Georgia Department of Transportation
Office of Planning

Georgia Statewide Freight and Logistics Plan, 2010-2050

Truck
Modal Profile

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1.0 Introduction

This report performs an in-depth analysis of goods movement by trucks in Georgia. It describes the framework in which freight operates in Georgia along with describing the freight transportation system in terms of supply and demand. It also documents various needs and emerging issues that impact the trucking industry in Georgia. The structure of the report is as follows:

- **Chapter 1, Introduction –** Describes the structure of the report.
- **Chapter 2, Institutional Perspective –** Describes the regulatory and policy framework of the logistics industry from the trucking industry's perspective.
- **Chapter 3, Trucking-Related Infrastructure (Supply) –** Provides information on the current supply of trucking-related infrastructure in Georgia, including road infrastructure, establishments that utilize/operate trucks, and truck parking/rest facilities.
- **Chapter 4, Economic Forecasts –** Identifies sources of economic and freight forecasts related to the trucking industry. Sources are described and compared to provide insight on potential industry growth trajectories.
- **Chapter 5, Trucking Demand –** Assembles data from several sources to understand where trucks are, where they are going, what they are carrying, and how these patterns may change over time.
- **Chapter 6, Needs and Issues – Bottlenecks –** Identifies and analyzes current and potential future truck-related bottlenecks on Georgia's highway system using the statewide travel demand model and truck-equipped GPS data.
- **Chapter 7, Needs and Issues: Safety –** Analyzes truck safety in Georgia, including comparisons of truck and auto crashes, identification of truck-involved crash locations, and discussion of types of truck-involved crashes.
- **Chapter 8, Needs and Issues: Parking –** Provides information on the balance of parking supply and demand on Georgia's Interstate system.
- **Chapter 9, Needs and Issues: Truck Size and Weight Issues –** Describes Georgia truck size and weight laws, and discusses emerging issues on these issues along with operation of oversize and overweight trucks.
- **Chapter 10, Needs and Issues: Alternative Fuels –** This section discusses alternative fuel options for the trucking industry and describes impediments to the implementation of alternative fuel for trucks in Georgia.
- **Chapter 11, Summary of Key Findings, Needs and Issues –** Summarizes key findings, needs, and issues related to the trucking industry. This chapter is based on the summary information provided in other paragraphs. It will also be used as the starting point for identifying freight solutions in the State.

2.0 Institutional Perspective on Trucking Industry

2.1 STRUCTURE OF TRUCKING INDUSTRY

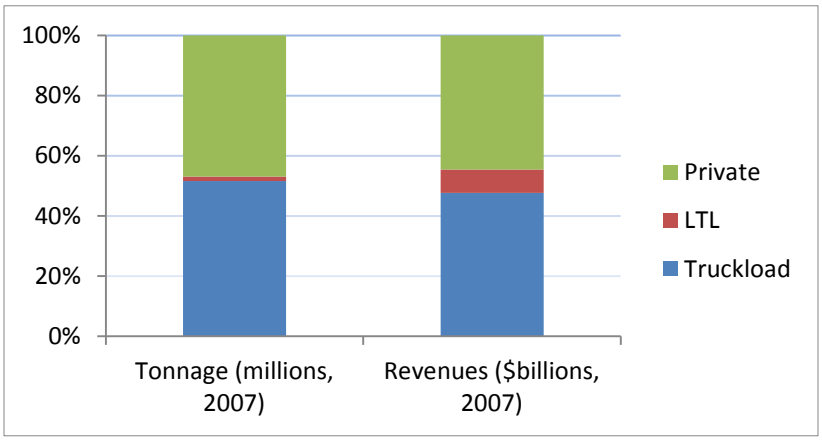
The trucking industry is comprised of three key segments: truckload, less than truckload ("LTL"), and private fleets. Truckload companies and LTL companies are both considered "for-hire carriers," because they both haul freight that is owned by other businesses. As the names suggest, truckload carriers ship only a single customer's goods in a single truck, while LTL carriers ship multiple customers' goods in a single truck. Private truck fleets are owned by companies, such as manufacturers, retailers, and other businesses, that operate their own fleet of trucks to support their primary business.

According to the 2007-2008 American Trucking Association (ATA) "Trucking and the Economy Report," tonnage from truckload companies was estimated at roughly 5.5 billion tons, or 35 percent of total freight tonnage and 50 percent of truck tonnage. National truckload revenue is about $310 billion per year. This translates into roughly 40 percent of total transportation revenue and close to 50 percent of truck revenue.

The ATA reports that the LTL component of the industry is smaller: just over 155 million tons, or about 1 percent of total tonnage and nearly 1.5 percent of truck tonnage. The higher value of most LTL shipments generates revenue of about $50 billion annually to account for approximately 6 percent of total revenue and 7 percent of truck revenue.

Private trucking firms handle more than 5 billion tons of cargo each year, representing 48 percent of total truck tonnage. Private carrier revenue is estimated at about $290 billion, nearly 45 percent of truck revenue. Figure 2.1 shows the tonnage and revenue of each of the three trucking segments.

Figure 2-1 Percent of Tonnage and Revenues by Trucking Segment, U.S.



Source: ATA Trucking and The Economy Report, 2007-2008

The Federal Highway Administration (FHWA) Highway estimates that of the 15.5 million trucks operating in the United States, 1.9 million are tractor trailers. Georgia has the fifth-highest number of tractor-trailer registrations at roughly 100,000 as of 2007. The four states with higher truck-tractor registrations are Florida, California, Texas, and Alabama.

The ATA report states that there are approximately 360,000 companies with truck fleets in the United States; 82 percent of these companies operate six or fewer trucks. Ninety-six percent of these companies operate 28 or fewer trucks. Four percent of these companies (or 14,000) have 29 trucks or more. According to the 2010 Georgia Logistics Report, there are approximately 35,000 trucking companies currently located in Georgia; most are small, locally-owned businesses. Therefore, at the state and national levels, the majority of trucking companies are small firms each operating a handful of trucks.

Of the nearly 9 million jobs supported by the trucking industry, about 30 percent are employed in the wholesale and retail industries with another 30 percent in the transportation and public utility industries. The U.S. Department of Labor reports that there are 3.5 million truck drivers in the United States, and that 1 in 10 are independent -- a majority of which are owner-operators. Many in the trucking industry are concerned about the aging of the truck driver workforce and the impact of truck driver availability.

2.2 TOP 10 TRUCKING INDUSTRY ISSUES IN GEORGIA

The American Transportation Research Institute (ATRI) conducts an annual survey of trucking firms to determine the top issues facing the industry. As the research arm of the ATA, ATRI is a member of the project team and a coauthor of this report. This section describes the result of their annual survey at both the national level for 2008-2010 as well as providing information specific to Georgia for 2010.

Survey Description

The ATA "Top Industry Issues" survey of the trucking industry identifies the most pressing current issues facing the industry, and then recommends strategies to address those issues. The survey is conducted in two phases; the initial "Phase One Survey" is designed to identify and categorize key issue areas and strategies from a representative sample of for-hire and private motor carriers. This survey population represents a cross-section of fleet sizes, industry sectors and geographic regions.

The "Phase Two Survey" is distributed to a larger sample of more than 4,000 carriers each year. The final survey response dataset allows ATRI to rank-order the relative importance of each issue identified in Phase One. Respondents also are able to identify preferred strategies for addressing each issue. Phase Two survey respondents represent industry stakeholders from both the United States and Canada; it includes motor carriers, commercial drivers, and other stakeholders. The results of the survey from years 2008 to 2010 were tabulated for this report and are shown in Table 2.1 below. It provides insight into the institutional environment in which the trucking industry operates on both a state and national scale.

Results of the National Top Industry Issues Survey

Three of the most critical industry issues identified by the national-level respondent population during 2008, 2009, and 2010 were the economy, government regulations and fuel issues as shown in Table 2.1. In 2010 the three most important issues facing the national trucking industry were the economy, the Comprehensive Safety Accountability (CSA) 2010 regulations, and general government regulation.

Table 2.1 Top 10 National Issues for the Trucking Industry

Rank	2008	2009	2010
1	Fuel Issues	Economy	Economy
2	Economy	Government Regulation	CSA 2010
3	Driver Shortage	Fuel Issues	Government Regulation
4	Government Regulations	Congestion	Hours-of-Service
5	Hours of Service	Hours-of-Service	Driver Shortage
6	Congestion	Commercial Driver Issues	Fuel Issues
7	Tolls/Highway Funding	Environmental Issues	Transportation Funding/ Infrastructure (Congestion)
8	Environmental Issues	Tolls/Highway Funding	On-Board Truck Technology
9	Tort Reform	Size and Weight	Environmental Issues
10	On-Board Truck Technology	On-Board Truck Technology	Size and Weight

Source: ATRI Annual Survey.

The economy was stated as the most important issue for both 2010 and 2009. This is concurrent to the significant impact of the recent economic slowdown that reduced demand for trucking services by up to 25 percent.

Government regulation appeared frequently near the top of the list between 2008 and 2010. Changes in regulation, or even the possibility of changes in regulation, create a high level of uncertainty for business planning. Long-range planning such as the decision to buy or sell vehicles or the decision to expand operations can be subject to uncertainty as management decisions are put on hold until the regulatory climate becomes better understood. In addition to Federal regulations, carriers engaged in Interstate commerce also can be subject to several dozen different state and local regulations.

Fuel issues were at the top of the survey in 2008, but have since declined in rank. The year 2008 brought an unprecedented increase in diesel fuel prices rising to over $4 per gallon compared to just $2 per gallon in 2007 and an average of roughly $1 per gallon between 2000 and 2004. In 2008, IHS Global Insight reported that fuel had overtaken labor as the largest cost driver at trucking firms.[1] Fuel prices declined significantly in 2009 as the recession reduced demand for fuel significantly, while short-term supplies for fuel remained constant. However, with the rise in oil prices that began in 2011, fuel prices will provide a key challenge for the trucking industry.

Comprehensive Safety Accountability (CSA), a new regulatory initiative led by the Federal Motor Carriers Safety Administration (FMCSA), emerged as a top issue in 2010. CSA replaced 'SafeStat' as the evaluation and scoring system used by FMCSA to monitor truck and bus safety. CSA increased the reporting requirements on safety history for individual truck drivers and trucking fleets as a whole. The tracking of these safety records could add costs to the trucking industry. At the time that the survey was conducted, there was a great deal of confusion and uncertainty regarding the specific implementation of this initiative. More information about CSA is discussed in Chapter 7 on Truck Safety.

There also is a change to the Hours-of-Service Regulation that accompanies the CSA initiative. The Hours-of-Service regulations (49 CFR Part 395) put limits in place for when and how long commercial motor vehicle (CMV) drivers may drive. The draft changes to the truck driver hours of service primarily involve the reduction in hours that a driver can drive per day from 11 hours to 10 hours. This has the potential to affect supply chains and alter the optimal location of warehouses and distribution centers for specific companies. Additionally, it may increase costs as companies seek new facilities to optimize their supply chains in the face of these new restrictions on their operations.[2]

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[1] Source: IHS Global Insight, Perspectives Article, August 14, 2008.

[2] Source: www.logisticsmgmt.com/article/are_private_fleets_about_to_hit_a_wall

While driver shortages were still an issue in 2008, this problem has decreased in rank in parallel with the recent economic slowdown. It is expected that the driver shortage problem will reemerge as a top concern within the industry as the economy strengthens. In fact, driver shortages rebounded to the fifth spot in 2010, signaling an emerging economic recovery. Congestion and transportation infrastructure funding continue to be a focus of trucking companies; travel delays due to congestion and poor infrastructure is a cost center for many in the industry.

There also are issues that are typically reported on the top 10 list annually but tend to rank near the bottom. The need for tort reform is often selected as a top issue due to the high cost of civil litigation. Typically, such lawsuits are filed against trucking companies after truck-involved crashes, even in instances where trucking companies are not actually at fault for a crash.

Environmental regulations are often a concern for the industry as well. Individual states have enacted numerous environmental policies, thus creating a patchwork of regulations across the nation that many Interstate motor carriers find difficult to navigate. Increasingly stringent national emissions standards also have significantly added to the cost of a commercial motor vehicle.

On-board truck technology is consistently mentioned by survey respondents but tends to be ranked at the very bottom of the list. On-board technologies have a myriad of benefits to the industry, but there is a level of concern that use of such technology could be mandated by regulators. As an example, a recent proposal by FMCSA would mandate electronic on-board recorders (EOBR) on some 500,000 Interstate motor carriers. While drivers must follow such regulations and document adherence to HOS rules through the use of logbooks, EOBRs could accomplish the same goal. However, there are significant privacy concerns in regard to having government track private sector commercial vehicle activity so closely. A second prominent issue with on-board technology is that such equipment is often expensive and is not widely used throughout the industry; a mandate would, therefore, be an added cost to many of the smaller trucking firms in the industry. Finally, mandating certain "approved" equipment has the effect of stifling innovation; a technology provider, for instance, may not be able to advance certain types of equipment because the newer technology may not fully meet the original guidelines.

Georgia Issues in the Top Industry Issues Survey

Table 2.3 shows the top 10 issues as identified by trucking firms based in Georgia and compares those rankings with the national survey. Overall, the comparisons indicate that many of the issues facing the Georgia trucking industry and the same as those faced by trucking firms nationally. However, there are some differences worth noting. In particular, the top two issues in Georgia are the reverse of what they are for the nation. In Georgia, CSA was the top issue with the economy being the second most important issue. This is somewhat

surprising considering the economy in Georgia had a somewhat slower rebound from the economic slowdown compared to some other states.

Table 2.2 Top 10 Issues Facing the Trucking Industry in Georgia

Rank	Rank Relative to National Survey		
	2008	2009	2010
1	Fuel Issues (Same)	Economy (Same)	CSA (-1)
2	Economy (Same)	Congestion (-2)	Economy (+1)
3	Hours of Service (-2)	Government Reg. (+1)	Hours of Service (-1)
4	Congestion (-2)	Commercial Driver Issues (-2)	Government Reg. (+1)
5	Government Reg. (+1)	Fuel Issues (+2)	Driver Shortage (Same)
6	Driver Shortage (+3)	Hours of Service (+1)	Fuel Issues (Same)
7	Environmental Issues (-1)	Size and Weight (-2)	Transportation Funding/ Infrastructure (Congestion) (Same)
8	Tolls/Highway Funding (+1)	On-Board Truck Tech. (-2)	On-Board Truck Tech. (Same)
9	On-Board Truck Tech. (-1)	Environmental Issues (+2)	Environmental Issues (Same)
10	Tort Reform (+1)	Tolls/Highway Funding (+2)	Size and Weight (Same)

Source: ATRI Annual Survey.

In 2008 and 2009, Georgia did differ from the national rankings in terms of congestion. In fact, the issue of traffic congestion and infrastructure deficiency ranked two spots higher in both 2008 and 2009 in Georgia. In 2009, the Georgians surveyed by ATRI ranked congestion as the second most important issue after the economy. While for the entire survey, congestion was ranked as the second most important concern.

This higher congestion ranking is no surprise given the high levels of congestion in metropolitan Atlanta. In 2010, the congestion category was combined with a general transportation infrastructure and finance category. Under this more general categorization, Georgia's ranking was the same as the rest of the nation. It should be noted that congestion is the most important issue listed by the trucking industry that a state department of transportation (DOT) would be able to impact directly.

In 2010, the convergence of Georgia issues with national issues is the most evident. Six of the top 10 issues were ranked in the same order for Georgia as they are for the rest of the country. The other four issues showed no more than one level of difference between Georgia and the United States.

3.0 Truck-Related Infrastructure (Supply)

Truck-related infrastructure consists of three primary components: 1) the highway infrastructure; 2) freight facilities where trucks are loaded, unloaded, and stored; and 3) truck stop facilities where truck drivers refuel, rest, and take breaks. This section describes each of these facilities in Georgia.

3.1 HIGHWAY INFRASTRUCTURE

In 2009, there were 117,413 miles of roadways in Georgia.[3] Table 3.1 shows road mileage by road system type and ownership. The "workhorse" for moving trucks is the urban Interstate system. This classification of roads comprises just 460 of the total 117,413 miles of statewide road system or 0.3 percent of the statewide road mileage total.

Rural and small urban Interstates are important for carrying intercity truck traffic. These two classifications of roads comprise 783 miles, which is approximately 0.7 percent of the statewide road mileage total. The non-Interstate roadways in Atlanta are primarily used to connect to the Interstate system and for local distribution of goods. The vast majority of the truck VMT in the State is carried by the Interstate system.

Figure 3.1 shows the number of lane miles on Georgia's road network based on the information contained in the statewide travel demand model for 2006. As shown in the figure, generally the Interstate system is either four or six lanes, while the non-Interstate road system is two or four lanes. The primary exceptions is that in urbanized areas (most notably in Atlanta), there are several Interstates with seven or more lanes. There also are a few non-Interstate roads with more than four lanes.

Both I-75 and I-95 are at least six lanes for their entire alignment through Georgia. These two Interstates represent nearly 40 percent of the Interstate system in the State. The other Interstates are primarily six or more lanes only in select urbanized locations.

[3] www.dot.ga.gov/DS/Data#tab-2

Table 3.1 Mileage by Route and Road System in Georgia, 2009

Road System Type	State Route Mileage	County Road Mileage	Local Road Mileage	Total Mileage
Rural Interstate	716	–	–	716
Rural Principal Arterial	2,637	6	1	2,644
Rural Minor Arterial	5,137	57		5,195
Rural Major Collector	5,559	7,210	48	12,816
Rural Minor Collector		7,320	9	7,350
Rural Local	1	48,013	3,545	51,559
Rural Totals	14,055	62,630	3,625	80,281
Small Urban Interstate	67	–	–	67
Small Urban Freeway	8	–	–	8
Small Urban Principal Arterial	589	16	13	618
Small Urban Minor Arterial	414	386	198	997
Small Urban Collector	4	89	311	604
Small Urban Local	0	1,904	,802	4,706
Small Totals	1,087	2,597	3,324	7,001
Urbanized Interstate	460	–	–	460
Urbanized Freeway	131	7	–	138
Urbanized Principal Arterial	1,104	169	65	1,338
Urbanized Minor Arterial	1,221	1,669	397	3,287
Urbanized Collector	1	1,527	582	2,130
Urbanized Local	14	16,093	6,671	2,778
Urbanized Totals	2,952	19,465	7,715	30,132
State Totals	18,093	84,692	14,665	117,413

Source: GDOT Roadway Characteristics and Mileage Reports (Report 445).

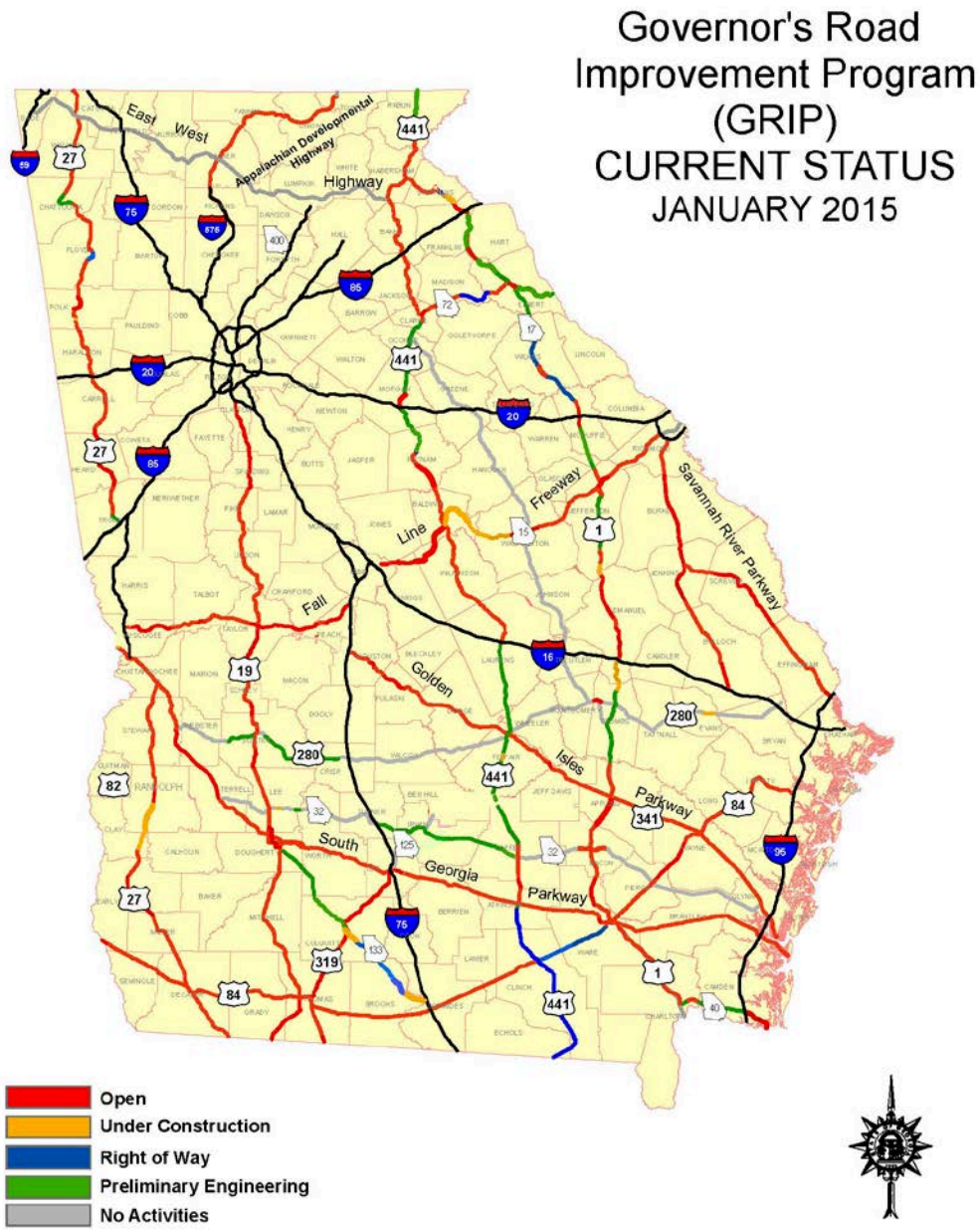
3.2 GEORGIA GRIP PROGRAM

The Governor's Road Improvement Program, commonly referred to as "GRIP", is a system of state highways in Georgia which have been targeted for improvement to increase economic development in the State. GRIP began in in 1989 by the Georgia General Assembly to support rural economic development through a series of routes shown in Figure 3.2. Economic analysis has shown that improving the routes on this network has had a positive impact.[4]

[4]http://www.dot.ga.gov/BuildSmart/Programs/Documents/GRIP/Facts/GRIPSystemSummaryFactSheet.pdf

GRIP increased connectivity throughout the State, which is beneficial for trucks that have origins or destinations in nonurban areas. GRIP roads also are beneficial for trucks with trip travel patterns not on the State's Interstate system. Section 4.0 of this report on trucking demand provides more detail on origins, destinations and routing for trucks in the State.

Figure 3-1 Status of GRIP Corridors



Source: GDOT www.dot.ga.gov/BuildSmart/Programs/Documents/GRIP/Map/GRIPMAP.pdf

3.3 HIGHWAY DESIGNATIONS

Table 3.1 shows the roadway classification in Georgia based on the FHWA roadway functional classification system. There also are other highway designation systems that are related to truck traffic. The National Highway System (NHS) is a set of roads that are Federally-classified as important for the nation's economy, defense and mobility (Figure 3.3). The NHS also contains a Strategic Highway Network (STRANET) shown in Figure 3.3. The STRANET is a network of highways which are important to the United States' strategic defense policy and which provide defense access, continuity and emergency capabilities for defense purposes. The data for both networks come from the National Highway Planning Network by FHWA.

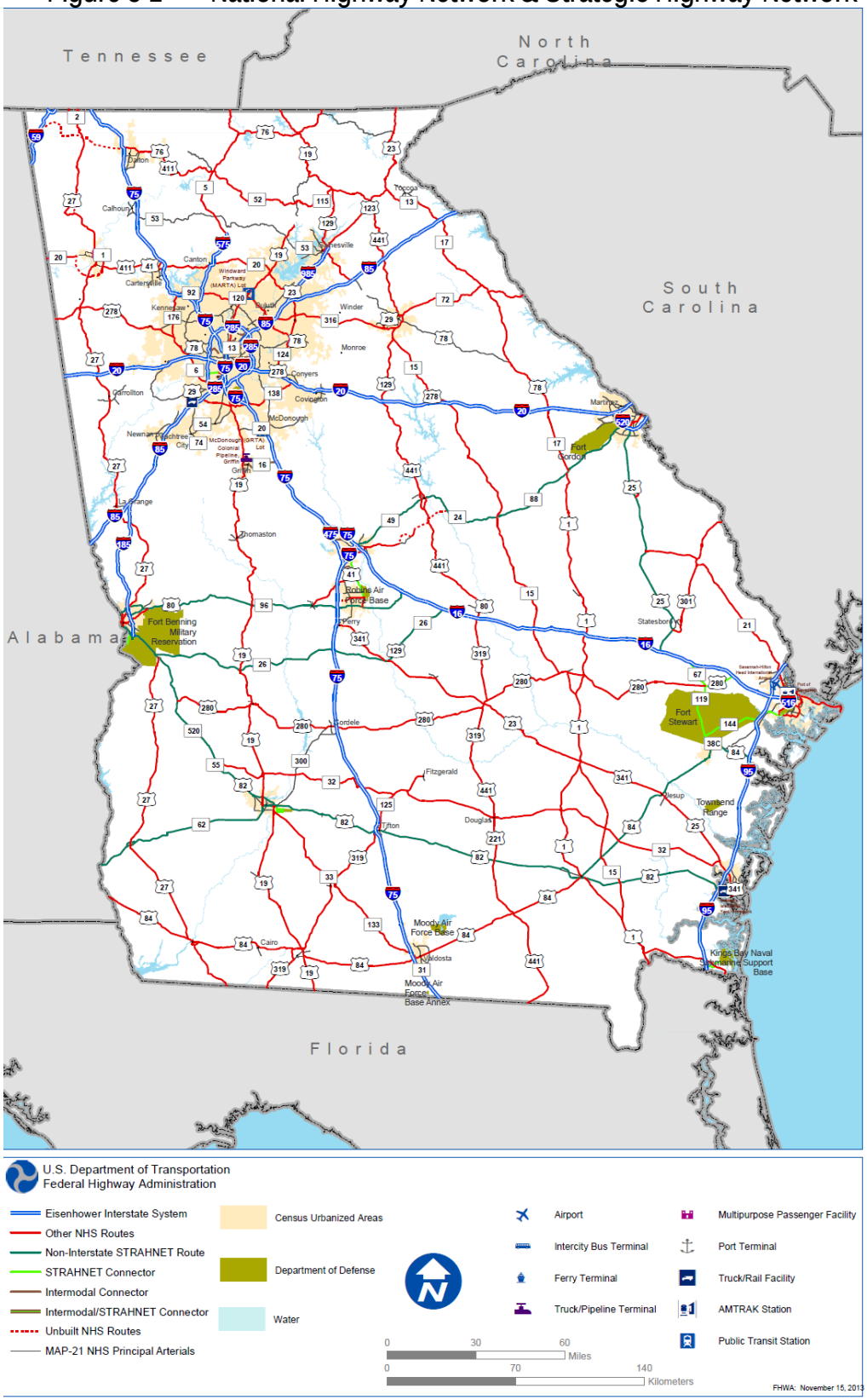
Georgia also designates specific truck routes related to oversize trucks. Oversize trucks are those that either have longer dimensions or heavier weights than those allowable by the five-axle, 80,000-pound Federal truck weight limit. Figure 3.4 shows the truck route network in Georgia. The truck route network follows the following three coding scheme from as per GDOT's "System Inventory Data Collection Coding and Procedures Manual":

- **A** stands for "designated access routes for oversize trucks allowing single and twin trailers."
- **C** is used for designated access routes that only allow for oversize trucks that utilize twin trailers. These are routes with sharp turns that oversize (in terms of length) single trailer trucks cannot negotiate, but shorter, articulated twin trailer combinations can use.
- **D** is used for "all Interstate routes."

There also is a small set of roads that trucks are prohibited from using. These are shown in black in Figure 3.4.

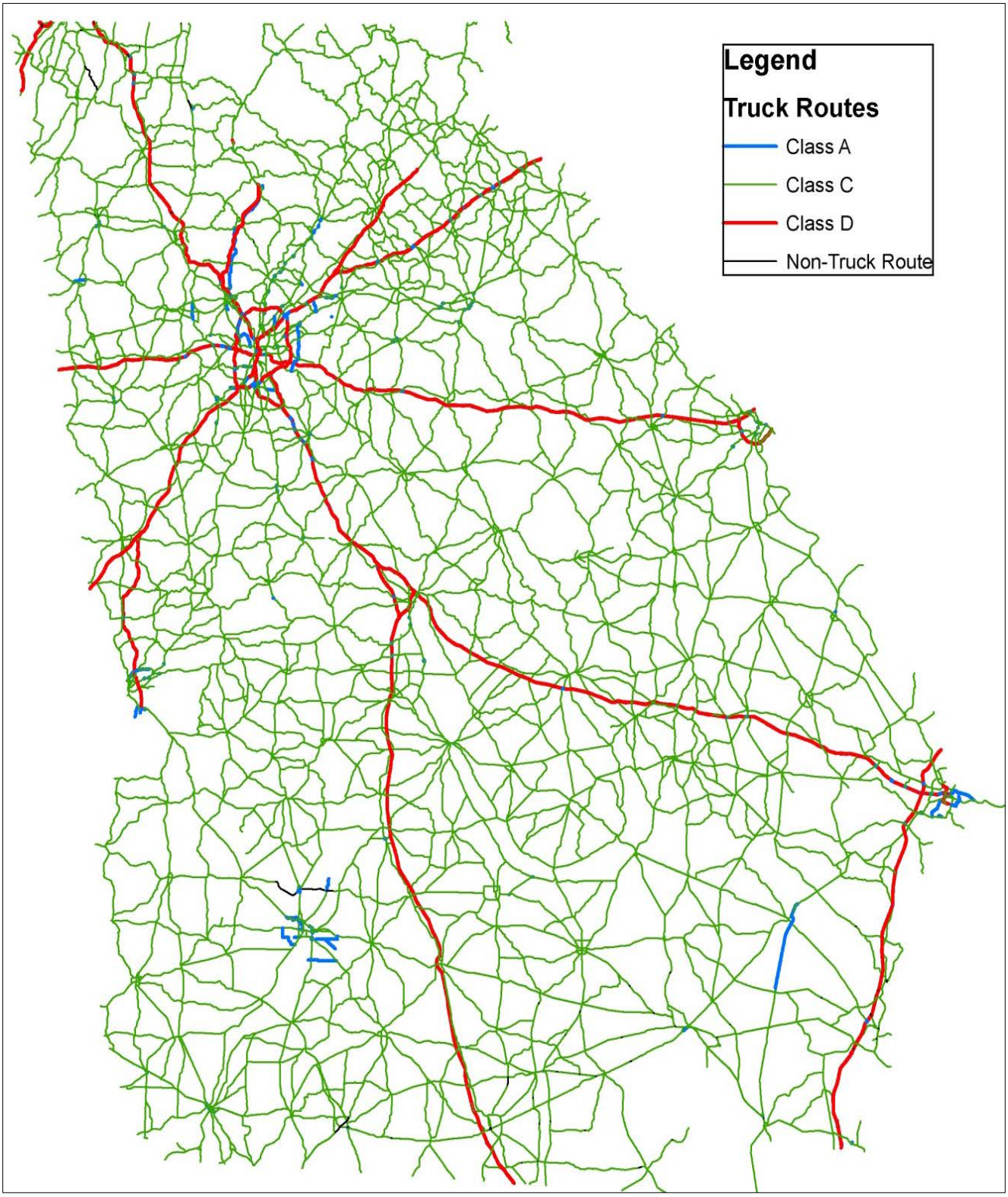
In Georgia, there is only one posted restriction for hazardous materials on the state roadway system. This restriction is for the tunnel on Georgia 400 that runs underneath an office building on Peachtree Street in Atlanta.

Figure 3-2 National Highway Network & Strategic Highway Network



Source: FHWA, Nov. 2013

Figure 3-3 Georgia Truck Routes



Source: GDOT Office of Transportation Data

3.4 TRUCK STOP AND REST FACILITIES

Truck parking facilities are an important component of the truck-related infrastructure. They ensure the safety of truck operations by providing areas where truck drivers can take necessary breaks. The location and operation of these facilities also provides information on truck points of entry and exit from the general road network and they can sometimes indicate freight-intensive locations in the State. This section shows the location of parking facilities in Georgia. Section 8.0 examines the balance of parking supply and demand in more detail for Georgia.

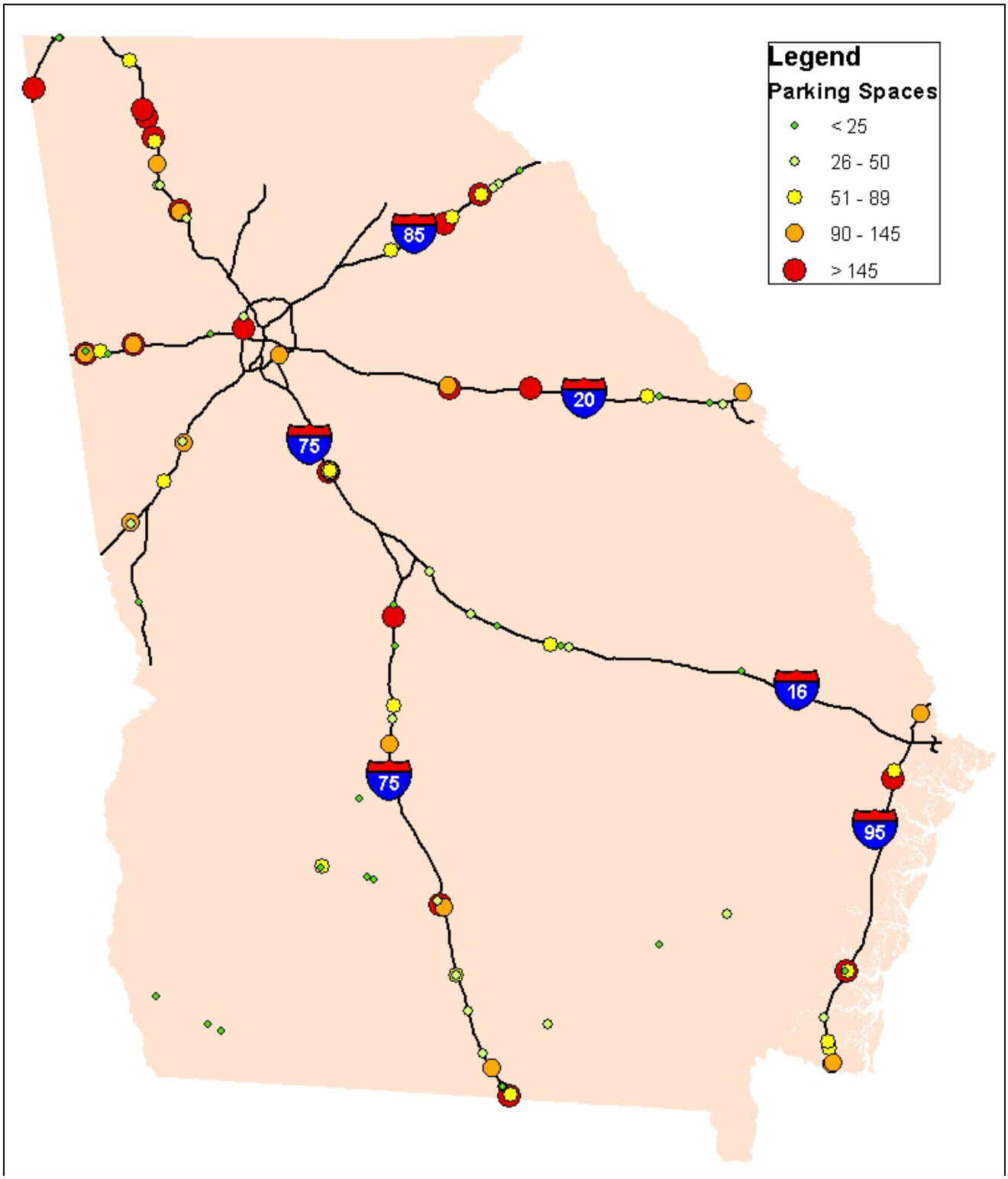
Truck stops are privately-owned commercial facilities that provide an opportunity to rest and fulfill many nonrest-related activities, including refueling, eating, and potentially access to the Internet. Rest areas are publicly-owned facilities that offer truck drivers with minimal services. They are primarily used for long periods of rest, typically associated with overnight stays.

Figure 3.10 shows the location of commercial truck stops along the Interstate system in Georgia and the number of parking spaces at each truck stop. The figure shows that the vast majority of truck stops are located in rural regions. This is primarily due to the availability of relatively inexpensive land and the ability to attract intercity truck traffic at rural locations.

Figure 3.11 shows the location of rest areas and weigh stations in Georgia along with the number of parking spaces at each location. The figure shows that these facilities also are located primarily in rural regions. There also are relatively fewer of these facilities and they are much smaller in terms of their number of parking spaces.

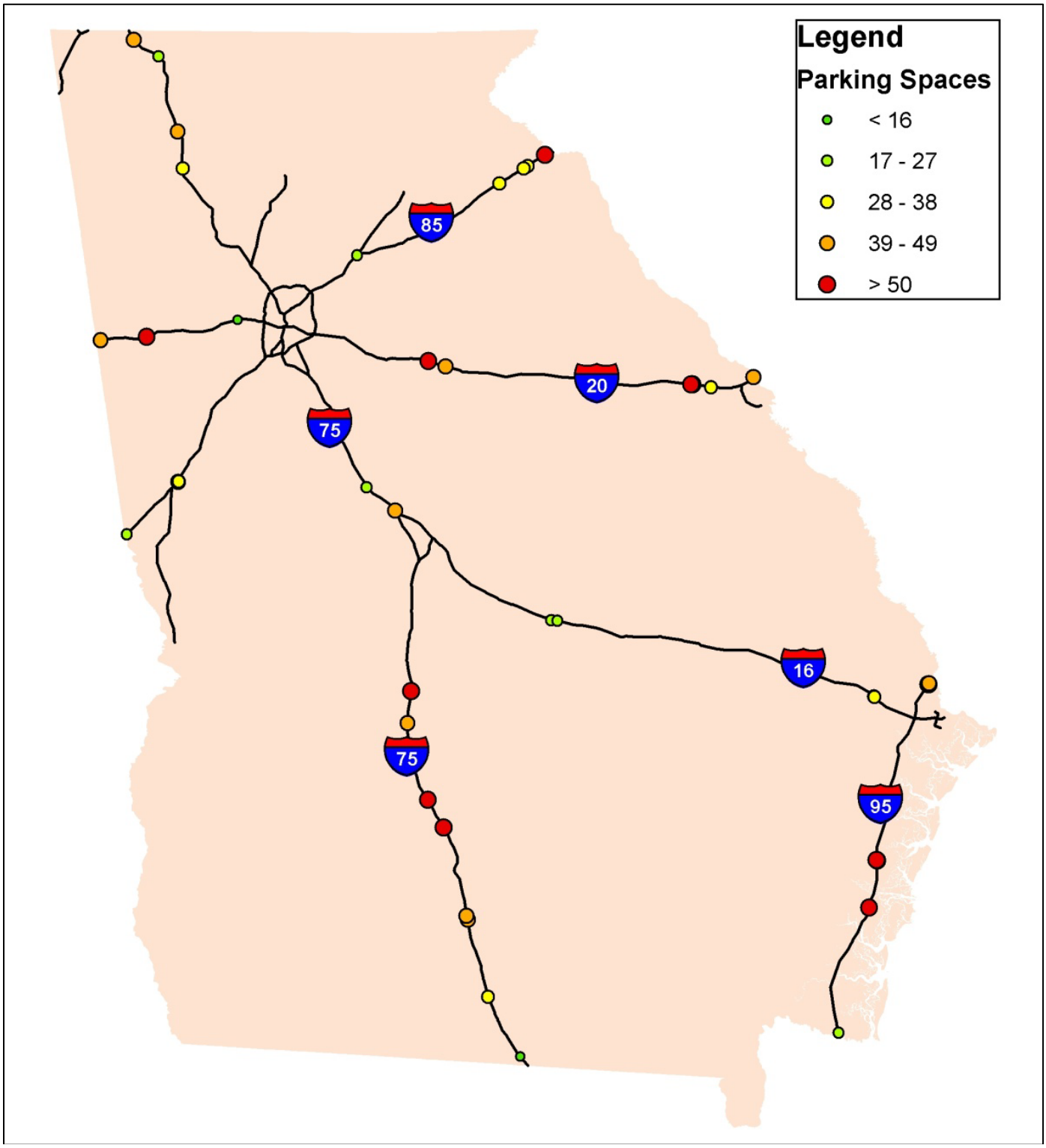
Table 3.2 shows the number of parking spaces on each of the long-haul corridors in Georgia. Nearly half of the total truck parking spaces in the state are on I-75. The I-75 south of Macon corridor has the most truck parking spaces with over 2,000. This is followed by the I-75 north of Atlanta corridor and the I-95 corridor. Both of these corridors have over 1,500 truck parking spaces. However, in terms of density of parking spaces per freeway mile, the I-20 west of Atlanta corridor was the highest with over 18 parking spaces per freeway mile over 50 percent more than the state average of 11 parking spaces per freeway mile. Truck parking density is lowest on I-16 with just two parking spaces per freeway mile.

Figure 3-4 Parking Spaces at Truck Stops



Source: ATRI Truck Stop Data & project team analysis.

Figure 3-5 Parking Spaces at Rest Stops and Weigh Stations



Sources: ATRI compilation of Rand McNally Atlas Data & data from "The Trucker's Friend". Rest area data from GDOT website: www.dot.ga.gov/InvestSmart/Pages/RestAreas.aspx

Table 3.2 Truck Parking Spaces per Highway Mile in Georgia

Corridor	Total Distance Miles	Total Parking Spaces	Parking Spaces per Mile
I-20 West of Atlanta to Alabama Line	50	902	18
I-75 North of Atlanta to Tennessee Line	94	1,587	17
I-75 South of Macon to Florida Line	156	2,515	16
I-95 from South Carolina Line to Florida Line	111	1,558	14
I-85 North of Atlanta to South Carolina Line	83	969	12
I-85 South of Atlanta to Alabama Line	81	628	8
I-75 South of Atlanta to Macon	67	512	8
I-20 East of Atlanta to South Carolina Line	133	978	7
I-16 Macon to Savannah	164	391	2
Total	939	10,040	11

Source: Project team analysis.

3.5 KEY FINDINGS ON HIGHWAY INFRASTRUCTURE

This chapter has identified the following key findings related to Georgia's highway infrastructure:

- The vast majority of trucking activity occurs on less than one percent of the State's road system mileage – the Interstate system;
- Roughly 40 percent of the Interstate system in Georgia is at least six lanes;
- The majority of freight activities in the state are focused in metro Atlanta region with Savannah being second;
- Freight facilities outside of Atlanta and Savannah are typically concentrated in urbanized areas and along rural Interstate segments; and
- Nearly half of all of the truck parking spaces in Georgia are adjacent to I-75.

4.0 Economic Forecasts

Goods movement is the result of economic activity, so understanding the performance of economic sectors is a critical component to understanding freight flows. This section examines alternative sources of economic and freight forecasts in Georgia and discusses the implications of these forecasts for freight flows across the state. The three primary sources of forecasts used are:

1. American Trucking Association's national forecasts on truck activity;
2. Data from economy.com at the state-level data, by major goods-producing industries; and
3. TRANSEARCH truck flow data by commodity.

4.1 FORECAST BASED ON AMERICAN TRUCKING ASSOCIATION

The American Trucking Association (ATA) develops short- and long-range forecasts of economic activity for the trucking sector for the entire country. They also track historical changes in national trucking activity with a monthly truck tonnage index that they provide to member companies of their organization. Unfortunately, state-level data are not available through the ATA.

According to the ATA, national truck tonnage dropped 14 percent from 2008 to 2009. At the time those statistics were announced, ATA did not expect domestic truck tonnage to return to pre-recession levels until 2015.[5]

ATA expects that by 2021, truck tonnage will increa4.20 percent relative to 2009 levels. This would result in an increase from 8.8 billion tons annually in 2009 to 11.5 billion tons in 2021, as shown in Figure 4.1. This translates to a compound annual growth rate (CAGR) of 2.2 percent between 2009 and 2021. This growth rate is consistent with forecasts in other GDOT statewide studies including its GDOT Truck Lane Needs Identification Study.

According to the ATA forecast, trucking is expected to increase its market share of freight transportation relative to other freight modes (rail, marine, air, and pipeline) to 70.7 percent by 2021, up from 68 percent in 2009.

[5] American Trucking Association "*U.S. Freight Transportation Forecast to 2021*", 2010.

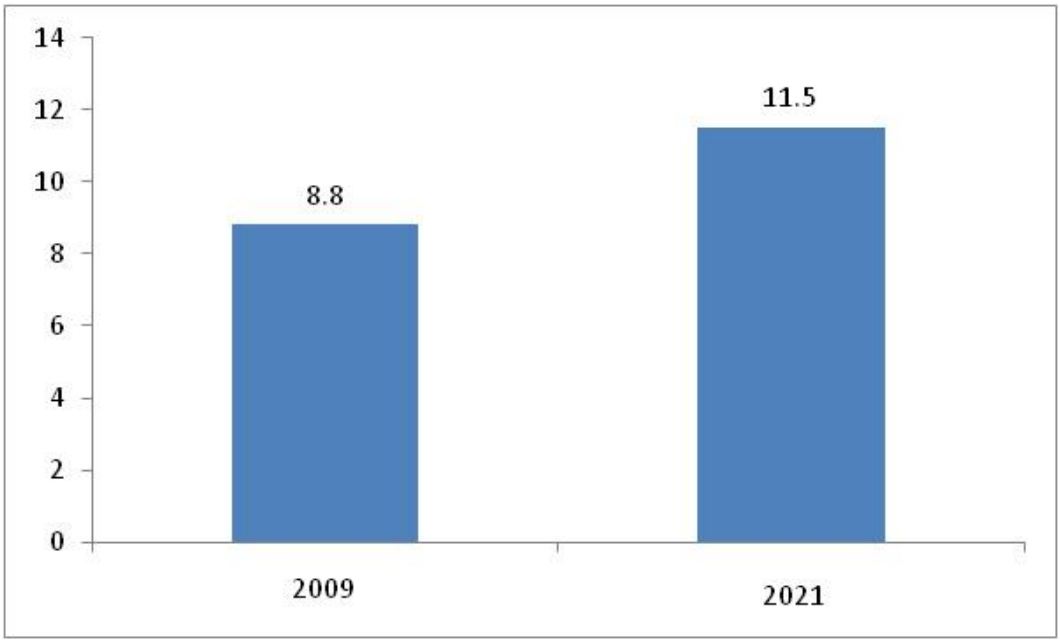
4.2 FORECAST BASED ON DATA FROM *ECONOMY.COM*

As part of the Georgia Statewide Freight and Logistics Plan, GDOT acquired economic output data for Georgia from Economy.com, which is a department within Moody's Analytics Economic and Consumer Credit Analytics. Moody's provides national and subnational economic and consumer credit trends primarily to support business decisions and investment professionals.

The data acquired from Economy.com provides information on gross state product for Georgia by industry -- a direct measure of the value of economic output (as opposed to tonnage, which is a measure of goods movement activity.)

Table 4.1 shows the economy.com estimate of output by industry in Georgia in 2009 along with the economy.com forecast of output in 2050. The forecast predicts some industries growing significantly faster than others. Overall, economy.com forecasts a compound annual growth rate of 2.3 percent for Georgia's economy -- roughly equivalent to the 2.2 percent compound annual growth rate forecast for truck tonnage by ATA.

Figure 4-1 U.S. Truck Tonnage Growth
In Billion Tons



Source: American Trucking Association

4.3 FORECAST BASED ON *TRANSEARCH* DATA

Global Insight TRANSEARCH freight flow data were analyzed to make inferences regarding economic forecasts for the trucking industry because the database provides freight flows by mode and commodity for 2007 and 2050.

TRANSEARCH estimates of truck flows by commodity for 2007 and 2050. Table 4.2 shows this information and includes inbound, outbound and internal flows ('through' truck flows are not included because trips with both the origin and destination outside of Georgia are not as strongly related to the State's economy.)

TRANSEARCH data estimates that Georgia's truck flows will grow from 450 million tons in 2007 to 846 million tons by the year 2050 -- a compound annual growth rate of 1.5 percent. This growth rate is significantly lower than the 2.2 percent growth rate forecast by the American Trucking Association. It also is significantly lower than the forecasts for most the goods-dependent industries generated by Economy.com. This indicates that the TRANSEARCH forecasts are relatively conservative compared to forecasts from other sources.

The TRANSEARCH data also indicates that there is a wide growth range for various commodities in the State of Georgia. The top three commodity categories, based on tonnage, are nonmetallic minerals, secondary traffic (goods moved to/from warehouses and distribution centers), and clay/concrete/glass/stone. These commodities have growth rates of 1.7 percent, 2.4 percent, and 0.2 percent, respectively. This implies that truck market share in future years will be dependent on both the actual growth rates achieved for specific commodities and the ability of the trucking industry to compete with other modes on a commodity-by-commodity basis.

The TRANSEARCH data also can be compared to the Economy.com forecast. Table 4.3 shows that TRANSEARCH also has a relatively conservative forecast compared to the forecast methodology of Economy.com.

Table 4.1 Georgia Gross State Products by Select Industries: 2007 & 2050 (in Millions of 2005 Dollars)

Industry	2007	2050	CAGR
Agriculture, Forestry, Fishing and Hunting	2,864	3,449	0.43%
Mining	362	785	1.81%
Utilities	6,852	15,274	1.88%
Construction	17,225	30,874	1.37%
Wholesale Trade	28,414	80,099	2.44%
Food Manufacturing	9,264	10,543	0.30%
Beverage & Tobacco Product Manufacturing	612	563	-0.19%
Textile Mills	2,473	2,988	0.44%
Textile Product Mills	3,524	5,229	0.92%
Apparel Manufacturing	262	321	0.48%
Leather & Allied Product Manufacturing	858	1,316	1.00%
Wood Product Manufacturing	1,636	870	-1.46%
Paper Manufacturing	3,345	2,862	-0.36%
Printing & Related Support Activities	1,244	528	-1.97%
Petroleum & Coal Products Manufacturing	474	162	-2.47%
Chemical Manufacturing	3,458	8,316	2.06%
Plastics & Rubber Products Manufacturing	2,307	7,416	2.75%
Nonmetallic Mineral Product Manufacturing	1,503	3,807	2.18%
Primary Metal Manufacturing	551	1,859	2.87%
Fabricated Metal Product Manufacturing	2,241	6,697	2.58%
Machinery Manufacturing	2,398	5,386	1.90%
Computer & Electronic Product Manufacturing	2,072	5,429	2.27%
Electrical Equipment, Appliance, & Component Manufacturing	1,403	7,240	3.89%
Transportation Equipment Manufacturing	4,456	11,634	2.26%
Furniture & Related Product Manufacturing	874	1,599	1.41%
Miscellaneous Manufacturing	1,403	2,810	1.63%
Retail Trade	25,263	77,185	2.63%
Transportation and Warehousing	14,699	39,766	2.34%

Source: Economy.com data.

Table 4.2 Tons of Commodity Flow by Trucks by Type of Movement, Georgia

Standard Trans. Commodity Code "STCC 2"	Commodity Type	Year 2007	Year 2050	CAGR
14	Nonmetallic Minerals	116,890,075	244,017,334	1.7%
50	Secondary Traffic	74,800,733	203,314,108	2.4%
32	Clay, Concrete, Glass, or Stone	51,881,536	55,239,096	0.2%
24	Lumber or Wood Products	49,014,583	49,237,249	0.01%
20	Food or Kindred Products	32,693,665	63,934,955	1.6%
29	Petroleum or Coal Products	20,338,843	21,401,879	0.1%
28	Chemicals or Allied Products	17,359,508	33,083,884	1.5%
1	Farm Products	13,538,279	33,483,212	2.1%
26	Pulp, Paper, or Allied Products	12,459,503	12,528,578	0.01%
33	Primary Metal Products	9,493,413	11,421,219	0.4%
10	Metallic Ores	8,138,347	9,057,907	0.3%
34	Fabricated Metal Products	7,358,359	10,505,213	0.8%
22	Textile Mill Products	6,752,464	11,693,916	1.3%
30	Rubber or Misc. Plastics	6,341,431	13,235,340	1.7%
35	Machinery	4,738,473	12,911,161	2.4%
37	Transportation Equipment	4,497,702	10,161,079	1.9%
36	Electrical Equipment	4,315,923	15,459,168	3.0%
25	Furniture or Fixtures	2,620,856	10,121,092	3.2%
27	Printed Matter	2,169,389	3,600,394	1.2%
23	Apparel or Related Products	2,143,459	5,247,488	2.1%
39	Misc. Manufacturing Products	1,248,362	5,346,200	3.4%
38	Instruments, Photo Equipment, Optical Equipment	579,843	9,419,460	6.7%
31	Leather or Leather Products	347,888	1,005,160	2.5%
8	Forest Products	284,902	833,296	2.5%
11	Coal	244,864	98,932	-2.1%
21	Tobacco Products	129,025	62,314	-1.7%
9	Fresh Fish or Marine Products	88,965	470,218	4.0%
19	Ordnance or Accessories	3,590	19,887	4.1%
	Grand Total	450,473,979	846,909,743	1.4%

Source: TRANSEARCH Data.

Table 4.3 Comparison of Truck and Economic Forecasts

Mode and Source	Forecast Years	CAGR	Units
Truck (TRANSEARCH)	2007-2050	1.50%	Tons
Truck (ATA national forecast)	2009-2021	2.20%	Tons
Economy.com Georgia GDP	2007-2050	2.10%	Dollars

Source: Project team analysis.

4.4 KEY FINDINGS ON TRUCKING FORECASTS

This chapter described three sources of economic and freight forecast data and generated the following key findings:

- The trucking industry does not expect to achieve pre-recession tonnage volumes until 2015.
- However, between 2009 and 2021, the trucking industry expects to grow at a 2.2 percent compounded annual growth rate.
- The TRANSEARCH forecast has the lowest estimates of future growth of the three sources. Its forecast is roughly one-third lower than that of the trucking industry and economy.com. This indicates that the TRANSEARCH data is likely a good lower bound for freight forecasts, but that other sources will need to be used to generate upper bounds on freight flows. A more detailed economic analysis will be conducted as part of Task 4 of this project.

5.0 Trucking Demand

This section contains a large amount of detailed information regarding truck activity in Georgia. However, the analysis is based on answering four basic questions regarding truck activity:

1. Where are the trucks?
2. What locations are trucks going to and from?
3. What are the trucks carrying?
4. How will the answers to these three questions change in the future?

No single data source provides the answer to all of these questions, however this section assembles data from a wide range of sources to provide as comprehensive an answer to these questions as the data allows. The sections are structured to match the questions using the following format:

1. *Where are the trucks?*
    a. Section 5.1 identifies the location of trucks using truck count data.
2. *What locations are trucks going to and from?*
    a. Section 5.2 provides an origin-destination analysis using TRANSEARCH data.
    b. Section 5.3 describes origin-destination patterns using the Georgia statewide travel demand model.
    c. Section 5.4 describes origin-destination data from roadside truck surveys.
    d. Section 5.5 provides data on truck trip ends using truck-equipped GPS data.
    e. Section 5.6 provides information on truck movements over short and medium durations using truck-equipped GPS data.
3. *What are the trucks carrying?*
    a. Section 5.7 provides a commodity analysis using TRANSEARCH data.
    b. Section 5.8 provides commodity information from the roadside truck surveys.
4. *How will the answers to these three questions change in the future?*
    a. Section 5.9 provides truck forecast data from TRANSEARCH.
    b. Section 5.10 provides perspectives on future truck volumes using the statewide travel demand model.

This section concludes with Section 5.11, which describes the key findings related to trucking demand in Georgia.

5.1 TRUCK COUNT DATA

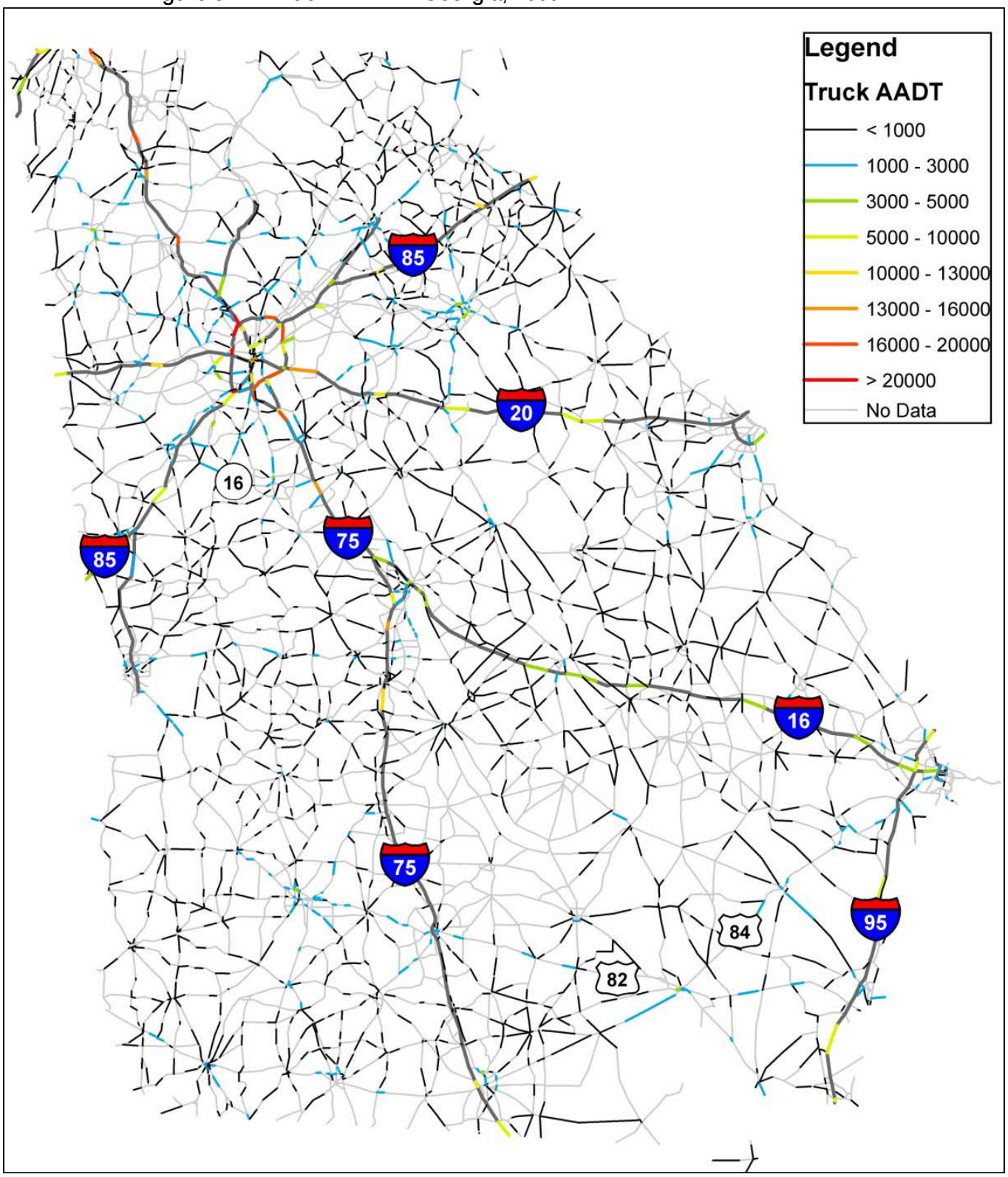
Truck count data can be used to identify the amount of trucks throughout the state. GDOT's Office of Traffic Data maintains an ongoing vehicle classification count database. The database is a mix of actual continuous count data and estimates based on extrapolating shorter duration counts (typically 48 hours). These data can be used to generate average annual daily traffic (AADT) for trucks on hundreds of road segments in the state. Data takes into account the 16-vehicle classification definitions used by the Federal Highway Administration.

Figure 5.1 provides a map with GDOT truck AADT for the year 2009. It indicates that the highest truck volume locations are on the Interstate system. Several locations on the Interstate system have more than 16,000 trucks per day as indicated by the red and orange lines. At the other end of the spectrum, truck volumes on non-Interstates are not as robust; there are very few road segments off the Interstate system that are not colored blue or black, meaning there are very few non-Interstate segments with more than 3,000 trucks per day. There appears to be few locations where large volumes of trucks are diverting off the Interstate system before they are close to their final destination.

Figure 5.2 shows truck counts in the Atlanta metropolitan region – a region with the highest truck volume locations in the state. The map shows that I-285 and I-75 have the highest volumes in the region and the state. Truck volumes inside I-285 are notably lower which is consistent with the ban on "through" trucks on I-75 and I-85.

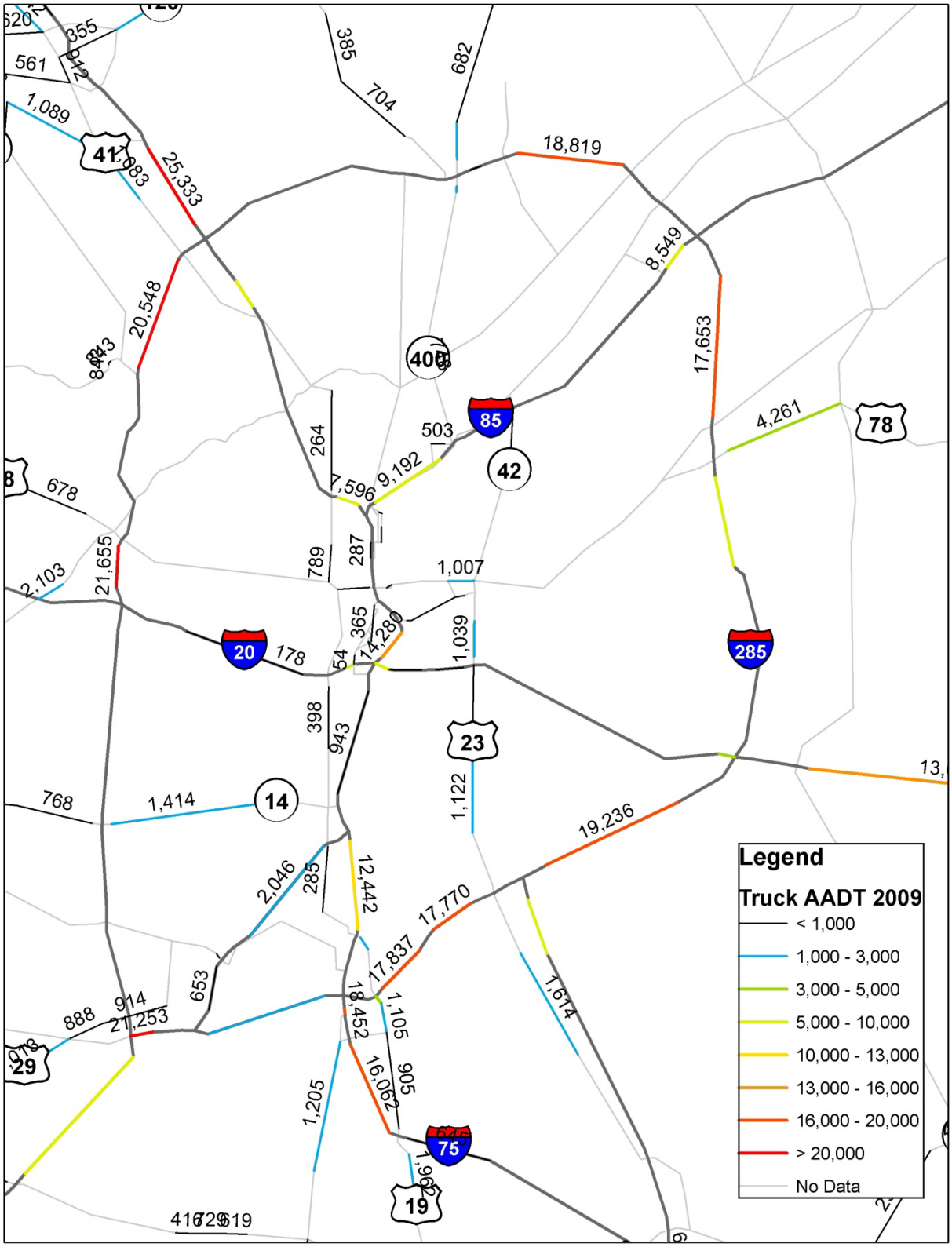
NOTE: When looking at Figure 5.2, there is not a vehicle classification location on I-85 north of I-285 until well past the split with I-985; this appears to be a data gap.

Figure 5-1 Truck AADT in Georgia, 2009



Source: GDOT Classification Count Data, 2009.

Figure 5-2 Truck AADT in Metro Atlanta, 2009



Source: GDOT Classification Count Data, 2009.

Figure 5.3 shows truck count data based on classification counts that were conducted as part of the GDOT "Radial Freeways" microsimulation study. For this study, vehicle count and length data were collected for purposes of developing a microsimulation model of activity on I-75, I-85, and I-20 in the Atlanta region. For this data collection effort, trucks were defined as all vehicles longer than 40 feet. This count data is not directly comparable to the GDOT OTD count data due to the different methodologies and technologies that are utilized. However, the important note is that it indicates that truck volumes on I-85 just north of I-285 have truck volumes that are roughly comparable with the highest truck volumes on the State, which are on I-75 north of I-285. This reinforces the notion that this location should be included in the State's classification count database. Similarly, there are locations on I-20 west of I-285 that appear to have amongst the highest volumes in the State that are not covered in the OTD count program.

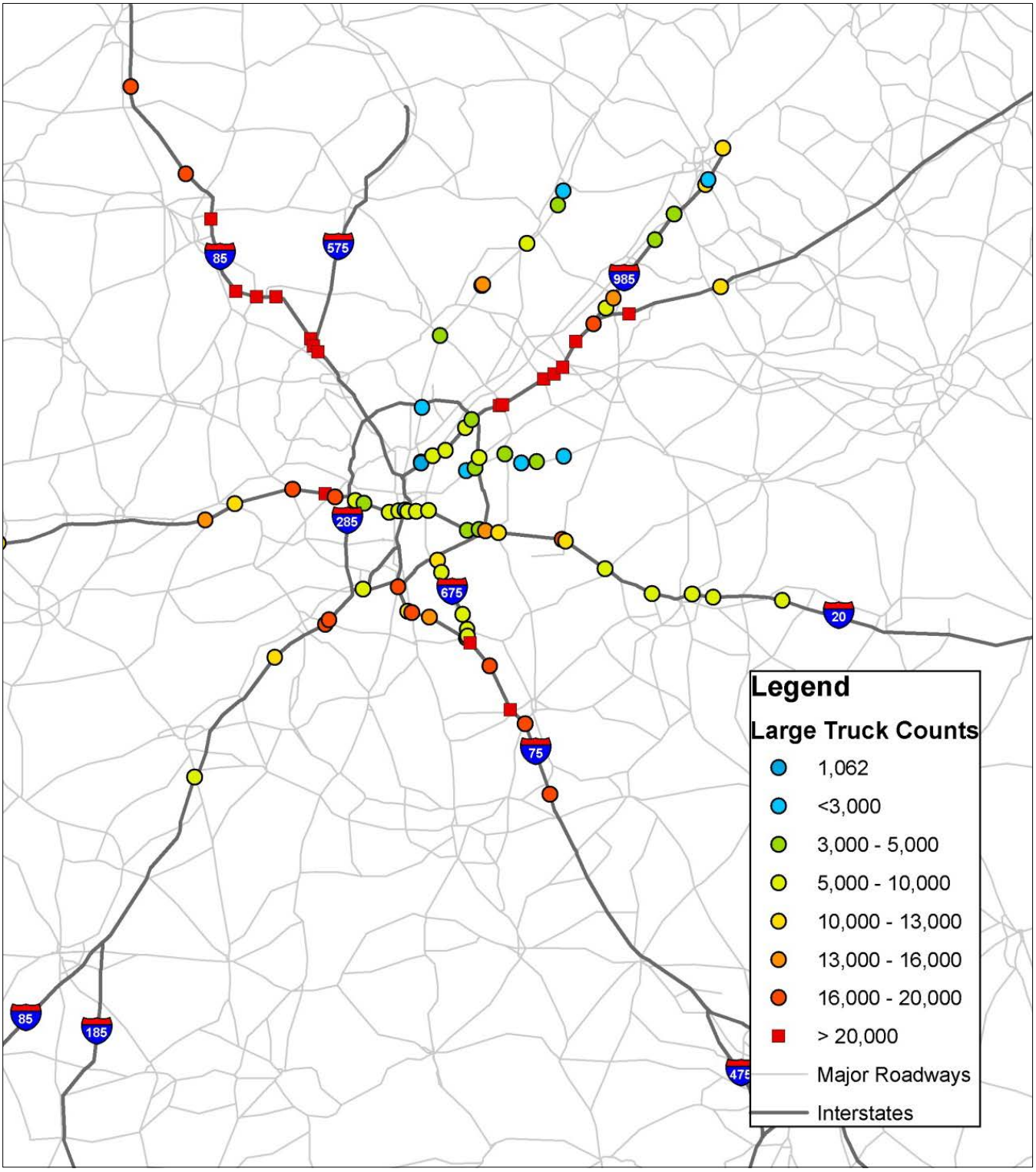
Table 5.1 lists the top 50 truck count locations in the State. It confirms that the highest truck count locations in the State are in the Atlanta region. The top 12 locations are all in the Atlanta metropolitan region – including locations in Cobb, Fulton, Henry, DeKalb, and Clayton Counties. The next highest locations are all on I-75 in North Georgia (Whitfield, Bartow, and Catoosa Counties). All of the top 50 locations are on the Interstate system.

Figure 5.4 shows only the top 50 locations using labels from 1-50 to indicate the highest to the lowest truck count locations. This graphic is particularly useful for indicating locations that do not have high truck volumes. In particular, I-16 does not have any top 50 truck volume locations. I-16 connects to the Port of Savannah, which generates over 5,000 trucks per day as discussed in the Marine Modal Profile. However, some of these trucks travel along I-16 and others travel on I-95 which results in relatively low truck volumes on I-16. Similarly, relatively low truck volumes are evident on I-85 south of the Atlanta metropolitan area and I-20 east of Newton County.

Table 5.2 shows the top 10 non-Interstate locations for truck counts. The top four locations are in the Atlanta region, including one on State Route 316, one on State Route 70 (Fulton Industrial Boulevard), and two on Georgia 400. Other notable non-Interstate locations with high truck volumes include U.S. 19 in the Albany region, , U.S. 78 in DeKalb County, State Route 3 (Tara Boulevard) in Spalding County, and State Route 6 (Thornton Road) in Fulton and Cobb Counties.

Table 5.3 shows the top locations by truck percentages. All of these locations are off the Interstate system where auto volumes are relatively low. There are three locations with high truck percentages and over 1,000 trucks per day. These locations are on State Route 19 in Laurens County, on U.S. 82 in Atkinson County, and on State Route 96 in Taylor County.

Figure 5-3 Radial Counts of Large Trucks in Atlanta, *2007*



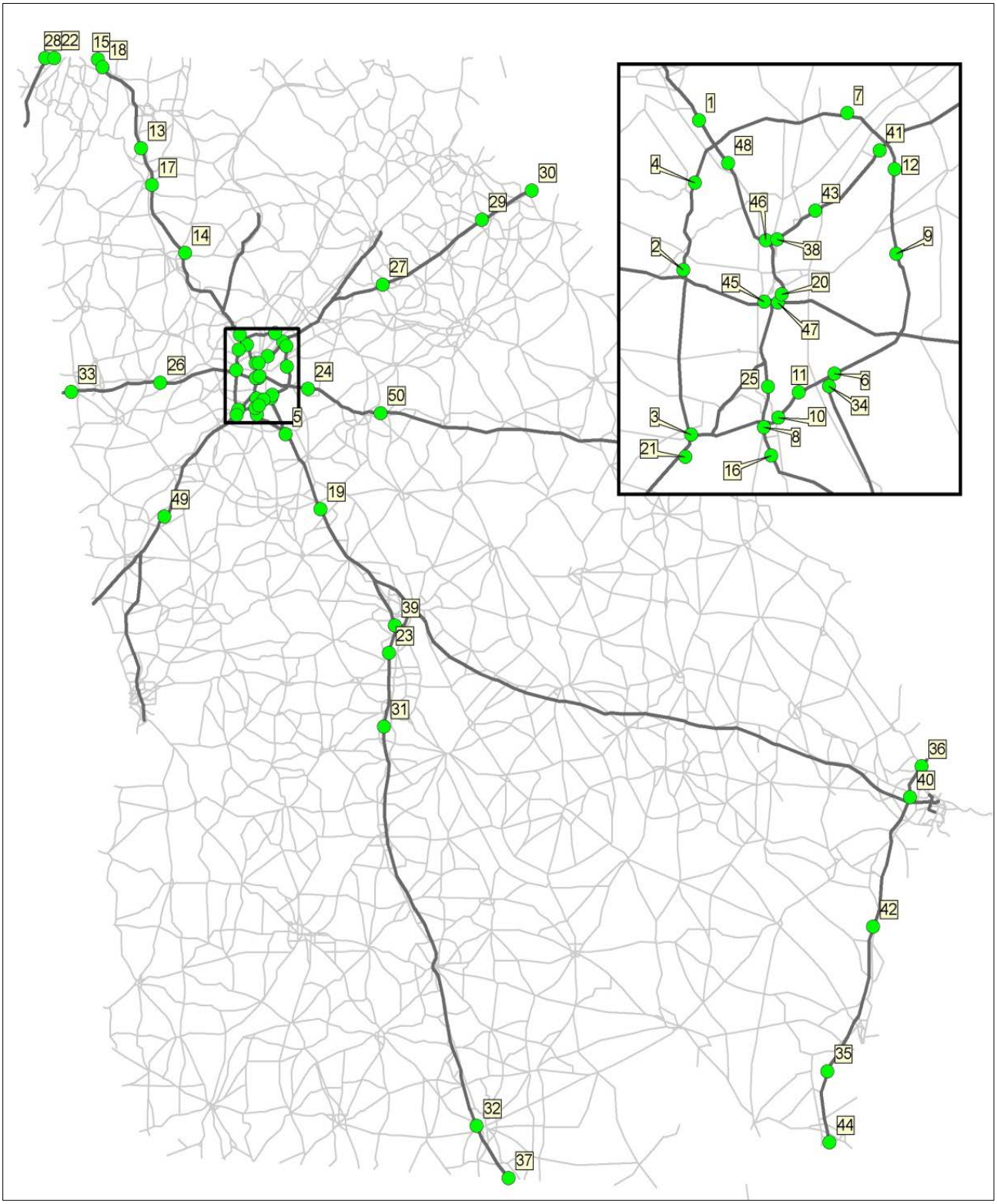
Source: GDOT's "Radial Freeways Microsimulation Study", 2007.

Table 5.1 Top 50 Truck Count Locations in Georgia, *2009*

Rank	County	Route	Beginning Mile	End Mile	AADT	Truck Percentage	Truck AADT
1	Cobb	I-75	2.38	3.96	281,480	9	25,333
2	Fulton	I-285	9.87	11.46	154,680	14	21,655
3	Fulton	I-285	0	0.81	132,830	16	21,253
4	Cobb	I-285	2.57	4.09	158,060	13	20,548
5	Henry	I-75	16.26	19.75	141,840	14	19,858
6	DeKalb	I-285	23.61	24.91	147,970	13	19,236
7	DeKalb	I-285	1.96	2.98	209,100	9	18,819
8	Clayton	I-75	8.66	9.71	205,020	9	18,452
9	DeKalb	I-285	12.45	14.12	180,360	10	18,036
10	Clayton	I-285	0	2.29	127,410	14	17,837
11	Fulton	I-285	53.03	54.32	126,930	14	17,770
12	DeKalb	I-285	6.72	8.91	196,140	9	17,653
13	Whitfield	I-75	0	2.84	61,430	27	16,586
14	Bartow	I-75	12.82	16.28	66,000	25	16,500
15	Catoosa	I-75	12.03	13.44	86,350	19	16,407
16	Clayton	I-75	6.23	8.65	178,470	9	16,062
17	Gordon	I-75	4.96	7.75	63,610	25	15,903
18	Catoosa	I-75	8.4	12.02	67,030	23	15,417
19	Butts	I-75	0.33	4.58	71,310	21	14,975
20	Fulton	I-75	7.31	7.96	285,590	5	14,280
21	Fulton	I-85	8.63	11.78	136,380	10	13,638
22	Dade	I-24	3.53	4.13	61,740	22	13,583
23	Peach	I-75	8.81	11.12	73,120	18	13,162
24	DeKalb	I-20	11.86	14.96	130,910	10	13,091
25	Fulton	I-75	0.53	1.73	155,520	8	12,442
26	Douglas	I-20	0.64	4.63	72,350	17	12,300
27	Jackson	I-85	0	2.09	56,490	21	11,863
28	Dade	I-24	0	0.94	42,990	26	11,177
29	Franklin	I-85	4.38	8.43	39,070	28	10,940
30	Hart	I-85	0.29	2.14	39,540	27	10,676
31	Houston	I-75	3.21	10.06	44,180	24	10,603
32	Lowndes	I-75	16.01	18.04	43,050	23	9,902
33	Haralson	I-20	0	4.66	31,390	31	9,731
34	DeKalb	I-675	0	2.71	74,510	13	9,686
35	Camden	I-95	14.19	26.36	45,450	21	9,545
36	Chatham	I-95	16.63	20.2	47,070	20	9,414
37	Lowndes	I-75	0	1.55	36,030	26	9,368
38	Fulton	I-85	27.81	29.09	229,810	4	9,192
39	Bibb	I-475	0	3.99	50,990	18	9,178
40	Chatham	I-95	7.4	10.14	66,670	13	8,667
41	DeKalb	I-85	5.94	7.14	213,720	4	8,549
42	McIntosh	I-95	13.66	21.92	42,180	20	8,436
43	DeKalb	I-85	0	0.9	210,330	4	8,413
44	Camden	I-95	0	1.15	54,320	15	8,148
45	Fulton	I-20	8.47	8.78	157,790	5	7,890
46	Fulton	I-75	11.2	12.13	189,900	4	7,596
47	Fulton	I-20	9.26	10.05	179,980	4	7,199
48	Fulton	I-75	17.13	18.06	172,020	4	6,881
49	Meriwether	I-85	0	4.43	41,920	16	6,707
50	Newton	I-20	7.89	12.22	41,600	16	6,656

Source: GDOT Classification Data, 2009.

Figure 5-4 Top 50 Highest Truck Count Locations in Georgia*, 2009*



Source: GDOT Classification Data, 2009.

Table 5.2 Top 10 Truck Count Non-Interstate Locations in Georgia, *2009*

County	Route	Beginning Mile	End Mile	AADT	Truck Percent	Truck AADT
Gwinnett	SR 316	0.00	2.44	87,220	7	6,105
Fulton	SR 70	28.65	29.65	27,870	20	5,574
Fulton	GA 400	6.97	8.43	181,960	3	5,459
Fulton	GA 400	16.32	18.15	129,790	4	5,192
Spalding	SR 3	5.58	6.22	34,890	14	4,885
Dougherty	U.S. 19	3.51	4.99	39,440	11	4,338
DeKalb	U.S. 78	1.55	2.79	106,530	4	4,261
Dougherty	U.S. 19	7.18	8.14	39,510	10	3,951
Fulton	SR 6	4.29	5.81	31,560	12	3,787
Laurens	SR 19	19.55	19.94	6,370	58	3,695

Source: GDOT Classification Data, 2009.

Table 5.3 Top 20 Locations with High Truck Percent and Volumes, *2009*

County	Route	Beginning Mile	End Mile	AADT	Truck Percent	Truck AADT
Ben Hill	U.S. 129	14.22	14.85	1,300	74	962
Taylor	SR 90	6.53	11.35	240	63	151
Laurens	SR 19	19.55	19.94	6,370	58	3,695
Screven	SR 17	0	4.86	1,020	39	398
Atkinson	U.S. 82	0	2.86	3,350	38	1,273
Houston	SR 26	11.61	14.62	920	38	350
Screven	SR 24	35.92	41.29	1,630	37	603
McDuffie	SR 80	1.61	1.76	280	37	104
Jefferson	U.S. 319	1.65	3.96	1,610	36	580
Monroe	U.S. 341	0	2.09	1,340	36	482
Burke	U.S. 17W	5.87	9.6	910	36	328
Warren	SR 80	24.2	25.06	300	36	108
Taylor	SR 96	8.39	9.31	3,030	35	1,061
Floyd	U.S. 411	1.77	2.05	2,350	35	823
Houston	SR 26	0	3.41	1,740	35	609
Houston	SR 26	4.73	7.91	1,580	35	553
Turner	SR 32	16.27	21.11	920	35	322
Schley	U.S. 19	12.56	16.12	880	35	308
Walker	SR 157	3.67	8.2	440	35	154
Wilkinson	SR 96	1.96	9.36	280	35	98

Source: GDOT Classification Data, 2009.

5.2 ORIGIN-DESTINATION ANALYSIS USING TRANSEARCH DATA

GDOT acquired Global Insight TRANSEARCH freight flow data to assist with their freight planning efforts, including the Statewide Freight and Logistics Plan. TRANSEARCH provides county-level, origin-destination tonnage data for over 20 commodities and for each of the primary freight modes – truck, rail, water, and air. The data was purchased for a base year of 2007 and for a forecast year of 2027. The project team extended this forecast to 2050 using FHWA FAF3 data. This section will examine the origin-destination characteristics of the trucking mode in the TRANSEARCH database in 2007.

Table 5.4 shows the truck tonnages for inbound, outbound, internal and through truck trips for Georgia in 2007. Internal truck trips have the highest percentage with 35 percent of the total tonnage followed by 30 percent for through truck trips. Inbound and outbound truck trips combined are another 35 percent of the total. Therefore, 70 percent of the truck tonnage moved in the State is directly related to Georgia's economy.

In terms of through truck trips, the project team generated an estimate of approximately 10-15 percent of the through truck trips are trucks that travel along I-95 between South Carolina and Florida. The remainder of the through truck trips (between 85 and 90 percent) go through the Atlanta metropolitan region. This is because the State's three main Interstates (I-75, I-85, and I-20) all intersect in the Atlanta region. These Interstates provide excellent connectivity for the State, but they also are used by vehicles that are simply traveling through the State and are not at all related to the State's economy. These through truck trips place an additional burden on the physical condition of the State's Interstate system, and they add to congestion in the urbanized areas in the State that are located on the Interstate, particularly in Atlanta. Development of options that bypass Atlanta would assist in removing a significant portion of truck activity from the region.

Table 5.5 shows the origins and destinations of truck traffic for inbound and outbound trips. It shows that Florida is Georgia's top trading partner in terms of goods that move by truck. Florida generates 26 percent of Georgia's inbound truck tonnage, and it receives 15 percent of Georgia's outbound truck tonnage. This is primarily based on the fact that Florida is the largest economy in the Southeast U.S., and the fact that Florida and Georgia are neighboring states. The Florida economy is actually larger than all of Georgia's other neighboring states combined. California and Texas also are top 10 trading partners with Georgia due to the size of their economies. The other major trading partners for Georgia are other neighboring states, including Alabama, South Carolina, North Carolina, and Tennessee. These trends reflect the extent to which Georgia's economy is tied to the Southeast U.S. primarily, and secondarily to the major state economies throughout the country. Figure 5.5 shows the truck tonnage trade between all states in the United States.

Table 5.4 Summary of Truck Flows by Type of Movement for Georgia, *2007*

Type of Movement	2007 Tons	Percent of Total
Within	226,021,926	35%
Through	190,325,118	30%
Outbound	118,071,185	18%
Inbound	106,380,868	17%
Total	640,799,096	100%

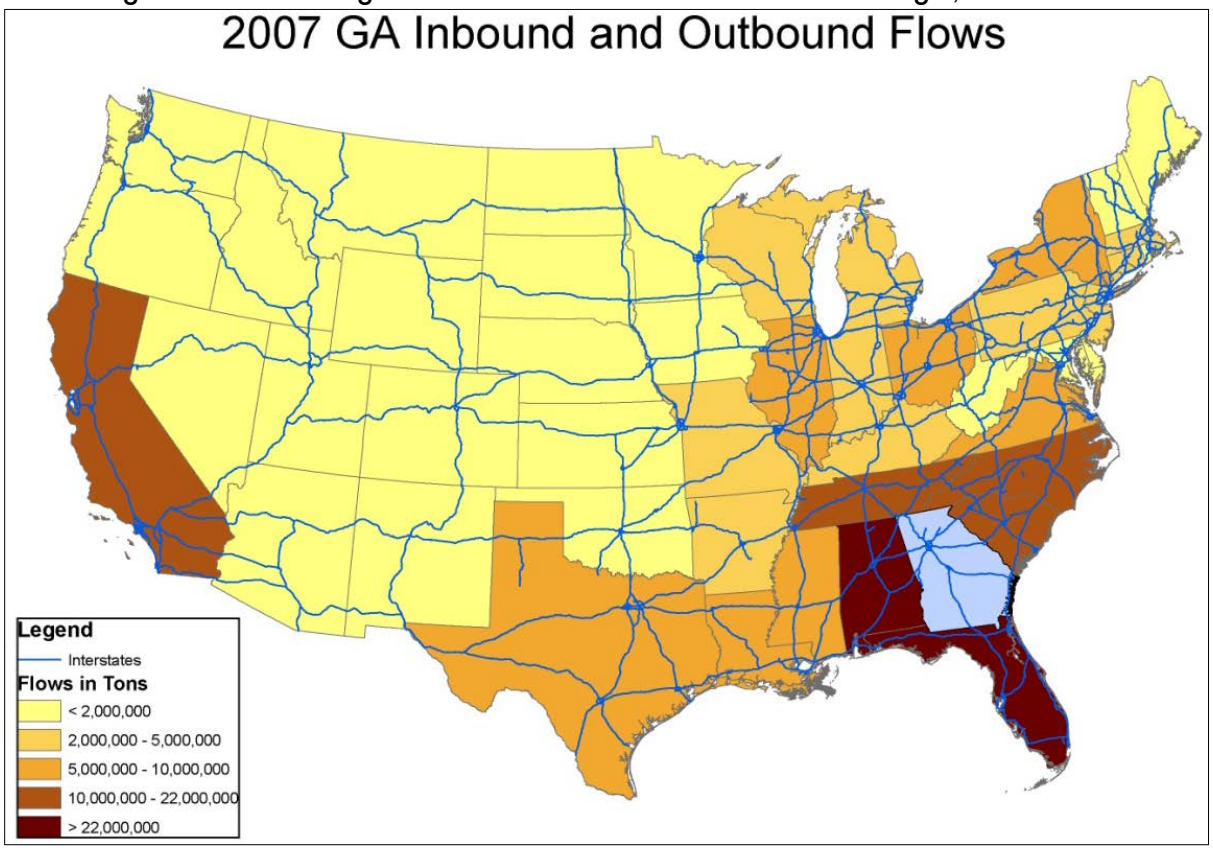
Source: TRANSEARCH.

Table 5.5 Top 10 Origin States of Georgia Truck Traffic, *2007*

Rank	State	Truck Tons	Percent Total Inbound	Rank	State	Truck Tons	Percent Total Outbound
1	FL	27,691,377	26%	1	FL	18,173,961	15%
2	AL	14,977,863	14%	2	NC	12,345,276	10%
3	SC	9,387,293	9%	3	SC	11,537,086	10%
4	CA	6,202,533	6%	4	TN	8,640,026	7%
5	TN	5,235,017	5%	5	AL	7,451,813	6%
6	TX	5,213,746	5%	6	VA	6,070,102	5%
7	MS	4,124,912	4%	7	NY	5,255,603	4%
8	IL	3,457,363	3%	8	TX	4,206,503	4%
9	NC	3,343,678	3%	9	LA	4,039,827	3%
10	LA	3,018,633	3%	10	CA	3,904,694	3%

Source: TRANSEARCH Data.

Figure 5-5 Trading Partners for Truck Movements for Georgia, *2007*



Source: TRANSEARCH Data.

County-Level Truck Flows

County-level truck flows were examined to determine locations within Georgia with relatively high or low truck volumes. Table 5.6 shows the top 20 counties for inbound and outbound truck tonnage; it is apparent that metro Atlanta is home to the largest percentage of the truck flows in the state. Fulton, Gwinnett, DeKalb, and Cobb Counties account for 38 percent of Georgia's inbound truck tons and 21 percent of Georgia's outbound truck tons. This high percentage is primarily based on the freight demand that accompanies large population (consumption) centers such as metro Atlanta.

Chatham County is the largest single county generator of truck tons, generating over 21 percent of the outbound truck tonnage in the state -- roughly the same amount of Fulton, Gwinnett, DeKalb and Cobb Counties combined. This high volume of outbound trucks in Chatham County is primarily due to the large number of imported containers from the Port of Savannah.

Export volumes at the port make Chatham County second in terms of inbound truck tonnage. Similarly, shipments through the Port of Brunswick make Glynn County the fifth largest county in Georgia in terms of outbound truck tonnage.

Table 5.6 Top 20 Counties with Highest Truck Tons, *2007*

	Inbound			Outbound	
County	Truck Tons	Percent of Total	County	Truck Tons	Percent of Total
Fulton	28,354,215	27%	Chatham	24,747,960	21%
Chatham	8,677,489	8%	Fulton	14,315,413	12%
Gwinnett	4,315,205	4%	DeKalb	4,510,309	4%
DeKalb	4,248,574	4%	Gwinnett	3,762,409	3%
Cobb	3,574,647	3%	Glynn	3,632,475	3%
Tift	3,427,215	3%	Richmond	3,497,863	3%
Richmond	3,033,269	3%	Cobb	2,789,090	2%
Carroll	2,956,327	3%	Tift	2,687,926	2%
Clayton	2,748,225	3%	Bibb	2,341,544	2%
Muscogee	2,630,894	2%	Hall	2,180,890	2%
Coffee	2,473,136	2%	Whitfield	2,138,084	2%
Lowndes	2,461,220	2%	Gordon	1,730,203	1%
Dougherty	2,306,558	2%	Washington	1,501,080	1%
Bibb	1,791,290	2%	Clarke	1,493,460	1%
Washington	1,279,766	1%	Troup	1,474,861	1%
Troup	1,276,050	1%	Lowndes	1,370,231	1%
Wilkinson	1,247,071	1%	Floyd	1,354,432	1%
Floyd	1,196,664	1%	Bartow	1,324,244	1%
Bartow	1,035,330	1%	Elbert	1,280,639	1%
Crisp	975,612	1%	Dougherty	1,261,408	1%

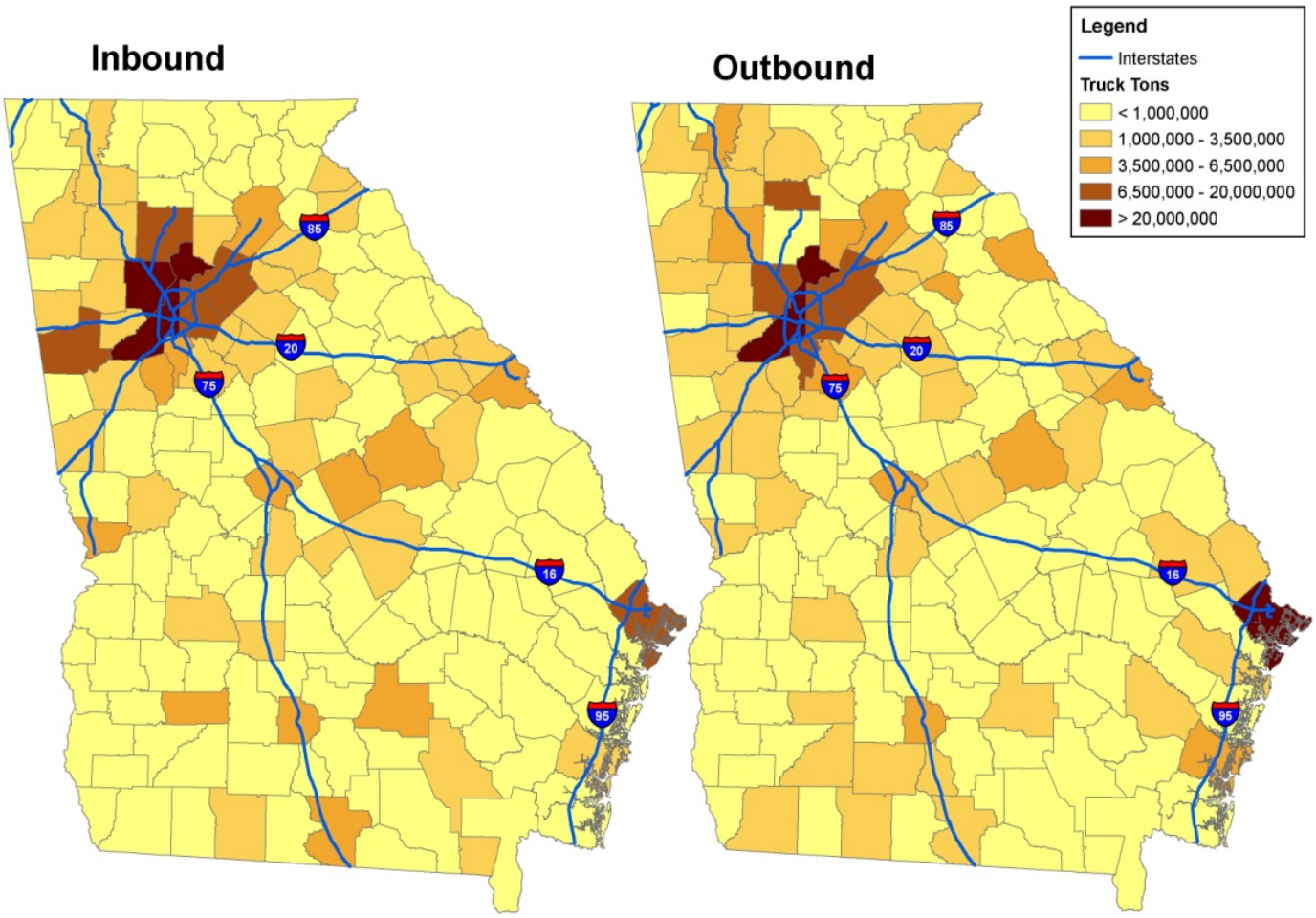
Source: TRANSEARCH Data.

Midsized metropolitan regions generate and attract a fair share of truck tonnage as well. Richmond County (Augusta), Dougherty County (Albany), Bibb County (Macon), Hall County (Gainesville), Lowndes County (Valdosta), and Muscogee County (Columbus) are in the state's top 20 counties in terms of truck tonnage.

There are some notable smaller population counties that have high truck tonnages. Tift County is the sixth largest county in terms of truck tons generated and eighth largest in terms of truck tons attracted. Most of this tonnage is outbound flows of food products and inbound flows of metal products, paper products, and goods from warehouses and distribution center such as Target. Washington and Floyd Counties (Rome) are the other two counties that are in the top 20 in terms of inbound and outbound tonnages. Washington and Floyd Counties have large volumes of nonmetallic minerals; for example, Washington County is on the list due to kaolin clay production.

In northern Georgia, Whitfield County (Dalton) and Gordon County (Calhoun) are notable as the 11th and 12th largest counties in terms of outbound truck tonnage. Whitfield has large outbound and inbound flows of textile mill products associated with carpet production. Gordon County has large outbound shipments of textile mill products (carpet production), chemicals or allied products, and clay/concrete/glass/stone. Coffee County in south Georgia is the 11th largest truck tonnage in the state, largely due to the presence of a Walmart distribution center.

Figure 5-6 Inbound & Outbound Truck Tons by County, *2007*



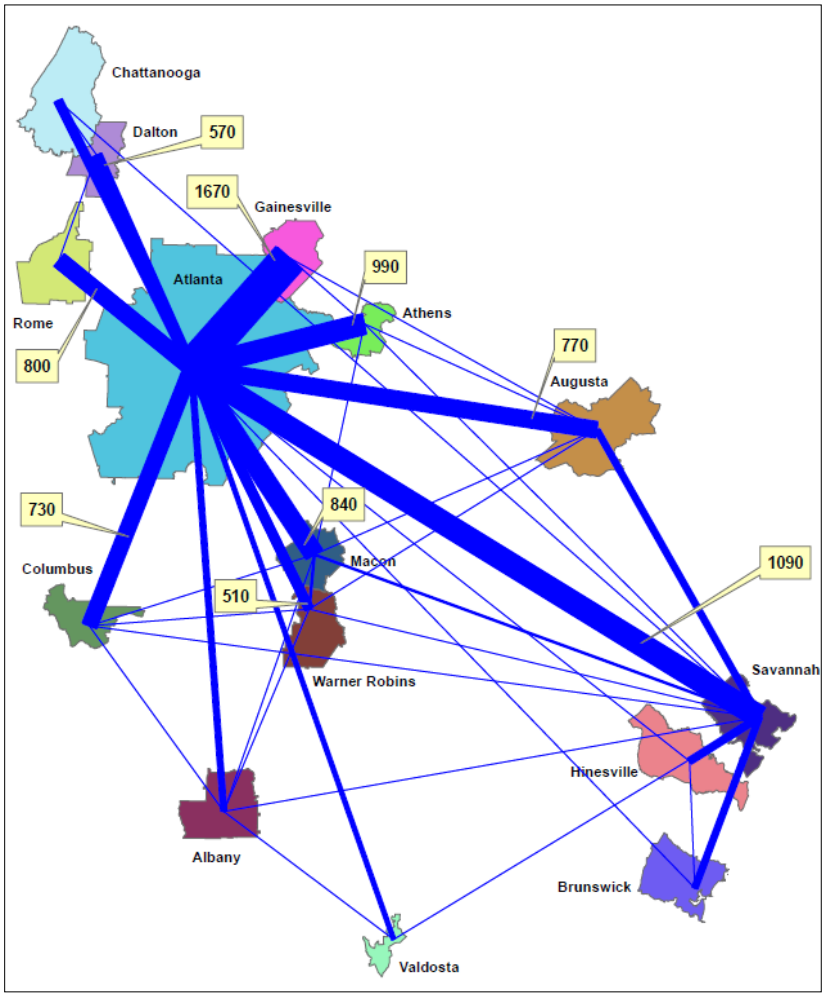
Source: TRANSEARCH Data.

