses from the corridor. Treatments may include frontage roads or new roadways to improve interparcel access.

- Safety: As part of the existing conditions analysis, a safety analysis was performed on the corridor and high crash locations were identified. Because interchanges reduce crashes compared to at-grade intersections, this treatment was recommended in segments of the corridor with a crash rate above the statewide average of 142.0 total crashes per 100 million vmt and 1.78 fatal crashes per 100 million vmt.

- System connectivity: Includes two components: cross-corridor connections and interfaces with major roads serving as key links in the regional transportation system. Cross-corridor connections provide opportunities for motorists, bicyclists, and pedestrians to get from one side of the corridor to the other. Interfaces between the corridor and major roads provide connections linking the corridor with destinations such as shopping, employment, and residential neighborhoods.

- Stakeholder input: Public input favors the construction of a controlled-access freeway, followed by creating a limited-access road and a multilane divided road. Technical advisory committee members provided suggestions on access/ interchange locations and off-corridor solutions and expressed concern over feasibility and cost.

5.3 Scenarios

Properties associated with the improvement scenarios formulated above are further explained in this section. Both scenarios imply a major shift in how property access will be furnished to and from SR 365 and the public road system. Only 3 miles of the 23-mile SR 365 corridor are presently built to limited-access freeway standards. In response to access changes assumed in each scenario and in light of concerns expressed by the public regarding access, the descriptions emphasize properties associated with each scenario's ability to provide access.

Two improvement strategies that reasonably address transportation- and development-related issues in the SR 365 corridor were identified by the study team after assessing future year 2030 daily traffic projections, identifying future capacity constraints, reviewing local land use plans, identifying critical sections from the crash analysis, and considering comments from stakeholders and the public concerning goals and objectives. The names and a brief description of each are provided below.

Six-Lane Partial Freeway Scenario – Consists of significant design changes that would not result in a uniform cross section over the length of the corridor from Jesse Jewell Parkway to Demorest – Mount Airy Highway. The most prominent change would occur over more than 9 miles of SR 365 at the southern end of the corridor. It would entail reconstructing SR 365 to a six-lane, limited-access freeway. The limited-access freeway would extend from Jesse Jewell Parkway and I-985 outside Gainesville to Belton Bridge Road outside Lula. Moving north into Habersham County, the existing partially controlled access design would remain the same, but it would be widened from a four-lane facility to a six-lane facility. This would cover the 9-mile section from Belton Bridge Road in Hall County to Level Grove Road in Habersham County. Two changes to SR 365's design would occur over the last 4.5 miles of the corridor. First, the existing four-lane, limited-access freeway design from Level Grove Road to Cannon Bridge Road/SR 105 would be widened to six lanes. Second, the limited-access freeway design would be extended north through the Demorest – Mount Airy Highway intersection.

Freeway Scenario – Consists of significant design changes that would produce a uniform cross section over the entire length of the study corridor. This would entail rebuilding SR 365 into a six-lane, limited-access freeway over the entire 23-mile length of the corridor.

5.3.1 Cross-Street Treatments

To adequately describe the candidate improvement strategies and to analyze each strategy's relative effectiveness, a set of access rules was applied to each of the cross streets that intersect SR 365. The frequency of access and exact locations of access onto and off of SR 365 that were assumed in this study are consistent with Georgia DOT's interchange spacing guidelines and with the application of access management principles that attempt to balance the needs of local governments, property owners, and users of the roadway system.

Cross streets intersecting SR 365 were placed into one of four access treatment categories:

1. Signalized Intersection – At-grade access onto and off of SR 365, such as the existing SR 52 intersection in Hall County or the existing Duncan Bridge Road intersection in Habersham County.

2. Freeway Interchange – Grade-separated access onto and off of SR 365, such as the existing Jesse Jewell Parkway interchange in Hall County and the Cannon Bridge Road/SR 105 interchange in Habersham County.

3. Overpass/Underpass – Provides access between the eastern and western sides of SR 365, but does not provide access onto and off of SR 365 itself.

4. Cul-De-Sac – The road's access onto and off of SR 365 is removed. There is not an overpass/underpass connecting to the other side of SR 365.

In both improvement scenarios, no access onto and off of SR 365 is assumed using at-grade, unsignalized intersections. In the freeway scenario, there are no signalized intersection treatments.

5.3.2 Scenario Descriptions

5.3.2.1 Partial Freeway Scenario

A map depicting a conceptual illustration of the partial freeway scenario is presented on Figure 17. It provides a visual of how cross streets that currently intersect SR 365 would be managed and how access might be provided in the partial freeway scenario over the entire length of the corridor. Frontage roads or a local street access that would be supplementary to improvements on SR 365 itself were assumed to be constructed in this scenario.

5.3.2.1.1 Conceptual Schematics

Cross-street treatments for the partial scenario that were assumed in the analyses are listed in Table 38 by county. There are a total of 37 cross streets in the study corridor that currently have access to and from SR 365. Ten of these cross streets are assumed to be freeway-type interchanges in the partial scenario, while another three cross streets are signalized intersections. The remaining cross streets are assumed to be either overpasses/underpasses or cul-de-sacs without access to SR 365.

5.3.2.2 Freeway Scenario

A map depicting a conceptual illustration of the freeway scenario is presented on Figure 18. It provides a visual of how cross streets that currently intersect SR 365 would be managed and how access might be provided in the freeway scenario. Frontage roads or local street access that would be supplementary to improvements on SR 365 itself were assumed to be constructed in this scenario.

5.3.2.2.1 Conceptual Schematics

Cross-street treatments for the freeway scenario are presented in Table 38. These treatments are similar to those enumerated earlier for the partial scenario. However, the three signalized intersections that were part of the partial scenario are converted into freeway interchanges in the freeway scenario. There is no at-grade access to and from SR 365 in this scenario, which is primarily in response to the very high importance placed on safety-related goals.

Table 38 Access Consideration – Cross-Street Treatments (Freeway and Partial Freeway Scenarios, 2005 and 2030)

No.	Cross Street Name	Freeway Interchange	Signalized Interchange	Overpass/ Underpass	Cul-De-Sac
HALL COUNTY					
1	Jesse Jewell Parkway	■			
2	Howard Road			■	
3	Ramsey Road				■
4	White Sulphur Road	■			
5	Chiplan Drive				■
6	Whitehall Road	■			
7	Unknown Road				■
8	Cagle Road			■	
9	Unknown Road				■
10	SR 52 (Lula Highway)	■			
11	Athens Street			■	
12	Belton Bridge Road	■			
13	Mountain View Parkway				■
14	Jaemor Farm Road				■
15	Tribble Gap Road			■	
16	Mud Creek Road	■	■		

No.	Cross Street Name	Freeway Interchange	Signalized Interchange	Overpass/ Underpass	Cul-De-Sac
HABERSHAM COUNTY					
17	Yonah Post Road				■
18	Crane Mill Road			■	
19	Mt. Zion Road				■
20	Alto Mud Creek Road	■	■		
21	Anderson Circle				■
22	Lowthy Road				■
23	Lingering Shade				■
24	Wilbanks Road			■	
25	Mulberry Hill (South)				■
26	BC Grant Road				■
27	Mulberry Hill (North)				■
28	Charley Davis Road				■
29	LC Turner Road				■
30	Red Hawk Lane				■
31	Duncan Bridge Road	■	■		
32	Kudzu Hill Drive				■
33	Level Grove Road	■			
34	U.S. 441 Bypass	■			
35	Cannon Bridge Road/SR 105	■			
36	Mize Road				■
37	Demorest – Mount Airy Highway	■			