5.3 ORIGIN-DESTINATION ANALYSIS USING STATEWIDE TRAVEL DEMAND MODEL

Truck origin-destination analysis also can be conducted using the GDOT statewide travel demand model. This section examines 'internal' state truck flows between Georgia census-designated urbanized areas and also estimates Georgia's "through" truck trips (with neither an origin or destination in state.)

Figure 5.7 maps the truck flows between Georgia's urbanized areas based on the travel demand model. It shows that the largest truck flows are between metro Atlanta other census-designated urbanized areas of the state. The three largest truck flows are: metro Atlanta to metro Gainesville (1,670 daily trucks), metro Atlanta to metro Savannah (1,090 daily trucks), and metro Atlanta to metro Athens (990 daily trucks.) The largest non-Atlanta truck volumes are between metro Savannah and metro Augusta (311 daily trucks.)

Figure 5-7 Estimated Daily Truck Volumes Between Census-Designated Urbanized Areas in Georgia



Source: GDOT Statewide Travel Demand Model (October 2010 run)

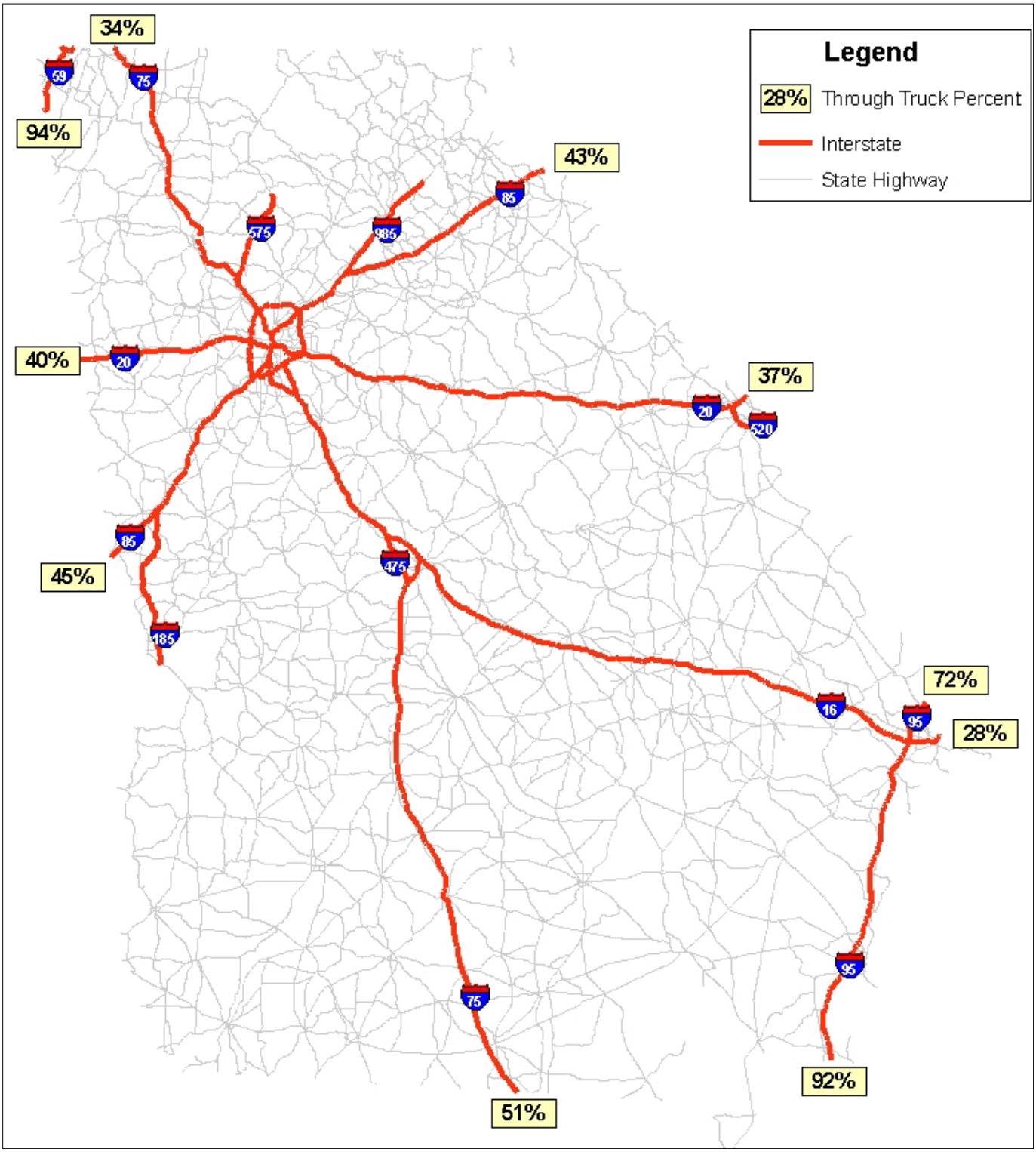
Table 5.7 Estimated Daily Truck Volume Between Census-Designated Urbanized Areas in Georgia

Area	Albany	Athens	Atlanta	Augusta	Brunswick	Chattanooga	Columbus	Dalton	Gainesville	Hinesville	Macon	Rome	Savannah	Valdosta	Warner Robins
Albany	–	3	101	6	4	2	22	1	2	2	15	2	25	22	13
Athens	3	–	447	31	1	4	5	4	33	1	15	6	26	2	7
Atlanta	129	543	–	436	27	258	391	361	982	16	461	467	820	82	209
Augusta	6	28	338	–	9	5	6	5	20	7	25	6	178	7	12
Brunswick	6	1	23	10	–	1	2	0	1	18	3	0	143	13	3
Chattanooga	1	4	181	4	0	–	3	29	9	0	3	13	23	1	2
Columbus	29	5	339	7	2	4	–	5	9	1	23	7	37	8	17
Dalton	1	4	206	3	0	17	3	–	9	0	3	14	8	1	2
Gainesville	2	29	687	18	1	8	7	10	–	0	8	8	15	2	4
Hinesville	3	1	28	12	21	1	2	0	1	–	4	0	167	6	3
Macon	15	15	377	25	2	4	22	4	10	2	–	6	51	9	48
Rome	2	5	333	5	0	12	6	17	9	0	5	–	8	1	3
Savannah	25	15	272	133	149	11	24	7	8	114	49	4	–	25	23
Valdosta	21	2	52	6	10	1	6	1	2	3	7	1	32	–	5
Warner Robins	17	10	297	17	3	3	24	3	6	2	62	4	45	9	–

Source: GDOT Statewide Travel Demand Model, October 2010.

Figure 5.8 on the next page shows the estimated percent of trucks entering Georgia that are 'through' truck trips. For example, of the trucks that enter the state on I-20 from South Carolina, 37 percent travel through the state without stopping at any location in the state. Therefore, the numbers on this figure can be used as a proxy for how important each of the Interstate corridors is for Georgia's economy. Just south of the Tennessee border, I-75 has the lowest percent of truck through trips: 34%. This contrasts with 72 percent of the trucks entering the state on I-95 from South Carolina, and 92 percent of the trucks from Florida, are "through" truck trips.

Figure 5-8 Model "Through" Truck Percentages on Georgia Interstates:
At state border locations



Source: GDOT Statewide Travel Demand Model (October 2010 run)

5.4 ORIGIN-DESTINATION ANALYSIS USING ROADSIDE TRUCK SURVEY DATA

Another perspective on truck origins and destinations can be considered using data collected from roadside truck origin-destination surveys. In 2005, the Atlanta Regional Commission ("ARC") conducted roadside truck surveys primarily at weigh stations in/around metro Atlanta as part of their regional freight mobility plan. GDOT supplemented these around the rest of the state in 2006 as part of the GDOT Truck Lane Needs Identification Study. (At the time this report was first written, the I-20 westbound station west of Augusta was closed for reconstruction and not available for data collection…after its reconstruction completed, data was collected at this site through GDOT Office of Planning's *Connect Central Georgia Study*; this last piece made the dataset complete and robust for use in supplementing this report.)

Tables 5.8 and 5.9 provide the number of trucks by origination and destination states for each of Georgia's neighbor states at each origin-destination survey location. Tables 5.10 and 5.11 provide percentage of trucks by origination and destination states for each of Georgia's neighbor states at each survey location; a sample of findings are as follows:

- **Florida is the top 'trading partner' for Georgia in terms of truck freight.** It is by far the largest recipient of Georgia's goods on I-75, the highest volume truck corridor in the State. At the Forsyth, Georgia survey location (weigh station) in central Georgia, over half the southbound truck traffic was destined for Florida, while the other half had destinations within Georgia. The finding of Florida's status as Georgia's top trading partner was mirrored in the TRANSEARCH analysis conducted in the previous section.
- **Florida is the largest generator of "through" truck traffic for Georgia.** Even as far north as the survey location on I-75 in Ringgold, just south of the Tennessee border, approximately 20 percent of trucks are destined for Florida. On I-95, virtually all "through" truck traffic has a trip end in Florida.
- **South Carolina and North Carolina are the state's 2nd and 3rd top trading partners in terms of truck freight, respectively.** South Carolina receives a significant fraction of Georgia truck traffic from both I-20 and I-85. North Carolina and South Carolina combined are responsible for over half of the goods that arrive in the State via I-85. Alabama is the 4th largest trading partner for Georgia in terms of truck freight.
- **I-16 is used as a truck "expressway" for traffic connecting the Port of Savannah to other locations within Georgia.** Roughly 80 percent of the trucks surveyed on I-16 in Pembroke (west of Savannah) have both their origin and destination in Georgia. Trip ends east of Pembroke are mostly likely to be the Port of Savannah as it is by far the largest freight generator in that region. This indicates that trucks from the Port that have interior trip ends outside of Georgia primarily utilize I-95.

Table 5.8 Origin States of Trucks at Georgia Survey Stations

Survey Location	Dir	Georgia	Florida	South Carolina	North Carolina	Alabama	Tennessee	Other	Total
I-75 at Valdosta	NB	38	279	–	–	–	–	–	317
	SB	133	1	1	–	7	23	106	271
I-75 at Forsyth	NB	72	37	2	2	–	–	6	119
	SB	134	4	1	3	6	15	37	200
I-75 at Ringgold	SB	22	–	4	4	5	41	62	138
I-85 at LaGrange	NB	37	4	–	–	37	4	26	108
	SB	90	2	11	8	11	–	15	137
I-85 at Lavonia	SB	12	1	27	29	2	2	30	103
I-20 at Bremen	WB	88	1	7	3	5	4	9	117
I-20 at Lithia Springs	EB	47	1	1	6	31	5	35	126
I-20 at Augusta	EB	149	2	14	3	17	14	42	241
I-95 at Chatham	SB	5	1	152	67	–	4	113	342
I-95 at Eulonia	NB	99	354	–	–	1	–	5	459
	SB	164	1	103	63	–	5	87	423
I-16 at Pembroke	EB	245	22	29	6	–	–	11	313
	WB	271	31	26	8	–	–	3	339
Totals		1,606	741	378	202	122	117	587	3,753

Source: GDOT Truck Lane Needs Identification Study Data, ARC Regional Freight Mobility Plan 2005 Data.

Table 5.9 Destination States of Trucks at Georgia Survey Locations

Survey Location	Dir	Georgia	Florida	South Carolina	North Carolina	Alabama	Tennessee	Other	Total
I-75 at Valdosta	NB	229	1	2	9	3	22	51	317
	SB	32	237	–	–	–	–	2	271
I-75 at Forsyth	NB	69	2	4	2	1	12	29	119
	SB	100	97	–	–	–	–	2	199
I-75 at Ringgold	SB	96	28	2	–	2	7	3	138
I-85 at LaGrange	NB	60	2	12	7	14	–	13	108
	SB	43	8	–	63	–	–	23	137
I-85 at Lavonia	SB	67	8	–	11	1	2	14	103
I-20 at Bremen	WB	23	1	1	3	–	5	47	80
I-20 at Lithia Springs	EB	88	8	8	3	10	2	7	126
I-20 at Augusta	EB	73	1	115	1	28	–	23	241
I-95 at Chatham	SB	105	215	3	2	1	1	10	337
I-95 at Eulonia	NB	191	1	89	–	56	3	119	459
	SB	75	344	–	1	–	–	3	423
I-16 at Pembroke	EB	245	22	29	–	6	–	11	313
	WB	264	3	5	17	1	15	34	339
Totals		1,760	978	270	119	123	69	391	3,710

Source: GDOT Truck Lane Needs Identification Study Data, ARC Regional Freight Mobility Plan 2005 Data.

Table 5.10 Origin State Percentages of Trucks at Georgia Survey Locations

Survey Location	Dir	Georgia	Florida	South Carolina	North Carolina	Alabama	Tennessee	Other	Total
I-75 at Valdosta	NB	12%	88%	0%	0%	0%	0%	0%	100%
	SB	49%	0%	0%	0%	3%	8%	39%	100%
I-75 at Forsyth	NB	61%	31%	2%	2%	0%	0%	5%	100%
	SB	67%	2%	1%	2%	3%	8%	19%	100%
I-75 at Ringgold	SB	16%	0%	3%	3%	4%	30%	45%	100%
I-85 at LaGrange	NB	34%	4%	0%	0%	34%	4%	24%	100%
	SB	66%	1%	8%	6%	8%	0%	11%	100%
I-85 at Lavonia	SB	12%	1%	26%	28%	2%	2%	29%	100%
I-20 at Bremen	WB	75%	1%	6%	3%	4%	3%	8%	100%
I-20 at Lithia Springs	EB	37%	1%	1%	5%	25%	4%	28%	100%
I-20 at Augusta	EB	62%	1%	6%	1%	7%	6%	17%	100%
I-95 at Chatham	SB	1%	0%	44%	20%	0%	1%	33%	100%
I-95 at Eulonia	NB	22%	77%	0%	0%	0%	0%	1%	100%
	SB	39%	0%	24%	15%	0%	1%	21%	100%
I-16 at Pembroke	EB	78%	7%	9%	2%	0%	0%	4%	100%
	WB	80%	9%	8%	2%	0%	0%	1%	100%

Source: GDOT Truck Lane Needs Identification Study Data, ARC Regional Freight Mobility Plan 2005 Data.

Table 5.11 Destination State Percentages of Trucks at Georgia Survey Locations

Survey Location	Dir	Georgia	Florida	South Carolina	Alabama	North Carolina	Tennessee	Other	Total
I-75 at Valdosta	NB	72%	0%	1%	3%	1%	7%	16%	100%
	SB	12%	87%	0%	0%	0%	0%	1%	100%
I-75 at Forsyth	NB	58%	2%	3%	2%	1%	10%	24%	100%
	SB	50%	49%	0%	0%	0%	0%	1%	100%
I-75 at Ringgold	SB	70%	20%	1%	0%	1%	5%	2%	100%
I-85 at LaGrange	NB	56%	2%	11%	6%	13%	0%	12%	100%
	SB	31%	6%	0%	46%	0%	0%	17%	100%
I-85 at Lavonia	SB	65%	8%	0%	11%	1%	2%	14%	100%
I-20 at Bremen	WB	29%	1%	1%	4%	0%	6%	59%	100%
I-20 at Lithia Springs	EB	70%	6%	6%	2%	8%	2%	6%	100%
I-20 at Augusta	EB	30%	0%	48%	0%	12%	0%	10%	100%
I-95 at Chatham	SB	31%	64%	1%	1%	0%	0%	3%	100%
I-95 at Eulonia	NB	42%	0%	19%	0%	12%	1%	26%	100%
	SB	18%	81%	0%	0%	0%	0%	1%	100%
I-16 at Pembroke	EB	78%	7%	9%	0%	2%	0%	4%	100%
	WB	78%	1%	1%	5%	0%	4%	10%	100%

Source: GDOT Truck Lane Needs Identification Study Data, ARC Regional Freight Mobility Plan 2005 Data.

- **The Georgia portion of I-95 is primarily used to move goods between the Carolinas and Florida.** At the I-95 Eulonia southbound weigh station survey location (approximately halfway between Savannah and Jacksonville, Florida), the percentage of trucks generated from the Carolinas is as high as the number of trucks generated in Georgia. At the I-95 Chatham southbound survey location, there are twice as many trucks originating in the Carolinas relative to the number generated in Georgia.
- **Tennessee serves as a 'pass-through' state for Georgia's trucks.** Over 45 percent of the trucks surveyed on I-75 at Ringgold, just south of the Tennessee border, had origination states that were north of Tennessee. Only 30 percent report Tennessee as an origination. Similarly, at the I-75 survey location near Forsyth, Georgia there were more than twice as many trucks from non-neighbor Georgia states (i.e., north of Tennessee) than trucks from Tennessee. This implies that improvements in Tennessee's Interstate system also will benefit Georgia truck traffic and Georgia's economy.

The roadside surveys also requested information regarding specific cities for originating and terminating traffic. Table 5.12 lists the specific cities (not metro areas) in descending order in terms of their frequency of being captured in the survey. It shows that Savannah was the single most often cited city in the origin-destination ("O-D") surveys with 387 trucks either going to or from this city. Atlanta was second with 227 responses and Augusta was a distant third with 72 responses, but is particularly noteworthy given that there was no available survey location on westbound I-20 at that time. The Georgia cities of Brunswick; Macon; Valdosta; LaGrange; Forest Park; and Statesboro round out the top nine city locations mentioned in the survey.

Note: This is not a direct estimate of the number of trucks generated in each city, because survey locations were not evenly spread across the state and some locations only surveyed in one direction. However, it does provide some indication of cities that are key generators and attractors of Georgia truck traffic.

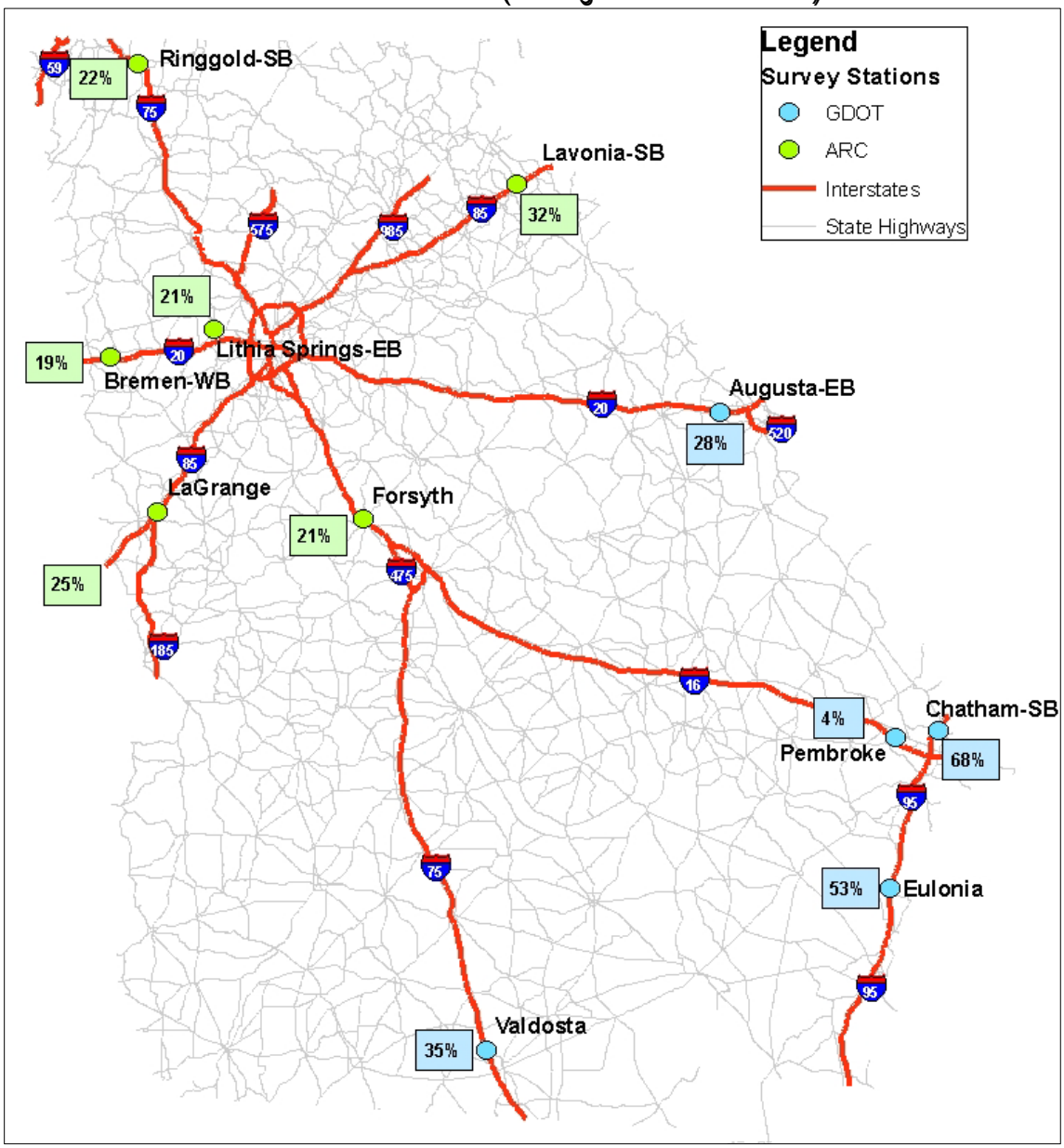
Table 5.12 Top Origin and Destination Cities Cited in O-D Surveys

Rank	O-D	Count	Rank	O-D	Count
1	Savannah	387	11	Norcross	29
2	Metro Atlanta	227	12	Dublin	28
3	Augusta	72	13	Columbus	26
4	Brunswick	61	14	Richmond	24
5	Macon	46	15	McDonough	22
6	Valdosta	40	16	Albany	21
7	LaGrange	38	17	Dalton	20
8	Forest Park	33	18	Savannah	20
9	Statesboro	31	19	Rincon	19
10	South Fulton Co.	30	20	Garden City	19

The surveys also can be used similar to the travel demand model in terms of estimating the importance of each corridor to Georgia's economy. Figure 5.9 shows the percent of trucks surveyed at each location with both an origin and destination outside the state.

The results mirror trends predicted by the state travel demand model that the I-75 Ringgold location has one of the lowest percentages and the locations on I-95 have the highest percentages of "through" traffic. I-16 has the lowest percentage of through truck traffic in the state (four percent), which means virtually all trucks on this corridor are directly related to Georgia's economy.

Figure 5-9 O-D Survey "Through" Truck Percent on Interstates, *2006*
(at weight station locations)



Source: GDOT Truck Lane Needs Identification Study Data & ARC Regional Freight Mobility Plan 2005 Data.

5.5 TRUCK TRIP END ANALYSIS USING TRUCK-EQUIPPED GPS DATA

Commercial trucks are increasingly incorporating GPS technology to assist in truck fleet tracking and management. A third-party vendor typically manages the GPS data and technology. These third-party vendors often make their GPS data available to non-trucking entities in a way that the data is aggregated with identifying truck company information removed to assure the privacy of the vendor's customers. Recently, the Federal Highway Administration (FHWA) negotiated rights to a wide sample of GPS data from some of the largest truck GPS data providers for use in studies such as this report.

As one of the team members working on the Georgia Statewide Freight and Logistics Plan, ATRI's analysis of the GPS data was utilized in a number of different sections in this report and is referred to as the FHWA/ATRI Freight Performance Measurement ("FPM") Database. The following information describes an analysis done identifying truck trip ends within the state.

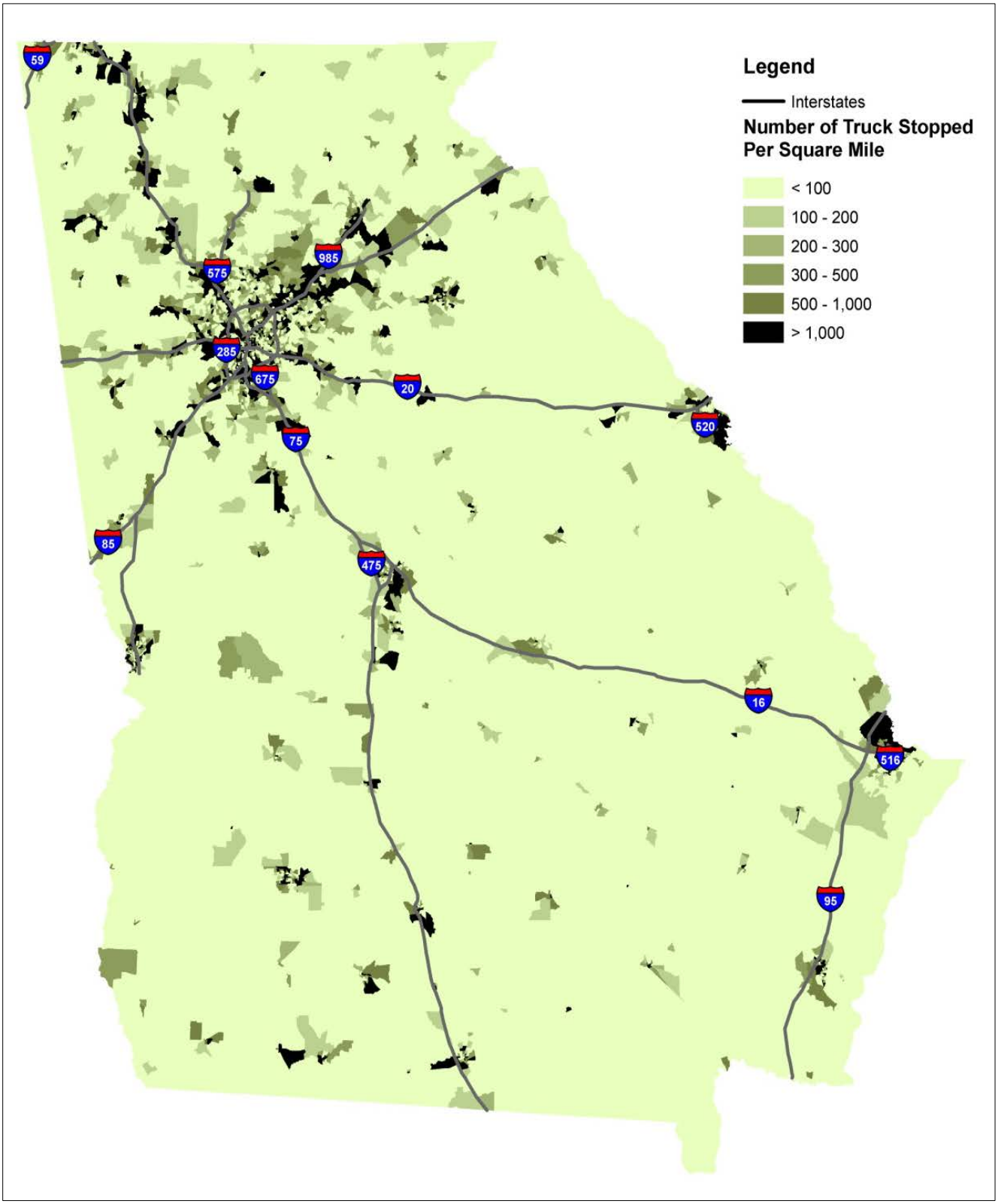
Note: GPS-equipped trucks are not perfectly representative of the entire trucking population in Georgia; in particular, trucks with smaller fleets and owner-operators are less likely to use this technology. These smaller operations are more common for truck drays at ports and railyards as well as for bulk/commodity operations that handle forest products, wood products, and sand/gravel. Additionally, truck trips at truck stops are removed from this analysis to avoid simply identifying truck stop locations.

Figure 5.10 shows a map of truck trip ends in Georgia using the FPM database for each census block groups. Not too surprisingly, the figure shows that the bulk of the truck trip ends are located in the urbanized areas; this is consistent with the county-level analysis that was conducted using the TRANSEARCH analysis.

Figure 5.10 also displays the truck intensity of various corridors in the state. The I-75 corridor between metro Atlanta and Tennessee appears to be the most intensive due to many truck-focused locations adjacent to the corridor. On I-85 north of metro Atlanta, it appears more truck-intensive than I-75 approaching metro Atlanta from the north; however, for the last 50 miles on I-85 before South Carolina the freight intensity drops off significantly. The freight intensity on I-20 also drops off significantly east of metro Atlanta, as does I-75 south of metro Atlanta and I-85 south of metro Atlanta. There are also discrete areas of truck intensity on I-75 between Macon and Florida; this appears to be the most truck intensive corridor in southern Georgia.

Detailed county-level data is shown in Table 5.13; it lists the top Georgia counties for truck 'trip ends'. Not surprisingly, counties in metro Atlanta area are some of the highest: Fulton, DeKalb, Gwinnett, and Clayton counties are the top four. Chatham County, the location of the Port of Savannah, is fifth. Mapped versions of 'zoomed in' areas of the state were also created as part of this report.

Figure 5-10 Number of Trucks Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



Source: Project team analysis of FHWA/ATRI Freight Performance Measurement ("FPM") Database.

Table 5.13 Top 50 Counties with Highest Number of Trucks Stopped
(Oct. 1, 2008 – Sept. 30, 2009)

Rank	County	Truck Stops	Rank	County	Truck Stops
1	Fulton	819,560	26	Floyd	73,602
2	De Kalb	685,425	27	Barrow	73,191
3	Gwinnett	591,194	28	Lowndes	71,902
4	Clayton	436,842	29	Cherokee	69,221
5	Chatham	419,830	30	Walker	68,808
6	Hall	407,671	31	Newton	68,448
7	Cobb	351,383	32	Spalding	66,431
8	Bartow	293,476	33	Troup	60,977
9	Henry	252,806	34	Colquitt	59,178
10	Richmond	236,164	35	Murray	57,927
11	Dougherty	208,425	36	Lamar	56,805
12	Gordon	195,558	37	Carroll	53,543
13	Rockdale	166,446	38	Tift	52,805
14	Clarke	146,751	39	Walton	50,168
15	Bibb	140,790	40	Grady	42,418
16	Douglas	139,090	41	Paulding	41,914
17	Jackson	133,065	42	Columbia	39,710
18	Franklin	113,391	43	Early	37,541
19	Coweta	112,146	44	Fayette	36,670
20	Catoosa	108,989	45	Laurens	36,535
21	Muscogee	91,904	46	Decatur	35,597
22	Forsyth	90,710	47	Effingham	33,926
23	Houston	85,276	48	Taylor	31,535
24	Pickens	79,579	49	Morgan	30,163
25	Glynn	76,740	50	Thomas	27,819

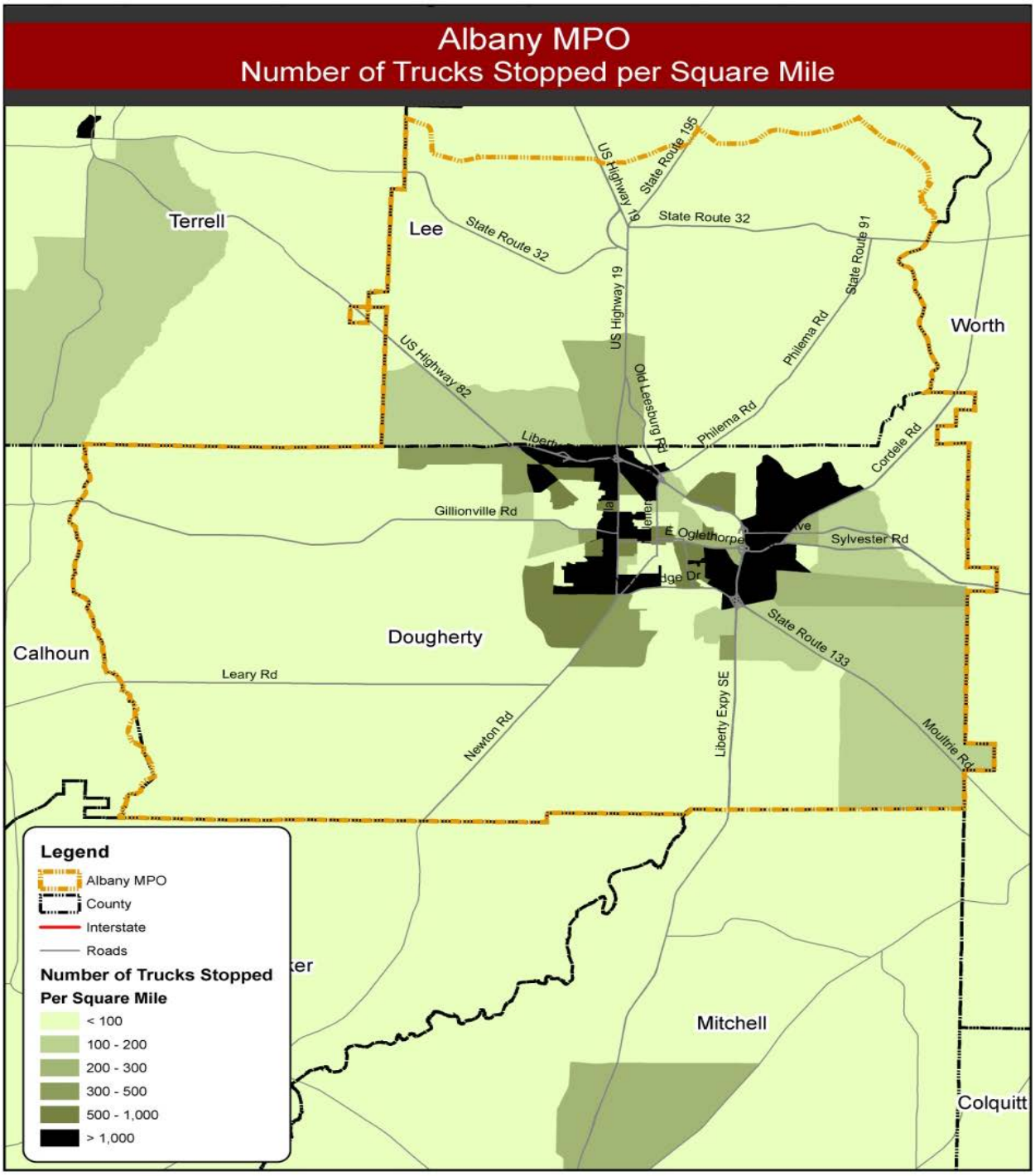
Source: FHWA/ATRI Freight Performance Measurement ("FPM") Database.

An example of a 'zoomed in' area of Georgia is shown in Figure 5.11, which displays the truck trip ends at the census block group level for the Albany region. (***Note**: Appendix A at the back of this report contains the individual maps of each urbanized area in Georgia.*)

Figure 5.11 shows that truck activity identified through the FPM focus at specific locations around Albany -- many of which closely correlate with land uses designated in Comprehensive Plans as industrial, commercial, etc. Combining these planning activities and resources reinforce the need for freight planning

activities by Metropolitan Planning Organizations in each urbanized area, because high truck locations often have unique transportation needs.

Figure 5-11 EXAMPLE: Albany, Georgia Region -- Number of Truck Stopped per Square Mile, *(Oct. 1, 2008 – Sept. 30, 2009)*



Source: Project team analysis of FHWA/ATRI Freight Performance Measurement ("FPM") Database.

5.6 TRUCK MOVEMENT ANALYSIS USING TRUCK-EQUIPPED GPS DATA

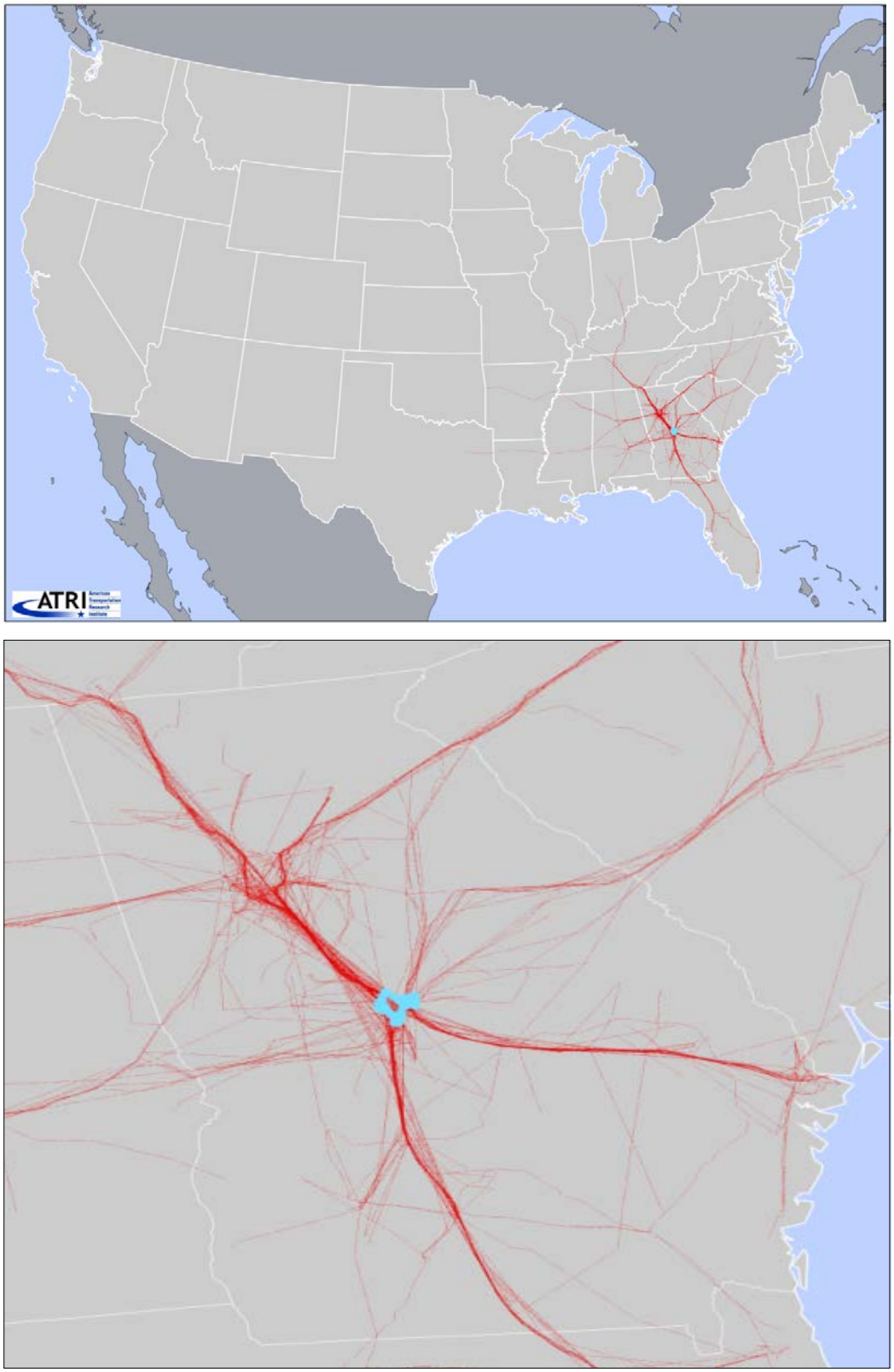
The FPM data can also be used to track truck movement over periods of time. This provides an understanding of how far trucks travel from Georgia and give insight into Georgia's relationship with other states in the Southeast U.S.

Figures 5.12, 5.13, and 5.14 are example travel paths of roughly 500 trucks leaving Macon, Georgia and tracked at their locations 12 hours, 24 hours, and 72 hours later. The figures show the majority of trucks captured in this analysis generally stayed in the Southeast U.S.; this is particularly notable on Figure 5.14, which shows trucks after 24 hours of tracking. Very few of the trucks had left the Southeast U.S. -- even after this extended period of time.

These types of 500-sample truck flow maps were also developed for the example areas of Albany and Savannah for similar time periods; their maps follow the Macon maps.

Tables 5.14, 5.15, and 5.16 show the percentage of trucks in Georgia, the Southeast U.S., and metro Atlanta, respectively. Most notably, Table 5.15 shows that 90 percent of trucks from these metro regions remain in the Southeast U.S. after 24 hours; after 72 hours, roughly half remain. This means trucking tends to be a regional activity -- Georgia's most significant trading partners are states that are closest to it.

Figure 5-12 Truck Flow Paths from Macon example: 12 Hours After Departure



Source: ATRI, Project Team Analysis

Figure 5-13 Truck Flow Paths from Macon example: 24 Hours After Departure

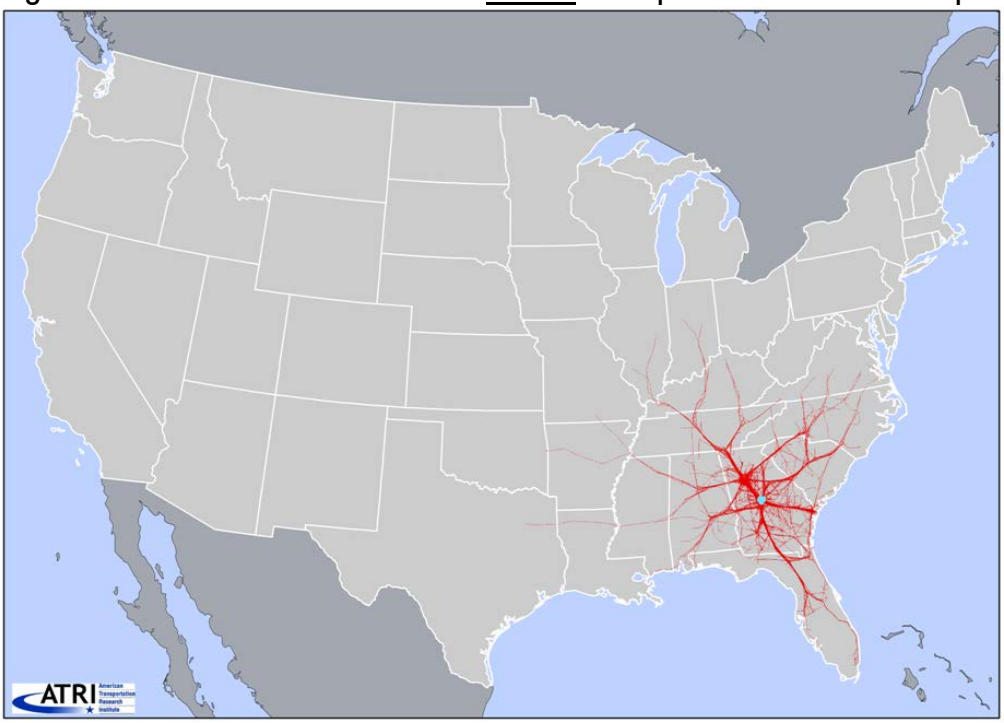
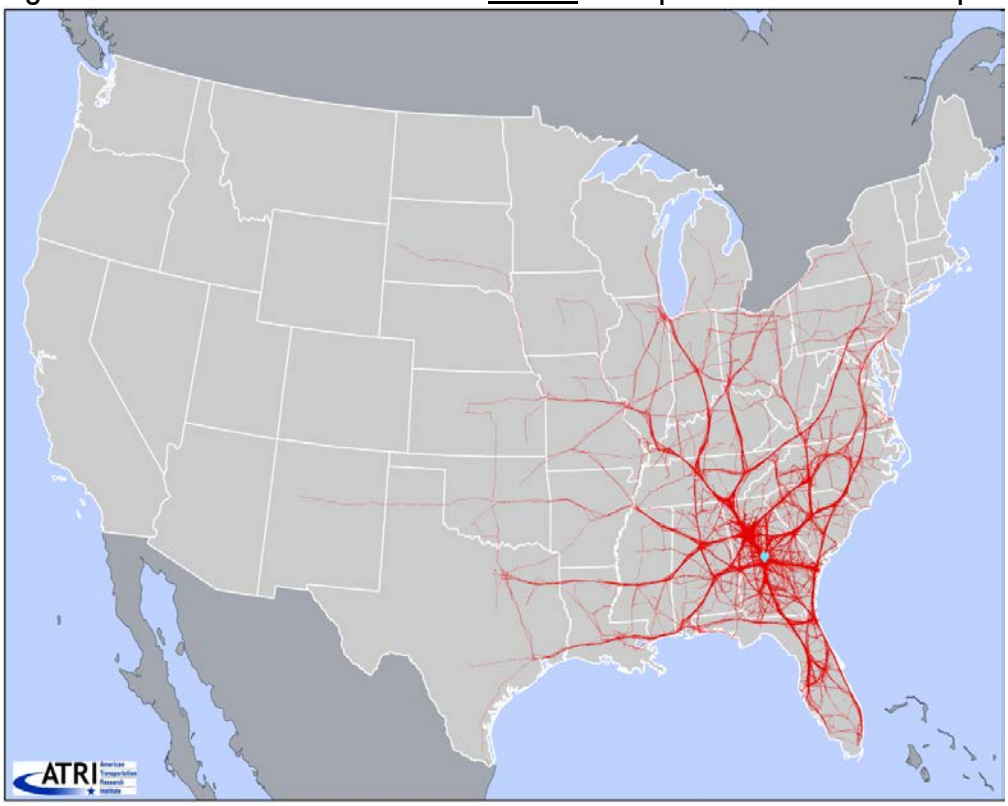
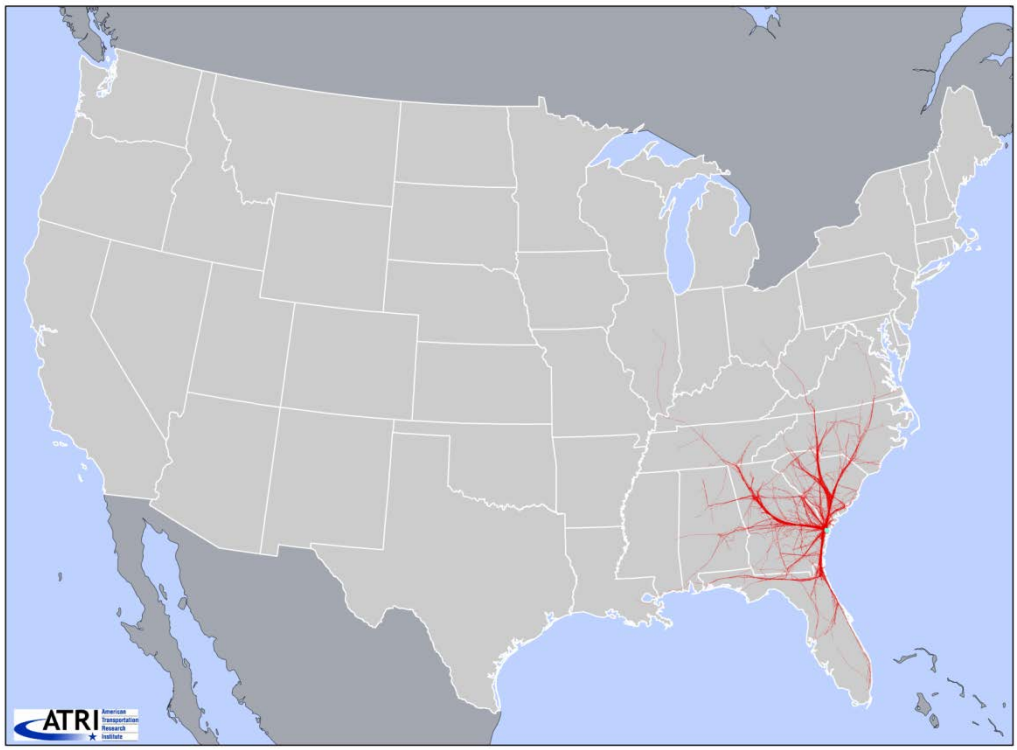
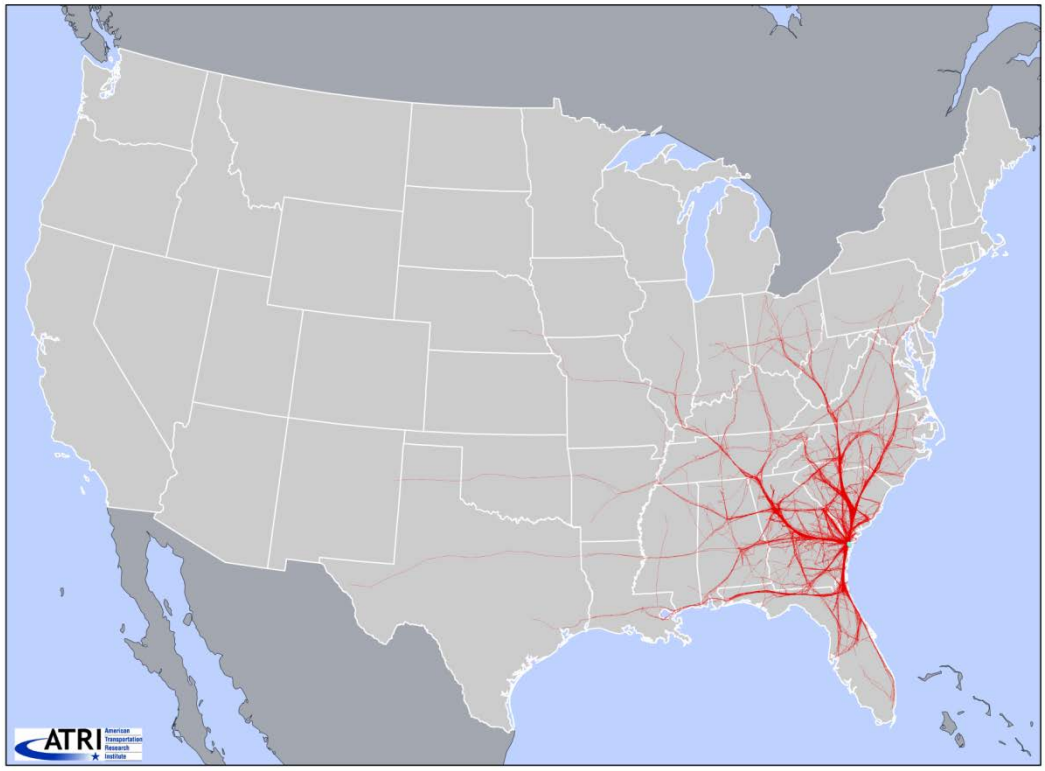


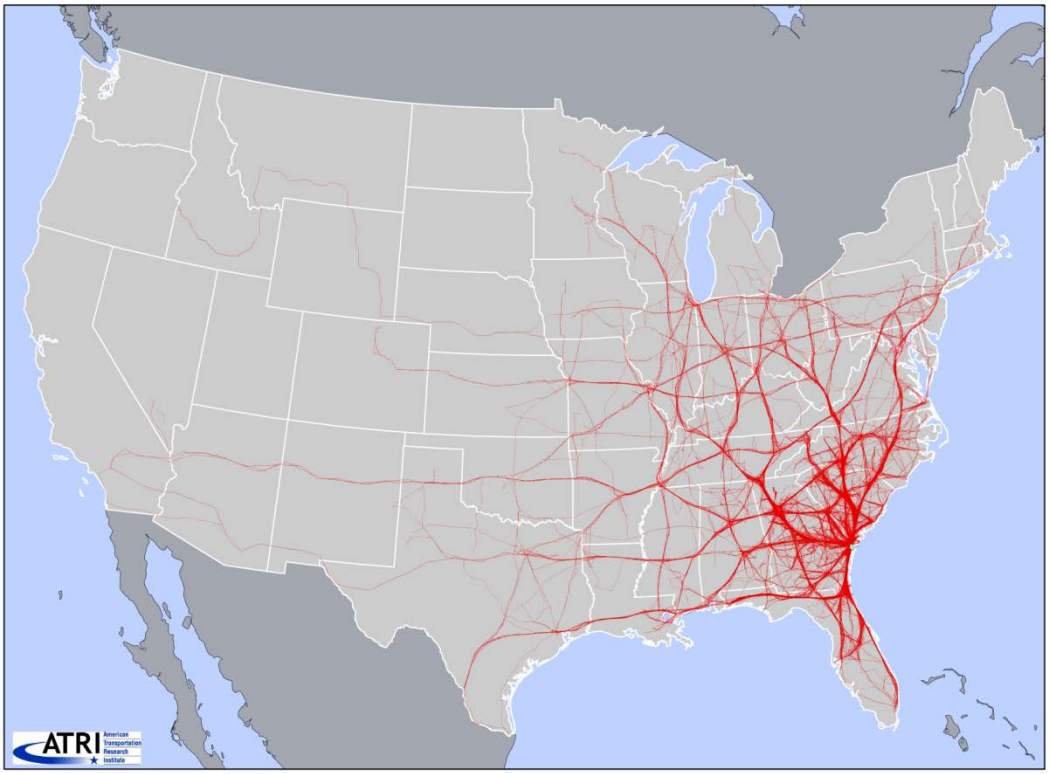
Figure 5-14 Truck Flow Paths from Macon example: 72 Hours After Departure



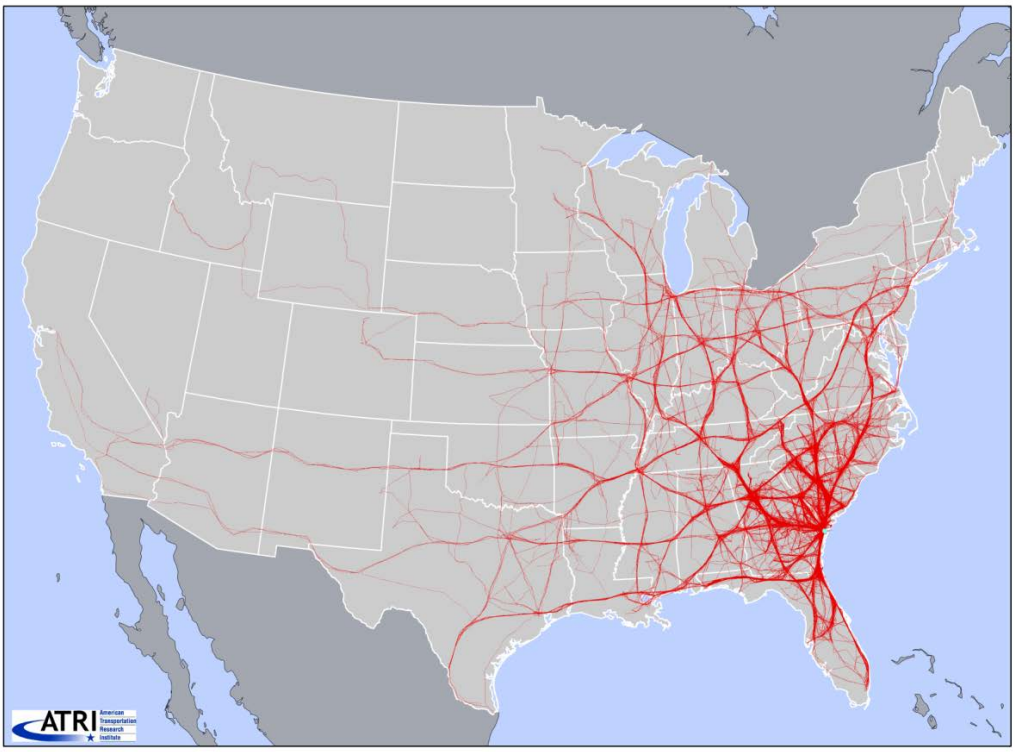
Savannah area Truck Flow Maps


ATRI
American Transportation Research Institute


ATRI
American Transportation Research Institute

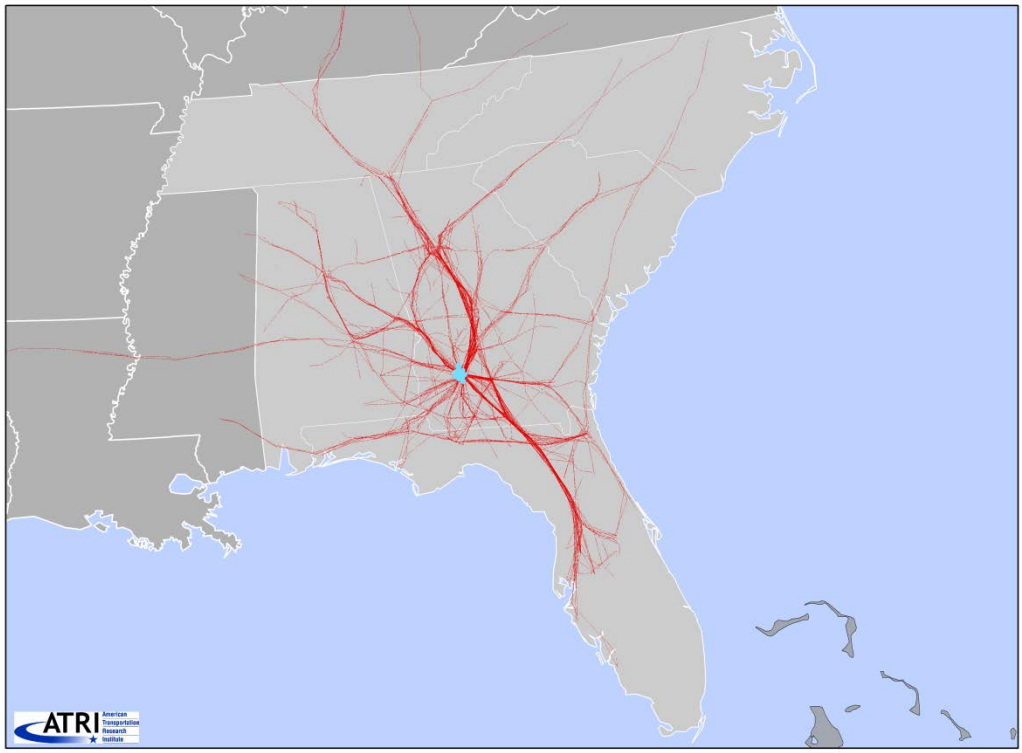


Truck Flow Paths from Savannah example: 7 Days After Departure



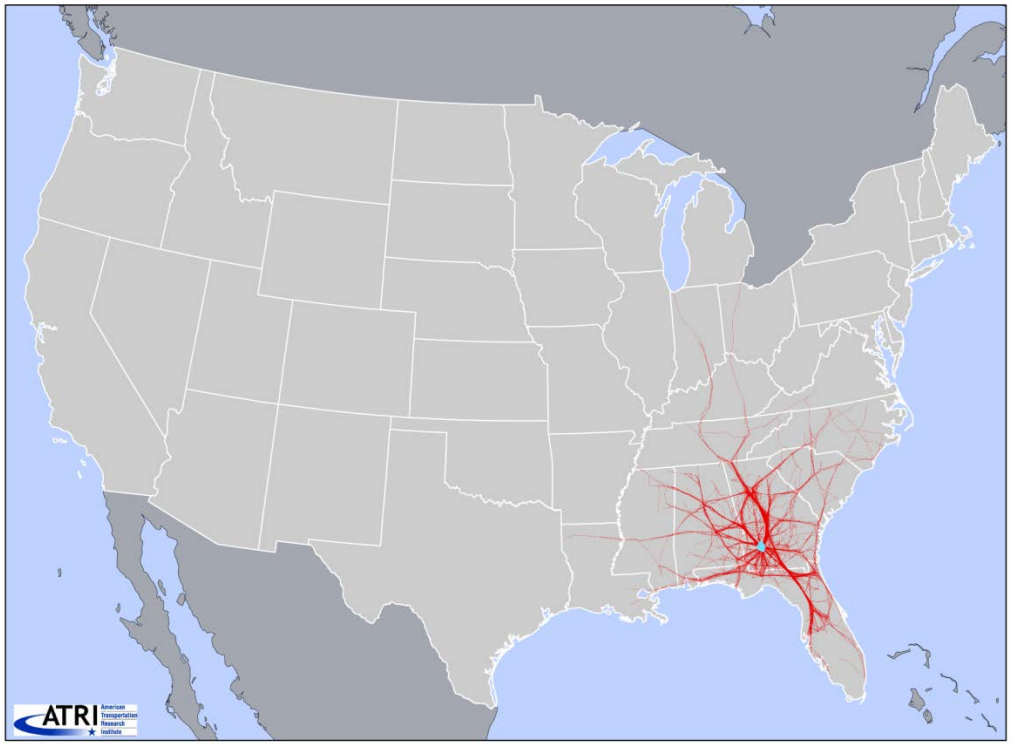
Albany area Truck Flow Maps

Truck Flow Paths from Albany example: 12 Hours After Departure



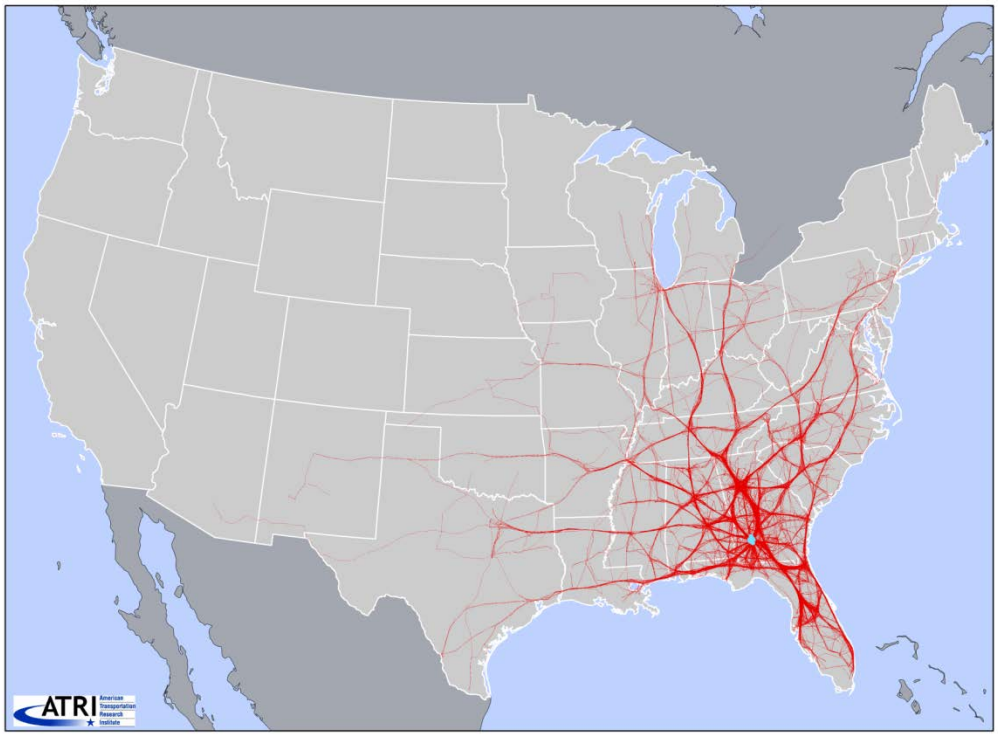
Source: ATRI, Project Team Analysis

Truck Flow Paths from Albany example: 24 Hours After Departure Truck



Truck Flow Paths from Albany example: 48 Hours After Departure Truck

Truck Flow Paths from Albany example: 72 Hours After Departure Truck



Truck Flow Paths from Albany example: 7 Days After Departure Truck

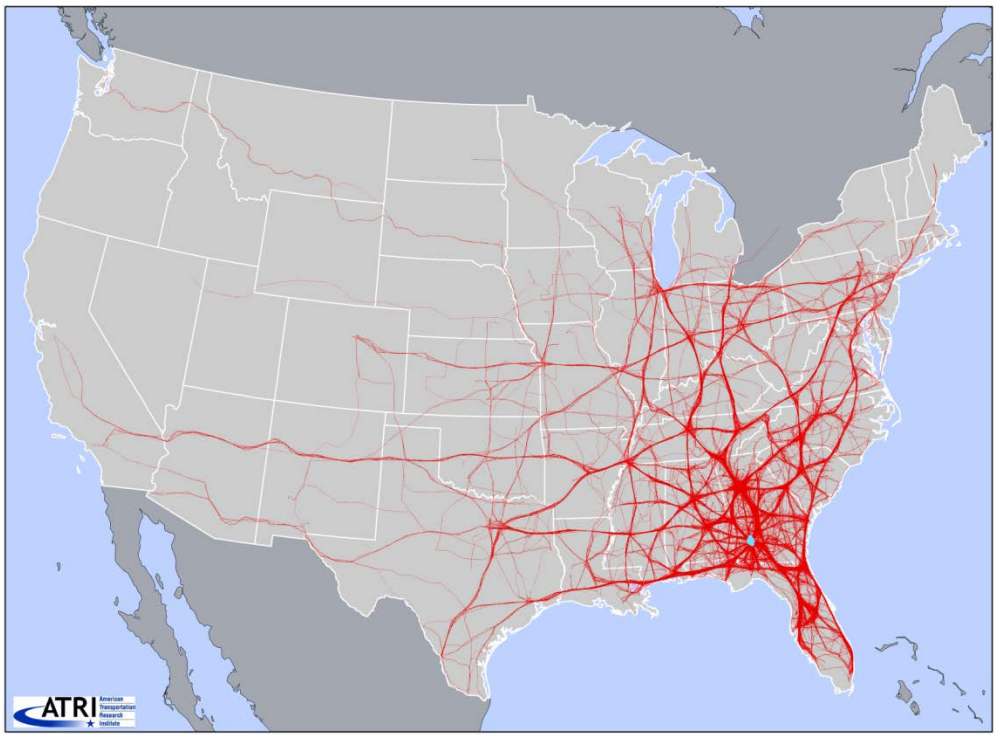


Table 5.14 Percent of Trucks Staying in Georgia over Time

Trucks Starting In…	Percent of Trucks Staying In…	Sample Size	After 12 Hours	After 24 Hours	After 48 Hours	After 72 Hours	After 1 Week
Albany	Georgia	622	47%	30%	14%	11%	6%
Savannah	Georgia	495	51%	32%	16%	12%	8%
Macon	Georgia	497	58%	46%	25%	19%	11%
Atlanta metro	Georgia	1,986	77%	53%	27%	21%	15%

Source: Project team analysis, FHWA/ATRI Freight Performance Measurement ("FPM") Data.

Table 5.15 Percent of Trucks Staying in Southeast U.S. over Time

Trucks Starting In…	Percent of Trucks Staying In…	Sample Size	After 12 Hours	After 24 Hours	After 48 Hours	After 72 Hours	After 1 Week
Albany	Southeast U.S.	622	89%	88%	68%	52%	36%
Savannah	Southeast U.S.	495	83%	72%	51%	39%	29%
Macon	Southeast U.S.	497	87%	90%	66%	53%	40%
Atlanta metro	Southeast U.S.	1,986	91%	91%	64%	51%	40%

Source: Project team analysis, FHWA/ATRI Freight Performance Measurement ("FPM") Data.

Table 5.16 Percent of Trucks Staying in Metro Atlanta over Time

Trucks Starting In…	Percent of Trucks Staying In…	Sample Size	After 12 Hours	After 24 Hours	After 48 Hours	After 72 Hours	After 1 Week
Atlanta metro	Atlanta metro	1,986	56%	32%	12%	9%	4%

Source: Project team analysis, FHWA/ATRI Freight Performance Measurement ("FPM") Data.

5.7 COMMODITY ANALYSIS USING ROADSIDE TRUCK SURVEY DATA

Conducting a commodity analysis provides insight on the relationship of trucks to the broader Georgia economy. The commodities identified in roadside surveys conducted through the GDOT Truck Lane Needs Identification study indicate which industries rely on Georgia's infrastructure to move their supplies and end products. This analysis was conducted only at truck survey locations which were part of the GDOT study, because the ARC survey locations noted in Section 5.4 of this report did not request commodity information.

Table 5.17 shows the commodity distribution for the GDOT truck survey locations. It showed that food and farm products were the largest single sector in the survey, representing between 12 and 30 percent of the truck movements at the locations shown in the table. Transportation equipment and chemicals were the only other commodities that exceeded 10 percent of the trucks surveyed at the Augusta and Chatham County/Savannah survey locations, respectively.

Table 5.17 Commodities Distribution at GDOT Survey Stations, *2005*

Commodities	I-75 Valdosta	I-95 Eulonia	I-95 Chatham Co.	I-20 Augusta	I-16 Pembroke
Food and Farm Products	30%	27%	25%	12%	14%
Transportation Equipment	8%	10%	4%	14%	10%
Chemicals	5%	2%	7%	10%	10%
Textiles	1%	4%	8%	3%	4%
Clay/Concrete/Glass/Stone	0%	3%	5%	5%	5%
Lumber/Wood/Logs	1%	3%	4%	0%	2%
Warehousing (Secondary Traffic)	0%	3%	0%	2%	4%
Sand and Gravel (Nonmetallic Minerals)	0%	1%	0%	2%	0%
Other Commodities	54%	47%	48%	52%	49%
Total	100%	100%	100%	100%	100%

Source: GDOT Truck Lane Needs and Identification Study.

5.8 COMMODITY ANALYSIS USING TRANSEARCH DATA

Table 5.18 shows commodity data extracted from the TRANSEARCH database that represents all goods moved by truck in the state. This table has a high percentage of nonmetallic minerals, which is a commodity category that includes materials used in cement and concrete commonly used in road and building construction. These goods are typically delivered by truck over relatively short distances due to their abundance and use across the state. The category also includes kaolin, which is found in abundance in Georgia and is used to make ceramics (e.g., porcelain) and paper.

The term "secondary traffic" refers to commodities in the database representing the short 'dray' truck trips (i.e. from warehouses and distribution centers to final destinations.) This category includes any type of goods typically moved between warehouses and distribution centers.

Clay/concrete/glass/stone is a commodity category used for construction purposes similar to nonmetallic mineral. This commodity, along with lumber and wood products, totals over 10 percent in the state.

Table 5.18 Georgia Truck Tonnage by Commodity, *2007*

Commodity	Inbound	Outbound	Within	Through	Total Tons	Percent Total
Nonmetallic Minerals	19,113,030	8,662,976	89,114,069	2,494,403	119,384,478	18.6%
Secondary Traffic	23,928,245	13,079,992	37,792,496	28,270,706	103,071,439	16.1%
Chemicals or Allied Products	2,386,962	14,111,912	860,634	44,324,229	61,683,737	9.6%
Food or Kindred Products	8,781,281	16,302,225	7,610,159	27,863,475	60,557,141	9.5%
Clay, Concrete, Glass, or Stone	4,751,403	10,185,748	36,944,385	7,772,121	59,653,657	9.3%
Lumber or Wood Products	9,681,918	13,773,559	25,559,106	8,751,860	57,766,443	9.0%
Farm Products	7,563,212	3,439,293	2,535,774	10,644,741	24,183,020	3.8%
Primary Metal Products	6,673,497	1,121,628	1,698,288	13,624,626	23,118,040	3.6%
Petroleum or Coal Products	6,019,830	7,730,158	6,588,855	1,856,055	22,194,898	3.5%
Pulp, Paper, or Allied Products	2,547,986	4,343,009	5,568,508	5,929,428	18,388,931	2.9%
Fabricated Metal Products	3,527,438	2,778,410	1,052,511	7,707,803	15,066,162	2.4%
Rubber or Misc Plastics	2,331,353	3,725,229	284,849	6,600,745	12,942,176	2.0%
Transportation Equipment	581,340	3,487,013	429,349	4,722,847	9,220,549	1.4%
Machinery	1,246,337	2,167,155	1,324,981	4,292,331	9,030,804	1.4%
Textile Mill Products	333,980	5,320,665	1,097,819	1,864,752	8,617,216	1.3%
Metallic Ores	1,114,347	2,569,260	4,454,740	11,876	8,150,222	1.3%
Electrical Equipment	1,416,199	2,199,412	700,312	3,247,999	7,563,921	1.2%
Apparel or Related Products	1,468,962	383,955	290,542	3,834,778	5,978,236	0.9%
Furniture or Fixtures	872,347	1,217,103	531,406	2,017,872	4,638,728	0.7%
Printed Matter	866,791	625,816	676,782	2,367,822	4,537,211	0.7%
Miscellaneous Manufacturing Products	424,608	506,200	317,554	942,462	2,190,824	0.3%
Instrument, Photo Equipment, Optical Equipment	261,417	222,591	95,835	607,658	1,187,501	0.2%
Leather or Leather Products	200,573	57,790	89,525	391,213	739,101	0.1%
Forest Products	–	–	284,902	–	284,902	<0.1%
Coal	244,864	–	–	29,647	274,512	<0.1%
Tobacco Products	40,609	60,088	28,328	132,615	261,639	<0.1%
Fresh Fish or Marine Products	–	–	88,965	–	88,965	<0.1%
Ordnance or Accessories	2,340	–	1,250	21,054	24,645	<0.1%
Total	106,380,868	118,071,185	226,021,926	190,325,118	640,799,096	100.0%

Source: TRANSEARCH data & Project team analysis

5.9 TRUCK FORECAST USING TRANSEARCH DATA

TRANSEARCH data obtained for this project included a forecast of freight flows for the year 2027. This forecast was extrapolated to 2050 by the project team using factors calculated from the FHWA Freight Analysis Framework3 database.

Table 5.19 shows the TRANSEARCH forecast at the commodity level for Georgia. Overall, truck tonnage is forecast to grow at a 1.4 percent compounded annual rate. This is considered a relatively conservative forecast, as many forecasts project truck tonnage growth between 2 and 3 percent.

Table 5.19 also shows that commodities are projected to grow at very different rates; of most importance is the growth of the largest commodities. "Secondary traffic" (drayage and truck moves from warehouses and distribution centers) is forecast to grow at a 2.4 percent annual rate -- much higher than the 1.4 percent annual growth projected for the entire state. Several of the bulk commodities forecasted to grow as significantly over the long term include clay, concrete, glass, or stone; lumber or wood products; and petroleum or coal products. Future tasks of this project will examine the sensitivity of the forecast to growth rates of specific commodities.

Table 5.20 shows the truck forecast by the four general movement types: 'inbound', 'outbound', 'internal', and 'through' trips. The TRANSEARCH forecast indicates that *inbound* truck movements are forecast to grow faster than *outbound* truck movements, reflecting Georgia's consumption portion of the economy expected to grow faster than the production portion of the economy. 'Through' truck tonnage is forecast to grow much faster than internal truck tonnage; this indicates that truck trips will generally get longer, because 'through' truck trips are generally much longer than internal truck trips.

Table 5.21 and 5.22 show the anticipated growth in truck tonnage for the top 10 state trading partners for Georgia. Florida is clearly expected to remain the top trading partner for Georgia.

Alabama is forecast to be the fastest-growing neighboring state *origin* in terms of truck tonnage, while South Carolina is forecast to be the fastest-growing neighboring state *destination*. This put more focus on I-85 as an important corridor; truck traffic on it is expected to grow faster than other Georgia interstates.

Figure 5.15 maps the tonnage for truck tonnage to each state in the United States. It illustrates the rapid growth projected for truck tons to California and Texas.

Table 5.23 shows inbound truck tonnage by county within Georgia. Fulton County is forecast to remain the largest county for inbound truck tonnage by the year 2050. However, the fastest-growing counties based on truck tonnage are forecast to be *outside* metro Atlanta; these include Tift County which is expected to grow 201 percent between 2007 and 2050 and become the 4th-largest in the state for inbound truck tonnage. Muscogee (Columbus), Lowndes (Valdosta),

and Dougherty (Albany) Counties are the other top counties forecast to grow over 200 percent between 2007 and 2050.

Table 5.19 Georgia Truck Tonnage by Commodity, *year 2050*

Commodity	2007	2050	CAGR
Nonmetallic Minerals	116,890,075	244,017,334	1.7%
Secondary Traffic	74,800,733	203,314,108	2.4%
Clay, Concrete, Glass, or Stone	51,881,536	55,239,096	0.2%
Lumber or Wood Products	49,014,583	49,237,249	0.01%
Food or Kindred Products	32,693,665	63,934,955	1.6%
Petroleum or Coal Products	20,338,843	21,401,879	0.1%
Chemicals or Allied Products	17,359,508	33,083,884	1.5%
Farm Products	13,538,279	33,483,212	2.1%
Pulp, Paper, or Allied Products	12,459,503	12,528,578	0.01%
Primary Metal Products	9,493,413	11,421,219	0.4%
Metallic Ores	8,138,347	9,057,907	0.3%
Fabricated Metal Products	7,358,359	10,505,213	0.8%
Textile Mill Products	6,752,464	11,693,916	1.3%
Rubber or Misc Plastics	6,341,431	13,235,340	1.7%
Machinery	4,738,473	12,911,161	2.4%
Transportation Equipment	4,497,702	10,161,079	1.9%
Electrical Equipment	4,315,923	15,459,168	3.0%
Furniture or Fixtures	2,620,856	10,121,092	3.2%
Printed Matter	2,169,389	3,600,394	1.2%
Apparel or Related Products	2,143,459	5,247,488	2.1%
Misc Manufacturing Products	1,248,362	5,346,200	3.4%
Instruments, Photo Equipment, Optical Equipment	579,843	9,419,460	6.7%
Leather or Leather Products	347,888	1,005,160	2.5%
Forest Products	284,902	833,296	2.5%
Coal	244,864	98,932	-2.1%
Tobacco Products	129,025	62,314	-1.7%
Fresh Fish or Marine Products	88,965	470,218	4.0%
Ordnance or Accessories	3,590	19,887	4.1%
Total	450,473,979	846,909,743	1.4%

Source: TRANSEARCH and Project team analysis.

Table 5.20 Summary of Georgia's Truck Flows, by Type of Movement, *2007*

Type of Movement	Year 2007	Year 2050	Percent Growth
Inbound	106,380,868	277,419,550	161%
Outbound	118,071,185	205,411,846	74%
Within	226,021,926	364,078,347	61%
Through	190,325,118	482,753,521	154%
Total	640,799,096	1,329,663,264	108%

Source: TRANSEARCH and Project team analysis.

Table 5.21 Top 10 Origin States of Georgia Truck Traffic, *2007*

		Truck Tons		
Rank	State	Year 2007	Year 2050	Percent Growth
1	Florida	27,691,377	76,191,944	175%
2	Alabama	14,977,863	44,483,441	197%
3	South Carolina	9,387,293	20,537,966	119%
4	California	6,202,533	25,037,194	304%
5	Tennessee	5,235,017	12,853,287	146%
6	Texas	5,213,746	16,347,875	214%
7	Mississippi	4,124,912	7,465,352	81%
8	Illinois	3,457,363	6,594,275	91%
9	North Carolina	3,343,678	9,352,374	180%
10	Louisiana	3,018,633	7,227,819	139%

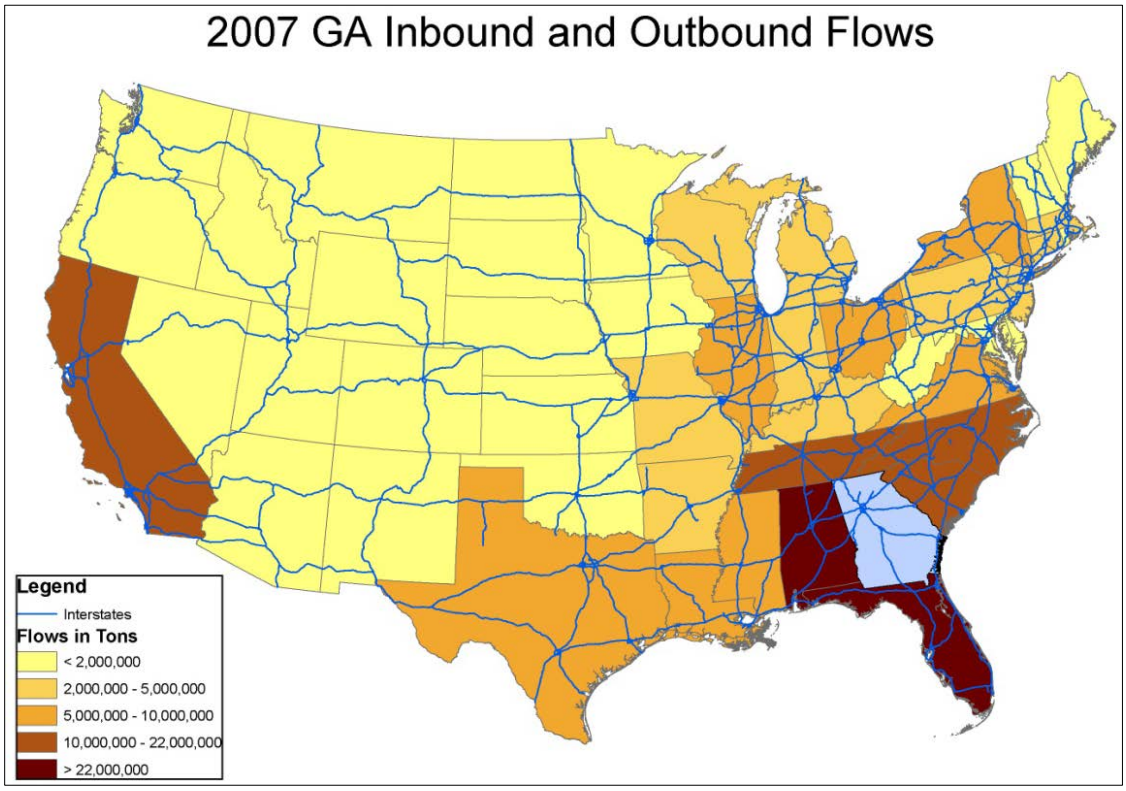
Source: TRANSEARCH and Project team analysis.

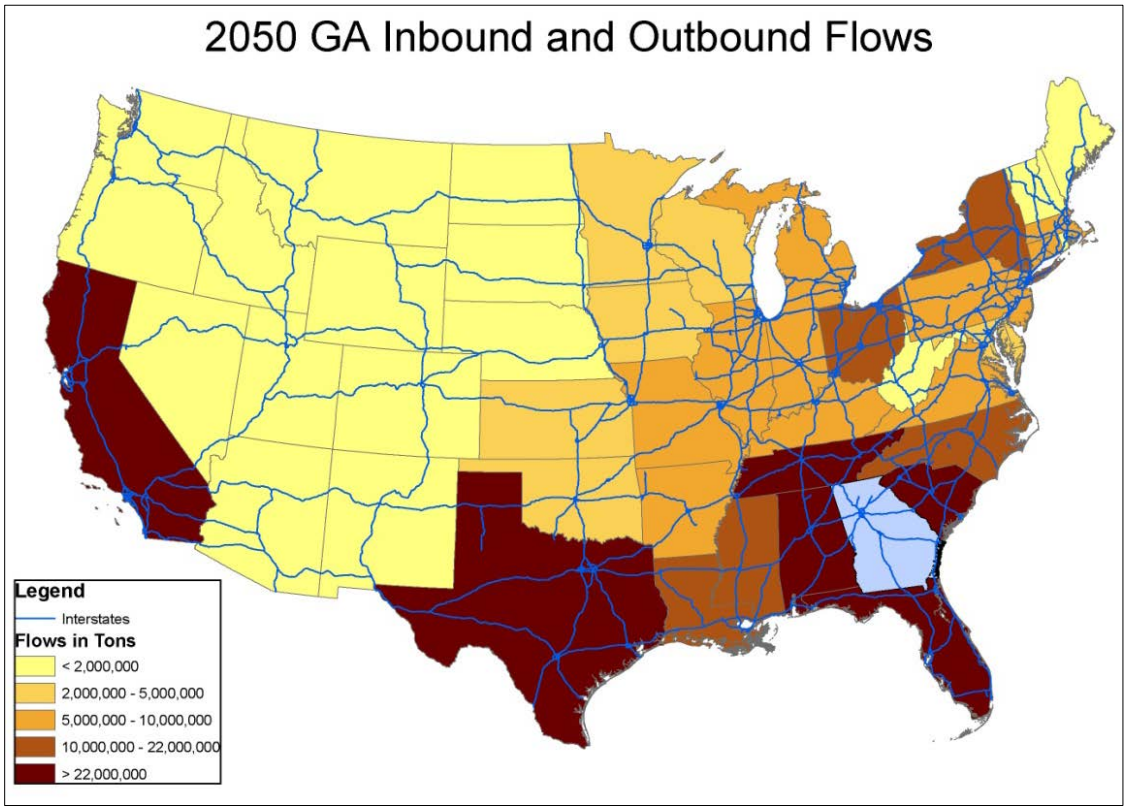
Table 5.22 Top 10 Destination States for Georgia Truck Traffic, *2007*

		Truck Tons		
Rank	State	Year 2007	Year 2050	Percent Total Outbound
1	Florida	18,173,961	30,725,096	69%
2	North Carolina	12,345,276	12,646,634	2%
3	South Carolina	11,537,086	23,395,650	103%
4	Tennessee	8,640,026	11,354,854	31%
5	Alabama	7,451,813	14,528,991	95%
6	Virginia	6,070,102	7,044,677	16%
7	New York	5,255,603	10,605,055	102%
8	Texas	4,206,503	8,730,343	108%
9	Louisiana	4,039,827	6,907,223	71%
10	California	3,904,694	6,891,587	76%

Source: TRANSEARCH Data and Project team analysis.

Figure 5-15 Inbound and Outbound Truck Flows for Georgia, *2007 and 2050*





Source: TRANSEARCH and Project team analysis.

Table 5.23 Top 20 Georgia Counties with Highest Inbound Truck Tons, *2007*

Rank	County	Truck Tons 2007	Truck Tons 2050	Percent Growth
1	Fulton	28,354,215	62,791,449	121%
2	Chatham	8,677,489	22,101,174	155%
3	Gwinnett	4,315,205	10,743,881	149%
4	DeKalb	4,248,574	9,707,059	128%
5	Cobb	3,574,647	7,823,460	119%
6	Tift	3,427,215	10,305,222	201%
7	Richmond	3,033,269	4,890,219	61%
8	Carroll	2,956,327	6,903,019	133%
9	Clayton	2,748,225	7,413,172	170%
10	Muscogee	2,630,894	8,725,196	232%
11	Coffee	2,473,136	6,428,414	160%
12	Lowndes	2,461,220	10,147,109	312%
13	Dougherty	2,306,558	9,912,196	330%
14	Bibb	1,791,290	3,645,275	103%

Source: TRANSEARCH and Project team analysis.

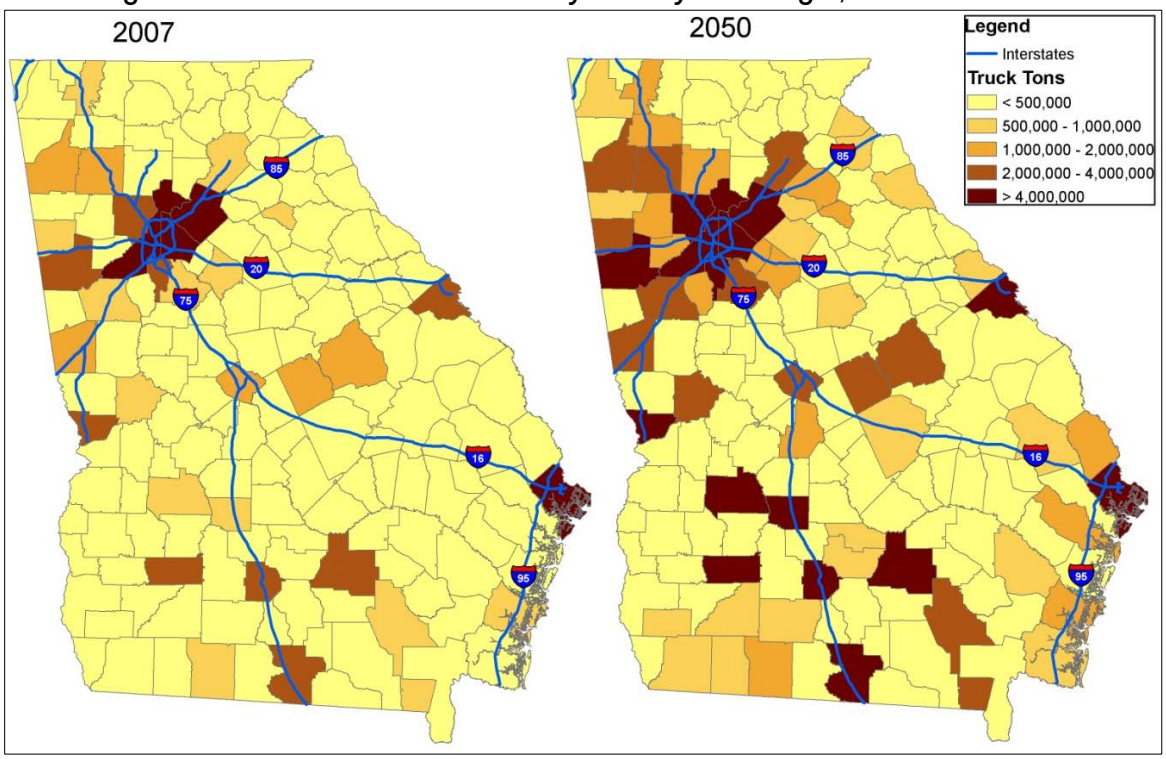
Similarly, Table 5.24 shows that Chatham and Fulton Counties will remain the top two for outbound tonnage. Gwinnett County is forecast to have the fastest growth of the top counties with 133-percent growth between 2007 and 2050, making it 3rd largest in terms of truck tonnage in the state. Figures 5.16 and 5.17 show the inbound and outbound truck tonnage by county in 2007 and 2050.

Table 5.24 Top 20 Georgia Counties w/Highest Outbound Truck Tons, *2007*

County	Truck Tons 2007	Truck Tons 2050	Percent Growth
Chatham	24,747,960	49,343,003	99%
Fulton	14,315,413	26,946,245	88%
DeKalb	4,510,309	7,888,082	75%
Gwinnett	3,762,409	8,763,530	133%
Glynn	3,632,475	3,718,477	2%
Richmond	3,497,863	4,810,641	38%
Cobb	2,789,090	5,181,244	86%
Tift	2,687,926	4,133,175	54%
Bibb	2,341,544	3,407,901	46%
Hall	2,180,890	4,287,933	97%
Whitfield	2,138,084	2,952,818	38%
Gordon	1,730,203	2,696,733	56%
Washington	1,501,080	2,466,688	64%

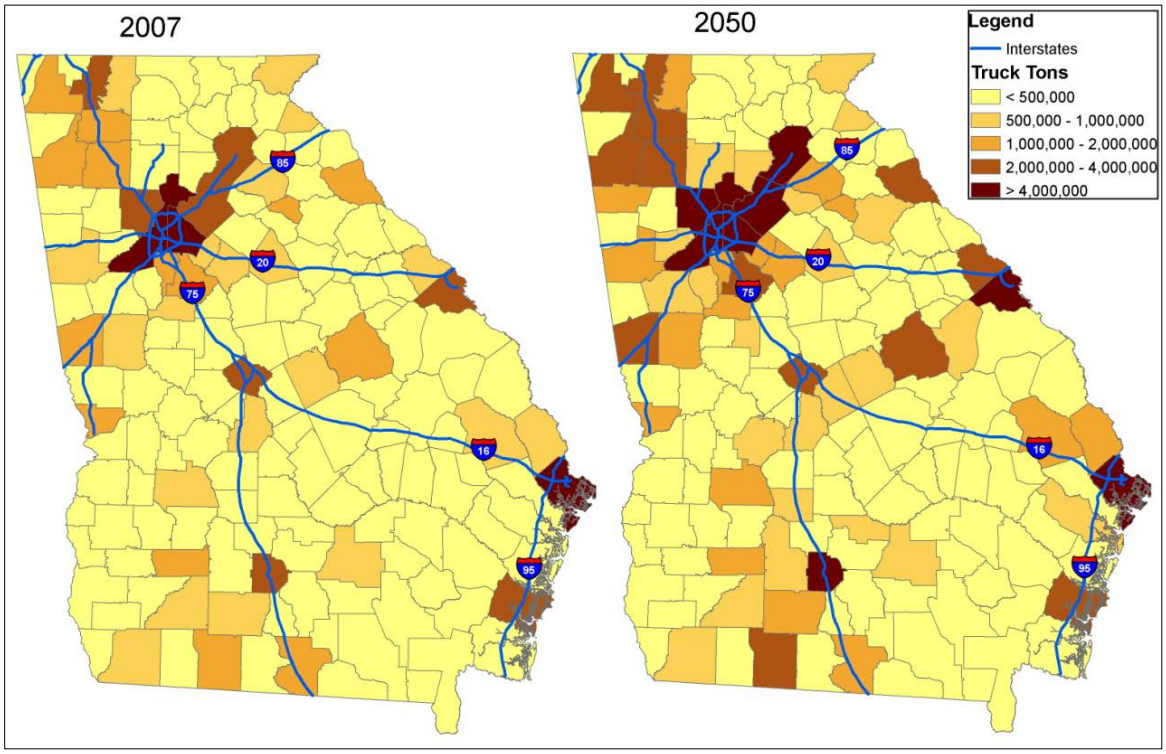
Source: TRANSEARCH and Project team analysis.

Figure 5-16 Inbound Truck Tons by County in Georgia, 2007 & 2050



Source: TRANSEARCH Data and project team analysis.

Figure 5-17 Outbound Truck Tons by County, 2007 & 2050



Source: TRANSEARCH Data and Project team analysis.

5.10 TRUCK FORECASTS USING STATEWIDE TRAVEL DEMAND MODEL

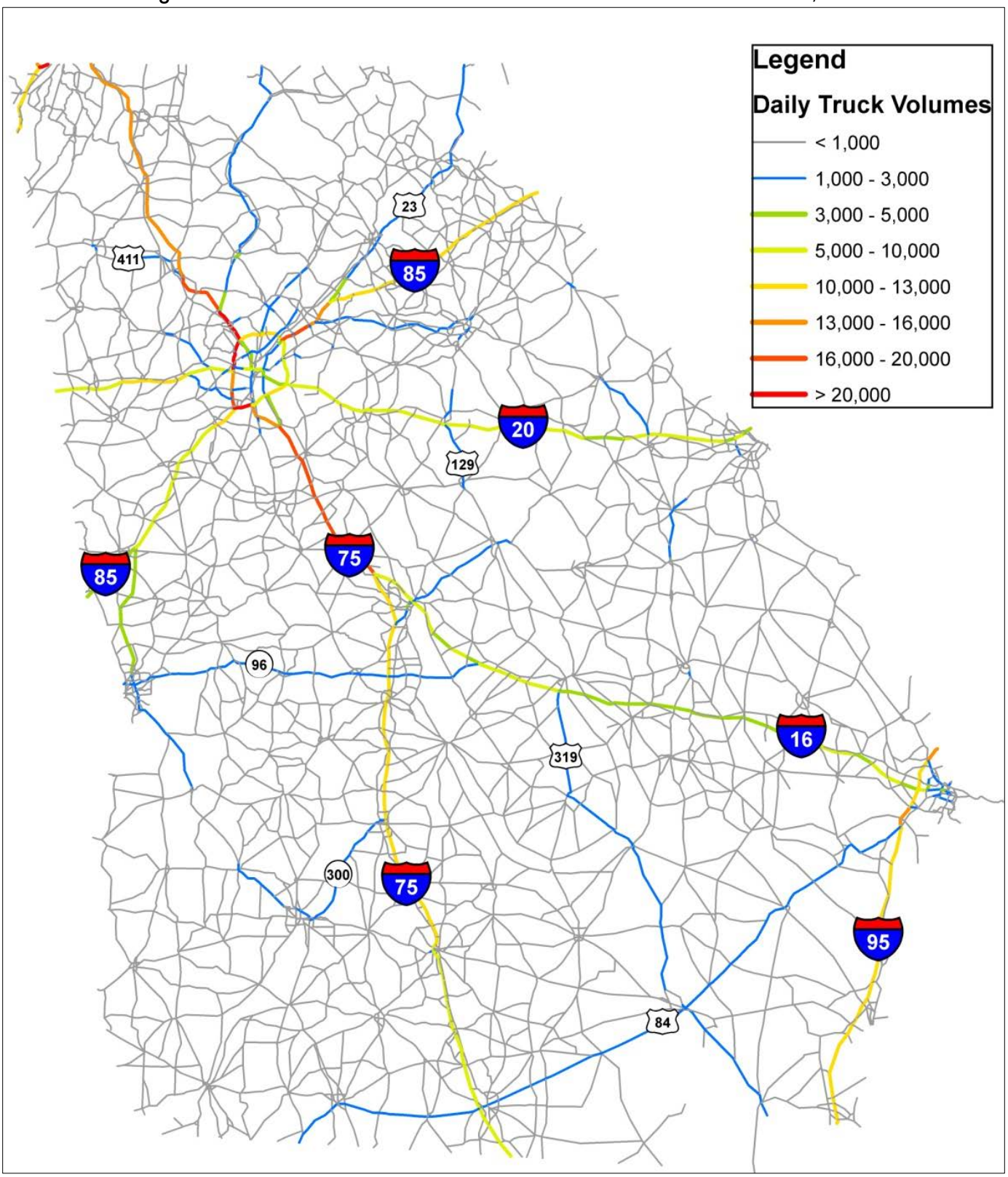
Another perspective on freight forecasting can be found from utilizing the GDOT statewide travel demand model. The model provides information on truck volumes in the base year of 2006, in the forecast year of 2050, and for several years in between.

Figure 5.18 shows the truck volumes in the base year. Figure 5.19 shows truck volumes forecast to 2050, and Figure 5.20 shows the difference between volumes in the two different models. As shown in Figure 5.20, the travel demand model predicts that the fastest growing corridors in terms of total number of trucks in this time period are several Interstate segments in the Atlanta metropolitan region and the northern portion of I-95.

Secondarily, slightly slower growth is anticipated for I-20 between Atlanta and Augusta; and on Interstate legs of I-75 and I-85 approximately 10 to 20 miles outside of the perimeter. This indicates that the current version of the model is anticipating slow growth for the trucking sector.

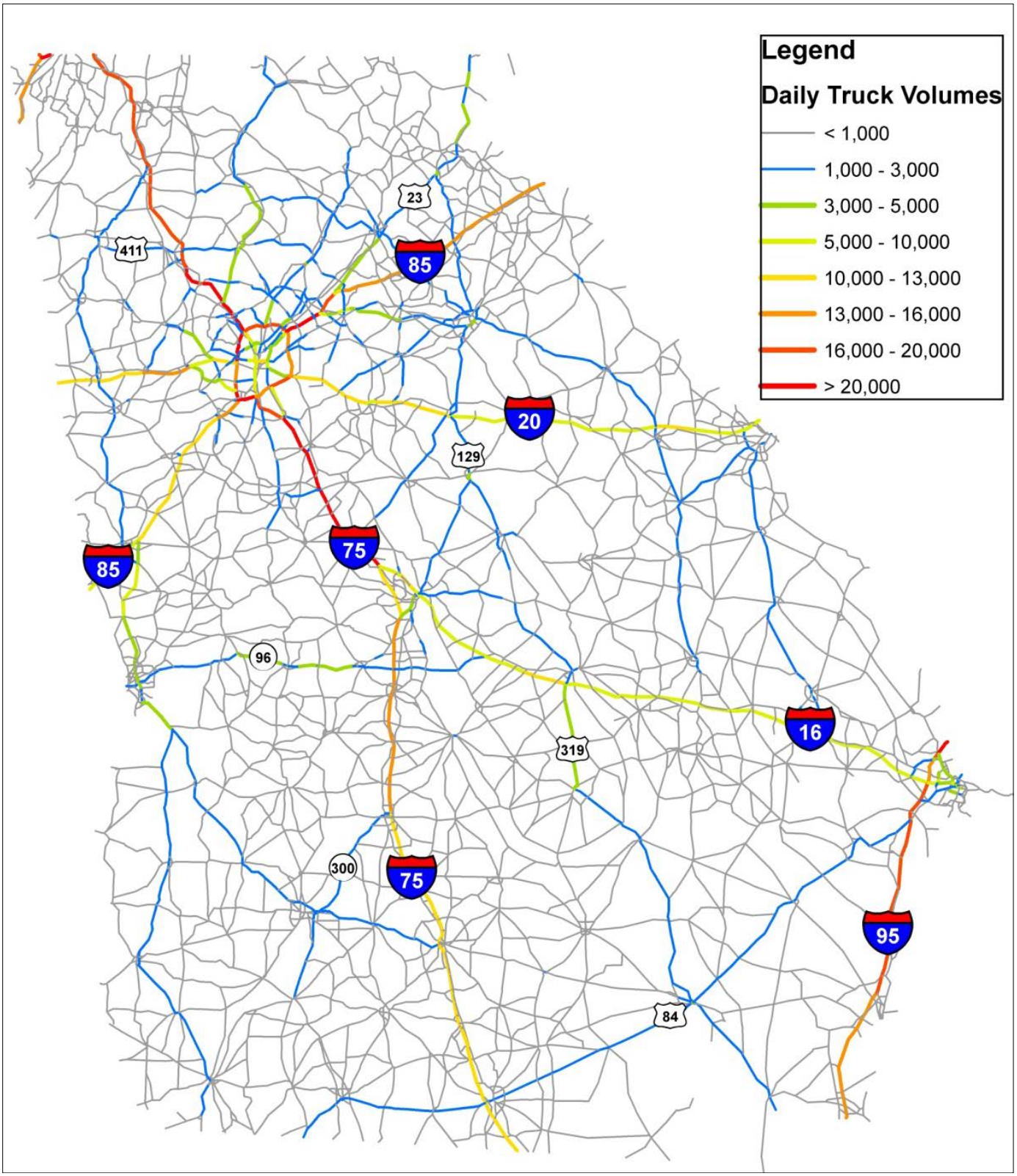
A subsequent task in this project will conduct more robust alternative freight forecasts in greater detail, including comparing the TRANSEARCH and truck model forecasts to those derived from other sources.

Figure 5-18 Statewide Travel Demand Model: Truck AADT Volumes, *2006*



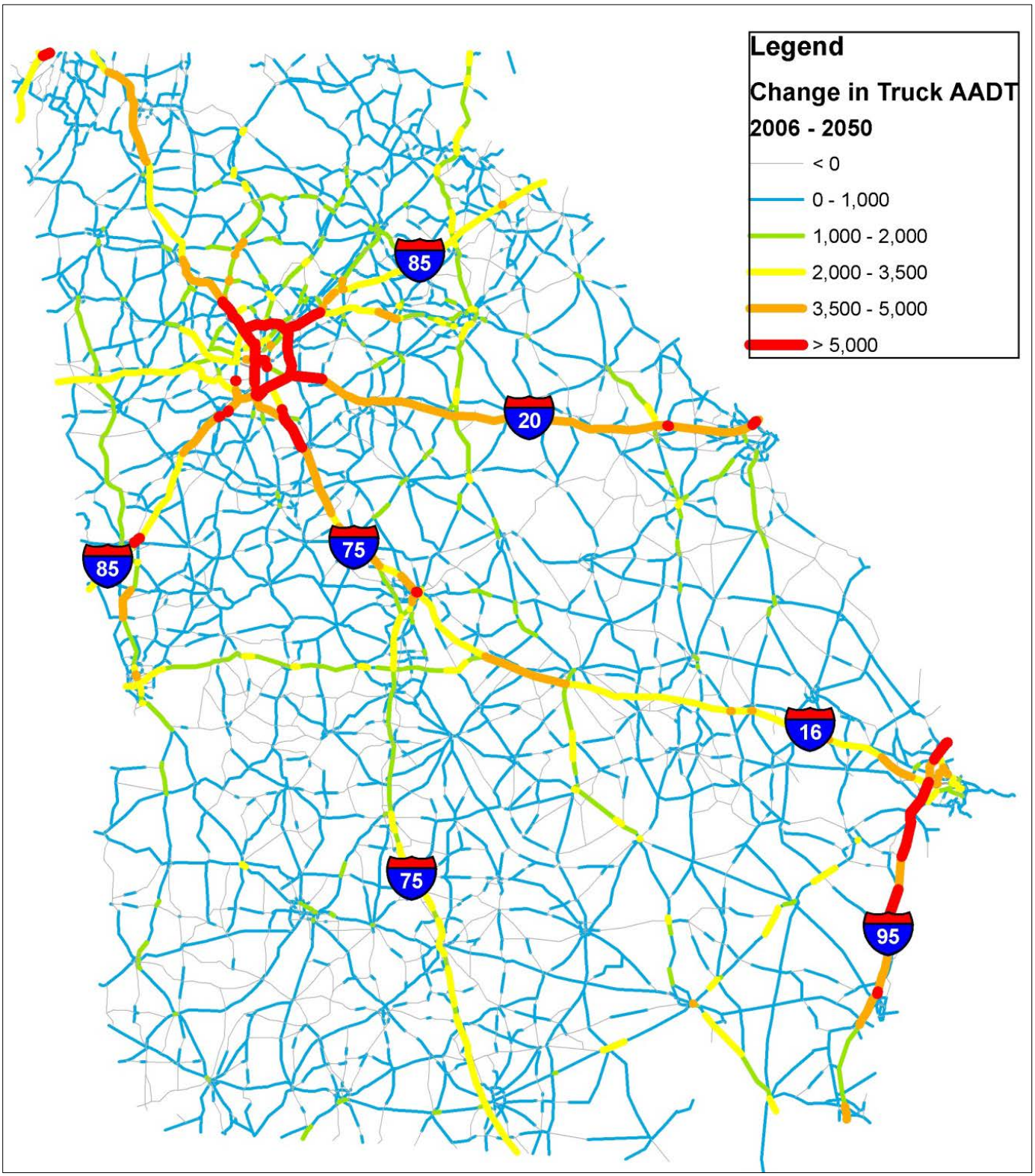
Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

Figure 5-19 Statewide Travel Demand Model: Truck AADT Volumes, *2050*



Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

Figure 5-20 Differences in Truck Volumes Between 2006 and 2050 Model Outputs



Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

5.11 KEY FINDINGS ON TRUCK DEMAND

This chapter has provided a large amount of data and information related to trucking demand. The following are key findings related to where the trucks are and where they are going on Georgia's Highway Infrastructure:

- The most freight-intensive long-haul corridor in Georgia is I-75 between Atlanta and Chattanooga. This corridor carries freight traffic between both Georgia and Florida to locations throughout the Midwest. Closer in to the Atlanta region are the highest truck volumes in the State (over 25,000 trucks per day) as this long-haul truck traffic overlaps with local distribution traffic serving the Atlanta metropolitan region. The truck counts on I-75 in Whitfield, Catoosa, Bartow, and Gordon counties are the highest non-Atlanta truck counts in the State. Most of the long-haul truck traffic on this corridor goes through Tennessee and Kentucky on its way to states further north.
- I-75 between Atlanta and Macon is the second most significant freight corridor in Georgia. It captures traffic between the Atlanta metropolitan region and Georgia's top trading partner, Florida. It also is used by trucks moving goods coming through the Port of Savannah to get to Atlanta and points further west and north. I-75 in Henry and Clayton Counties are fast growing freight centers and also drive a significant portion of the truck volume close in to the Atlanta region.
- The "western wall" of I-285 which runs between I-75 north and south of Atlanta is a critical truck link in the State as it connects the two highest truck volume corridors and also is used by large industrial stakeholders on the historically freight-intensive southwest side of the Atlanta area. The top 11 truck count locations in the State are either on I-75 or the "western wall."
- The I-85 corridor north of Atlanta is the third highest in terms of truck volumes. High truck volumes extend out from the Atlanta region to Gainesville. They do appear to decrease significantly prior to the South Carolina state line. This corridor is different from I-75 in that the demand is only served by four lanes of Interstate rather than six lanes, which is the minimum throughout I-75. This impacts both congestion and mobility on the I-85 corridor. I-85 north of Atlanta also does not have truck count data close to I-285, which will limit the ability to track truck activity on the corridor.
- There appear to be relatively high truck volumes on I-20 at Fulton Industrial Boulevard. However, overall the I-20 corridor and the I-85 south of Atlanta corridor have significantly less volumes than the other corridors that connect to the Atlanta region.
- The primary truck use for I-16 is to move goods from the Port of Savannah subarea to the rest of Georgia. Roughly 80 percent of the trucks surveyed on I-16 in Pembroke have both their origin and destination in Georgia. Truck volumes on this corridor will track closely to growth of Port traffic overall.

- I-95 is a key corridor to get goods into, and out of, the Port of Savannah. However, truck volumes on this corridor that come from the port are dwarfed by the large numbers of "through Georgia" truck traffic that dominate the corridor. Most of the trucks on I-95 have origins and destinations in Florida and the Carolinas with well over half of the trucks on I-95 being through truck trips servicing economies outside of Georgia.
- I-475 is a critical truck bypass route in Macon serving 10,000+ trucks per day.
- The Interstate network in Georgia is extensive enough to capture the majority of the State's intercity truck travel patterns. Georgia's state highways have relatively low truck volumes. None of the State's top 50 truck counts is off the Interstate system. Additionally, there are only 10 count locations on state highways with over 3,000 trucks per day.
- The truck ban on "through Atlanta" trucks for I-75, I-85, and I-20 inside I-285 appears to be successful with relatively low truck volumes at these locations relative to other portions of the Atlanta regional Interstate.

These are key findings related to truck destinations, <u>from a southeastern regional perspective</u>:

- Nearly two-thirds of the truck tonnage in Georgia was found to be either internal Georgia trips or through Georgia trips. The remaining one-third was found to be either inbound or outbound truck trips.
- Florida is Georgia's top trading partner in terms of truck flows. This is consistent with Florida being by far the largest economy in the Southeast U.S. and the fourth largest economy in the country. Florida's economy is roughly twice as large as Georgia – the second largest economy in the Southeast U.S. Florida also is the largest generator of "through" truck traffic seen in Georgia.
- South Carolina and North Carolina are the State's second and third top trading partners in terms of truck freight, respectively. South Carolina receives a significant fraction of Georgia truck traffic from both I-20 and I-85. North Carolina and South Carolina combined are responsible for over half of the goods that arrive in the State via I-85. According to its Statewide Interstate Corridor Plan for Fiscal Years 2008-2030, South Carolina currently has no financially constrained plans to widen I-85 from the current four lanes up to six where it connects to the Georgia border.[6] Alabama is the fourth largest trading partner for Georgia in terms of truck freight. As shown in the 2012 Alabama Statewide Transportation Improvement Plan for Cleburne County, I-20 where it connects to the Georgia border is currently being widened to six lanes from the current four.[7]

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[6] http://www.scdot.org/Multimodal/pdf/SC_MTP_Interstate_Plan_FINAL.pdf

[7] https://cpmsweb2.dot.state.al.us/TransPlan/STIP/ViewReport.aspx?Type=Highway&Division=04&County=15&IsDraft=False

- Tennessee serves as a pass-through State for Georgia's trucks. Over 45 percent of the trucks surveyed at Ringgold, had origination states that were north of Tennessee. Only 30 percent had Tennessee as an origination State. Similarly, at the Forsyth survey location, there were more than twice as many trucks from states north of Tennessee then there were trucks from Tennessee. This implies that improvements in Tennessee's Interstate system also will benefit Georgia truck traffic and Georgia's economy.
- The Atlanta metropolitan region is the primary regional generator of truck traffic in Georgia. The top 12 truck count locations are all in the Atlanta metropolitan region. Fulton County is the largest generator of combined inbound and outbound truck tonnage in the State based on TRANSEARCH data. The Atlanta region also is home to 8 of the top 9 counties in terms of the number of truck trip ends based on the GPS data provided by the American Transportation Research Institute.
- Chatham County is the largest county-level generator of outbound truck traffic and the second largest of inbound truck traffic. Savannah was by far the most commonly cited city as a truck trip end in the roadside truck surveys conducted in Georgia; it was mentioned nearly twice as much as the number two response, Atlanta.
- There are several smaller counties from a population perspective that have relatively large portions of truck tonnage based on the TRANSEARCH data. These include Tift County due to a combination of manufactured and food products, Coffee County due to nonmetallic minerals, Glynn County due to the Port of Brunswick, Floyd County due to nonmetallic minerals, Whitfield County due to textile mill products, and Washington County due to kaolin.

The following are key findings related to what is in the trucks:

- The origin-destination surveys indicate that on the long-haul corridors a large proportion of the trucks are carrying farm and food-related products. This total amount was over 20% in Chatham, Eulonia, and Valdosta and 12% in Augusta. Secondarily, transportation equipment, which includes cars and car parts, was found to be a significant commodity at most locations. The remaining goods were distributed across several different commodities. There were no other locations with more than 10% of any single commodity.
- The TRANSEARCH data estimates truck trips on all roads in the State. It shows a very different commodity distribution. The top three commodities in TRANSEARCH are nonmetallic minerals, secondary traffic, and clay/concrete/glass/stone. These three commodities tend to travel short distances and, therefore, would not be picked up at the roadside O-D survey locations. Across Georgia, food and farm products combined are estimated at 10%.

The following are key findings related to trends <u>over time</u>:

- The 2050 freight flow forecast estimates that truck tonnage will grow by 1.4 percent annually. This is modest relative to other freight flow forecasts.

- The 2050 freight flow forecast indicates a wide range of growth rates for specific commodities across the State. This shows that different industries in Georgia are predicted to grow at different rates over the long term.
- The forecast also predicts that inbound shipments are growing significantly faster than outbound and "through" shipments. This indicates the consumption portion of Georgia's economy will grow faster than the production portion, and average truck trip lengths will increase over time.
- The forecast also predicts that Florida will remain the top trading partner for Georgia with Alabama remaining the second largest trading partner.
- The GDOT statewide travel demand model predicts relatively modest gains in the number of trucks on key Georgia Interstates and state highway.

6.0 Needs and Issues – Bottlenecks

This chapter describes two types of freight-related bottlenecks in the state: bottleneck **segments** and bottleneck **hotspots**.

Section 6.1 describes *corridor-level* bottleneck segments throughout the entire system for a base- and future-year scenario, and describes how this is likely to impact truck travel. This analysis was conducted primarily utilizing the statewide travel demand model. Section 6.2 describes recent GPS-based *corridor-level* freight bottlenecks; this data allows for an understanding of the impact of system reliability on trucks. Section 6.3 shows *site-specific* "hot spot" bottleneck points identified in national studies that highlighted several locations in Georgia -- typically at/around major interchanges. Section 6.4 summarizes the key findings from this chapter.

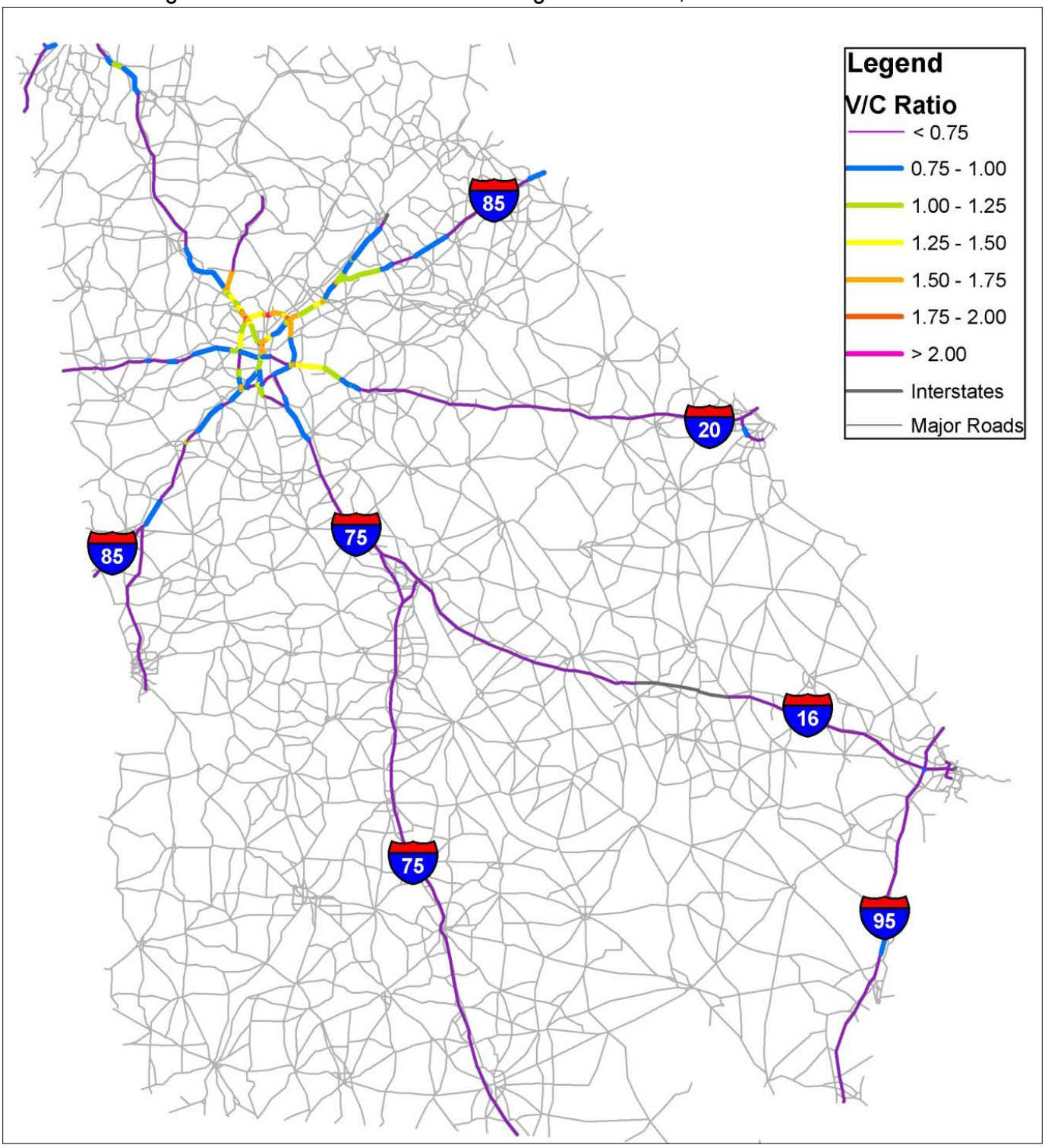
6.1 BOTTLENECK SEGMENTS: *CORRIDOR-LEVEL CONGESTION IN THE BASE- AND FUTURE-YEAR (PER GDOT STATEWIDE TRAVEL DEMAND MODEL)*

The Georgia statewide travel demand model estimates congestion using a Volume-to-Capacity ratio ("V/C") based on 24-hour volumes and 24-hour capacities. A road segment with a V/C ratio of one is operating at capacity. A V/C ratio above one indicates a road segment that is impacted by congestion, while a V/C ratio below one is operating below capacity. In this analysis, volumes include all vehicles on the roadway not just trucks. Capacity is the number of vehicles that can be handled on the roadway, which is primarily a supply-versus-demand function of the number of lanes. (NOTE: *This methodology does not identify operational or capacity deficiencies at interchanges*.)

Figure 6.1 shows the estimated V/C ratios on Georgia's interstate system in the base year of 2006. As expected, the highest V/C ratios are present in the Atlanta metropolitan region. I-285 has high V/C ratios on its entire alignment; I-75, I-85 and I-20 tend to have their highest levels of congestion near I-285, with congestion decreasing moving further away from Atlanta.

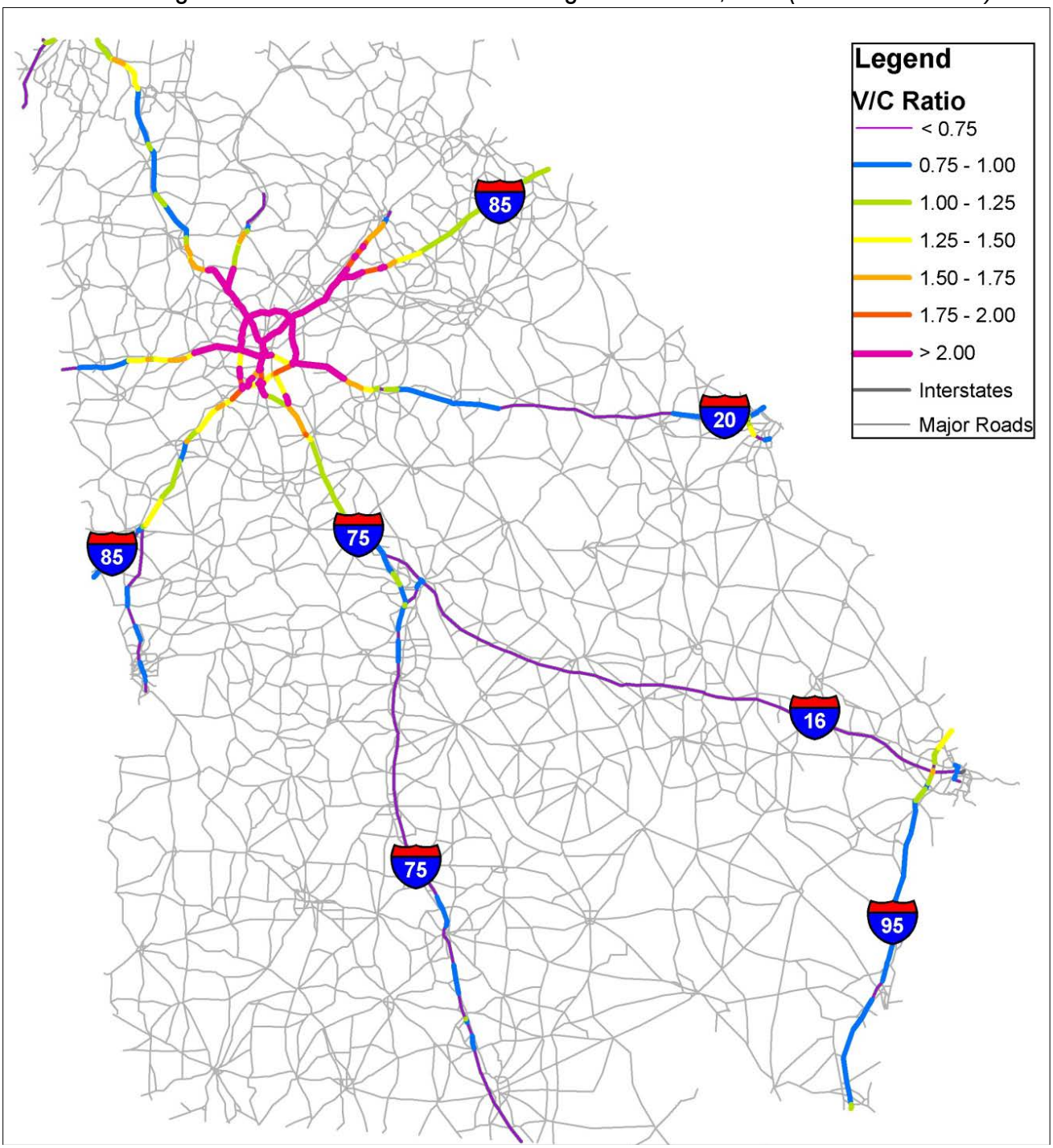
Of particular note is that I-85 north of Atlanta appears to have the longest stretch of congestion with a V/C ratio higher than one several miles north of the I-85 split with I-985. By comparison, the congestion on I-75 north of Atlanta drops to below one at the I-75 split with I-575. This indicates that I-85 may have congestion levels that continue further as one leaves the metro Atlanta area than I-75.

Figure 6-1 Model V/C Ratio for Georgia Interstates, *2006*



Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

Figure 6-2 Model V/C Ratio for Georgia Interstates, *2050 ("no-build" scenario)*



Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

Figure 6.2 shows the forecasted V/C ratios on Georgia's interstate system in the year 2050. It assumes the existing number of lanes and routes as today with future levels of traffic on them (it is a "what if" scenario to see how today's

routes/lanes would be able to handle future year traffic demands -- sometimes known as a "no build" scenario).

Atlanta remains the region with the highest levels of congestion. This figure allows us to draw the following general conclusions about future congestion levels on the State's key interstate corridors:

- I-85 north of Atlanta would appear to be the most congested corridor in Georgia by the year 2050. The V/C ratio is over 1.0 for its entire alignment.
- I-85 south of Atlanta would have a V/C ratio above 1.0 for a considerable amount of the corridor until the I-85 split with I-185.
- I-75 between Atlanta and Macon would have a V/C ratio above 1.0 until just north of Macon
- I-75 between Atlanta and Tennessee has high levels of congestion in the Atlanta metropolitan region and the Chattanooga region, but several locations below 1.0 in the rural areas.
- I-20 has limited congestion outside of the Atlanta metropolitan region
- I-95 has sufficient capacity, except for a few shorter segments in the Savannah metropolitan region
- I-16 will operate well below capacity into the long-term future.

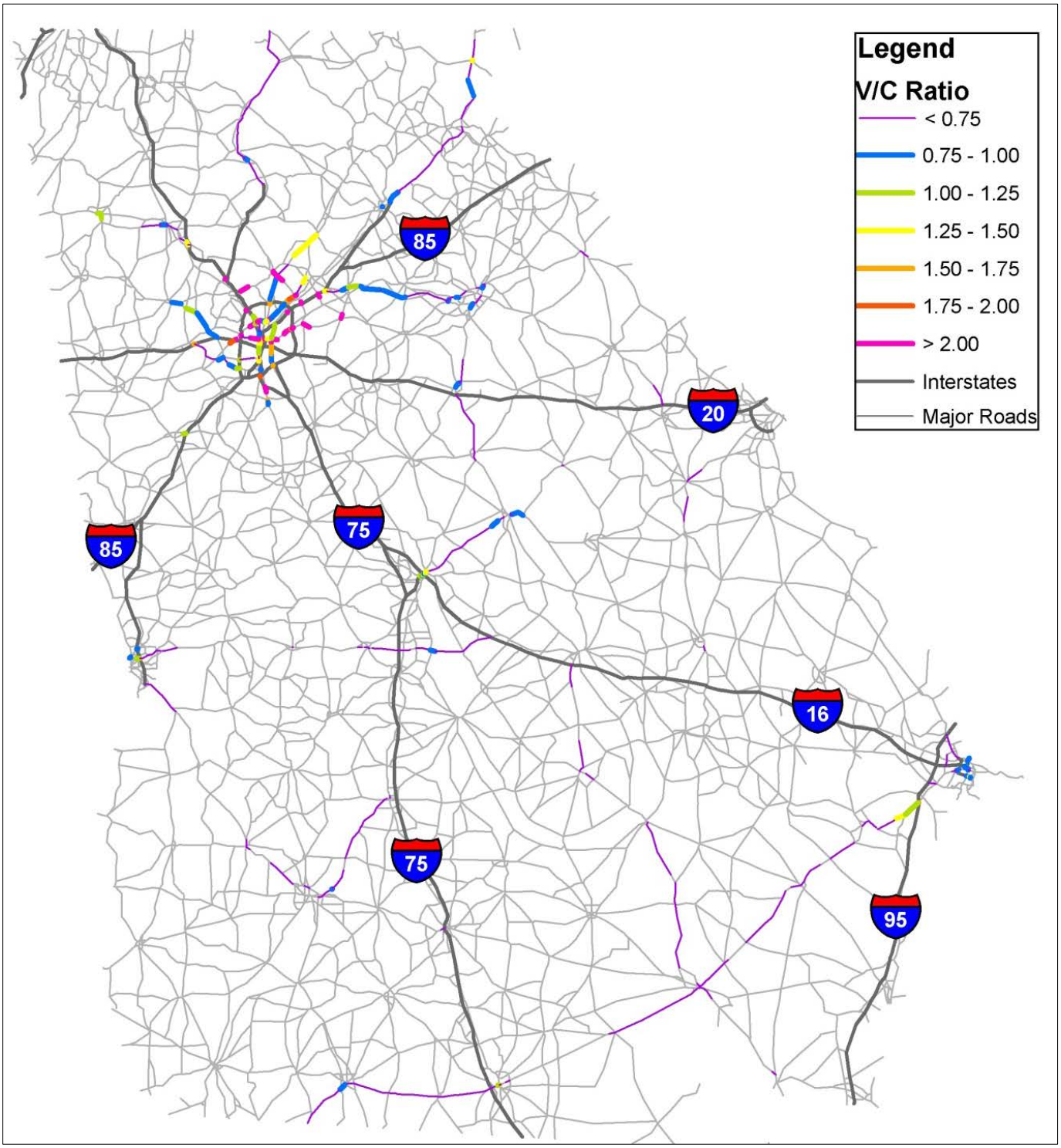
Generally, I-75 performs better than I-85 in terms of its ability to handle traffic demands in the future. This is largely due to the fact that I-75 is already a total of six lanes throughout the State, as opposed to I-85, which is a total four lanes at most rural locations.

Figures 6.3 and 6.4 show the V/C ratios on non-interstate segments with truck volumes greater than 1,000 per day. These figures indicate that the non-interstate road network in rural portions of the State generally has adequate capacity to handle truck and auto volumes well into the distant future, however Atlanta metro has the most non-interstate routes with high congestion levels. Secondarily, small congested segments are evident in other urban areas such as Albany, Athens, Macon, Savannah, Augusta, and Columbus.

(***Note****: Details about how interstate and non-interstate routes perform within MPO areas in the current and future years are handled through the MPO's ongoing planning process, respective regional travel demand modeling exercises, Long Range Transportation Plan updates, etc.; those seeking that detailed level of information should reference those documents.*)

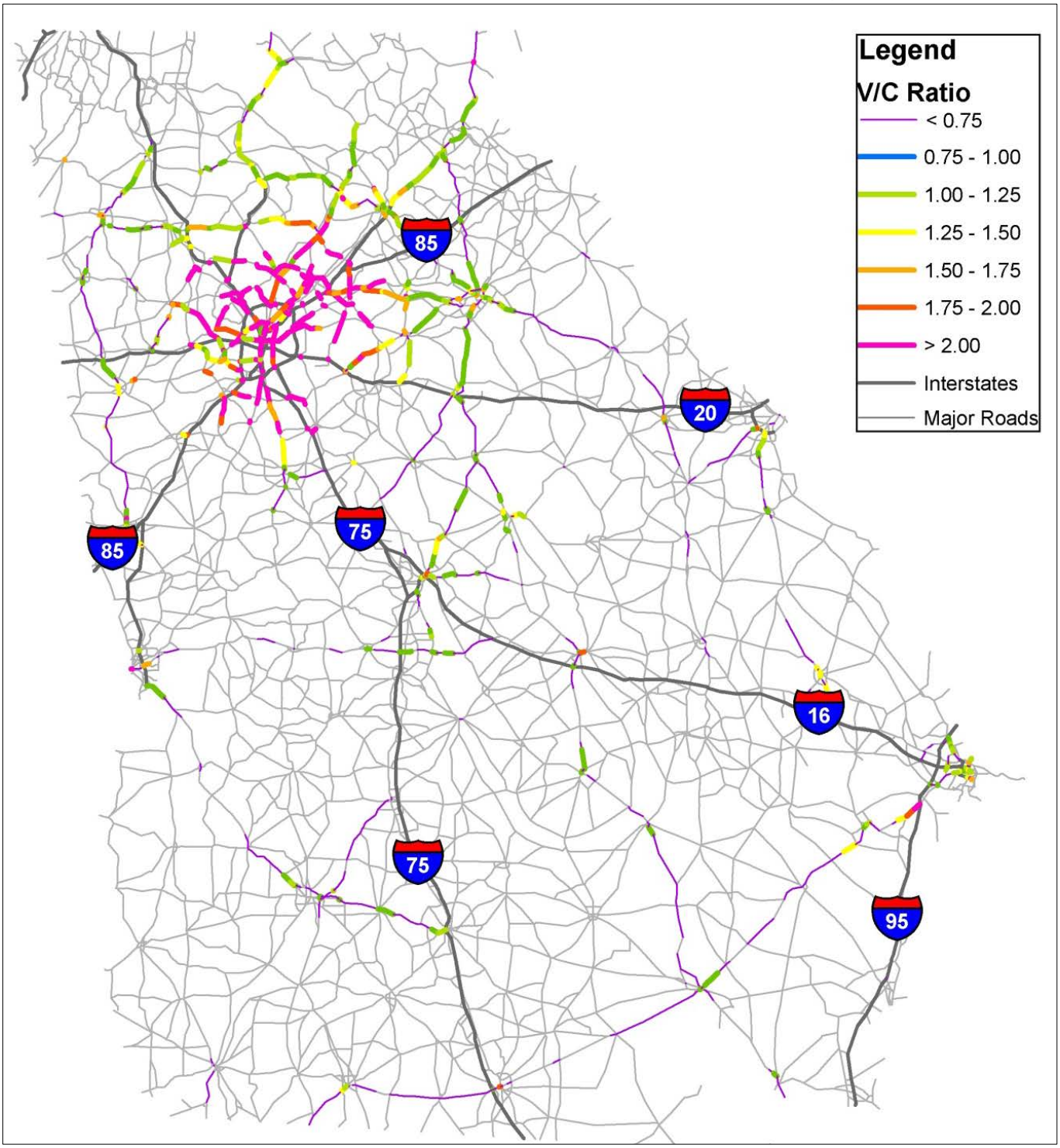
Figure 6.5 shows the change in truck AADT between the years 2006 and 2050, as forecasted by the GDOT statewide travel demand model. The model forecasts that truck volume growth will be the highest on a collection of interstates in the Atlanta metropolitan region. From the "long haul" corridor perspective, I-20 east of Atlanta and I-75 between Chattanooga and Macon also expect to experience high truck volume growth.

Figure 6-3 Model V/C Ratio for Non-Interstate Locations with Truck Volume Greater than 1,000: *2006*



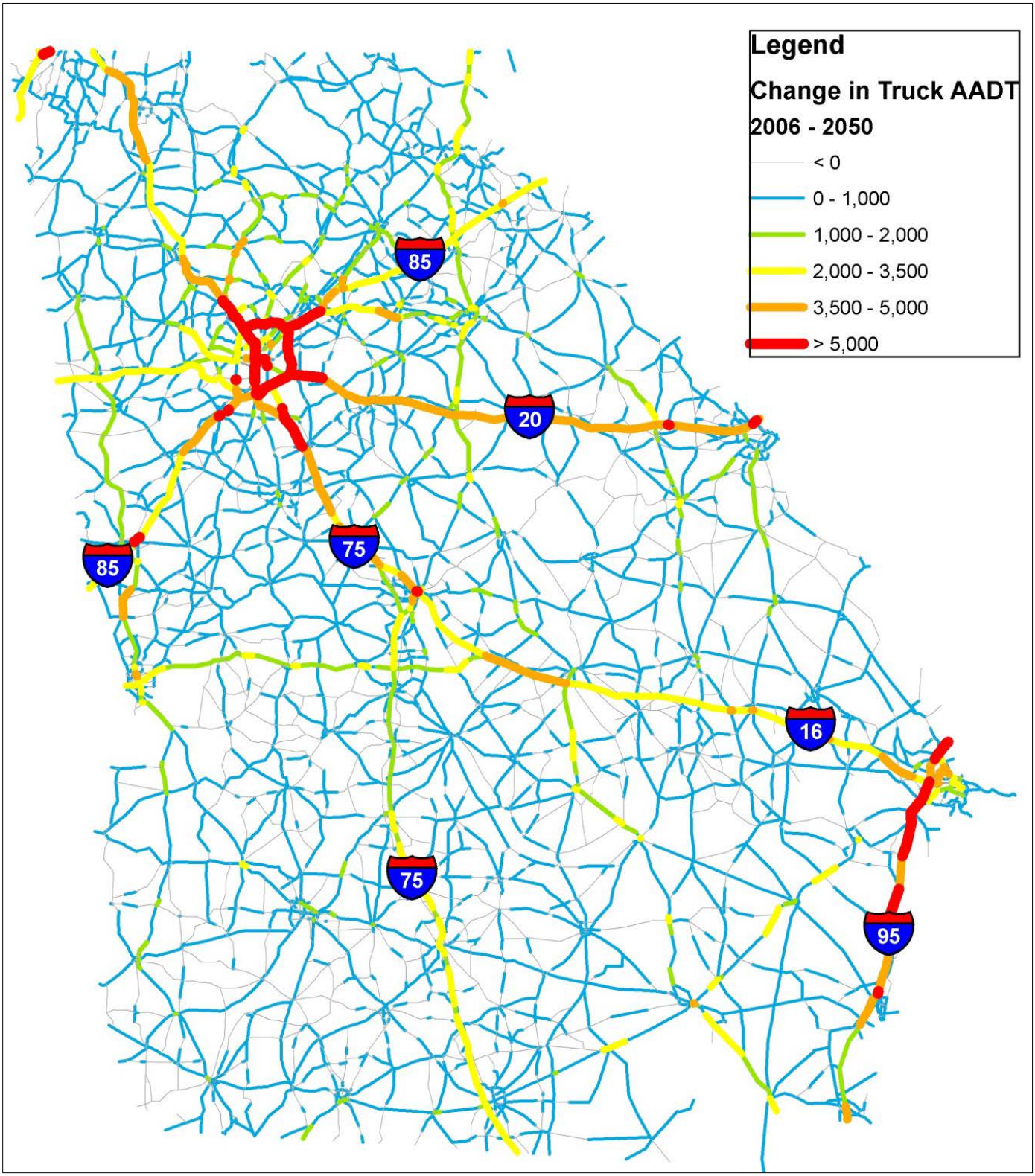
Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

Figure 6-4 Model V/C Ratio for Truck Volume Greater than 1,000 for Non-Interstate Locations, *2050 ("no build" scenario)*



Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

Figure 6-5 Change in Truck AADT *(between 2006 & 2050, "no build" scenario)*



Source: GDOT Statewide Travel Demand Model output (Jan. 2011 Model Version)

6.2 BOTTLENECK SEGMENTS:
CORRIDOR-LEVEL FOR THE CURRENT YEAR (PER ATRI GPS DATA)

FHWA/ATRI Freight Performance Measurement GPS data were utilized to gain an additional perspective on current corridor-level bottlenecks in Georgia. The analysis consisted on the following elements:

- A statewide analysis of truck speeds on the interstate system during four time periods;
- A corridor-level comparative analysis of the most congested interstate segments in the State; and
- A detailed analysis of each of the most congested corridors.

The GPS data were assembled over a 12-month period between October 1, 2009 and September 30, 2010. A detailed description of the data and the methodology used for analyzing the data are provided in Appendix B, which also includes all data and analysis for the entire state.

Statewide Truck Speed Analysis

The first set of analyses examines the annual average speeds for the entire State, as well as the Atlanta metro area. The analysis is conducted by showing average speeds for the entire State, and then showing directional speeds within the Atlanta metropolitan region. The analysis was conducted for the following four weekday time periods:

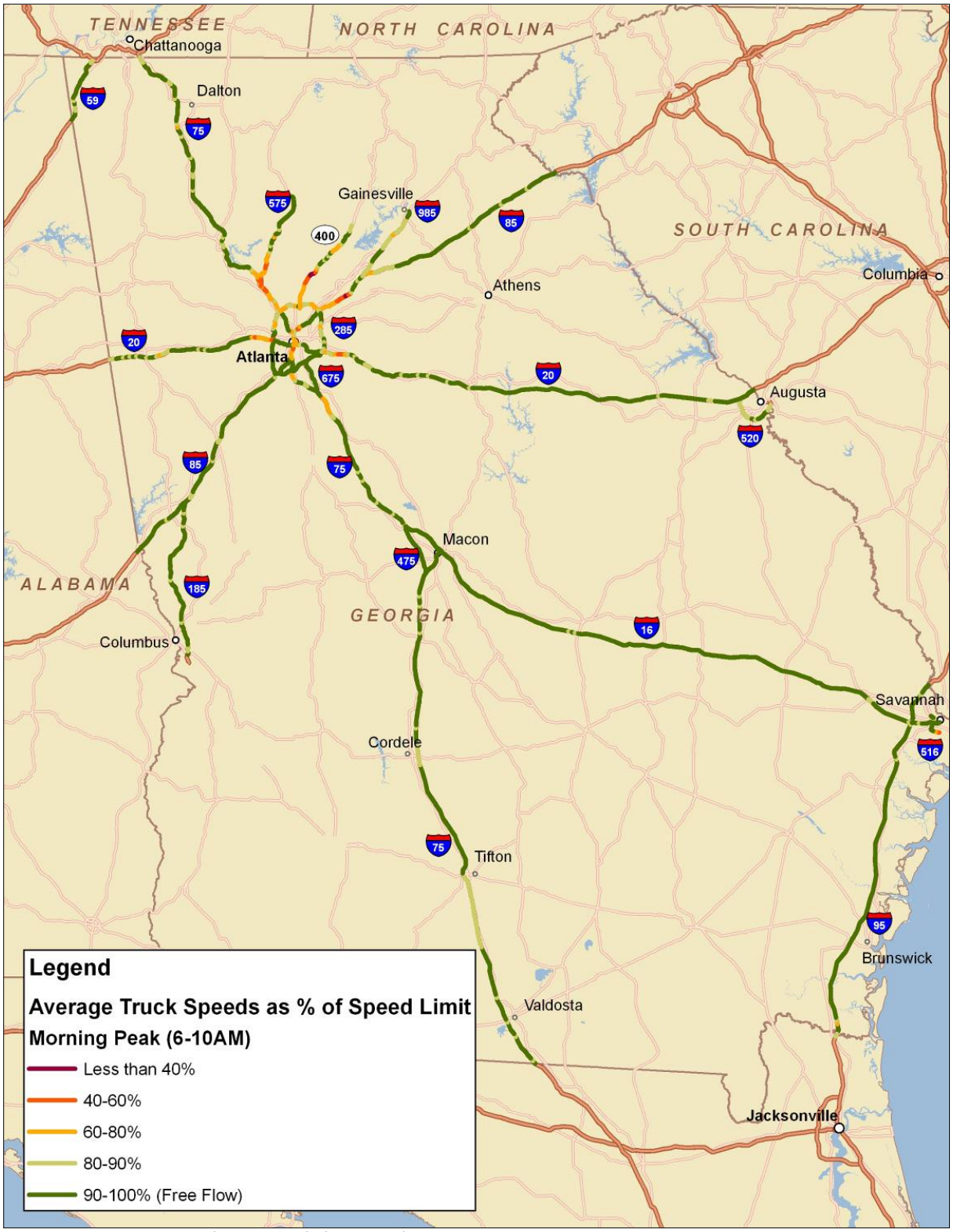
1. Morning Peak – 6:00 a.m. to 10:00 a.m. (Figures 6.6 and 6.7);
2. Mid-day – 10:00 a.m. to 3:00 p.m. (Figures 6.8 and 6.9);
3. Afternoon Peak – 3:00 p.m. to 7:00 p.m. (Figures 6.10 and 6.11); and
4. Off-Peak – 7:00 p.m. to 6:00 a.m. (Figures 6.12 – statewide only).

The data analysis shown in the figures reinforce many commonly held understandings about traffic in Georgia. Average speeds were very close to the speed limit throughout most of the State during all time periods. Overall, the system appears to be operating at a very high level. The exceptions to this general rule were the Atlanta metropolitan region which has several congested segments and a few sections on I-75 in south Georgia where there was ongoing construction throughout the data assembly time period.

Additionally, within the Atlanta metropolitan region, the lowest truck speeds were for trucks that were traveling in the direction of peak period traffic during the morning and afternoon time periods. There was little congestion during the mid-day period, except on the Downtown Connector (I-75/85) and a few interstate interchanges. It is also notable that the afternoon congestion is significantly worse than the morning congestion.

Figures 6.6 through 6.12 demonstrate that key truck corridors in the State are all significantly impacted by the urban congestion that is experienced in the Atlanta region. Therefore, efforts to decrease urbanized congestion in Atlanta will benefit the trucking industry and freight-related sectors of Georgia's economy.

Figure 6-6 Average Truck Speeds as a % of Speed Limit
Morning Peak (Data from 10/01/2009 - 9/30/2010)

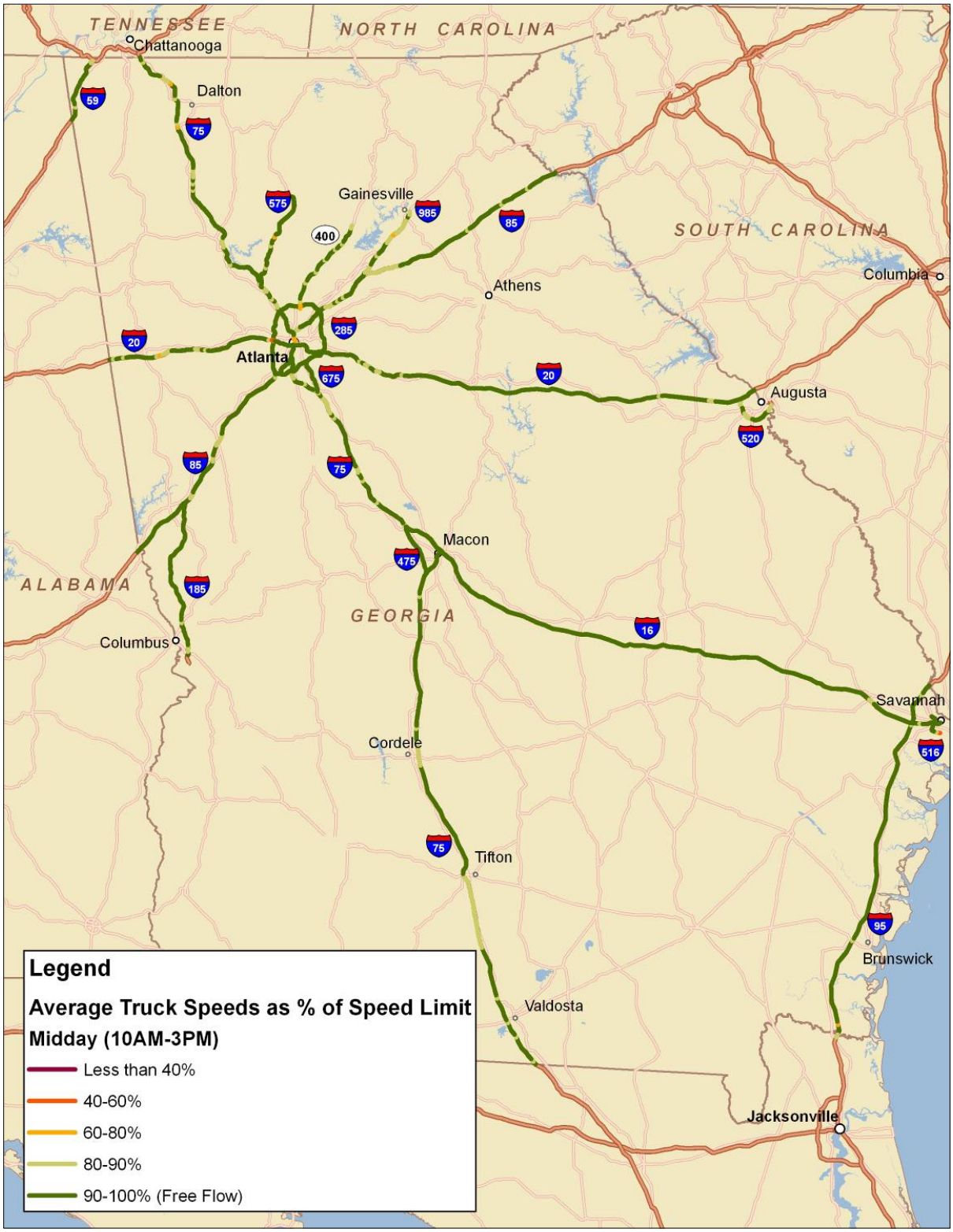


Source: Project team analysis & FHWA/ATRI FPM Data.

Figure 6-7 Metro Atlanta Average Truck Speeds as a Percent of Speed Limit
Morning Peak (Data from1 0/01/2009 - 9/30/2010)

Source: Project team analysis, FHWA/ATRI FPM Data.

Figure 6-8 Average Truck Speeds as a Percent of Speed Limit
Mid-day (Data from 10/01/2009 - 9/30/2010)

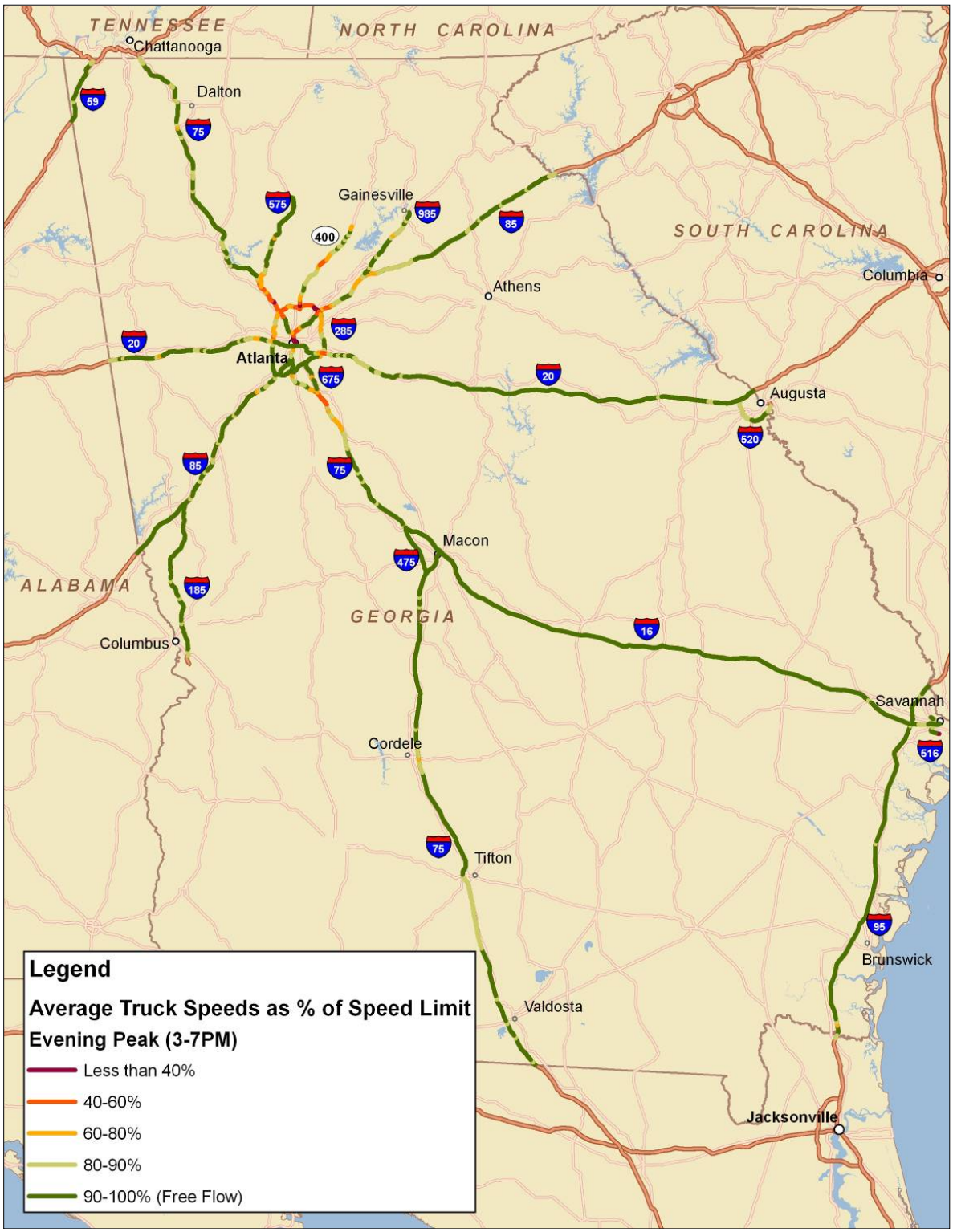


Source: Project team analysis, FHWA/ATRI FPM Data.

Figure 6-9 Metro Atlanta Average Truck Speeds as a Percent of Speed Limit
Mid-day (Data from 10/01/2009 - 9/30/2010)

Source: Project team analysis, FHWA/ATRI FPM Data.

Figure 6-10 Average Truck Speeds as a Percent of Speed Limit, *Afternoon Peak* (Data from 10/01/2009 - 9/30/2010)

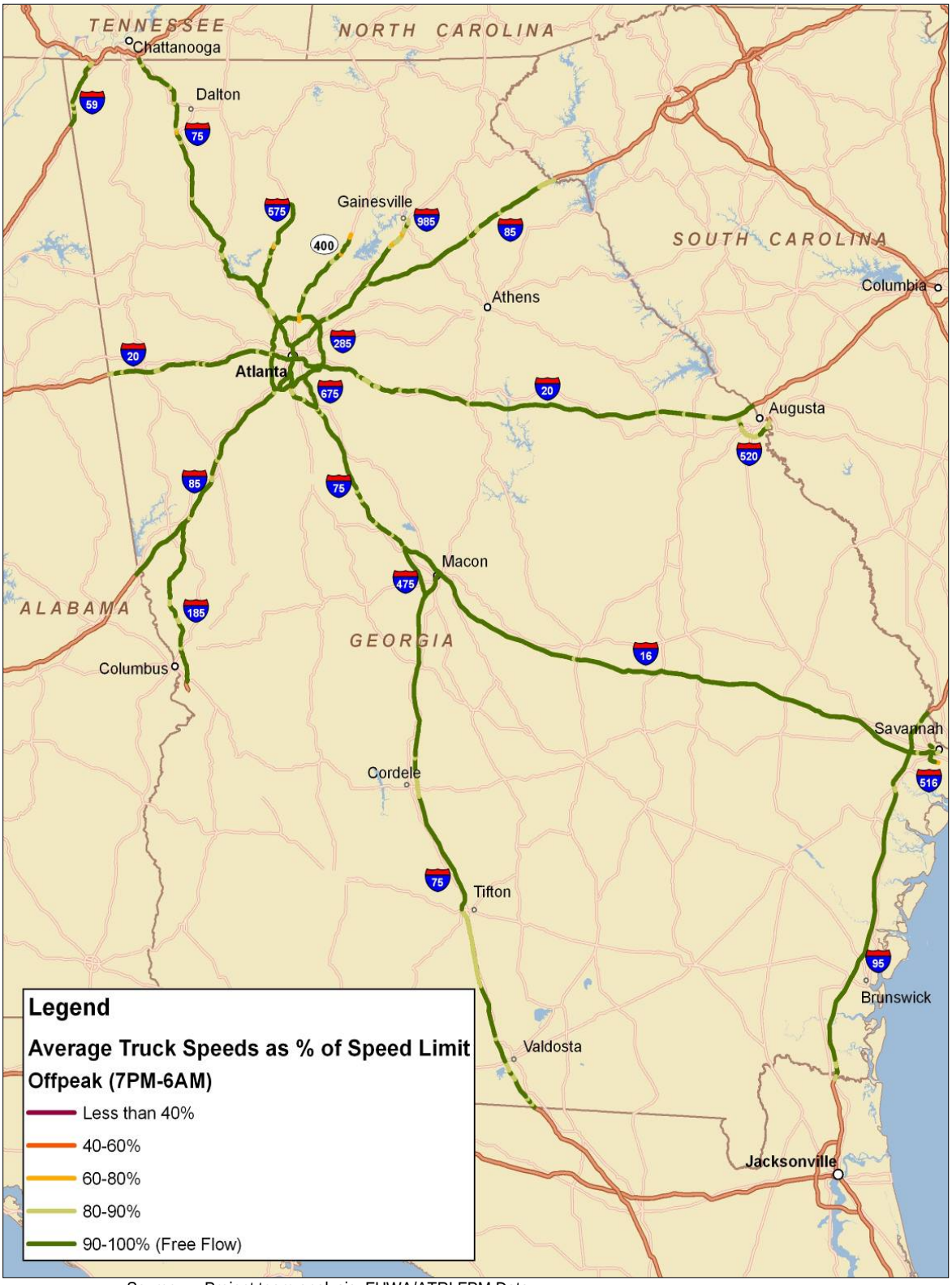


Source: Project team analysis, FHWA/ATRI FPM Data.

Figure 6-11 Metro Atlanta Average Truck Speeds as a Percent of Speed Limit
Afternoon Peak (Data from 10/01/2009 - 9/30/2010)

Source: Project team analysis, FHWA/ATRI FPM Data.

Figure 6-12 Average Truck Speeds as a Percent of Speed Limit
Off-Peak (Data from 10/01/2009 - 9/30/2010)



Source: Project team analysis, FHWA/ATRI FPM Data.

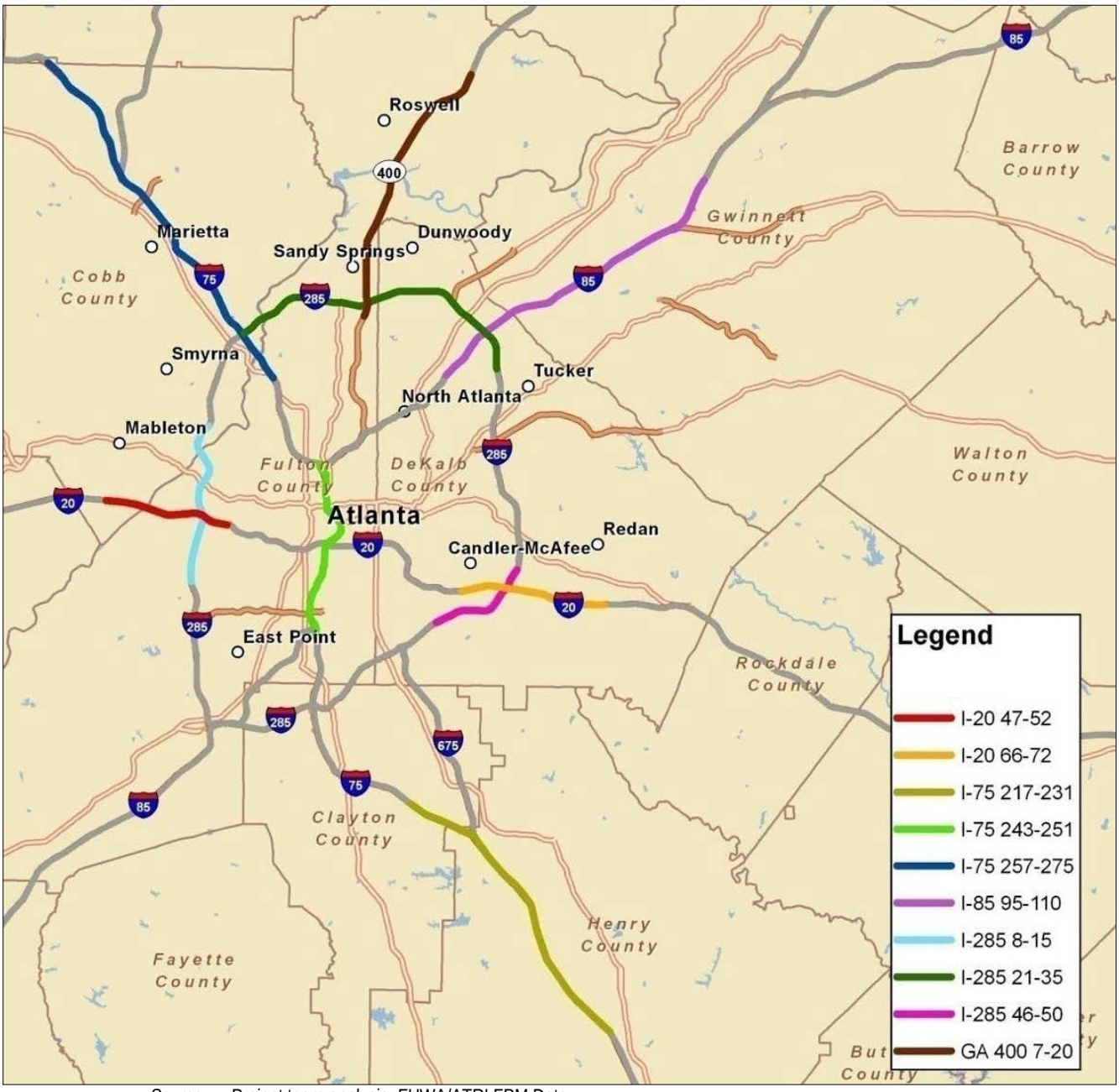
Comparison of Most Congested Corridors

Using the GPS data, the 10 most congested corridors were analyzed based on average speed data across the entire 24-hour time period. These corridors are shown in Figure 6.13. Comparing this figure to the top 50 truck locations provided in Table 5.1, it is evident that the top 12 highest truck volume locations are all on the most congested corridors in the State. This indicates that trucks exacerbate already congested conditions in the Atlanta metropolitan region. It also means that trucks are part of the vehicle population that is negatively impacted by congestion. This creates additional costs for the trucking industry and may contribute to the cost of shipping and doing business in metro Atlanta.

Table 6.1 shows average speeds for each of the 10 most congested corridors during each time period. It shows that all of the 10 most congested corridors have significant variation in speeds by time of day and direction. This indicates that it is commute traffic that is generating the majority of this congestion.

Table 6.2 shows the lowest travel speeds in the State by location and time period. It shows that I-75 has the most severe congestion in terms of average speeds. Three of the four most congested locations/times in the State are on I-75. Interestingly, the second most congested corridor is I-20 on the west side of I-285. This is also a heavily truck trafficked corridor connecting Fulton Industrial Boulevard to I-20 and to I-285 on the west side of metro Atlanta.

Figure 6-13 Map of Highway Bottleneck Segments, Metro Atlanta



Source: Project team analysis, FHWA/ATRI FPM Data.

Table 6.1 Summary for 10 Georgia Corridor Bottleneck Segments, By Direction

		Average Speed			
Corridor	Direction	AM Peak	Mid-day	PM Peak	Off-Peak
I-20: Milepoints 47-52	EB	38.2	52.6	54.6	58.7
I-20: Milepoints 47-52	WB	56.8	56.7	51.0	56.8
I-20: Milepoints 66-72	EB	59.5	58.2	39.9	56.9
I-20: Milepoints 66-72	WB	47.0	55.5	54.0	57.0
I-75: Milepoints 217-231	NB	55.9	59.5	55.0	61.7
I-75: Milepoints 217-231	SB	62.9	60.4	47.1	62.2
I-75: Milepoints 243-251	NB	40.1	52.5	39.7	55.7
I-75: Milepoints 243-251	SB	51.9	51.5	38.0	56.2
I-75: Milepoints 257-275	NB	61.7	60.2	39.3	60.1
I-75: Milepoints 257-275	SB	45.7	58.6	58.8	62.0
I-85: Milepoints 95-110	NB	60.6	59.9	48.3	60.4
I-85: Milepoints 95-110	SB	43.5	57.7	57.0	61.8
I-285: Milepoints 8-15	Inner Loop	54.5	58.9	55.7	59.5
I-285: Milepoints 8-15	Outer Loop	58.6	56.5	42.8	58.3
I-285: Milepoints 21-35	Inner Loop	50.9	56.6	37.0	57.5
I-285: Milepoints 21-35	Outer Loop	50.9	56.1	40.0	58.1
I-285: Milepoints 46-50	Inner Loop	60.5	60.5	58.0	61.6
I-285: Milepoints 46-50	Outer Loop	54.2	57.7	46.3	58.1
GA 400: Milepoints 7-20	NB	58.3	59.8	52.7	60.0
GA 400: Milepoints 7-20	SB	40.1	57.7	50.4	60.4

Source: Project team analysis, FHWA/ATRI FPM Data.

Table 6.2 Top 10 Congested Bottleneck Segments in Georgia

Rank	Corridor	Time Period	Direction	Average Speed
1	I-75: Milepoints 243-251	PM Peak	SB	38.0
2	I-20: Milepoints 47-52	AM Peak	EB	38.2
3	I-75: Milepoints 257-275	PM Peak	NB	39.3
4	I-75: Milepoints 243-251	PM Peak	NB	39.7
5	I-20: Milepoints 66-72	PM Peak	EB	39.9
6	I-285: Milepoints 21-35	PM Peak	Outer Loop	40.0
7	I-75: Milepoints 243-251	AM Peak	NB	40.1
8	GA 400: Milepoints 7-20	AM Peak	SB	40.1
9	I-285: Milepoints 8-15	PM Peak	Outer Loop	42.8
10	I-85: Milepoints 95-110	AM Peak	SB	43.5

Source: Project team analysis, FHWA/ATRI FPM Data.

Detailed Corridor Analysis – I-75 Example (north of Atlanta)

Each of the top 10 corridors was analyzed in detail to gain an understanding of the specific *existing* delay characteristics at each location. These analyses are contained in Appendix B of this document "Performance Measurement Analysis of Major Freight Corridors in Georgia".

For illustrative purposes, one corridor from Appendix B is discussed in the following pages -- the I-75 corridor between milepoints 257 and 275. The specific segment studied is shown in Figure 6.14 assume the current number of lanes & alignment as it exists today (i.e. does <u>not</u> reflect the proposed Northwest Corridor project.)

Figure 6-14 I-75: Milepoints 257 to 275

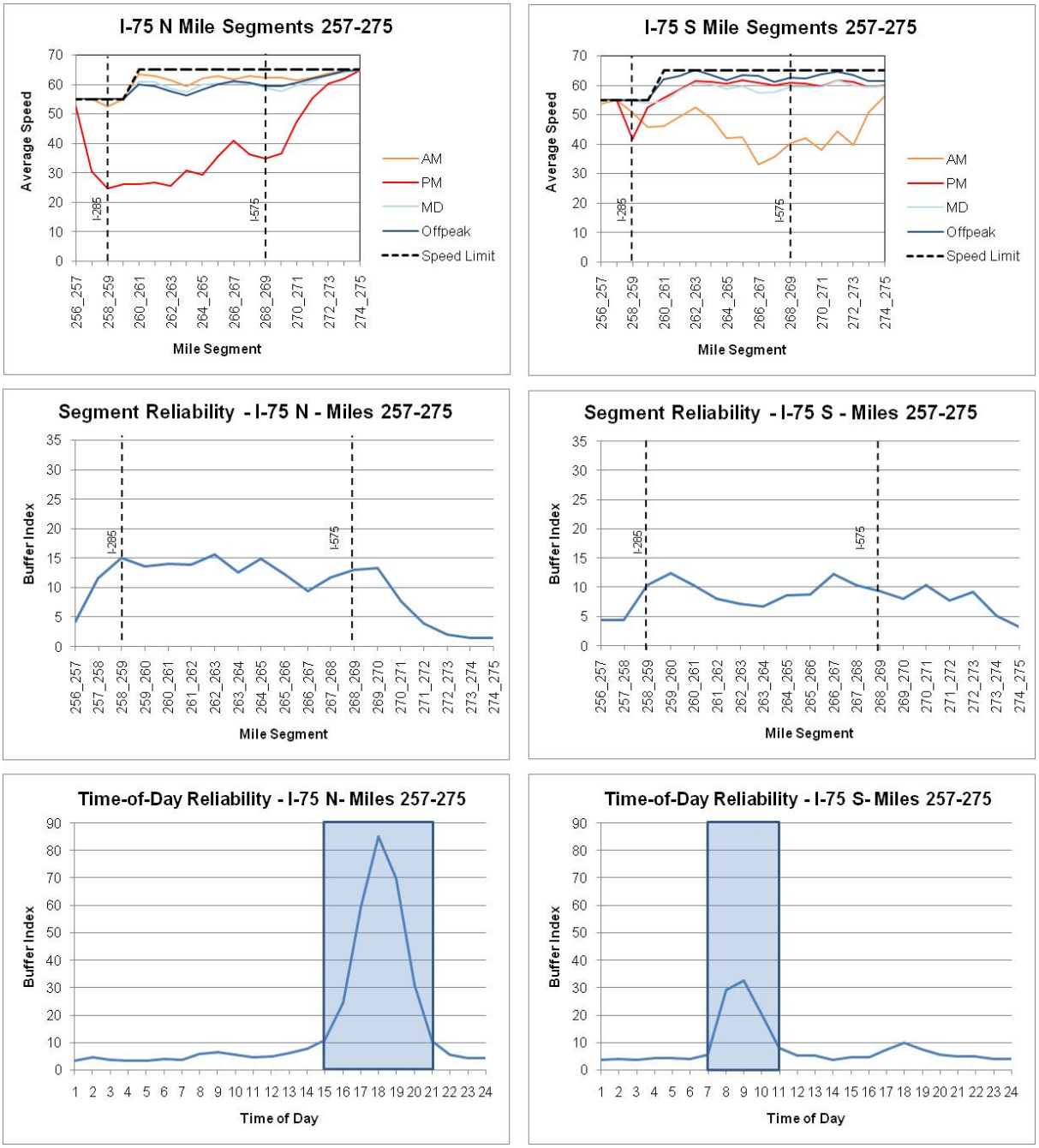
Source: Project team analysis, FHWA/ATRI FPM Data.

On the next page, figure 6.15 displays six graphs describing the delay characteristics at this location. The top left graph shows the average speed by time period over the 20-mile segment in the northbound direction. The top right graph shows the same information in the southbound direction.

In the northbound direction during the PM peak period, the speed is roughly 25 mph on the segment of I-75 intersecting I-285. The speed gradually increases to roughly 35 mph at I-75 and does not reach free-flow speeds until 6 miles north of I-575.

In the southbound direction during the AM peak period, the speed is slowest just south of I-575 with average speeds of roughly 35 mph slowly increasing to free-flow speeds inside of I-285.

Figure 6-15 I-75: Milepoints 257-275…Avg. Speed, Segment &Time-of-Day Reliability



Source: Project team analysis, FHWA/ATRI FPM Data.

The middle two graphs in Figure 6.15 show the buffer index in each direction. The buffer index is the percent of travel time that needs to be added to the free-flow trip time to be 95% confident that the traveler arrives on time. For I-75 northbound at I-285, the buffer index of 15 indicates that a truck driver would

need 15% more travel time relative to free-flow time to be 95% confident they could travel that one-mile segment.

The buffer index is more relevant to specific corridors over time. This is shown in the bottom two graphs in Figure 6.15. These bottom left graph shows that the buffer index peaks at 6:00 p.m. in the northbound direction with a buffer index of roughly 80. At that time, a truck driver would need to plan on a trip along this 20-mile corridor taking 36 minutes to give the driver a 95% probability of traveling the corridor on time. This translates to an extra 16 minutes of travel time that needs to be built into every trip on this corridor.

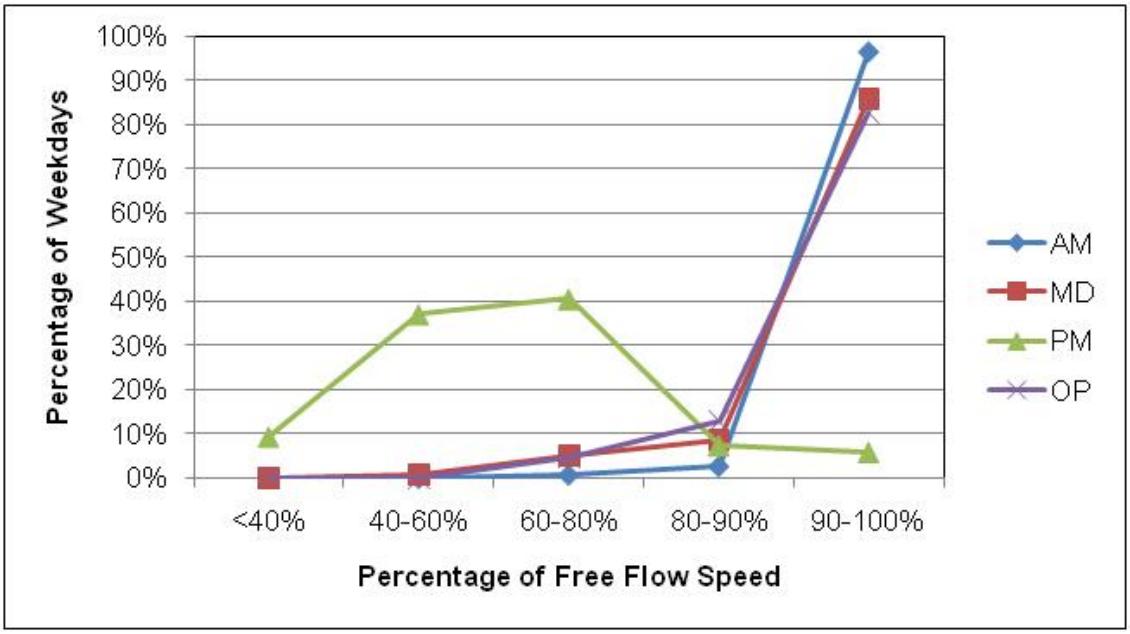
Similarly, in the southbound direction, the peak buffer index of 30 at roughly 9:00 a.m. indicates that a truck driver would need to build in additional 6 minutes of travel time to ensure being on time 95% of the time.

Figures 6.16 and 6.17 on the next page shows the distribution of truck speeds on this corridor in the northbound and southbound direction. The figure shows that in the northbound direction during the p.m. peak period, nearly 50% of trucks are traveling at less than one-half of the free-flow speed, and roughly 90% of the trucks are traveling at less than 50 mph.

In the southbound direction during the a.m. peak period, roughly 70% of trucks are traveling at less than 50 mph. These graphs also highlight the wide variability in potential travel times along the corridor.

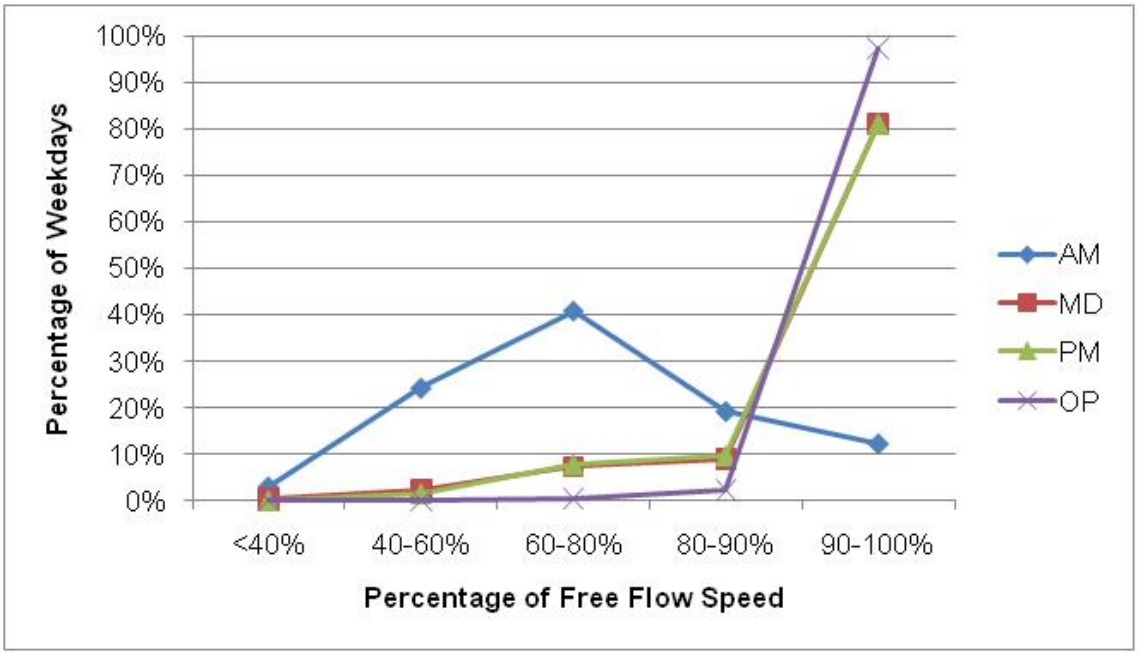
This variability complicates the truck routing and facility planning process for motor carriers. Most are forced to build in significant redundancies into their logistics systems to ensure that on-time delivery is possible for the products that they are moving.

Figure 6-16 Distribution of Average Speeds by Time Period: I-75 North of metro Atlanta between Milepoints 256-275



Source: FHWA/ATRI FPM Data, Project team analysis

Figure 6-17 Distribution of Average Speeds by Time Period: I-75 South of metro Atlanta between Milepoints 256-275



Source: FHWA/ATRI FPM Data, Project team analysis

TABLE 6.3 BOTTLENECK HOT-SPOTS IN GEORGIA

As shown in the table below, numerous national-level truck bottleneck studies have been completed over the past several years. Methodologies varied, as did the data source that was used. The results indicate several Georgia locations that are consistently mentioned. Most of these studies were led by ATRI (the American Transportation Research Institute, an affiliate of the American Trucking Association.)

A summary of Georgia locations cited in the studies is shown below; the lower the number means higher ranked in terms of more congestion, comparatively:

Georgia Location	FHWA study, 2005 Initial Assessment of 227 U.S. Freight Bottlenecks on Highways	FHWA study, 2008 Estimated Cost of Freight Involved in Highway Bottlenecks	ATRI study, 2009 Freight Performance Measures Analysis of 30 Freight Bottlenecks	ATRI study, 2009 Bottleneck Analysis of 100 Freight Significant Highway Locations	ATRI study 2010 Congestion Monitoring at 250 U.S. Freight Significant Highway Locations	ATRI study 2012 Congestion Monitoring at 125 U.S. Freight Significant Highway Locations	ATRI study 2013 Congestion Analysis of 100 U.S. Freight Significant Highway Locations	ATRI study 2014 Congestion Impact Analysis of Freight Significant Highway Locations	ATRI study 2015 Congestion Impact Analysis of Freight Significant Highway Locations
Atl., GA: I-285 @ I-85 (North metro)	2nd	3rd	4th	5th	9th	5th	14th	3rd	1st
Atl., GA: I-285 @ I-75 (North metro)	7th	18th	23rd	15th	20th	13th	24th	14th	12th
Atl., GA: I-285 @ I-20 (West metro)	11th	-	-	22nd	42nd	33rd	46th	25th	26th
Atl., GA: I-75 @ I-85 (North metro)	15th	12th	17th	62nd	-	96th	-	88th	81st
Atl., GA: I-20 @ Fulton Industrial Blvd.	21st	-	-	-	-	-	-	-	-
Atl., GA: I-285 @ SR 400 (southbound 400)	95th	-	-	-	-	-	-	-	-
Atl., GA: I-285 @ SR 400 (northbound 400)	206th	-	-	-	-	-	-	-	-
Atl., GA: I-285 @ I-20 (East metro)	-	32nd	-	37th	58th	32nd	64th	23rd	52nd
Atl., GA: I-20 @ I-75/85 (Downtown)	-	4th	11th	57th	79th	68th	-	61st	65th
Atl., GA: I-75 @ I-675	-	-	-	66th	105th	101st	-	95th	86th
Macon, GA: I-75 @ I-16	-	-	-	-	180th	-	-	-	-
Savannah, GA: I-95 @ I-16	-	-	-	-	194th	-	-	-	-
Macon, GA: I-75 @ I-475 (South of city)	-	-	-	-	198th	-	-	-	-

6.3 KEY FINDINGS ON TRUCK BOTTLENECKS

Key findings regarding bottleneck *segments* include:

- Not too surprisingly, the highest V/C ratios in Georgia are in metro Atlanta. I-285 has high V/C ratios on its entire alignment. I-75, I-85, I-20, and State Route 400 tend to have their highest levels of congestion around interchanges at I-285, with congestion decreasing moving further away from Atlanta.
- I-85 north of Atlanta is the most routinely congested corridor in the state. It has the longest stretch of congestion with a year 2006 V/C ratio higher than 1.0 several miles north of the I-85 interchange with I-985. With no improvements, by the year 2050 I-85 is forecast to have a V/C ratio 1.0+ from Atlanta to South Carolina.
- I-75 is the 2nd most congested corridor in the State. It has several segments of congestion between Macon and Chattanooga in 2006; ATRI's GPS analysis indicated that three of the four more severely congested interstate segments are along I-75.
  - With no improvements, by the year 2050 the vast majority of the interstate between Atlanta and Macon will have a V/C greater than 1.0.
  - I-75 north of Atlanta performs better than I-85 north of Atlanta along rural stretches of the State (I-75 has a minimum of six lanes throughout Georgia, as opposed to I-85 which has a total of four lanes at most rural locations.)
- I-20 has limited regularly-occurring congestion outside of the Atlanta metropolitan region, both today and forecast out to the year 2050.
- I-95 and I-16 are forecast to operate at acceptable travel conditions (volume well below capacity) through the year 2050, except for localized segments in the Savannah metropolitan region.
- Compared to interstates, the rural non-interstate road network is forecast to have adequate capacity to handle truck and auto traffic by the year 2050.

The key findings regarding bottleneck *hotspots* include:

- Various national studies indicate a significant variability of the ranking of Georgia's hotspot locations.
  - A comprehensive national research project being conducted by the Transportation Board (NCHRP project 08-98) is underway to develop a consistent methodology for analyzing and classifying hotspot bottlenecks. Deliverables will include release of a guide regarding the identifying, classifying, evaluating, and mitigating truck freight bottlenecks.

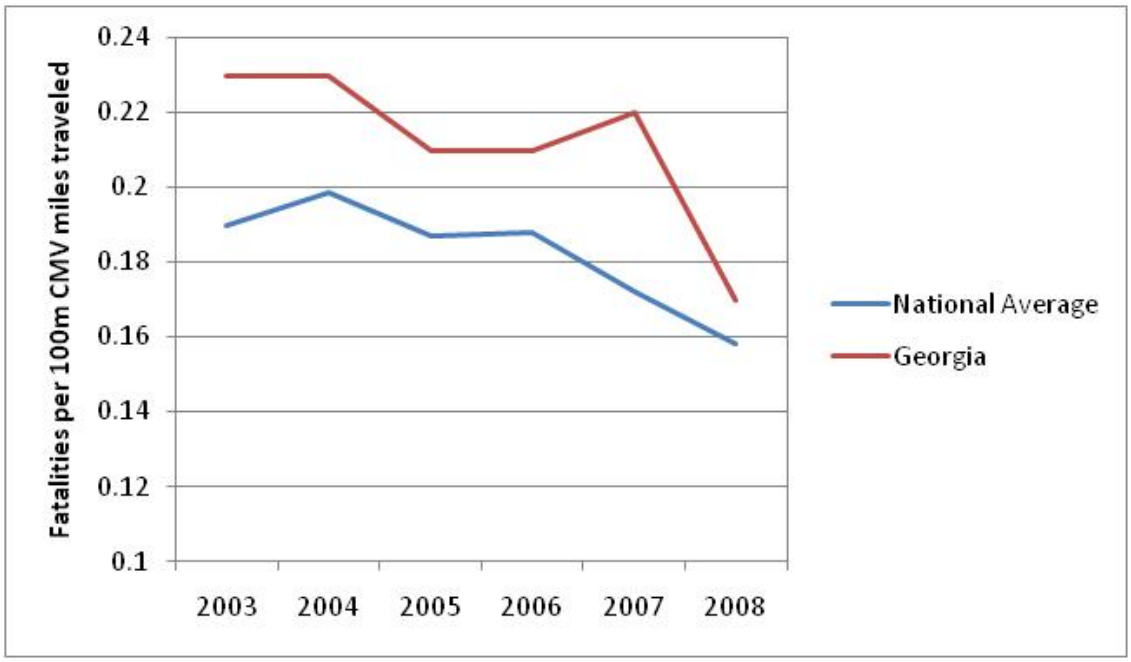
- Note: The Task 5 recommendations report repeats Georgia's bottleneck hotspots in Table 6.3, but includes information on recently-completed GDOT projects and/or projects under development to improve traffic flow.

7.0 Needs and Issues – Safety

Truck safety is an issue for both truck drivers and other users of the roadway. In 2008, nearly 4,229 people in the United States died in motor vehicle crashes involving large trucks (defined as vehicles with gross vehicle weight greater than 10,000 pounds). This was 11 percent of all traffic-related fatalities.[8] Eighty-five percent of the occupants killed in these crashes were occupants of another vehicle. The same year, 90,000 people were injured in truck-related crashes.

Crashes involving trucks in the state show similar trends. In 2008, 180 people died in truck-involved crashes in Georgia and 3,800 people were injured.[9] In 2008, Georgia ranked 22nd in truck involved fatality rates (0.17 fatalities per 100m CMV miles traveled). That year, the national average was 0.16 fatalities per 100m CMV miles traveled with a high of 0.33 and a low of 0.02. Georgia's fatality rate for truck- involved crashes is slightly above the national average from 2003 to 2008, as shown in Figure 7.1.

Figure 7-1 Georgia and National Average Fatality Rates Compared



Source: Data from U.S. DOT/FHWA, Highway Statistics (annual series), FARS through FMCSA.

[8] Year 2008 Large Truck Crash Overview, U.S. DOT Federal Motor Carrier Safety Administration, Publication No. FMCSA-RRA-10-004, March 2010.

[9] Fatality Analysis Reporting System (FARS) 2008 Final.

Truck safety is a particular concern in any region with high levels of truck and auto activity. Particularly, the mixing of truck and auto traffic has unique safety characteristics, which must be considered. This chapter begins with a description of crash data available in Georgia and explores truck safety in Georgia in detail through the following sections and topics:

- **Section 7.2, Comparison of Truck versus Auto-Involved Crashes –** This subsection compares the truck versus auto-involved crashes at the statewide level, MPO level, and corridor level.
- **Section 7.3, Truck-Involved Crash Characteristics –** This subsection analyzes some of the general characteristics of truck-involved crashes in Georgia, including crash type, severity, number of vehicles involved, and reported causation factors.
- **Section 7.4, Locations with the Highest Number of Truck-Involved Crashes –** This subsection zooms in on specific high-crash locations and identifies these locations by number of truck-involved crashes. Location-specific information for the top three crash areas also is examined.
- **Section 7.5, Locations with the Highest Number of Fatal Truck-Involved Crashes** - This subsection zooms in on specific high-crash locations and identifies these locations by number of truck-involved crashes. Location-specific information for the top three crash areas also is examined.
- **Section 7.6, Locations with the Highest Number of Severe Injury and Fatal Crashes** - This subsection zooms in on specific high-crash locations and identifies these locations by number of truck-involved crashes. Location-specific information for the top three crash areas also is examined.
- **Section 7.7, Law Enforcement Crash Response Experience –** This subsection summarizes interviews with on-the-ground law enforcement personnel to better understand crash characteristics in Georgia.
- **Section 7.8, Existing GDOT and National Truck Safety Programs –** This subsection reviews recent progress in addressing truck safety nationally and Georgia.
- **Section 7.9, Key Findings and Needs Related to Truck Safety –** This subsection summarizes the key safety findings from this section and draws truck safety needs concluded from this section.

7.1 DATA AND METHODOLOGY

To compare truck-involved and auto-involved crashes and identify the locations with the greatest number of truck-involved crashes, the Georgia Statewide Crash

Database was analyzed for the years between 2005 and 2008.[10] For this four-year period, truck and auto vehicle-miles traveled (VMT) is summarized from the Georgia statewide traffic model.

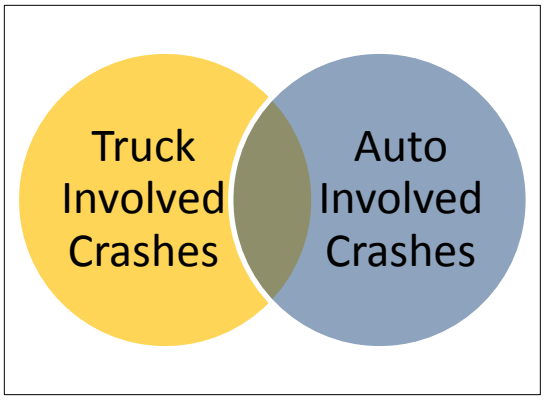
There are three basic components of the crash rate analysis: 1) number of crashes, 2) VMT, and 3) crash rates. These are each described in the sections below.

Number of Crashes

A truck-involved crash is defined as a crash with at least one truck involved. The Georgia Statewide Crash Database classifies vehicles in crashes into 22 types. The "truck tractor (bobtail)," "tractor/trailer," "tractor with twin trailers," "logging truck," "logging tractor/trailer," and "single unit truck" are regarded as trucks. An auto-involved crash is defined as crashes involving at least one auto vehicle, including "passenger car," "pickup truck," "van," and "motorcycle, scooter, or minibike."

It should be noted that this methodology involves double-counting of some crashes since crashes that involved both a truck and an auto are included in both categories as illustrated in Figure 7.2. This methodology allows a comparison of truck-involved crashes relative to all motor vehicle crashes.

Figure 7-2 Cross Section of Truck- and Auto-Involved Crashes



The number of truck- and auto-involved crashes is described by four categories: all crashes, severe injury crashes, injury crashes, and fatal crashes. A severe injury crash is defined as a crash having one or more occupants severely injured but no occupants fatally wounded. Injury crashes are defined as all crashes involving any type of injury excluding fatalities. Severe injury crashes are included in the injured crashes category. A fatal crash is defined as a crash having one or more occupants fatally wounded.

[10] *Note on Data Accuracy*: The locations for selected crashes, especially those along I-285 and I-85 (Southside) are modified by the project team. This is because the original locations in the database were based on XY coordinates, which was found to have significant discrepancies with other locational information, such as route name and mile post numbers. The error is believed to be generated from automated accident recording procedures employed by GDOT that relied on approximate cross street information to generate accident locations that did not take into considerations the changes in GIS route systems when doing automated assignments. The corrected data was verified and validated to be reasonable.

Vehicle-Miles Traveled (VMT)

Truck VMT was derived from the Georgia Statewide Travel Demand Model. The model network contains the annual average daily VMT and percentage of trucks in the traffic mix in 2006 for major roadways. The truck VMT for each model link was estimated by multiplying the VMT by the truck percentage and 365 days to convert annual average daily VMT. The 2006 statewide truck VMT was derived by summing the truck VMT for all the model links. The truck VMT for other years (2005, 2007, and 2008) were adjusted based on the 2006 truck VMT by applying an expansion factor[11] of the statewide VMT. Auto VMT was derived by subtracting truck VMT from total VMT.

Crash Rates

Using the latest data available at the time this report was first developed, truck-involved crash rates were calculated by dividing the number of truck-involved crashes by the truck VMT in millions. The same methodology used to calculate truck-involved crash rates was applied to calculate the auto-involved crash rates.

7.2 LOCATION OF HIGHEST NUMBER OF TRUCK-INVOLVED CRASHES

This section focuses on specific high-crash locations by number of truck-involved crashes and describes specific characteristics for the top crash locations for each injury category. The years of the data analyzed were the most recent available at the time the report was developed.

Top Locations by Number of Crashes

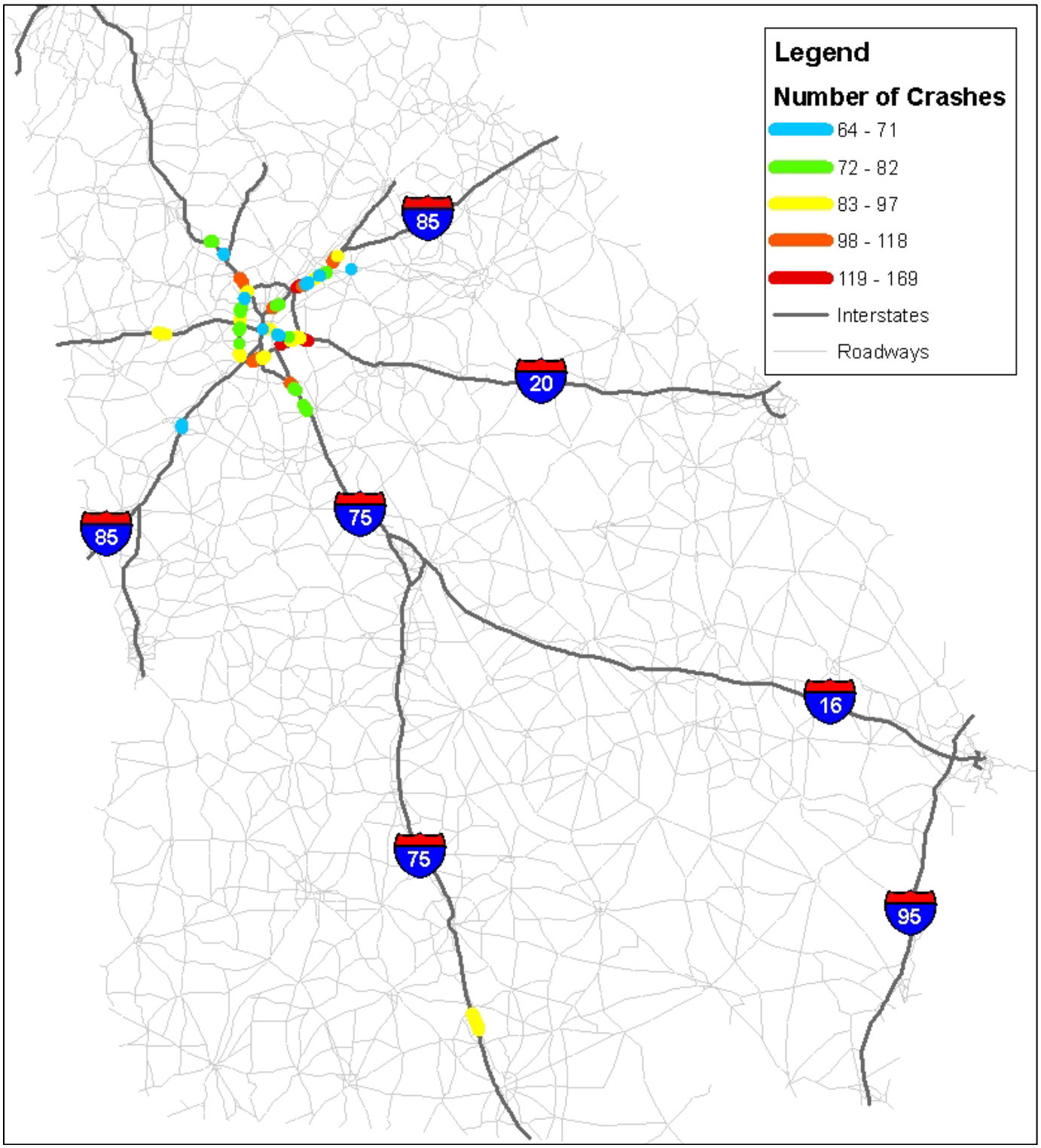
Figures 7.6 and 7.7 show maps of the top 50 high truck-involved crash locations (by total number of truck-involved crashes). Table 7.13 lists the top 50 locations, which amounted to 4,591 truck-involved crashes.

The majority of the top truck-involved crash locations are concentrated in the Atlanta region, correlated with high truck traffic volumes; most are close to egress/ingress points of urban interstate corridors. Portions of I-285 and I-85 appear to have the highest number of crashes. Based on the absolute number of crashes (not averages) the three highest truck-involved crash locations are:

1. I-285 eastbound between Clifton Springs Road and Panthersville Road (169 crashes).
2. I-20 East metro Atlanta between Miller Road and Wesley Chapel Road (168 crashes).
3. I-85 North metro Atlanta between I-285 and Jimmy Carter Boulevard merge (160 crashes).