■ Freeway and Partial Scenarios

■ Freeway Scenario only

■ Partial Freeway Scenario only

5.4 Evaluation

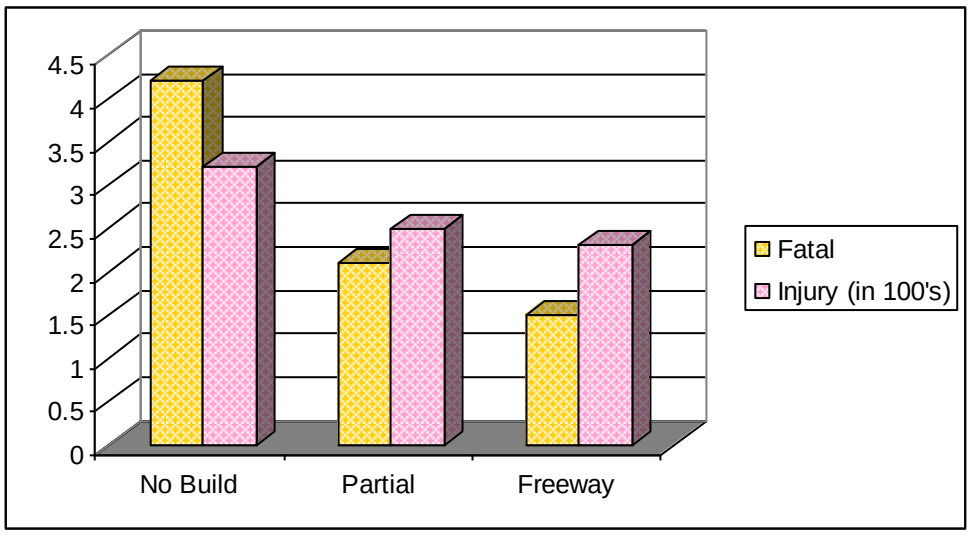
Each corridor scenario was evaluated for its anticipated ability to satisfy the identified corridor goals and objectives. This evaluation included a detailed evaluation of future travel conditions and traffic operations. The costs to implement each scenario were also estimated. Each scenario was evaluated in relation to the future year 2030 no-build or baseline model scenario. The aim of the evaluation analysis was to identify which scenario best addresses the study's goals and objectives in the most cost-effective manner.

The quantitative evaluation was based on traffic assignment output from the SR 400 and SR 365 travel demand model, the crash analysis, estimated project costs, and an environmental screening assessment. The resulting performance measures are discussed below relative to each of the study corridor's goals.

5.4.1 Improve Safety

The freeway scenario would most improve safety by reducing the number of severe crashes (those that result in injury or fatality). Based on future year 2030 daily traffic levels forecasted by the travel demand model and current crash rates experienced in Georgia, the freeway scenario was found to lower the number of fatal crashes on SR 365 by an estimated 2.7 crashes per year and injury crashes by 92 crashes per year in comparison with the no-build scenario. The reduction of severe crashes on SR 365 would be partially offset by slight increases in property damage crashes elsewhere in the road system. Drops in severe crashes are attributable to higher fatal and injury crash rates experienced on rural principal arterials in comparison with rural freeways in Georgia. To put these reductions in perspective, actual experience from 2000 to 2003 showed an average of 3.25 fatal crashes per year. Since 2003, that number has been steadily rising, according to stakeholders and the public. Estimated numbers of future year 2030 fatal and injury crashes computed in the safety analysis are displayed on Chart 13 for the no-build, partial freeway, and freeway scenarios.

Chart 13 Estimated Number of Fatal and Injury Crashes by Scenario



Source: Georgia DOT crash data and SR 400/SR 365 travel demand model

Using the same analysis approach, the partial freeway scenario was found to lower the number of fatal crashes on SR 365 by an estimated 2.1 crashes per year and injury crashes by 75 crashes per year in comparison with the no-build scenario. Though this lesser amount of severe crashes is not as great as the freeway scenario, it is still significant in comparison with the no-build scenario.

Bicycle and pedestrian safety will also be improved in locations where crossings are redesigned from at-grade to grade-separated crossings.

5.4.2 Increase Mobility

Using travel demand model output, the study team computed effectiveness measures for several study objectives associated with this goal:

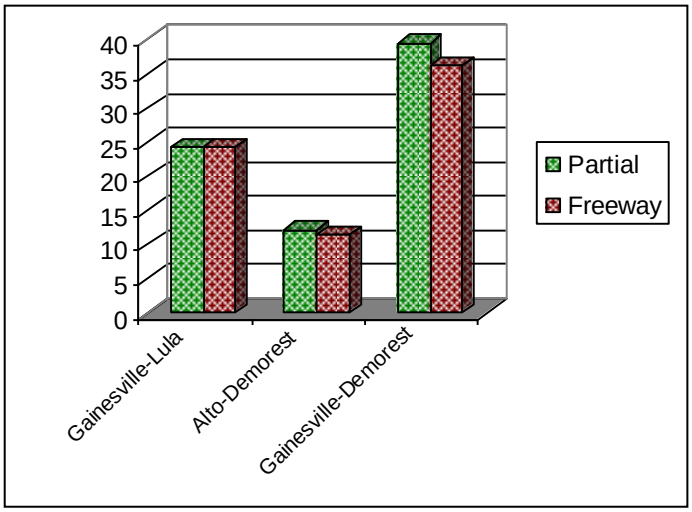
- Reduce corridor trip times
- Reduce systemwide hours of delay
- Reduce corridor route mileage operating at an unacceptable LOS

The relative performance of each expansion scenario is explained below for the effectiveness measures listed previously.

5.4.2.1 Reduce Corridor Trip Times

Because the study corridor is 23 miles long, three origin-destination pairs were used to gauge the relative difference in trip times between the partial and freeway improvement scenarios: Gainesville to Lula, Alto to Demorest, and Gainesville to Demorest. In Gainesville, the specific origin was equivalent to the main Northeast Georgia Medical Center Campus. In Lula, Alto, and Demorest, trip time locations were equivalent to city boundaries nearest to SR 365. Average peak-period travel times from the 2030 travel demand model runs provided the benchmark statistics. Travel time differences between the scenarios are shown on Chart 14.

Chart 14 Travel Times for Selected Trip Interchanges



Source: CORSIM model

The freeway scenario has a slight advantage over the partial freeway scenario in terms of trip time reduction. In the Gainesville to Lula example, average peak-period travel times for both scenarios were computed to be 24.3 minutes. The freeway scenario in the Alto to Demorest trip interchange was computed to be about 30 seconds shorter in comparison to the partial freeway scenario. The freeway scenario was estimated to provide motorists with slightly more than a three-minute time savings for the Gainesville to Demorest city pair.

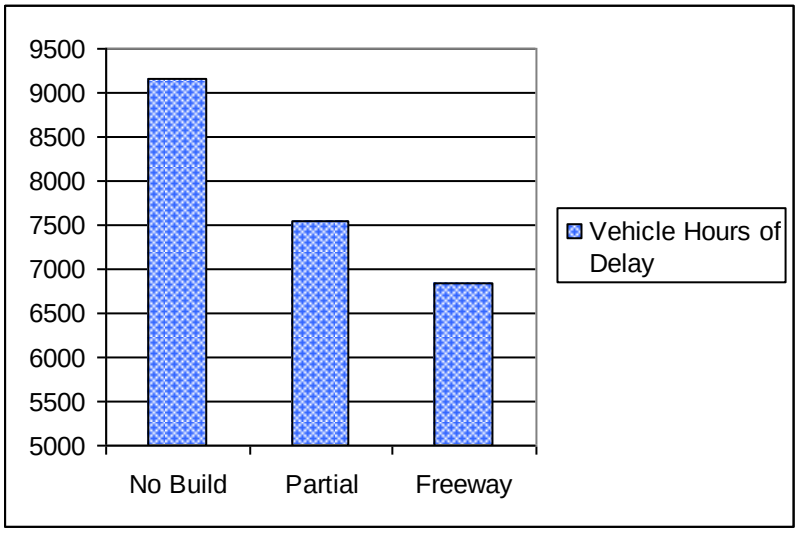
For perspective purposes, the base year 2005 travel demand model estimated average peak-period travel times of 16.6 minutes to travel between Gainesville and Lula, 9.6 minutes to travel between Alto and Demorest, and 30.2 minutes to travel from Gainesville to Demorest.

5.4.2.2 Reduce Systemwide Hours of Delay

Although there is presently little systemwide delay experienced by motorists in the SR 365 corridor, this is expected to change in the future unless investments are made to improve capacity in the study corridor. The 2030 model run of the no-build scenario estimated 9,160 daily hours of cumulative delay time in the SR 365 study corridor, including all roads in the model network within a 4-mile-wide buffer around SR 365. Projected hours of vehicle delay for the future year 2030 were also estimated for the partial freeway and freeway scenarios.

The vehicle hours of delay effectiveness measure favors the freeway scenario over the partial freeway scenario. A bar chart displaying projected 2030 vehicle hours of delay for the three scenarios is shown on Chart 15. The freeway scenario generates 6,850 vehicle hours of delay per weekday, which is 2,310 fewer hours than in the no-build scenario. In comparison, the partial scenario's vehicle hours of delay is 7,540 hours, which is 1,620 below the no-build scenario's daily delay.

Chart 15 Vehicle Hours of Delay



Source: CORSIM model

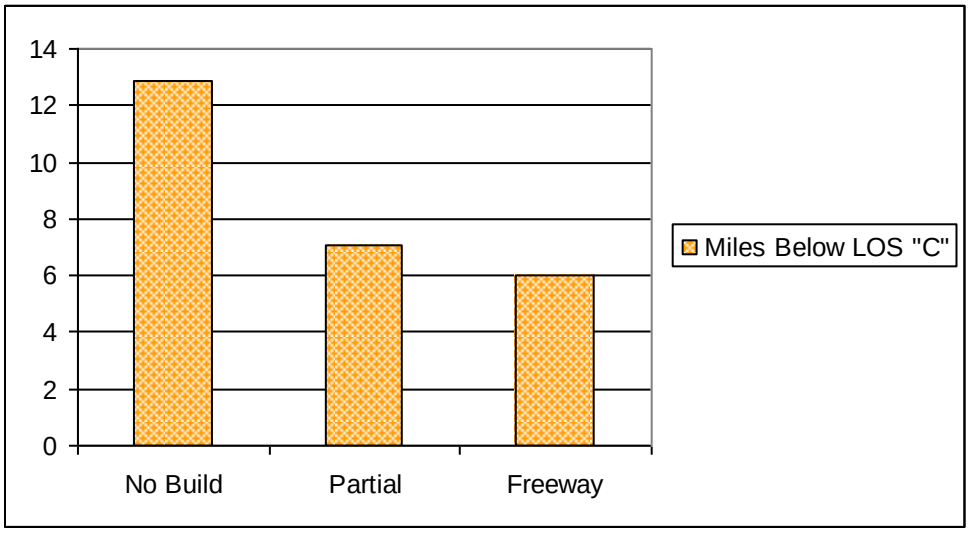
For comparison purposes, only 150 daily vehicle hours of delay were computed by the travel demand model for the base year 2005. The only model links showing congestion in the base year 2005 were on Jesse Jewell Parkway and Cannon Bridge Road/ SR 105.

5.4.2.3 Reduce Corridor Route Mileage Operating at an Unacceptable LOS

There are no sections or route miles on SR 365 that currently operate at an unacceptable LOS in accordance with our base year 2005 model scenario run and the existing conditions analysis. By the future year 2030, however, operating conditions on a total of 12.9 route miles of SR 365 are not expected to meet Georgia DOT's minimum LOS C standard if no capacity improvements are made in the SR 365 corridor. SR 365 route miles operating below LOS C in 2030 were also computed for the partial freeway and freeway scenarios.

The freeway scenario, with six lanes of freeway capacity, produces the fewest number of route miles operating below Georgia DOT's LOS C threshold. A bar chart displaying route miles on SR 365 operating below LOS C for the three 2030 modeled scenarios is presented on Chart 16. The freeway scenario results in 6 route miles operating below LOS C in comparison with 7.1 route miles for the partial freeway scenario and 12.9 route miles for the no-build scenario. In each future year 2030 model scenario, operating conditions on the section of SR 365 between Jesse Jewell Parkway and White Sulphur Road are projected to operate below LOS C.

Chart 16 SR 365 Route Miles Operating Below LOS C



Source: CORSIM model

5.4.3 Better Manage Access

Three effectiveness measures were evaluated by the study team to assess how well each improvement strategy responded to the general goal of managing access. The three effectiveness measures were:

- Reduce corridor access points
- Increase connectivity
- Increase average speed in congested conditions

Table 39 Access Characteristics

Scenario	Number of Access Points	Number of New Interchanges
No-Build	97	0
Partial	20	10
Freeway	20	13

The first two of these effectiveness measures are contrary to each other. Some people believe that more access is desirable, while others believe that less access is better.

5.4.3.1 Reduce Corridor Access Points

Although the partial freeway and freeway improvement scenarios are assumed to have the same number of access points (20), the freeway scenario is slightly more beneficial because it eliminates all at-grade intersections on SR 365. Both scenarios provide significantly less access than the no-build scenario, which would have approximately 97 access points. Some basic access characteristics associated with the no-build, partial freeway, and freeway scenarios are displayed in Table 39. The number of corridor access points is reported in one column, and the other column contains the number of new interchanges, overpasses, and underpasses.