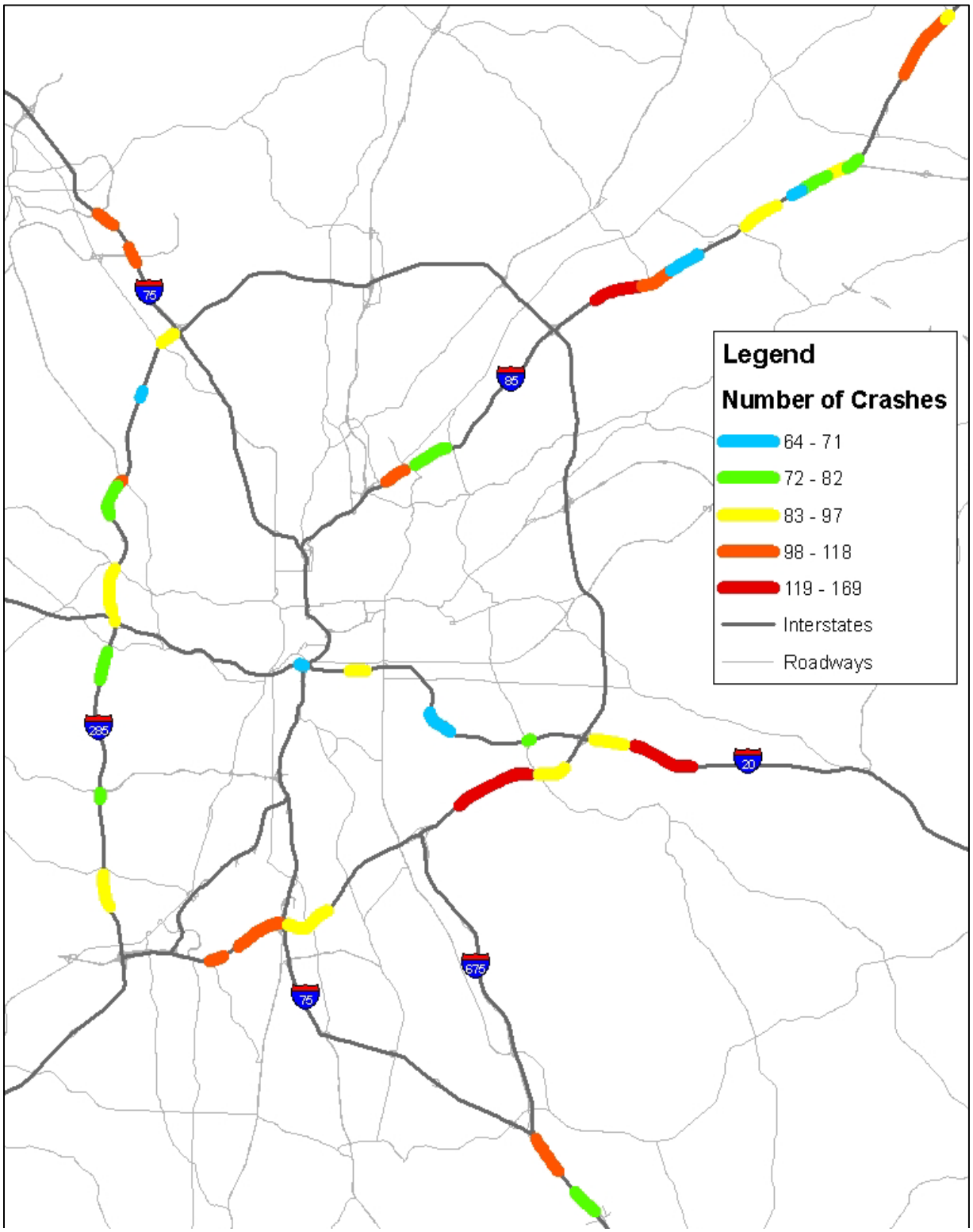
[11] Expansion Factor Source: GDOT Office of Transportation Data's *Annual Average Daily Traffic Report* (2005 to 2008).

Figure 7-3 Top 50 High Truck-Involved Crash Locations, by Number of Crashes, *2005 to 2008*



Source: GDOT Crash Database.

Figure 7-4 Top 50 High Truck-Involved Crash Locations, by Number of Crashes in Atlanta, *2005 to 2008*



Source: GDOT Crash Database.

Table 7.1 Top 50 High Truck-Involved Crash Locations, by Number of Crashes

Rank	Road Name	Start Point	End Point	Crashes	Length
1	I-285 EB	Clifton Springs Road	Panthersville Road	169	1.39
2	I-20 WB OTP	Miller Road	Wesley Chapel Road	168	1.96
3	I-85 NB OTP	I-285	Jimmy Carter Boulevard merge	160	1.51
4	I-285 NB	Bouldercrest Road merge	Clifton Springs Road	143	1.04
5	I-285 WB	Exit to Riverdale Rd	Ramp from Riverdale Rd NB	118	0.46
6	I-85 NB OTP	Jimmy Carter Boulevard merge	Center Way	117	0.64
7	I-285 EB	I-75SB	Sullivan Rd	117	1.52
8	I-85 SB ITP	N Druid Hills Road NE merge	Ramp to Lenox Road NE	112	0.69
9	I-285 NB	S Cobb Drive SE ramp	S Cobb Drive SE	107	0.22
10	I-85 NB OTP	Ramp to Jimmy Carter Boulevard	Jimmy Carter Boulevard	107	0.29
11	I-85 NB OTP	Old Peachtree Rd merge	Exit to Lawrenceville Suwanee Rd	107	2.09
12	I-75 NB OTP	Ramp to Delk Road EB	Delk Road WB merge	106	0.50
13	I-75 NB OTP	Walt Stephens Road	Ramp to I-575	103	1.17
14	I-75 NB OTP	Ramp to S Marietta Parkway SE	S Marietta Parkway SE	100	0.61
15	I-285 NB	Collier Dr NW	Exit to Bankhead Highway NW	97	1.12
16	I-85 NB OTP	Beaver Ruin Road merge	Ramp to Steve Reynolds Boulevard	97	1.15
17	I-285 NB OTP	Exit to Bankhead Highway	Bankhead Highway	95	0.24
18	I-85 NB OTP	Old Norcross Road	Lawrenceville Bypass	95	0.68
19	I-20 WB OTP	Wesley Chapel Road merge	Ramp to I-285	94	0.93
20	I-20 WB OTP	Post Road merge	Tyson Road	91	2.44
21	I-285 EB	Flat Shoals Parkway	Flat Shoals Parkway merge	89	0.20
22	I-20 WB ITP	Chester Avenue SE	Berean Avenue SE	88	0.49
23	I-75 NB OTP	Coffee Road merge	Ramp to Old Quitman Road	88	4.75
24	I-285 NB	I-20 EB merge	I-20 EB	86	0.06
25	I-285 NB	Washington Road merge	Exit to Camp Creek Parkway	86	0.98
26	I-85 NB OTP	Ramp to Lawrenceville Suwanee Road	Lawrenceville Suwanee Road	85	0.19
27	I-285 WB	Conley Road	I-75 NB	85	1.44
28	I-285 NB	Cobb Parkway	I-75 SB	84	0.46
29	I-285 NB	Flat Shoals Parkway	Columbia Drive	84	0.66
30	I-20 WB ITP	Exit to Candler Road	Candler Road	82	0.13
31	I-75 NB OTP	Eagles Landing Parkway merge	Flippen Road	78	0.90
32	I-85 NB OTP	Lawrenceville Bypass	Boggs Road	77	0.47
33	I-85 NB OTP	Pleasant Hill Road merge	Old Norcross Road	77	0.87
34	I-75 NB OTP	Hampton Road merge	Mount Carmel Road	77	1.83
35	I-85 SB ITP	National Data Plaza NE	Corporate Boulevard NE	76	0.38

Rank	Road Name	Start Point	End Point	Crashes	Length
36	I-285 SB	Boulder Park Drive SW	Benjamin E Mays Drive SW	76	0.91
37	I-75 SB OTP	Priest Road	Woodstock Road NW	76	0.92
38	I-85 NB	Clairmont Road merge	National Data Plaza NE	74	0.68
39	I-285 NB	River View Road	ramp to S Cobb Drive SE	74	0.97
40	I-285 NB	Exit to Lakewood Fwy	Lakewood Fwy NB ramp	73	0.20
41	I-85 NB OTP	Center Way	Ramp to Indian Trail Lilburn Road	71	0.97
42	I-85 SB OTP	Lower Fayetteville Road	Poplar Road	71	1.05
43	I-20 WB ITP	Central Avenue SW	Pryor St SW	70	0.05
44	I-85 NB OTP	Pleasant Hill Road	Pleasant Hill Road merge	69	0.19
45	Buford Drive	Hurricane Shoals Road NE	State Route 316	67	0.26
46	I-285 NB	Ramp to Pace Ferry Road	Pace Ferry Road	66	0.22
47	I-20 WB ITP	Washington St SW	Central Avenue SW	65	0.07
48	I-85 NB OTP	Ramp to Pleasant Hill Road	Pleasant Hill Road	65	0.16
49	I-20 WB ITP	Gresham Rodd merge	Fayetteville Rd	65	0.88
50	I-75 NB OTP	Ramp to Big Shanty Road	Big Shanty Road	64	0.35

Source: GDOT Crash Database.

Highest Truck-Involved Crash Location – I-285 EB between Clifton Springs Road and Panthersville Road

I-285 East between Clifton Springs Road and Panthersville Road is a 1.4-mile road segment on the southeast side of the Atlanta metropolitan region. As shown in Table 7.14, the top two crash types for this segment are "side-swipe" in the same direction and "rear-end". This indicates that a major contributor to crashes could be high-traffic congestion that leads to weaving conflicts and stop-and-go traffic. Side-swipe crashes also occur when there are many lanes and the road geometry requires significant weaving in order to make an exit. Drivers who are following too closely and changing lanes improperly (in order to weave) are often the major reasons for the crashes.

"Angle" crashes also occur frequently; most likely due to improper egress/ingress accessing or exiting the freeway. Strategies to either reduce the need for weaving such as changing the lane configuration may be one consideration at this location.

Table 7.2 Crash Information for I-285 WB between Clifton Springs Road and Panthersville Road

		Number	Percent
Overall	Truck Involved Crashes	169	–
	Fatalities	0	–
	Severe Injuries	0	–
	Total	169	
Type	Side-Swipe – Same Direction	69	41%
	Rear-End	65	38%
	Angle	27	16%
	Not a Collision with a Motor Vehicle	7	4%
	Head-On	1	1%
	Side-Swipe – Opposite Direction	3	1%
	Total	172	100%
Causation	No Contributing Factors	77	42%
	Following Too Close	42	23%
	Changes Lanes Improperly	32	17%
	Total	151	82%

Source: GDOT Crash Database.

Second Highest Truck-Involved Crash Location – Interstate 20 WB between Miller Road and Wesley Chapel Road

This 2-mile long stretch of interstate is located east of I-285, almost immediately past the interchange. As shown in Table 7.15,the most common crash types at this location are similar to that of the first location, i.e., side-swipe, same direction, rear-end, and angle crashes.

Similarly, the crash causation characteristics are also the same as the top truck-involved crash location – following too closely and changing lanes improperly. This indicates that strategies that reduce weaving and reduce stop-and-go traffic may be a consideration.

Table 7.3 Crash Information for Interstate 20 between Miller Road and Wesley Chapel Road

		Number	Percent
Overall	Truck Involved Crashes	168	99%
	Fatalities	1	1%
	Severe Injuries	0	0%
	Total		
Type	Side-Swipe – Same Direction	65	39%
	Rear-End	60	36%
	Angle	25	15%
	Not a Collision with a Motor Vehicle	16	10%
	Head-On	1	1%
	Side-Swipe – Opposite Direction	1	1%
	Total	168	100%
Causation	No Contributing Factors	80	44%
	Changes Lanes Improperly	43	24%
	Following Too Close	32	18%
	Other causes	27	15%
	Total	182	100%

Source: GDOT Crash Database.

Third Highest Truck-Involved Crash Location – Interstate 85 North metro Atlanta Between I-95 and Jimmy Carter Boulevard Merge

This 1.5-mile long segment of I-85 is located in Northeast Atlanta just outside of I-285. Again, it has similar distribution of crash types as the top two locations discussed above, as well as similar contribution factors. This means that the three locations share similar characteristics that may contribute to truck-involved crashes, such as location near complex egress/ingress points, high traffic volumes and multiple lanes.

Table 7.4 Crash Information for Interstate 85 North metro Atlanta Between I-285 and Jimmy Carter Boulevard Merge

		Number	Percent
Overall	Truck Involved Crashes	160	
	Fatalities	1	0.625%
	Severe Injuries	2	1.25%
Type	Side-Swipe – Same Direction	64	40%
	Rear-End	46	29%
	Angle	40	25%
	Not a Collision with a Motor Vehicle	8	5%
	Side-Swipe – Opposite Direction	2	1%
	Head-On	0	0%
Causation	No Contributing Factors	82	51.3%
	Changes Lanes Improperly	39	24%
	Following Too Close	22	14%
	Other	17	10.7%

Source: GDOT Crash Database.

7.3 LAW ENFORCEMENT CRASH RESPONSE EXPERIENCE

First responder experiences are always important to help gather information that cannot be found by simply performing data analysis. An interview was conducted with Captain Bruce Bugg, the Region 4 Commander of the Motor Carrier Compliance Division (MCCD) within the Georgia Department of Public Safety. His on-the-ground experience makes him uniquely qualified to provide input on important truck safety issues in Georgia. Captain Bugg also was best positioned to provide us with the most useful information because of his previous involvement with the statewide safety planning effort.

The Department of Public Safety is a state-led agency for the Federal Motor Carrier Safety Assistance Program. This program allows the MCCD to conduct safety inspections of commercial motor vehicles (trucks and buses), highway

shipments of hazardous materials, and to perform compliance reviews (safety performance audits) on motor carriers.[12]

Current MCCD Efforts

The first part of the interview involves determining what the MCCD already has done in terms of identifying high truck-involved crash locations, and safety improvements. The MCCD already has been generating high-crash traffic locations each quarter, which employs a risk-based crash scoring methodology by assigning costs to different types of traffic accidents. Specifically, a crash score of 1 is assigned to a property-damage-only crash, a score of 13 is assigned to an injury crash, and a fatal crash has a score of 238. These scores are grouped into counties for each of the nine regions to determine the counties with the highest scores. Two reports are produced each quarter using this methodology, a CMV crashes by region by county, and CMV crashes by county, day, and time segment. The reports are useful in identifying counties within each region that have high crashes, but does not pinpoint specific high-crash corridors.

Each region, on the other hand, also generates a High-Crash Corridor Report each quarter. These reports, done by troopers, identify the top three counties in each region that have high-crashes corridors. The names of the corridors also are listed as well as a series of strategies and next steps to improve safety in those areas. This information, again, is useful for enforcement purposes, but the corridors identified are broad (e.g., I-75) and the strategies largely includes holistic enforcement initiatives.

Safety Issues Identified

Captain Bugg provided information on what he perceives to be key safety issues in the region, and what factors contributed to such issues. The first safety issue is the presence of left-hand highway exits. Trucks usually drive on the rightmost lane on the Interstate, and when left-hand exits are used, additional difficulty is placed on the trucks to weave through the traffic and exit in time. The second issue is the adequacy of truck stops. Captain Bugg believes that the presence of more adequate and friendly truck stops can improve the safety of Interstates, as shown in the case of I-285, where the southside of I-285 has less crashes and more truck-friendly facilities. Lastly, the presence of construction areas may also be a contributing factor in truck-involved crashes.

High-Crash Locations

A primary issue regarding the safety analysis is to determine high-crash location corridors and intersections. Captain Bugg recalled several locations that are considered significant truck-crash locations. The first location is in the Macon

[12] http://dps.georgia.gov/motor-carrier-compliance-division-0

area associated with the I-75 and I-16, where there are short exit ramps and the presence of left hand ingress/egress points. In metro Atlanta, U.S. 78 and I-285 southbound has a left-hand exit and significant crash frequencies, as well as the I-285 and I-20 Interchange with frequent crashes where trucks run into ditches.

Potential Solutions

Captain Bugg pondered the retrofitting of inspection sites, such as addition of jersey walls, to provide smoother ingress/egress points for trucks undergoing inspection. In addition, understanding the effect between number of hours of driving and sleeping may be important.

7.4 EXISTING GEORGIA AND NATIONAL TRUCK SAFETY PROGRAMS

Highway Safety Plan

The Governor's Office of Highway Safety (GOHS) publishes a Highway Safety Plan annually, which serves as the state's guide for highway safety initiative implementation and an application for federal grant funding from the National Highway Traffic Safety Administration (NHTSA). The Highway Safety Plan is directly aligned with the priorities of the Georgia Strategic Highway Safety Plan, and is used to justify, develop, implement, monitor, and evaluate traffic safety activities for improvement throughout the federal fiscal year.

Georgia Strategic Highway Safety Plan

The Georgia Strategic Highway Safety Program[13] (SHSP) documents the highway safety progress in Georgia; during development of this document, the latest version available was for 2009. That 2009 version set its primary goal to reduce annual crash deaths to below 1,498 by 2012 through a series of measures and programs, most directly related to trucks is commercial motor vehicle safety and addressed through the Motor Carrier Safety Assistance Program[14] (MCSAP).

The MCSAP was initiated through a Federal grant[15] program managed under the Federal Motor Carrier Safety Administration (FMCSA). It provides financial assistance to states to reduce the number and severity of crashes and hazardous materials incidents involving commercial motor vehicles (CMV). In Georgia, the Department of Public Safety is the lead Georgia agency for the MCSAP, with the

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[13] www.gahighwaysafety.org/highway-safety/shsp

[14] http://dps.georgia.gov/motor-carrier-compliance

[15] www.fmcsa.dot.gov/grants/mcsap-basic-incentive-grant/motor-carrier-safety-assistance-program-mcsap-basic-and-incentive

MCCD is responsible for the implementation of, and compliance with, the MCSAP guidelines. The state Strategic Highway Safety Plan addresses the heavy truck aspect of safety through summarizing the MCCD's Commercial Vehicle Safety Plan, which will be discussed separately in the following pages.

Georgia Commercial Motor Vehicle Safety Plan (CMVSP)

At the time this document was first produced, as of 2007 Georgia had the fourth-highest number of fatalities involving a commercial motor vehicle. Therefore, enforcing the compliance of such vehicles was a high priority. The CMVSP is an annual report published to document the progress of MCCD in improving commercial vehicle safety in Georgia.

The goal of the CMVSP in 2010, which was the latest available at the time this document was first produced, was to reduce the fatal crash rate in relation to the Federal goal, which was to reduce Georgia's 2007 fatal crash rate by 0.06 per 100 million miles traveled by the end of FY 2010. Crash reduction focused on increased inspections, compliance reviews, and enforcements. In addition, improving the quality of data is another goal stated in the CMVSP to better identify high-risk carriers, drivers, vehicles and highways within the state.

The 2010 CMVSP showed that while 2009 performance goals had been met, the determination as to whether crash reduction was met is unsure because of data reporting issues.

The MCCD states that it must continue to identify problem areas that contribute to crash causation and place increased emphasis of those problems identified. Results show that fatal and nonfatal crashes show a reduction of 0.9 percent from 2006 to 2007 and fatalities show a reduction of 0.9 percent from 2006 to 2007. However, not all crashes may have been received. In addition, results also show that reductions in vehicles that are out of service and have violations reduced in the last year, as well as increase in traffic enforcement on speeding, failure to obey traffic control devices and seat belt usage.

The MCCD has several emphasis areas to reach the fatalities reduction goal. The MCCD plans to increase enforcements on rural roads, increase driver focused inspections, continue participate in Operation Safe Driver, sponsored by CVSA and FMCSA and obtaining more accurate data.

Georgia "Ticketing Aggressive Cars & Trucks (GTACT) Program"

The Federal TACT program is a traffic enforcement program that uses communication, enforcement, and evaluation activities to reduce CMV-related crashes, fatalities, and injuries. In Georgia, the GTACT program was initiated to increase driver awareness of CMVs through education and enforcement. The Georgia *Ticketing Aggressive Cars and Trucks Program* is a traffic safety campaign designed to increase driver awareness of the dangers they face with risky driving behaviors around commercial motor vehicles. The program combines educational outreach with traffic enforcement to reduce the number of crashes

between commercial vehicles and much-smaller passenger vehicles[16]. Data from the program has shown decrease in crashes involving CMVs and an increased awareness to the general public.

The GTACT program maintains a web site detailing efforts taken so far. In the first wave of the program, portions of I-85 and I-285 were targeted as enforcement areas since they were identified as relatively high truck-involved crash corridors based on results from the Federal Motor Carrier Safety Administration (FMCSA), who also funds the state program. Other focus areas of the state included I-75 in the southern part of the state[17]. Specific efforts include cautioning drivers to "leave more space" through enforcement by officers, informing drivers through billboards, radio, ads, and safety message signs. The web site also provides information to educate drivers on how to drive safely.

Comprehensive Safety Analysis (CSA) 2010 Initiative

The CSA 2010 Initiative already was identified as the number two trucking related issue in the nation based on the ATRI survey mentioned in Chapter 2. The CSA 2010 is a Federal Motor Carrier Safety Administration (FMCSA) initiative to improve large truck and bus safety by introducing a new enforcement and compliance model that allows FMCSA and its State Partners to track and monitor a larger number of carriers in closer to real time. This process is designed to lead to earlier detection of safety problems, most notably unsafe drivers and truck fleets with disproportionately unsafe vehicles.

The CSA 2010 initiative was prompted due to a slowing of crash reductions and limitations of current compliance models. Limitations include resource intensive compliance reviews that only reach out to a small number of trucks, a lack of targeting contributors for crashes, and a lack of options regarding solutions for identified problems. As such, the CSA 2010 Operational Model is developed and is characterized by:

1. A more comprehensive measurement system that uses inspection and crash results to identify risky behaviors;
2. A proposed safety fitness determination methodology that is based on performance data; and
3. A comprehensive intervention process designed to more efficiently and effectively correct safety deficiencies.

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[16] www.georgiatact.net

[17] http://dps.georgia.gov/press-releases/2009-02-26/i-75-truck-safety-campaign-underway

A key component of the program is that each motor carrier will be rated in a number of compliance areas based on citation and noncompliance information collected. These ratings will then help enforcement personnel to determine which method of intervention to choose from, thus reducing enforcement costs and improving effectiveness. The program was rolled out in December 2010

The impact of this program on safety enforcement in Georgia is that each violation becomes much more important for truck drivers and truck fleet operators. Captain Bugg mentioned carriers are now beginning to question all violations, not just out-of-service violations.

GDOT Safety Programs

GDOT continues its standing safety program with multiple components to identify needed safety improvements and delivering projects to improve safety.[18]

Through its *Georgia Highway Safety Improvement Program* (HSIP), GDOT conducts a continuous and systematic focus on identifying and reviewing specific traffic safety issues around the state and developing improvements. The HSIP program annually allocates funds to complete projects specifically identified in the SHSP. Projects typically pursued under HSIP include moderate-sized operational improvements such as intersection improvements, turn lanes, signage, and signal upgrades.

The GDOT *Off-System Safety Program* (OSSP) funds improvements to road facilities that are maintained by agencies other than GDOT. OSSP is an opportunity for local governments to pursue funds for safety projects from GDOT; the types of projects typically include smaller 'operational' improvements such as pavement markings, rumble strips, and guardrails. OSSP projects are initiated through the GDOT District[19] traffic engineer and coordinated through the Local Maintenance and Improvement Grant[20] process, as all OSSP projects are let locally.

The GDOT *High Risk Rural Roads* (HRRR) program funds improvements to roads functionally classified as 'rural major' or 'minor collectors' that currently or as a result of projected increases in traffic volumes experience fatalities or injuries in excess of the statewide average for that functional class of roadway. GDOT maintained and local roads are eligible for the program, and projects are let by GDOT. The GDOT Office of Traffic Operations prepares a list of eligible routes for each GDOT District. A variety of project types are covered by the program,

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[18] http://documents.atlantaregional.com/tcc/2014/2014-03-21/Safety_Program_Overview.pdf

[19] www.dot.ga.gov/AboutGDOT/Districts

[20] www.dot.ga.gov/PS/Local/LMIG

which are more complex than those funded under OSSP, and include work up to the level of railroad grade-separation projects.

GDOT's *Road Safety Audits* (RSA's) are performed to examine the safety performance of existing or future roads to identify potential road safety issues. These reviews are performed proactively by a third party, and area done in the field in order to gain a more comprehensive understanding of the design features of a facility as they pertain to safety.

Additional Georgia Commercial Vehicle Enforcement Officers

In June of 2015, Governor Nathan Deal announced the addition of 60 commercial vehicle enforcement officers to the existing force of 234 at a cost of $10 million.[21] Of these 60 new officers, half will patrol the I-95 and I-16 corridors, and another 20 will be deployed in the metro Atlanta area.

This increase in patrol numbers is in anticipation of the increased in truck traffic that will result from the Savannah harbor deepening and is also intended as a response to a 4 percent rise in crashes involving trucks since 2012. This increase in patrol officers bolsters the efforts of the GTACT program and the goals of the CMVSP.

7.5 KEY FINDINGS AND NEEDS RELATED TO TRUCK SAFETY

- Based on latest data available at time this document was first produced, in 2008 there were 180 fatalities in truck-involved crashes in Georgia and 3,800 injuries,[22] ranking the state as 22nd in the country in terms of truck-involved fatalities with 0.17 fatalities per 100 million truck miles traveled.
- Nearly 30,000 of the 57,200 truck-involved crashes (52%) occurred in the Atlanta metropolitan region making it by far the location with the highest number of truck-involved crashes in Georgia. Savannah had the second highest number of crashes with just 1,666.
- I-285 had the highest number of truck-involved crashes (6,271) and a significant crash rate (13 crashes per million truck VMT). I-285 has high truck volumes and significant amounts of vehicular weaving.
- Even though 25% of total truck-involved crashes occur in rural regions, 57% truck-involved fatality crashes occur in rural regions. This may have contributions to higher percentage of head-on collisions in rural regions.

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[21] http://gov.georgia.gov/press-releases/2015-06-11/deal-expands-highway-safety-enforcement-efforts

[22] Fatality Analysis Reporting System (FARS) www.nhtsa.gov/FARS 2008 Final.

8.0 Needs and Issues: Truck Parking

This section compares truck parking supply and truck parking demand to determine the adequacy of commercial vehicle parking at various locations.

8.1 TRUCK PARKING SUPPLY

Truck parking supply consists of the types of truck facilities: truck stops and truck rest areas. Truck stops are privately-owned commercial facilities that provide an opportunity to rest and fulfill many nonrest-related activities, including refueling, eating, and potentially access to the Internet. Rest areas are publicly-owned facilities that offer truck drivers with minimal services. They are primarily used for long periods of rest, typically associated with overnight stays. These facilities were also discussed in Section 3.4 of this report.

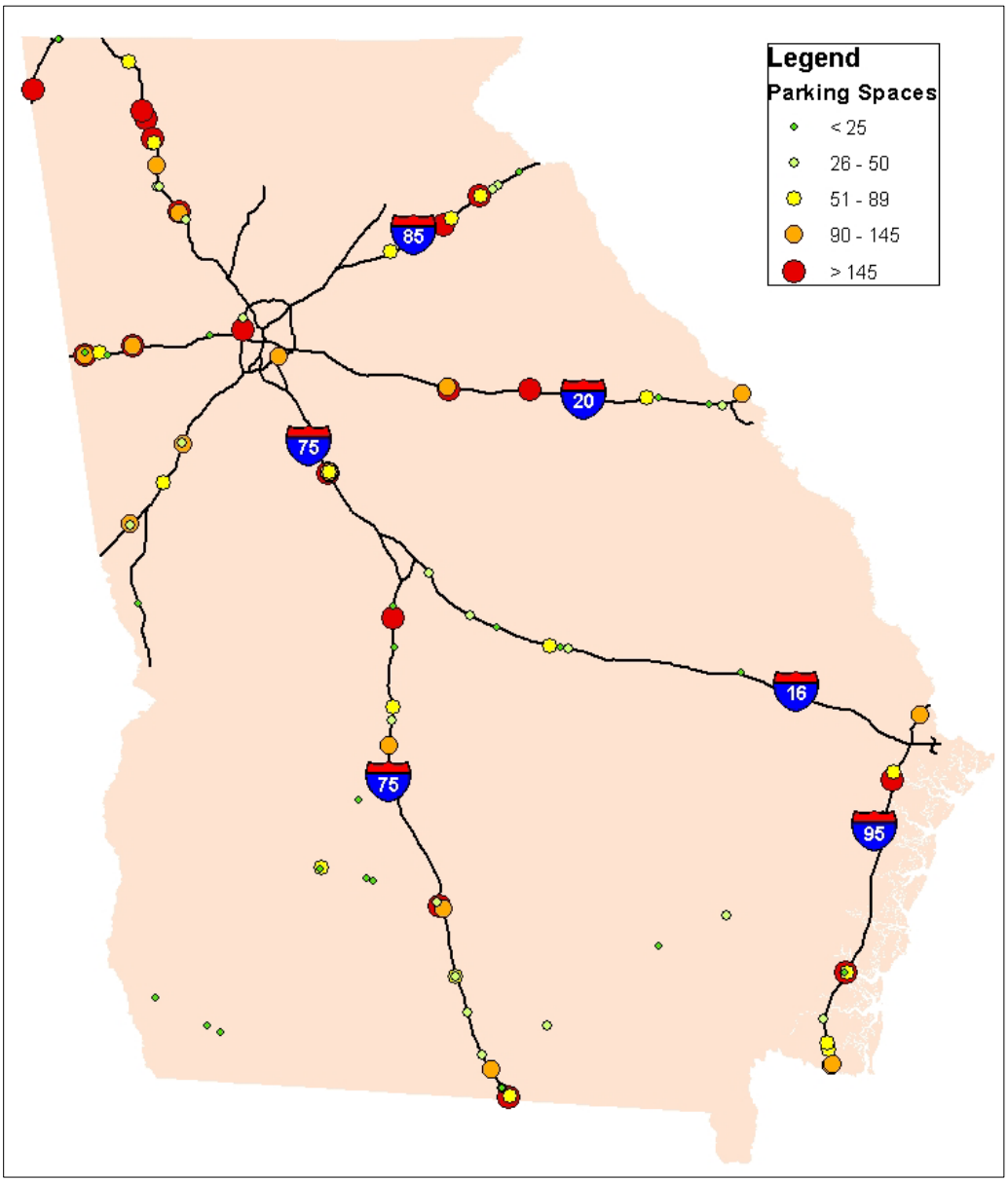
Figure 8.1 shows the location of commercial truck stops along the Interstate system in Georgia and the number of parking spaces at each truck stop. These maps were developed based on a combination of a pre-existing ATRI truck stop database and visual observation using Google Earth. As mentioned in Chapter 3 of this report, the figure shows that the vast majority of truck stops are located in rural regions. This is primarily due to the availability of relatively inexpensive land and the ability to attract intercity truck traffic at rural locations. Figure 3.11 shows the location of rest areas and weigh stations in Georgia along with the number of parking spaces at each location.

Each truck stop and rest area in the project team's database was assigned to a corridor based on its location. Most truck stops are located off of the interstate, because these are the locations with the most traffic. Table 8.1 shows the number of parking spaces on each of the long-haul corridors in Georgia. This represents truck parking supply by interstate corridor for Georgia.

As mentioned in Chapter 3, nearly half of the total truck parking spaces in the State are on I-75. However, in terms of density of parking spaces per freeway mile, the I-20 west of Atlanta corridor was the highest with over 18 parking spaces per freeway mile -– 50% more than the state average of 11 parking spaces per freeway mile. Truck parking density is lowest on I-16 with 2 parking spaces per freeway mile.

Weigh stations were also calculated as part of the truck parking supply, because Georgia allows trucking parking at weigh stations at non-operating hours.[23] The numbers of spaces are then summed up for each of the nine corridors regions as shown in Figure 8.1 below. I-285 and the Interstate segments within the I-285 bypass are not considered due to the high percentage of short haul truck traffic on these facilities.

Figure 8-1 Parking Spaces at Truck Stops



Source: ATRI Truck Stop Data and project team analysis.

[23] Study of Adequacy of Commercial Truck Parking Facilities – Tech. Report, FHWA, 2002.

Table 8.1 Truck Parking Spaces per Highway Mile

Corridor	Total Distance (Miles)	Total Parking Spaces	Parking Spaces per Mile
I-20 West of Atlanta to Alabama Line	50	902	18
I-75 North of Atlanta to Tennessee Line	94	1,587	17
I-75 South of Macon to Florida Line	156	2,515	16
I-95 from South Carolina Line to Florida Line	111	1,558	14
I-85 North of Atlanta to South Carolina Line	83	969	12
I-85 South of Atlanta to Alabama Line	81	628	8
I-75 South of Atlanta to Macon	67	512	8
I-20 East of Atlanta to South Carolina Line	133	978	7
I-16 Macon to Savannah	164	391	2
Total	939	10,040	11

Source: Project team analysis.

8.2 TRUCK PARKING DEMAND

The demand for truck parking is estimated using a methodology adopted from the FHWA Report, *Study of Adequacy of Commercial Truck Parking Facilities.* The report determined the supply and demand of parking for Georgia as a whole based on 2002 data. The analysis in this chapter extends the FHWA methodology to estimate truck parking demand for specific long-haul corridors based on current year truck travel data. Long-haul trucks are the truck types of greatest concern because they have longer rest periods, and therefore require more parking hours than short haul trucks. Short haul trucks tend to return to their home base at the end of the day.

The demand for long-haul truck parking spaces can be determined by multiplying a **peak-parking factor** for long-haul trucks with the **total parking time**. This peak-parking factor is the ratio of peak parking demand (in spaces) to total daily parking demand (in hours) for long-haul trucks. If parking demand were evenly distributed throughout the day, this value would be 1/24 or about 0.04. Because parking demand for long-haul trucks is concentrated during overnight hours, this number should exceed 0.04. A value of 0.09 was generated by FHWA based on visual observation of parking activity at truckstops.

The total parking time can be determined from multiplying the **total driving time** (hours of travel per day) with the **long-haul parking ratio**. The total highway driving time (THT) can be determined from this equation:

$$THT = Truck\% * AADT * L/S$$

Where:

THT is the average truck-hours of travel per day;

Truck% is the percentage of daily volume consisting of trucks;

AADT is the annual average daily traffic;

L is the length of the roadway segment in miles; and

S is the average speed of the trucks in miles per hour.

Each of the four independent variables were estimated using outputs from the Georgia statewide travel demand model.

Next, the long-haul parking ratio needs to be determined. This is the ratio of the total parking time to the total driving time for long-haul trucks. The following equation is used by FHWA to estimate this parameter:

$$PR_{LH} = \frac{8days \times \frac{24hr}{day} - T_{DRIVING} - T_{HOME} - T_{LOAD/UNLOAD} - T_{SHIPPER/RECEIVER}}{T_{DRIVING}} + \frac{5min}{60min} = 0.7833$$

Where,

$T_{DRIVING}$ is the time driving for long-haul drivers (value = 70h/8days);

T_{HOME} is the time at home for long-haul drivers (value = 42h/8days);

$_{TLOAD/UNLOAD}$ is the loading and unloading for long-haul drivers (value = 15h/8days);

$T_{SHIPPER/RECEIVER}$ is the time at shipper/receiver for long-haul drivers (value = 16h/8days).

This equates to a long-haul parking ratio of 0.7833 for the State of Georgia.

Using the THT and long-haul parking ratio, now we can determine the total parking time for each corridor. Note that the THT also needs to be multiplied with the **seasonal peaking factor** of 1.15 to adjust the annual average daily traffic to a seasonal peak day to better estimate the maximum peak demand for truck parking. This seasonal peaking factor represents a peak truck volume of 15 percent above the average.

To eliminate short-haul truck trips in rural and urban areas from the analysis, the portion of short-haul truck trips from the THTs for both the rural and urban portions is removed. To determine how much short-haul trips there are for rural and urban corridors, ArcGIS software was used to overlay urban MPO

boundaries with the corridors. The THTs for the urban and rural segments are the calculated separately. Next, the FHWA short-haul to long-haul ratios were applied to determine the percentages of long-haul trucks. By multiplying the THTs with the percent of long-haul trucks, the appropriate short-haul truck trips were removed. The long-haul percentage was estimated to be 93 percent for rural segments, and 64 percent for urban segments based on origin-destination surveys conducted as part of the FHWA study.

The final peak-period truck parking demand for each of the corridors in Georgia is shown in Table 8.2 along with the corresponding truck parking supply, and parking adequacy calculations.

Table 8.2 Truck Parking Adequacy for Corridors in Georgia

Corridor	Peak Period Truck Parking Demand	Truck Parking Supply	Excess Parking Spaces	Percentage Difference
I-75 Middle GA	1,721	2,515	794	46
I-20 West GA	532	902	370	69
I-20 East GA	750	978	228	30
I-95	1,425	1,558	133	9
I-75 North GA	1,538	1,587	49	3
I-85 North GA	1,000	969	-31	-3
I-85 South GA	551	512	-39	-7
I-16	811	391	-420	-52
I-75South GA	1,076	628	-448	-42

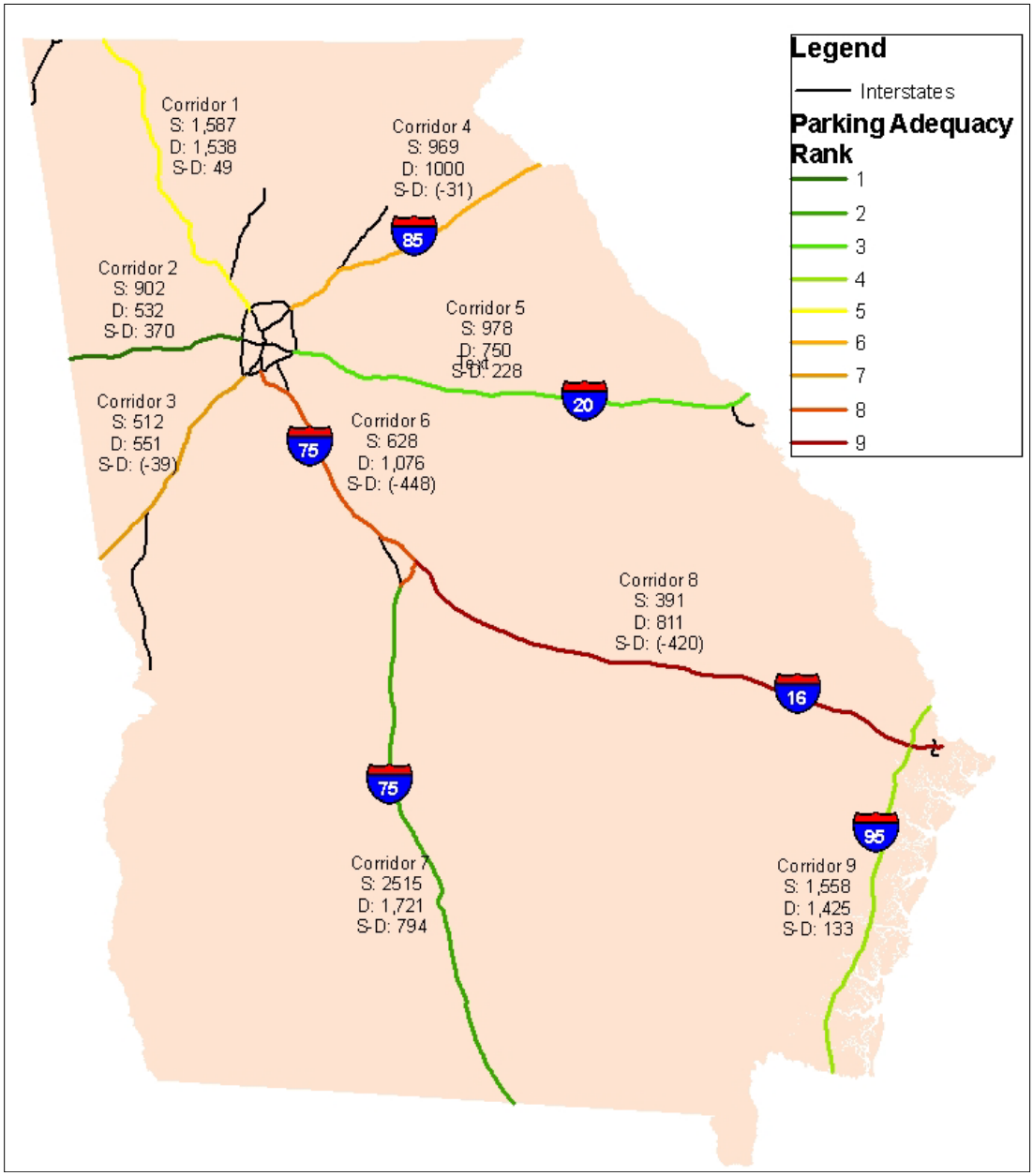
Source: Project team analysis.

8.3 RESULTS

Table 8.2 shows the results of the analysis for each corridor. Based on this methodology, the most likely location of truck parking shortages are I-75 in south Georgia, I-16, I-85 in south Georgia, and I-85 in north Georgia.

Figure 8.2 displays the truck parking supply and demand in graphical terms. The colors on the map show the relative shortage intensities along each corridor, with red indicating the most severe shortage, green indicating adequate truck parking.

Figure 8-2 Truck Parking Adequacy for Corridors in Georgia



Source: Google Satellite Image Data.

8.4 KEY FINDINGS ON TRUCK PARKING

There appears to be a shortage of long-term truck parking on select corridors in Georgia. Confirmation of this analysis would involve collection of field data on Georgia's interstate corridors to identify locations of illegal truck parking and truckstop overflow locations. Information from this analysis can also be provided to the private sector to identify potential locations for future development of new truck parking facilities.

In July of 2015, FHWA released the results of its Jason's Law Truck Parking Survey[24]. The Survey was conducted as mandated by MAP 21 in order to conduct a comparative assessment of the capability of each State to provide adequate parking and rest facilities for commercial motor vehicles engaged in interstate transportation, assess the volume of commercial motor vehicle traffic in each State, and develop a system of metrics to measure the adequacy of commercial motor vehicle parking facilities in each State.

A new National Coalition on Truck Parking was announced that will work to find solutions to the nation's truck parking shortage that was found to exist in the Jason's Law Truck Parking Survey[25]. The findings in the survey show most states reported having truck parking shortages occurring at all times of the day on every day of the week. The National Coalition on Truck Parking will consist of many public and private stakeholders. The Coalition was announced simultaneously with the release of the Jason's Law Survey results.

[24]http://www.ops.fhwa.dot.gov/freight/infrastructure/truck_parking/jasons_law/truckparkingsurvey/index.htm

[25]http://www.truckinginfo.com/news/story/2015/08/new-coalition-to-look-for-truck-parking-solutions.aspx

9.0 Needs and Issues: Truck Size and Weight

This chapter describes the laws, regulations, processes, and issues for operating oversize/overweight vehicles in Georgia. This section will review Federal and Georgia size and weight law *in place as of the time this document was adopted (Spring 2012)* to identify when a vehicle is no longer considered legal and outline how permits are issued to allow movement of such vehicles. As such,

FOR THE LATEST INFORMATION & REQUIRMENTS, ALWAYS VISIT THIS WEBSITE:
www.dot.ga.gov/PS/Permits/OversizePermits

9.1 GEORGIA TRUCK SIZE AND WEIGHT LAWS

Georgia state statute defines the size and weight limits for vehicles that can operate on Georgia highways without obtaining a special permit. The majority of commercial vehicles on Georgia's highways operate within these legal limits. Above these limits, the motor carrier (or passenger driver, for a private vehicle and load, for example a boat of exceptional dimension) must purchase a permit issued by the Georgia Department of Transportation (GDOT). This concept is defined in a combination of both Federal Law and Georgia state law (Code Section 32-6-1) [26] as well as in GDOT published rules (672-2) [27].

Most vehicles are governed by the same width, height, length (including overhang), and weight limits. Some vehicles, often within a specific commodity class, are exempt from some of these limits. A summary of common exemptions from these limits are outlined later in this chapter.

Limits and Route Type When Traveling *Without* a Permit

The size and weight limits for a vehicle that does not need a permit (commonly referred to colloquially as a "legal vehicle") depend on the designation of the highway segments being traveled. Specifically, differentiation for the following:

- **Interstate Highway System –** Weights are governed by the Federal Bridge Formula, to an absolute maximum of 80,000 pounds. According to FHWA, "Congress enacted the Bridge Formula in 1975 to limit the weight-to-length ratio of a vehicle crossing a bridge. This is accomplished either by spreading

[26] www.dot.ga.gov/PS/Permits/OversizePermits#tab-4

[27] www.dot.ga.gov/PS/Permits/OversizePermits#tab-4

weight over additional axles or by increasing the distance between axles." A calculator for determining the legal weight depending on the configuration of the vehicle is available at the FHWA web site.[28] Vehicles also have different limits for vehicle length when using Interstate highways.

- **National Highway System (NHS) –** Vehicles on the national highway system have different limits for vehicle length when using NHS highways.
- **State Designated System and Other State Routes –** Vehicles on the State Designated System or other state routes have a different formula for maximum weight for vehicles with two, three, or four axles, and are subject to different rules regarding maximum legal length.
- **County Roads –** Travel on county roads is limited to a lower maximum gross weight.

General Limits

The following limits on size and weight generally apply in Georgia.

- **Gross Weight –** Regardless of state or Interstate highway, no vehicle and load can exceed 80,000 pounds without obtaining a permit. Depending on the configuration of the vehicle and load, limits of less than 80,000 may apply. County roads are further limited to 56,000 pounds unless making a pickup or delivery with the appropriate documentation.
- **Axle Weight –** In addition to the overall gross weight of the vehicle and load, specific axles and groups of axles are subject to individual limits. A single axle is limited to 20,340 pounds, and a tandem axle is limited to anywhere between 34,000 and 40,680 pounds depending on the highway(s) being used and the overall configuration and dimensions of the vehicle.
- **Height –** Maximum allowed height in Georgia without a permit is 162 inches, or 13 feet 6 inches.
- **Width –** Maximum allowed width in Georgia without a permit is 102 inches, or 8 feet 6 inches.
- **Length**, as defined by AASHTO, is the total longitudinal dimension of a single vehicle, a trailer, or a semitrailer, including bumper and load but excluding noncargo-carrying equipment. The maximum legal length of a vehicle is based on the configuration of the vehicle and in some cases, the load being carried. In general, however, single trailers are limited to 53 feet, multiple trailer units on state routes are limited to 28 feet per trailer, and overall maximum legal length can vary up to 100 feet depending on configuration.

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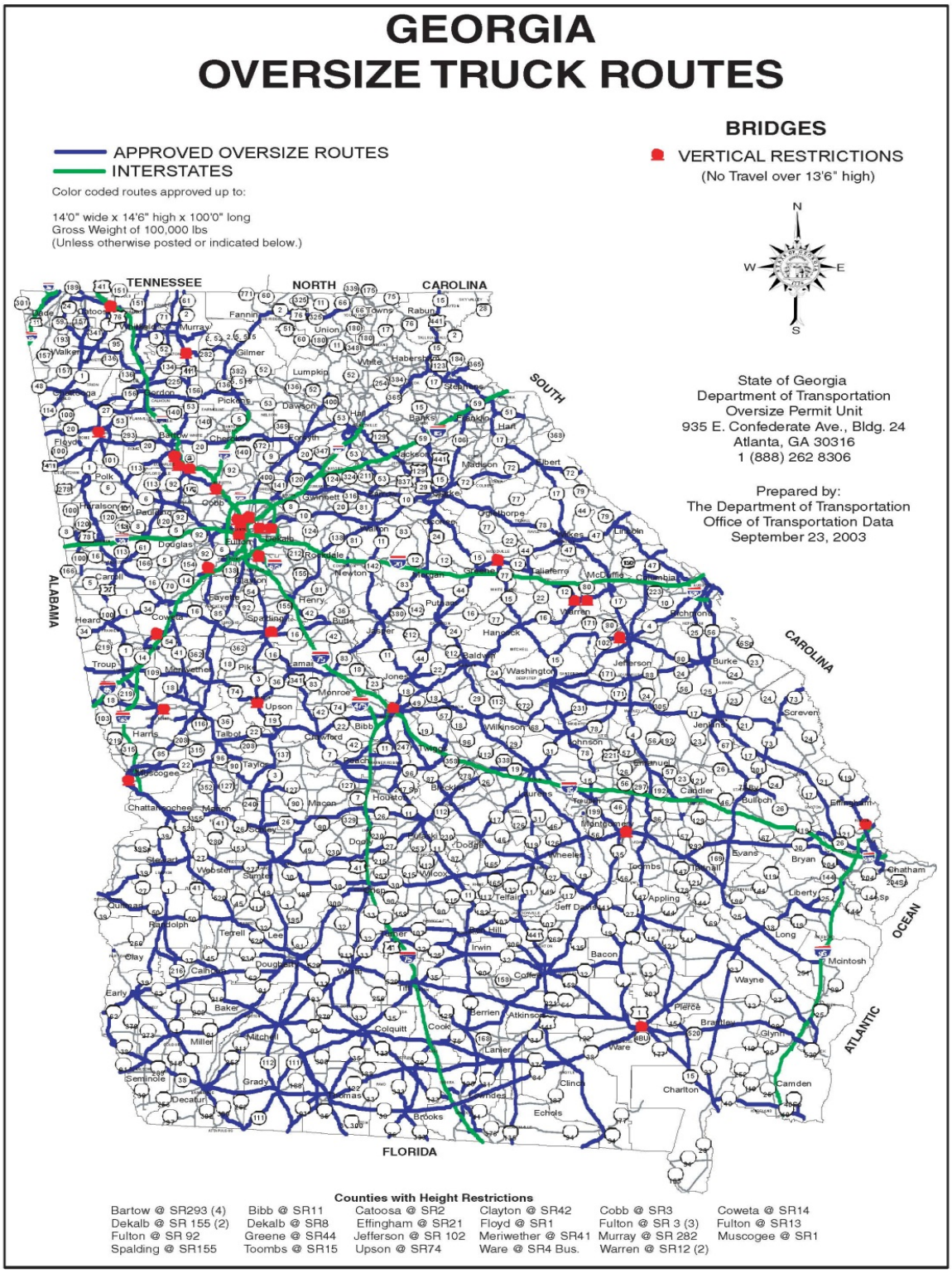
[28] http://ops.fhwa.dot.gov/freight/sw/brdgcalc/calc_page.htm

Figure 9-1



Source: GDOT www.dot.ga.gov/PartnerSmart/permits/Documents/GaOversizeTrkRouteMap.pdf

Legal Limit Exceptions

This section highlights some of the most common commercial vehicle exceptions to the size and weight laws listed above. In addition to exceptions to the legal limits on some commercial vehicles, there are additional exceptions to the nondivisible load permitting provisions.

The most common exception to state law is for industry-specific exceptions to the weight limits for non-Interstate routes. A limit of 23,000 pounds per axle to a total maximum gross weight of 80,000 pounds is available for the following industries:

- Hauling forest products from the forest where cut to the owner's place of business, plant, plantation, or residence;
- Hauling live poultry or cotton from a farm to a processing plant;
- Hauling feed from a feed mill to a farm;
- Hauling granite, either block or sawed for further processing, from the quarry to a processing plant located in the same or an adjoining county; or
- Hauling solid waste or recovered materials from points of generation to a solid waste handling facility or other processing facility; and
- Hauling unhardened concrete from plant to customer.

Another area where exceptions are common are in the nonpermit maximums for length. Some examples of exceptions are:

- Car and boat carriers allow a load length of 65 feet, a tractor/trailer unit of 60 feet, and overhangs of three feet to the front and 4 feet to the rear;
- Stinger steered units are limited to a maximum of 75 feet, with overhangs of 3 feet to the front and four feet to the rear; and
- Overall length is unlimited on state routes when twin trailer combinations with 28 feet trailer units are used.

9.2 GDOT PERMIT OFFICE

Permits for traveling above legal limits are issued by the GDOT' Oversize Permit Unit. The Permit Unit issues approximately 180,000 permits annually. Customers can apply for a permit either by fax or by using an on-line permit ordering application. The Oversize Permit Unit is comprised of approximately 25 staff, and will interact with the agency's structural engineers in the Bridge Maintenance Unit if a detailed analysis of bridge impacts is required for a proposed permitted vehicle.

For vehicles and loads that exceed the previously outlined sizes and weights, permits are issued by the GDOT's Oversize Permit Unit. There are two types of permits available, trip and annual, each with different limitations and fees.

Trip Permits

Trip permits comprise approximately 80 percent of the size and weight permits that the GDOT issues each year. These permits are valid for 10 travel days. Travel is permitted from one-half hour after sunrise to one-half hour before sunset Monday through Saturday. Generally, no travel is permitted on Sundays or declared holidays.

Though Georgia law does not specify axle limits for their trip permits, the following table shows their published "typical allowed weights" by number of axles.

Table 9.1 Typically Allowed Weights for Overweight Permit Applications

Number of Axles	Typically Allowed Weights (Pounds)
1	23,000
2	46,000
3	60,000
4	92,000
5	100,000
6	125,000
7	148,000
8	150,000

Source: GDOT web site.

The following information is required for an overweight or oversize trip permit:

- A description of the load;
- Name of transporter;
- Origin and destination;
- Routes of travel (for loads with dimensions greater than 12 feet wide, 13 feet and 6 inches high, 125 feet in length, or 100,000 pounds); and
- Insurance provider information.

Standard single trip permits have a fee of $30 and are subject to the following limits:

- Width: 16 feet;
- Height: 16 feet; and
- Weight: 150,000 pounds.

Superload trip permits have a fee of $125. Weight is limited to 180,000 pounds, but width and height are not specifically limited. The issuance of a permit for

dimension will be based on the specific dimensions available on the requested route.

- Width: >16 feet;
- Height: >16 feet; and
- Weight: 180,000 pounds.

Any loads with dimensions greater than 12 feet wide, 13 feet and 6 inches high, 125 feet in length, or 100,000 pounds require routes. Additionally, if a load's dimensions are greater than 15 feet and 11 inches wide, 15 feet and 5 inches high, 125 feet long, or 100,000 pounds, an exact beginning and ending junction will be necessary for loads beginning and/or ending within the State of Georgia.

Superload plus permits has a fee of $500 and requires analysis of the impact of the proposed vehicle on the bridges to be traversed, conducted by one of the Department's structural engineers. For these trip permits, it may take up to 3 weeks to obtain approval.

Annual Permits

Annual permits comprise approximately 20 percent of the size and weight permits that the GDOT issues each year. Annual permits are good for a period of one year from the date of purchase. These are interchangeable within the same company, as long as the original is in the transport vehicle at the time of movement; may be used for any load type that is not divisible, and does not exceed any dimension as listed on the permit. The carrier is required to maintain $300,000 liability insurance with the GDOT as the certificate holder and must be on file with the Department for the duration of the permit. Unlike trip permits, annual permits may be used on any route, although it is the responsibility of the permit holder to ensure that the route being travel does not have height or width restrictions or posted bridge weight limits. The maximum allowed axle weight on an annual permit is 25,000 pounds unless otherwise specified.

Standard annual permits have a fee of $150 and have the following limits:

- Width: 12 feet;
- Height: 14 feet and 6 inches;
- Length: 100 feet; and
- Weight: 100,000 pounds.

Annual plus permits have a fee of $500 and travel is allowed only on NHS routes. They have the following limits:

- Width: 14 feet (from base to 10 feet above ground) and 14 feet and 8 inches for the upper portion of the load;
- Height: 14 feet and 6 inches;

- Length: 100 feet; and
- Weight: 100,000 pounds.

Applications for permits of gross vehicle weight of greater than 150,000 pounds must undergo an engineering review before a decision is made about permit issuance. This review is conducted by the bridge maintenance function at GDOT. The bridge maintenance staff considers the impacts the vehicle would have on bridges being traversed, determines if the vehicle can move safely, and imposes travel restrictions on the permit such as traveling at 5 miles per hour on certain bridges.

Depending on the size and weight of the permitted vehicle and load, a vehicle may be required to utilize its permit only when accompanied by one or more escort vehicles, following established protocols. Unlike many states, Georgia has a Certified Escort Training program, and escort vehicle drivers may be certified through a local technical college program.

9.3 GEORGIA CVISN AND GDOT'S ROLE IN SUPPORTING SIZE AND WEIGHT ENFORCEMENT

Background: The National CVISN Program

The CVISN (Commercial Vehicle Information Systems and Networks) program is a nationwide information sharing and partnership effort supported by the Federal Motor Carrier Safety Administration (FMCSA). CVISN consists of the information systems and communications networks owned and operated by governments, motor carriers, and other stakeholders. Many stakeholders have data about motor carriers, their vehicles, commercial drivers, crashes, and the enforcement actions of officers, yet by and large they are not capable of sharing the data electronically. The various information systems of the stakeholders can be described as "stovepipes." Stovepiped systems prevent stakeholders from sharing the data in the systems for purposes such as improving safety and increasing efficiency.

CVISN supports state capabilities in three areas: safety information exchange, electronic screening, and electronic credentialing. CVISN supports a framework or architecture that enables government agencies, motor carriers, and other parties to exchange information and conduct business transactions electronically. This framework is designed to address the inability of state agencies to share commercial vehicle operations data electronically with other agencies in the State and in other states. By electronically linking government agencies and motor carriers, CVISN aims to improve safety, streamline credentialing and regulatory systems and procedures, and increase the productivity of the motor carrier industry.

Georgia's Participation in CVISN

The State of Georgia has a strong history of interest and participation in ITS/Commercial Vehicle Operations (CVO), dating back to 1997. Georgia completed its required documentation to obtain Federal funding in fall 2000, and these documents were accepted by FMCSA. In the ensuing years, Georgia's CVISN structure experienced changes in organization and personnel. Advances in technology and changes in technology preferences impacted the CVISN projects described in the original documents, from the particular systems to be deployed to the interfaces between systems. Furthermore, state funding in the absence of Federal Deployment Funds was not sufficient to support deployment of the complete suite of Core CVISN capabilities. Recently, the CVISN team has reconvened and has expressed its commitment to achieving Core CVISN compliance.

Changes in Georgia's CVISN organizational structure since 2000 have affected how commercial vehicle operations are conducted in the State. Roadside inspections, previously completed by the Public Service Commission, are now performed by the Department of Public Safety (DPS), Motor Carrier Compliance Division (MCCD). Weigh stations, previously staffed by the GDOT, are now staffed by DPS-MCCD. In addition, DPS previously administered driver licensing, which is now performed by the Department of Driver Services (DDS).

The State of Georgia recently updated its required CVISN documents and affirmed Georgia's commitment to complete the implementation of all Core CVISN capabilities. In addition, Georgia intends to implement Expanded CVISN capabilities to further improve commercial vehicle safety, security, mobility, and productivity.

The Department of Revenue (DOR) is the lead agency for CVISN. The lead agency provides focused leadership for CVISN activities extending from the planning phase through deployment. DOR also is the lead agency for five of the planned CVISN projects. DOR is supported by two state agencies, GDOT and DPS, which are the co-lead agencies for the remaining planned CVISN project. Together, these three agencies are largely responsible for the regulation and enforcement of commercial motor vehicles (CMV) in Georgia. The agencies are listed below with their high-level CVO-related responsibilities.

- **DOR –** IRP, IFTA, titling, intrastate vehicle registration, Unified Carrier Registration (UCR), intrastate operating authority, and Performance and Registration Information Systems Management (PRISM) deskside processes;
- **GDOT –** Oversize and overweight (OS/OW) permitting, mainline weigh-in-motion (WIM) systems, and memorandum of understanding (MOU) with Heavy Vehicle Electronic License Plate (HELP), Inc. (PrePass electronic screening system governing body); and
- **DPS –** Size and weight enforcement, roadside safety inspections, roadside credentials enforcement, carrier compliance reviews, electronic screening

operations roadside oversight, hazardous materials permitting and enforcement, and amber lights permitting.

Current Accomplishments Related to Size and Weight

All of Georgia's 19 weigh stations support Core CVISN-compliant electronic screening in the form of **PrePass**[29], which is a transponder-based electronic screening system owned, installed, and administered by HELP, Inc. Enrolled vehicles are screened according to safety history and credentials status; safe and legal vehicles are allowed to bypass without slowing down or stopping. The first Georgia sites were operational in January 2007; the last went on-line in Dec. 2007.

GDOT executed the MOU with HELP, Inc. that established PrePass in Georgia, and serves as the lead administrative agency for the state's participation. Weight station personnel oversee the 'e-screening' operations at the roadside. None of the facilities is equipped with mainline WIM at this time, although all support WIM on the entrance ramp.

Planned CVISN Deployment Projects Related to Size and Weight

Six projects are identified in the CVISN Program Plan and Top-Level Design as candidates for future deployment. Three of those projects have direct relationship to size and weight activities, and are described below.

Commercial Vehicle Information Exchange Window ("CVIEW")

CVIEW serves as the core CVO data exchange system in Georgia[30]. Its primary focus is exchange data among multiple systems within the state. CVIEW also exchanges data with the SAFER and PRISM national systems. Like these systems, CVIEW collects data from multiple sources so that users can access the data they need from a single place. Users include roadside enforcement and state administrative offices responsible for credentialing, licensing, and permitting systems.

Before a credential is issued, the credentialing system (e.g., IRP, IFTA, OS/OW permitting) will check the carrier's status (e.g., IRP, IFTA, UCR, title, PRISM MCSIP, OOS) in CVIEW and after the credential is issued will send updated information to CVIEW for incorporation into the carrier and vehicle snapshots. The Motor Carrier Compliance Division of the Department of Public Safety will access CVIEW snapshots at the roadside for enforcement purposes. Snapshots also will be used at virtual weigh stations and possibly at PrePass sites. Motor carriers view their own information that is stored in the CVIEW database.

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[29] http://www.prepass.com/services/prepass/Pages/WhatIsPrepass.aspx

[30] http://cvisn.fmcsa.dot.gov/default.aspx?PageID=cview

This project implements the Core CVISN capability for a CVIEW (or equivalent) system for the exchange of intrastate and interstate data within the State and connection to SAFER for exchange of Interstate data through snapshots.

E-Credentialing Portal

The electronic credentialing portal provides a one-stop shopping experience for the users of Georgia CVISN systems. It has a single sign-on capability so that users need only enter their username and password once for selected applications. Once a user has been authenticated, the portal displays the appropriate links to allow access to the system(s) for which they are authorized.

The portal is accessible from the Department of Revenue's web site at www.cvisn.dor.ga.gov.

The Georgia electronic credentialing portal supports:

- On-line registration requests by users;
- Single sign-on capability that allows access to all participating applications a user is authorized for; and
- Access to on-line applications based on the user type.

At a minimum, the applications accessed through the portal include:

- Carrier portal account and demographic information; and
- IRP, IFTA licensing and fuel tax filing, UCR, and OS/OW permitting, with CVIEW also available for the carrier to view its own safety and credentials information.

Implementation of the portal is not a Core CVISN requirement; rather, it represents Expanded CVISN functionality in the expanded e-credentialing area. Nonetheless, Georgia considers it essential to its Core CVISN program by providing a single point of authentication for end users to access all CVISN credentialing applications for which the user is authorized.

Through GDOT's membership in the I-95 Corridor Coalition, the state of Georgia's portal is also available with all east coast states on the coalition's website: http://www.i95coalition.org/commercial-vehicle-operations-online-portal/#Georgia

Virtual Weigh Station

With inspection resources stretched thin due to increasing traffic volumes, staffing cuts, and expansion of roles and activities, states are deploying virtual weigh stations to enhance their weight enforcement efforts and monitor commercial vehicles on more roads without the use of on-site staff and with a smaller investment in equipment. A virtual weigh station is a roadside enforcement facility that does not require continuous staffing and is monitored

from another location, and which typically includes a WIM installation, a camera system, and high-speed communications, for use in real-time truck screening.

Virtual weigh stations are intended to mimic the capabilities of a fixed weigh station. Typically, one is located where a fixed weigh station would not be feasible for environmental or cost reasons. For example, virtual sites can be located in urban areas more readily than fixed, staffed weigh stations. They also may be located where a fixed, staffed site is not needed, but where violators are likely to travel. Depending on the technologies present, virtual weigh stations provide at least the same information about a vehicle as does a traditional weigh station.

Virtual weigh station deployment is not a Core CVISN requirement; rather, it represents Expanded CVISN functionality in the Smart Roadside area. Virtual weigh stations are deemed to be a key component of Georgia's overall commercial vehicle enforcement strategy, rounding out enforcement activities conducted at fixed weigh stations and by mobile enforcement teams. Virtual weigh stations will provide Georgia with a cost-effective tool to monitor and enforce truck weights on bypass and secondary routes.

In this project, a pilot location will be equipped with WIM, automatic vehicle identification, and screening capabilities to monitor commercial vehicles that travel past the virtual weigh station. All screening capabilities may not be operational at the time of initial rollout, but they will be added as soon as they are operational (e.g., CVIEW data). In the interim, temporary interfaces may be developed to allow screening on safety in addition to weight.

A U.S. DOT number reader and a license plate reader (LPR) will provide automatic vehicle identification (AVI) capabilities. A U.S. DOT number reader uses a camera and optical character recognition (OCR) technology to capture the U.S. DOT number from the side of the vehicle and identify the carrier. A license plate reader uses a camera and OCR to automatically "read" a license plate and identify the vehicle. Both the U.S. DOT number reader and LPR can interface with CVIEW to retrieve safety and credentials information associated with the carrier and vehicle identified automatically by its U.S. DOT number and license plate, respectively, for use in automated screening. Additionally, license plates can be searched in the Georgia Crime Information Center (GCIC)/National Crime Information Center (NCIC) or other database or list, further expanding the screening factors. An overview camera also will be installed to capture a broader image of the vehicle. A WIM system will be deployed for weight screening.

Deployment of a U.S. DOT number reader and LPR at the virtual weigh station will allow screening on safety, credentials, and criminal justice information as well as weight and can considerably reduce the time required to retrieve additional information about a suspect vehicle.

9.4 SIZE AND WEIGHT TRENDS IN TRUCKING

Federal and state transportation policy-makers are considering increasing truck size and weight limits as a means of increasing the productivity of the freight system. Increasing size and weight limits would decrease the number of trucks needed to move goods, thereby decreasing congestion, emissions and the number of truck-involved crashes by reducing truck VMT. However, increasing these limits also has the potential to exacerbate damage to the nation's deteriorating bridge and pavement infrastructure. Heavier trucks also have the potential to cause more severe crashes as the physical impacts of these trucks would increase.

The rail industry has been a vocal opponent of increasing truck size and weight regulations stating that the benefits are overstated and that rail would lose mode share and many shortline railroads would cease operations. Within this debate, several specific policy actions are being discussed or implemented. This section highlights a few of these methods and provides some relevant data on them, including the prominent debate over congressional proposals for a six-axle, 97,000-pound truck limit.

The Potential Six-Axle 97,000 Pound Vehicle

In 2010, a new bill was introduced into the U.S. Senate that, if passed, would allow state departments of transportation to raise their Interstate weight limits to 97,000 pounds if a vehicle was operating with six axles. The proposal has strong support from the trucking industry, shippers, and some states – including Vermont and Maine – where heavy trucks currently pass through village and town centers on the state network. The proposed configuration was tested during a one-year congressionally-authorized pilot period on the Interstates of Vermont and I-95 in Maine. Currently, U.S. DOT is preparing a report to Congress on the impacts of the one-year pilot on bridge durability, pavements, highway safety, commerce, traffic volumes, and energy. The results of that study may provide a template for other states to analyze the potential impacts of allowing the six-axle 97,000-pound truck onto their systems. If the proposal becomes Federal law, Georgia could allow the six-axle 97-kip configuration on its Interstate system.

Until the Vermont-Maine Study is complete, states like Georgia may look to studies conducted by other states on the potential effect of the six-axle 97-kip truck. The most recent examination was completed by the Wisconsin DOT, which analyzed the impacts on state and interstate highways of a very similar six-axle 98-kip truck.

Wisconsin Truck Size and Weight Study: Six-Axle 98-Kip Truck Results

According to the Wisconsin study, if Federal law allowed the six-axle 98-kip truck on its Interstate system, the configuration would provide a significant savings to shippers and would slightly reduce truck VMT, leading to safety and

congestion savings. The analysis also showed savings to the State's highway pavement budget because of the distribution of weight on six axles causing less wear on the pavement. The negative finding of the study related to bridges and found that the six-axle 98-kip truck would require additional state bridge funding in addition to the existing backlog of bridge costs. Even with the increased bridge costs, the study concluded that the six-axle truck would provide net benefits. Table 9.2 summarizes the findings of the six-axle 98-kip truck analysis.

Table 9.2 Annual Costs and Benefits for Candidate Configurations Assuming Interstate Operation is Allowable

System User Benefits			Public Agency Benefits and Impacts			Net Benefits	
Transport Savings	Safety	Congestion	Pavement	Bridge Costs for TSW Configs	Baseline Bridge Costs	With TSW Bridge Costs Only	With All Bridge Costs
127.94	9.40	11.03	10.19	(8.48)	(55.50)	150.09	94.59

Note: All values in millions (assumes Interstate highway and non-Interstate highway operation).

In addition to the metrics listed in Table 9.2, the Wisconsin study also considered the safety performance of the six-axle 98-kip truck. Using the University of Michigan Transportation Research Center (UMTRI) physical modeling capabilities, the study tested the six-axle 98,000 pound configuration against internationally accepted safety performance standards and it received passing grades in all of the tests by satisfying the target value thresholds. The results are shown for the various safety tests in Table 9.3.

Table 9.3 Performance Measures for the Six- and Seven-Axle Tractor Semitrailer

Performance Measure	Target Value	Six-Axle Semi 98,000	Performance
Static Rollover Threshold (Ideal)	0.35g (minimum)	0.40g	Satisfactory
Load Transfer Ratio	0.60 (maximum)	0.309	Satisfactory
Rearward Amplification	2.00 (maximum)	0.977	Satisfactory
High-Speed Transient Offtracking	2.62 feet (maximum)	0.36 feet	Satisfactory
High-Speed Offtracking	1.51 feet (maximum)	0.93 feet	Satisfactory
Low-Speed Offtracking	19.69 feet (maximum)	19.03 feet	Satisfactory

In addition to the Wisconsin study, it should be noted that in 2001 the United Kingdom raised its gross vehicle weight limit to 97,000 pounds for six-axle vehicles. Their data shows a 35-percent reduction in fatal truck-involved crashes and an overall decline in VMT for trucks over the past decade. Canada and other

parts of Europe currently have higher weight limits than the United States as well.

Interoperability and Uniformity across States

The national themes within the heavy-haul community tend to be divided into Federal and state topics. National topics of interest to the heavy-haul community include topics common to many other carriers such as hours of service rules and electronic on-board recorders, as well as specialized topics such as general size and weight laws for the Interstate and load securement and other highway safety standards.

At the state level, concerns raised by industry leaders often involve the following three topics:

1. Regional permitting of OSOW loads. This is less of an issue in Georgia, where Georgia is one the states in the region with procedures to allow for a base regional permit and an envelope vehicle[31], than it is in other parts of the country such as New England and the Midwest.
2. Best practices in pilot car and escorts. Again, this is less of an issue in Georgia, where the DOT has established a certified escort program through local colleges.
3. Standardization of permit weight regulations, including tandem and tridem axle grouping maximum weights. This is more of an issue in Georgia; as noted earlier, Georgia has a lower maximum weight for its annual permits than its neighboring states, and the various states in the region differ when it comes to allowed weights for groupings.

The general theme of the heavy-haul industry's comments at various industry events is the need to balance the prerogative of each state to adjust laws and regulations to meet the unique needs of the State against the needs of businesses operating across states to have a more uniform operating model to provide increased operating efficiency and improved safety.

9.5 KEY FINDINGS AND ISSUES ON TRUCK SIZE AND WEIGHT

As of the time this document was first developed, the following key findings and issues were identified in this chapter on truck size and weight:

- The number of oversize and overweight permits is increasing at a rapid rate in Georgia and most other states in the U.S.

[31] http://perba.dotd.louisiana.gov/welcome.nsf

- Permit fees are relatively low, and do not appear to cover additional wear and tear on the State's infrastructure
- Georgia's maximum gross vehicle weight limit of 100,000 pounds is significantly lower than those of some neighboring states, which utilize 150,000 pounds. This can add extra costs to the trucking industry as they are forced to use multiple shipments or attempt to bypass the State.
- Switching to a 6-axle, 97,000 pound weight limit would provide substantial savings to the trucking industry and shippers across Georgia and the rest of the U.S. In 2010, legislation was introduced in the U.S. Senate to change the limits, but the bill did not advance.
- Oversize and overweight vehicles are particularly negatively impacted by the trend towards more roundabouts in road design.
- There is a significant disconnect between bridge maintenance and the needs of oversize overweight trucks in Georgia such that vehicles often travel two and three times as long as legal commercial vehicles to reach their destination.

9.6 MAP-21 COMPREHENSIVE TRUCK SIZE AND WEIGHT LIMITS STUDY

More recently, US DOT completed a national truck size and weight study. Provisions in MAP-21, the Moving Ahead for Progress in the 21st Century Act required the USDOT to conduct a Comprehensive Truck Size and Weight Limits Study addressing differences in safety risks, infrastructure impacts, and the effect on levels of enforcement between trucks operating at or within federal truck size and weight (TSW) limits and trucks legally operating in excess of federal limits; comparing and contrasting the potential safety and infrastructure impacts of alternative configurations (including configurations that exceed current federal TSW limits) to the current Federal TSW law and regulations; and, estimating the effects of freight diversion due to these alternative configurations.[32]

[32] http://ops.fhwa.dot.gov/freight/sw/map21tswstudy/index.htm

10.0 Needs and Issues: Alternative Fuels

10.1 TYPES OF FUELS

Diesel has historically been the fuel of choice for truck manufacturers in the United States. This is primarily due to its fuel efficiency relative to gasoline. Diesel engines also produce higher levels of torque than gasoline engines making them even more fuel efficient as the vehicle's loaded weight increases. Diesel engines do have higher costs than gasoline engines to purchase and maintain, but these higher costs are more than offset by the fuel efficiency of diesel engines along with their higher durability. However, diesel prices have risen significantly over the last two decades along with price of gasoline (see Figure 10.1). From 1994 to 1999, the price of diesel was close to $1 per gallon. Between 2000 and 2005, diesel prices rose from $1 to $2 per gallon, and as of May 2011 they are above $4 per gallon. As discussed in Chapter 2, fuel represents roughly 25 percent of the costs of the average trucking company. Therefore, diesel fuel prices going up by 400 percent in a decade has the impact of doubling the total costs of the average trucking firm. This has a significant impact on trucking profitability, costs to shippers, and final costs to consumers.

Figure 10-1 Monthly Diesel Prices in the United States, 1994 to 2011

Source: U.S. Energy Information Association Weekly Diesel Prices.

The rise in the price of diesel has led to increased consideration of an alternative fuel source for the onroad trucking fleet. There are various types of alternative fuel options, but most of them are not widely available and have issues of

supply, high cost, and technological immaturity. Others are not practical for heavy truck fleets. Table 10.1 compares the different kinds of fuel options in terms of fuel source, applications, fuel cost, emission reductions, refueling infrastructure and energy security. Neither ethanol nor electric fuels are viable options for heavy-duty vehicles as the technology to produce these engines is still immature. Biofuel can reduce PM, CO, and hydrocarbon emissions, but may slightly increase NO_x emissions. Usually, a blend of 20 percent biodiesel is used with diesel and no engine change is needed. In Georgia, biodiesel use is advocated because of the availability of various agricultural feedstock needed to produce biodiesel. However, a vastly increased usage of biodiesel would put significant price pressure on the price of agricultural products that are consumed by the general population.

For these reasons, much of the consideration of alternative fuels for trucks has centered on the potential for expanding the use of natural gas. The proponents of increased use of natural gas have cited three main reasons for supporting its increased use in the United States:

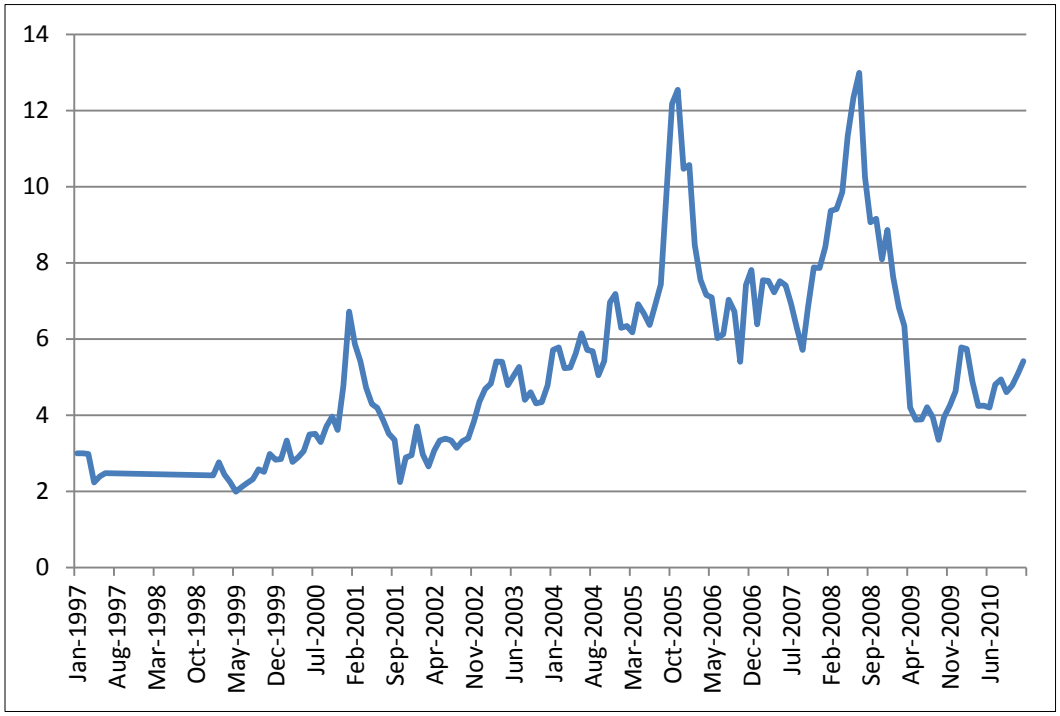
- **Natural gas is currently cheaper than the other forms of energy.** Recent technological development has allowed for the identification and extraction of significant natural gas reserves around the world. Much of this natural gas is located in the U.S. This increased supply has managed to significantly reduce the price of natural gas from its 2008 high back to 2003 prices making it extraordinarily inexpensive compared to diesel fuel. Figure 10.2 shows the price of natural gas over the past 25 years. These cost savings would translate into higher profitability for Georgia's trucking industry and for shippers across the State.
- **Natural gas is relatively cleaner than other nonrenewable sources**, particularly diesel and gasoline. Table 10.1 shows that use of natural gas rather than diesel in trucks would reduce carbon monoxide and particulate matter emissions by over 90 percent; it would reduce hydrocarbon emissions by over 50 percent; and it would reduce NO_x emissions by between 35 and 60 percent. These emissions reductions far exceed the reductions being generated by programs currently in operation.
- **Natural gas is largely produced in the United States.** This can be compared to diesel fuel which is primarily generated from imported oil. Switching the trucking fleet to natural gas would decrease U.S. imports and, therefore, boost economic output and employment domestically. Additionally, proponents of natural gas argue that reducing the U.S. dependence on foreign sources of energy will provide greater flexibility to U.S. foreign policy, particularly in regards to U.S. relations with countries that produce large quantities of oil that have competing political interests with the U.S.

Table 10.1 Issues Regarding Different Types of Alternative Fuels

Fuel Type	Main Fuel Source	Applications	Approximate Fuel Cost	Emission Reductions	Refueling Infrastructure	Energy Security
Biodiesel	Soybean Oil, waste cooking oil, animals fats, and rapeseed oil	Light-Duty (LD) and HD diesel vehicles.	Less than petroleum diesel. Slightly more expensive than diesel or gasoline	B20: CO – 12.6%, HC -11%, NO_x +1.2%, PM -15%; B100: CO -43.2%, HC – 56.3%, NO_x +5.8%, PM -70%	Easily blended in existing diesel pumps and tanks. Several fleets use blends higher than the common B2 blend. Available in bulk form from many suppliers, 22 states have stations to public. 27 stations in Georgia.	Domestically produced, fossil fuel inputs similar to petroleum.
Diesel	Crude Oil	Many types of Vehicle classes. Main fuel for HD vehicles.	Slightly less than gasoline.	Can be reduced to varying degrees based on different retrofit technologies	Available at select fueling stations throughout the country	Not secure. Manufactured using imported oil.
E85-Ethanol	Corn, grains or agricultural waste	Many Light-Duty (LD) vehicles available as Flex Fuel Vehicles (FFV) capable of running on any blend of E85 and gasoline.	Less than gasoline or diesel. Also less BTUs/gallon.	CO – 40%, VOCs -15%, NO_x -10%, PM -20%	Use existing gasoline/diesel infrastructure with minor modifications. 25 stations in Georgia, almost all for government use.	Domestically produced and renewable.
Electric/Hybrid Electric Vehicle (EV/HEV)	Coal; nuclear, natural gas, hydro-electric, and other renewable sources also possible.	Neighborhood EVs (NEV) for campus and planned communities, alternative fuel HEV and Electric transit and shuttle.	Less than gasoline and diesel. No Federal and state tax.	Potential zero emissions for EVs if solar charged. HEVs offer significant emission reductions over conventional models.	NEVs are charged in 110V outlets. For transit application fast charge 220V is available. May need special charging outlets for HD trucks.	Coal is a stable fuel source that is domestically produced.
Liquefied Natural Gas (LNG)	Underground reserves	HD trucks, LNG appropriate for HD long-distance vehicles.	Significantly less than gasoline and diesel.	CO – 90-97%, HC -50-75%, NO_x -35-60%, PM -90-97% (CNG/LNG combined)	For home and small-med fleets - $2,000-$90,000. Large fleet refueling $250,000. Public LNG stations limited (<40 nationally).	Domestically produced.

Source: U.S. Department of Energy, American Lung Association, and Project team analysis

Figure 10-2 Price of U.S. Natural Gas LNG Imports
Dollars per Thousand Cubic Feet



Source: U.S. Energy Information Administration

In addition, there have been dramatic recent improvements to the technology for identifying and extracting natural gas reserves. For example, a recent discovery of the Marcellus Shale in the Mid-Atlantic region of the United States is estimated to contain more than 500 trillion cubic feet of natural gas, enough gas to supply the entire United States for two years. The presence of such volumes of gas in the Eastern United States has great economic significance in stabilizing the supply of natural gas and gives natural gas a distinct advantage in the marketplace.[33]

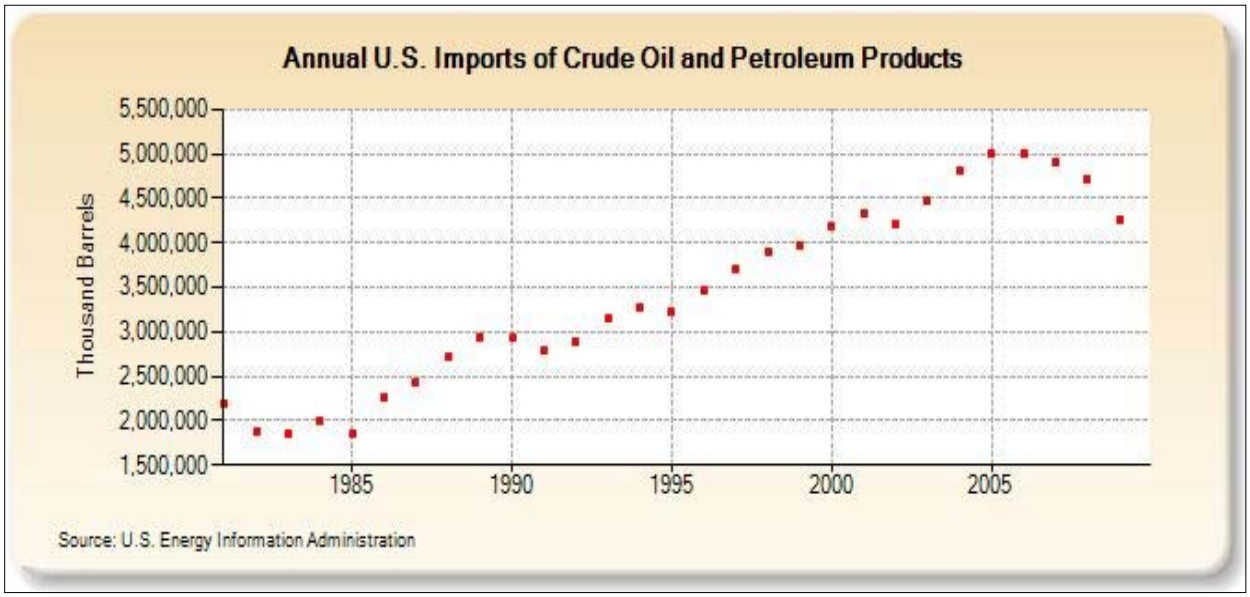
10.2 U.S. Dependence on Foreign Oil

Over the last several decades, U.S. dependence on foreign oil has soared from about 2 billion barrels in 1980 to about 5 billion barrels in 2005 (Figure 10.3). This amount has decreased somewhat over the last few years due to the recent recession. These large amounts of annual imports are largely attributable to high demand from the transportation sector. In 2004, transportation consumed nearly

[33] http://geology.com/articles/marcellus-shale.shtml

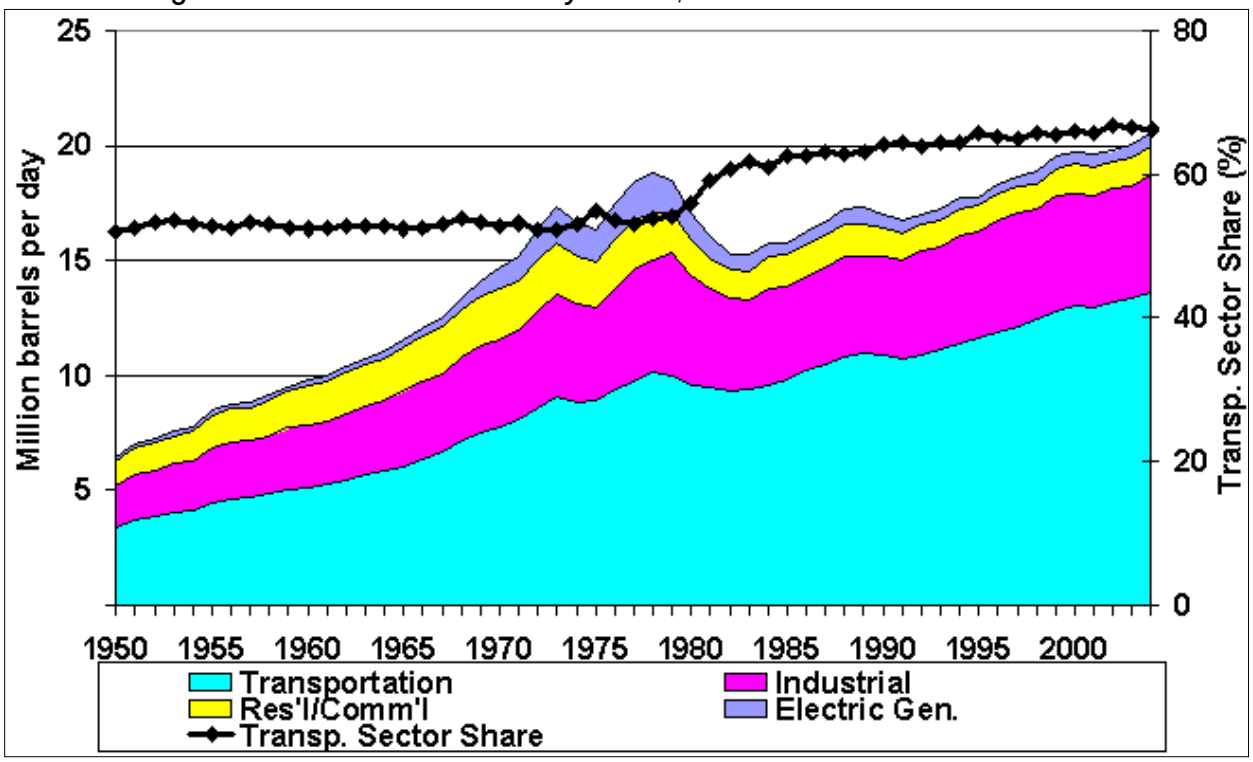
65 percent of all crude oil demands in the United States (Figure 10.4). Freight plays a significant role in oil dependence as freight trucks in 2008 accounted for 15 percent of total petroleum consumption and will account for 20 percent of petroleum consumption for the transportation sector in 2035.[34]

Figure 10-3 Annual U.S. Imports of Crude Oil and Petroleum Products



[34] www.eia.doe.gov/oiaf/aeo/otheranalysis/aeo_2010analysispapers/natgas_fuel.html

Figure 10-4 U.S. Oil Demand by Sector, 1950 to 2004



Source: U.S. Energy Information Administration Monthly Oil Demand Statistics.

10.3 DESCRIPTION OF NATURAL GAS MARKET

Natural gas can be divided into compressed natural gas (CNG) and liquefied natural gas (LNG). CNG currently is the more widely available form of natural gas and already is being successfully used in short-range, centrally fueled vehicles such as refuse trucks, concrete mixers, straight trucks, and school buses. However, CNG is believed to be an impractical fuel for long-distance freight trucks because its lower energy density limits vehicle range and necessitates more frequent fill-ups. LNG is likely to be a better option for longer-distance freight trucks. It has higher energy density than CNG, but there currently is no LNG refueling infrastructure. The simplest technology solution would be to add natural gas refueling stations to the central owner-operated facilities that service shorter-range trucks and buses. Long-range, heavy-duty trucks, on the other hand, refill at public gas stations, and would require a broader infrastructure to allow for the implementation of natural gas.

The benefits of natural gas usage in trucks for emissions reductions have been documented in several real-world examples. For instance, in a study of the City of Los Angeles Bureau of Sanitation LNG Heavy-Duty Trucks, a 23 percent reduction in nitrogen oxides emissions from dual-fuel LNG refuse trucks

compared with diesel trucks was recorded.[35] Exact amounts of emission reduction vary by engine design, year, and other factors, in general. However, the following potential reductions offered by LNG relative to diesel have been documented as[36]:

- Production of half the particulate matter of average diesel vehicles;
- Significant reduction in carbon monoxide emissions;
- Reductions of nitrogen oxide and volatile organic hydrocarbon emissions by 50 percent or more;
- Potential reductions in carbon dioxide emissions of 25 percent depending on the source of the natural gas;
- Drastic reductions in toxic and carcinogenic pollutants; and
- Increase in methane emissions (not a reduction).

10.4 NATURAL GAS VS. DIESEL TRUCK COST: COMPARISON

Many short range truck and bus fleets have transitioned to natural gas to take advantage of the life-cycle cost savings of this fuel. Transit buses now account for about 66 percent of all vehicular natural gas use. 26 percent of all new transit bus orders in 2009 were for natural gas. Additionally, 11 percent of natural gas use in the U.S. is for waste collection and transfer vehicles, and this demand is reportedly growing.[37]

This section provides general information on the cost differential between natural gas trucks and diesel trucks. The cost to purchase a new heavy-duty diesel truck averages around $130,000 and the cost can be higher or lower depending on the size and characteristics of the truck.[38] According to the EIA, the cost to purchase a natural gas truck is $17,000 higher for light/heavy-duty vehicles, $40,000 more for medium/heavy-duty vehicles, and $60,000 more for heavy/heavy-duty trucks. The additional cost is primarily due to the need for highly insulated tanks to hold the liquefied natural gas. The technology for these tanks is relatively mature and is, therefore, not expected to decrease significantly over time.[39]

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[35] www.afdc.energy.gov/afdc/pdfs/35115.pdf

[36] www.afdc.energy.gov/afdc/vehicles/natural_gas_emissions.html

[37] https://www.ngvamerica.org/about-us/

[38] www.trucks.com; ATRI personnel

[39] www.eia.doe.gov/oiaf/aeo/otheranalysis/aeo_2010analysispapers/natgas_fuel.html

The EIA also estimates that converting an existing diesel engine to a natural gas engine would cost between $6,000 and $12,000 depending on the design of the engine. This conversion also would require the installation of the insulated tanks mentioned in the previous paragraph, which would add additional costs to the conversion.[40]

Due to the lower cost of natural gas, the operating costs of a natural gas truck are significantly less than for diesel trucks. As of the spring of 2011, this savings in fuel is roughly $2 per gallon for natural gas. For a long-haul truck that travels 120,000 miles in a year, this equates to a savings of $36,923 per year. Therefore, the payback period for the more expensive capital cost incurred for a long-haul truck is a little over one and a half years (Table 10.2). The payback period for a simple engine conversion can be as short as six months.[41]

The primary reason that the trucking industry does not switch to natural gas is the lack of a nationwide LNG or CNG refueling infrastructure. As mentioned previously, most LNG refueling stations are privately owned, and there are limited numbers of public stations as are available for diesel. There are only 825 CNG and 39 LNG refueling stations throughout the U.S., according to the Department of Energy compared to approximately 68,000 stations that sell diesel. Building fueling stations can be extremely costly. Currently, a natural gas fueling station costs over $1 million to build. Given the slightly lower driving ranges of LNG relative to diesel trucks, an even more extensive network would need to be developed.[42]

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[40] www.omnitekcorp.com/altfuel.htm

[41] www.omnitekcorp.com/altfuel.htm

[42] www.eia.doe.gov/oiaf/aeo/otheranalysis/aeo_2010analysispapers/natgas_fuel.html

Table 10.2 High-Level Analysis for Estimated Payback Period for New Natural Gas Long-Haul Truck

Item	Amount	Source
Cost for a New Long-Haul Diesel Truck	130,000	Truck.com and Others
Increased Cost of a Natural Gas Truck	60,000	EIA
Cost for a New Long-Haul Natural Gas Truck	190,000	Derived
Average Annual Mileage for a Long-Haul Truck	120,000	NAP[43]
Miles Per Gallon of Diesel Trucks	6.5	Various[44]
Gallons of Diesel Fuel Consumed per Year	18,461	Derived
Savings Per Equivalent Gallon of Natural Gas Relative to Diesel	2	EIA
Annual Savings for Natural Gas Trucks	36,923	Derived
Payback Time for Diesel Truck	1.6	Derived

10.5 LEGISLATIVE TRENDS

As of the time this report was developed, the advantages for natural gas for the trucking fleet generated some momentum for legislation related to creating incentives to accelerate the switch of trucks from diesel to natural gas. Most notably, the New Alternative Transportation to Give Americans Solutions Act, or NAT GAS Act (S. 1408), sponsored by Sens. Robert Menendez (D-NJ), Harry Reid (D-NV), and Orrin Hatch (R-UT). Its House companion (H.R. 1835) is sponsored by Reps. Dan Boren (D-OK), John Larson (D-CT), and John Sullivan (R-OK). These bills would create economic incentives to boost investments in heavy-duty vehicles powered by natural gas and the necessary refueling infrastructure. According to the Center for American Progress, the key provisions in the bill are increasing and extending several key tax credits as described in below in the bulleted list:[45]

- **Alternative Fuel Tax Credit –** Allows natural gas users to receive a 50-cent credit per 121 cubic feet (for CNG) or gallon (for LNG) of natural gas they purchase through at least 2019.
- **Alternative Fueled Vehicle Tax Credits –** Makes all dedicated natural gas vehicles eligible for a credit equal to 80 percent of the vehicle's incremental cost; makes all bio-fuel natural gas vehicles eligible for a credit equal to 50

[43] Report on "Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles," The National Academy Press, 2010

[44] www.volvoadvantage.com/fuelcalc_plain.php; Report on "Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles" The National Academy Press 2010; and ATRI Personnel

[45] https://www.americanprogress.org/issues/green/report/2010/04/14/7577/american-fuel/

percent of the vehicle's incremental cost; and increases the light-duty vehicle purchase tax credit by 150 percent – from $5,000 to $12,500 – and doubles the vehicle purchase tax credits for all other vehicle weight classes.

- **Alternative Minimum Tax Applicability –** Allows the natural gas vehicle and fueling infrastructure tax credits to count against the alternative minimum tax provisions and makes them transferable under certain conditions.
- **Refueling Property Tax Credit –** Creates an incentive to build CNG or LNG refueling facilities by increasing the refueling property tax credit from 50 percent or $50,000 per station to 50 percent or $100,000 per station.
- **Research and Development Grants –** Provide grants through the Department of Energy to light- and heavy-duty engine manufacturers for research and development of better natural gas engines.

The bill also encourages the Federal government to set an example by mandating the purchase of alternative fuel vehicles, including natural gas vehicles, in its fleet. It also expresses that the EPA should streamline the process for certifying natural gas vehicle retrofit kits.

The impact of natural gas trucks on the diesel fleet in Georgia has the potential to be significant. Even without a national program, implementation of a program in Georgia or in a broader Southeast U.S. has the potential to decrease logistics costs for Georgia companies and thereby increase the economic competitiveness of companies that are located in Georgia or considering relocating to the State.

10.6 KEY ISSUES ON ALTERNATIVE FUELS

The following key issues have been identified in this chapter on alternative fuels:

- Diesel fuel prices have risen significantly, virtually doubling the total costs of the average trucking firm.
- Natural gas appears to be the most viable alternative fuel for consideration for trucking activity. It is cheaper, so it can reduce costs to the trucking industry and its customers. It produces far less emissions than diesel trucks. It also is domestically produced giving it the potential to boost the U.S. economy, reduce the trade deficit, and reduce our reliance on foreign countries with opposing political objectives.
- The biggest impediment to wide adoption of natural gas is the lack of a regional or national fueling infrastructure. There is current legislation to provide incentives to speed the adoption of natural gas, but it has not yet passed through the Congress.