5.4.3.2 Increase Connectivity

The partial freeway scenario offers an advantage over the freeway scenario in terms of connectivity and accessibility to properties inside the SR 365 study corridor. Design of the partial freeway scenario does not afford the same level of access control as the freeway scenario for 9 miles in the middle of the study corridor. From Belton Bridge Road to Level Grove Road, there are three at-grade intersections for access on and off SR 365. Although the partial freeway scenario was assumed to not have any additional access on and off SR 365 between the three signalized intersections, it is more difficult for Georgia DOT and local governments to achieve in comparison with the freeway scenario. The freeway scenario, by definition, will not have any additional access

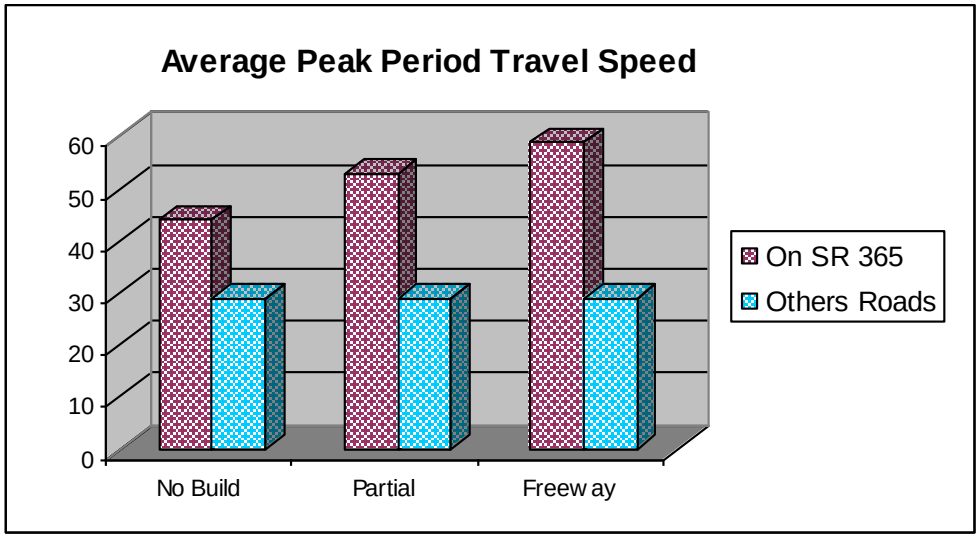
points beyond the three interchanges because right-of-way or access rights would be an inherent cost element of the total project cost.

Along those sections of SR 365 that have fully controlled access, implementation of frontage or access roads that would be located roughly parallel to SR 365 and that would emphasize access to property could enhance the accessibility performance of both improvement scenarios.

5.4.3.3 Increase Average Speed in Congested Conditions

The freeway improvement strategy has an advantage over the partial freeway scenario with regards to average peak-period travel speeds. The average peak-period travel speed on SR 365 for the freeway scenario was forecasted to be 59 mph, which was equivalent to the average peak travel speed modeled for the base year 2005 condition. For the partial freeway scenario, the average peak-period travel speed was projected to be 53 mph on SR 365. If no improvements were made, the future year 2030 travel speed was forecasted to be 44 mph. Peak-period travel speeds for SR 365 as well as for other roadways in the SR 365 corridor are shown on Chart 17 for each scenario.

Chart 17 Average Peak-Period Travel Speeds



Source: CORSIM model

Average travel speeds on other roads in the corridor show that there is no difference between the scenarios. The peak travel speed for the no-build scenario is 29 mph,

which is the same as in the partial freeway and freeway scenarios. Other road speeds suggest that major improvements to SR 365 would not divert a substantial amount of traffic off parallel roads inside the study corridor. Average speeds show that SR 365 improvements would attract more traffic to intersecting cross streets in comparison with the no-build scenario.

There are some modest benefits in peak-period travel speeds that the freeway and partial alternatives would provide, but they were not reflected in this analysis. Average peak-period travel speeds on Cleveland Highway/U.S. 129 and Clarks Bridge Road/ SR 284 located several miles to the west of SR 365 would rise slightly because some of the traffic forecasted to use those highway corridors would divert to an improved SR 365 corridor.

5.4.4 Support Transportation Best Practices

5.4.4.1 Potential Environmental Impacts

In evaluating the improvement options for SR 365, the meaning of “environmental” is broadened to include social and environmental considerations. In this corridor study, environmental impacts are assessed by the study team based on findings of a sketch-level analysis, which was described earlier in this report. The most important factor revealed by the preliminary assessment of social and environmental considerations is that there do not appear to be any fatal flaws that would eliminate either build scenario from further consideration. The relative impact that each scenario has on society and the environment are reported below.

From the standpoint of minimizing disturbances to existing land uses and natural habitat, the no-build scenario performs better than the partial freeway or freeway scenario. Comparing just the partial freeway and freeway scenarios, the partial freeway scenario would provide designers with more flexibility to avoid or mitigate disturbances to existing land uses or natural habitat in more than 9 miles in the middle of the corridor. Most importantly, neither build scenario appears to have a serious environmental issue that would prevent it from being developed in further detail.

With regards to social considerations, the partial freeway and freeway scenarios are more favorable than the no-build scenario in terms of adverse impacts. The primary reason for this conclusion concerns the amount of growth in the corridor that is anticipated in the future. Currently, congestion is not an issue in the corridor. However, local governments and the study team believe that this will change soon. Commercial

and residential developments are currently being planned for properties in the North Hall portion of the SR 365 corridor. In Habersham County, the same is expected, but not as quickly as in North Hall. For local governments, businesses, and residents to have the basic infrastructure necessary to accommodate sustainable and desirable growth in the future, additional roadway capacity is needed in the SR 365 corridor. The partial and freeway strategies provide the level of capacity needed to serve this growth, notwithstanding accessibility needs of individual property owners. Moreover, the sketch-level environmental exploration showed that additional capacity could be built into SR 365 with a relatively small number of institutional, residential, historic, and business relocations or costly road alignment shifts.

Of the two build scenarios, the partial freeway scenario inherently offers more tolerance in the design phase of project development to avoid relocations and is more flexible in terms of meeting accessibility needs of property owners in the corridor. However, from a statewide perspective, increased flexibility in terms of access to properties in the corridor that the partial freeway scenario may have in comparison with the freeway scenario would likely occur at the expense of other goals, including highway safety and statewide economic development initiatives. SR 365 is functionally classified as a principal arterial and is designated on the National Highway System (NHS), which means that it serves a relatively high proportion of long-distance trips. Its role as an important facility in the statewide and regional system of roads needs to be considered with its impact on local communities and property owners.

5.4.4.2 Cost-Effectiveness

Both improvement strategies provide a 20-year stream of user benefits that exceed total costs. The partial freeway scenario, with a benefit-cost ratio of 2.46, was more cost-effective than the freeway scenario, whose benefit-cost ratio was 1.45. User benefits were computed chiefly by computing cumulative travel times and operating costs from link-level operational analyses performed on the no-build, partial, and freeway scenarios. A safety component was also incorporated into user benefits. Using statewide crash rates by functional class, crash cost reductions were estimated for the partial freeway and freeway scenarios in comparison with the no-build scenario because injury and fatal crash rates for rural principal arterials are higher than those for rural interstate freeways. Of the three components of user cost savings, travel time savings comprised the largest share.