11.0 Summary of Key Truck Findings, Needs, and Issues

This section compiles a summary of the key findings, needs and issues identified throughout this report. These key findings summarize the state of the trucking industry and Georgia's transportation system in regards to goods movement. They also will feed into the solutions identification and prioritization activities that will occur in future tasks.

11.1 TRUCKING INDUSTRY FUNDAMENTALS

The trucking industry is one of Georgia's largest industries. In Georgia, trucking provides 1 in 14 jobs, paid wages of nearly $12 billion in 2008, and 40 percent of all taxes and fees paid by Georgia motorists. The trucking industry is also the core component of the goods movement system. It moves over 70 percent of the State's goods by tonnage and value, and it provides last-mile connectivity for each of the other freight modes. Efforts to make Georgia's trucking industry more efficient will be beneficial for truckers, the movement of goods, and the State's economy as a whole.

Employee costs and fuel costs are the primary costs involved in the trucking industry. Vehicle fleet capital cost is a distant third. Improvements to the highway infrastructure allows for truck fleets to be more efficient in their utilization of labor, it also reduces fuel consumption through better travel speeds.

Georgia's interstate system is by far the most critical infrastructure utilized by the trucking industry. Even though it represents less than one percent of the State's roads, Georgia's interstate system carries the vast majority of truck VMT. The alignment of the interstate system is so effective that there are no non-interstate roads in Georgia with a significant truck volume. Continued investment in the interstate system is the most efficient means of benefiting the State's trucking industry.

11.2 GEOGRAPHIC DISTRIBUTION OF TRUCKING ACTIVITY

Georgia has a growing logistics and distribution business, with large facilities located all around the state. As of July 2013, there were 26 facilities with 1 million ft^2, and 80 between one-half and one million ft^2.[46]

The Atlanta metropolitan region is the top generator of trucking activity in the state. Due to its large population and its geographic location, there is a significant amount of trucking activity that is moving in and out of the Atlanta region, and there is a significant fraction of trucking activity attempting to go around the Atlanta region. Fulton County alone is estimated to attract 27 percent of all of the trucking activity in the state. Four of the top five counties in terms of truck tonnage are located in the Atlanta region: Fulton, Gwinnett, DeKalb, and Cobb. The highest truck volumes on the state are found on I-75 just outside of I-285 and the "western wall" of I-285 that connects I-75 on both sides of Atlanta. These are the locations where the State's long-haul truck traffic and the local distribution truck traffic intersect. The Atlanta region is also home to the largest fraction of warehouses, distribution centers, logistics firms, and logistics users in the state.

The container traffic moving through the Port of Savannah makes the Savannah region the second highest location of truck activity in the state. Chatham County alone generates over 20 percent of the state's outbound truck traffic. Savannah also has the second highest concentration of freight facilities in Georgia. This trucking activity has turned I-16 into a truck expressway moving goods from the port to inland destinations around Georgia and throughout the U.S.

Florida is the most important neighboring state for Georgia in terms of trucking activity. Due to its status as the 4th largest economy in the U.S., Florida is Georgia's top trading partner in terms of truck tonnage. However, Florida also generates the vast majority of through truck traffic for the state. Roughly 30 percent of the trucks entering the state travel through the state without making any drop-offs or pickups. Over half of the truck traffic on I-95 is through truck traffic. The vast majority of the through truck traffic in Georgia is moving in or out of Florida. At the other end of the spectrum, Tennessee primarily serves as a pass-through state for Georgia trucks. Most of the trucks leaving Georgia on I-75 go through Tennessee on the way to states in the Midwest.

There are several smaller counties from a population perspective that have relatively large portions of truck tonnage based on the TRANSEARCH freight flow data. These include Tift County due to a combination of manufactured and

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[46] http://selectgeorgia.com/publications/WarehousingandLogisticsIndustry.pdf

food products, Coffee County due to nonmetallic minerals, Glynn County due to the Port of Brunswick, Floyd County due to nonmetallic minerals, Whitfield County due to textile mill products, and Washington County due to kaolin.

There appears to be limited long-term truck parking on select corridors in Georgia. Information from this analysis can be provided to the private sector to identify potential locations for future development of new parking facilities.

11.3 PERFORMANCE OF GEORGIA ROAD NETWORK

The Georgia trucking industry is significantly impacted by congestion. Not surprisingly, the most severe congestion is in the Atlanta metropolitan region. Based on the results of the GDOT statewide travel demand model, I-285 is heavily congested throughout its entire alignment. I-75, I-85 and I-20 tend to have their highest levels of congestion at I-285 with congestion decreasing moving further away from Atlanta.

The 2050 TRANSEARCH freight flow forecast estimates that truck tonnage will grow by 1.4 percent annually. Even with this relatively modest growth rate forecast, truck volumes will grow by nearly 70 percent across the state between 2007 and 2050.

I-85 has the longest stretches of congestion in the state. It has a current volume-to-capacity (V/C) ratio higher than one several miles north of the I-85 split with I-985. In 2050, I-85 is forecast to have a V/C ratio over 1.0 from Atlanta to the South Carolina border.

I-75 has the second longest stretch of congestion in the State. It has several segments of congestion between Macon and Chattanooga in 2006. In 2050, the vast majority of the interstate between Atlanta and Macon would have a V/C greater than 1.0. I-75 is also the corridor with the most severe congestion in the State. The GPS analysis indicated that three of the four most severe interstate segments in the State are along I-75.

I-20 has limited congestion outside of the Atlanta metropolitan region, both today and forecast out to 2050. I-95 and I-16 are forecast to operate well below capacity in 2050, except for a few shorter segments in the Savannah metropolitan region. The non-interstate road network in rural portions of the State are forecast to have adequate capacity to handle truck and auto volumes in 2050.

There is a significant amount of variability at Georgia's most congested locations resulting in added costs to the State's trucking industry.

11.4 TRUCK SAFETY

Truck-involved crashes are a critical issue for both truck and car motorists. In 2008 (the most recent data available when this report was first compiled), there were 180 fatalities in truck-involved crashes in Georgia and 3,800 injuries[47] ranking the state 22nd in terms of truck involved fatalities with 0.17 fatalities per 100 million truck miles traveled. Eighty-five percent of the fatalities in truck-involved fatal crashes in Georgia were involved passenger cars. For fatal crashes, the truck-involved crash rate is roughly 300% higher than the rate for auto-involved crashes.

From the data that was available, this report identified a significant crash frequency on I-285 between I-85 and Old National Highway near Hartsfield Jackson airport. Between 2005 and 2008, this location had the highest frequency of truck-involved crashes (1,308), truck-involved severe injury crashes (25), and truck-involved fatalities (12).

More generally, I-285 was a corridor with significant truck-involved crashes (6,271) crashes and above average crash rate (13 crashes per million truck VMT). I-285 also had the highest truck-involved fatal crash rate (0.07 fatal crashes per million truck VMT). This above-average crash rate may partially be contributed by the significant amount of vehicular weaving that occurs on I-285.

Outside of I-285, the crash analysis indicates that truck-involved crashes are severe in rural areas relative to urban areas. While 25% of total truck-involved crashes occurred in rural regions, 57% of truck-involved fatal crashes occurred in rural regions. For example, head-on collisions accounted for 16% of the truck-involved fatal crashes and 2% of all truck-involved crashes. Head-on, truck-involved collisions were more likely to occur in rural regions where medians are less likely as opposed to urban areas.

Over 66% of all truck-involved fatal crashes were recorded as having "no contributing factors", while 38% of all truck-involved crashes were recorded in this fashion.

11.5 EMERGING TOPICS: TRUCK SIZE AND WEIGHT AND ALTERNATIVE FUELS

There are two emerging topics that could affect truck productivity: 1) truck size and weight and 2) alternative fuels.

In Georgia, the number of oversize and overweight permits is increasing, but permit fees are relatively low and may not cover resulting additional

[47] Fatality Analysis Reporting System (FARS) 2008 Final

maintenance needs. Additionally, Georgia's maximum gross vehicle weight limit of 100,000 lbs. is lower than some neighboring states (at 150,000 lbs.).

Additionally, there needs to be awareness between bridge maintenance and needs of oversize/overweight trucks in Georgia such that vehicles will not need to travel longer around certain bridges to reach their destination.

Nationally, some interests have advocated for increasing the current weight limits to make 6-axle, 97,000-lb. trucks legal. This could change productivity for the trucking industry. Additionally, higher weight limits may result in lower truck VMT, lower emissions, and less truck-involved crashes. In 2001, the United Kingdom adopted the 6-axle, 97,000 pound standard and reported a 35% reduction[48] in truck-involved fatalities and lower truck VMT. These trucks have also been studied in Maine and Vermont[49] and Wisconsin[50] which also showed some net positive results. Opponents of increased truck size and weight cite the negative impact on the road maintenance and safety concerns.

Most recently, the US DOT completed a comprehensive truck size and weight study[51] to providing guidance on policy discussions on the issue.

Alternative Fuels-- Similar to gasoline prices, diesel fuel prices have increased 400 percent over the last decade. This alone has increased the cost of shipping by 50 percent. It has also spurred consideration of alternative fuels for truck fleets. For some such, UPS for example, natural gas may be a viable alternative fuel for consideration for trucking activity[52]. A major impediment to wide adoption of natural gas is the lack of a regional or national fueling infrastructure. However, in the spring of 2015, UPS announced it would "build 15 compressed natural gas (CNG) fueling stations to support the purchase and planned deployment of 1,400 new CNG vehicles over the next year"[53] and noted that two of the locations would be in Georgia: Atlanta and Doraville.[54]

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[48] www.data2logistics.com/media/10802/march-2015-the-power-of-a-sixth-axle.pdf

[49] http://ops.fhwa.dot.gov/freight/sw/reports/me_vt_pilot_2012

[50] http://transportationproductivity.org/templates/files/wisconsindot-trucks-wstudy-1-1-09-final.pdf

[51] www.ops.fhwa.dot.gov/freight/SW/map21tswstudy/index.htm

[52] www.bloomberg.com/news/2014-03-05/ups-expands-alternative-fuel-fleet-32-with-1-000-propane-trucks.html

[53] www.pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=PressReleases&id=1429038032641-100

[54] www.bizjournals.com/atlanta/news/2015/04/01/ups-to-build-15-compressed-natural-gas-fueling.html

Appendix A

Compilation of MPO Truck Data

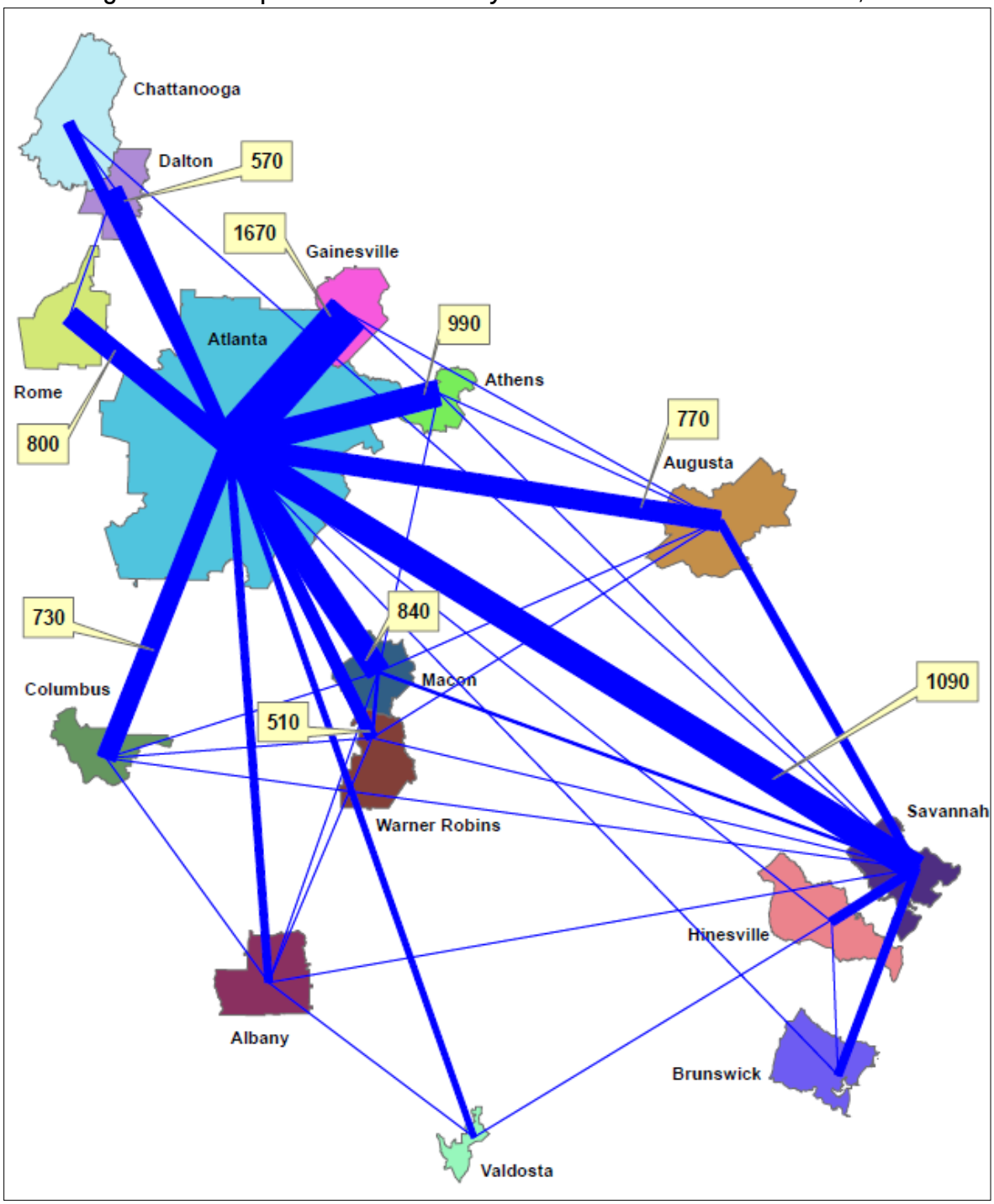
MPO ORIGIN-DESTINATION ANALYSIS USING STATEWIDE TRAVEL DEMAND MODEL

On the following page, figure A.1 maps the truck flows between Georgia's MPOs based on the travel demand model. Table A.1 provides truck flows between each of Georgia's MPOs based on the travel demand model.

It shows that the largest truck flows are between the Atlanta metropolitan region and other MPOs across the State. The three largest truck flows are: 1) Atlanta MPO to Gainesville MPO with 1,670 daily trucks; 2) Atlanta MPO to Savannah MPO with 1,090 daily trucks; and 3) Atlanta MPO to Athens MPO with 990 daily trucks.

The largest non-Atlanta truck volume is between the Savannah MPO and the Augusta MPO with 311 daily trucks.

Figure A.1 Map of Estimate of Daily Truck Volumes between MPOs, *2006*



Source: GDOT Statewide Travel Demand Model, October 2010.

Table A.1 Estimate of Daily Truck Volume between MPOs, *2006*

MPO	Albany	Athens	Atlanta	Augusta	Brunswick	Chattanooga	Columbus	Dalton	Gainesville	Hinesville	Macon	Rome	Savannah	Valdosta	Warner Robins
Albany	–	3	101	6	4	2	22	1	2	2	15	2	25	22	13
Athens	3	–	447	31	1	4	5	4	33	1	15	6	26	2	7
Atlanta	129	543	–	436	27	258	391	361	982	16	461	467	820	82	209
Augusta	6	28	338	–	9	5	6	5	20	7	25	6	178	7	12
Brunswick	6	1	23	10	–	1	2	0	1	18	3	0	143	13	3
Chattanooga	1	4	181	4	0	–	3	29	9	0	3	13	23	1	2
Columbus	29	5	339	7	2	4	–	5	9	1	23	7	37	8	17
Dalton	1	4	206	3	0	17	3	–	9	0	3	14	8	1	2
Gainesville	2	29	687	18	1	8	7	10	–	0	8	8	15	2	4
Hinesville	3	1	28	12	21	1	2	0	1	–	4	0	167	6	3
Macon	15	15	377	25	2	4	22	4	10	2	–	6	51	9	48
Rome	2	5	333	5	0	12	6	17	9	0	5	–	8	1	3
Savannah	25	15	272	133	149	11	24	7	8	114	49	4	–	25	23
Valdosta	21	2	52	6	10	1	6	1	2	3	7	1	32	–	5
Warner Robins	17	10	297	17	3	3	24	3	6	2	62	4	45	9	–

Source: GDOT Statewide Travel Demand Model, October 2010.

TRUCK TRIP END ANALYSIS USING TRUCK-EQUIPPED GPS DATA

Commercial trucks are increasingly incorporating GPS technology to assist in truck fleet tracking and management. A third-party vendor typically manages the GPS data and technology. These third-party vendors often make their GPS data available to nontrucking entities. The data is aggregated with specific truck company information removed to assure the privacy of the vendor's customers. Recently, the Federal Highway Administration (FHWA) negotiated rights to a wide sample of GPS data from some of the largest truck GPS data providers.

FHWA sponsored ATRI to conduct analysis of this data which is used in specialized studies such as the Georgia Statewide Freight and Logistics Plan. As one of the subcontractors to this plan, ATRI analysis of the GPS data was utilized in a number of different sections in this report. This database is referred to as the FHWA/ATRI Freight Performance Measurement (FPM) Database for purposes of this report. This section describes an analysis done identifying truck trip ends within the State of Georgia.

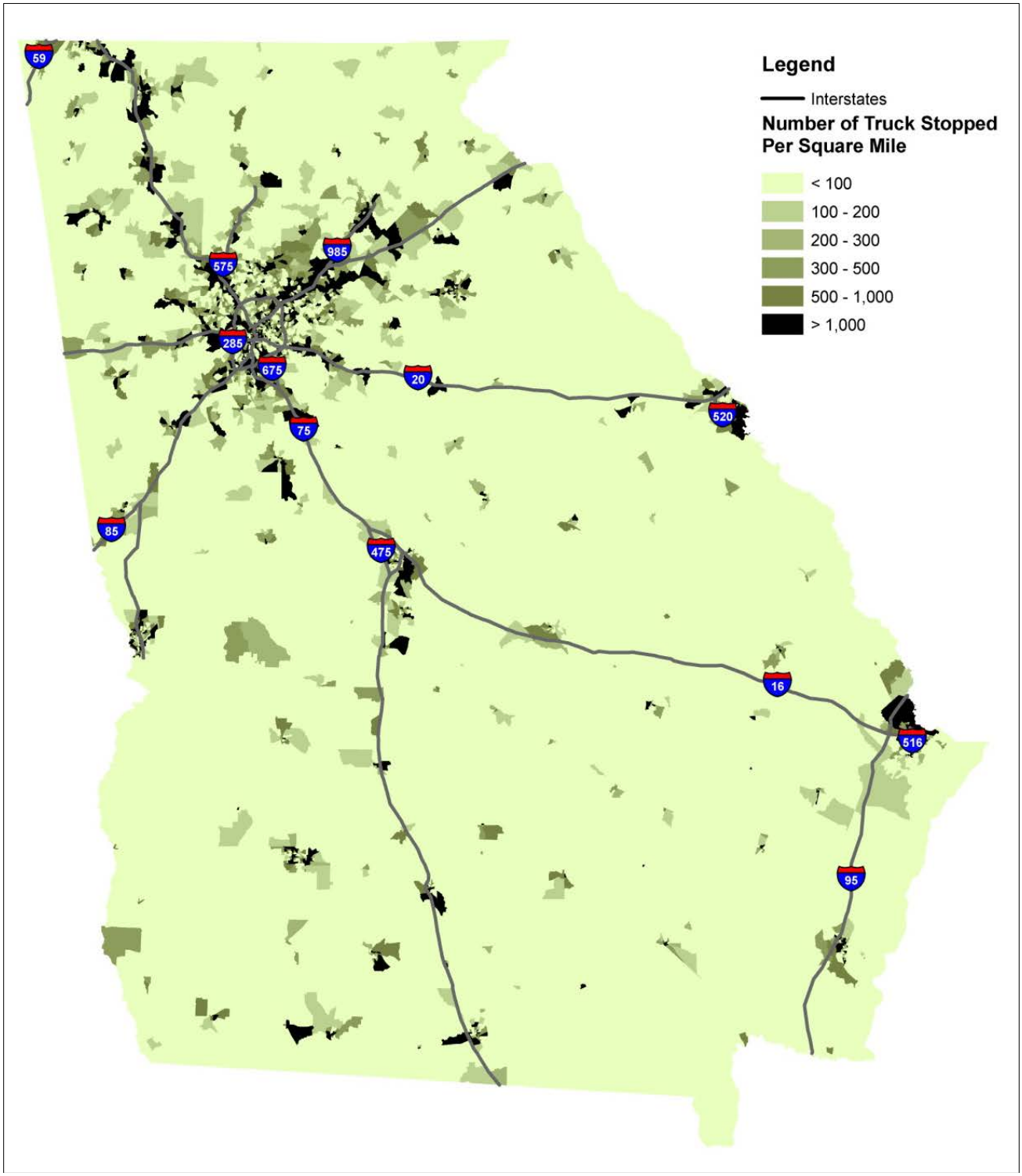
It should be noted that GPS-equipped trucks are not perfectly representative of the entire trucking population in Georgia. In particular, trucks with smaller fleets and owner-operators are less likely to use this technology. These smaller operations are more common for truck drays at ports and railyards and for bulk/commodity operations such as forest products, wood products, and sand and gravel type operations.

Figure A.2 shows a map of truck trip ends in Georgia using the FHWA/ATRI Freight Performance Measurement (FPM) database for each of Georgia's Census Block Groups. Truck trips at truck stops are removed from this analysis to avoid simply identifying truck stop locations. The figure shows that the bulk of the truck trip ends are located in the urbanized areas. This is consistent with the county-level analysis conducted using the TRANSEARCH analysis.

Table A.2 lists the top counties in Georgia in terms of truck trip ends based on the FPM data. Not surprisingly, counties in the Atlanta metropolitan area are some of the highest. Fulton, DeKalb, Gwinnett, and Clayton counties are the four highest in the State in terms of truck trip ends. Chatham County is a close fifth behind Clayton County.

Figures A.3 – A.18 show the truck trip ends at the Census block group level in MPO regions in Georgia. These maps are useful for identifying the most truck-intensive portions of the MPO region.

Figure A.2 Number of Trucks Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



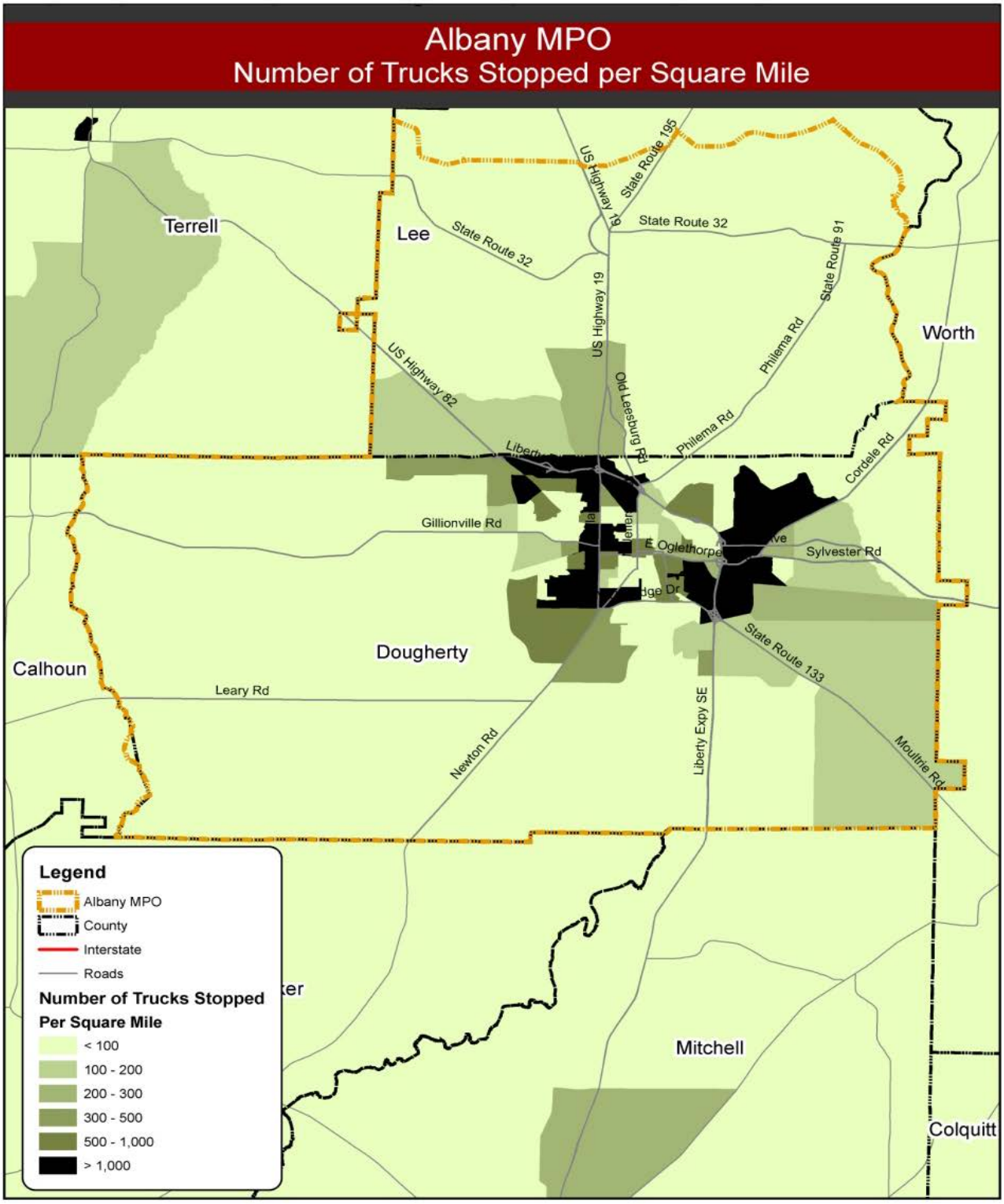
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Database.

Table A.2 Top 50 Georgia Counties with Highest Number of Trucks Stopped

Rank	County	Truck Stops	Rank	County	Truck Stops
1	Fulton	819,560	26	Floyd	73,602
2	De Kalb	685,425	27	Barrow	73,191
3	Gwinnett	591,194	28	Lowndes	71,902
4	Clayton	436,842	29	Cherokee	69,221
5	Chatham	419,830	30	Walker	68,808
6	Hall	407,671	31	Newton	68,448
7	Cobb	351,383	32	Spalding	66,431
8	Bartow	293,476	33	Troup	60,977
9	Henry	252,806	34	Colquitt	59,178
10	Richmond	236,164	35	Murray	57,927
11	Dougherty	208,425	36	Lamar	56,805
12	Gordon	195,558	37	Carroll	53,543
13	Rockdale	166,446	38	Tift	52,805
14	Clarke	146,751	39	Walton	50,168
15	Bibb	140,790	40	Grady	42,418
16	Douglas	139,090	41	Paulding	41,914
17	Jackson	133,065	42	Columbia	39,710
18	Franklin	113,391	43	Early	37,541
19	Coweta	112,146	44	Fayette	36,670
20	Catoosa	108,989	45	Laurens	36,535
21	Muscogee	91,904	46	Decatur	35,597
22	Forsyth	90,710	47	Effingham	33,926
23	Houston	85,276	48	Taylor	31,535
24	Pickens	79,579	49	Morgan	30,163
25	Glynn	76,740	50	Thomas	27,819

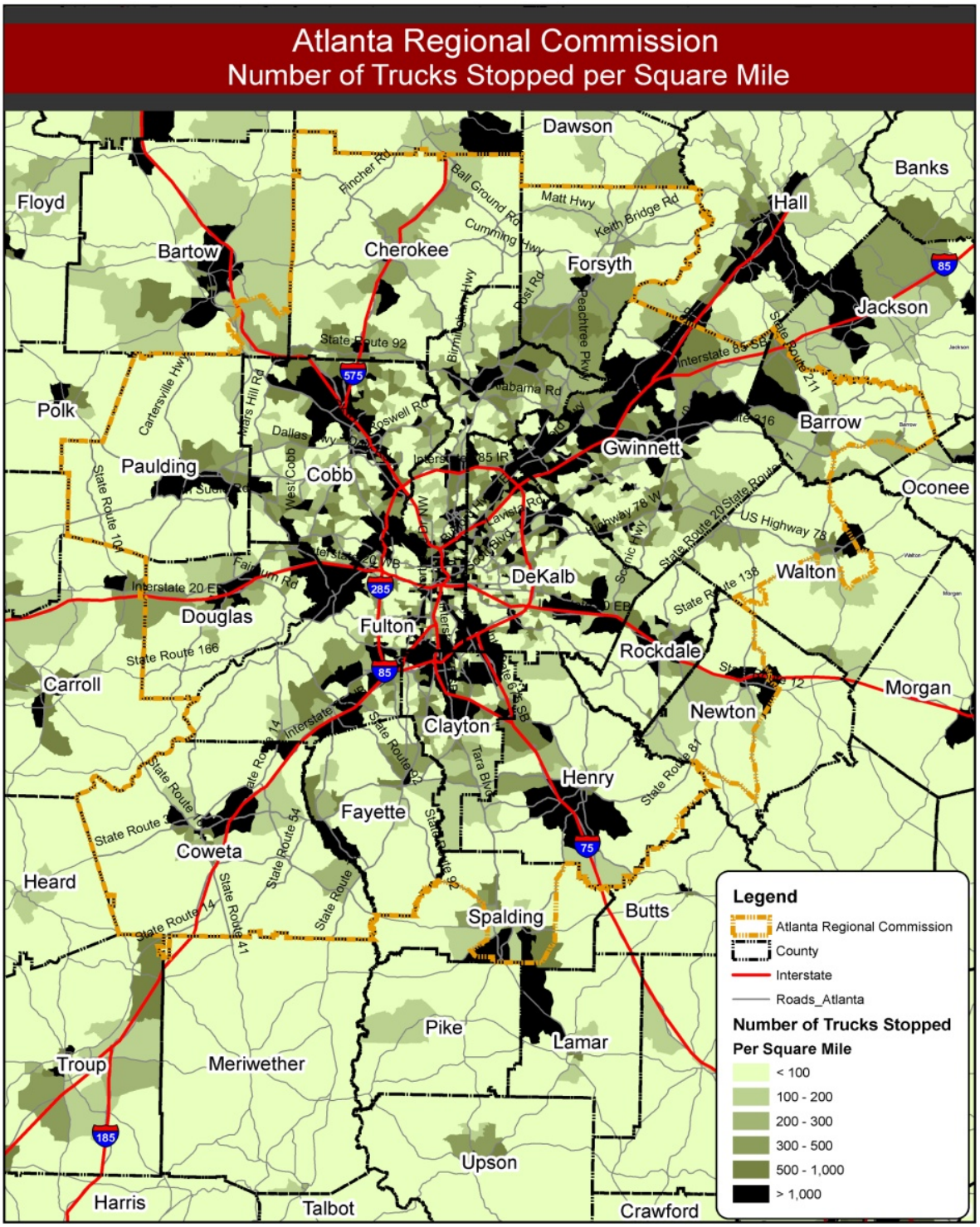
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Database.

Figure A.3 Albany Area Number of Truck Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



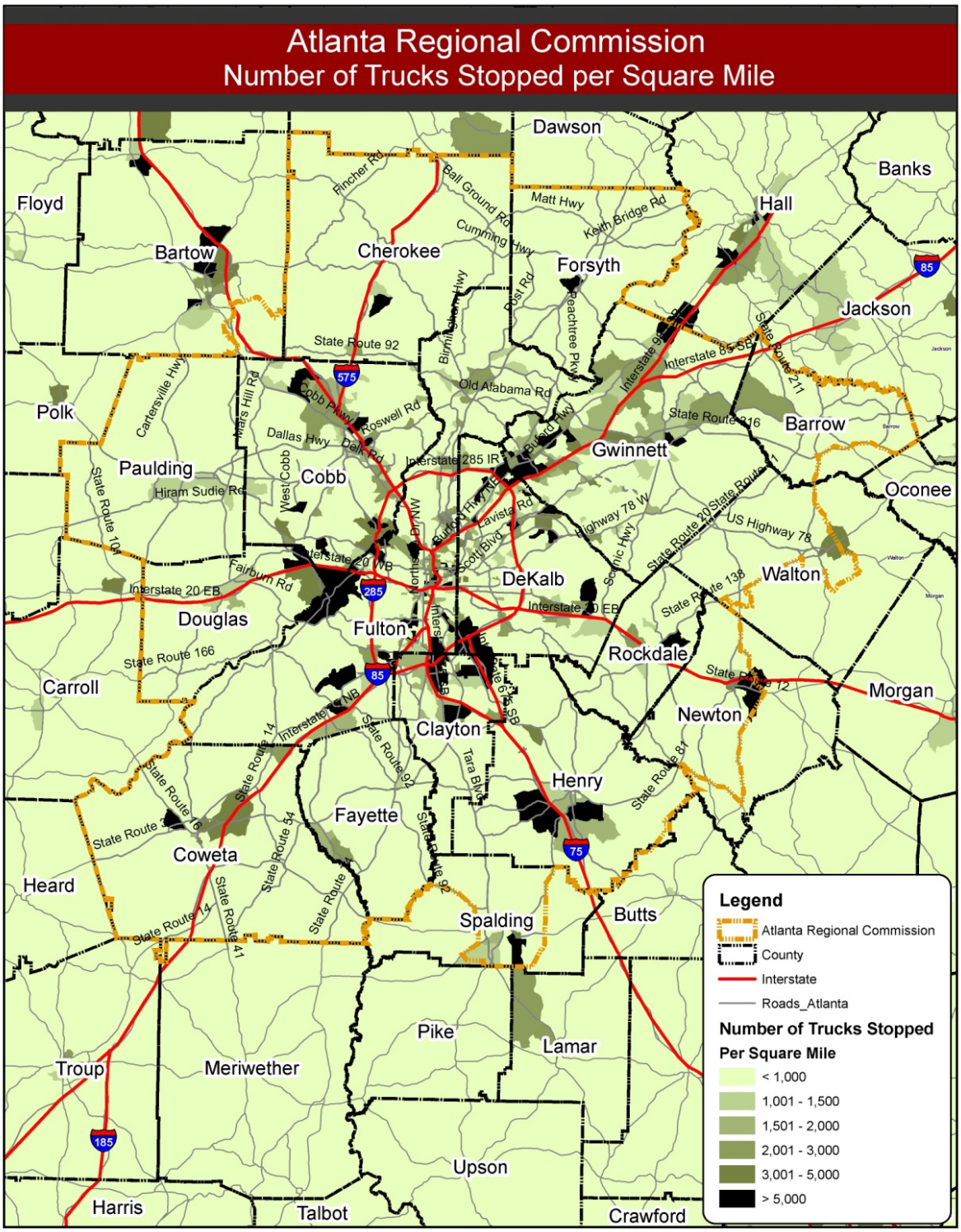
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Database.

Figure A.4 Atlanta Regional Commission Number of Truck Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



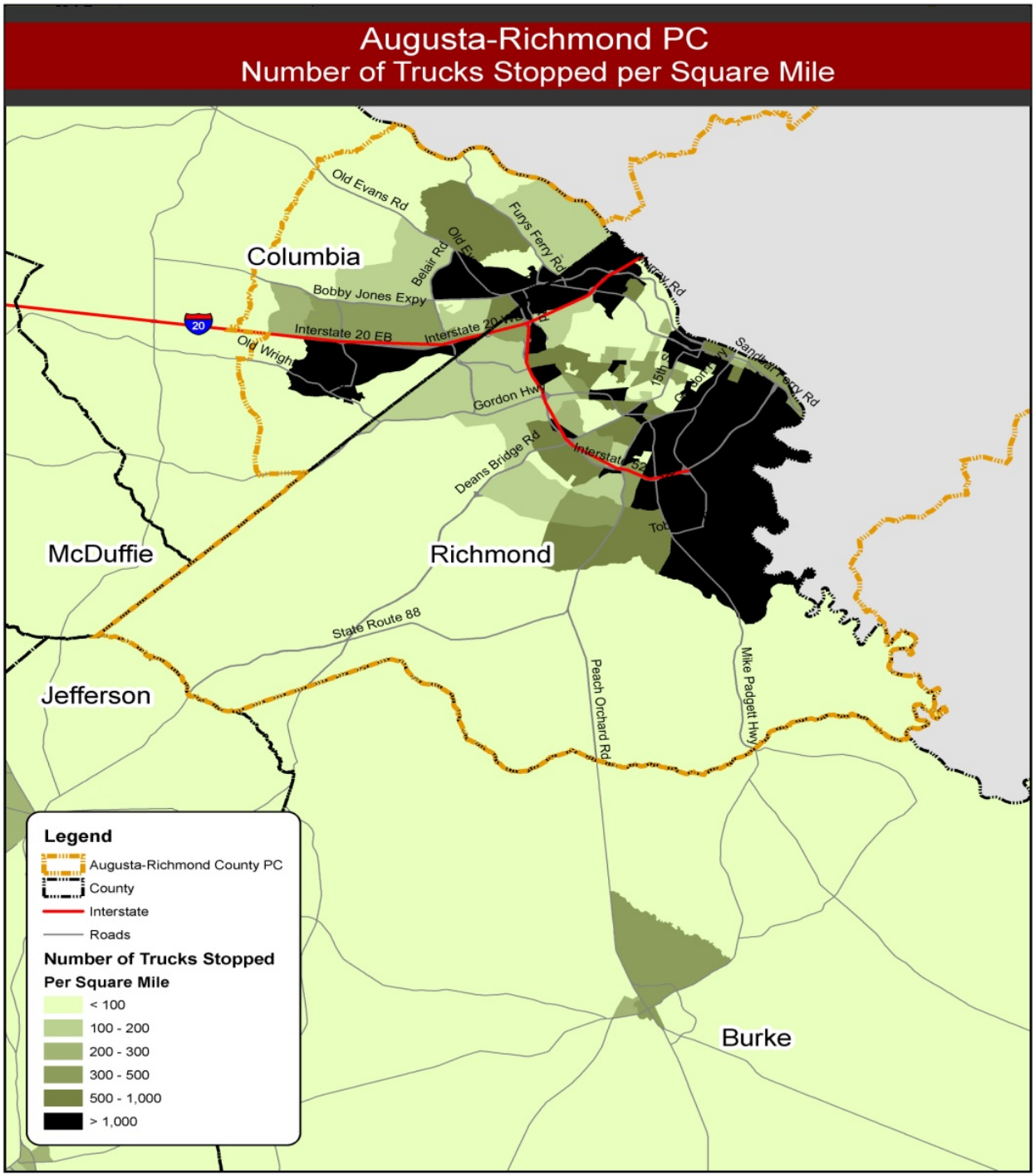
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Database.

Figure A.5 Atlanta Regional Commission Number of Truck Stopped per Square Mile – *Identification of Very High Truck Intensive Locations* *(Oct. 1, 2008 – Sept. 30, 2009)*



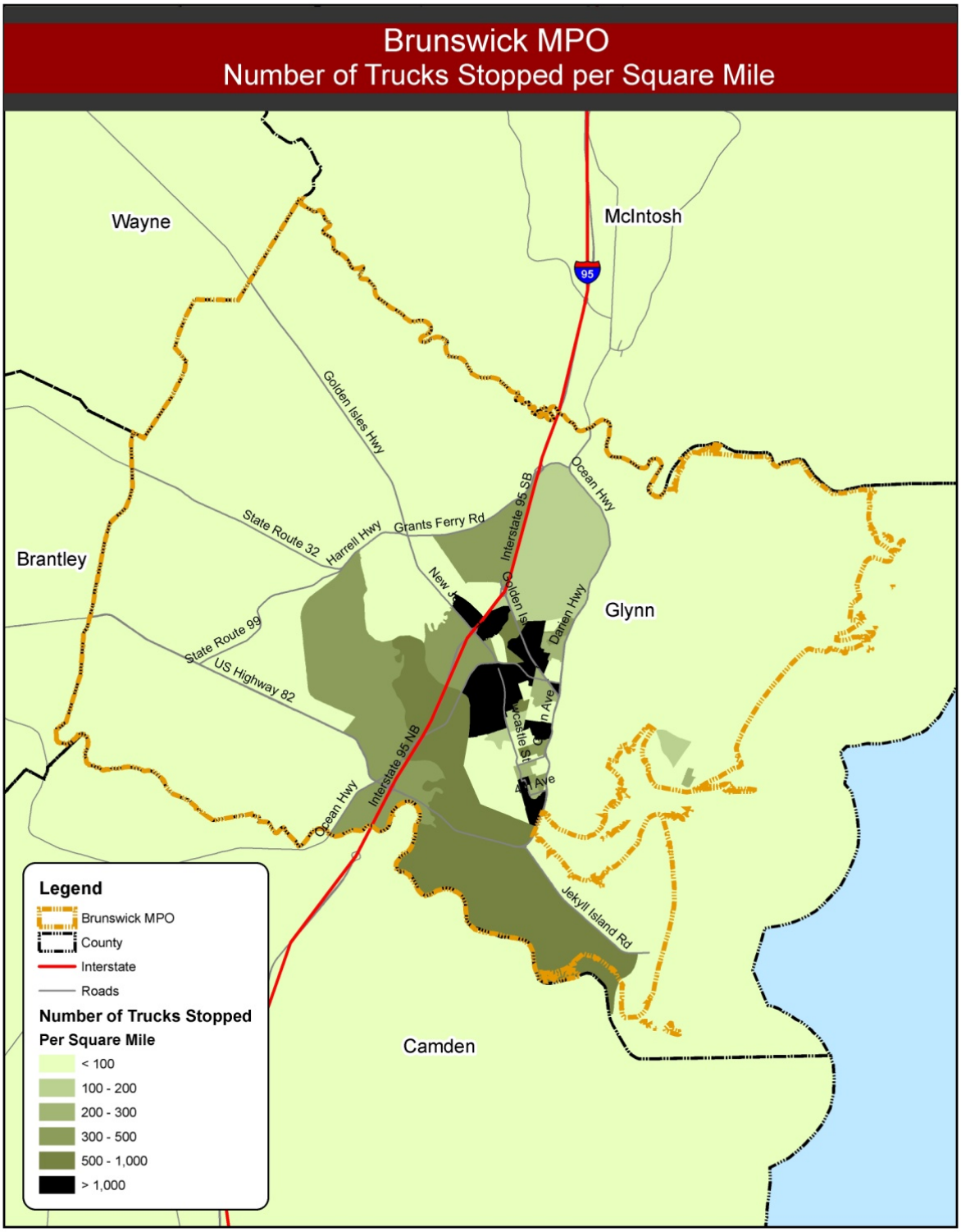
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.6 Augusta MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



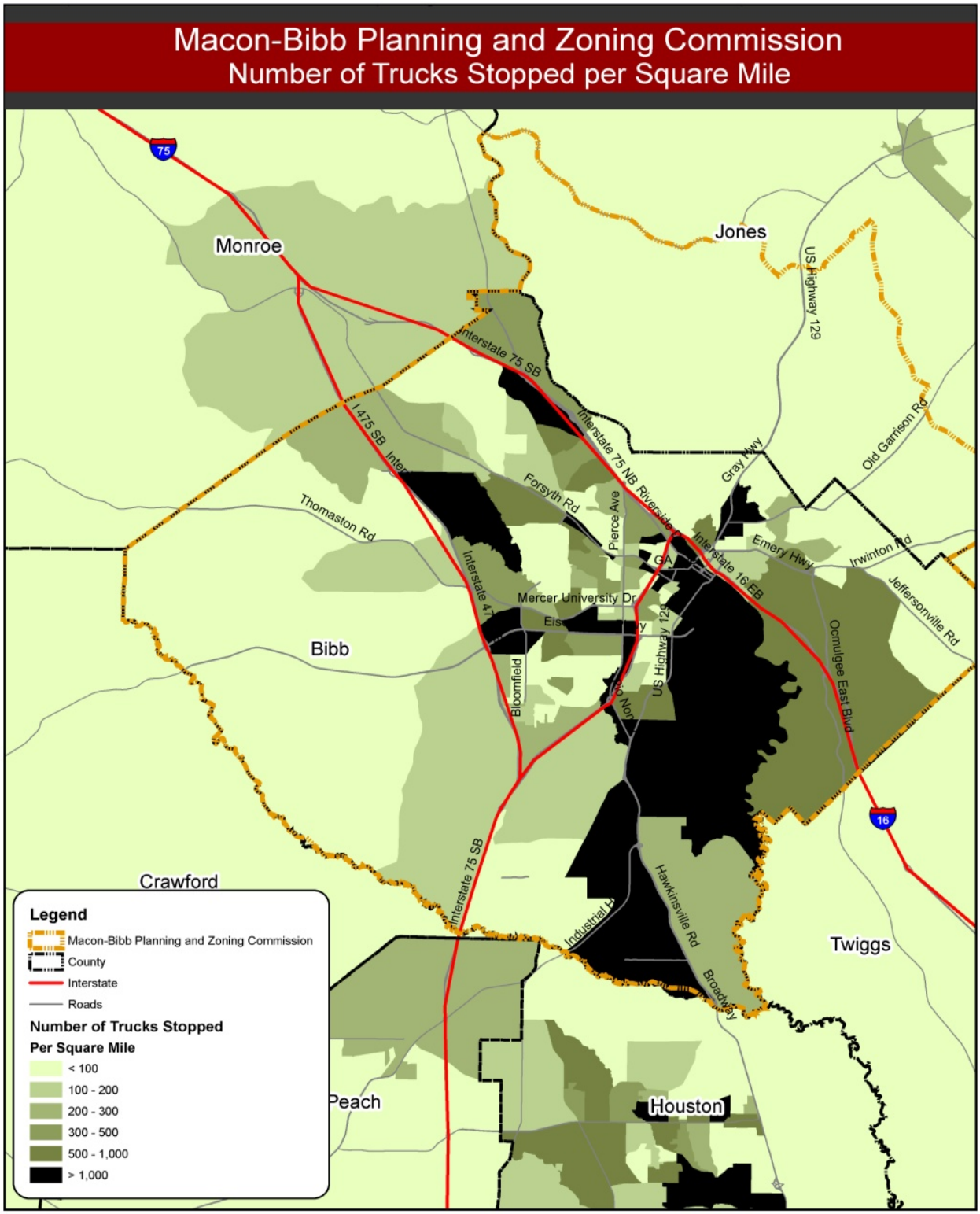
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.7 Brunswick MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



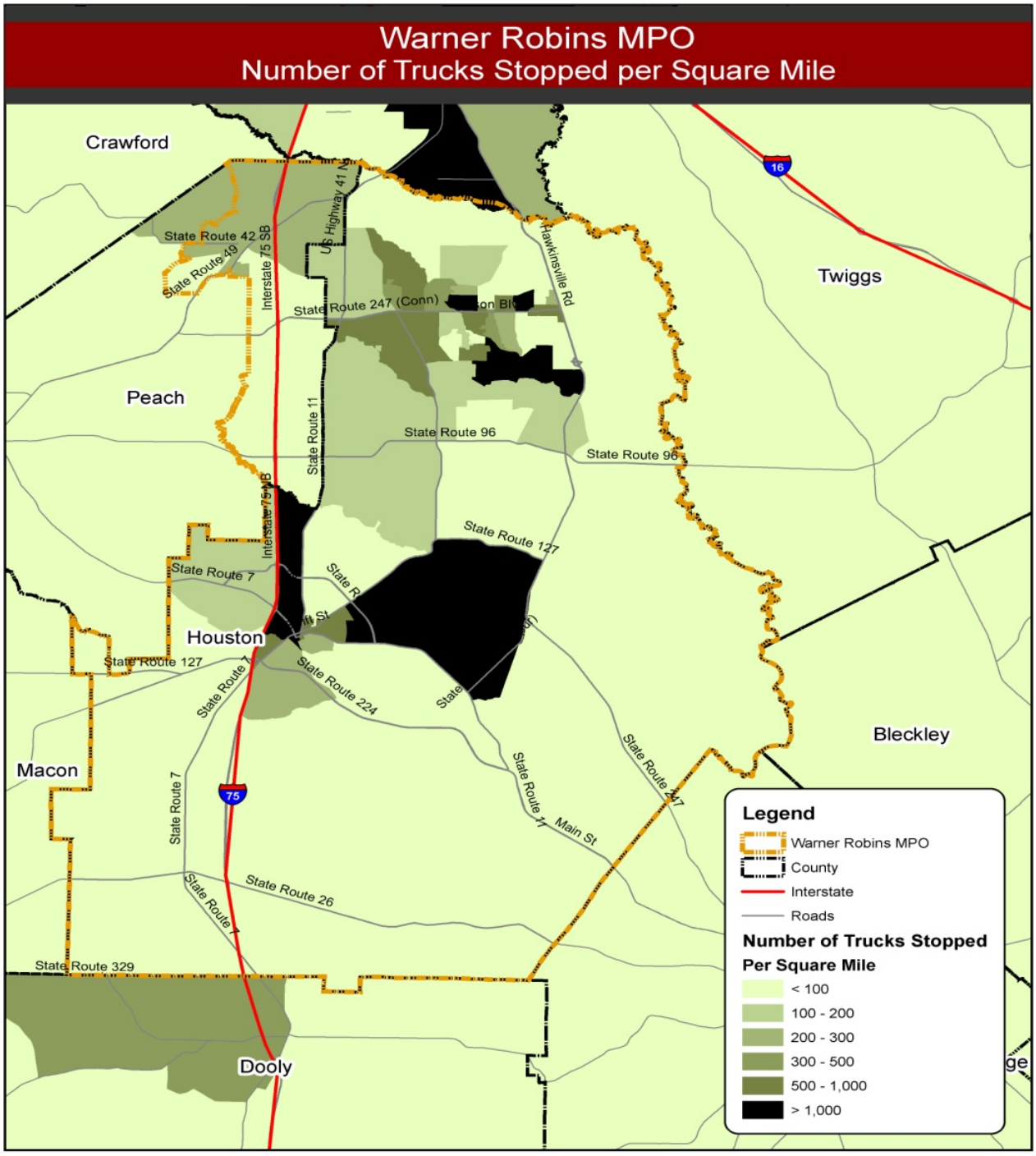
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.8 Macon MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



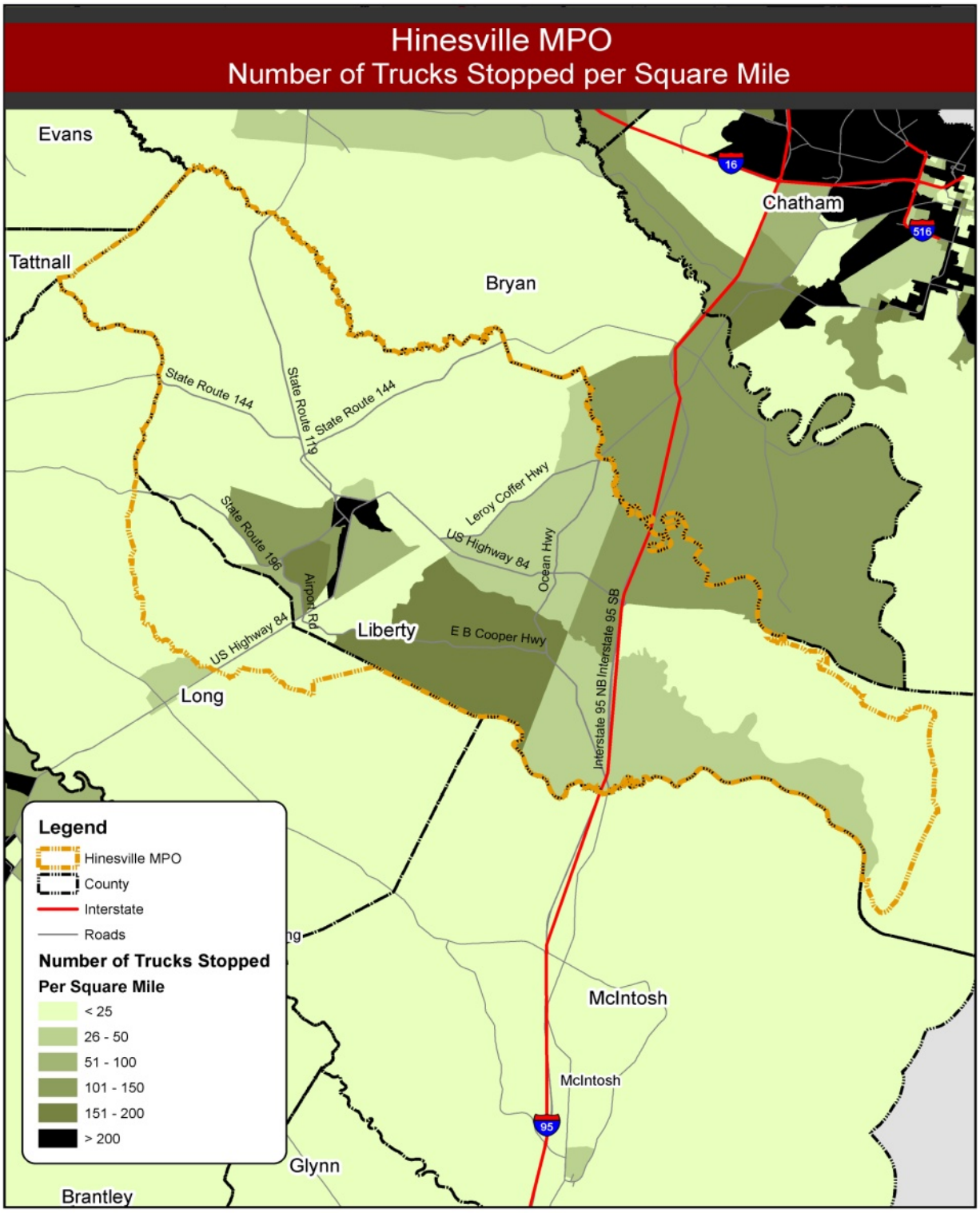
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.9 Warner-Robins MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



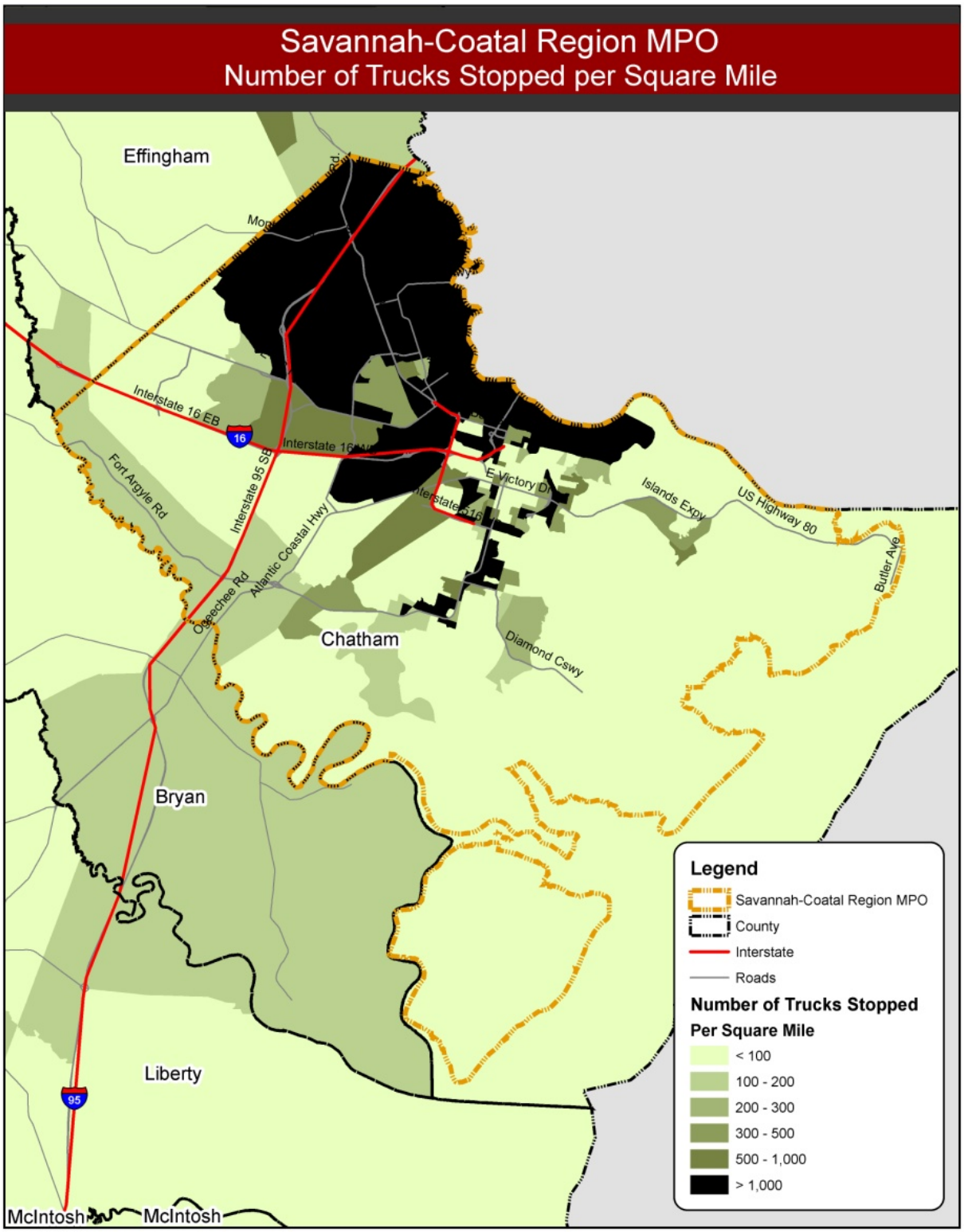
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.10 Hinesville MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



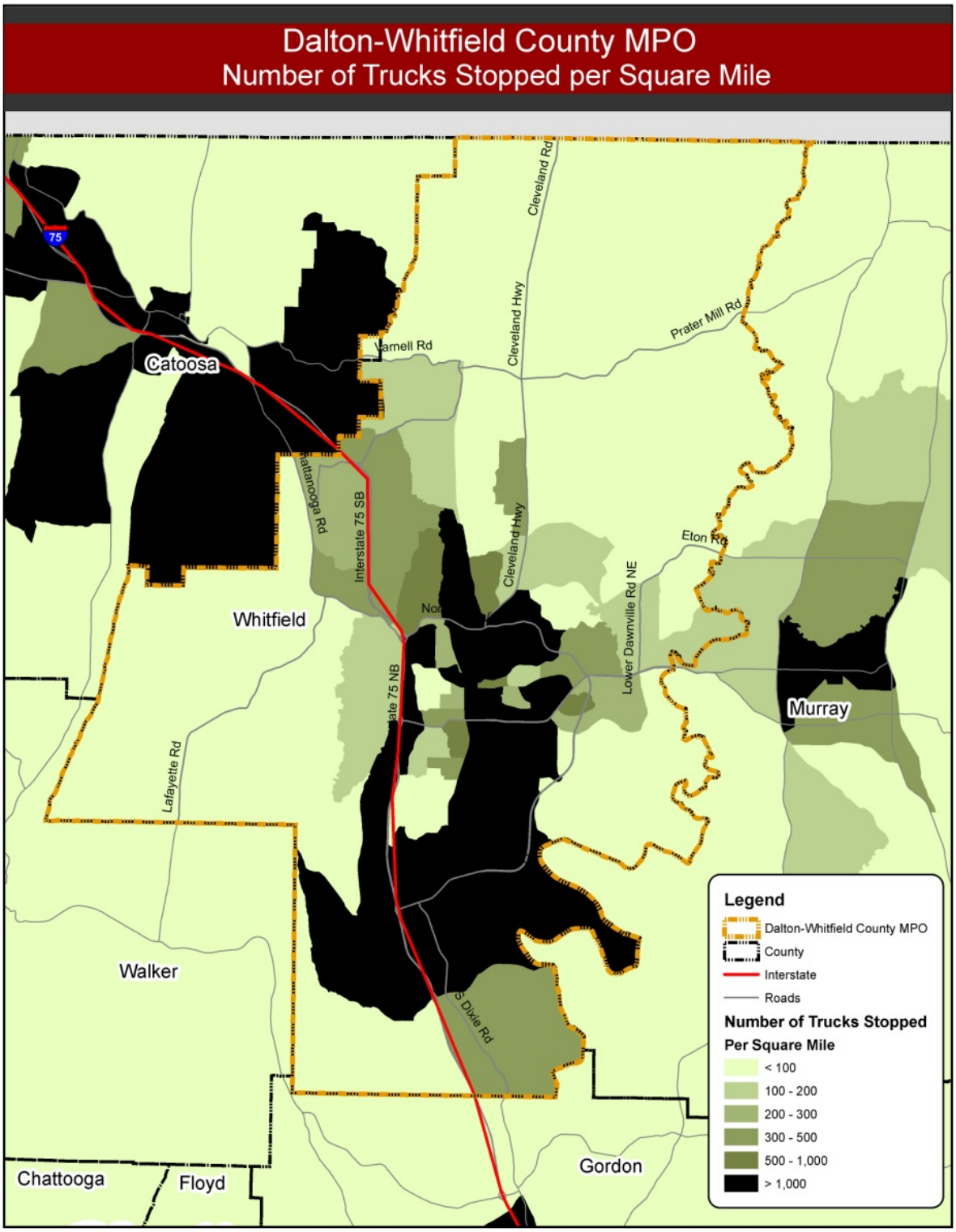
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.11 Savannah MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



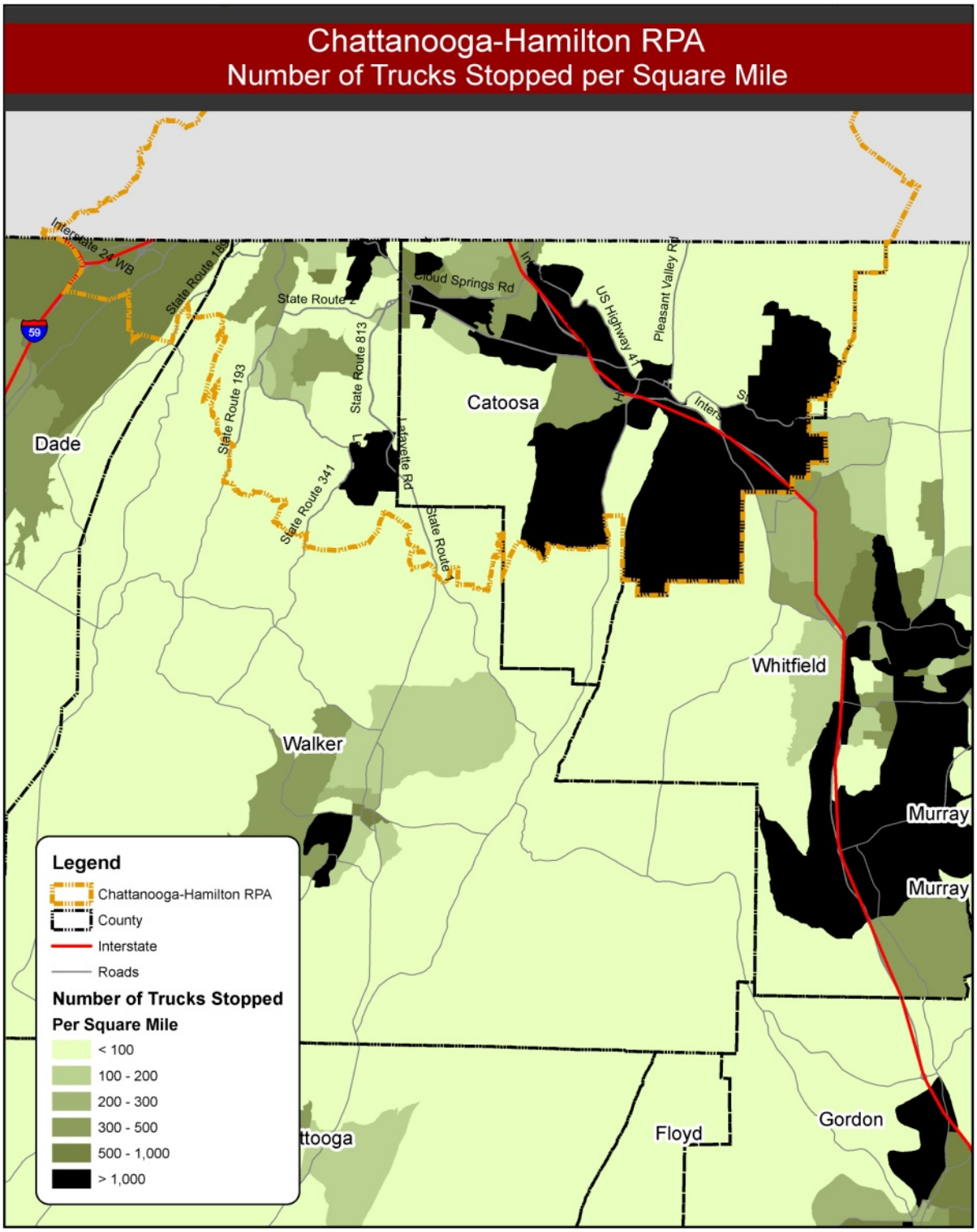
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.12 Dalton MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



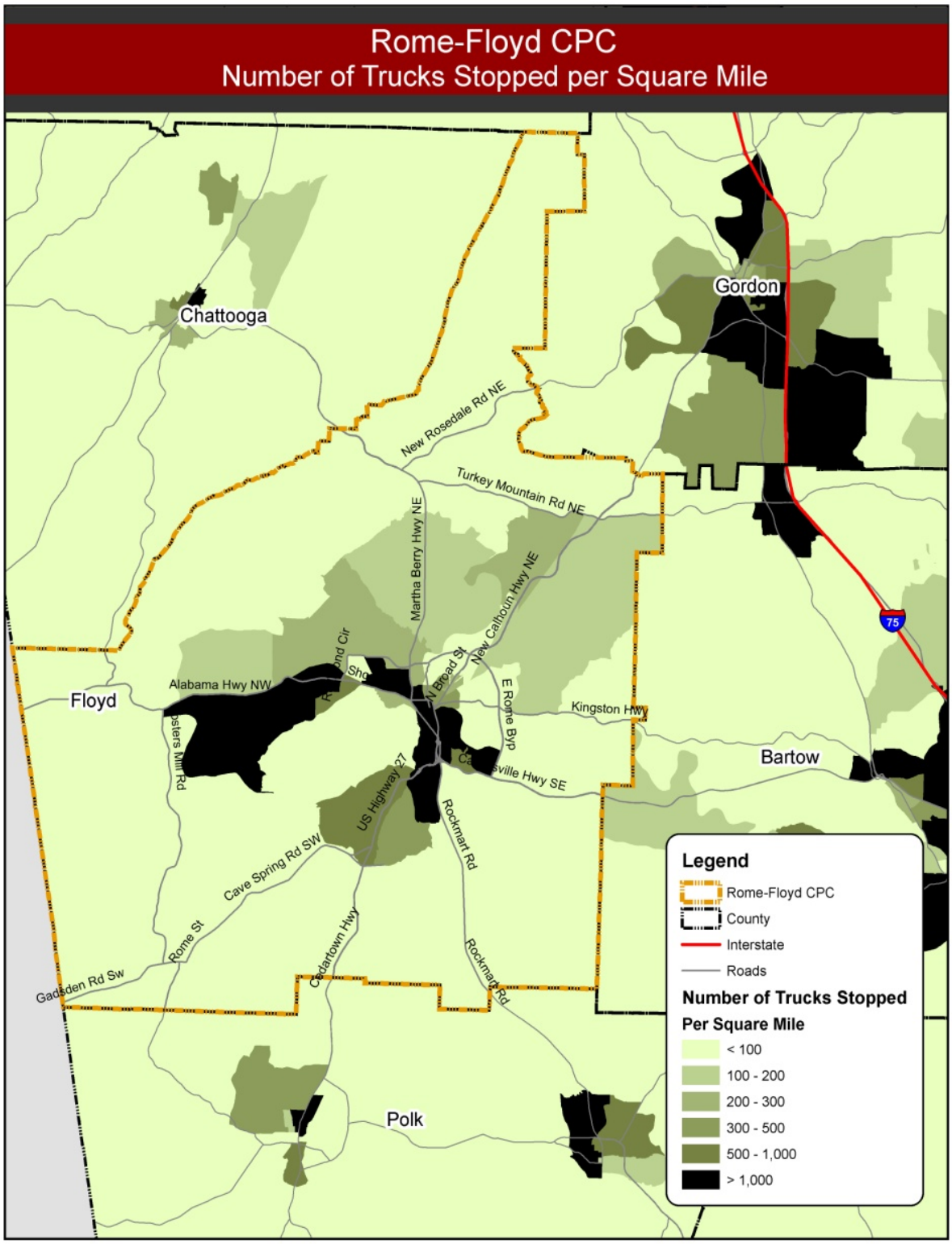
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.13 Chattanooga MPO Number of Truck Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



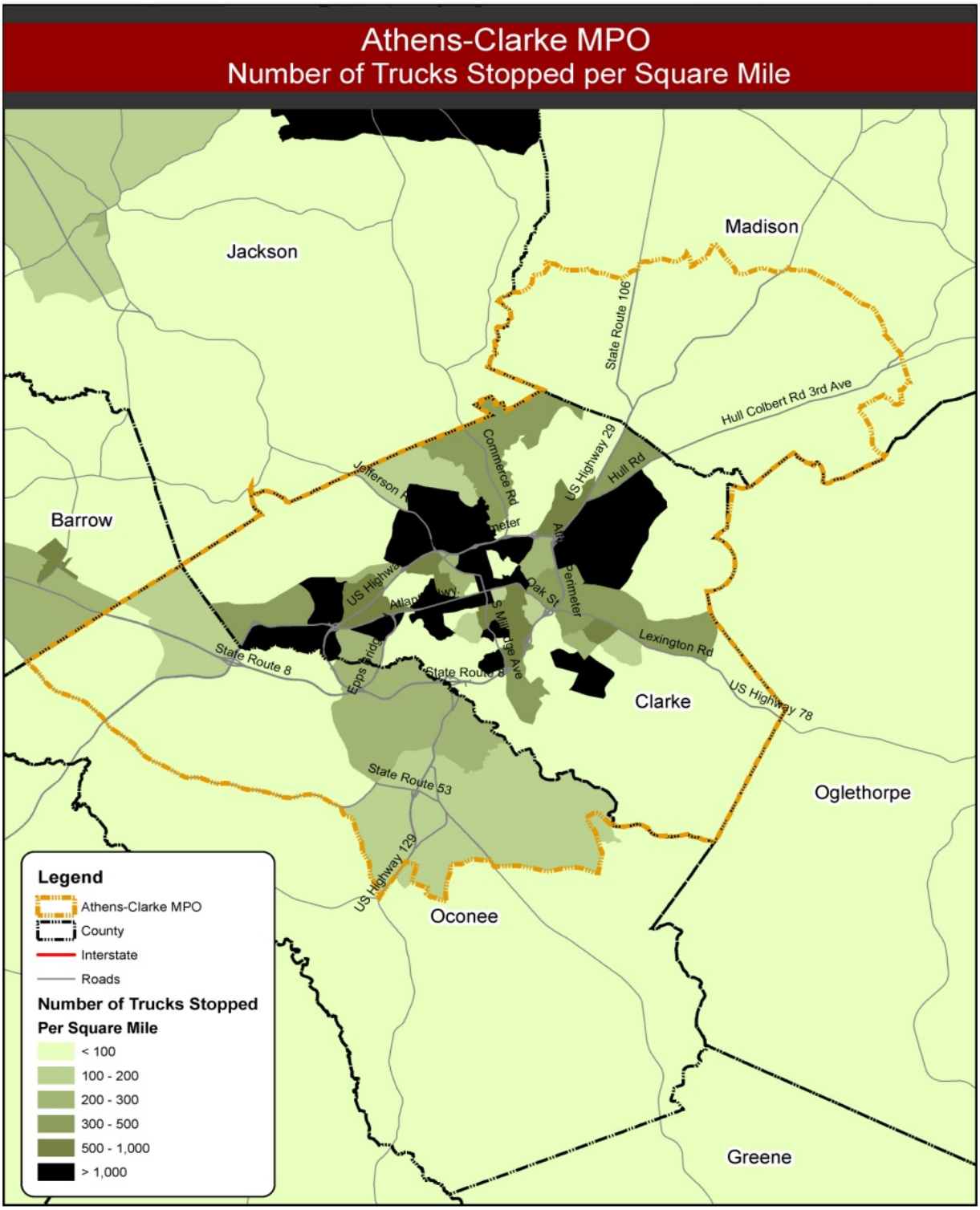
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.14 Rome MPO Number of Truck Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



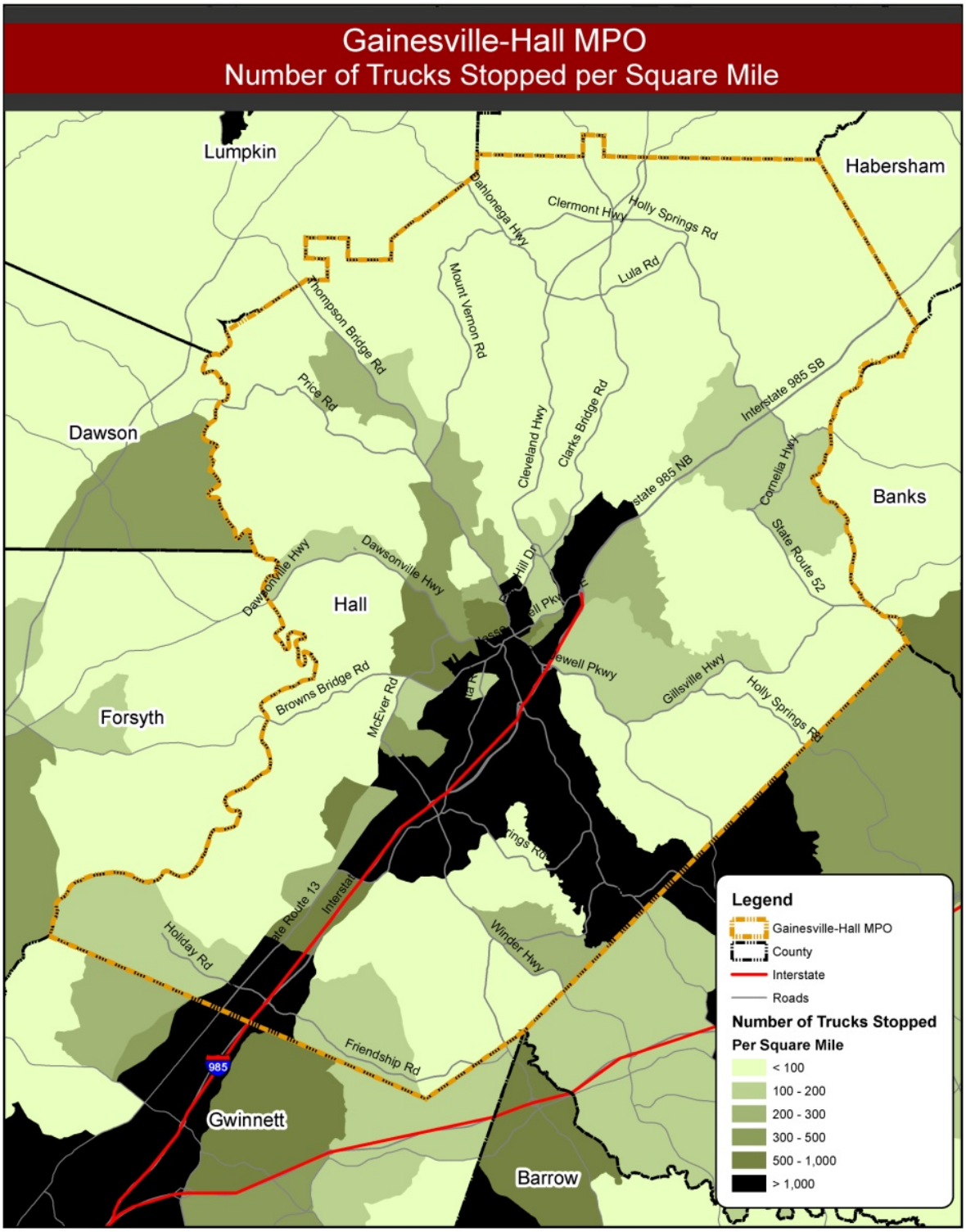
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.15 Athens MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



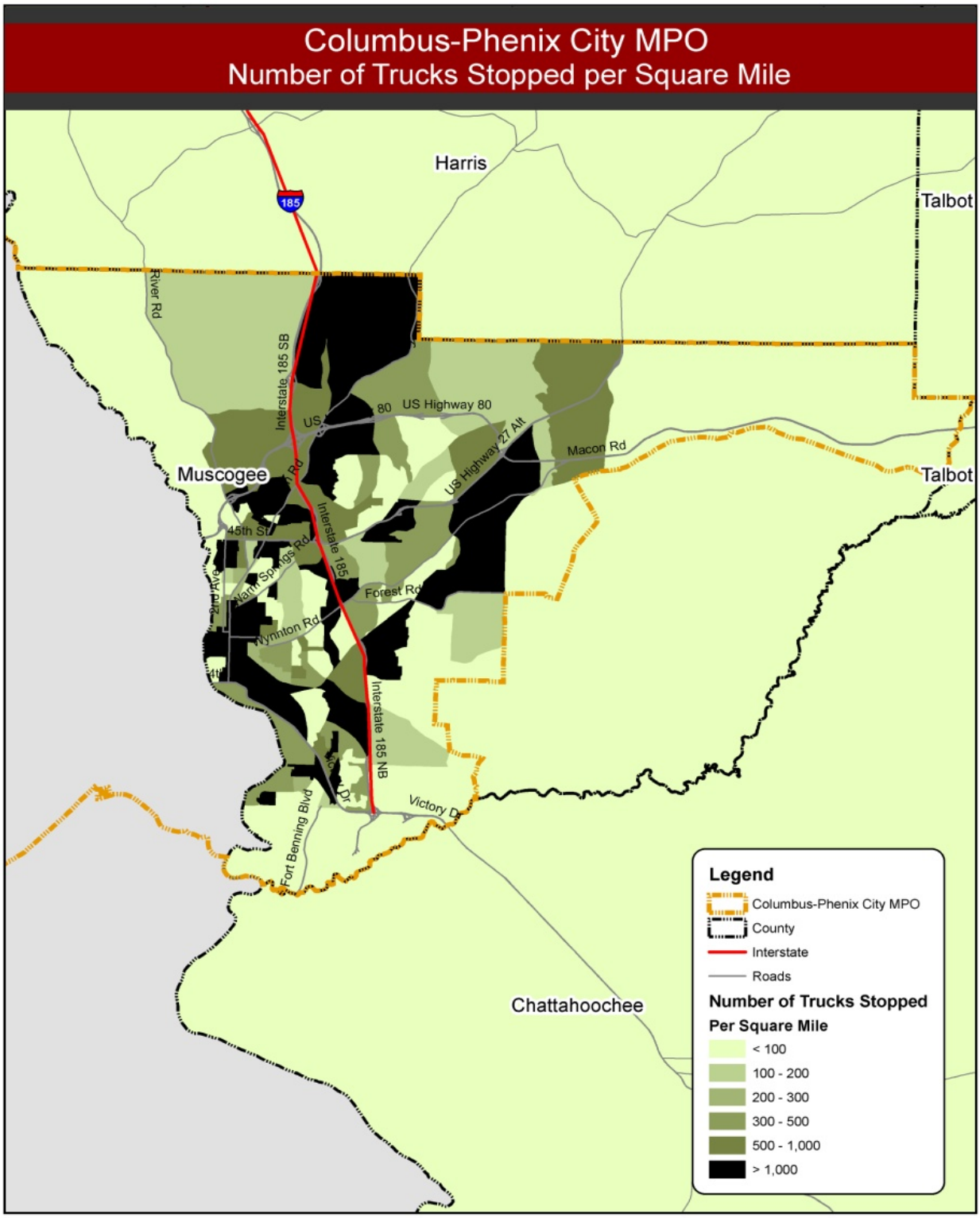
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.16 Gainesville MPO Number of Truck Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



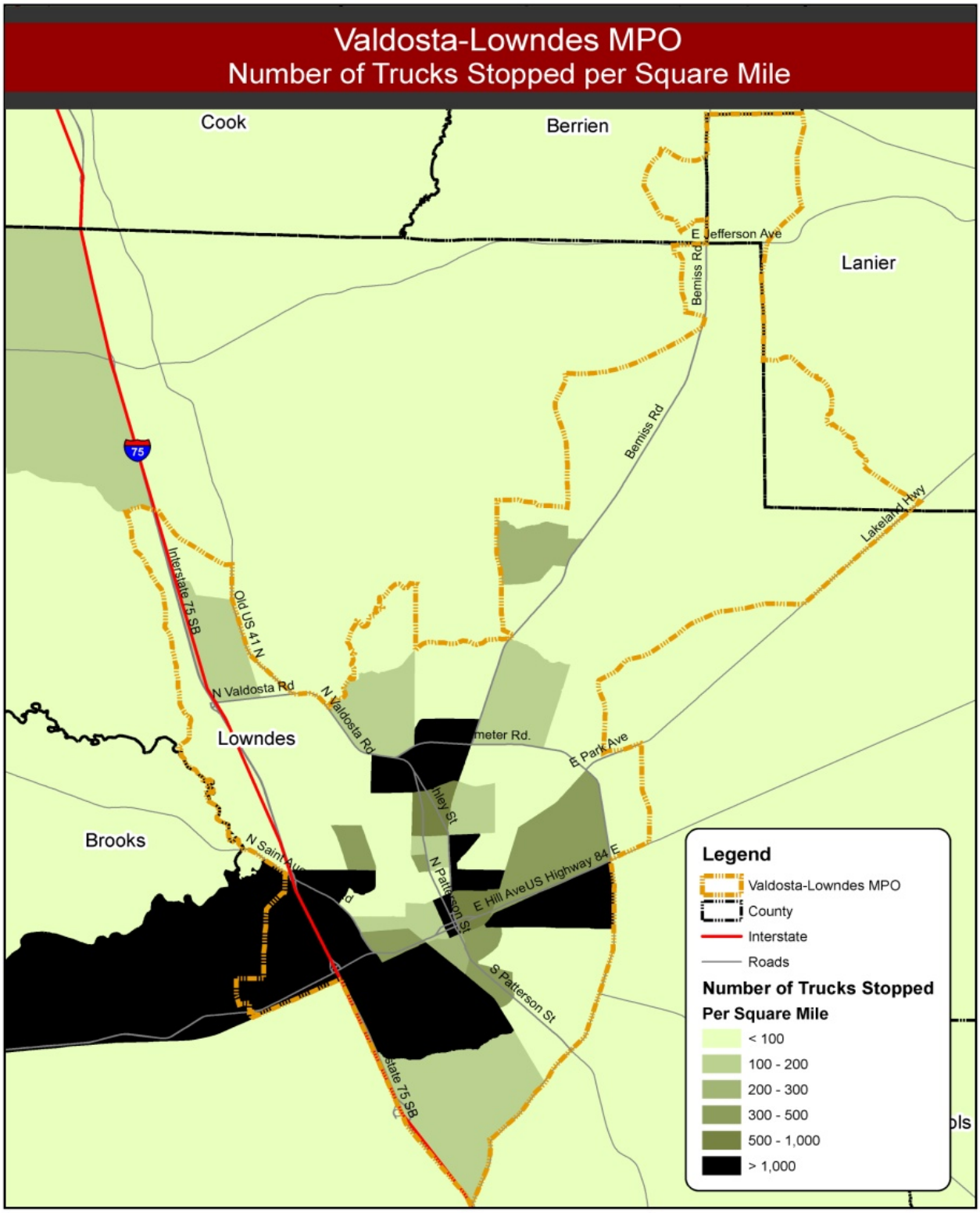
Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.17 Columbus MPO Number of Truck Stopped per Square Mile *(Oct. 1, 2008 – Sept. 30, 2009)*



Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

Figure A.18 Valdosta MPO Number of Truck Stopped per Square Mile
(Oct. 1, 2008 – Sept. 30, 2009)



Source: Project team analysis, FHWA/ATRI Freight Performance Measurement (FPM) Data

COUNTY-LEVEL TRUCK FLOWS

County-level truck flows can also provide insight on truck activity at the MPO level. Table A.3 shows the top 20 counties for inbound and outbound truck tonnage using Global Insight Transearch freight flow database. This table shows that the Atlanta metropolitan region is home to the largest percentage of the truck flows in the State. Fulton, Gwinnett, DeKalb, and Cobb Counties account for 38 percent of Georgia's inbound truck tons and 21 percent of Georgia's outbound truck tons. This high percentage is primarily based on the freight demand that accompanies large population centers such as the Atlanta metropolitan region.

Chatham County is the largest single county generator of truck tons generating over 21 percent of the outbound truck tonnage for the entire State. This is roughly the same amount of truck tons generated by Fulton, Gwinnett, DeKalb and Cobb Counties combined. This high volume of outbound trucks in Chatham County is primarily due to the large number of imported containers coming through the Port of Savannah; many of which rely on "last mile" port connector roads such as State Route 307, Grange Road, and Brampton Road which link the port to the interstate system (I-516, I-16 and I-95) and are US DOT-designated Intermodal Connectors. Export volumes at the port make Chatham the second largest county in terms of inbound truck tonnage. Similarly, shipments through the Port of Brunswick make Glynn County the fifth largest county in Georgia in terms of outbound truck tonnage.

Midsized metropolitan regions generate and attract a fair share of truck tonnage as well. Richmond County, Dougherty County, Bibb County, Hall County, Lowndes County, and Muscogee Counties are all top 20 counties in terms of truck tonnage. These counties house the Cities of Augusta, Albany, Macon, Gainesville, Valdosta, and Columbus, respectively.

In North Georgia, Whitfield and Gordon Counties are notable as the 11th and 12th largest counties in terms of outbound truck tonnage. Whitfield has large outbound and inbound flows of textile mill products. Gordon County has large outbound shipments of textile mill products, chemicals or allied products, and Clay/Concrete/Glass/Stone. Coffee County in south Georgia is the 11th largest truck tonnage in the State, largely due to shipments of nonmetallic minerals – likely kaolin.

Figures A.19 and A.20 show inbound and outbound maps of truck tonnage for all counties in Georgia in 2007 and 2050. It reinforces the notion that most truck flows are related to urban populations. However, it does show heavy rural truck flows in northwest Georgia and a scattering of heavy truck tonnage counties in South Georgia.

Similarly, Table A.4 and A.5 show that Chatham and Fulton Counties will remain the top two in terms of outbound tonnage. Gwinnett County is forecast to have the fastest growth of the top counties with 133-percent growth between 2007 and 2050, which would make it the third largest county in terms of truck tonnage in the State.

Table A.3 Top 20 Georgia Counties with Highest Truck Tons, *2007*

	Inbound			Outbound	
County	Truck Tons	Percent of Total	County	Truck Tons	Percent of Total
Fulton	28,354,215	27%	Chatham	24,747,960	21%
Chatham	8,677,489	8%	Fulton	14,315,413	12%
Gwinnett	4,315,205	4%	DeKalb	4,510,309	4%
DeKalb	4,248,574	4%	Gwinnett	3,762,409	3%
Cobb	3,574,647	3%	Glynn	3,632,475	3%
Tift	3,427,215	3%	Richmond	3,497,863	3%
Richmond	3,033,269	3%	Cobb	2,789,090	2%
Carroll	2,956,327	3%	Tift	2,687,926	2%
Clayton	2,748,225	3%	Bibb	2,341,544	2%
Muscogee	2,630,894	2%	Hall	2,180,890	2%
Coffee	2,473,136	2%	Whitfield	2,138,084	2%
Lowndes	2,461,220	2%	Gordon	1,730,203	1%
Dougherty	2,306,558	2%	Washington	1,501,080	1%
Bibb	1,791,290	2%	Clarke	1,493,460	1%
Washington	1,279,766	1%	Troup	1,474,861	1%
Troup	1,276,050	1%	Lowndes	1,370,231	1%
Wilkinson	1,247,071	1%	Floyd	1,354,432	1%
Floyd	1,196,664	1%	Bartow	1,324,244	1%
Bartow	1,035,330	1%	Elbert	1,280,639	1%
Crisp	975,612	1%	Dougherty	1,261,408	1%

Source: TRANSEARCH Data.

Table A.4 Top 20 Georgia Counties with Highest Inbound Truck Tons

Rank	County	Truck Tons 2007	Truck Tons 2050	Percent Growth
1	Fulton	28,354,215	62,791,449	121%
2	Chatham	8,677,489	22,101,174	155%
3	Gwinnett	4,315,205	10,743,881	149%
4	DeKalb	4,248,574	9,707,059	128%
5	Cobb	3,574,647	7,823,460	119%
6	Tift	3,427,215	10,305,222	201%
7	Richmond	3,033,269	4,890,219	61%
8	Carroll	2,956,327	6,903,019	133%
9	Clayton	2,748,225	7,413,172	170%
10	Muscogee	2,630,894	8,725,196	232%
11	Coffee	2,473,136	6,428,414	160%
12	Lowndes	2,461,220	10,147,109	312%
13	Dougherty	2,306,558	9,912,196	330%
14	Bibb	1,791,290	3,645,275	103%

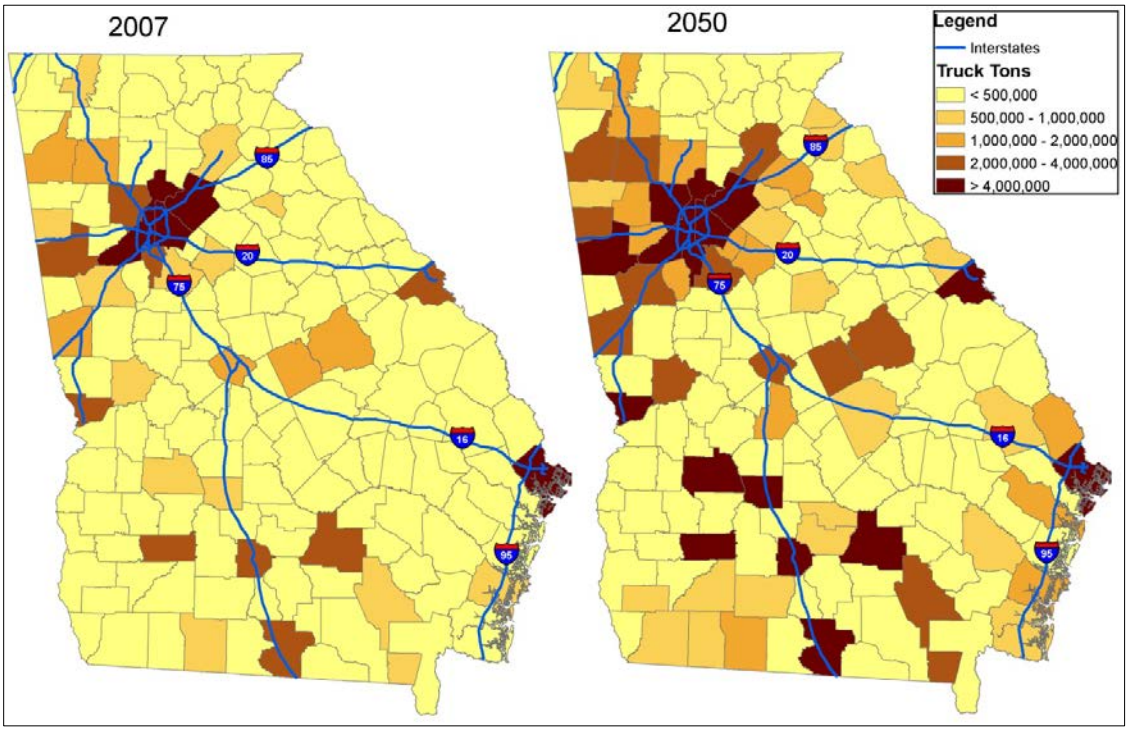
Source: TRANSEARCH Data.

Table A.5 Top 20 Georgia Counties with Highest Outbound Truck Tons

County	Truck Tons 2007	Truck Tons 2050	Percent Growth
Chatham	24,747,960	49,343,003	99%
Fulton	14,315,413	26,946,245	88%
DeKalb	4,510,309	7,888,082	75%
Gwinnett	3,762,409	8,763,530	133%
Glynn	3,632,475	3,718,477	2%
Richmond	3,497,863	4,810,641	38%
Cobb	2,789,090	5,181,244	86%
Tift	2,687,926	4,133,175	54%
Bibb	2,341,544	3,407,901	46%
Hall	2,180,890	4,287,933	97%
Whitfield	2,138,084	2,952,818	38%
Gordon	1,730,203	2,696,733	56%
Washington	1,501,080	2,466,688	64%

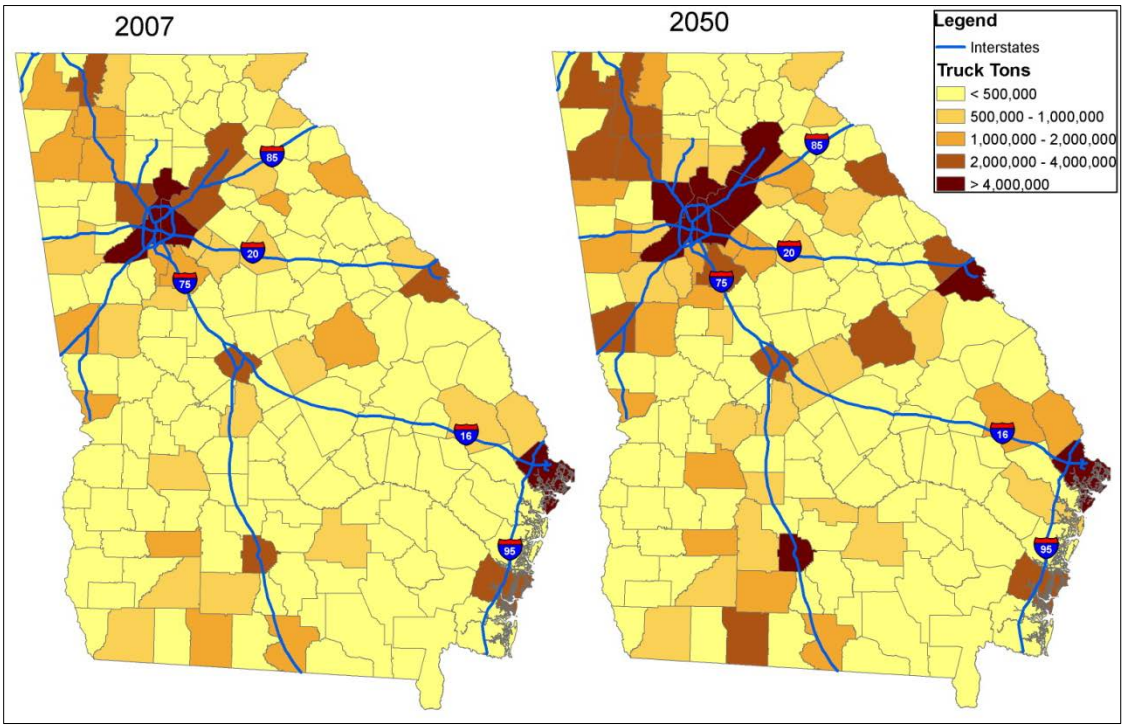
Source: TRANSEARCH Data.

Figure A.19 Inbound Truck Tons by County in Georgia, *Years 2007 and 2050*



Source: TRANSEARCH Data.

Figure A.20 Outbound Truck Tons by County, *Years 2007 and 2050*



Source: TRANSEARCH Data.

Appendix B

Performance Measurement Analysis of Major Freight Corridors in Georgia

Prepared By:
The American Transportation Research Institute (ATRI)

In Support of:
Georgia Department of Transportation's
State Freight & Logistics Plan

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INTRODUCTION

As part of the Georgia Statewide Freight & Logistics Plan, an analysis was conducted to assess truck mobility along many of Georgia's most freight significant highways. The goal of this performance measurement effort was to identify locations along these corridors where travel time is significantly impacted by traffic congestion. Knowledge of precisely where and when Georgia's freight transportation industry is losing productivity will help GDOT allocate limited highway resources towards projects that offer the greatest benefits.

As documented in this appendix, ATRI conducted an in-depth analysis of Georgia's major limited-access highways using truck position data derived from wireless onboard communication systems used by the trucking industry. The data analyzed represented weekday trucking activity during one year (10/01/2009 - 9/30/2010). Data from trucks using the following highways were analyzed: I-16, I-20, I-59, I-75, I-85, I-95, I-185. I-285, I-475, I-516, I-520, I-575, I-675, I-985 and Ga 400.

The four basic steps in this analysis were as follows:

1. Identification of study population (i.e. extraction of data from commercial vehicles traveling within a specific time frame and at a specific location from a larger "fused database");
2. Application of data quality tools and techniques;
3. Application of an analysis process that utilizes vehicle time, date and speed information to identify corridor operating characteristics; and
4. Final production of average speed profiles and reliability measures for the referenced corridor.

Two main sets of quantitative results were produced by this analysis: average speed profiles and reliability measures. The speed profiles show to what degree average speed consistently deviates from free-flow speed (i.e. speed limit) across various segments of the study corridors. The reliability measures build upon the speed profiles by identifying locations and times where average speeds vary during a 24-hour time period.