Estimated costs included right-of-way, construction, and maintenance. Right-of-way and construction costs were estimated to be $700 million and $608 million for the

freeway and partial freeway scenarios, respectively. The study team used a methodology reported in the American Association of State Highways and Transportation Officials' *Manual on User Benefits Analysis of Highway and Bus Improvements* for calculating benefit-cost ratios.

5.4.4.3 Other

Both improvement strategies support a number of other best transportation practices, including a strategy to make freight movement more safe and efficient, providing local governments with a major transportation artery from which to revise and update their future land uses and infrastructure needs, and opportunities to enhance alternate forms of transportation/recreation (i.e., carpooling, bicycle lanes, and pedestrian lanes).

5.4.5 Qualitative Corridor Characteristics

Qualitative information was also considered by the study team, including:

- Survey origin-destination data
- Comments from public safety departments
- Exchanges of ideas through the public involvement process

Travel behavior patterns, crash characteristics, and corridor development circumstances were considered by the study team in the evaluation process but were not directly reflected in effectiveness measurements. In terms of travel behavior, origin-destination surveys indicate that there is a high percentage of through trips traveling through the SR 365 corridor. Seasonal and weekend spikes in traffic volume on SR 365 are commonplace. This does not mean that there is not a significant volume of commuters using SR 365 or that almost everyone using SR 365 is driving to or from the North Georgia mountains. It means that there is a high proportion of motorists making long-distance trips in the traffic stream. The consequence of these different trip types, in terms of operations and safety, is that the expectations of drivers making long-distance trips are generally very different from the expectations of drivers making short-distance trips that begin and end inside the corridor.

The crash analysis highlighted sections of SR 365 where severity of crashes was more critical than on other sections. It did not explicitly state that most of those crashes occurred at an at-grade intersection, either signalized or not signalized, as opposed to

in the middle of an analysis section. Also, public involvement meetings enabled stakeholders and the public to express growing concerns they had about sections of SR 365. There was one location where the public voiced particular unease. The intersection of SR 365 at Demorest – Mount Airy Highway was emphasized by the public as being the most critical location in the corridor, but our crash analysis did not confirm that. Our crash analysis was based on data reported from 2000 to 2003, which were the most current data available at that time, but the severity of crashes at that Habersham County intersection became especially critical after 2003.

Like other areas of northern Georgia, residential and commercial development has been and will continue to influence traffic and safety through the study area. Georgia DOT has been besieged with requests from local governments and property owners for permits to access SR 365. As more commerce and people move into North Hall and Habersham County, this phenomenon is expected to continue. Presently, there are relatively large-scale developments being planned in Hall County between Gainesville and Lula along SR 365 that have the potential to increase the number of at-grade intersections and significantly add to daily traffic levels on SR 365. These developments are reflected in the SR 400 and SR 365 travel demand model to some extent.

6. Strategic Improvement Plan

The SIP includes a recommended expansion scenario for the portion of SR 365 studied in this report. The recommended improvement strategy is a long-range vision that looks more than 25 years into the future. It also includes a list of supporting steps that will be necessary to implement the long-range vision for the corridor.

6.1 Recommended Expansion

Based on analyses done by the study team in combination with collaboration from stakeholders and the public, the long-range recommendation is to implement the freeway strategy plus frontage roads and/or local roads that would connect to intersecting cross streets. The purpose of the frontage roads would be to provide access to nearby properties located between interchanges.

Despite not having a higher benefit-cost ratio than the partial freeway scenario, the study team recommends the freeway scenario. Based on SR 365's primary function – public safety – and regional economic development considerations, the freeway scenario is deemed superior in the context of a 22-year planning horizon (future year 2030). The partial freeway scenario fared well in comparison with the freeway scenario on many of the evaluation criteria and would serve as a reasonable substitute in the event that freeway scenario improvements become formidable to implement during the long-range time frame. In fact, the partial freeway scenario would generally fit neatly into a phased approach to implementing the freeway scenario.

With a total estimated projected cost of $700 million and an improvement corridor stretching over 23 miles, the full project would require being split into several smaller phases or projects. In addition to phasing the design, right-of-way acquisition, and construction of the recommended long-term improvement strategy for SR 365, a number of other supporting transportation and land use planning strategies would need to take effect for this investment to generate the level of benefits reported in this analysis.

6.2 Implementation Strategies

To minimize obstacles that could derail or impose significant delays in implementing the recommended long-range plan, a number of potential strategies have been identified to help advance the project. There are many detailed action steps that will be necessary to advance the recommended corridor concept. A specific action plan is

provided later in this section. However, the overall implementation strategy is described below.

6.2.1 Project Development

6.2.1.1 Concept Design

Based on the planning-level analysis documented in this report, the long-range recommendation is to implement a limited-access freeway facility plus frontage roads and/or local roads that connect to intersecting cross streets.

It is anticipated that mitigating the loss of existing direct property access (or providing alternate access) will be the most complicated and expensive element of upgrading the SR 365 corridor. Therefore, it is suggested that the concept design phase consider unconventional design concepts as necessary along the corridor as either interim solutions or the most cost-effective solutions for the ultimate design. Some unconventional design elements that should be considered include:

- Continuous flow intersections
- Paired intersections
- Median U-turns
- Superstreets
- Jughandles
- Continuous T-flow intersections

A brief description of each concept is included in Appendix I. It is suggested that this appendix serve as a guide to the future design phases.

6.2.2 Project Phasing

SR 365 can be subdivided into three primary sections for phasing of construction with further subdivisions if necessary. The three primary sections are displayed in Table 40 with a second layer of construction phasing that could be used if circumstances warranted. One other phase not shown in the construction phasing table is an access

management program. Access management is not so much a logical construction sequence as it is an ongoing transportation and land use planning program conducted by local governments in cooperation with Georgia DOT. As right-of-way is acquired to convert SR 365 into a limited-access facility, access to and from the public road system for nearby properties needs to be made available. In addition to purchasing necessary rights-of-way for the project's footprint, Georgia DOT must purchase access rights even where additional rights-of-way are not needed. These rights ensure that future driveways will not further impact travel on the corridor and reduce the number of driveways that must be relocated or removed to upgrade the corridor to limited access.

Table 40 Possible Project Phasing

Section I : Jesse Jewell Parkway – Belton Bridge Road		9.5 miles
(Hall County)		
Jesse Jewell Parkway to Bill Minor/Whitehall	Reconstruct to a six-lane freeway	4.3 miles
Bill Minor/Whitehall to SR 52	Reconstruct to a six-lane freeway	3.5 miles
SR 52 to Belton Bridge Road	Reconstruct to a six-lane freeway	1.7 miles
Section II: Level Grove Road – Demorest – Mount Airy Highway		4.5 miles
(Habersham County)		
Demorest – Mount Airy Highway Intersection	Grade-separate	
Level Grove Road to Demorest – Mount Airy Highway	Widen to a six-lane freeway	4.5 miles
Section III: Belton Bridge Road – Level Grove Road		9.0 miles
(Hall County and Habersham County)		
Belton Bridge Road to Habersham County	Reconstruct to a six-lane freeway	3.0 miles
Hall County to Level Grove Road	Reconstruct to a six-lane freeway	6.0 miles

With regards to a construction phasing schedule, the highest priority section of SR 365 is the 9.5 miles from Jesse Jewell Parkway to Belton Bridge Road in Hall County. Development of land and traffic growth is expected to occur most rapidly in this portion of the corridor.