For the speed profiles, each highway was divided into one-mile segments. An average speed was calculated along each one-mile segment for every one-hour interval of the 24-hour day using the aforementioned commercial vehicle database. The average speeds were then grouped into four "time-of-day" classes:

- Morning peak (6:00 AM to 10:00 AM);
- Mid-day (10:00 AM to 3:00 PM);
- Afternoon peak (3:00 PM to 7:00 PM) and;
- Off-peak (7:00 PM to 6:00 AM).

The average speeds for the four time-of-day classes were then plotted across each segment of the corridor. This data was also imported into Geographic Information Systems (GIS) software for visual display. Posted speed limit data were furnished by GDOT and supplemented with internet research. The posted speed information is only provided as a reference however, but is helpful in identifying whether "free-flow" speeds are achieved.

In addition to average speed profiles, the reliability of each corridor was analyzed. Reliability is measured two ways in this analysis: reliability of individual segments throughout the course of the day (segment reliability) and reliability of the corridor as a whole at certain times during the day (time-of-day reliability).

To produce a measure of travel time reliability, the "buffer index" equation was applied to speed data for each one-mile segment of a given corridor. The buffer index is defined as the ratio between the difference of the 95th percentile travel time and the average travel time divided by the average travel time. In theory therefore, a high index indicates less-reliable roadways or roadway segments.

When analyzed together, the reliability graphs, average speed graphs, and GIS mapping of speed data can help identify the locations at which travel times vary significantly over the course of a day and the time of day where these variations occur. These quantitative analyses provide insight into the location, time-of-day and intensity of congestion on a given highway.

The following proceeding pages present the results of the highway performance analysis in detail for the four time periods studied. The first set of analysis examines the annual average speeds for the entire state, as well as the Atlanta metro area, during the four weekday time intervals: Off-Peak, Morning Peak, Mid-day and Afternoon Peak.

The next section is a "congested corridors" analysis. This section highlights the areas of the state where truck traffic is most severely impacted by congestion and can serve as a list of areas where transportation infrastructure could be enhanced to improve truck mobility.

TIME OF DAY ANALYSIS

The first set of analyses examined the annual average speeds for the entire state, as well as the Atlanta metro area, during the four weekday time intervals:

- Morning Peak (6:00 AM to 10:00 AM);
- Mid-day (10:00 AM to 3:00 PM) and
- Afternoon peak (3:00 PM to 7:00 PM).
- Off-Peak (7:00 PM to 6:00 AM);

Detailed Methodology

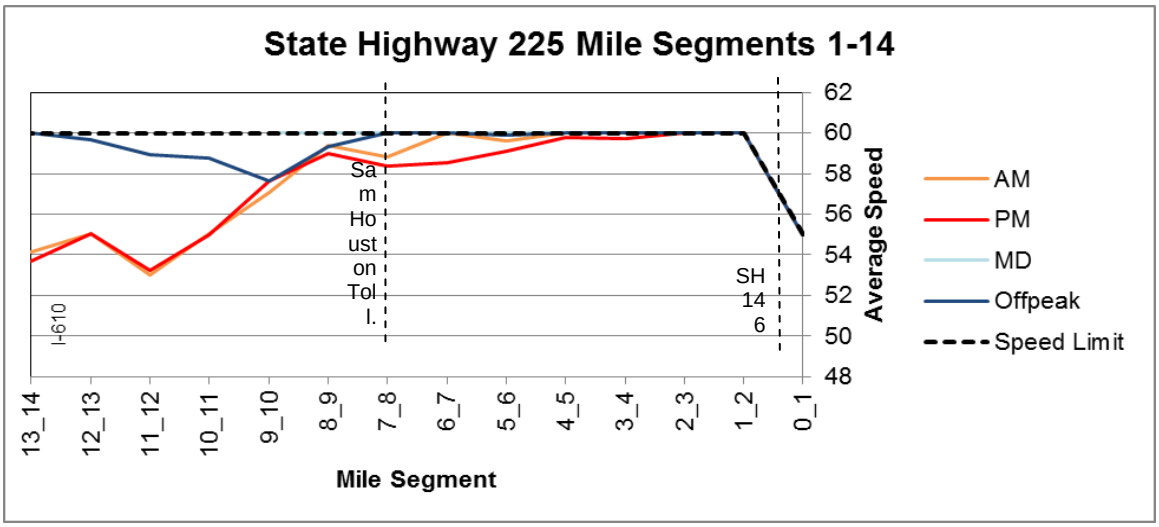
ATRI conducted an in-depth analysis of a series of Georgia highways using truck position data that were derived from wireless onboard communication systems used by the trucking industry. The four basic steps in this analysis were:

1. Identification of study population (i.e. extraction of data for commercial vehicles within a specific time frame and at a specific location from a larger "fused database");
2. Application of data quality tools and techniques;
3. Application of an analysis process that utilizes vehicle time, date and speed information to identify corridor operating characteristics;
4. Final production of average speed profiles and reliability measures for the referenced corridor.

There are two main sets of quantitative results that are produced by this analysis: average speed profiles, and reliability measures. The speed profiles show to what degree average speed is deviating from free-flow speed (i.e. speed limit) across various segments of the corridor under study. The reliability measures build on the speed profiles by not only again showing the segments of a corridor where speeds (or travel times) vary during the day, but also show at what time those variations are greatest.

For the speed profiles, each corridor that ATRI analyzed was split into one-mile segments for a more in-depth analysis. An average speed was calculated along each one-mile segment for every one-hour interval of the 24-hour day using the aforementioned commercial vehicle database. These average speeds were then grouped into four "time-of-day" classes: Morning peak (6:00 AM to 10:00 AM), Mid-day (10:00 AM to 3:00 PM), Afternoon peak (3:00 PM to 7:00 PM) and Off-peak (7:00 PM to 6:00 AM). The average speeds for every time-of-day class were then plotted across each segment of the corridor under analysis. Figure 1 shows an example of the resulting graph that is produced by the average speed profiles. All posted speed limit data shown on the average speed profiles were furnished by the Georgia Department of Transportation and supplemented with internet research. The posted speed information is therefore only provided as a reference, but is helpful in identifying "free-flow" speed.

Example of an Average Speed Profile



In addition to average speed profiles, the reliability of each corridor was also analyzed. Reliability is measured two ways in this analysis: reliability of individual segments throughout the course of the day (segment reliability), and reliability of the corridor as a whole at certain times during the day (time-of-day reliability). To help measure travel time reliability, the "buffer index" equation was applied to the commercial vehicle speed data for each one-mile segment of a given corridor under analysis. As background, the buffer index is the ratio between the difference of the 95th percentile travel time and the average travel time divided by the average travel time. Therefore, in theory, a high index indicates less-reliable roadways or segments of roadway. The formula is as follows:

$$\left[\frac{\text{95th Percentile travel rate (minute per mile)} - \text{Average travel rate (minute per mile)}}{\text{Average travel rate (minutes per mile)}}\right] \text{x } 100\%$$

Beginning first with segment reliability, for every corridor in this analysis, the corridor was split into one-mile segments for further study. The average travel speed for every one-hour interval of a 24-hour day were calculated for each of the one-mile segments. The hourly average speeds were then converted to average travel times (number of minutes needed to travel one mile at that average speed). These average travel times were then used as inputs for the buffer index calculations. This calculation yields the reliability of each 1-mile segment across the 24-hour period. Finally, the resulting buffer index values were plotted to illustrate reliability of a given segment of roadway throughout the course of the day. A higher buffer index value indicates more variation in travel times throughout the course of the day within a particular segment. Figure 2 illustrates the methodology for this exercise, while Figure 3 gives an example of the resulting graph this exercise produces. Notice certain segments along the corridor have a much higher buffer index, indicating the average travel times at those peaks vary more widely throughout the day as compared to segments with a lower buffer index.

Example of Mile Segment Reliability for Sample Corridor

Step 1: Sample Corridor

Mile 1	Mile 2	Mile 3	Mile 4

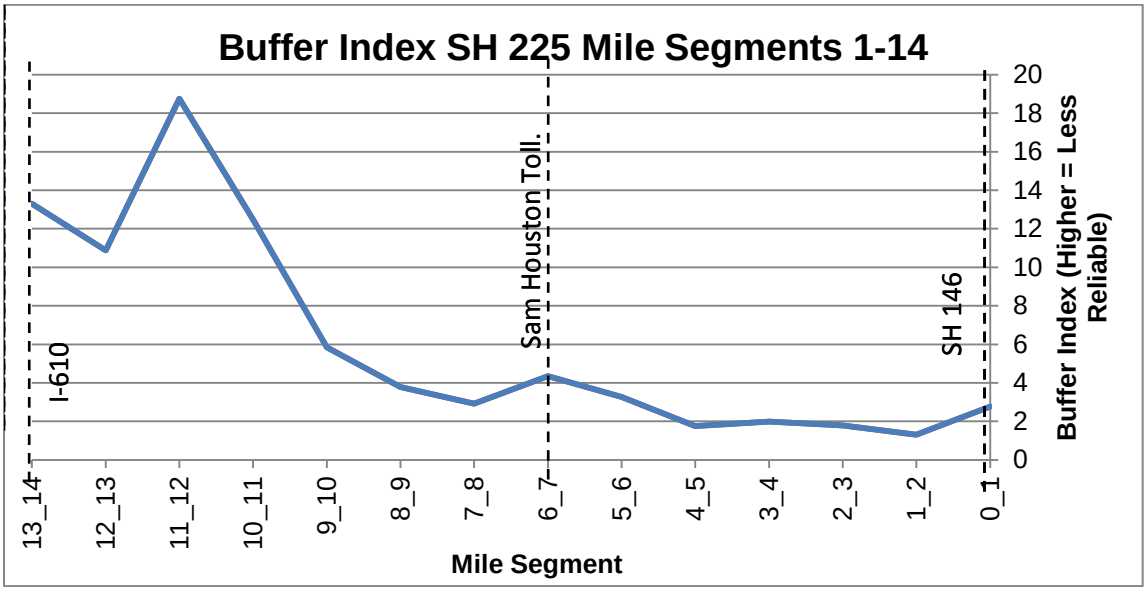
Step 2: Obtain Avg Travel Times

	Mile 1	Mile 2	Mile 3	Mile 4
Hour 1	Avg Travel Time	Avg Travel Time	Avg Travel Time	Avg Travel Time
Hour 2	Avg Travel Time	Avg Travel Time	Avg Travel Time	Avg Travel Time
…	…	…	…	…
Hour 23	Avg Travel Time	Avg Travel Time	Avg Travel Time	Avg Travel Time
Hour 24	Avg Travel Time	Avg Travel Time	Avg Travel Time	Avg Travel Time

Step 3: Utilize Hr 1 -24 Travel Time Averages in Buffer Index Equation for each one-mile segment

Step 4: Plot resulting buffer index values for each one-mile segment to illustrate travel time reliability throughout the day of various segments along the corridor

Example of a graph of mile-segment reliability



To further utilize the buffer index equation, time-of day reliability was analyzed for the entire corridor. This is essentially the inverse of the previous buffer index analysis. As in the previous exercise, average speeds for each one-mile segment of the corridor were converted to average travel times (again, minutes per mile) for every one-hour interval of the 24-hour day. However, for this exercise, the average travel times for each one mile segment were then used as the inputs to determine the buffer index for each hour of the day (rather than the average travel times for every one-hour interval used as the inputs to determine the index for each one mile segment). Finally, the buffer index values for each one-hour interval are plotted to illustrate the reliability of the entire corridor at various times throughout the day. Figure 4 illustrates this methodology, while Figure 5

gives an example of the resulting graph this exercise will produce. This buffer index calculation yields the reliability of the entire corridor during each one-hour interval. A higher buffer index value indicates more variation in travel times (i.e. speeds) throughout the corridor. Notice in the example graph the roadway has a higher buffer index at the morning and evening rush hours, indicating that during those hours, there are wide variations in travel times along the various one-mile segments of the corridor.

In cases where the corridor to be analyzed is extremely long or has changing characteristics (e.g. drastic speed limit changes), it may be best to split a corridor into smaller or more homogenous sections for this exercise. If this is the case for a particular corridor analyzed in this study, it will be noted in the text.

Example of a Time-of-Day Reliability for Sample Corridor

Step 1: Sample Corridor

Mile 1	Mile 2	Mile 3	Mile 4

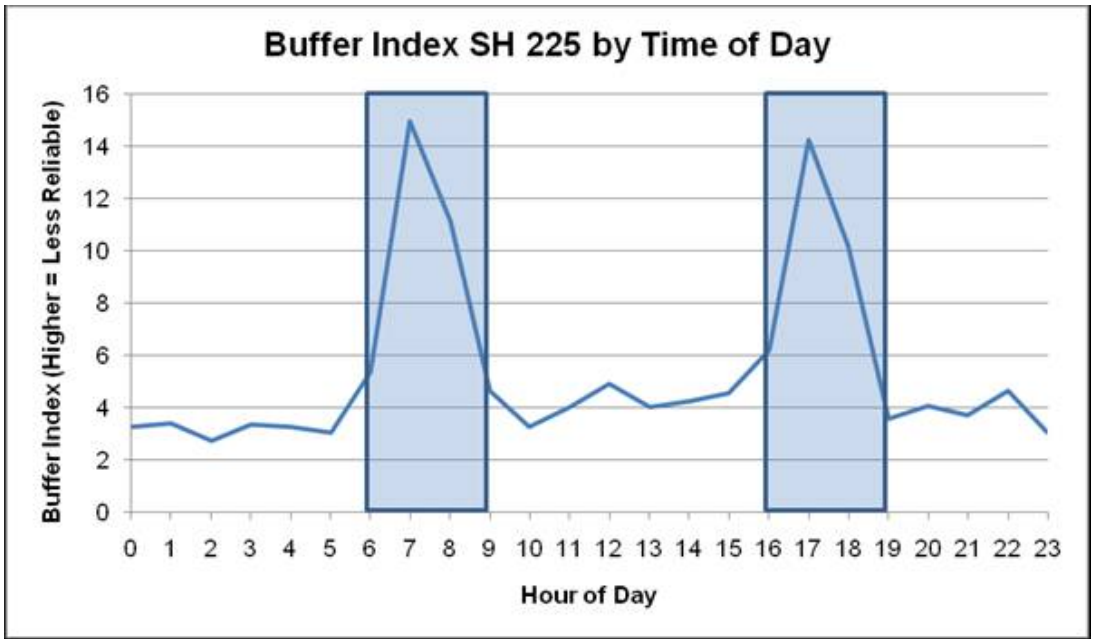
Step 2: Obtain Avg Travel Times

	Hour 1	Hour 2	…	Hour 23	Hour 24
Mile 1	Avg Travel Time	Avg Travel Time	…	Avg Travel Time	Avg Travel Time
Mile 2	Avg Travel Time	Avg Travel Time	…	Avg Travel Time	Avg Travel Time
Mile 3	Avg Travel Time	Avg Travel Time	…	Avg Travel Time	Avg Travel Time
Mile 4	Avg Travel Time	Avg Travel Time	…	Avg Travel Time	Avg Travel Time

Step 3: Utilize Miles 1 - 4 Travel Time Averages in Buffer Index Equation for each one-hour interval

Step 4: Plot resulting buffer index values for each one-hour interval to illustrate reliability of the entire corridor at various times throughout the day

Example of a graph of time-of-day reliability



When analyzed together, these reliability graphs can help identify the locations at which travel times vary significantly during the day and help identify the time-of-day where these variations occur. Coupled with the average speed profiles, these quantitative analyses can provide insight into the location, time-of-day, and intensity of congestion on a given corridor.

The following pages display the actual GPS data and corresponding for several truck-intensive routes in Georgia

Morning Peak

The morning peak timeframe, which is defined as 6:00 AM to 10:00 AM, is the first period presented in the "time of day" analysis. Figure 1 depicts the departure from free flow speed for the state during this timeframe. As expected, metro Atlanta experiences the most congestion in the state during the morning hours. In fact, there are few areas outside of Atlanta that dip below 90 percent of free flow.

The vast majority of high-congestion areas are in metro Atlanta, as illustrated in Figure 2. Here, the roads were analyzed in both directions of travel for further specificity. As expected, the most congestion is located mainly to the north of the metro area on highways headed south towards the city.

The most congested areas appear to be I-20 East in Cobb and Fulton counties, I-75 South near Kennesaw, I-575 South near Kennesaw and Woodstock, GA 400 at I-285, I-85 South past the GA 316 merge and at the GA 400 merge, I-20 West in DeKalb County, and the Downtown Connector (I-75/85) North.

Outside of Atlanta, the most congested morning peak location appears to be the terminus of I-516 in Savannah. Again, this is likely attributed to the road transitioning from limited access to signalized control.

Many of the minor dips in speed can also be attributed to construction work (particularly on I-75 in south Georgia) as well as trucks decelerating for exit ramps, truck stops and weigh stations, as previously discussed in the off-peak analysis.

Figure B-1. Average Truck Speeds as a Percent of Speed Limit – Morning Peak

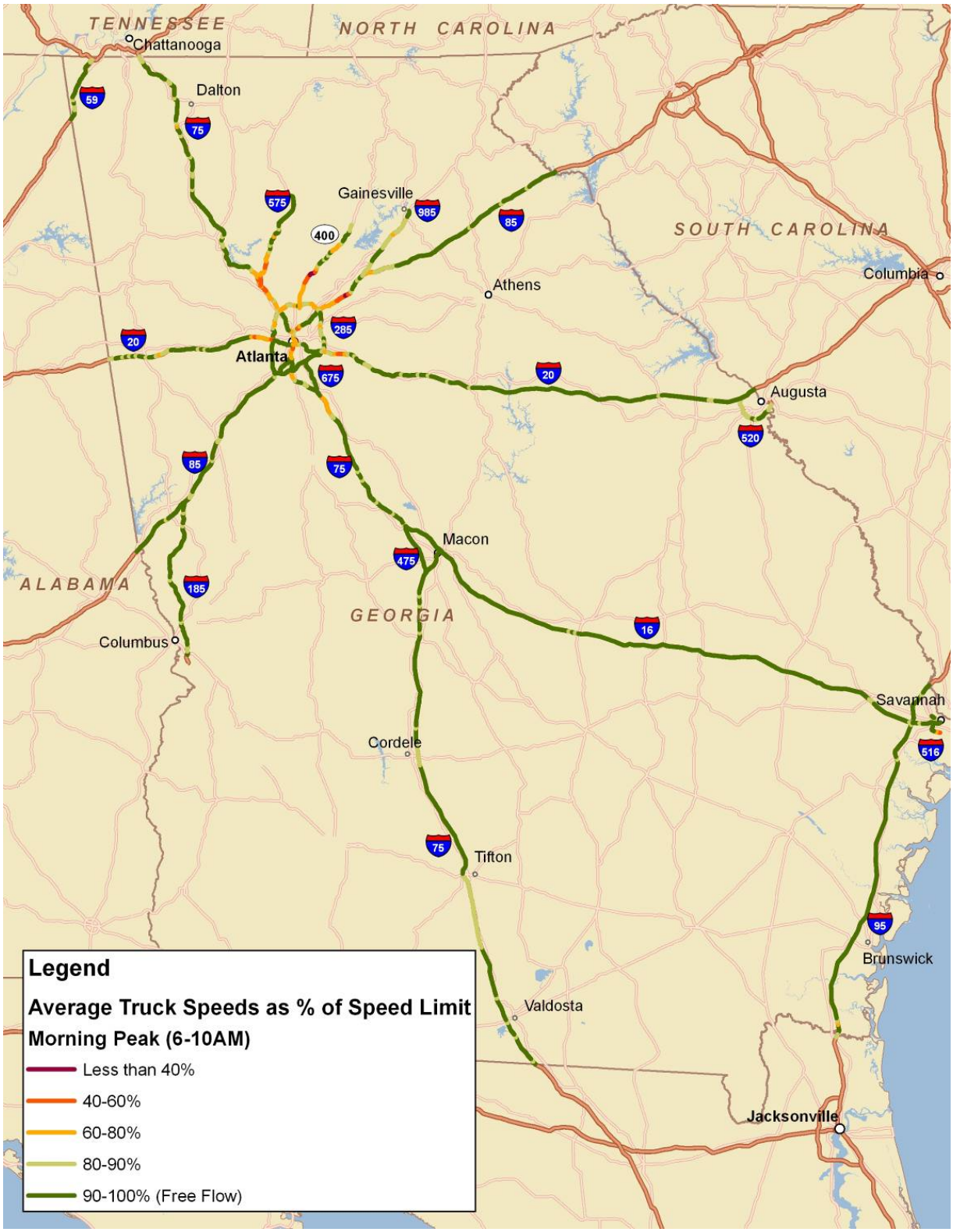


Figure B-2. Metro Atlanta Average Truck Speeds as a Percent of Speed Limit – Morning Peak

Mid-day

The next period studied is the mid-day timeframe, from 10:00 AM until 3:00 PM.

Figure 3 depicts the average truck speeds as a percent of free flow for this timeframe. Not surprisingly, the congestion from the morning period decreases significantly during mid-day, though there are still some slower locations in metro Atlanta.

Figure 4 displays a detailed metro Atlanta map. I-20 West at I-285 is still experiencing a large departure from free flow. This may identify an on-ramp issue for trucks moving from I-20 to I-285. A design issue with the onramp, coupled with the heavy truck traffic that is entering I-285, is likely creating a decrease in speed at this location. The only other area that is experiencing minor drops in speed is the Downtown Connector South (above I-20).

Figure 3. Average Truck Speeds as a Percent of Speed Limit – Mid-day

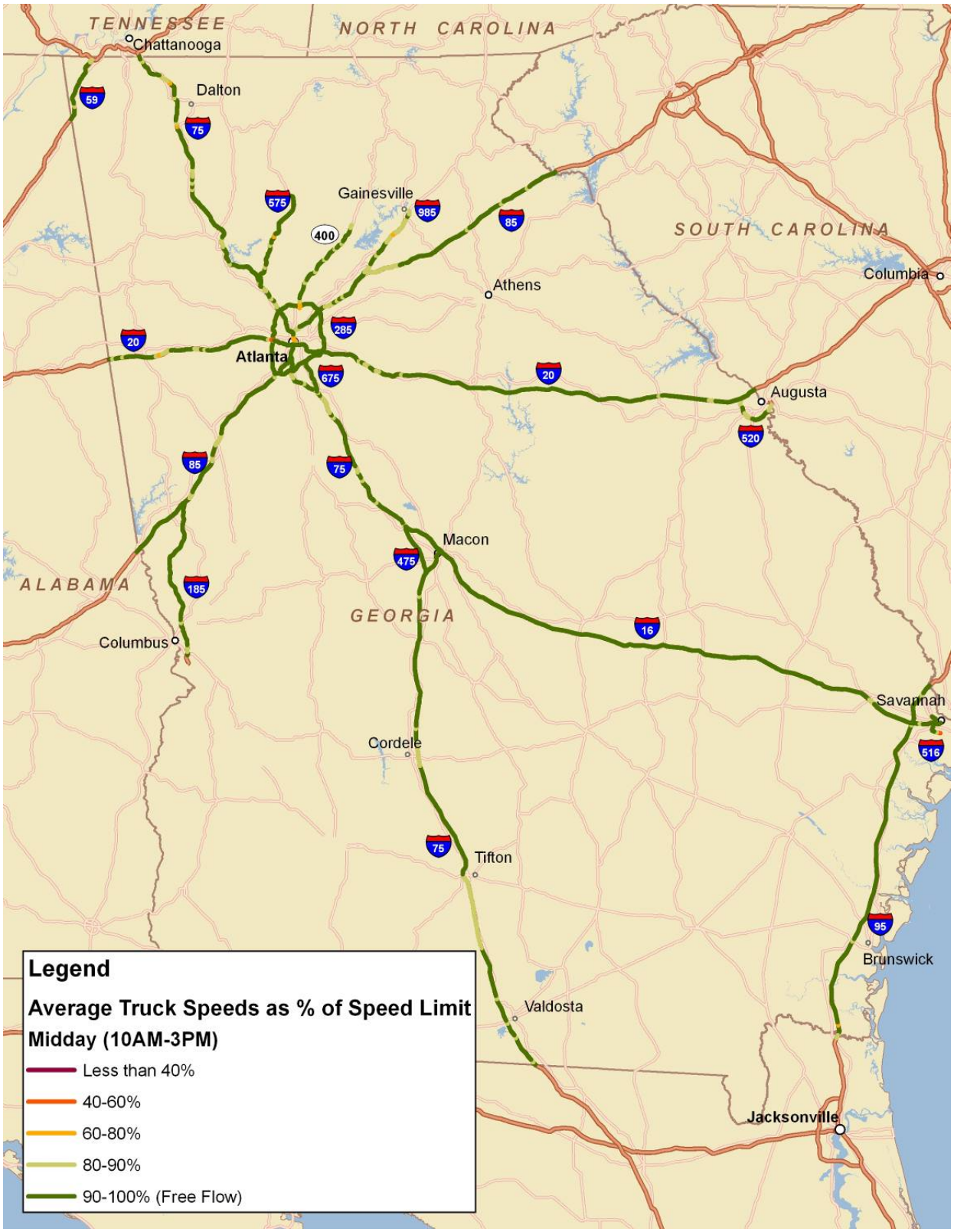


Figure B-4. Metro Atlanta Average Truck Speeds as a Percent of Speed Limit – Mid-day

Afternoon Peak

The afternoon peak timeframe is defined as 3:00 PM until 7:00 PM.

The results of the average speed analysis for the state are shown in Figure 5. The vast majority of congestion is located in the metro Atlanta region during this time period. Outside of metro Atlanta, the most congested location appears to be near Cordele. Other areas that are showing slowing, such as I-516 and I-185, are slowing due to factors other than congestion.

Figure 6 depicts Atlanta's afternoon congestion. The most congested areas in the afternoon peak appear to be I-75 North from I-285 to I-575 in Cobb County, I-285 East and West between I-75 and I-85 on the north side of the metro area, GA 400 North and South in Sandy Springs, GA 400 North in Alpharetta, I-85 North near I-285 in DeKalb and Gwinnett counties, I-85 South between the GA 400 merge and the I-75 merge, the Downtown Connector in both directions north of I-20, I-20 East at I-285 in DeKalb County, and I-75 near the I-675 merge in Henry County.

Figure B-5. Average Truck Speeds as a Percent of Speed Limit – Afternoon Peak

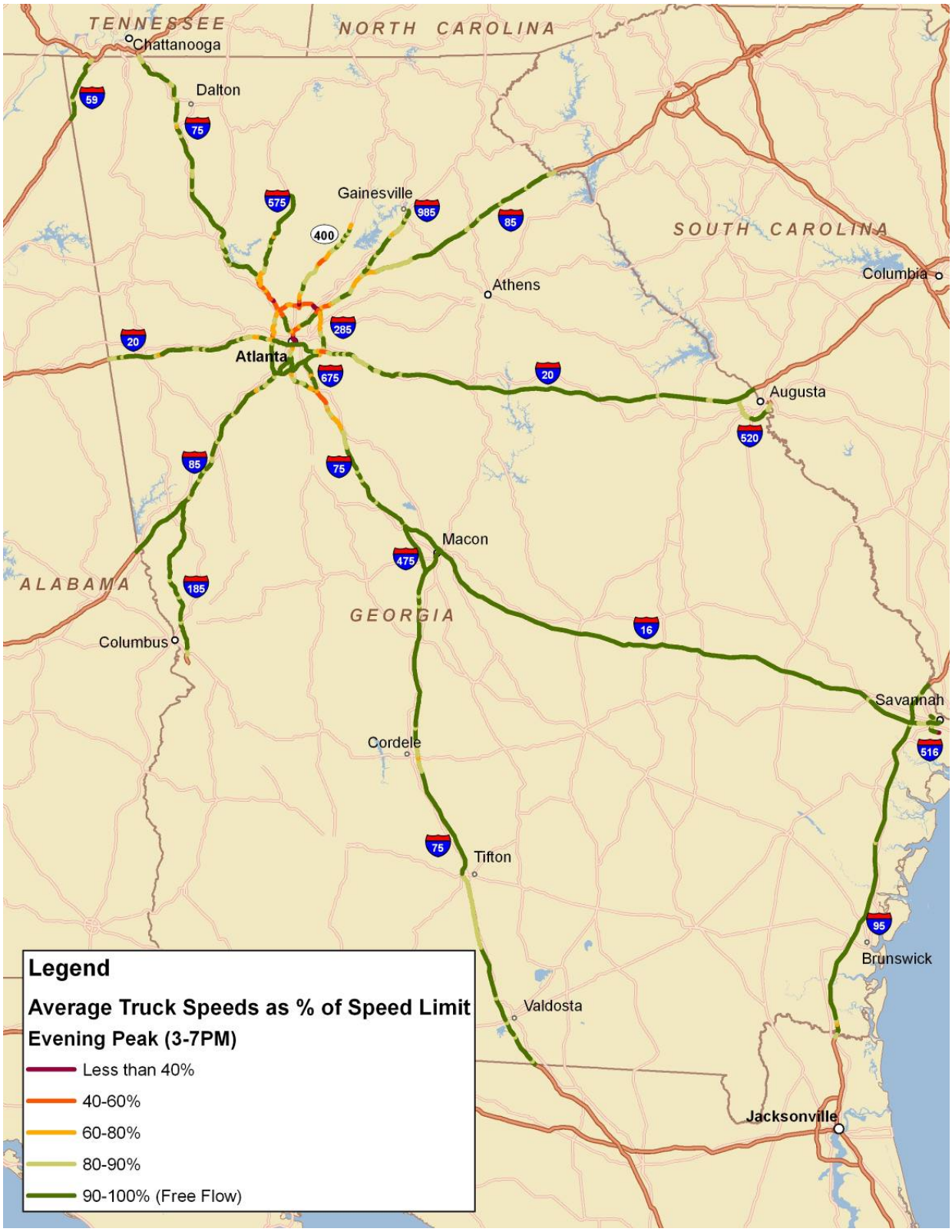


Figure B-6. Metro Atlanta Average Truck Speeds as a Percent of Speed Limit – Afternoon Peak

Off-Peak

The off-peak timeframe is defined as 7:00 PM to 6:00 AM.

Figure 7 displays a statewide map of average truck speeds as a percent of the posted speed limit for the 15 highways analyzed.[55] The off-peak analysis is helpful in identifying areas where there are slow average speeds due to factors other than congestion (e.g. night time construction zones, large truck stops).

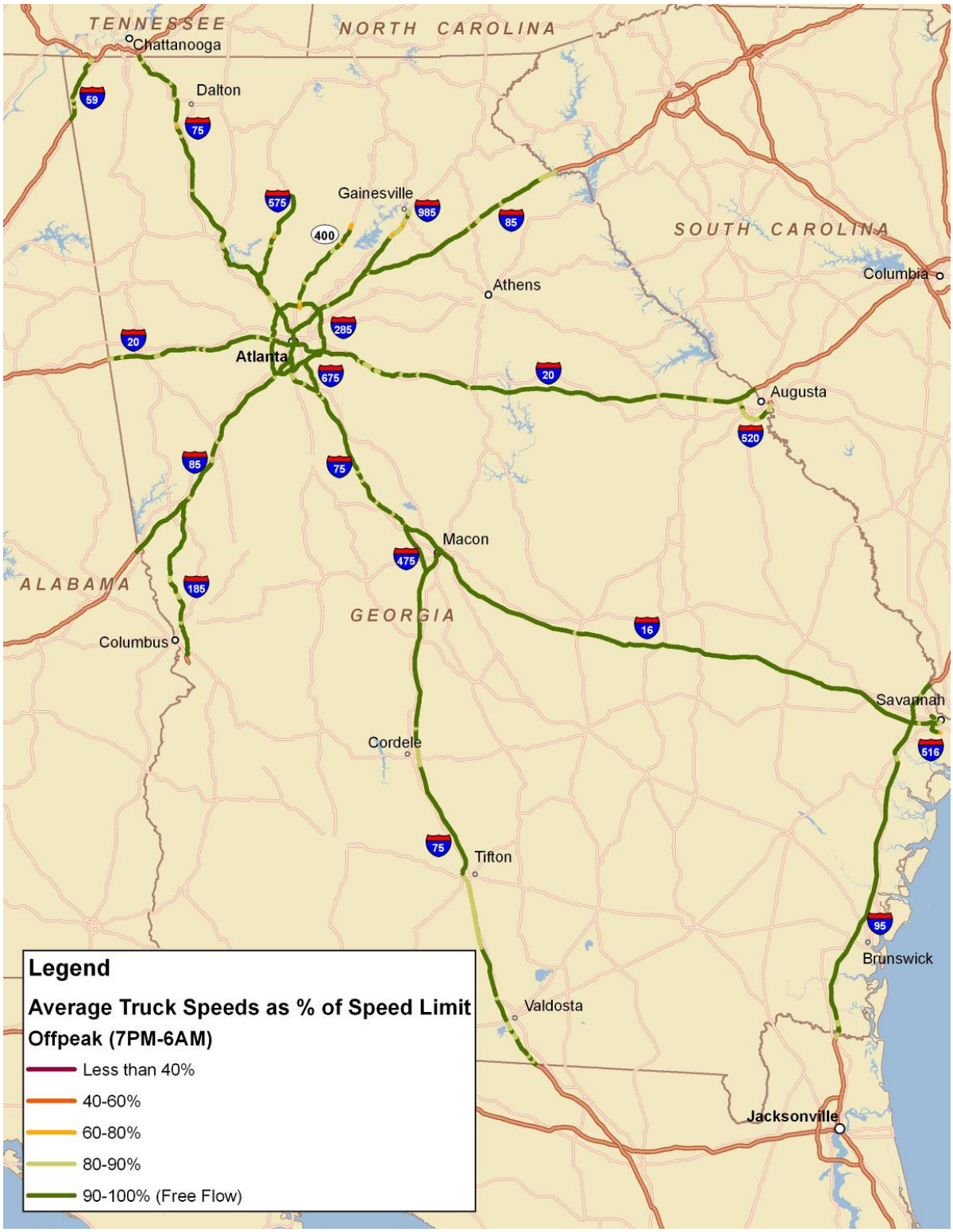
Not surprisingly, most of the roadways show little to no congestion with few areas reaching down into the 60-80 percent of free flow speed category. On I-575, for example, the slowdown is due to a series of sharp curves that require trucks to slow significantly. On the northern limit of GA 400, the slowdown at the northern terminus is due to the transition from a limited access highway to a signalized highway. The same issue occurs at the northern terminus of I-985 and southern termini of I-516 in Savannah and I-185 in Columbus. The slowdown at the southern end of GA 400 is most likely due to the fact that nearly all trucks must exit GA 400 onto I-285 at that point.

The map also highlights areas that were active construction at the time, such as on I-75 between Tifton and Valdosta. However, these construction areas typically result in minor average decreases in speed over the year and are temporary.

55 This can also be interpreted as "percent of free-flow speed." Please note that this is based on a year's worth of data (10/01/2009 - 9/30/2010) and does not include weekends.

Additionally, in areas of metro Atlanta where the highways were analyzed in both directions of travel (rather than combining both directions into one lump average), the map is depicting the direction of travel with the lowest speed. For example, if I-85 at mile 100 has an average speed of 50 miles per hour in the northbound lanes, and an average of 60 in the southbound, this map will plot the 50 miles per hour for that segment.

Figure B-7. Average Truck Speeds as a Percent of Speed Limit – Off-Peak



DETAILED ANALYSIS OF CONGESTED CORRIDORS

The following section focuses on 10 of the most congested truck corridors in Georgia. These 10 areas were selected based on a statewide visual inspection of the average speeds calculated for each of the locations. The sections were evaluated based on severity, duration and extent of congestion. The sections studied for this analysis are as follows (in numerical order) and are also shown in Figure 1.

- I-20 Milepoints 47-52
- I-20 Milepoints 66-72
- I-75 Milepoints 217-231
- I-75 Milepoints 243-251(Downtown Connector)
- I-75 Milepoints 257-275
- I-85 Milepoints 95-110
- I-285 Milepoints 8-15
- I-285 Milepoints 21-35
- I-285 Milepoints 46-50
- GA 400 Milepoints 7-20

Each analysis includes a map of the congested area, as well as an average speed profile, segment reliability analysis and time-of-day reliability analysis for each direction of travel. A discussion of the findings from the speed and reliability maps is also included for each location.

An explanation of the methodology behind the speed profiles and reliability measures can be found in Appendix A. Additionally, please note that the mile markers correspond with the shapefiles used by the research team and are not a match for actual GDOT mile markers.

For the purposes of comparison, Table 1 shows average speeds for the corridors during the four main time periods.

Figure B-8. Map of Hot Spot Highway Sections

Table B-1. Summary Statistics for 10 Hot Spots (by Direction)

Corridor	Direction	AM Peak Average Speed	Mid-day Average Speed	PM Peak Average Speed	Off-Peak Average Speed
I-20 Miles 47-52	EB	38.2	52.6	54.6	58.7
I-20 Miles 47-52	WB	56.8	56.7	51.0	56.8
I-20 Miles 66-72	EB	59.5	58.2	39.9	56.9
I-20 Miles 66-72	WB	47.0	55.5	54.0	57.0
I-75 Miles 217-231	NB	55.9	59.5	55.0	61.7
I-75 Miles 217-231	SB	62.9	60.4	47.1	62.2
I-75 Miles 243-251	NB	40.1	52.5	39.7	55.7
I-75 Miles 243-251	SB	51.9	51.5	38.0	56.2
I-75 Miles 257-275	NB	61.7	60.2	39.3	60.1
I-75 Miles 257-275	SB	45.7	58.6	58.8	62.0
I-85 Miles 95-110	NB	60.6	59.9	48.3	60.4
I-85 Miles 95-110	SB	43.5	57.7	57.0	61.8
I-285 Miles 8-15	Inner Loop	54.5	58.9	55.7	59.5
I-285 Miles 8-15	Outer Loop	58.6	56.5	42.8	58.3
I-285 Miles 21-35	Inner Loop	50.9	56.6	37.0	57.5
I-285 Miles 21-35	Outer Loop	50.9	56.1	40.0	58.1
I-285 Miles 46-50	Inner Loop	60.5	60.5	58.0	61.6
I-285 Miles 46-50	Outer Loop	54.2	57.7	46.3	58.1
GA 400 Miles 7-20	NB	58.3	59.8	52.7	60.0
GA 400 Miles 7-20	SB	40.1	57.7	50.4	60.4

I-20 Miles 47-52

This stretch of highway, shown in Figure 2, is an important truck route between Georgia and Alabama. The interchange of I-20 and I-285 is a critical node for freight movement due to commercial vehicle restrictions inside I-285, and the interchange has serious congestion issues. Figure 3 shows a large drop in average speed (down to 30 mph) when approaching this interchange on I-20 East, particularly in the morning. The spike in the buffer index during the morning hours eastbound never fully recovers until after the PM peak period. I-20 West shows a moderate drop in speed during the afternoon peak hours, which is to be expected given commuting patterns.

Figure 9. I-20 Miles 47-52

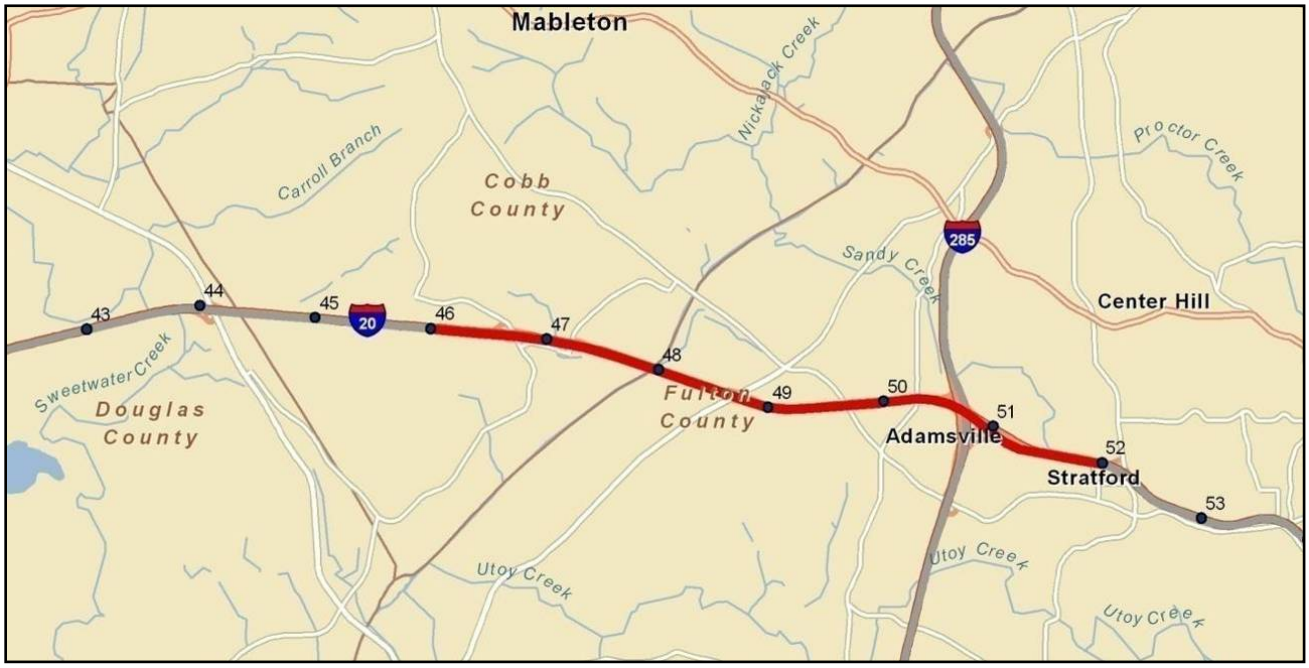
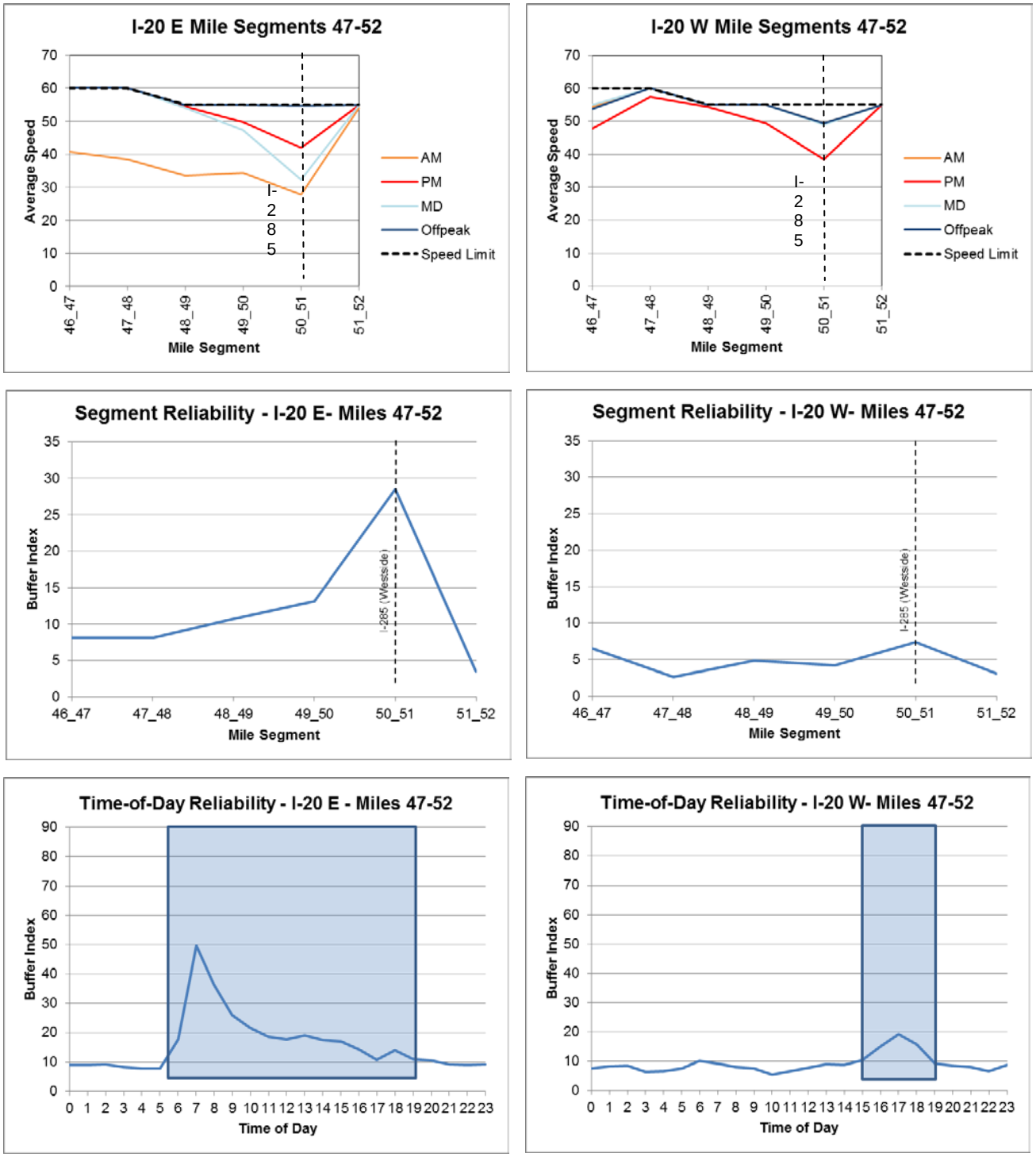


Figure B-10. I-20 Miles 47-52 Average Speed, Segment and Time-of-Day Reliability



I-20 Miles 66-72

This section of I-20, shown in Figure 4, is similar to the previous section of I-20 that was analyzed; is a critical east-west route for trucks in the southeast. The interchange with I-285 at mile marker 67 is heavily traveled by commercial vehicles due to vehicle restrictions for trucks inside I-285. As seen in Figure 5, I-20 East has a large drop in speed in the evening peak hours as I-285 is approached due to the large number of commercial vehicles moving onto the highway from I-285. I-20 West is most congested during the morning peak hours due to commuting patterns.

Figure B-11. I-20 Miles 66-72

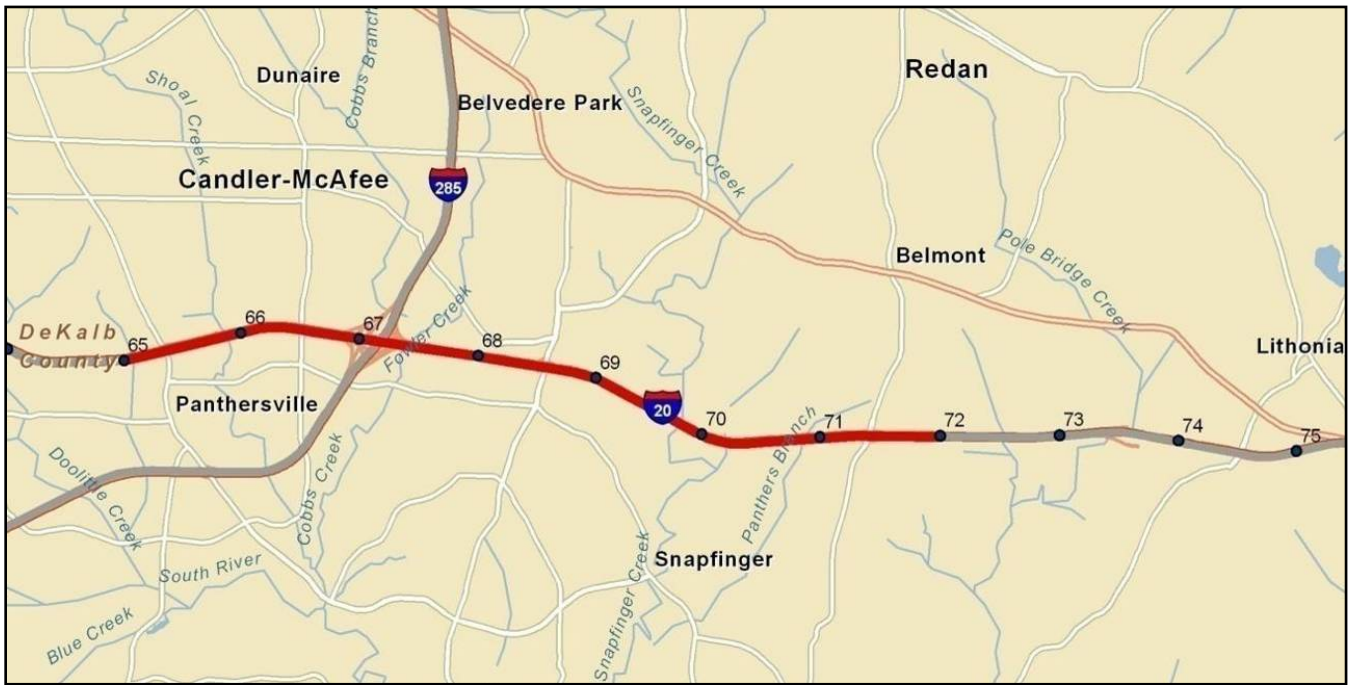
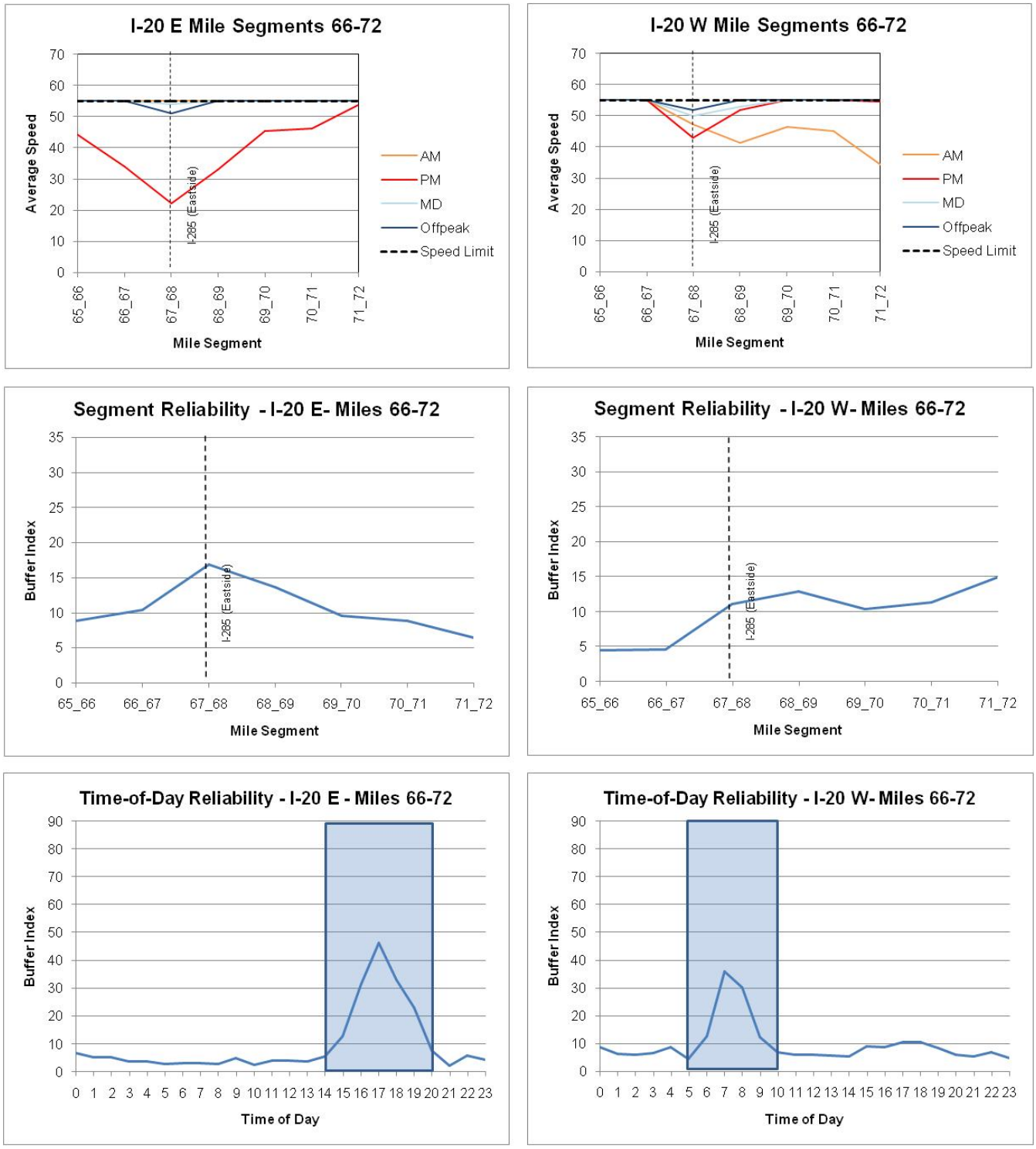


Figure B-12. I-20 Miles 66-72 Average Speed, Segment and Time-of-Day Reliability



I-75 Miles 217-231

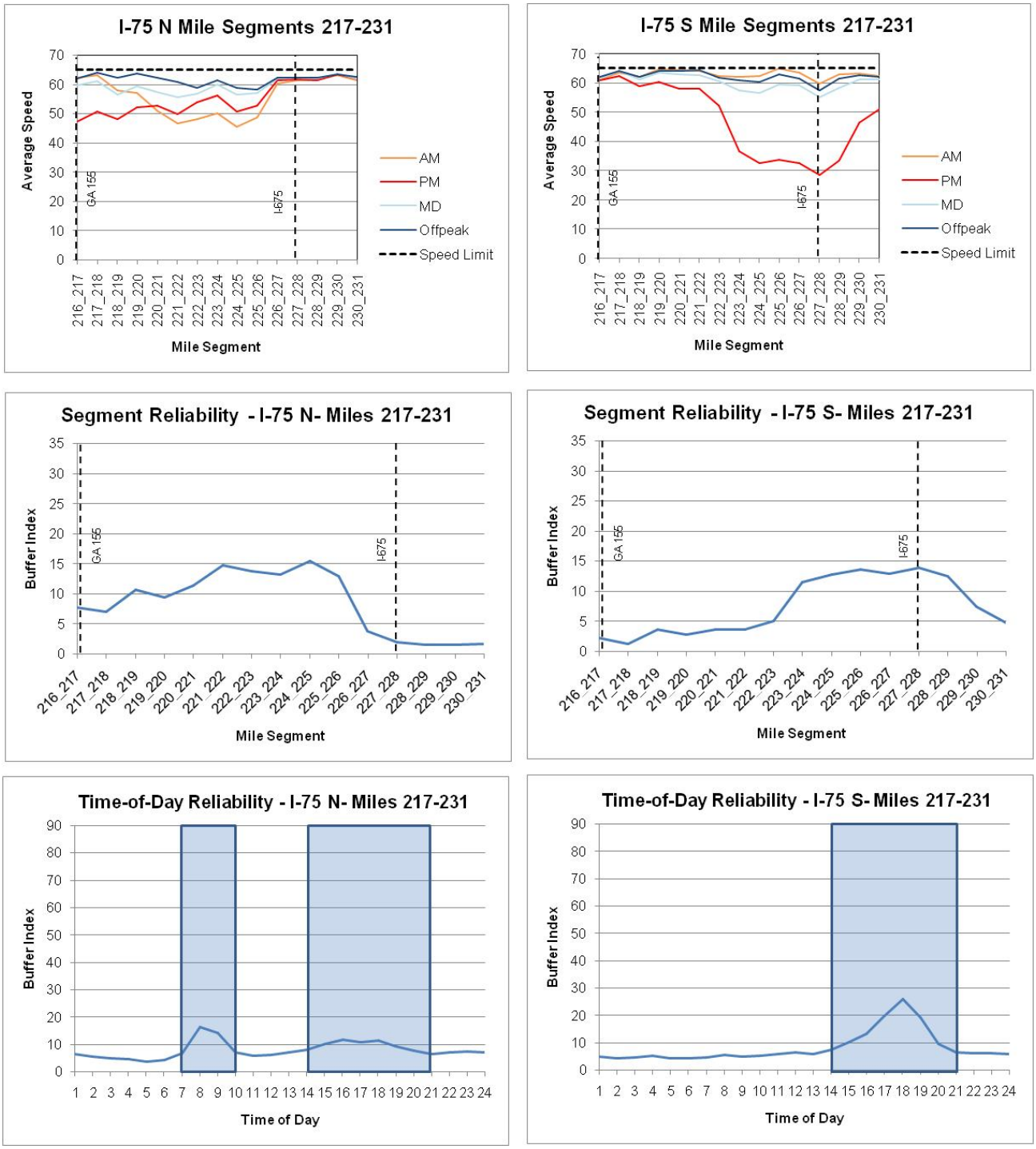
This section of I-75, shown in Figure 6, traverses the southern suburbs of metro Atlanta and contains the interchange with I-675 between miles 227 and 228. Figure 7 shows that I-75 North experiences moderate average speed drops in both the morning and evening peak travel times until I-675 is reached, where speeds then recover to free flow. I-675 is a major truck route to reach I-285, I-20 East, and I-85 North.

A significant portion of traffic exits the highway at I-675 which then relieves the congestion on I-75 North. The congestion prior to I-675 demonstrates the need for potential lane expansions south of I-675. (*Editor's note: a northbound auxiliary lane has recently been constructed and is open to traffic.)*

I-75 South experiences severe speed drops in the evening peak hours, with average speeds as low as 30 mph in certain areas. The Figure 7 graphs highlight the heavy usage of I-675 as the peak of congestion along this section of I-675 occurs right at that interchange. Additional lanes or improved merging at this intersection may be potential solutions to the congestion that this portion of I-75 South experiences on a daily basis.

Figure B-13. I-75 Miles 217-231

Figure B-14. I-75 Miles 217-231 Average Speed, Segment and Time-of-Day Reliability



I-75 Miles 243-251

This portion of I-75 runs concurrently with I-85 (as shown in Figure 8) and is generally referred to as the "Downtown Connector." This highway is notoriously congested and the speed and reliability graphs shown in Figure 9 confirm that reputation.

The Downtown Connector northbound experiences severe congestion in both the morning and the evening peak travel times. Average speeds drop below 30 mph in several locations during both time periods. This is a heavily traveled road by passenger vehicles, and although truck travel on this portion of highway is limited due to restrictions, commercial vehicles that make deliveries inside of I-285 experience congestion throughout a large part of the day.

The southbound Downtown Connector experiences peak congestion during the afternoon rush hour; average speeds are below 20 mph in certain areas. It is interesting to note that average speeds improve dramatically south of I-20.

Figure B-15. I-75 Miles 243-251

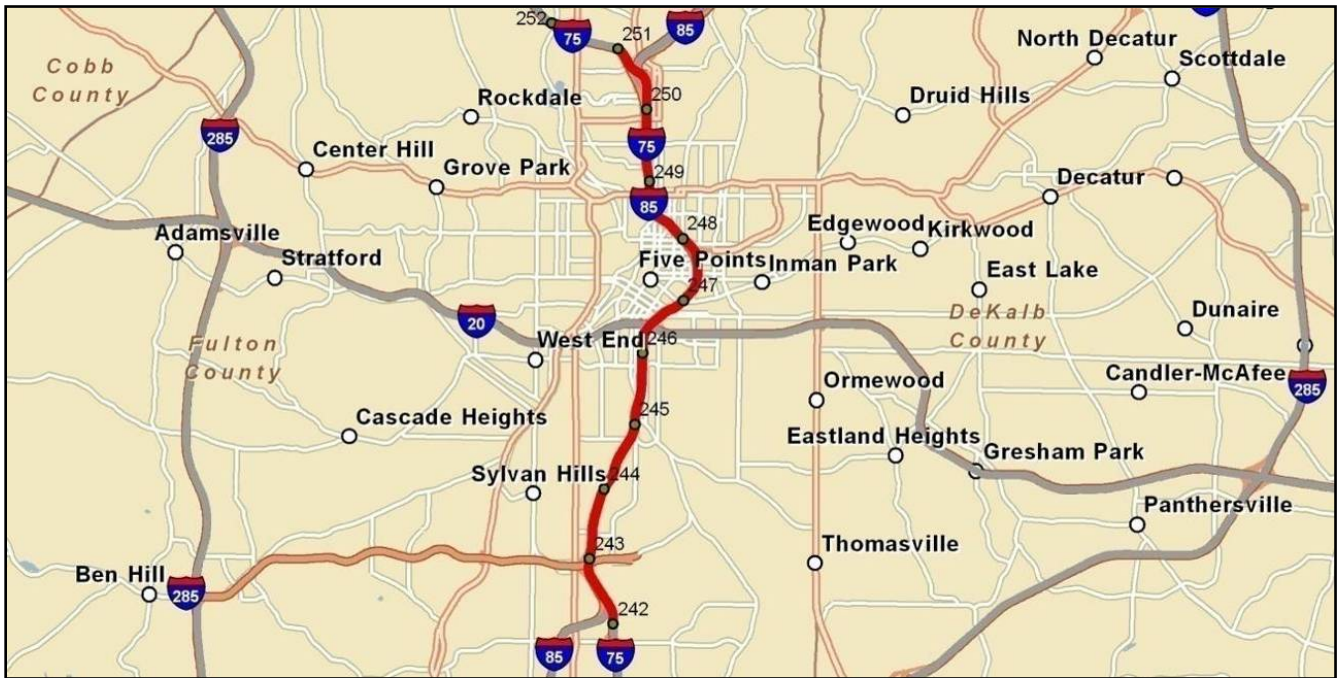
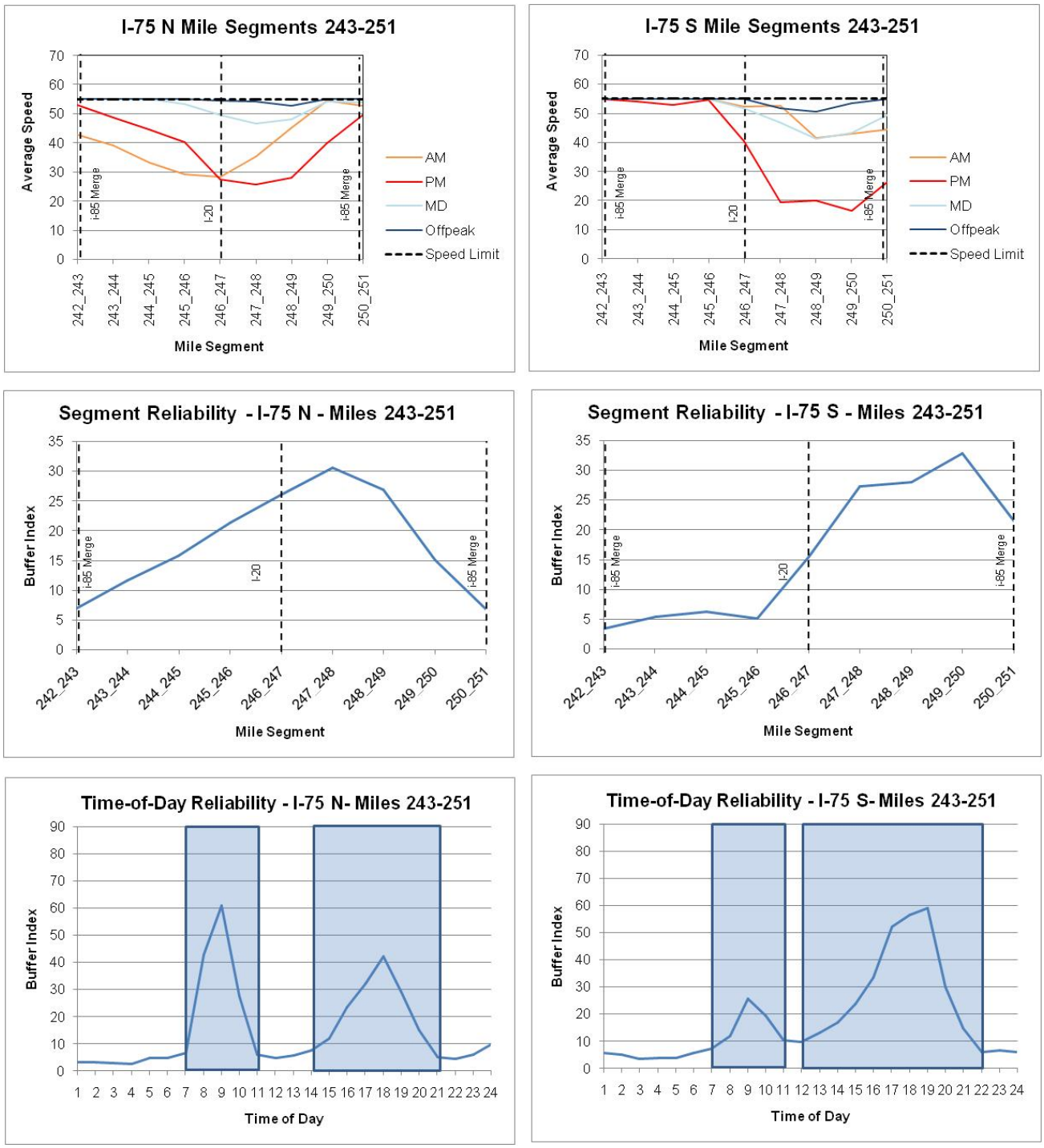


Figure B-16. I-75 Miles 243-251 Average Speed, Segment and Time-of-Day Reliability

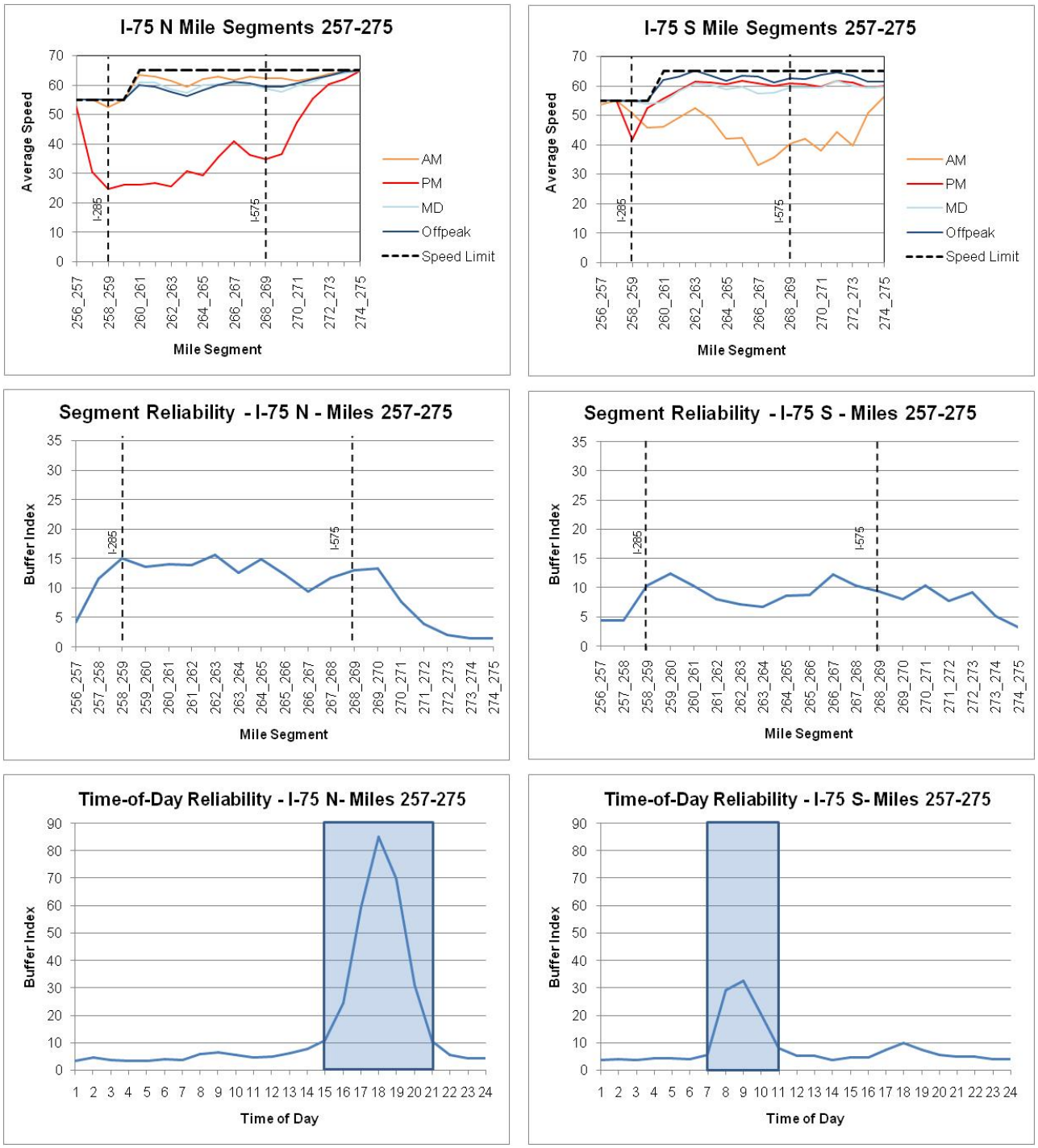


I-75 Miles 257-275

I-75 in Cobb County, shown in Figure 10, is a critical corridor for both passenger vehicles and freight. The heavy use of this highway for commuting results in large drops in average speeds during the morning and evening rush hours, as shown in Figure 11. Not surprisingly, I-75 North has a severe drop in average speed during the evening peak times (a low of 25 mph several sections) and I-75 South experiences a somewhat less severe drop during the morning peak times (as low as 35 mph). I-575 is a major access route to residents of Cherokee County; therefore, this is a critical interchange as much of the delay is due to vehicles merging southbound on I-575 in the morning.

Figure B-17. I-75 Miles 257 275

Figure B-18. I-75 Miles 257-275 Average Speed, Segment and Time-of-Day Reliability



I-85 Miles 95-110

This section of I-85, shown in Figure 12, is similar in character to I-75 in Cobb County. Figure 13 demonstrates that I-85 North is worse in the evening peak periods, with speeds as low as 25 mph in certain locations and I-85 South is worse in the morning peak periods (again, with speeds as low as 25 mph in certain areas). In terms of specific locations, it appears the interchange with I-285 is a critical node for northbound travel in the afternoon peak hours.

The large influx of trucks onto I-85 northbound from I-285 causes a severe bottleneck which takes several miles to recover. In the morning peak hours, on I-85 South, the influx of traffic from GA 316 at mile 107 causes the interstate to become congested. It is interesting to note that I-85 South at I-285 also experiences a sharp decline in speeds during the evening peak hours, most likely due to spillover congestion from I-285.

Figure B-19. I-85 Miles 95-110

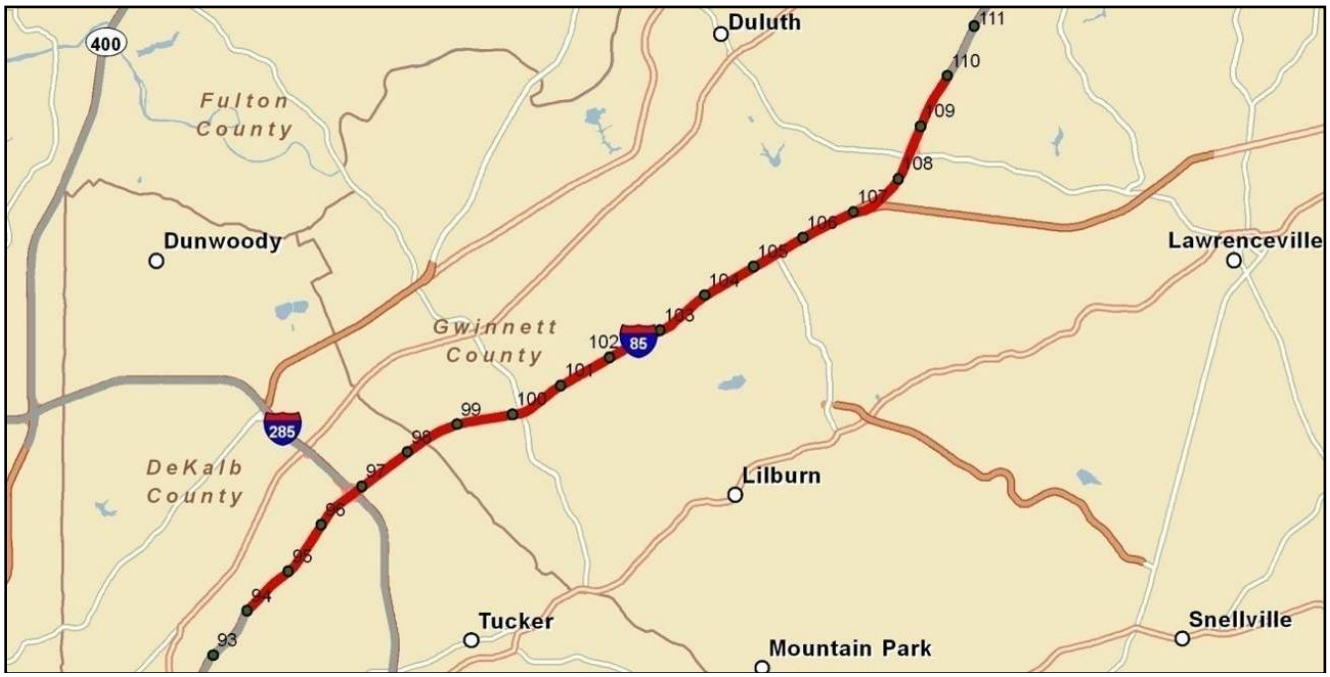
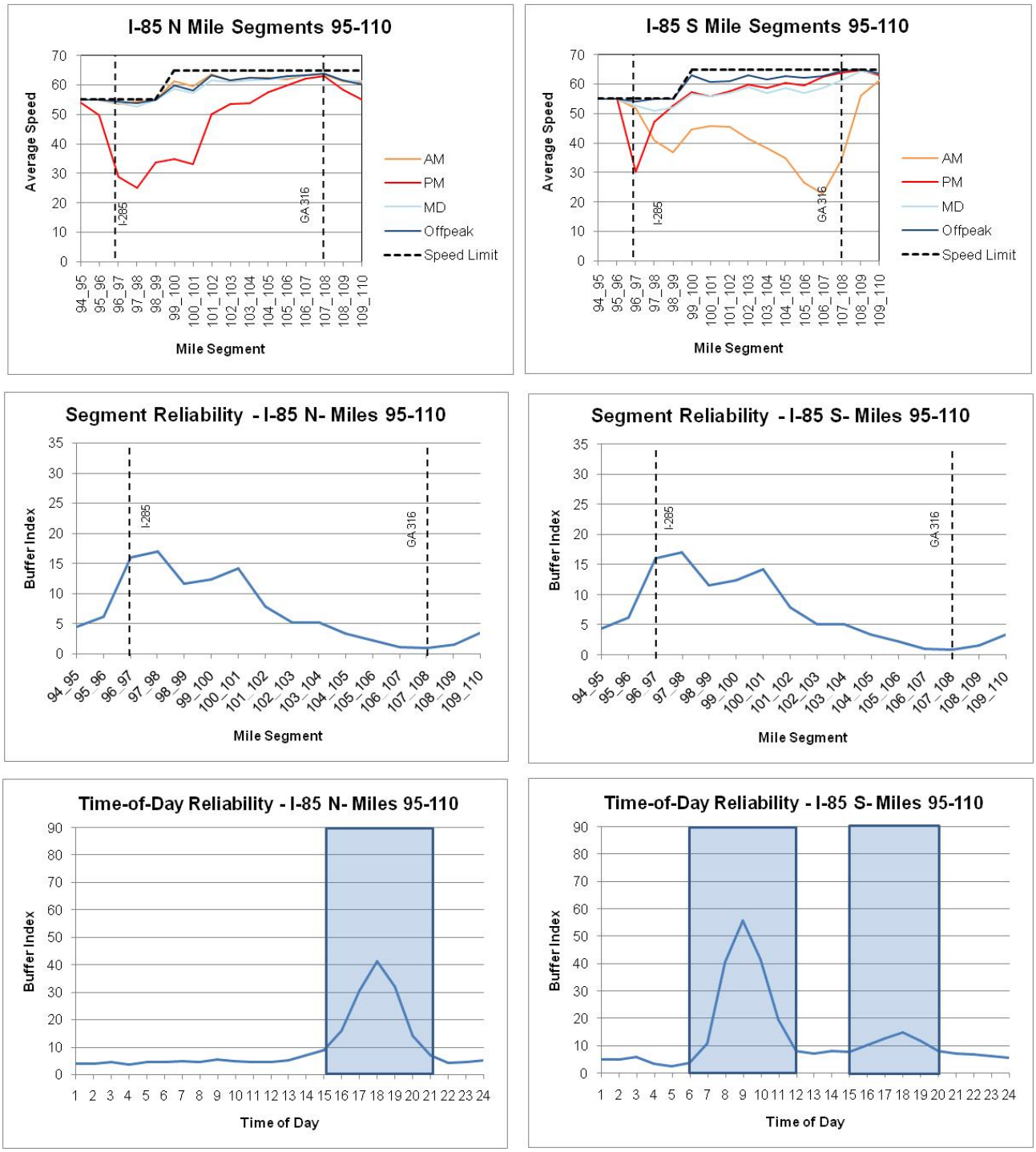


Figure B-20. I-85 Miles 95-110 Average Speed, Segment and Time-of-Day Reliability



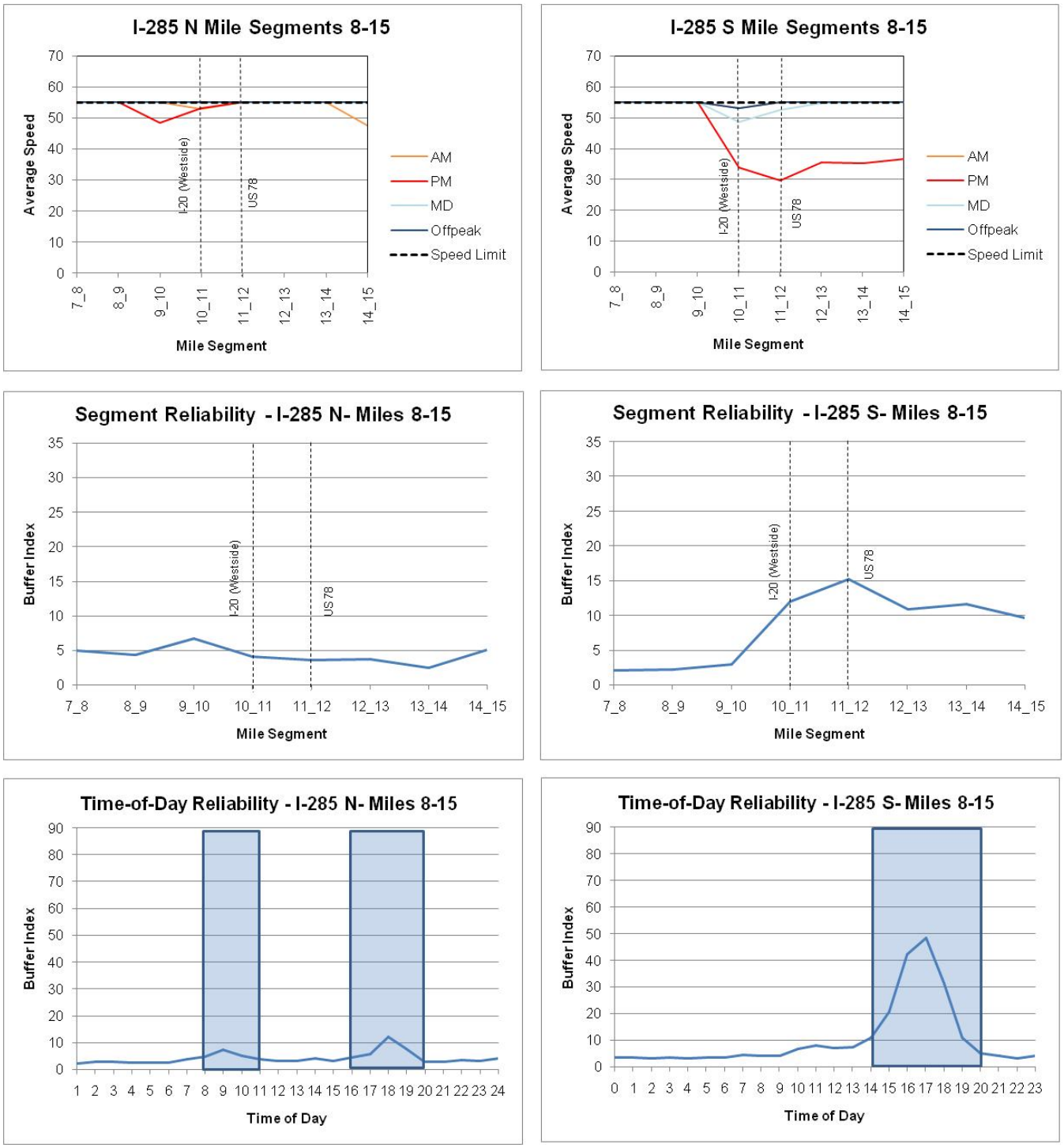
I-285 Miles 8-15

This section of I-285 (commonly referred to as the “Perimeter”) west of Atlanta is shown in Figure 14. The I-20 interchange with I-285 at mile 10 is critical for both passenger and freight travel alike. I-285 North, as shown in Figure 15, experiences very little congestion throughout the day. However, I-285 South experiences a large drop in average speeds during the evening peak times.

A significant portion of vehicles on I-285 South exit this highway at I-20, hence the improvement of speeds and reliability below mile 10. Before I-20 is reached however, speeds average only between 30 and 40 mph during the evening peak times.

Figure B-21. I-285 Miles 8-15

Figure B-22. I-285 Miles 8-15 Average Speed, Segment and Time-of-Day Reliability



I-285 Miles 21-35

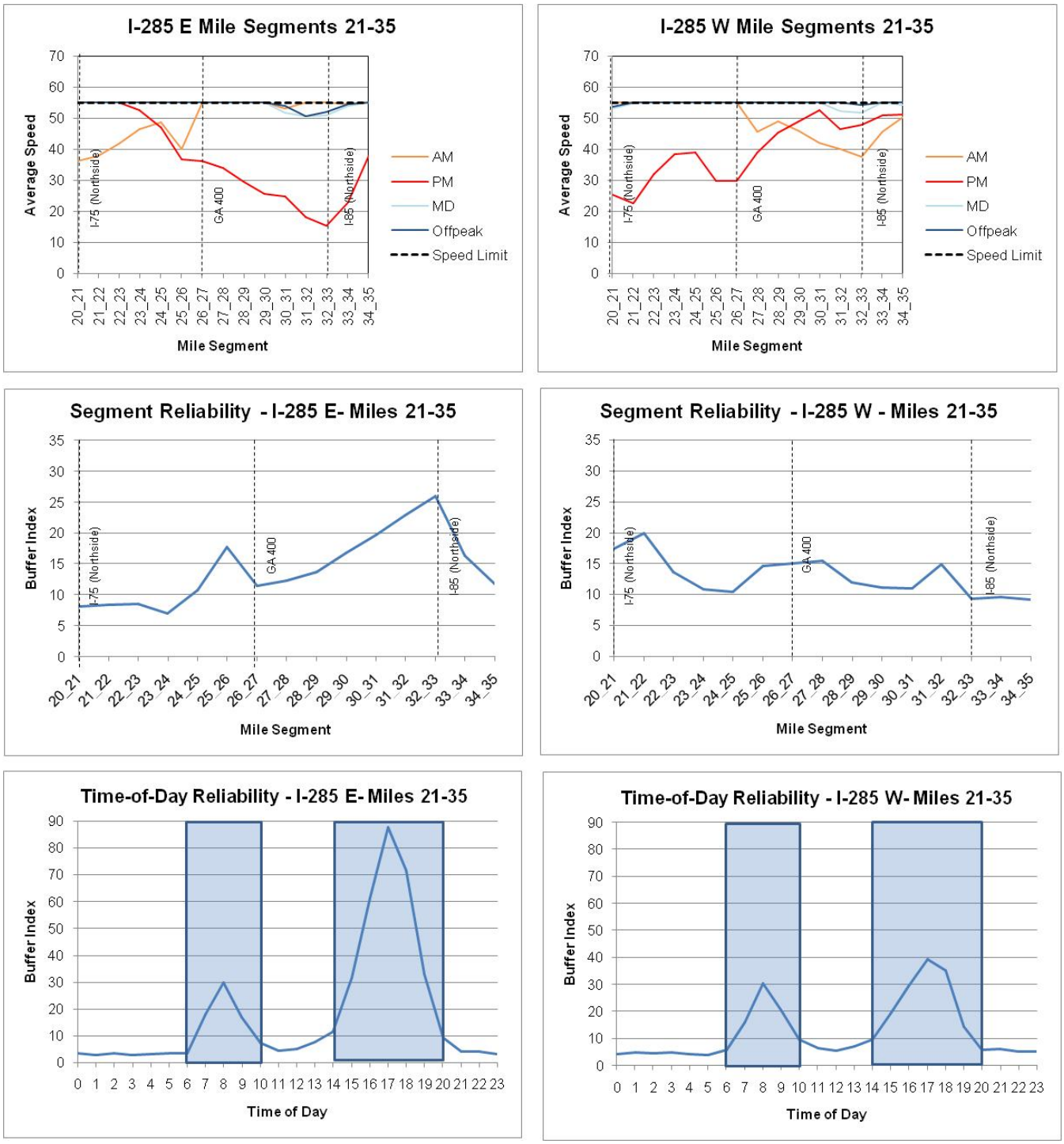
This section of I-285, shown in Figure 16, is known as the "top-end perimeter." It is a critical piece of infrastructure for passenger and commercial vehicles as it connects three major arterials: I-75, I-85 and GA 400.

I-285 East experiences moderate congestion in the morning hours between I-75 and GA 400, as depicted in Figure 17. However, the congestion in the afternoon hours is much more severe and worsens in the eastbound direction from I-75 to the I-85 exit. Speeds on this stretch of roadway drop to a low of nearly 15 mph.

I-285 West also has severe congestion. In the morning hours, there is a moderate drop in average speeds between I-85 and GA 400. As is the case with I-285 East, the afternoon peak times are much worse. Speeds continuously worsen from I-85 westbound to I-75, with average speeds reaching a low of approximately 25 mph.

Figure B-23. I-285 Miles 21-35

Figure B-24. I-285 Miles 21-35 Average Speed, Segment and Time-of-Day Reliability

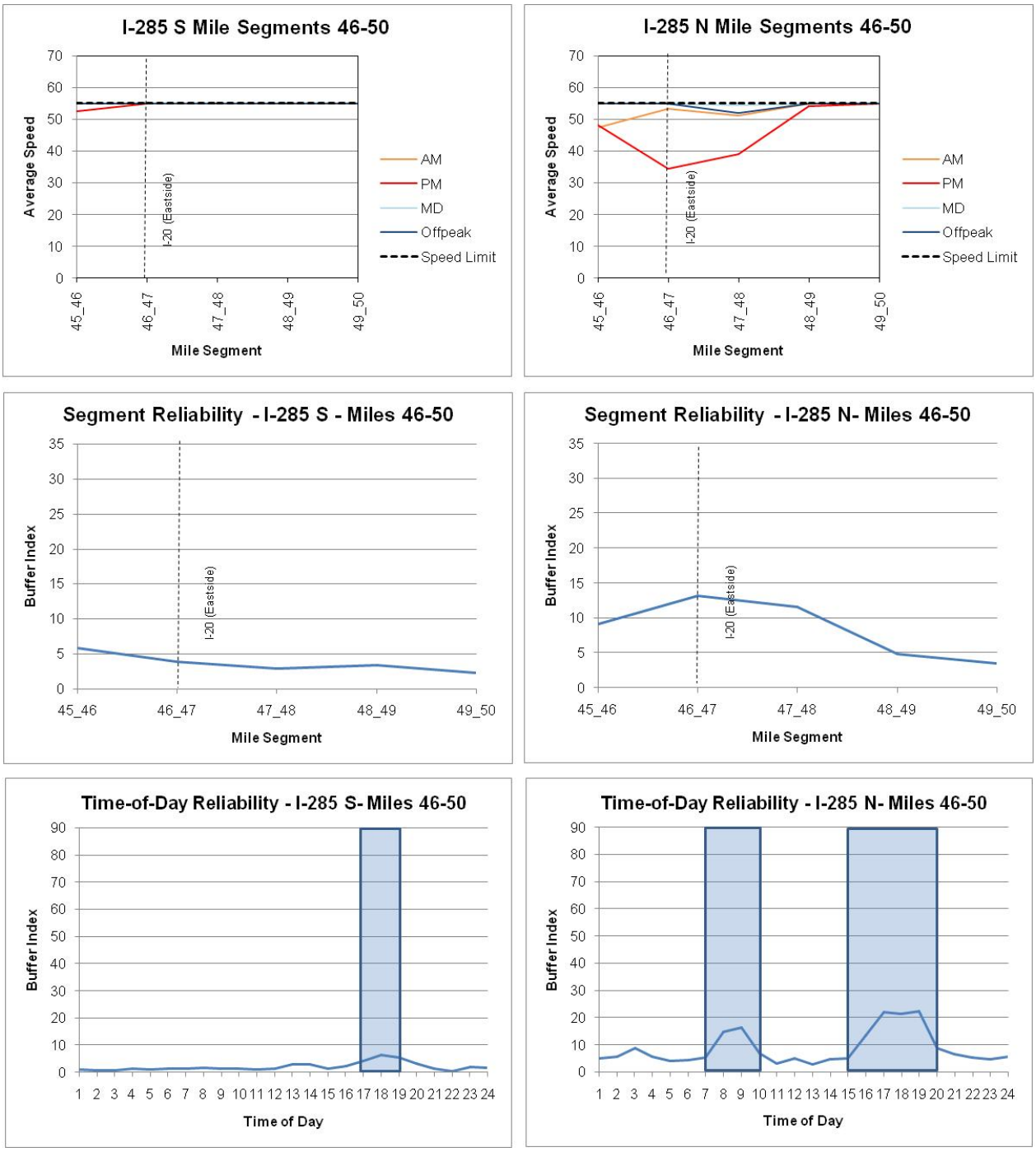


I-285 Miles 46-50

This small section of I-285, shown in Figure 18, is on the east side of metro Atlanta, and contains an important interchange with I-20. I-285 South, as shown in Figure 19, does not appear to experience much congestion on a regular basis, as average speeds stay near free flow at all hours of the day. I-285 North does experience moderate congestion in the afternoon hours as traffic funnels north from I-75 and I-675 in an attempt to reach I-20. On average, speeds decrease to approximately 35 mph at the I-20 interchange during the afternoon peak, and then improve after the exit.

Figure B-25. I-285 Miles 46-50

Figure B-26. I-285 Miles 46-50 Average Speed, Segment and Time-of-Day Reliability



GA 400 Miles 7-20

Georgia State Route 400, shown in Figure 27, is a critical north-south highway linking Atlanta to its northern suburbs. As Figure 28 shows, GA 400 northbound is particularly congested during the evening rush hour mostly at the I-285 interchange, and gradually lessens towards Roswell and Alpharetta. Afternoon/evening speeds on GA 400 northbound at I-285 often drop below 35 mph.

GA 400 southbound experiences a somewhat different pattern; it sees a sharp decline in speeds near I-285 during the evening peak times, with speeds dropping to 20 mph. This is due to the fact that most trucks exit GA 400 at I-285 due to truck restrictions. The influx of trucks onto an already congested I-285 causes major backups on GA 400 South.

Figure B-27. GA 400 Miles 7-20

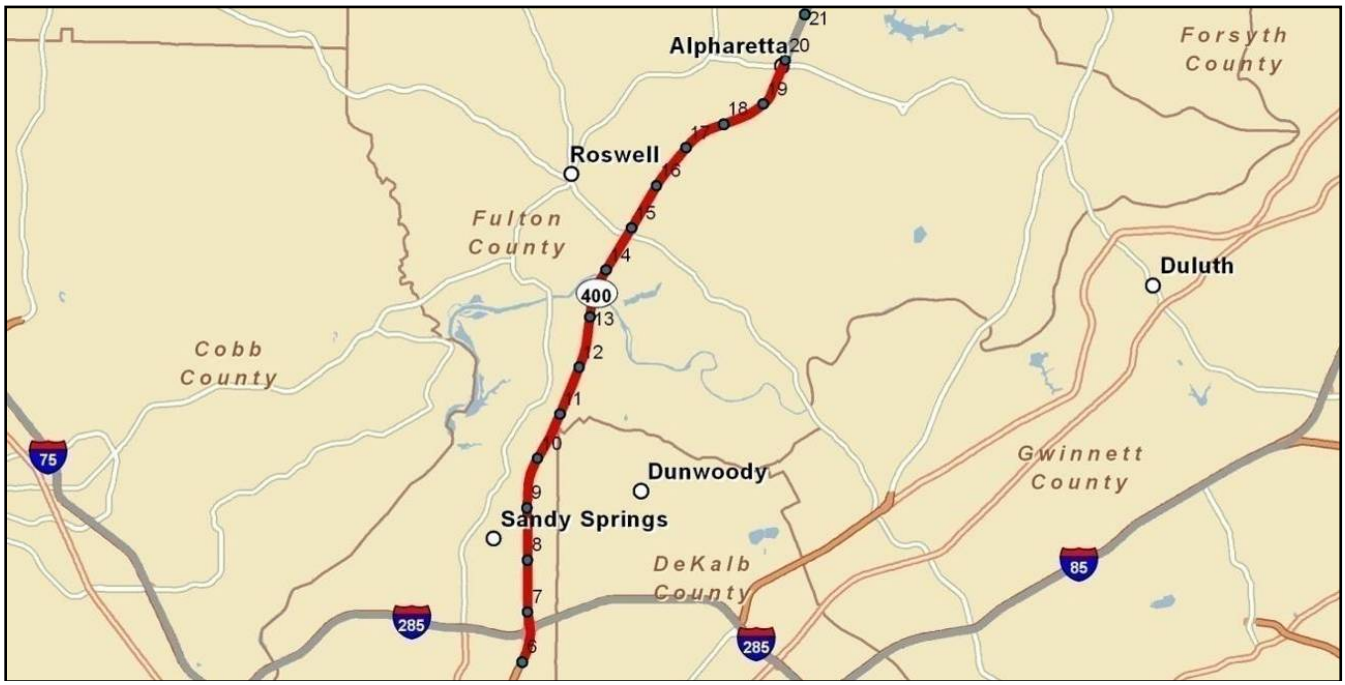
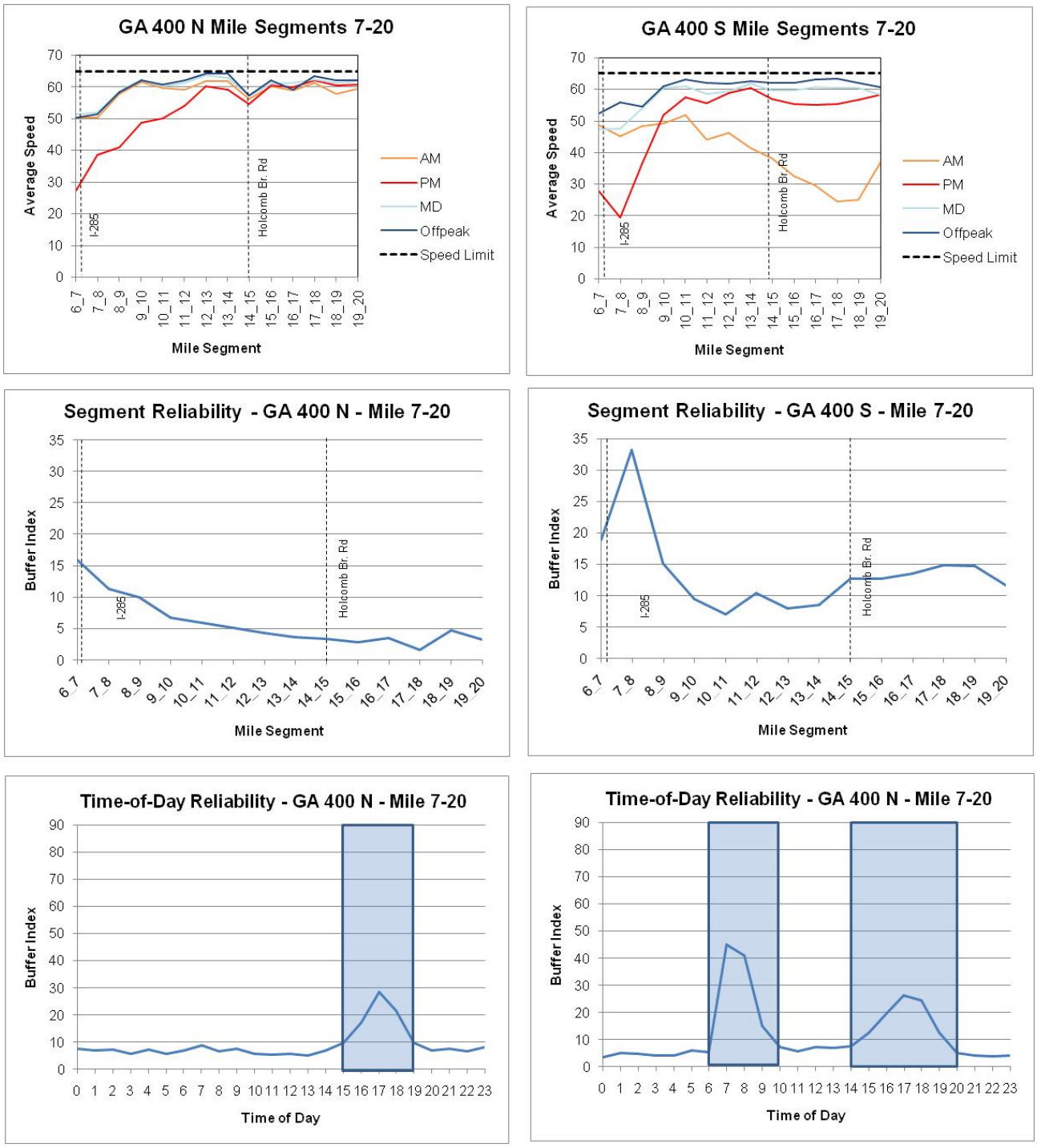


Figure B-28. GA 400 Miles 7-20 Average Speed, Segment and Time-of-Day Reliability



CONCLUSION

The most severe congestion experienced by the trucking industry in Georgia on limited access highways is exclusive to one area of the state -- metro Atlanta. The analysis in this report identifies where and when trucks are delayed due to the recurring congestion that typically results from limited highway capacity. Through this research, it is shown that truck delay in the state of Georgia is directly related to AM and PM peak travel periods, when large numbers of passenger vehicles enter the highway as part of the commute to and from work.