The second phase would include improvements needed to reconstruct SR 365 from a four-lane freeway to a six-lane freeway between Level Grove Road and Demorest – Mount Airy Highway in Habersham County. Based on crash experience at the

intersection between SR 365 and Demorest – Mount Airy Highway, constructing a grade-separated interchange at this location could be a logical first step in implementing the vision for this section. Widening SR 365 from a four-lane freeway to a six-lane freeway on this section is not expected to be needed in the one- to 10-year time frame. However, operational and safety conditions on the section from the U.S. 441 Bypass to Cannon Bridge Road/SR 105 may need to be addressed toward the end of the 10-year time frame.

Reconstructing SR 365 to a six-lane freeway over the 9-mile section from Belton Bridge Road to Level Grove Road is the third priority because a partially controlled access, four-lane cross section is expected to accommodate projected traffic volumes almost to the planning horizon of 2030. It is essential that local governments, Georgia DOT, and property owners work together in executing an access management program. If access is not controlled on this section, operational and safety conditions will deteriorate on this section much sooner.

Except for those sections of SR 365 between Jesse Jewell Parkway and SR 52 in Hall County, there is not an immediate need to widen SR 365 based on existing and future projected traffic volumes. The build-out from a four-lane arterial to a six-lane, limited-access freeway could be delayed until later in the 2010 to 2030 planning window north of SR 52. To preserve satisfactory service levels and limit the number of conflict points north of SR 52, steady progress will need to be made on acquiring right-of-way and phasing in access management program strategies.

Implementation of the six-lane freeway alternate will not bring about changes to currently programmed capacity and accessibility improvements listed in the CWP as reported in Appendix F. Nearly all of these planned improvements are located outside of the SR 365 corridor in areas of Hall County that have recently experienced substantial development. One of the projects inside the study corridor, SR 105/Cannon Bridge Road in Habersham County, was recently completed. Implementation of the project, however, could affect maintenance- and repair-type projects, which are not shown on Figure 15. Georgia DOT and local governments will have maintenance- and repair-type projects scheduled on roads and bridges in the SR 365 corridor during the projected implementation period. These types of projects will need to be coordinated with the phased implementation of the six-lane freeway project.

6.2.3 Access Management

The first substantial step toward implementing the transportation vision identified by this plan would be acquisition of right-of-way or purchasing access rights. Further study of the conceptual vision for the corridor needs to occur prior to commencing this step.

6.2.3.1 Access Management Program

The typical cross section for the proposed six-lane freeway south of Level Grove Road will require approximately 200 feet. Georgia DOT already owns 180 feet to more than 400 feet along this portion of the SR 365 corridor. Between proposed interchanges, additional right-of-way requirements are expected to be modest, notwithstanding the accommodation of accessibility needs for properties that already have direct access onto and off of SR 365. Areas where the proposed facility will need the most new right-of-way will be at the proposed interchanges, where right-of-way requirements are expected to grow beyond the 200 feet needed for a typical cross section.

Pressure on local governments to develop properties near and adjacent to SR 365 is already reaching a critical stage in terms of its effect on reducing Georgia DOT's ability to protect the road from more driveway and cross-street access. New developments, driveways, and cross streets will make right-of-way acquisition for the limited-access, six-lane freeway more difficult and expensive in the future. To minimize the costs and complexity associated with implementing the project, it would be judicious for Georgia DOT to prepare an access management plan to preserve the corridor.

The recommended improvements include limited access to SR 365. At this phase of study, limited access means that motorists can get on and off SR 365 at selected interchanges only. There will be no at-grade access in the full build-out of the freeway scenario. As right-of-way is acquired and improvements are phased into the corridor, it is anticipated that some existing at-grade access will remain. When all phases are implemented, however, access is currently proposed at the cross streets listed below.

Proposed Access To/From SR 365			
	Hall County		Habersham County
1.	Jesse Jewell Parkway (existing)	7.	Alto Mud Creek Road
2.	White Sulphur Road	8.	Duncan Bridge Road/SR 384
3.	Bill Minor/Whitehall	9.	Level Grove Road (existing)
4.	SR 52	10.	U.S. 441 Bypass (existing)
5.	Belton Bridge Road	11.	Cannon Bridge Road/SR 105 (existing)
6.	Mud Creek Road	12.	Demorest – Mount Airy Highway

Some of the interchanging cross streets listed above already provide access to SR 365 by means of grade-separated interchanges. These remain in the proposed plan for SR 365. The other eight interchanges currently provide at-grade access. These will be reconstructed as grade-separated interchanges.

Establishment of an access management program to assist in the implementation of frontage roads and the development of land use guidelines will be needed to support a phased implementation of the full set of road improvements recommended for SR 365. The program should be comprised of individuals representing Georgia DOT, local governments, and stakeholders in the corridor. Furnishing access to local properties from the public road system will be a key element in being able to acquire right-of-way and in restricting direct access on and off SR 365 to a limited number of cross-street locations. Greater detail on access management programs is provided in Appendix G.

6.2.3.2 Access Rights

In addition to purchasing necessary rights-of-way, Georgia DOT must purchase access rights where additional rights-of-way are not needed. These rights ensure that future driveways will not further impact travel on the corridor and reduce the number of driveways that must be relocated or removed to upgrade the corridor.

6.2.3.3 Adjacent Infrastructure Improvements

I-985 from Jesse Jewell Parkway southward to its terminus with I-85 is currently a four-lane freeway. For the recommended improvement plan for SR 365 to perform as reported in this study, I-985 would need to be widened into a six-lane freeway from Jesse Jewell Parkway in Gainesville to I-85 in Buford (approximately 25 miles). Without widening I-985, the recommended improvement plan for SR 365 would need to be re-evaluated.

6.2.4 Intelligent Transportation Systems

Features considered to be components of an intelligent transportation system (ITS) were not explicitly included in the full build-out plan for the SR 365 corridor in this study. They will be considered in subsequent phases of preliminary engineering. ITS elements that could be implemented in designing the SR 365 corridor improvements are state-of-the-art traffic signalization at intersections controlling turning movements at freeway ramp termini and Georgia DOT's prototype NaviGAtor system.

The prototype NaviGAtor system is a network of interconnected fiber optic cable, variable message signs, vehicle detectors, and cameras that give Georgia DOT the ability to:

- Operate a state-of-the-art incident management program
- Provide real-time traveler and traffic information to motorists
- Influence motorist routings when conditions warrant such action

Greater detail on ITS is provided in Appendix G.

6.2.5 Travel Demand Management

Travel demand management (TDM) techniques for mitigating traffic congestion were not considered in developing the 2030 vision for the SR 365 corridor. TDM strategies may be incorporated in subsequent preliminary engineering and design studies to support phased implementation of the plan's improvements and to provide motorists with options.

It may make sense to incorporate one or more park-and-ride lots at or near selected intersections to support regional and statewide efforts toward carpooling and increasing vehicle occupancy. Currently, land uses in the study corridor are predominantly rural and agricultural. There are no transportation management agencies operating in the corridor to offer transit incentives, advocate for more sidewalks and bicycle lanes, or modify business operations to better distribute traffic patterns on typical weekdays. However, as development takes hold in different sections of the corridor, businesses, residents, and local governments will take more interest in TDM strategies. As such, potential TDM strategies need to be considered in the preliminary engineering of the project and by local governments in their

comprehensive planning processes. Greater detail on TDM strategies is included in Appendix G.

6.2.6 Local Partnerships

Local partnerships will be needed to coordinate and monitor progress in implementing the 2030 vision for SR 365, perform access management, and modify land use policies and ordinances in local governments' comprehensive planning processes to support access management and TDM initiatives. Local partnerships need to include participation from a variety of individuals representing a cross section of government, institutional, business, and residential interests. In addition, Georgia DOT and local governments will need to inform and engage members of minority, low income, and religious or cultural backgrounds that are traditionally under-represented in the political process to be in compliance with U.S. DOT guidance pertaining to environmental justice.

Examples of land use and development policies that may be applicable to the SR 365 corridor are listed below.

- Local governments, in collaboration with Georgia DOT, should consider expanding their local street network parallel to SR 365 where there is commercial, institutional, or dense residential development to aid in converting SR 365 into a limited-access highway.

- Capital improvement elements of local government comprehensive plans should be modified to include a budget for new or improved local roads that will serve property owners whose access to and from the public road system is significantly lessened by the conversion of SR 365 to a limited-access highway.

- Zoning regulation changes administered by local governments that could aid in implementing the improvements to SR 365 include: creating an overlay district for special zoning regulations in the SR 365 corridor pertaining to property access, formulating a new process for local governments to grant driveway permits for properties inside the SR 365 overlay district that are being developed or redeveloped, considering the benefits of interparcel access in zoning ordinances for dense residential and commercial land uses, and considering the benefits from shared parking in zoning ordinances.

6.3 Action Plan

The process needed to implement the full set of SR 365 corridor recommendations is straightforward, but it will take patience and time. It will also entail subdividing the 23 miles of corridor improvements into shorter segments. Acquiring the right-of-way to begin construction of Phase I is estimated to take at least five years, assuming that funding was made available for the preliminary engineering and environmental studies now and that access, design, and cost issues could be addressed expeditiously.

The following is a step-by-step action plan outlining specific steps for each of the implementation strategies discussed above. Each step has an associated phase for delivery.

Table 41 Action Plan

Actions	Task Duration (years)	Cost*	Year	Considerations
Project Development				
Prepare a concept plan for the recommended scenario	1	$1,825,000	2	None
Add the project into the Statewide Long-Range Plan	.1	Staff time	3	This will need to be coordinated with the metropolitan planning organization planning process
Reconstruct SR 365 to a six-lane freeway between Jesse Jewell Parkway and Belton Bridge Road	5	$269,372,012	4	PE: 1 year ROW: 2 years CST: 2 years
Reconstruct SR 365 to a six-lane freeway between Level Grove Road and Demorest – Mount Airy Highway	5	$257,206,868	6	PE: 1 year ROW: 2 years CST: 2 years
Reconstruct SR 365 to a six-lane freeway between Belton Bridge Road and Level Grove Road	5	$89,698,184	8	PE: 1 year ROW: 2 years CST: 2 years
Access Management				
Prepare a corridor access management plan	1	$80,000	1	This could be coordinated with a statewide effort to develop access management guidelines for roadways based on functional classification

Table 41 Action Plan

Actions	Task Duration (years)	Cost*	Year	Considerations
Purchase access rights	5	$134,640,000	1	This is recommended as an early step because access rights are anticipated to increase in cost over time
Implement any additional action items from the access management plan	TBD	TBD	2	None
Adjacent Infrastructure Improvements				
Prepare a concept plan for I-985 from Jesse Jewell Parkway to I-85 (widen to six lanes)	1.5	$3,200.000	1	None
Widen I-985 from Jesse Jewell Parkway to I-85 to six lanes	.75	TBD	2	None
ITS				
Short term – Prepare an ITS/ATMS plan for an intersection collision warning system at unsignalized rural intersections in the corridor where sight line issues exist	.5		1	None
Long term – Prepare an ITS/ATMS plan that addresses state-of-the art traffic signalization at intersections controlling turning movements at freeway ramp termini, ramp metering, and traveler information through Georgia DOT's prototype NaviGAtor system	.75	$240,000	2	Coordinate with concept plan and PE efforts for each project phase
TDM				
Prepare a TDM plan for the corridor	.75	$80,000	2	Should include identifying/ assessing feasibility of local TMAs and/or new park-and-ride locations
Local Partnerships				
Coordinate with county government on land use and development policies to preserve the SR 365 corridor as a commuter corridor	1	Staff time	1	None

*Costs associated with PE, ROW, CST, and access rights are described in more detail in Appendix H.

The 2030 transportation vision for the SR 365 corridor will cost $700 million, which includes $250 million for right-of-way costs and $40 million for frontage roads. This estimate does not include the cost of conducting preliminary engineering and right-of-way studies. Georgia DOT's $2 billion annual budget currently is not able to fund its highway and transit project commitments throughout the state because of the state's population growth and rising construction costs. In light of ongoing highway funding issues that obscure the implementation of improvement projects throughout Georgia, it is not known when federal, state, or local funding for different implementation phases of the SR 365 vision will become available.

It will take time and resources to coordinate implementation of the SR 365 improvements and associated access management changes between Georgia DOT, GHMPO, the Georgia Mountains Regional Development Center, Hall County, Habersham County, and stakeholders. At a minimum, Georgia DOT will need to work with Georgia DNR, FHWA, and USEPA. Locally, managing and coordinating efforts to provide reasonable access to property owners in the corridor will be a significant effort.

6.4 Implementation Considerations

There are funding regulations and allocation guidelines to which Georgia DOT must adhere. In addition, local consent, environmental approvals, and environmental justice must be considered in accordance with federal and state transportation statutes. To the extent known at this time, these considerations are addressed in the preceding action plan and are more specifically discussed below.

Funding for the project is anticipated to come from a combination of sources, including federal, state, and local funding capital improvement programs. By federal and state statutes governing the allocation of transportation funds, money to implement the SR 365 improvements needs to come from multiple sources for all practical purposes. Exceptions could occur if a local government or privately controlled enterprise were to finance the improvements.

The study team anticipates that the project will be paid for by means of federal, state, and local capital needs programs. Typical federal funding for an NHS project requires a 20 percent minimum match from state and local sources. Moreover, Georgia DOT policy requires that transportation project funding be spent equally across congressional districts over a five-year period. In this case, 80 percent, or $560 million of the $700 million total project cost, could come from federal funds, leaving $140 million from Georgia DOT and local government programs for capital improvements.

6.4.1 State Process

Georgia DOT has two important interrelated processes that dictate the implementation schedule of a large-scale project like the SR 365 corridor improvement plan. The primary focus of one process is designing the project. The other process is geared to the financing, scheduling, and construction of the project (programming).

Design of the project is done in two major sequential steps. Generally, these are:

1. Preliminary Design – Includes a concept study, environmental studies, preliminary engineering, and a right-of-way plan.

2. Final Design – Includes environmental approval, location and design approval, final design, and right-of-way acquisition, plus modifications to final design and the right-of-way plan.