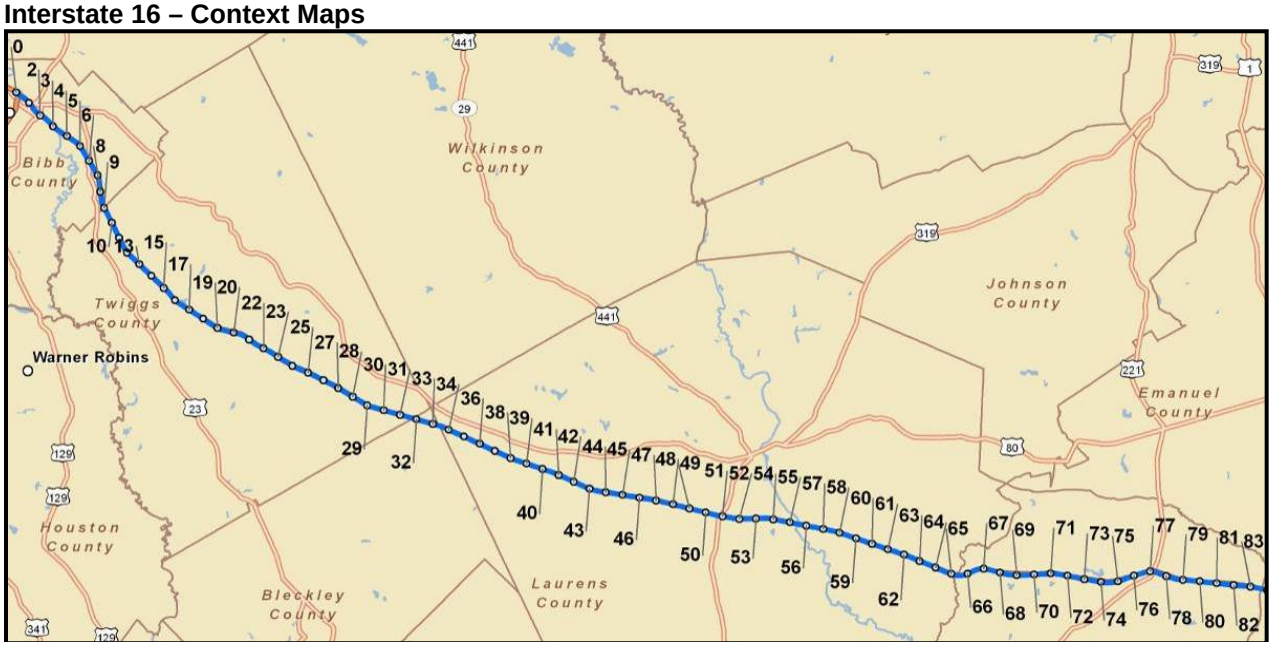
As is written in other parts of the broader study, both the amount of freight and the number of trucks that traverse Georgia's roadways annually will increase over the next several decades. Economic growth in the state will relate to some degree with the growth of freight movement. Likewise, the majority freight will continue to be moved by truck as it is typically the fastest and least expensive method for shipping most goods within a state and regionally.

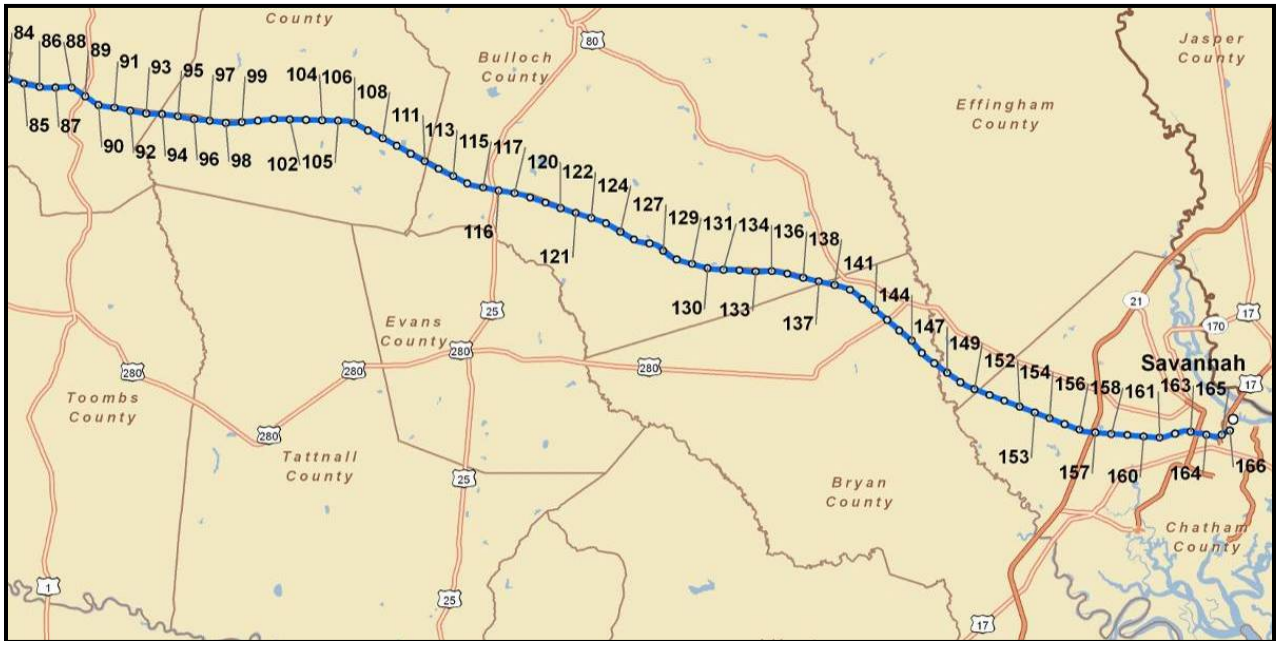
If improving the performance of freight movement is a goal, this report offers a list of locations where improvements can be best realized. The specifics of how to improve the most severely congested freight corridors in Georgia is best left to GDOT and its engineers. One point is fairly evident however: increased capacity and additional roadway options will allow Georgia's economy, and the amount of freight moved in the state, to continue to grow.

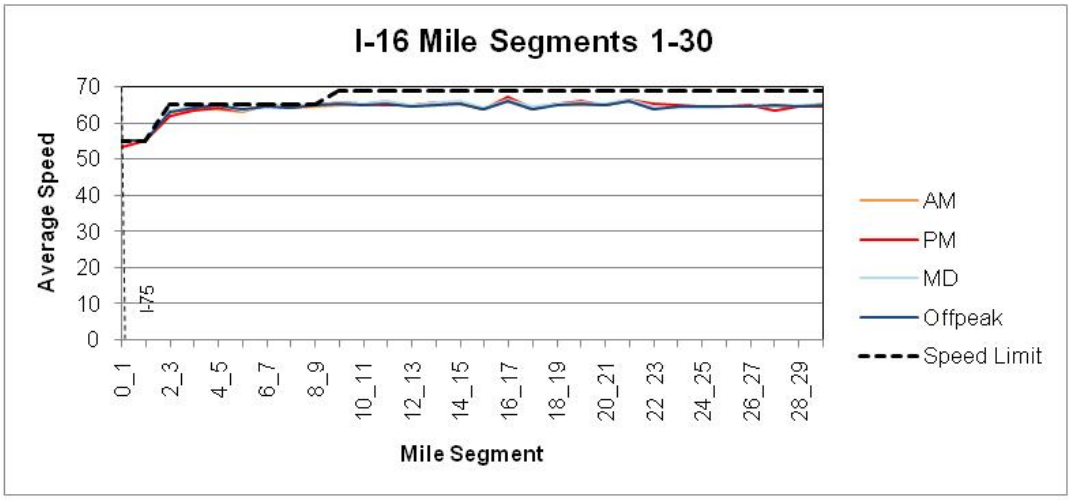
Finally, a performance measurement system such as the one demonstrated in this report can, on a monthly, quarterly or annual basis, track improvements or deteriorations in truck movements on Georgia's roadways. Such performance measurement is not limited to highways, though. By utilizing a performance measurement system, the effects of improvements to highways and other roadways can be measured and documented in order to justify costs and to highlight positive results.

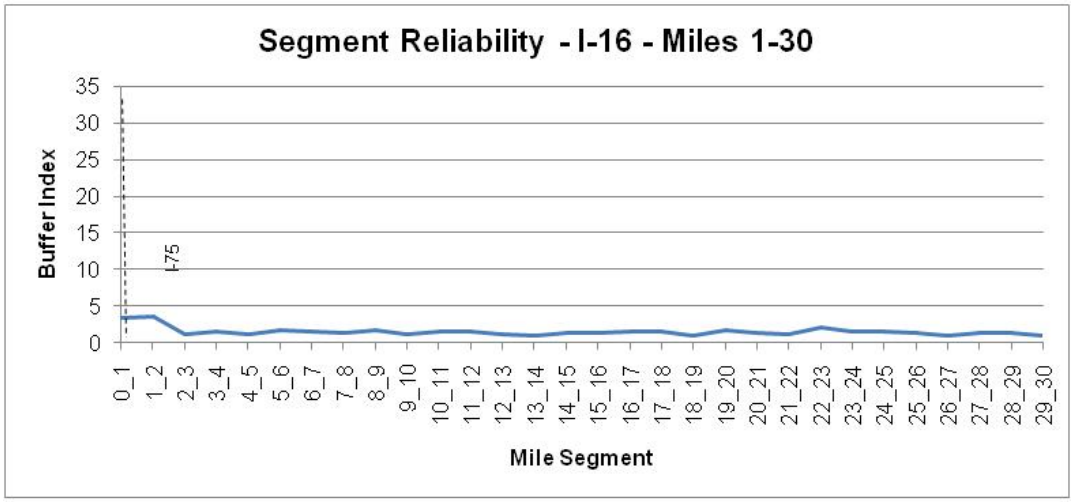
Figure B-29 ANALYSIS BY CORRIDOR SEGMENT OF ALL ROADWAYS

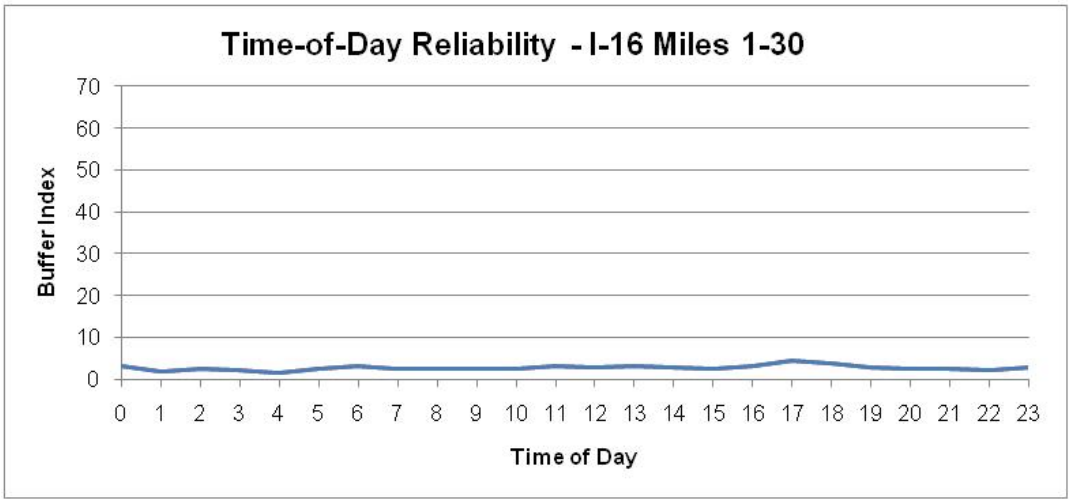
Interstate 16 – Context Maps

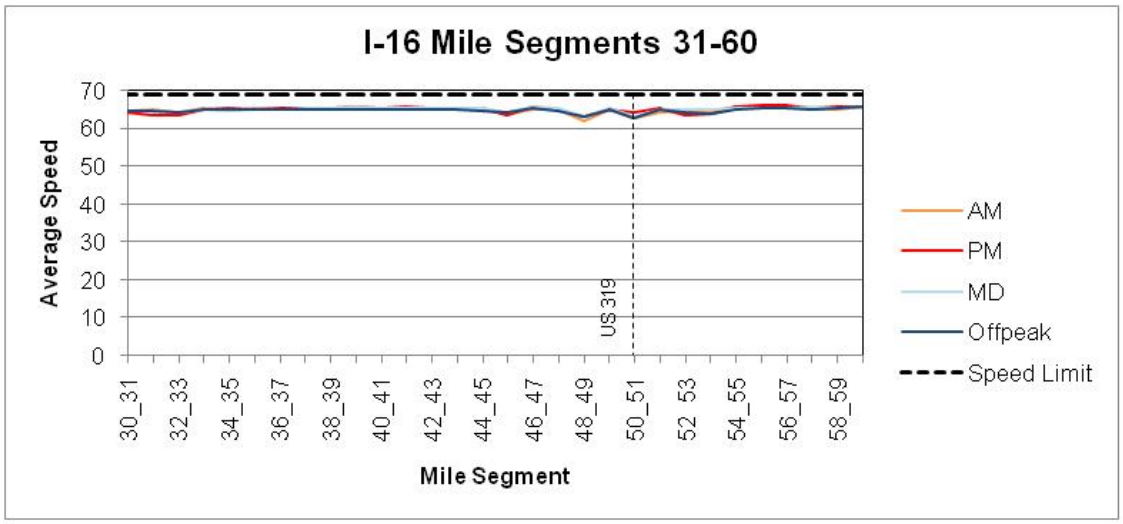


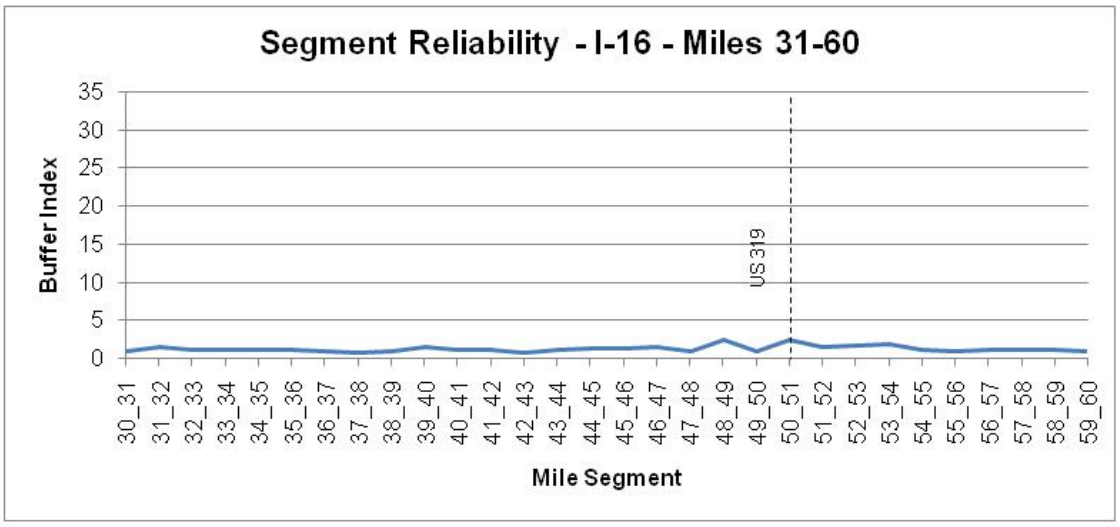


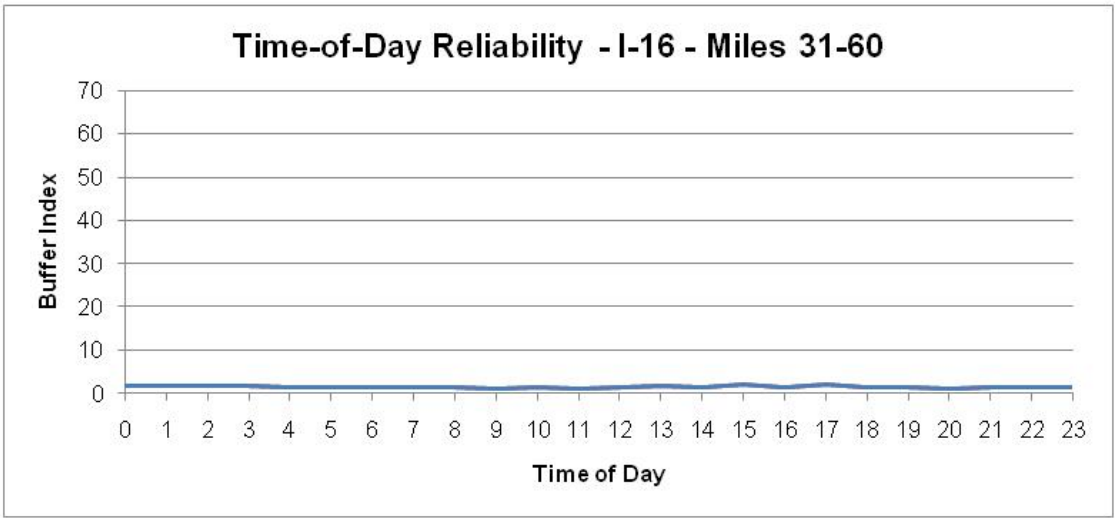

I-16 Mile Segments 1-30
Average Speed
70
60
50
40
30
20
10
0
I-75
0_1
2_3
4_5
6_7
8_9
10_11
12_13
14_15
16_17
18_19
20_21
22_23
24_25
26_27
28_29
Mile Segment
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - I-16 - Miles 1-30
Buffer Index
35
30
25
20
15
10
5
0
I-75
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
16_17
17_18
18_19
19_20
20_21
21_22
22_23
23_24
24_25
25_26
26_27
27_28
28_29
29_30
Mile Segment


Time-of-Day Reliability - I-16 Miles 1-30
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day


I-16 Mile Segments 31-60
Average Speed
70
60
50
40
30
20
10
0
US 319
30_31
32_33
34_35
36_37
38_39
40_41
42_43
44_45
46_47
48_49
50_51
52_53
54_55
56_57
58_59
Mile Segment
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - I-16 - Miles 31-60
Buffer Index
35
30
25
20
15
10
5
0
US 319
30_31
31_32
32_33
33_34
34_35
35_36
36_37
37_38
38_39
39_40
40_41
41_42
42_43
43_44
44_45
45_46
46_47
47_48
48_49
49_50
50_51
51_52
52_53
53_54
54_55
55_56
56_57
57_58
58_59
59_60
Mile Segment


Time-of-Day Reliability - I-16 - Miles 31-60
Buffer Index
70
60
50
40
30
20
10
0
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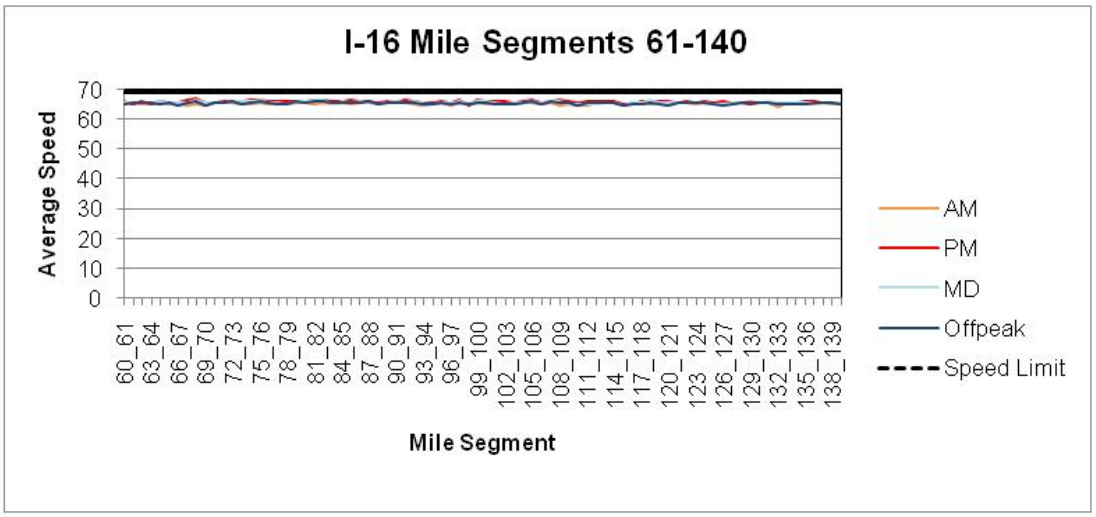
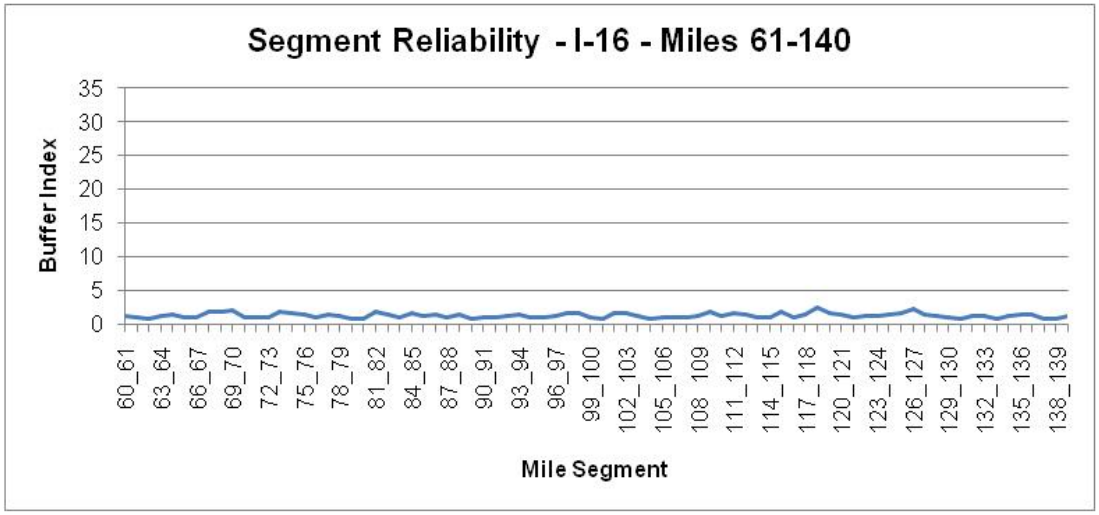
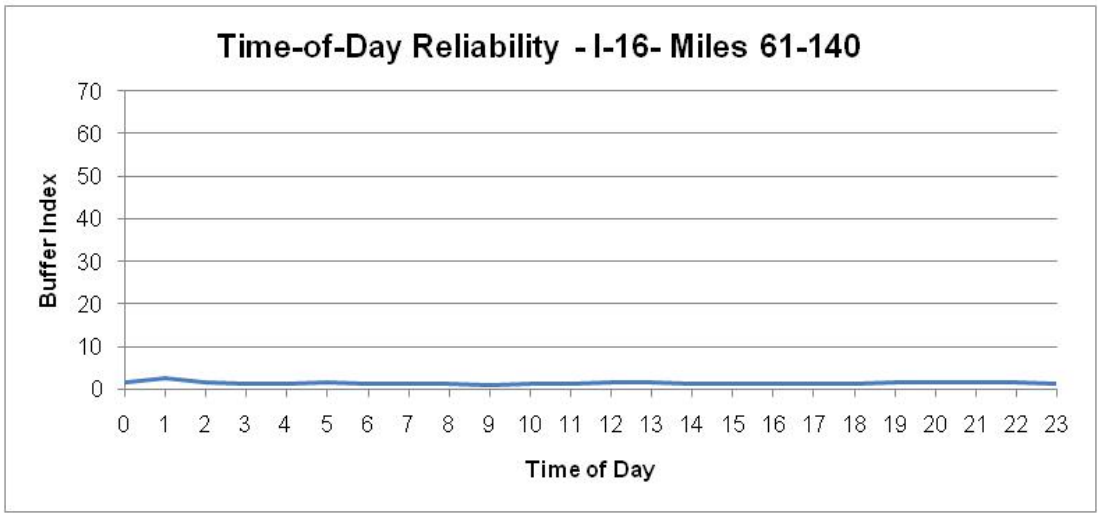
Time of Day


I-16 Mile Segments 61-140
Average Speed
70
60
50
40
30
20
10
0
60_61
63_64
66_67
69_70
72_73
75_76
78_79
81_82
84_85
87_88
90_91
93_94
96_97
99_100
102_103
105_106
108_109
111_112
114_115
117_118
120_121
123_124
126_127
129_130
132_133
135_136
138_139
Mile Segment
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - I-16 - Miles 61-140
Buffer Index
35
30
25
20
15
10
5
0
60_61
63_64
66_67
69_70
72_73
75_76
78_79
81_82
84_85
87_88
90_91
93_94
96_97
99_100
102_103
105_106
108_109
111_112
114_115
117_118
120_121
123_124
126_127
129_130
132_133
135_136
138_139
Mile Segment


Time-of-Day Reliability - I-16- Miles 61-140
Buffer Index
70
60
50
40
30
20
10
0
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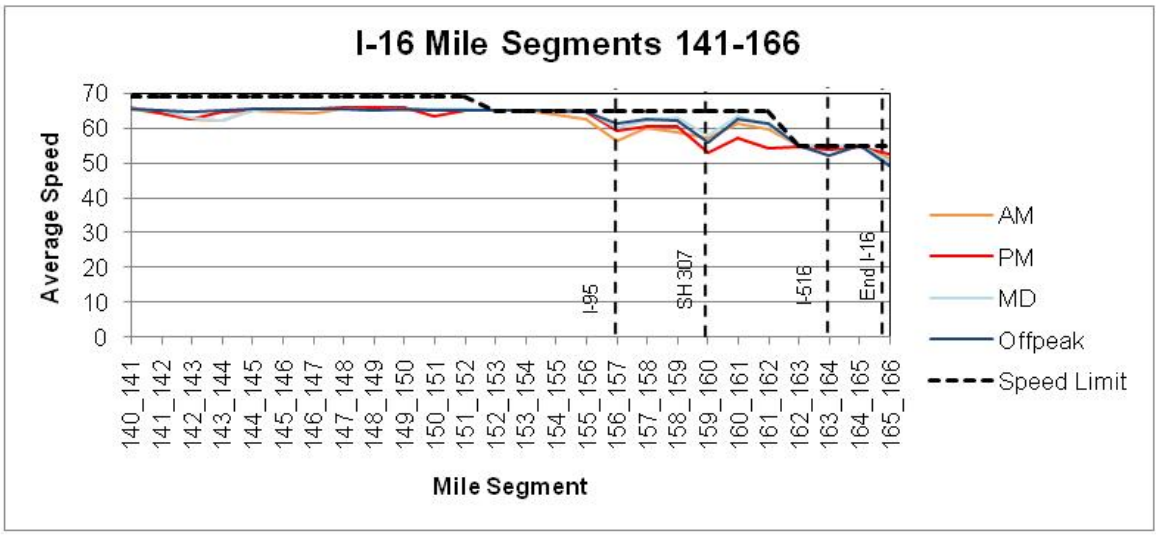
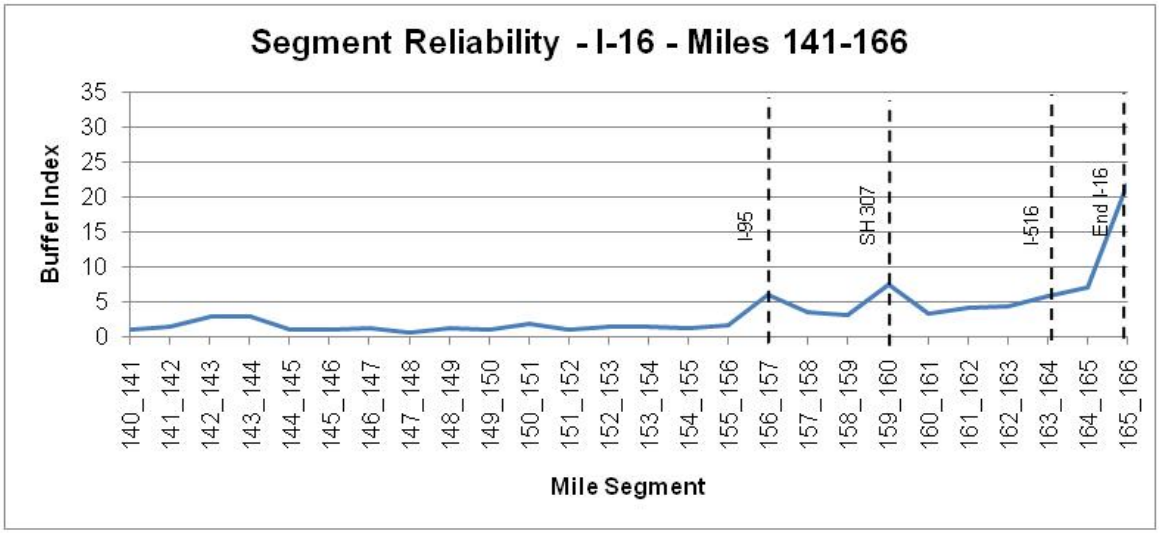
Time of Day


I-16 Mile Segments 141-166
Average Speed
Mile Segment
I-95
SH 307
I-516
End I-16
AM
PM
MD
Offpeak
Speed Limit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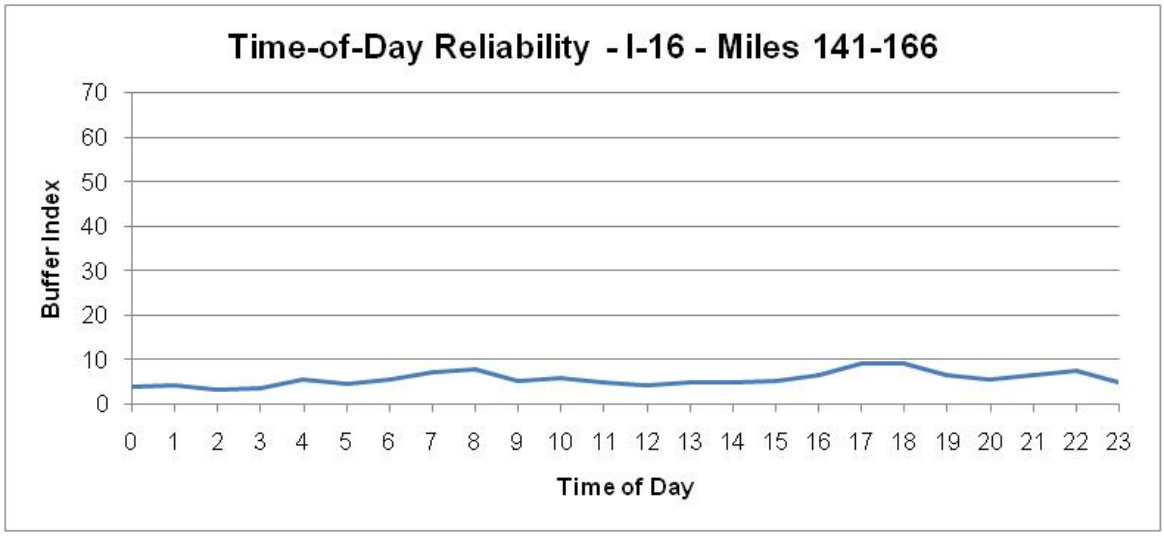
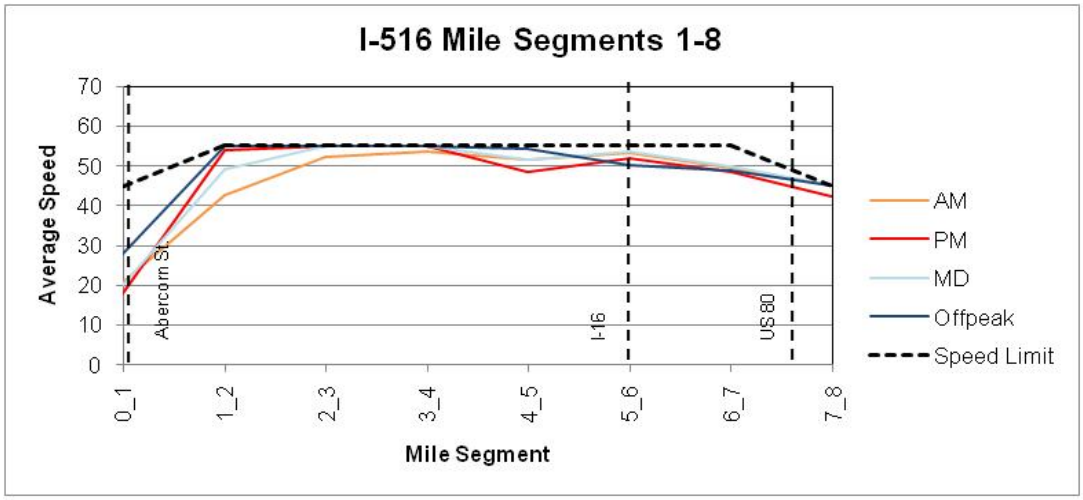
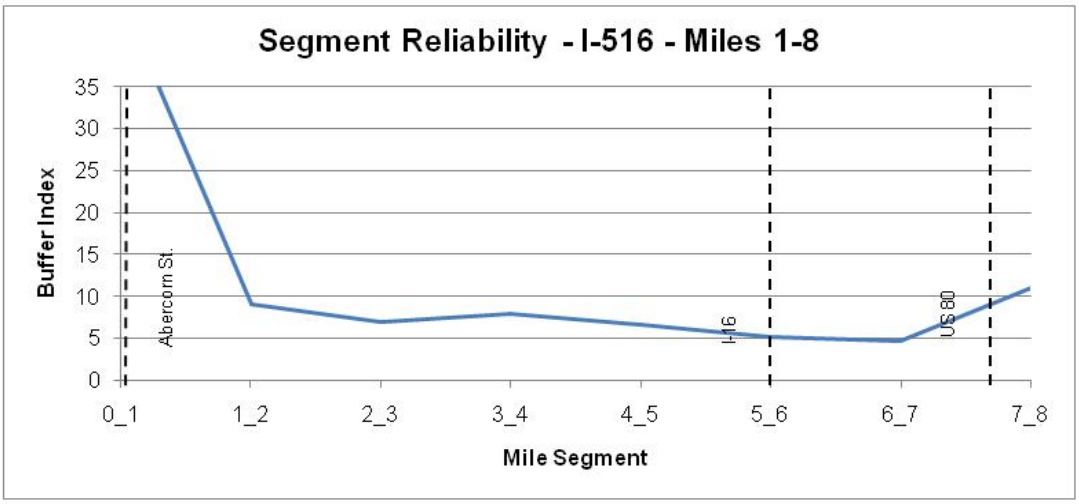
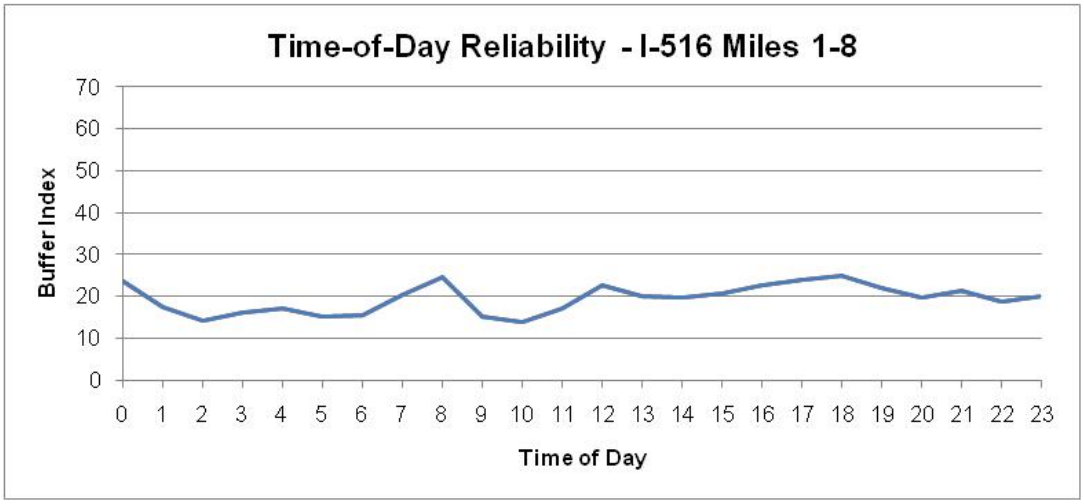
Buffer Index
Mile Segment
I-95
SH 307
I-516
End I-16


Time-of-Day Reliability - I-16 - Miles 141-166
Buffer Index
Time of Day

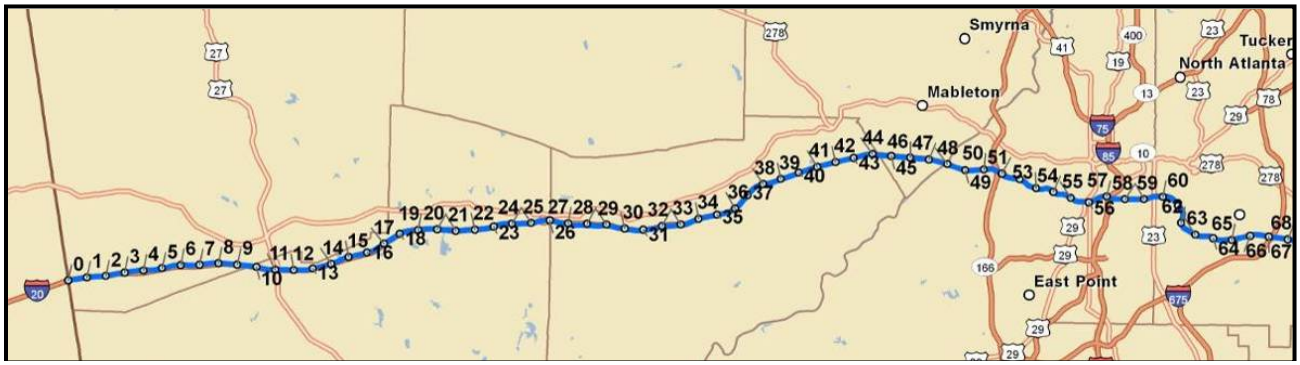
Interstate 516 – Context Map

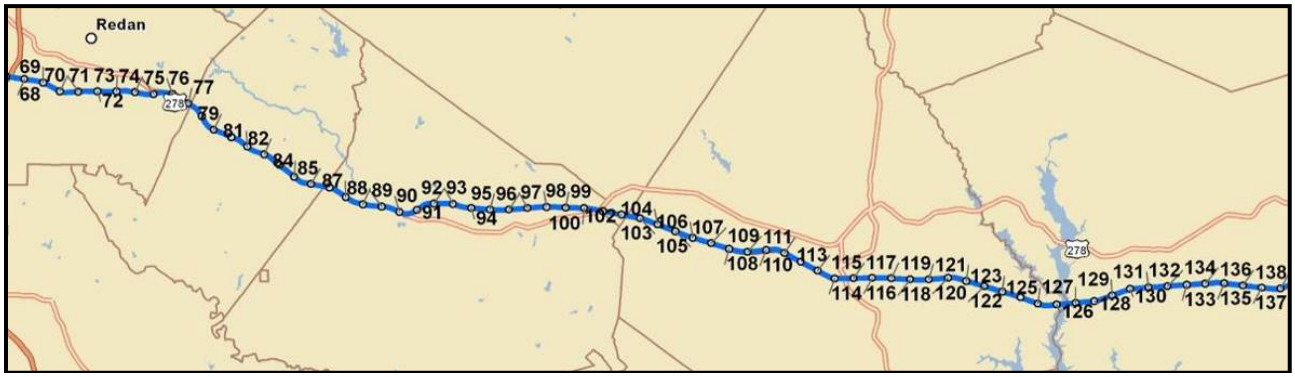

I-516 Mile Segments 1-8
Average Speed
70
60
50
40
30
20
10
0
Abercorn St.
I-16
US 80
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

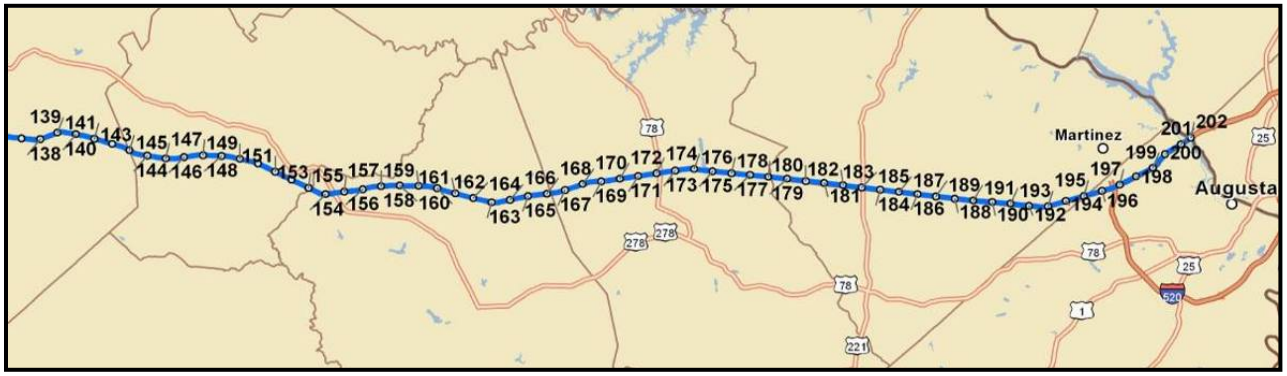

Segment Reliability - I-516 - Miles 1-8
Buffer Index
35
30
25
20
15
10
5
0
Abercorn St.
I-16
US 80
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
Mile Segment

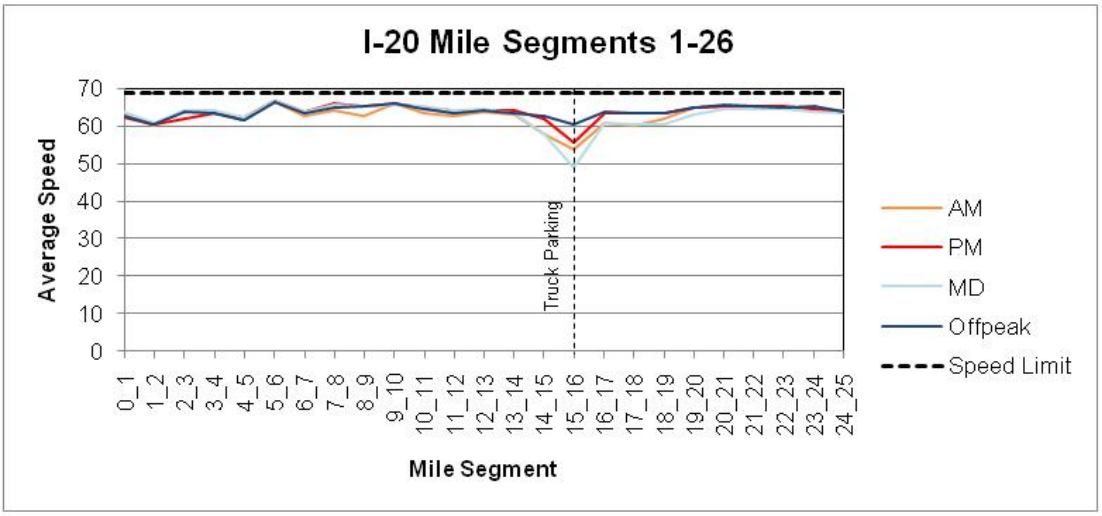

Time-of-Day Reliability - I-516 Miles 1-8
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

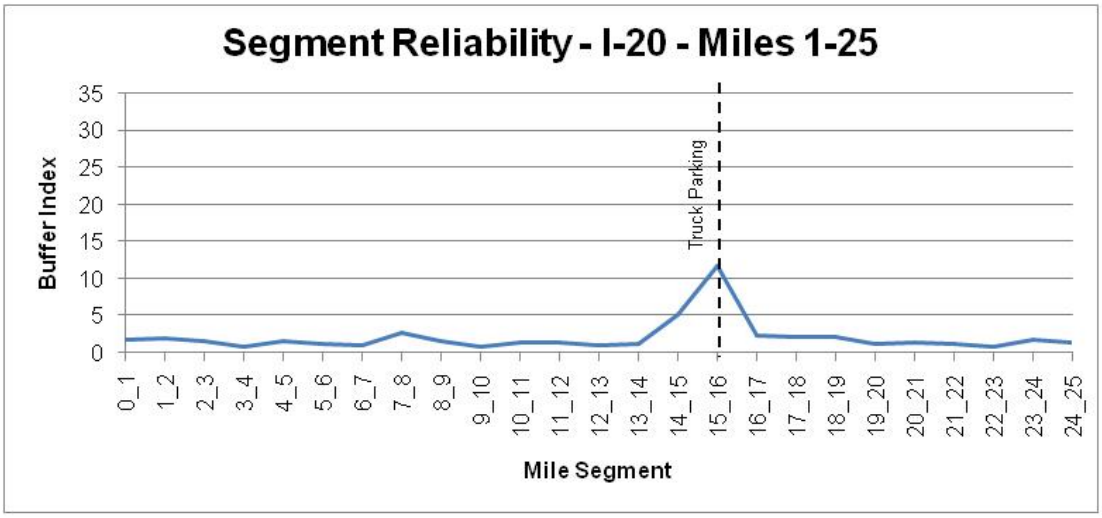
Interstate 20 – Context Maps

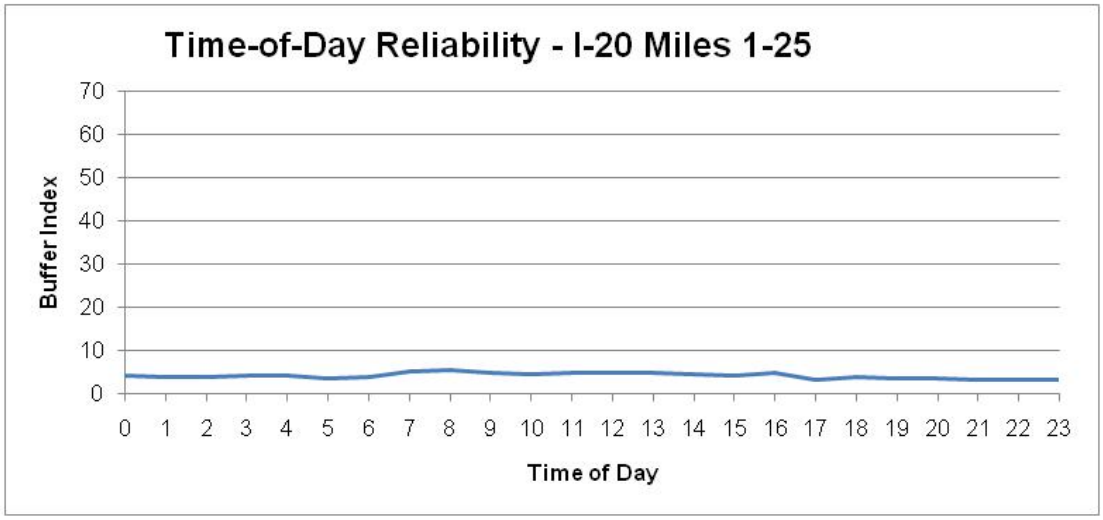


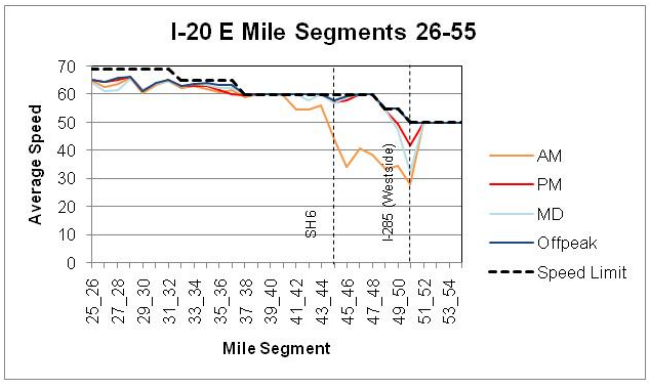


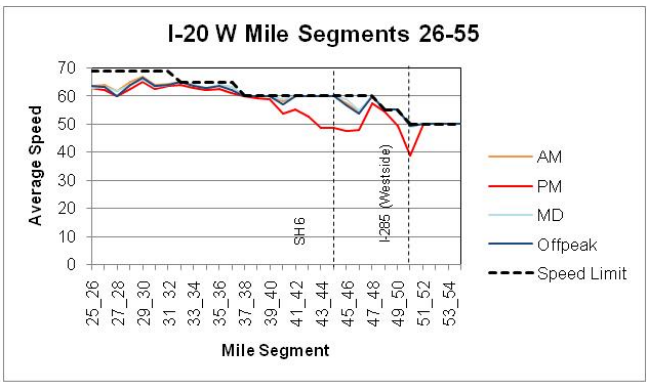


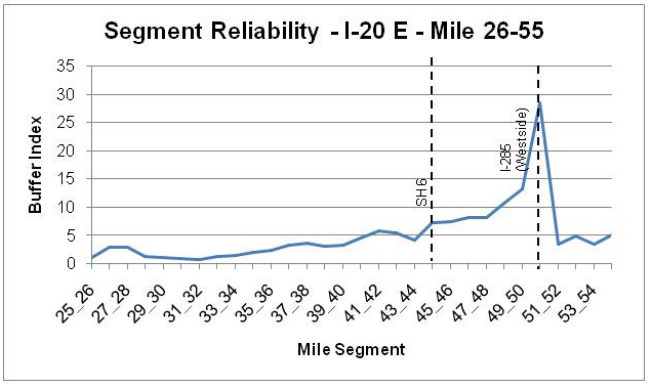

I-20 Mile Segments 1-26
Average Speed
70
60
50
40
30
20
10
0
Truck Parking
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
16_17
17_18
18_19
19_20
20_21
21_22
22_23
23_24
24_25
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

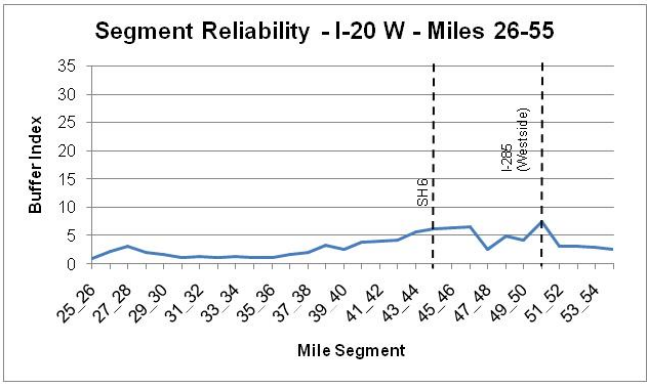

Segment Reliability - I-20 - Miles 1-25
Buffer Index
35
30
25
20
15
10
5
0
Truck Parking
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
16_17
17_18
18_19
19_20
20_21
21_22
22_23
23_24
24_25
Mile Segment

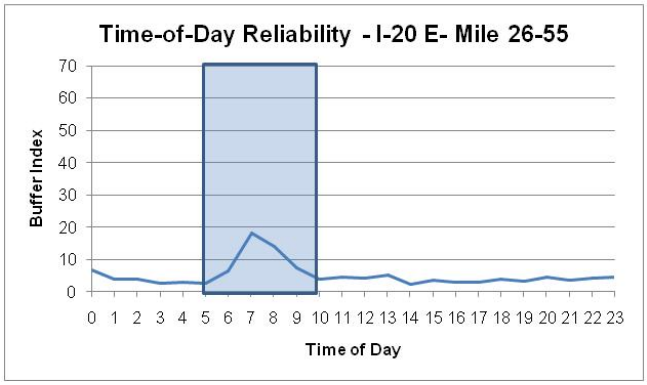

Time-of-Day Reliability - I-20 Miles 1-25
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

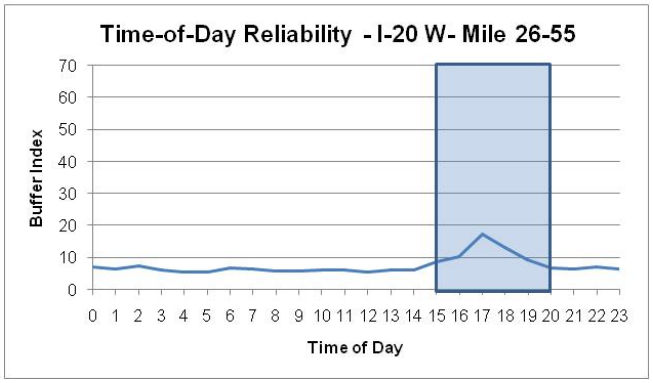

I-20 E Mile Segments 26-55
Average Speed
Mile Segment
SH6
I-285 (Westside)
AM
PM
MD
Offpeak
Speed Limit

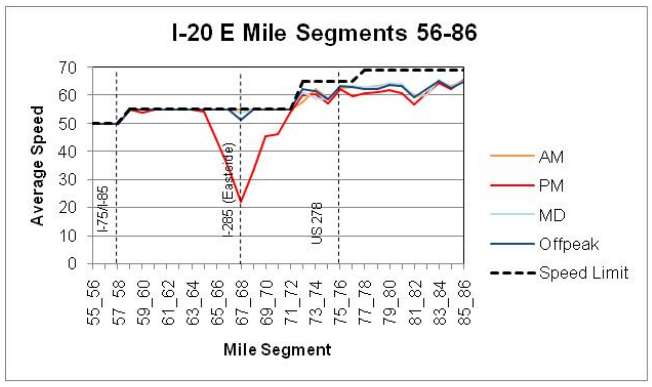

I-20 W Mile Segments 26-55
Average Speed
Mile Segment
SH6
I-285 (Westside)
AM
PM
MD
Offpeak
Speed Limit

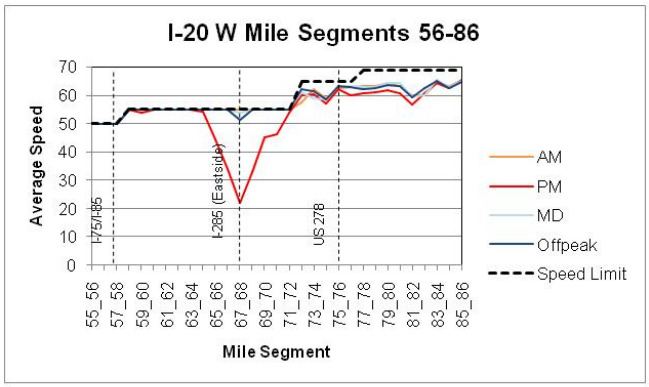

Segment Reliability - I-20 E - Mile 26-55
Buffer Index
Mile Segment
SH6
I-285 (Westside)

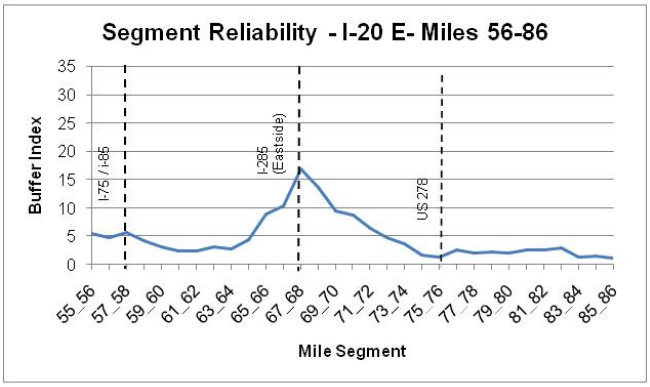

Segment Reliability - I-20 W - Miles 26-55
Buffer Index
Mile Segment
SH6
I-285 (Westside)

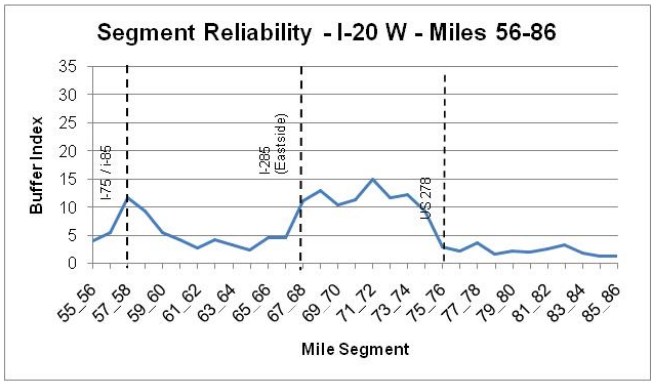

Time-of-Day Reliability - I-20 E- Mile 26-55
Buffer Index
Time of Day

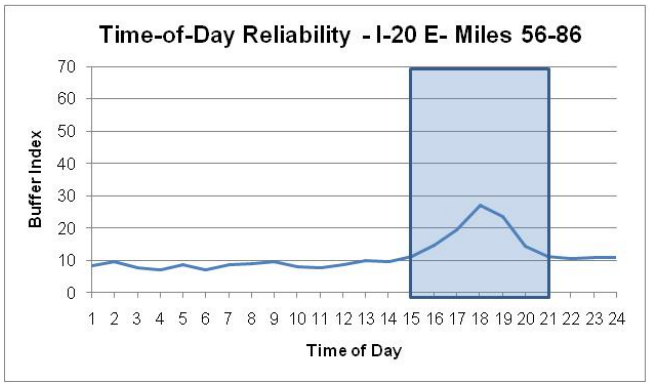

Time-of-Day Reliability - I-20 W- Mile 26-55
Buffer Index
Time of Day

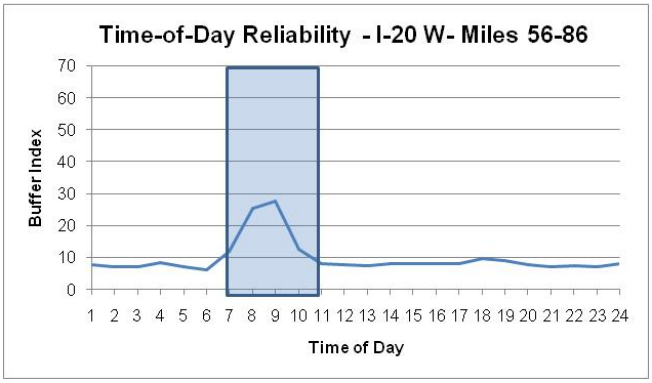

I-20 E Mile Segments 56-86
Average Speed
Mile Segment
I-75/I-85
I-285 (Eastside)
US 278
AM
PM
MD
Offpeak
Speed Limit

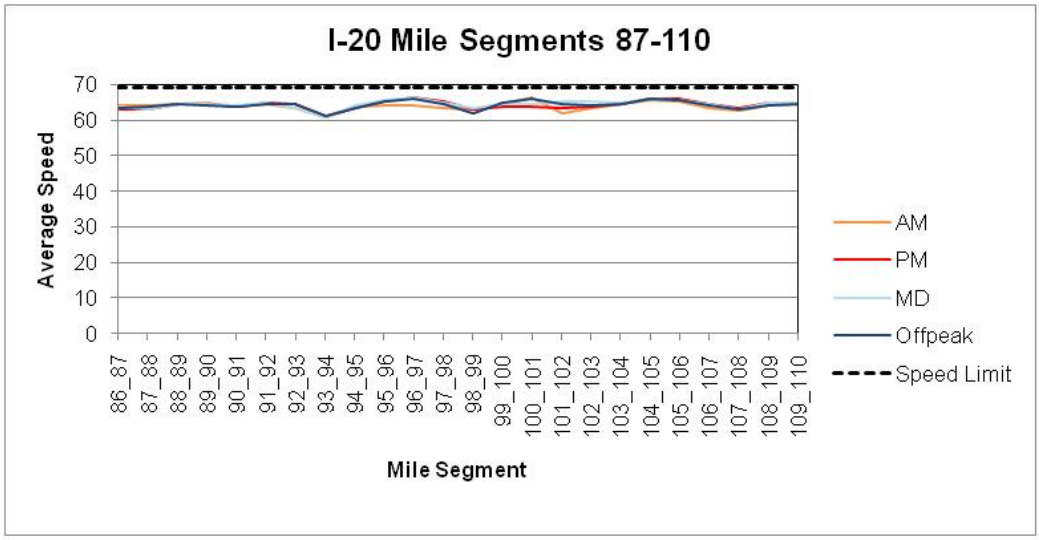

I-20 W Mile Segments 56-86
Average Speed
Mile Segment
I-75/I-85
I-285 (Eastside)
US 278
AM
PM
MD
Offpeak
Speed Limit

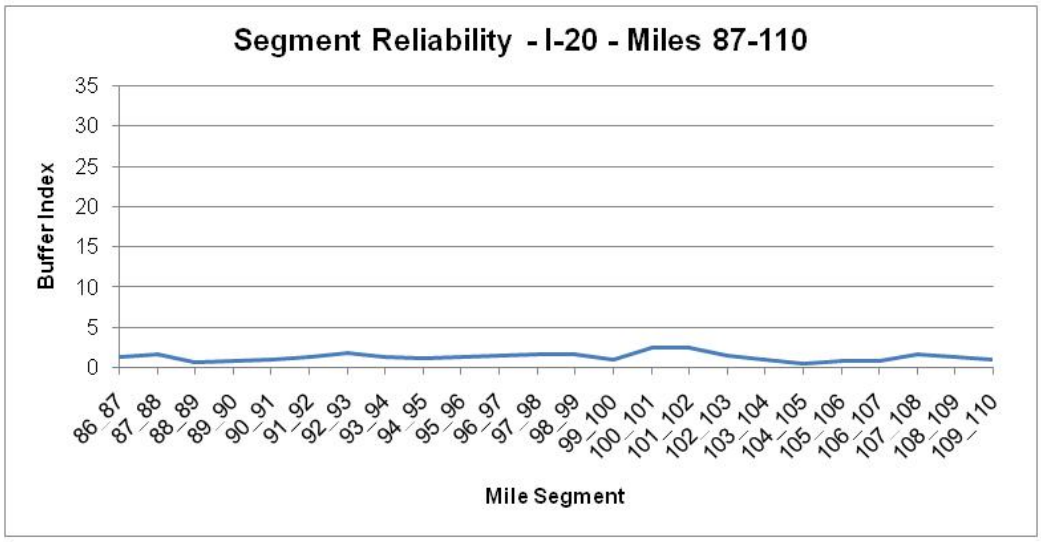

Segment Reliability - I-20 E- Miles 56-86
Buffer Index
Mile Segment
I-75 / i-85
I-285 (Eastside)
US 278

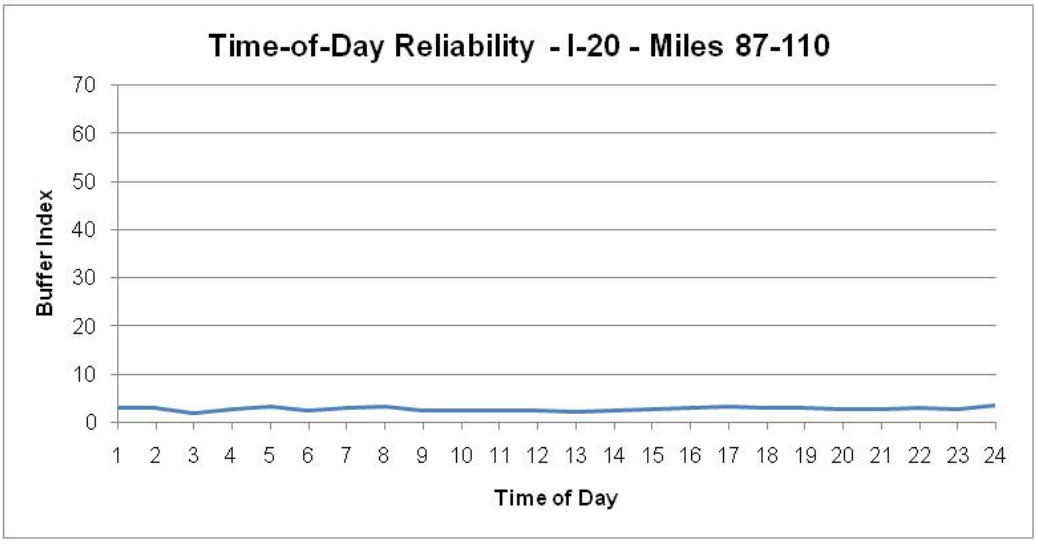

Segment Reliability - I-20 W - Miles 56-86
Buffer Index
Mile Segment
I-75 / i-85
I-285 (Eastside)
US 278

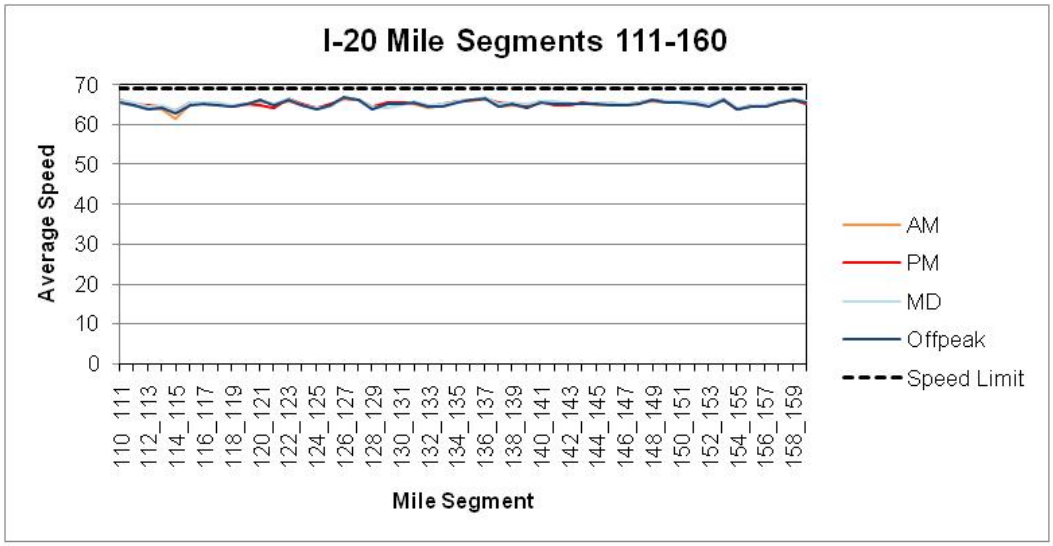

Time-of-Day Reliability - I-20 E- Miles 56-86
Buffer Index
Time of Day

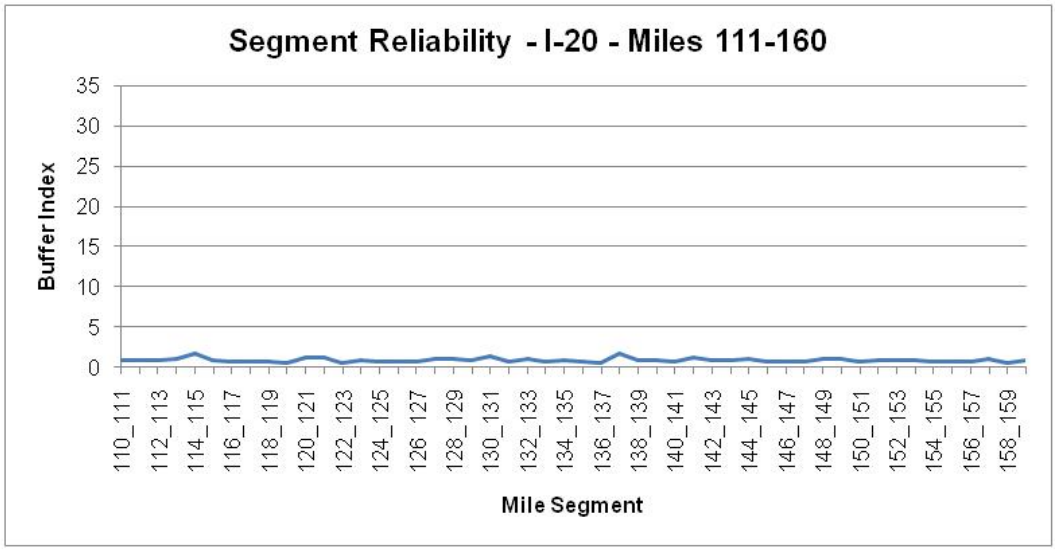

Time-of-Day Reliability - I-20 W- Miles 56-86
Buffer Index
Time of Day

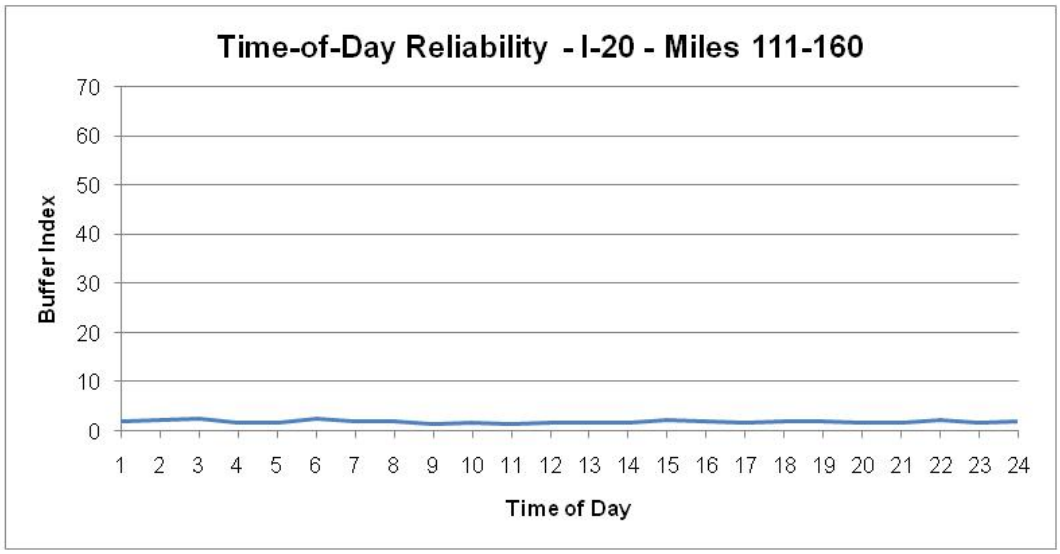

I-20 Mile Segments 87-110
Average Speed
70
60
50
40
30
20
10
0
86_87
87_88
88_89
89_90
90_91
91_92
92_93
93_94
94_95
95_96
96_97
97_98
98_99
99_100
100_101
101_102
102_103
103_104
104_105
105_106
106_107
107_108
108_109
109_110
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

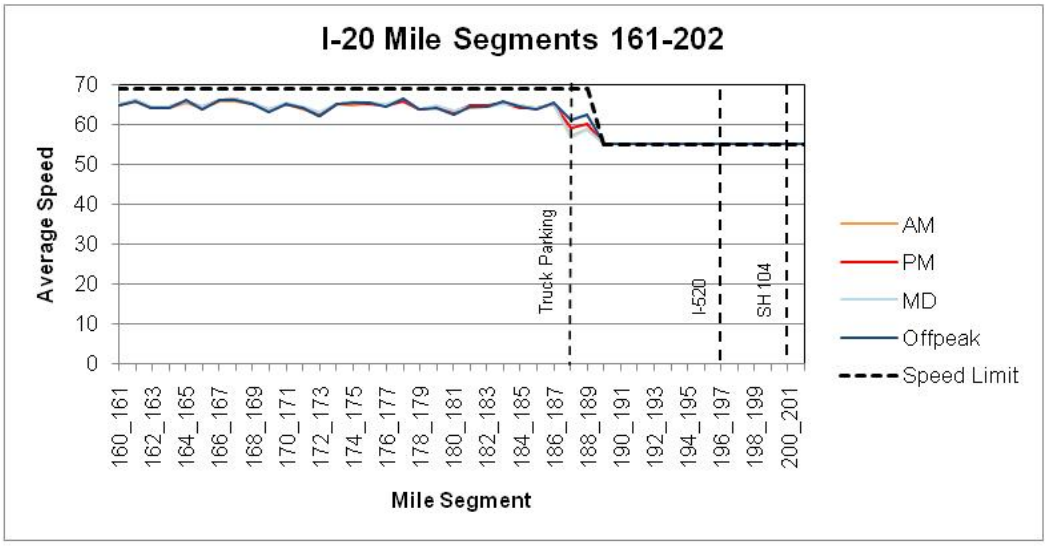

Segment Reliability - I-20 - Miles 87-110
Buffer Index
35
30
25
20
15
10
5
0
86_87
87_88
88_89
89_90
90_91
91_92
92_93
93_94
94_95
95_96
96_97
97_98
98_99
99_100
100_101
101_102
102_103
103_104
104_105
105_106
106_107
107_108
108_109
109_110
Mile Segment

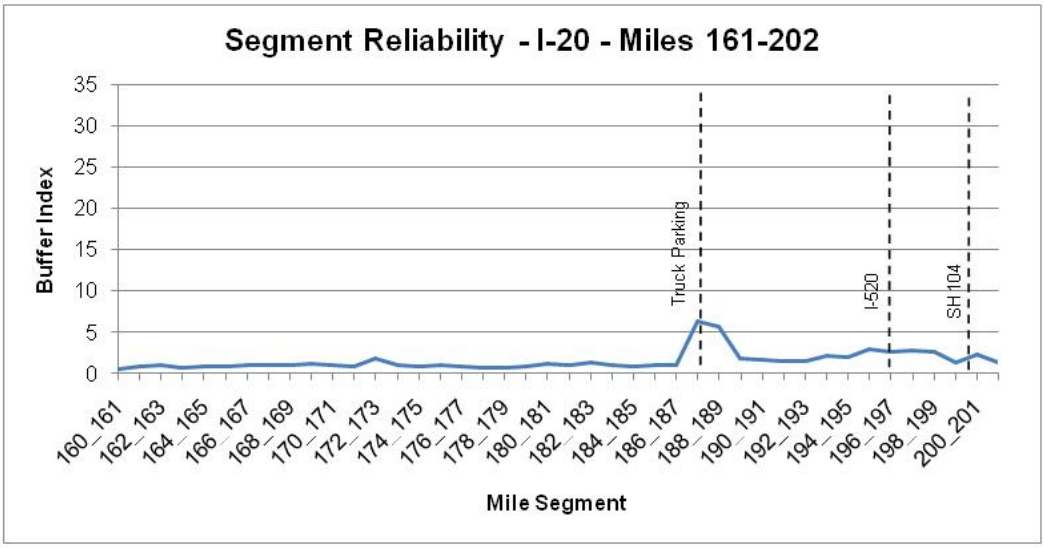

Time-of-Day Reliability - I-20 - Miles 87-110
Buffer Index
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
Time of Day

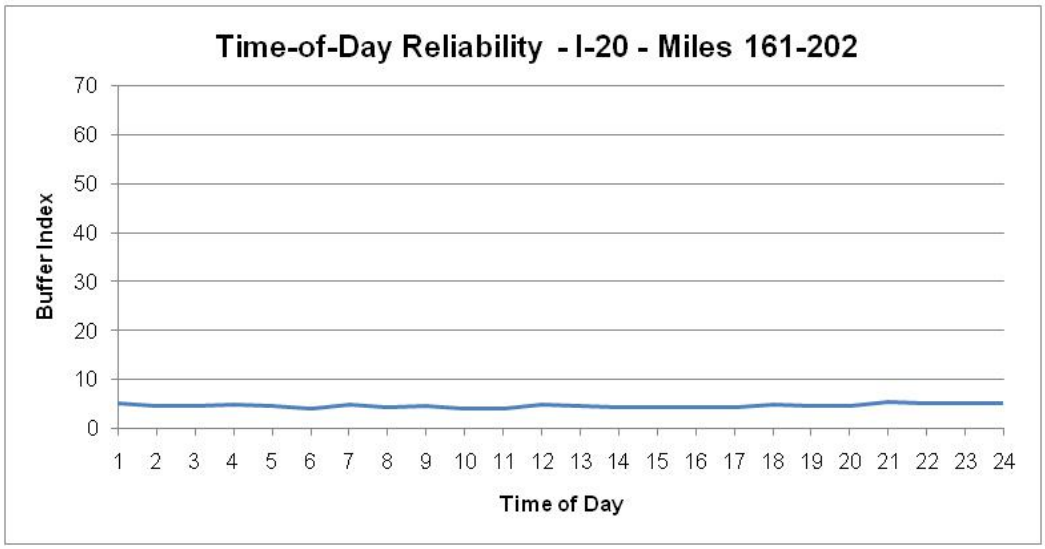

I-20 Mile Segments 111-160
Average Speed
70
60
50
40
30
20
10
0
110_111
112_113
114_115
116_117
118_119
120_121
122_123
124_125
126_127
128_129
130_131
132_133
134_135
136_137
138_139
140_141
142_143
144_145
146_147
148_149
150_151
152_153
154_155
156_157
158_159
Mile Segment
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - I-20 - Miles 111-160
Buffer Index
35
30
25
20
15
10
5
0
110_111
112_113
114_115
116_117
118_119
120_121
122_123
124_125
126_127
128_129
130_131
132_133
134_135
136_137
138_139
140_141
142_143
144_145
146_147
148_149
150_151
152_153
154_155
156_157
158_159
Mile Segment

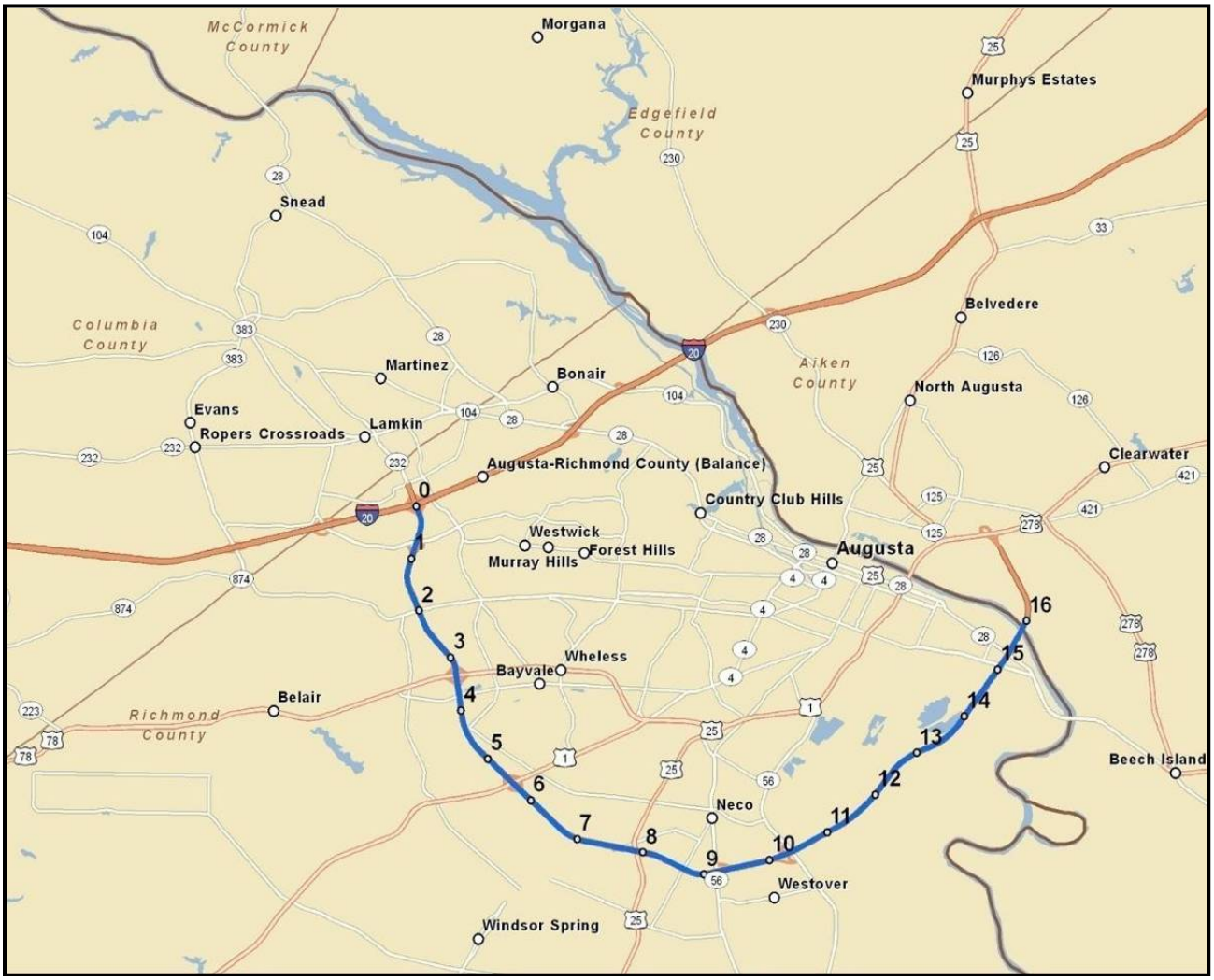

Time-of-Day Reliability - I-20 - Miles 111-160
Buffer Index
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day

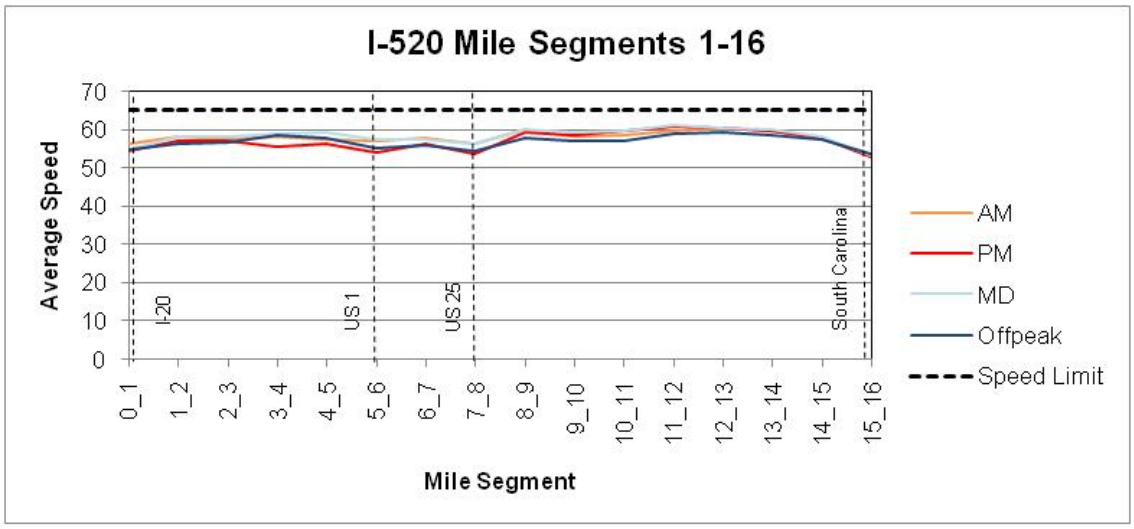

I-20 Mile Segments 161-202
Average Speed
Mile Segment
Truck Parking
I-520
SH 104
AM
PM
MD
Offpeak
Speed Limit

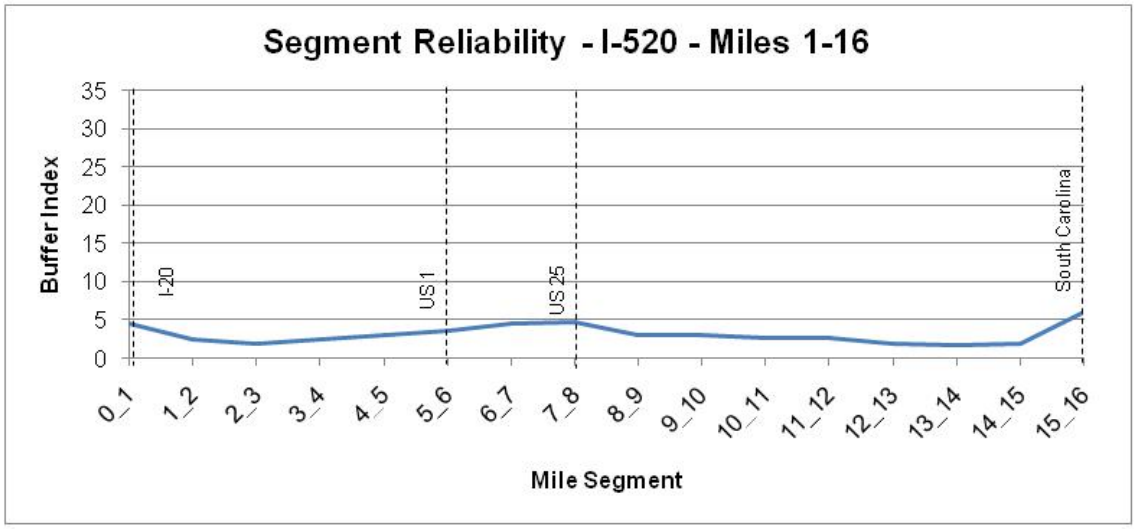

Segment Reliability - I-20 - Miles 161-202
Buffer Index
Mile Segment
Truck Parking
I-520
SH104

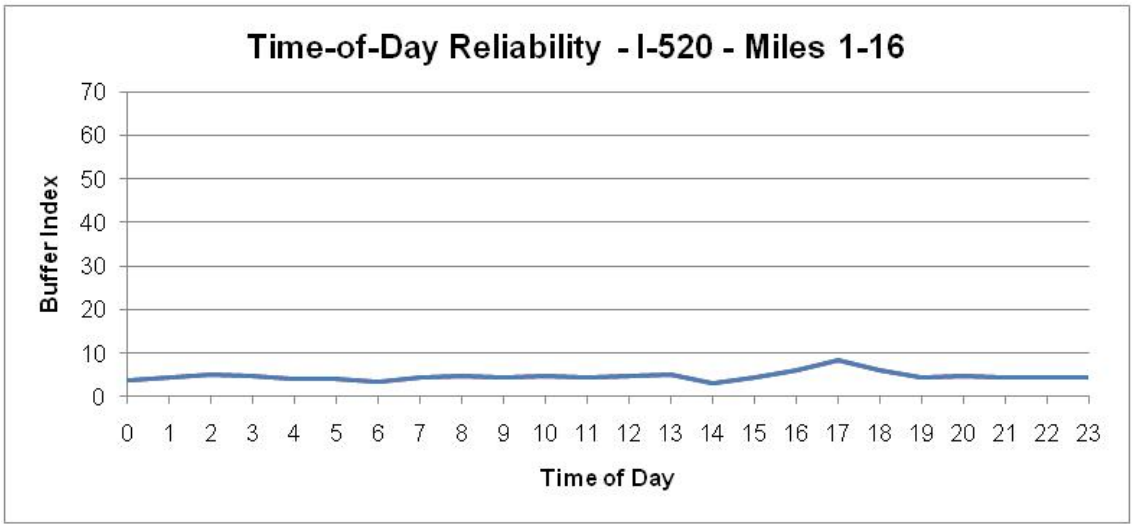

Time-of-Day Reliability - I-20 - Miles 161-202
Buffer Index
Time of Day

Interstate 520 – Context Map

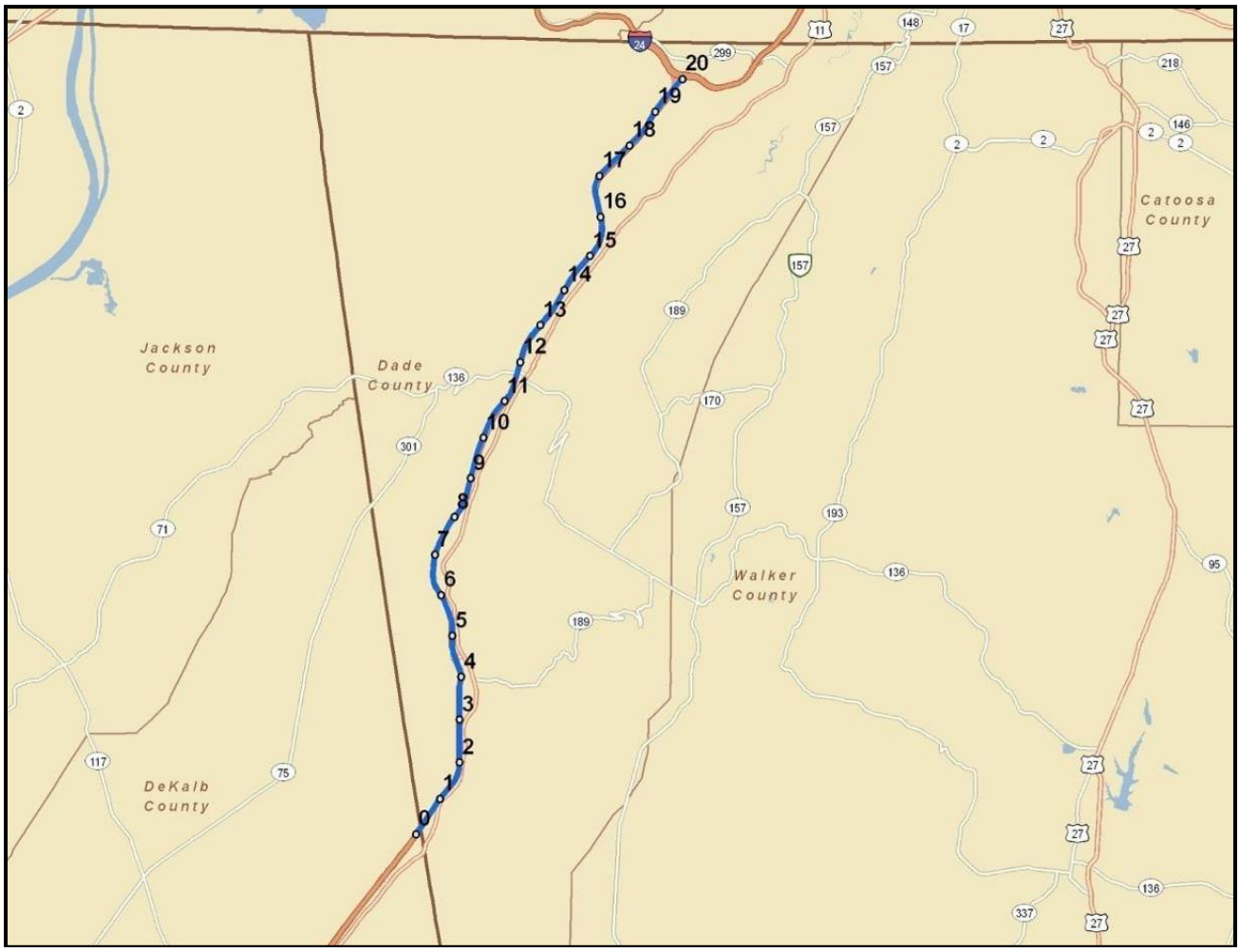


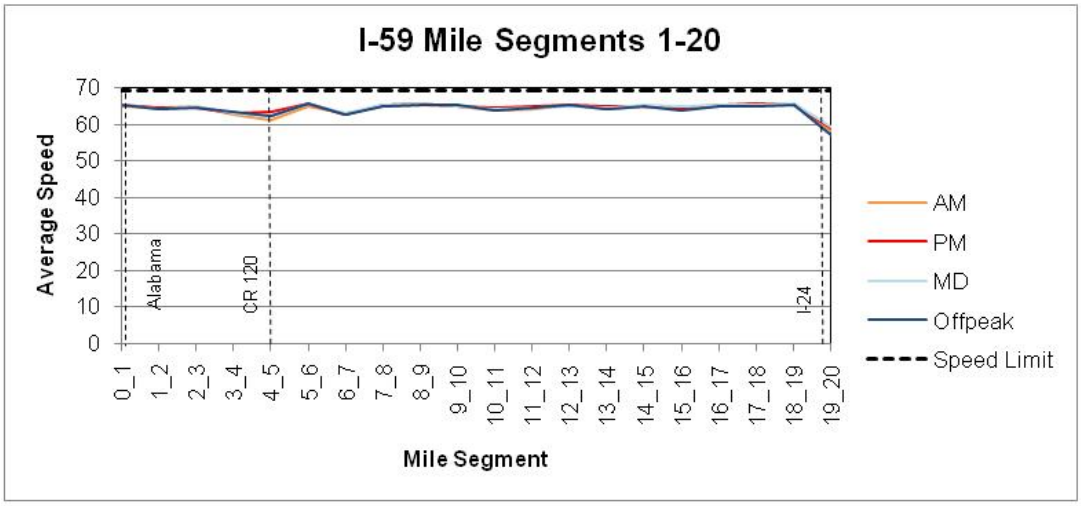

I-520 Mile Segments 1-16
Average Speed
70
60
50
40
30
20
10
0
I-20
US 1
US 25
South Carolina
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

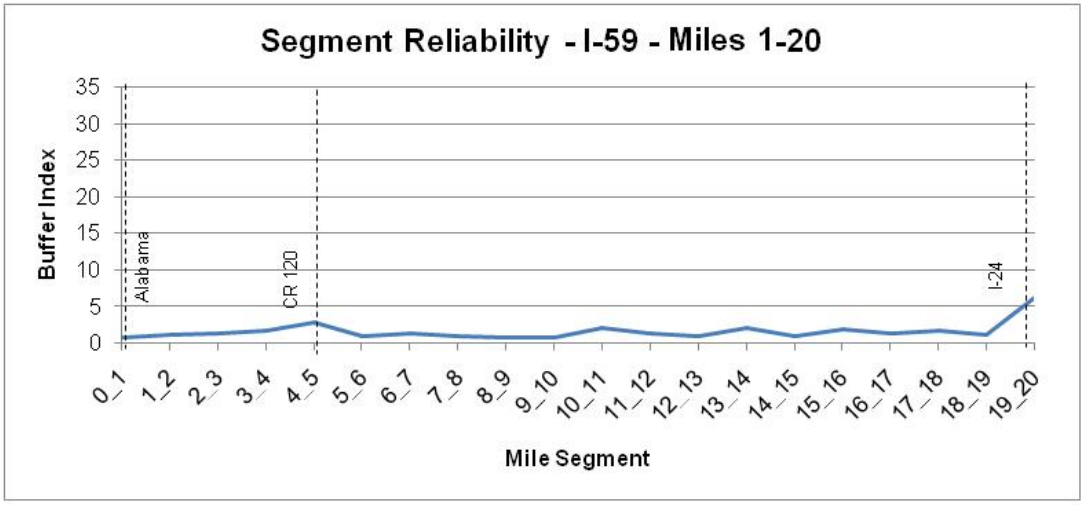

Segment Reliability - I-520 - Miles 1-16
Buffer Index
35
30
25
20
15
10
5
0
I-20
US1
US 25
South Carolina
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
Mile Segment

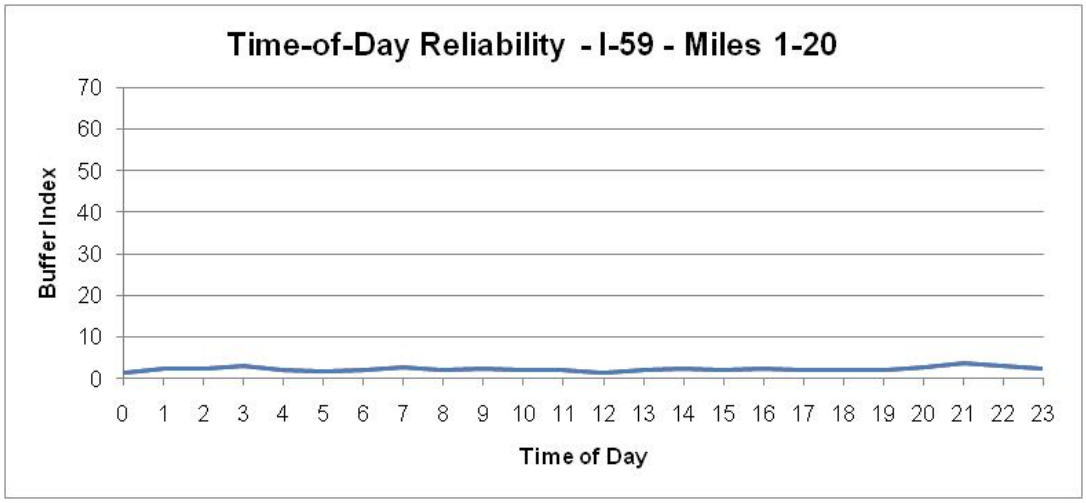

Time-of-Day Reliability - I-520 - Miles 1-16
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