These two phases of project design are not mutually exclusive. They could be thought of as an engineering-based econometric convergence process that concludes when the utilities for transportation function improvements and minimizing environmental impacts are maximized in relation to cost.

On a different yet related implementation track, there are administrative matters pertaining to the project that need to be programmed. Chiefly, programming includes funding and an implementation schedule. A project is considered programmed for implementation when elements of the project are programmed into the CWP and STIP. While Georgia DOT is primarily responsible for programming projects in Georgia, metropolitan planning organizations like GHMPO also have a role in this process. Outside of metropolitan areas, regional development centers, county commissioners, and municipal administrators also have avenues to collaborate with Georgia DOT on programming transportation improvement projects. A project of this scale will need to be programmed over several years.

6.4.2 Metropolitan Planning Process

GHMPO is a public agency funded by federal, state, and local revenues. Its purpose is to facilitate transportation planning in Hall County, including capital improvements like those advocated by this study for the Hall County portion of SR 365. Decision making at GHMPO is performed by the policy committee, which receives recommendations

and advice from two other committees: the technical coordinating committee and the citizens' advisory committee.

There is no metropolitan planning organization planning process in the Habersham County portion of the SR 365 corridor. Getting elements of the 2030 Vision programmed for the northern portion of the corridor will be done by Georgia DOT in consultation with the Georgia Mountains Regional Development Center, Habersham County officials, and officials representing municipal governments in Habersham County.

6.4.3 NEPA Process

The National Environmental Policy Act (NEPA) of 1969 provides a framework for environmental planning and decision making by federal agencies. NEPA directs federal agencies to consider the potential environmental consequences of their proposals, document the analysis, and make this information available to the public for comment prior to implementation. The NEPA process includes input from the public as well as from other state and federal agencies so that all environmental issues, such as impacts to the natural, social, cultural, and economic environments, and other issues are addressed. There are three levels of environmental analysis and documentation that may be undertaken to satisfy the NEPA process for a proposed project or action:

- Categorical Exclusion (CE): A CE is the lowest level of environmental documentation and is typically prepared for a project that is expected to have little or no impact on the human environment. A project being cleared under a CE typically does not require public involvement. Project types that are typically cleared with a CE may include intersection improvements, addition of turn lanes, signal upgrades, striping, safety, and most multi-use trails or sidewalks. Approval time for CEs range from six months to nine months.

- Environmental Assessment (EA): An EA is the appropriate level of documentation when the impacts of a project may be significant or potential impacts are difficult to determine. An EA requires public involvement at the minimum of one public information open house and a public hearing. Project types that typically qualify for an EA are those that would propose more than 1 mile of roadway on new location, major road widenings, projects with a potential for public controversy, and projects with combined impacts to Waters of the U.S., cultural resources, communities, noise levels, air quality, and other aspects of the human environment. An EA will often consider multiple alternatives, including a no-build alternative. Preparation of

an EA is a two-step process in which an EA is approved and, based on the findings, a Finding of No Significant Impact is generated. Approval time for EAs range from 12 months to 24 months.

- Environmental Impact Statement (EIS): An EIS is the highest level of environmental analysis and is generally the appropriate document type for large transportation corridors such as bypasses or interstates. An EIS is a three-step process with initial preparation of the Draft EIS, which progresses to a Final EIS before concluding with a Record of Decision. Public outreach is significant for an EIS and usually consists of several public information meetings and a hearing, as well as the creation of a citizens' advisory group and a technical advisory group. An EIS carries several alternatives through analysis, including the no-build scenario, in which all potential alternatives are analyzed to the same level for environmental impacts. The time period for preparation and approval of an EIS can range from three years to five years or more.

This project will likely require either an EA or an EIS. The study limits along the SR 365 and SR 400 corridors each encompass approximately 22 miles. The first step in determining the appropriate level of environmental documentation is examining specific project areas that demonstrate logical termini that would have little to no impact on the environment and could be cleared with a CE. Should Georgia DOT choose to clear the entire 22 miles of each corridor under one environmental document, the first level of analysis should start at the EA stage. The EA is selected when the significance of a project's impact on the environment is unknown. If it is determined early in the process that the project would have significant adverse impacts along each corridor, it would then be appropriate to elevate the environmental analysis to an EIS.

6.4.3.1 Commercial/Residential Relocations

The number of commercial and/or residential displacements that may occur as a result of the proposed project cannot be determined at this time. However, commercial and residential development in close proximity to the existing roadway was identified in several locations along SR 365. It may be possible to relocate residences and businesses within the same area or potentially farther back on the same parcels instead of relocating them to a new area. Once project development progresses, a conceptual stage study that includes the relocation impacts of the proposed project should be conducted to ensure compliance with Uniform Relocation Assistance and Real Properties Acquisition Act of 1970.

6.4.3.2 Historic Properties

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.

It is unlikely that historic properties will be impacted. No historic markers were noted along the corridor. Head's Mill is currently listed on the NRHP and is located approximately 1,200 feet east of the existing SR 165 corridor in Hall County. Given this distance, this site is not likely to be affected by any potential widening of SR 365.

6.4.3.3 Wetlands

Any improvements to the SR 365 corridor that would involve construction activities in the aquatic environments identified in the Existing Conditions section will require authorization of an impact permit pursuant to Section 404 of the Clean Water Act. Additionally, impacts to the North Oconee River may also require authorization pursuant to Section 10 of the Rivers and Harbors Act. Throughout Georgia, the Section 404 program is administered by the USACE Savannah Regulatory District.

In Georgia, there are three levels of permitting under USACE's program: regional, NWP, and IP. The type of permit coordination and authorization involved depends on the extent of proposed impacts on wetlands/waters of the United States.

6.4.4 Short-Term Improvements

Georgia DOT recently completed two projects that are expected to provide enhanced operations and safety in the SR 365 corridor. Because there are no current major capacity deficiencies in the corridor and because Georgia DOT recently made a substantial investment by constructing operational and safety improvements at intersections up and down the entire length of the study corridor, it is too early to determine what low-cost operational and safety improvements would be appropriate next steps. Based on the number of developments being planned near SR 365 in North Hall and other sporadic developments in the corridor, it would not be too early for Georgia DOT, local governments, stakeholders, and the public to establish an access management program.

In response to local government concerns about operations and safety throughout the study corridor, Georgia DOT reconstructed nearly all of the at-grade intersections on SR 365. These intersection treatments generally followed the same improvement pattern:

- Re-aligning and lengthening left-turn lanes on SR 365 approaches to allow for better deceleration and improved driver sight distances
- Lengthening right-turn lanes on SR 365 approaches where appropriate
- Reconstructing and adding turn lanes on selected cross streets
- Adding traffic signals to control turning movements at White Sulphur Road and Demorest – Mount Airy Highway (both intersections were primary cross streets of critical sections reported in the existing conditions analysis)

The second project was to reconstruct Cannon Bridge Road/SR 105 over SR 365 between Cornelia and Demorest in Habersham County. This improvement included additional auxiliary and turn lanes on Cannon Bridge Road/SR 105 as well as intersection and driveway re-alignments to provide better traffic flow within and through a burgeoning commercial district.