Interstate 59 – Context Map

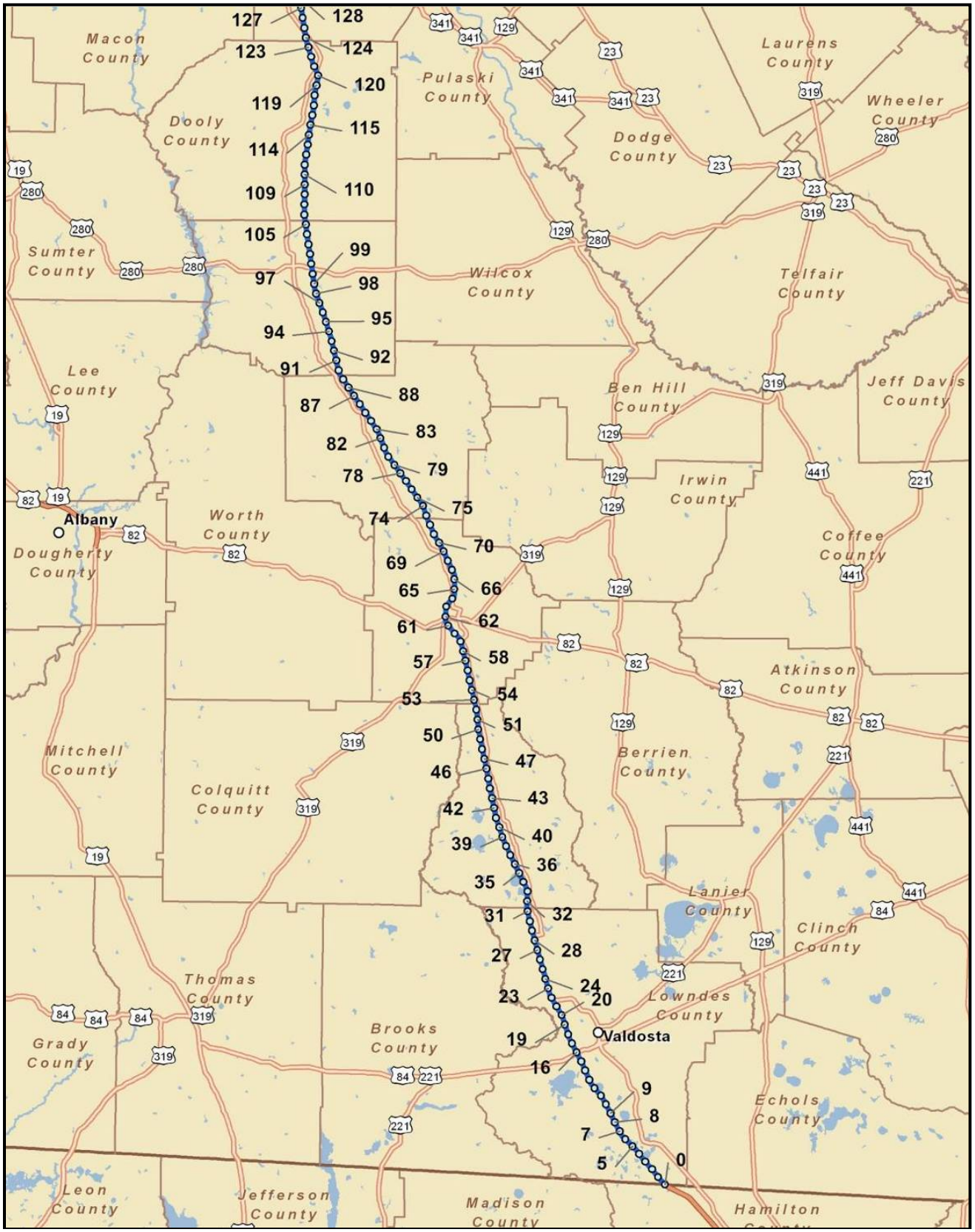


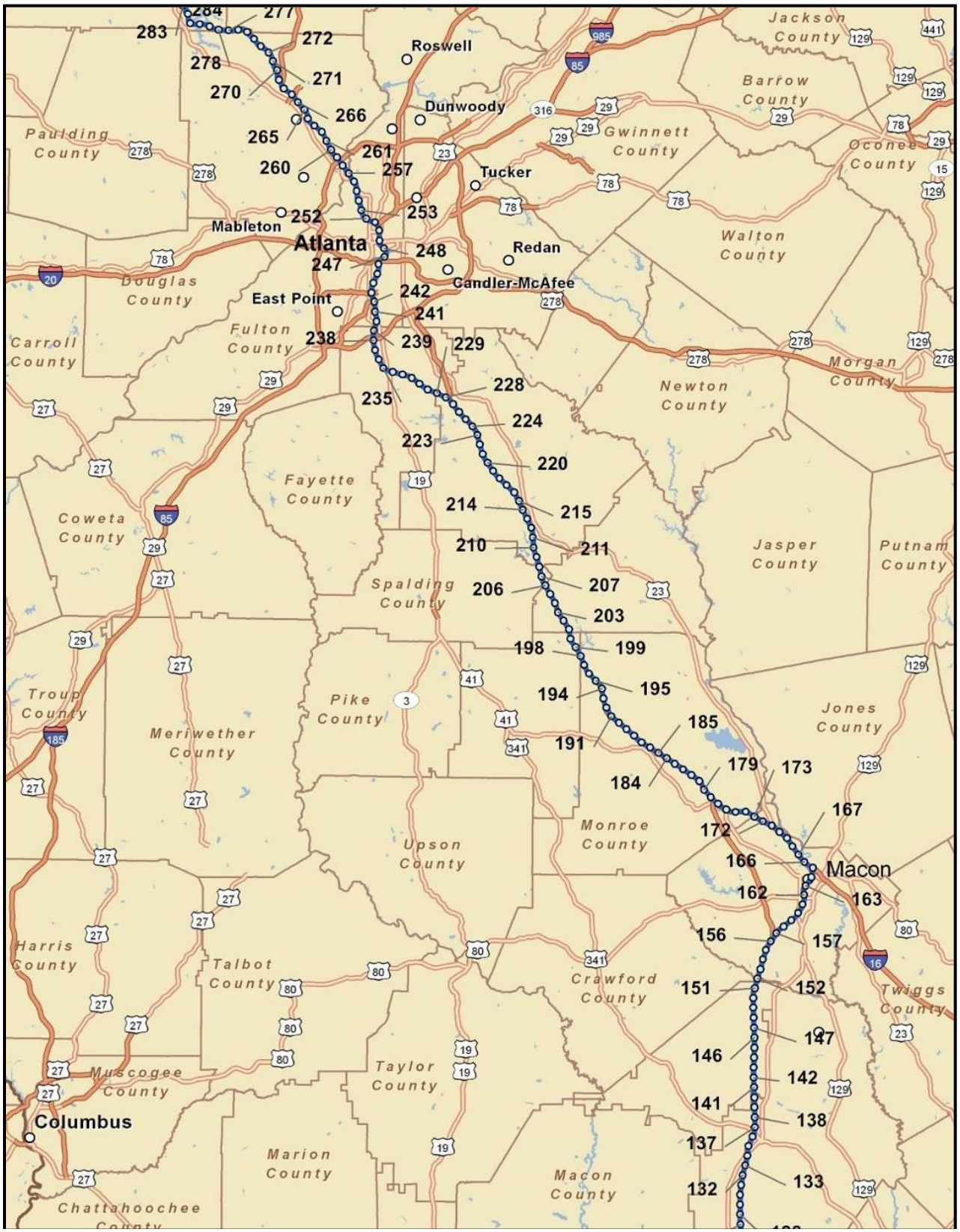

I-59 Mile Segments 1-20
Average Speed
70
60
50
40
30
20
10
0
Alabama
CR 120
I-24
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
16_17
17_18
18_19
19_20
Mile Segment
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - I-59 - Miles 1-20
Buffer Index
35
30
25
20
15
10
5
0
Alabama
CR 120
I-24
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
15_16
16_17
17_18
18_19
19_20
Mile Segment


Time-of-Day Reliability - I-59 - Miles 1-20
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

Interstate 75 – Context Maps




Roswell
Dunwoody
Tucker
Mableton
Atlanta
Redan
Candler-McAfee
East Point
Macon
Columbus
Paulding County
Douglas County
Carroll County
Fulton County
Fayette County
Coweta County
Spalding County
Pike County
Troup County
Meriwether County
Upson County
Monroe County
Jasper County
Putnam County
Jones County
Newton County
Walton County
Morgan County
Gwinnett County
Barrow County
Jackson County
Oconee County
Harris County
Talbot County
Crawford County
Twiggs County
Taylor County
Muscogee County
Marion County
Macon County
Chattahoochee County
283
284
277
272
278
271
270
266
265
261
260
257
253
252
248
247
242
241
238
239
229
228
235
224
223
220
214
215
210
211
206
207
203
198
199
194
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185
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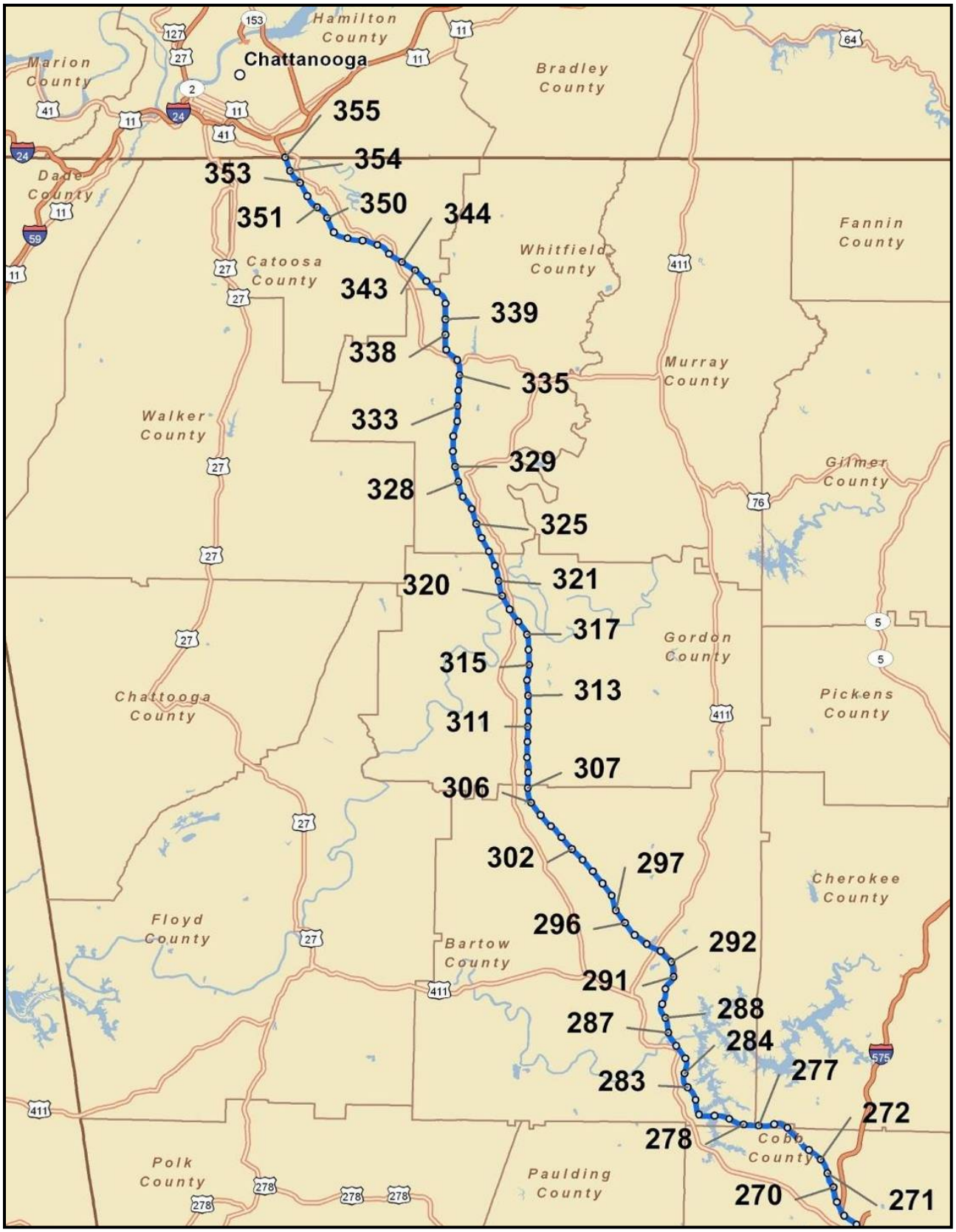
138
137
132
133


Hamilton County
Chattanooga
Marion County
Bradley County
Dade County
Catoosa County
Whitfield County
Fannin County
Murray County
Walker County
Gilmer County
Gordon County
Chattooga County
Pickens County
Cherokee County
Floyd County
Bartow County
Polk County
Paulding County
Cobb County
355
354
353
350
351
344
343
339
338
335
333
329
328
325
321
320
317
315
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292
291
288
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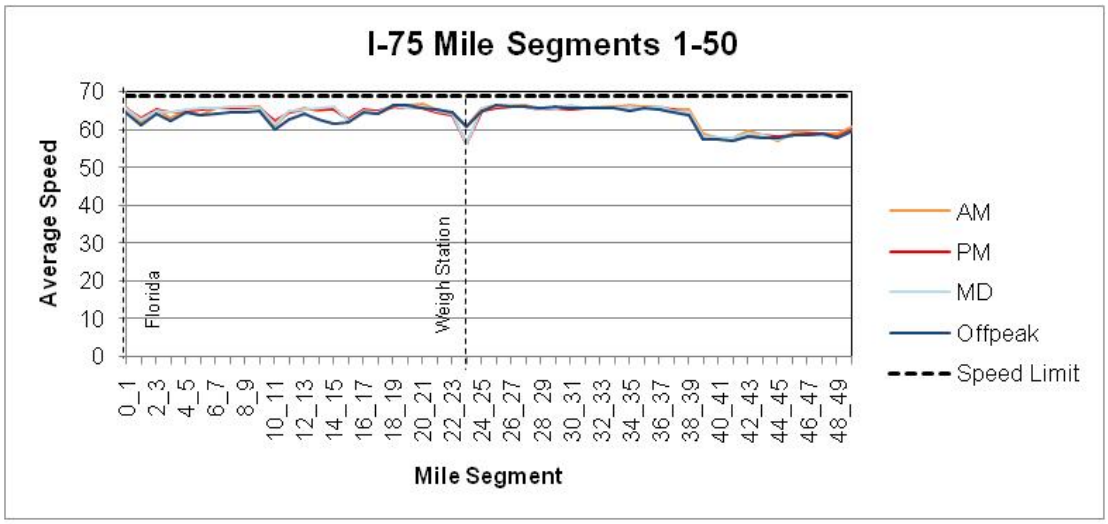
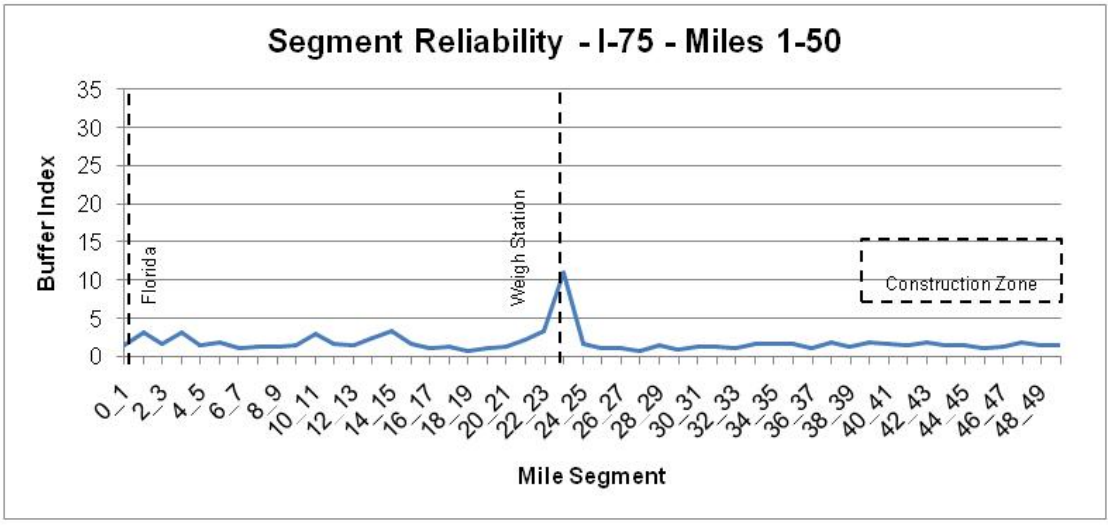
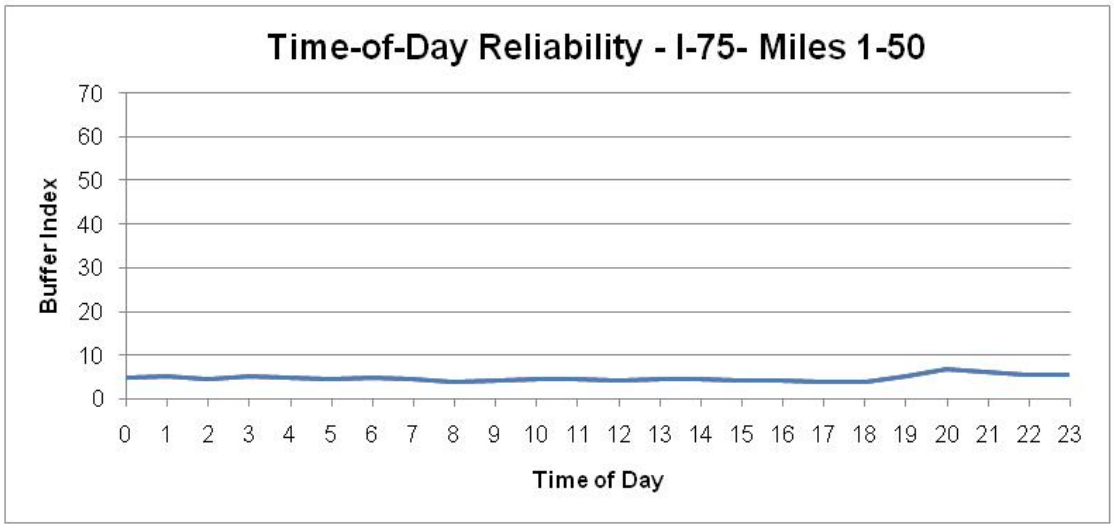
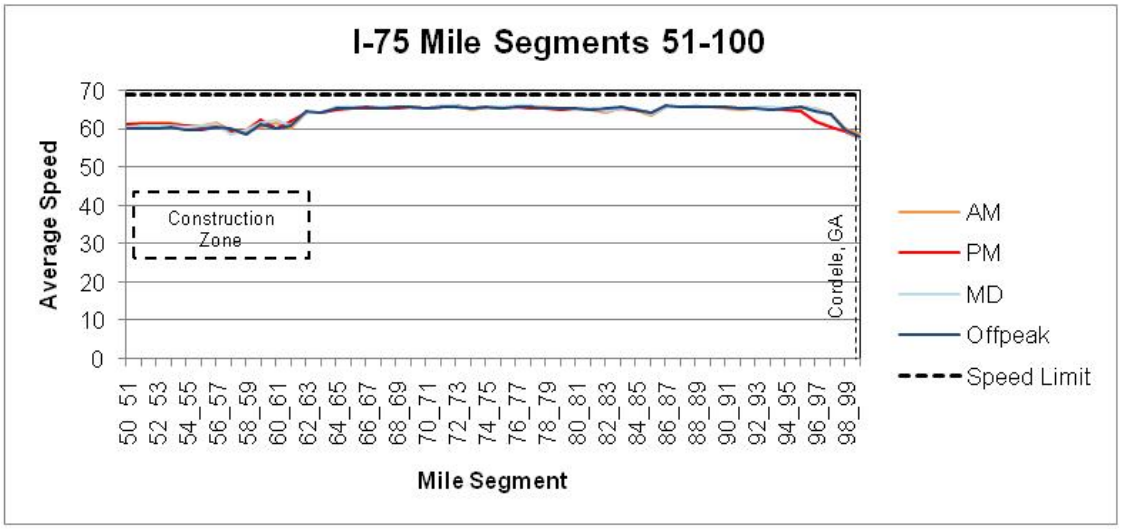
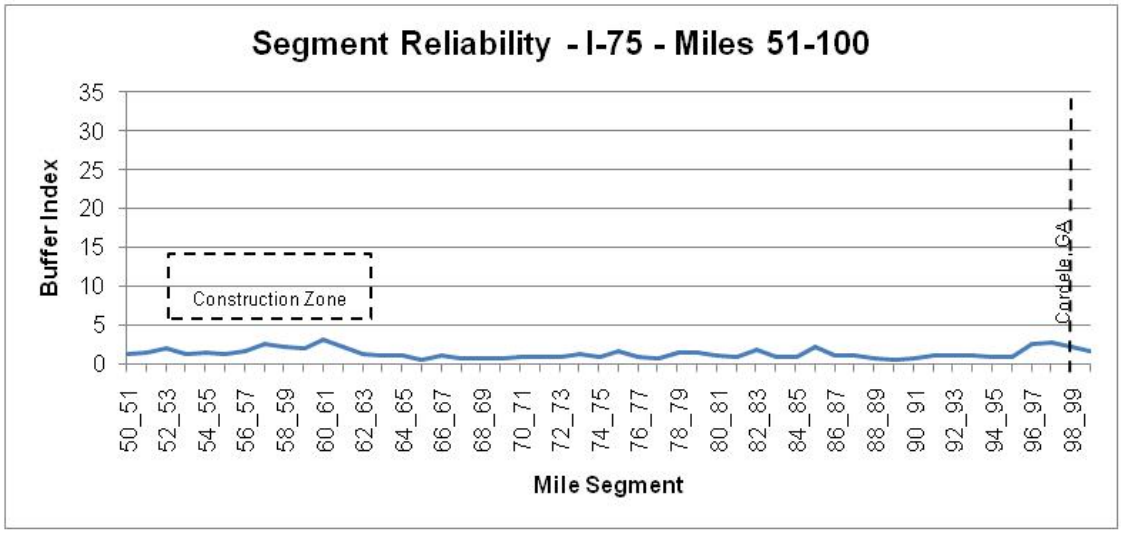
284
283
277
278
272
270
271

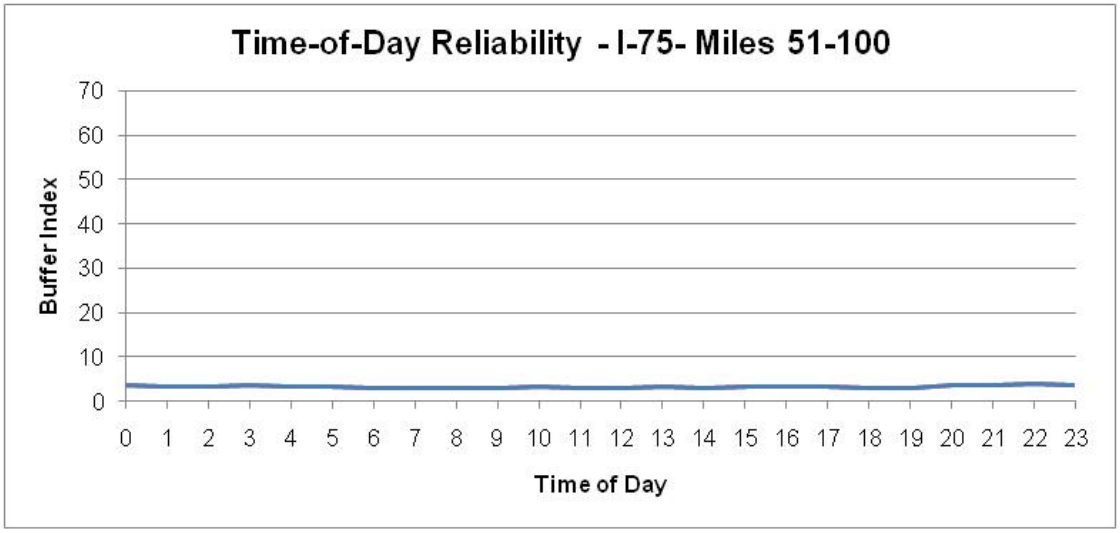

I-75 Mile Segments 1-50
Average Speed
Mile Segment
Florida
Weigh Station
AM
PM
MD
Offpeak
Speed Limit

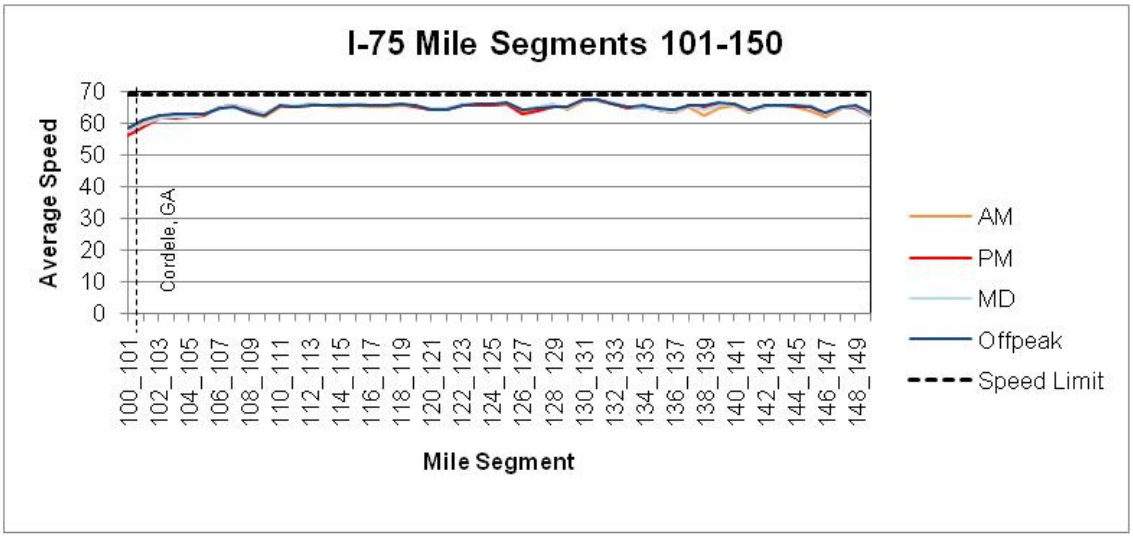

Segment Reliability - I-75 - Miles 1-50
Buffer Index
Mile Segment
Florida
Weigh Station
Construction Zone

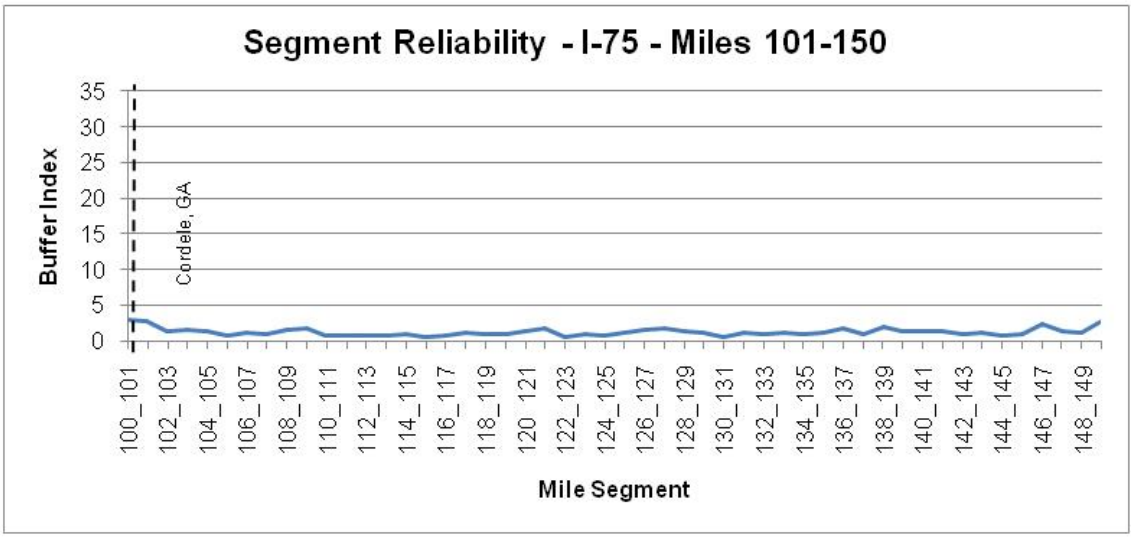

Time-of-Day Reliability - I-75- Miles 1-50
Buffer Index
Time of Day

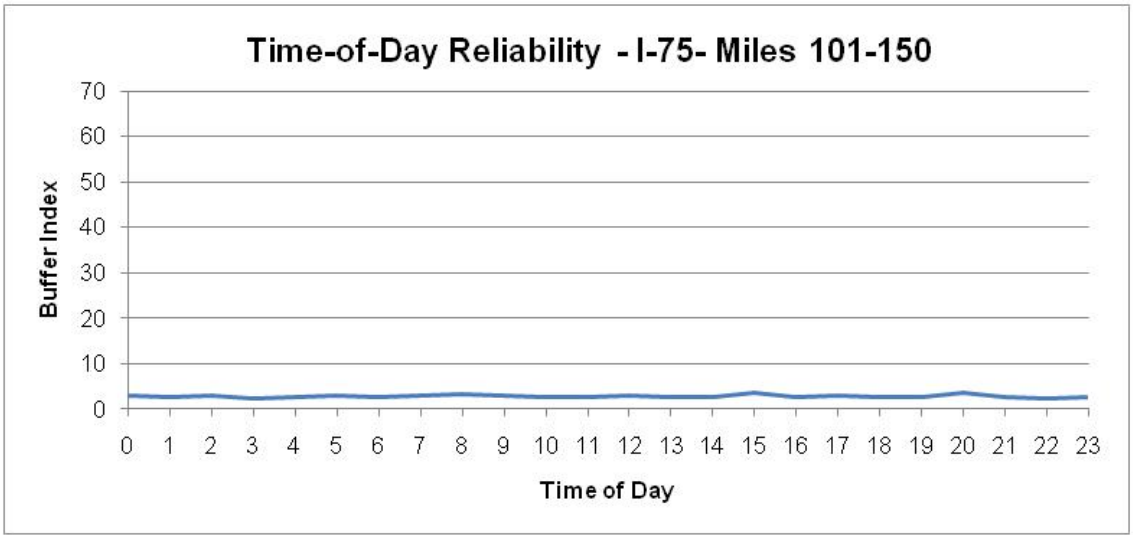

I-75 Mile Segments 51-100
Average Speed
70
60
50
40
30
20
10
0
Construction Zone
Cordele, GA
AM
PM
MD
Offpeak
Speed Limit
50_51
52_53
54_55
56_57
58_59
60_61
62_63
64_65
66_67
68_69
70_71
72_73
74_75
76_77
78_79
80_81
82_83
84_85
86_87
88_89
90_91
92_93
94_95
96_97
98_99
Mile Segment

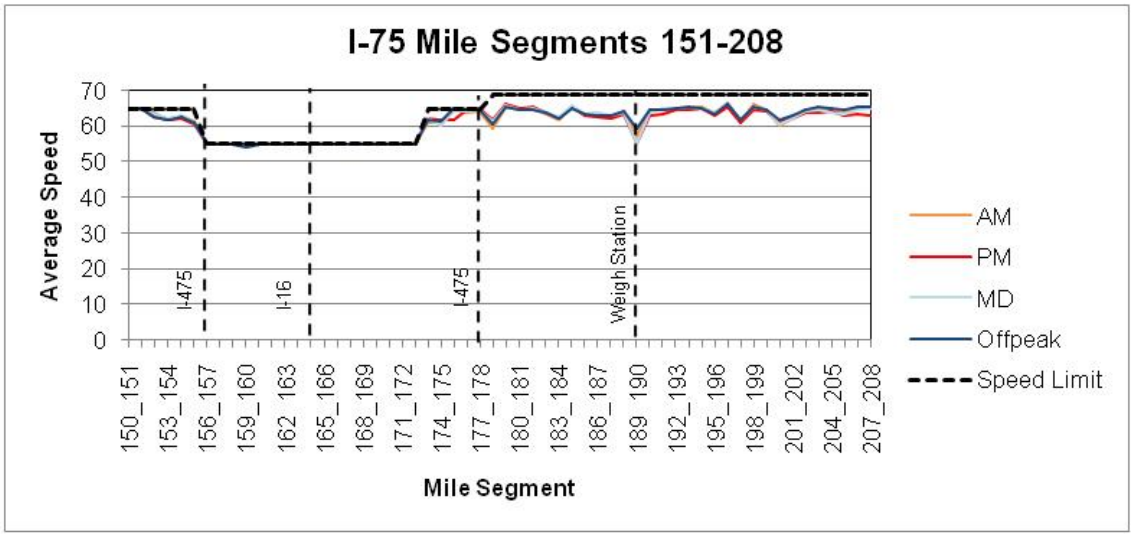

Segment Reliability - I-75 - Miles 51-100
Buffer Index
35
30
25
20
15
10
5
0
Construction Zone
Cordele, GA
50_51
52_53
54_55
56_57
58_59
60_61
62_63
64_65
66_67
68_69
70_71
72_73
74_75
76_77
78_79
80_81
82_83
84_85
86_87
88_89
90_91
92_93
94_95
96_97
98_99
Mile Segment

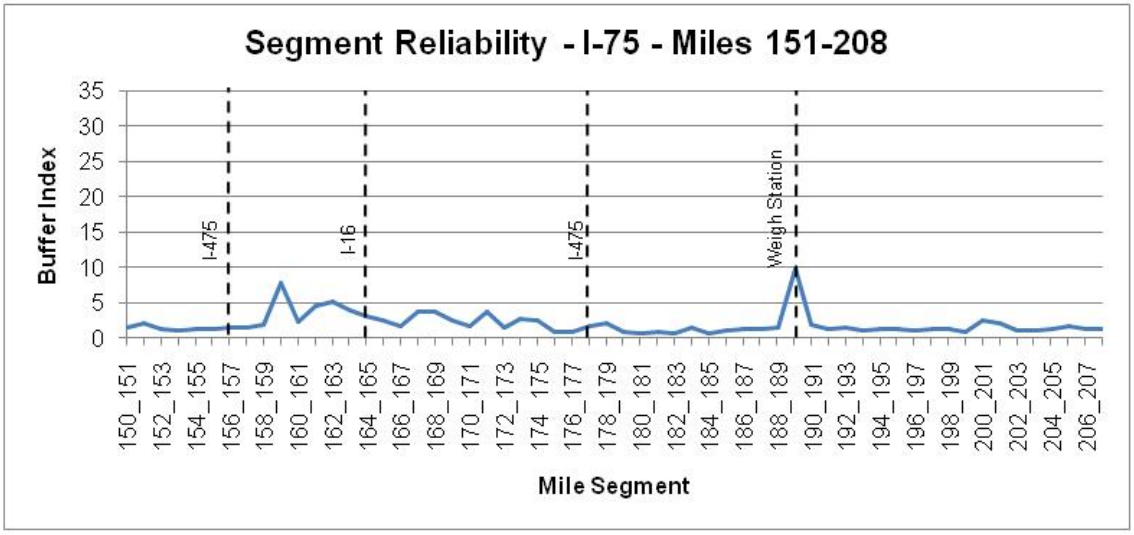

Time-of-Day Reliability - I-75- Miles 51-100
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

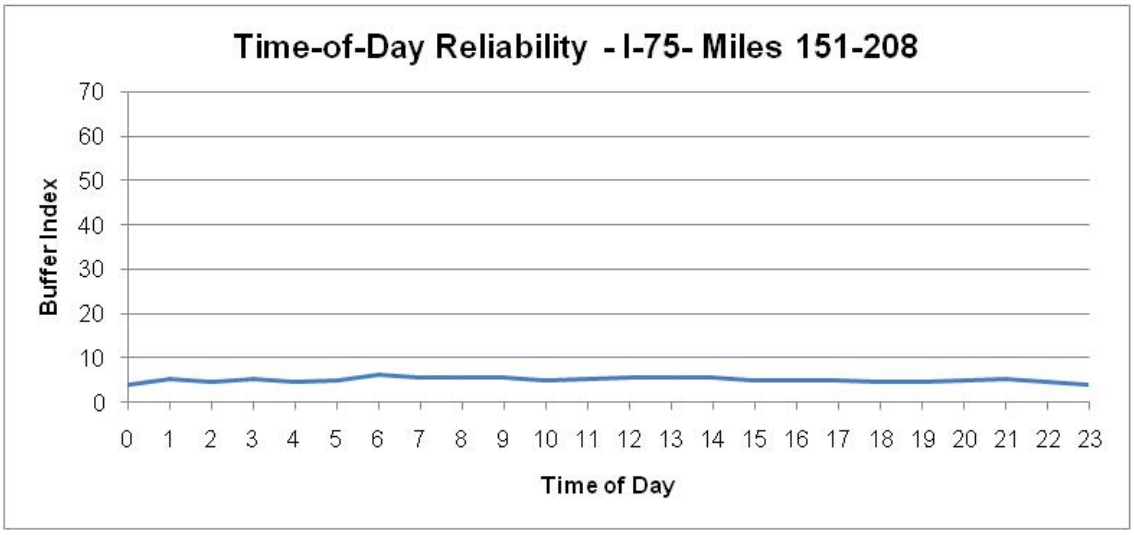

I-75 Mile Segments 101-150
Average Speed
70
60
50
40
30
20
10
0
Cordele, GA
100_101
102_103
104_105
106_107
108_109
110_111
112_113
114_115
116_117
118_119
120_121
122_123
124_125
126_127
128_129
130_131
132_133
134_135
136_137
138_139
140_141
142_143
144_145
146_147
148_149
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

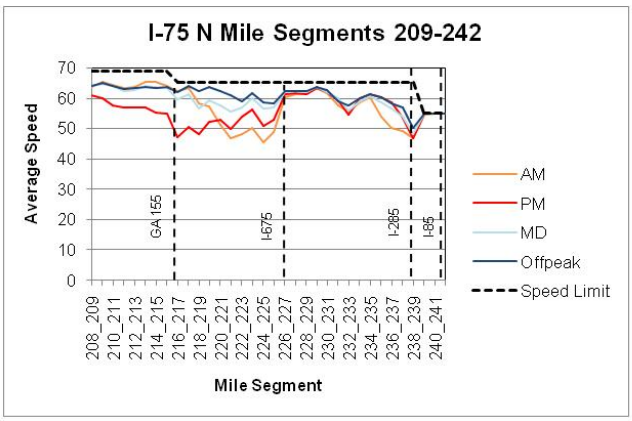

Segment Reliability - I-75 - Miles 101-150
Buffer Index
35
30
25
20
15
10
5
0
Cordele, GA
100_101
102_103
104_105
106_107
108_109
110_111
112_113
114_115
116_117
118_119
120_121
122_123
124_125
126_127
128_129
130_131
132_133
134_135
136_137
138_139
140_141
142_143
144_145
146_147
148_149
Mile Segment

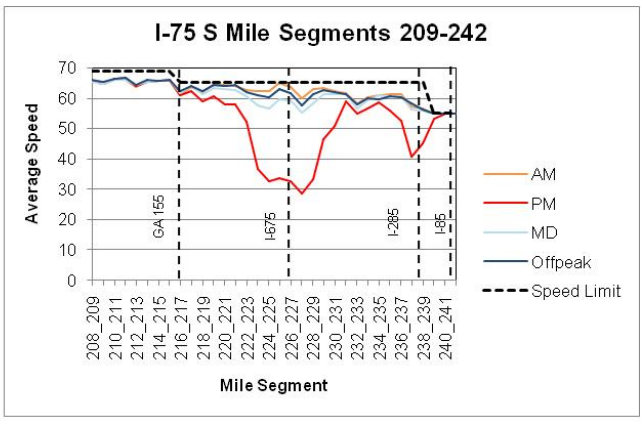

Time-of-Day Reliability - I-75- Miles 101-150
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

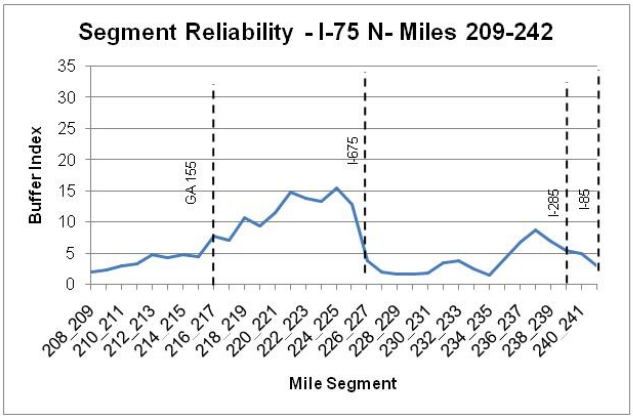

I-75 Mile Segments 151-208
Average Speed
70
60
50
40
30
20
10
0
I-475
I-16
I-475
Weigh Station
150_151
153_154
156_157
159_160
162_163
165_166
168_169
171_172
174_175
177_178
180_181
183_184
186_187
189_190
192_193
195_196
198_199
201_202
204_205
207_208
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

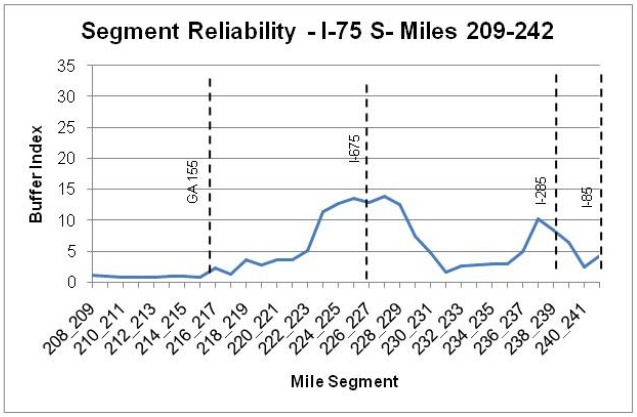

Segment Reliability - I-75 - Miles 151-208
Buffer Index
35
30
25
20
15
10
5
0
I-475
I-16
I-475
Weigh Station
150_151
152_153
154_155
156_157
158_159
160_161
162_163
164_165
166_167
168_169
170_171
172_173
174_175
176_177
178_179
180_181
182_183
184_185
186_187
188_189
190_191
192_193
194_195
196_197
198_199
200_201
202_203
204_205
206_207
Mile Segment

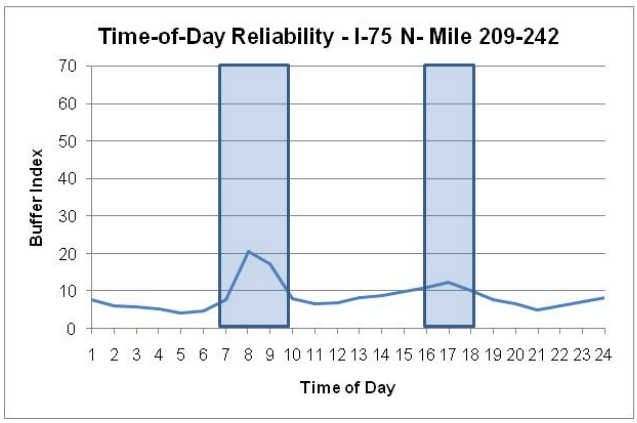

Time-of-Day Reliability - I-75- Miles 151-208
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

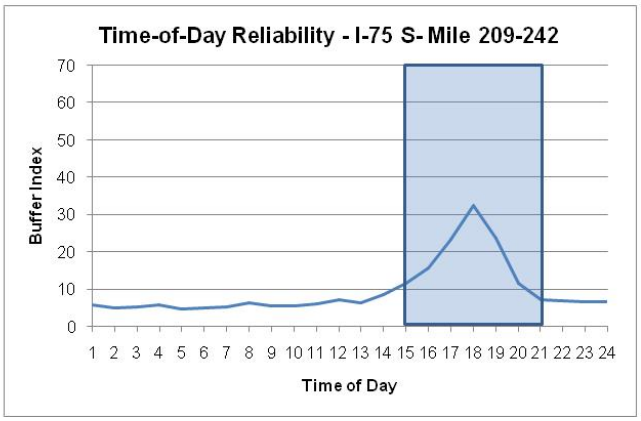

I-75 N Mile Segments 209-242
Average Speed
Mile Segment
GA 155
I-675
I-285
I-85
AM
PM
MD
Offpeak
Speed Limit

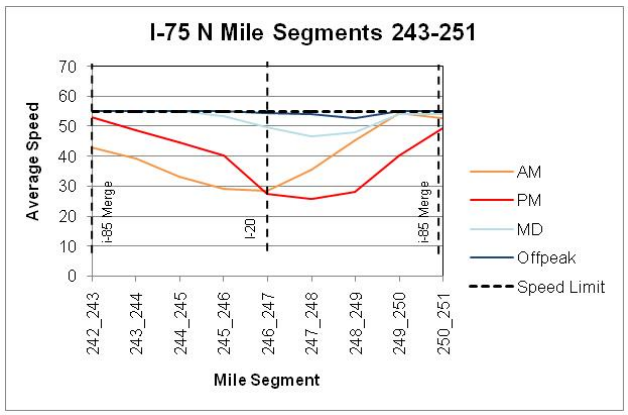

I-75 S Mile Segments 209-242
Average Speed
Mile Segment
GA 155
I-675
I-285
I-85
AM
PM
MD
Offpeak
Speed Limit

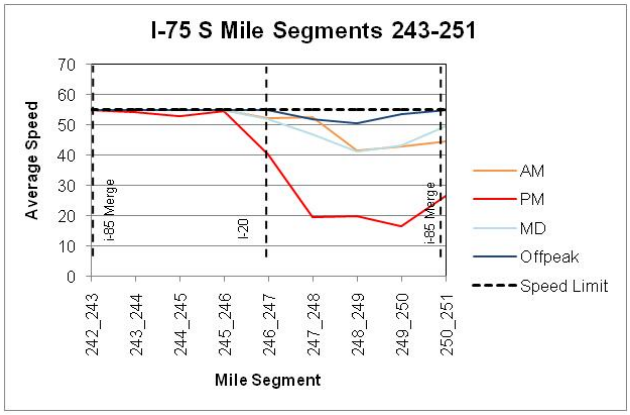

Segment Reliability - I-75 N- Miles 209-242
Buffer Index
Mile Segment
GA 155
I-675
I-285
I-85

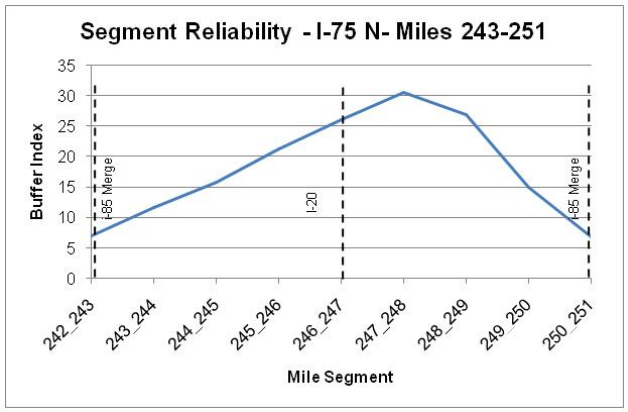

Segment Reliability - I-75 S- Miles 209-242
Buffer Index
Mile Segment
GA 155
I-675
I-285
I-85

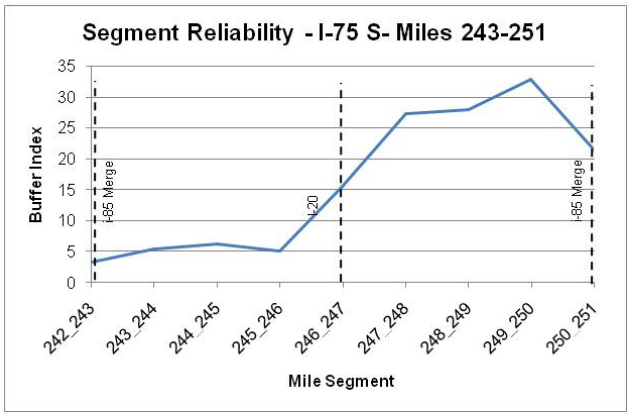

Time-of-Day Reliability - I-75 N- Mile 209-242
Buffer Index
Time of Day

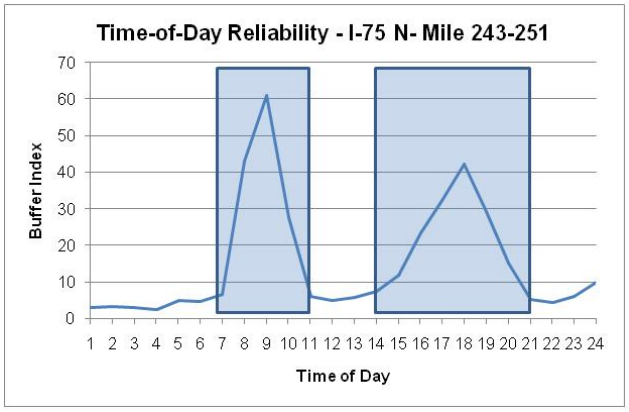

Time-of-Day Reliability - I-75 S- Mile 209-242
Buffer Index
Time of Day

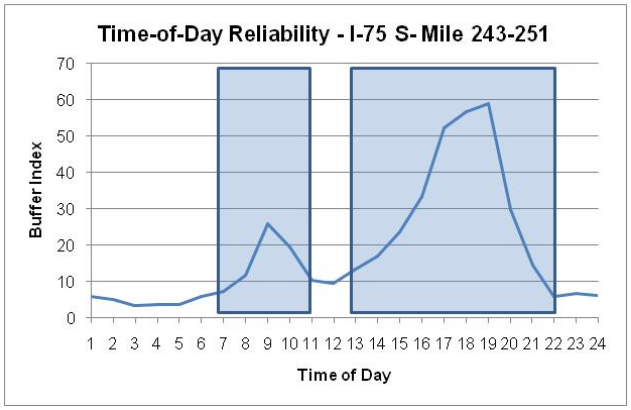

I-75 N Mile Segments 243-251
Average Speed
Mile Segment
i-85 Merge
I-20
i-85 Merge
AM
PM
MD
Offpeak
Speed Limit

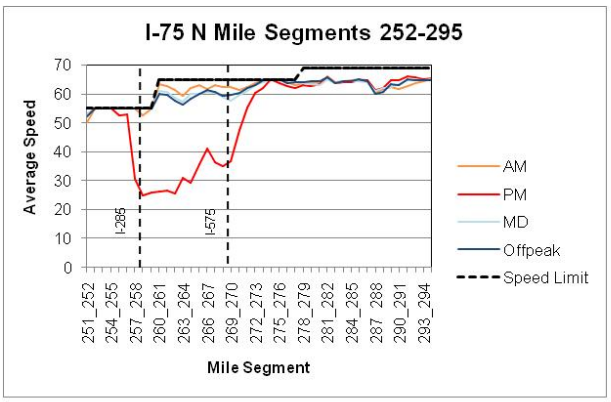

I-75 S Mile Segments 243-251
Average Speed
Mile Segment
i-85 Merge
I-20
i-85 Merge
AM
PM
MD
Offpeak
Speed Limit

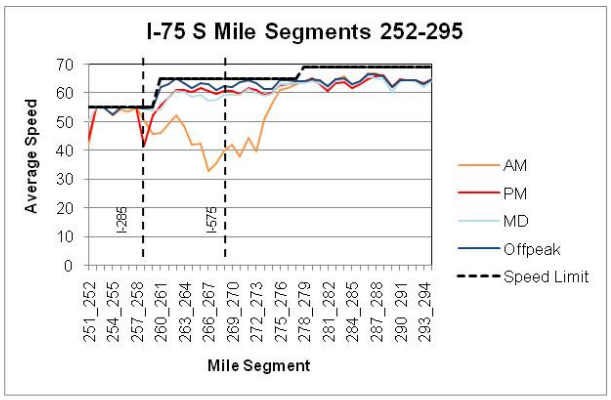

Segment Reliability - I-75 N- Miles 243-251
Buffer Index
Mile Segment
i-85 Merge
I-20
i-85 Merge

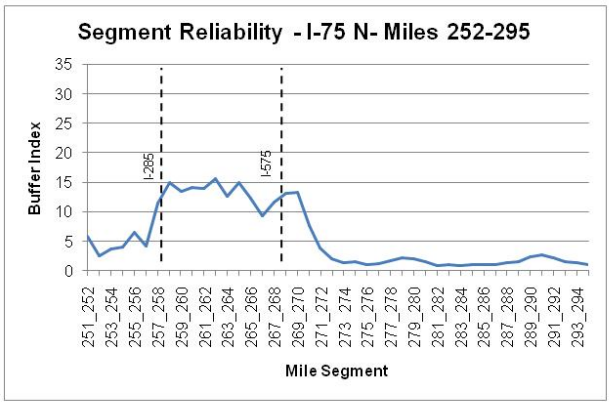

Segment Reliability - I-75 S- Miles 243-251
Buffer Index
Mile Segment
i-85 Merge
I-20
i-85 Merge

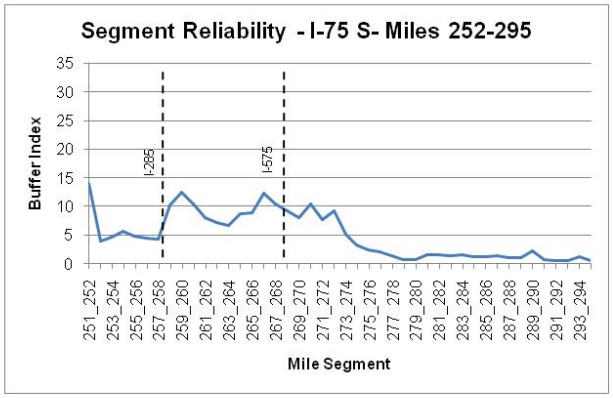

Time-of-Day Reliability - I-75 N- Mile 243-251
Buffer Index
Time of Day

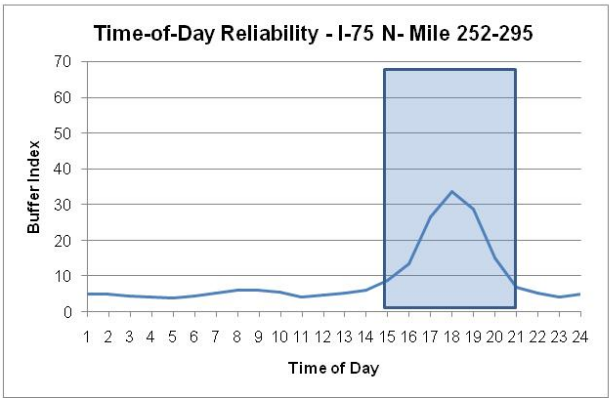

Time-of-Day Reliability - I-75 S- Mile 243-251
Buffer Index
Time of Day

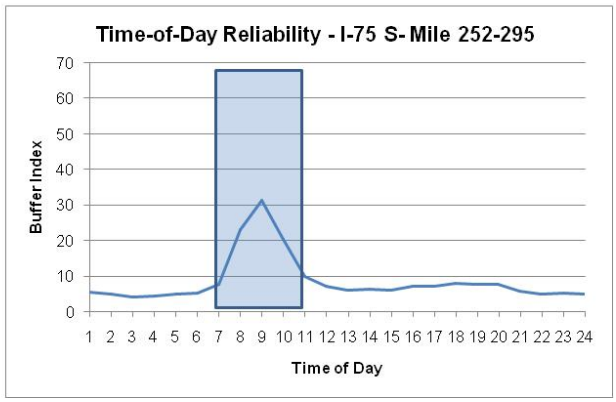

I-75 N Mile Segments 252-295
Average Speed
Mile Segment
I-285
I-575
AM
PM
MD
Offpeak
Speed Limit

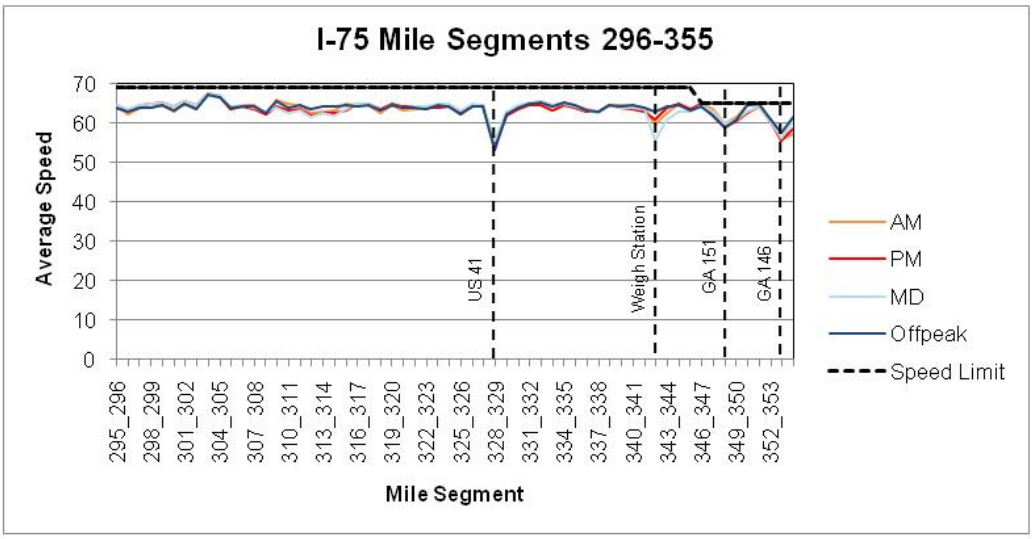

I-75 S Mile Segments 252-295
Average Speed
Mile Segment
I-285
I-575
AM
PM
MD
Offpeak
Speed Limit

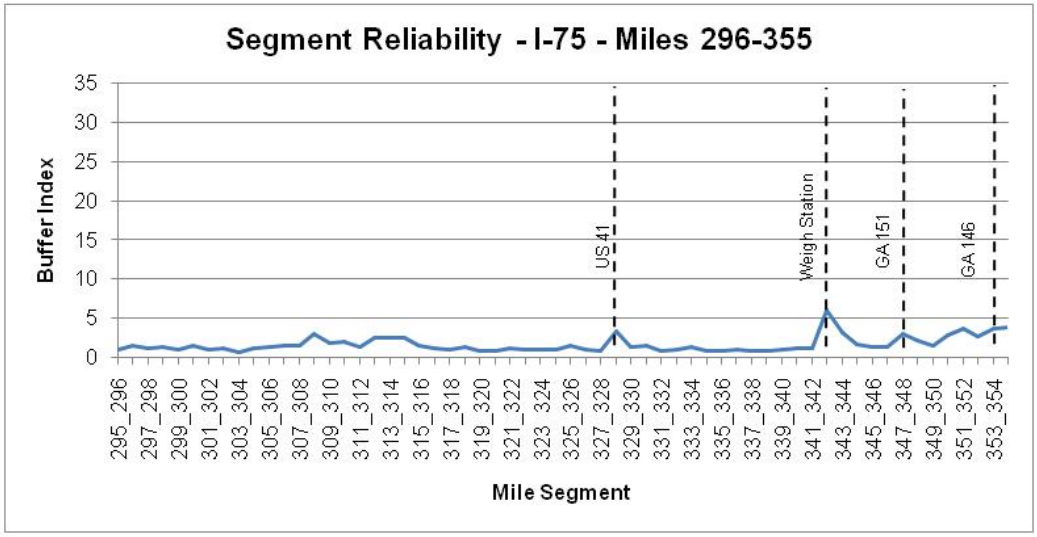

Segment Reliability - I-75 N- Miles 252-295
Buffer Index
Mile Segment
I-285
I-575

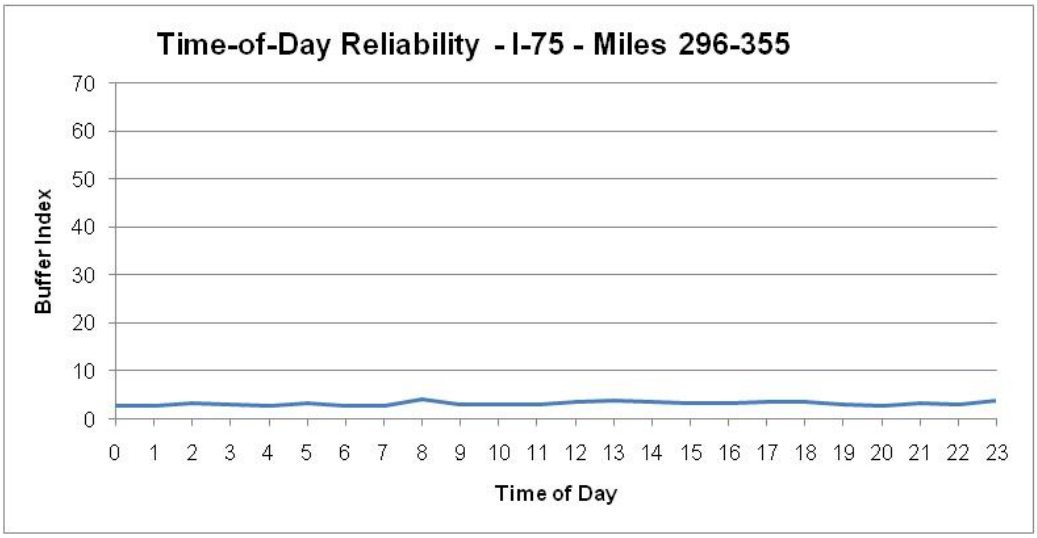

Segment Reliability - I-75 S- Miles 252-295
Buffer Index
Mile Segment
I-285
I-575


Time-of-Day Reliability - I-75 N- Mile 252-295
Buffer Index
Time of Day

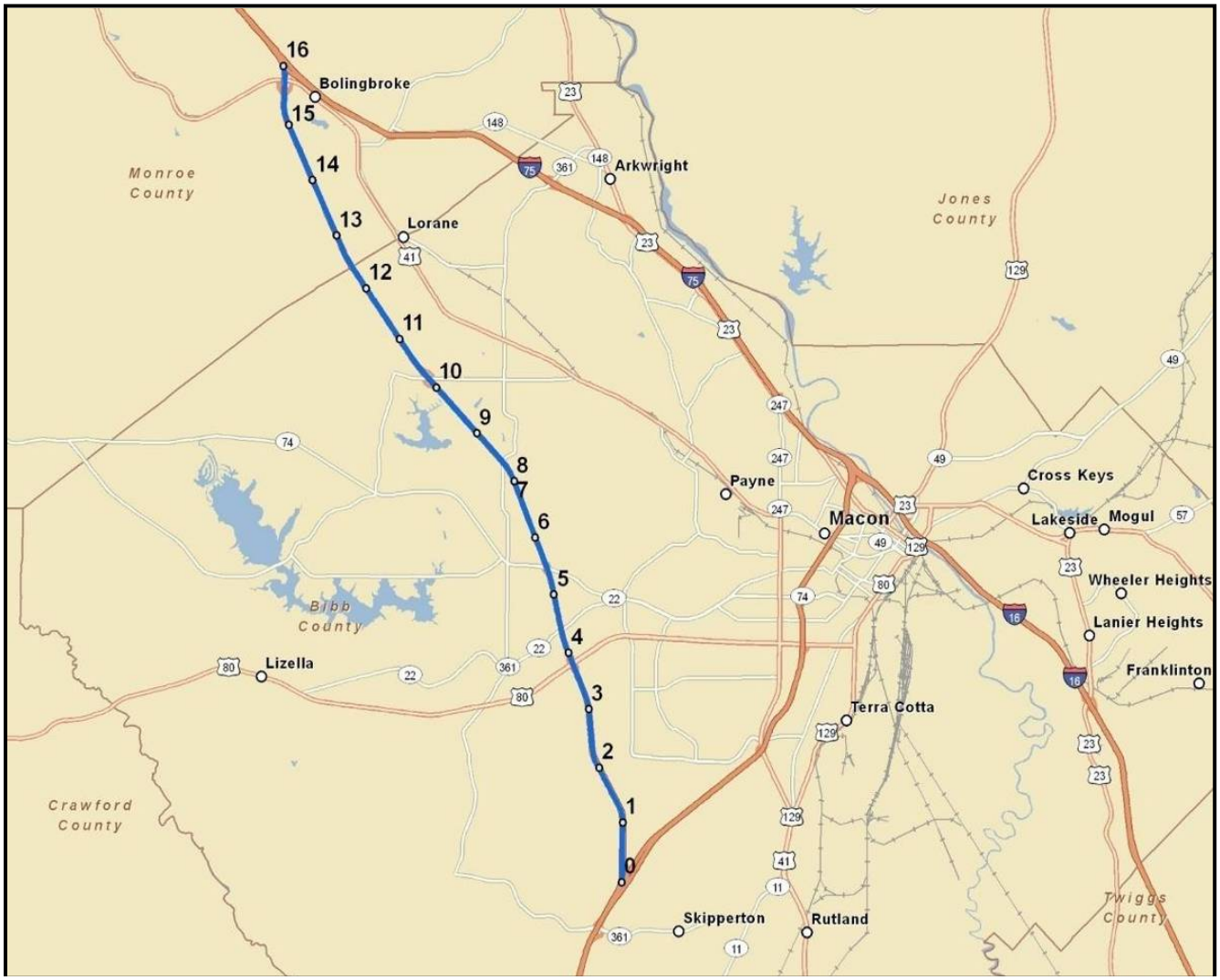

Time-of-Day Reliability - I-75 S- Mile 252-295
Buffer Index
Time of Day

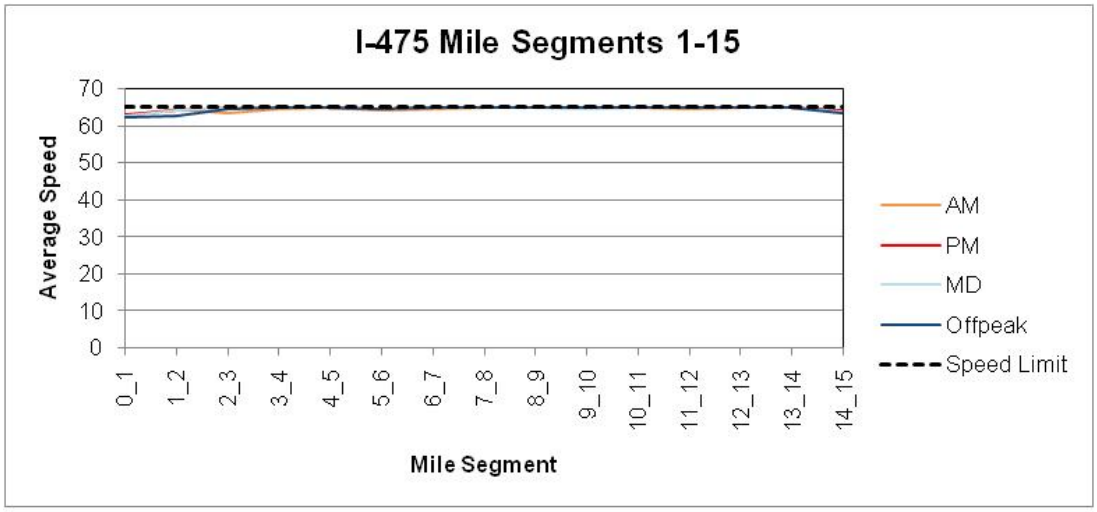

I-75 Mile Segments 296-355
Average Speed
70
60
50
40
30
20
10
0
US 41
Weigh Station
GA 151
GA 146
AM
PM
MD
Offpeak
Speed Limit
295_296
298_299
301_302
304_305
307_308
310_311
313_314
316_317
319_320
322_323
325_326
328_329
331_332
334_335
337_338
340_341
343_344
346_347
349_350
352_353
Mile Segment

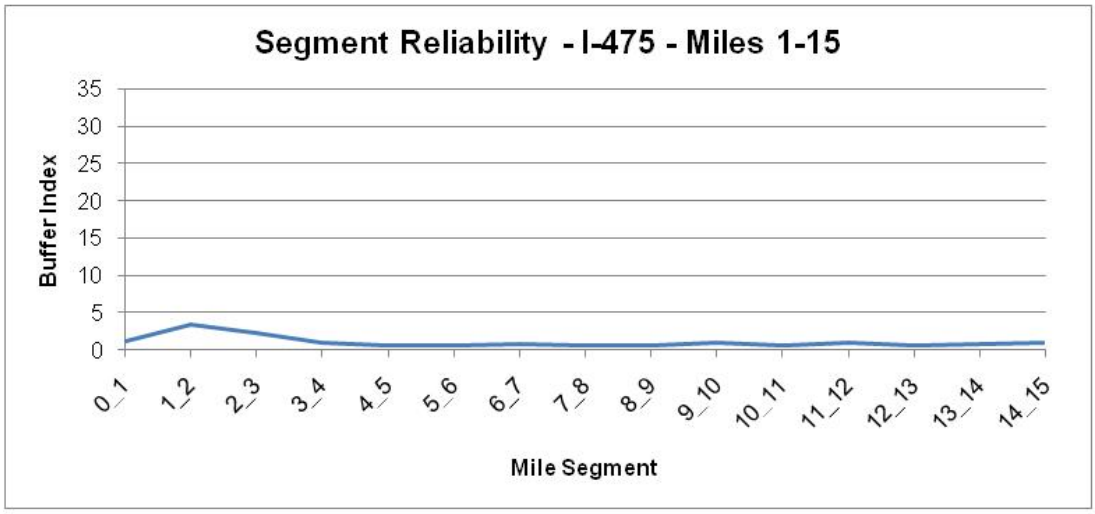

Segment Reliability - I-75 - Miles 296-355
Buffer Index
35
30
25
20
15
10
5
0
US 41
Weigh Station
GA 151
GA 146
295_296
297_298
299_300
301_302
303_304
305_306
307_308
309_310
311_312
313_314
315_316
317_318
319_320
321_322
323_324
325_326
327_328
329_330
331_332
333_334
335_336
337_338
339_340
341_342
343_344
345_346
347_348
349_350
351_352
353_354
Mile Segment

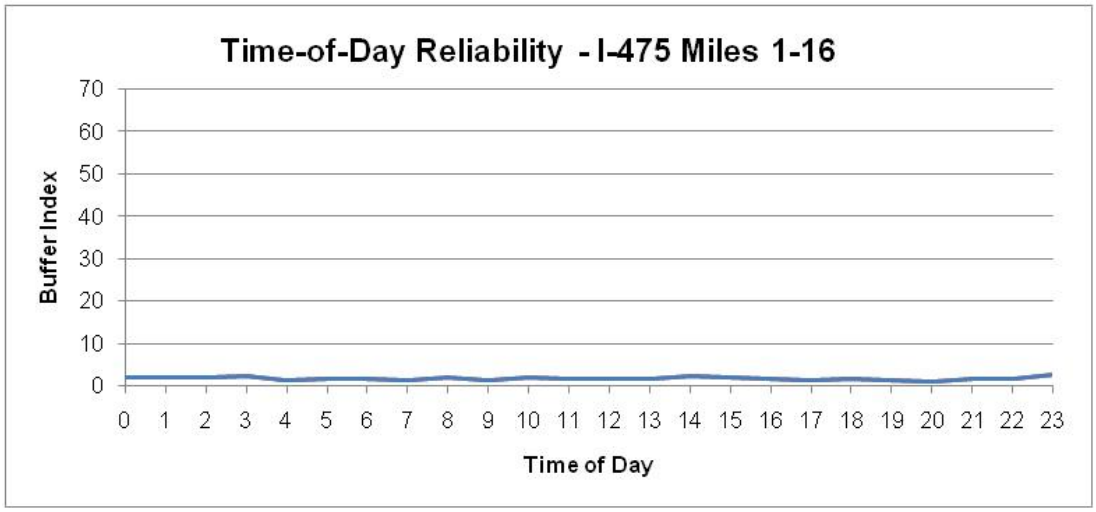

Time-of-Day Reliability - I-75 - Miles 296-355
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

Interstate 475 – Context Map

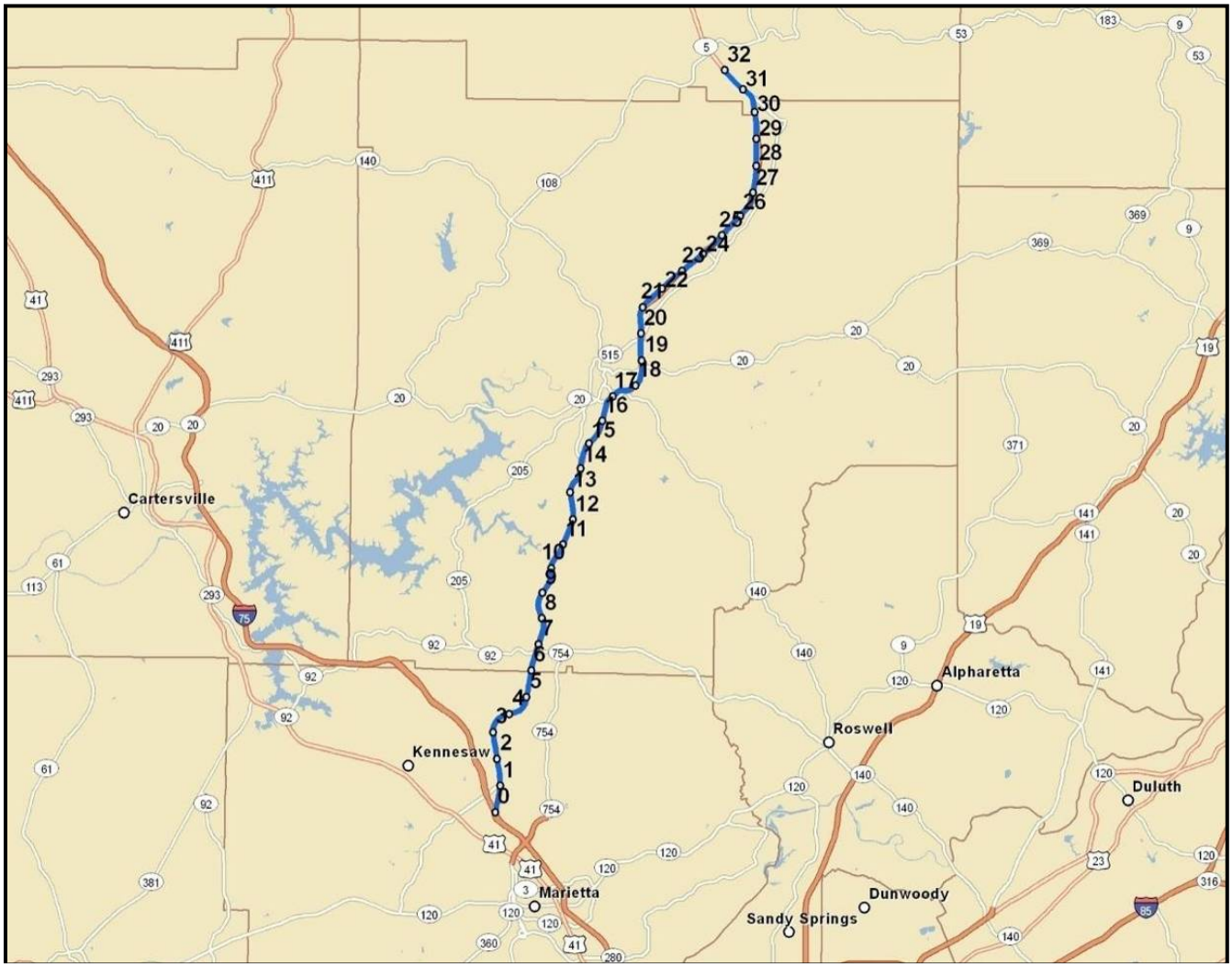


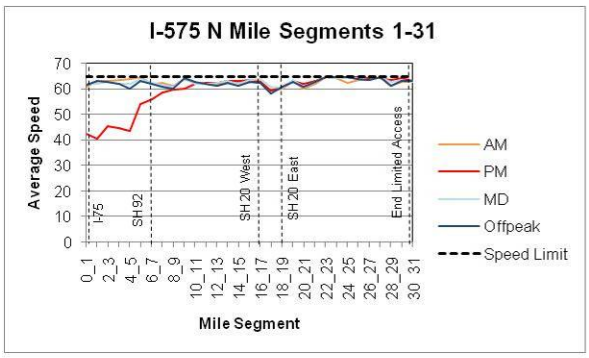

I-475 Mile Segments 1-15
Average Speed
70
60
50
40
30
20
10
0
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

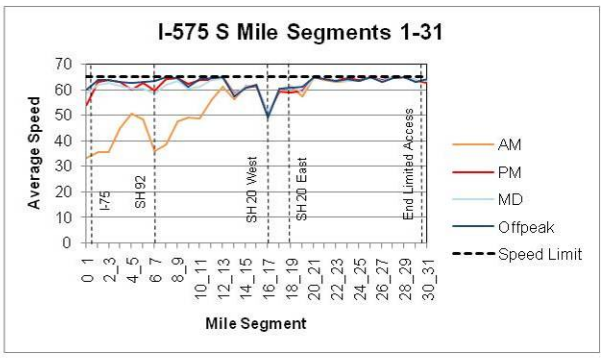

Segment Reliability - I-475 - Miles 1-15
Buffer Index
35
30
25
20
15
10
5
0
0_1
1_2
2_3
3_4
4_5
5_6
6_7
7_8
8_9
9_10
10_11
11_12
12_13
13_14
14_15
Mile Segment

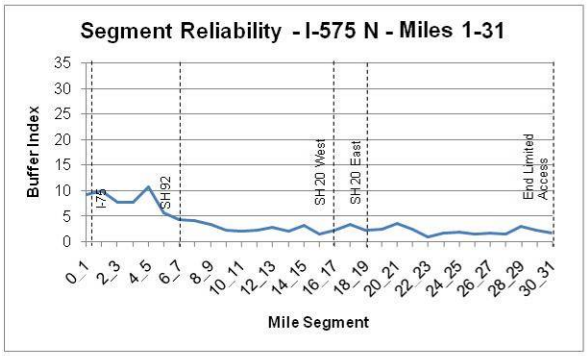

Time-of-Day Reliability - I-475 Miles 1-16
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

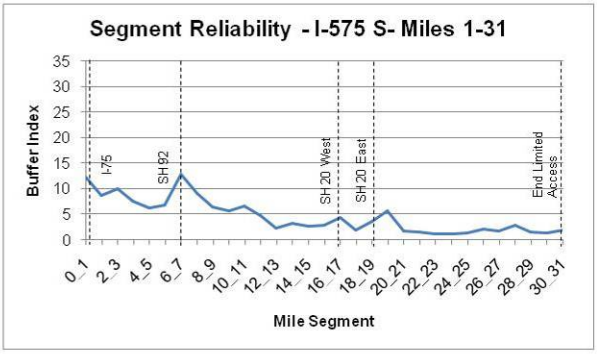
Interstate 575 – Context Map

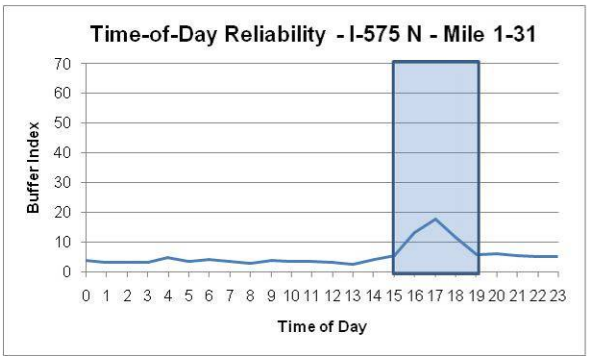


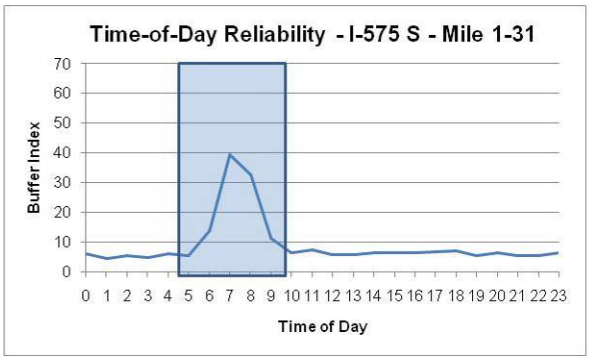

I-575 N Mile Segments 1-31
Average Speed
Mile Segment
I-75
SH 92
SH 20 West
SH 20 East
End Limited Access
AM
PM
MD
Offpeak
Speed Limit


I-575 S Mile Segments 1-31
Average Speed
Mile Segment
I-75
SH 92
SH 20 West
SH 20 East
End Limited Access
AM
PM
MD
Offpeak
Speed Limit

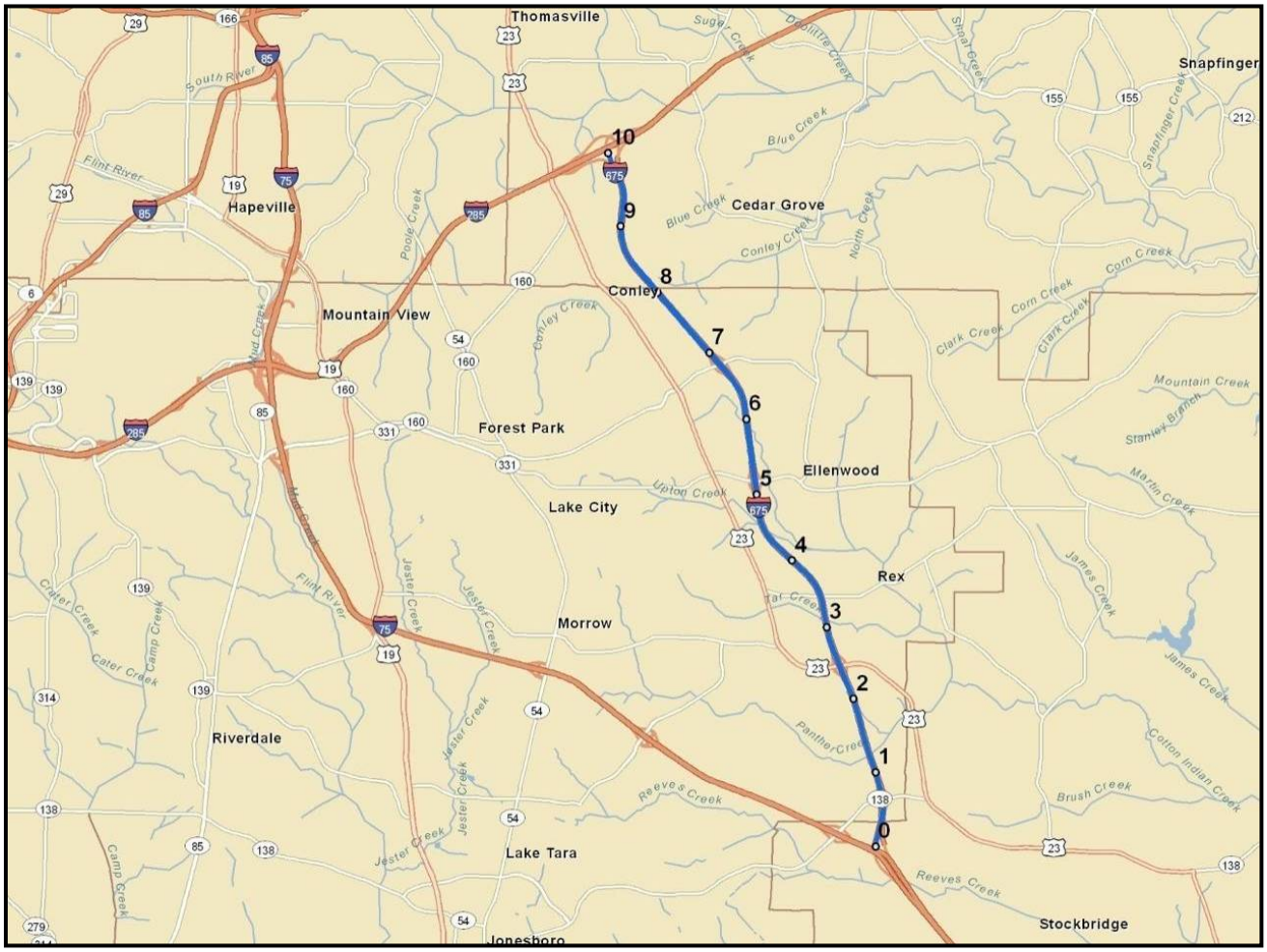

Segment Reliability - I-575 N - Miles 1-31
Buffer Index
Mile Segment
I-75
SH 92
SH 20 West
SH 20 East
End Limited Access

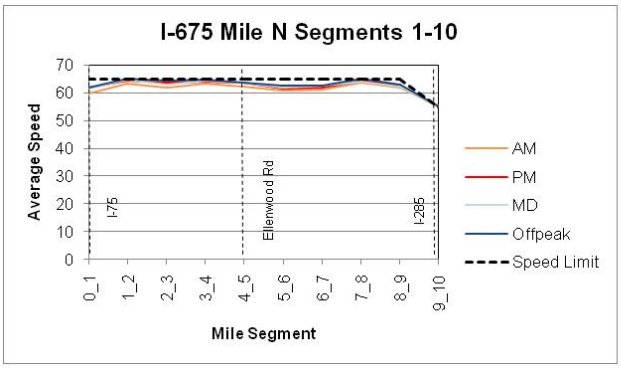

Segment Reliability - I-575 S- Miles 1-31
Buffer Index
Mile Segment
I-75
SH 92
SH 20 West
SH 20 East
End Limited Access

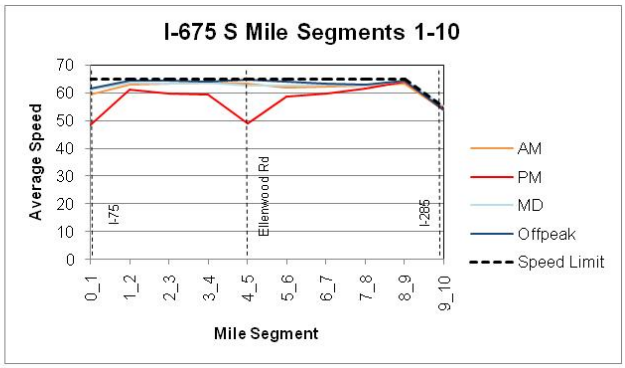

Time-of-Day Reliability - I-575 N - Mile 1-31
Buffer Index
Time of Day

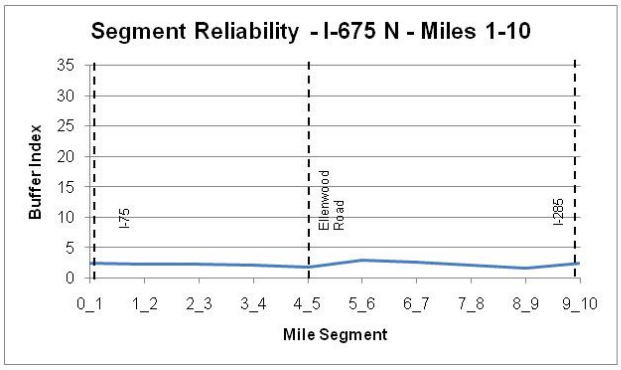

Time-of-Day Reliability - I-575 S - Mile 1-31
Buffer Index
Time of Day

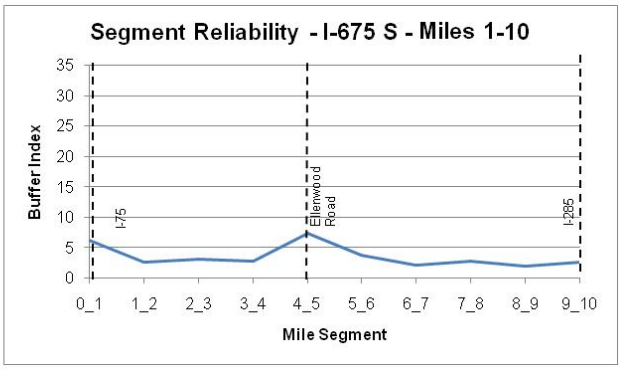
Interstate 675 – Context Map

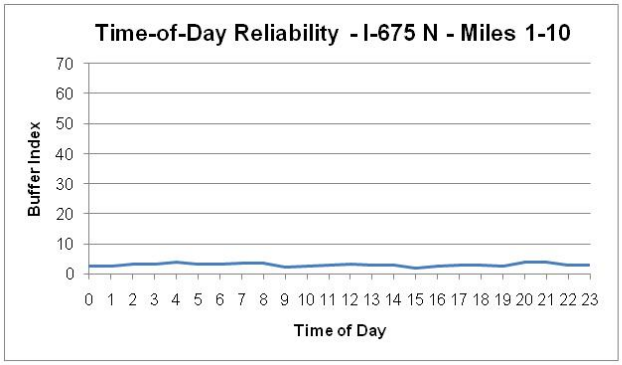


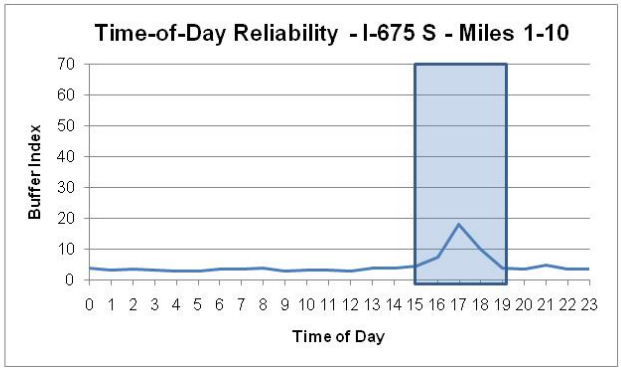

I-675 Mile N Segments 1-10
Average Speed
Mile Segment
I-75
Ellenwood Rd
I-285
AM
PM
MD
Offpeak
Speed Limit


I-675 S Mile Segments 1-10
Average Speed
Mile Segment
I-75
Ellenwood Rd
I-285
AM
PM
MD
Offpeak
Speed Limit

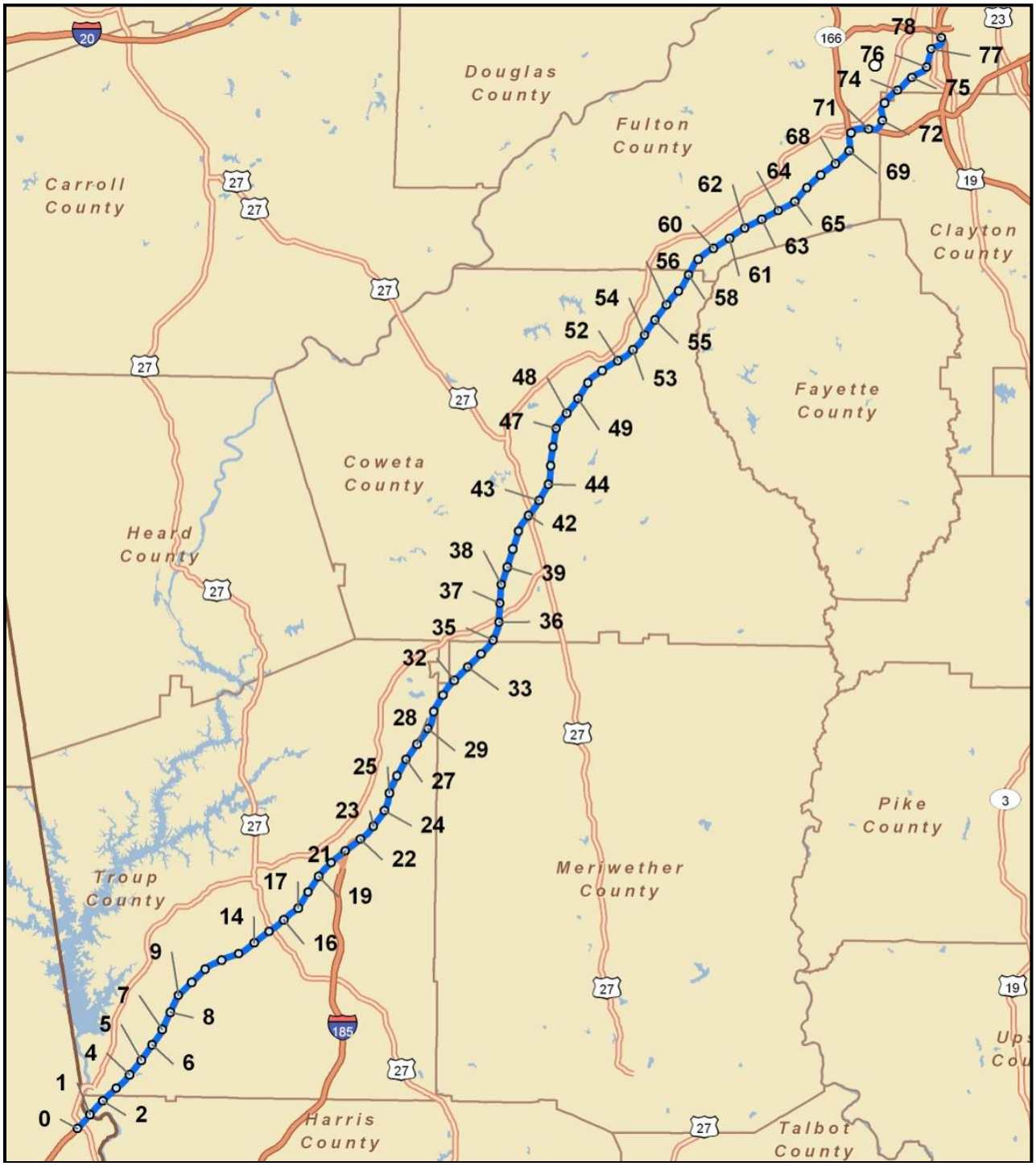

Segment Reliability - I-675 N - Miles 1-10
Buffer Index
Mile Segment
I-75
Ellenwood Road
I-285

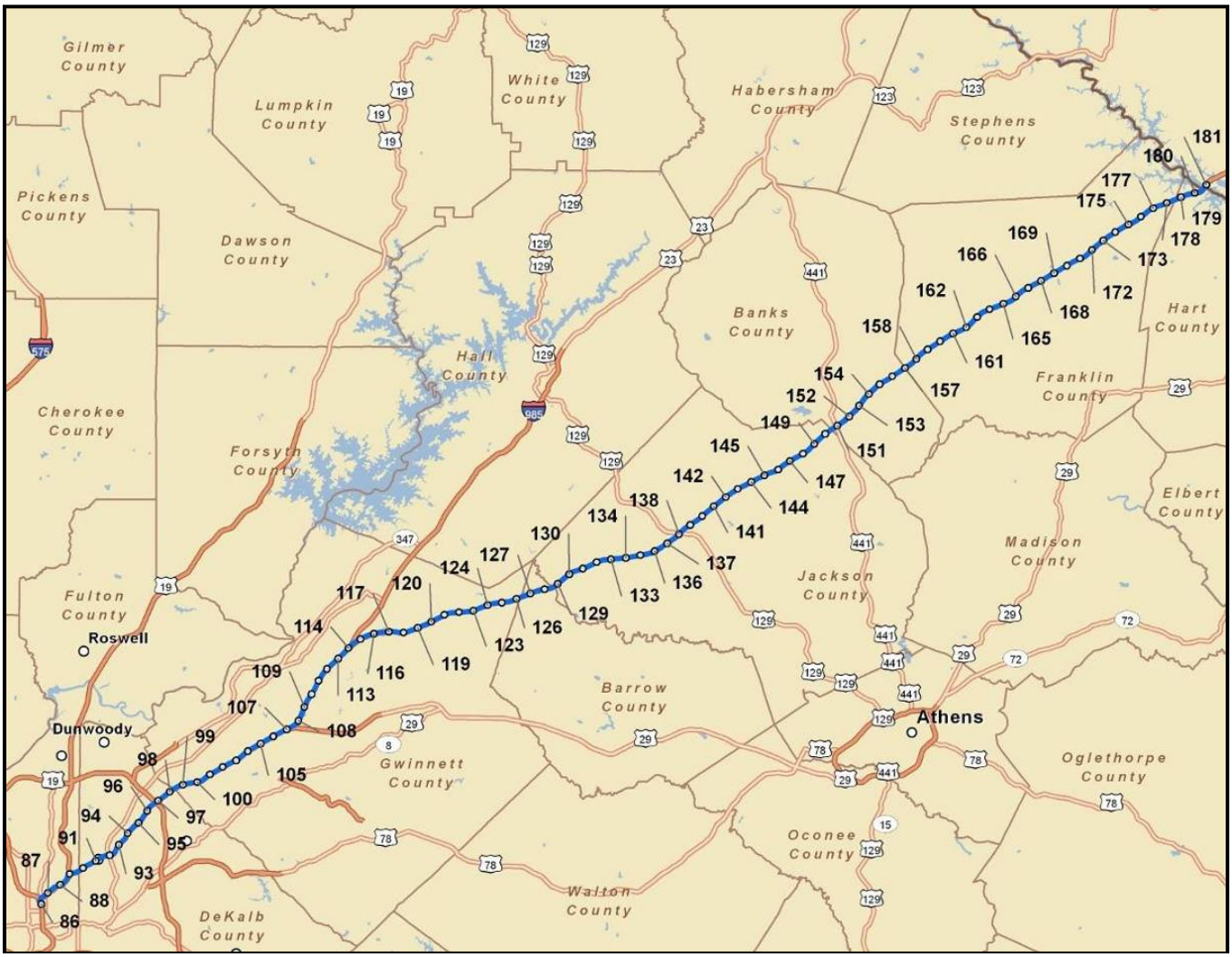

Segment Reliability - I-675 S - Miles 1-10
Buffer Index
Mile Segment
I-75
Ellenwood Road
I-285


Time-of-Day Reliability - I-675 N - Miles 1-10
Buffer Index
Time of Day


Time-of-Day Reliability - I-675 S - Miles 1-10
Buffer Index
Time of Day

Interstate 85 – Context Maps




Gilmer County
Lumpkin County
White County
Habersham County
Stephens County
Pickens County
Dawson County
Banks County
Hart County
Hall County
Franklin County
Cherokee County
Forsyth County
Elbert County
Madison County
Jackson County
Fulton County
Roswell
Dunwoody
Barrow County
Athens
Gwinnett County
Oglethorpe County
Oconee County
Walton County
DeKalb County
86
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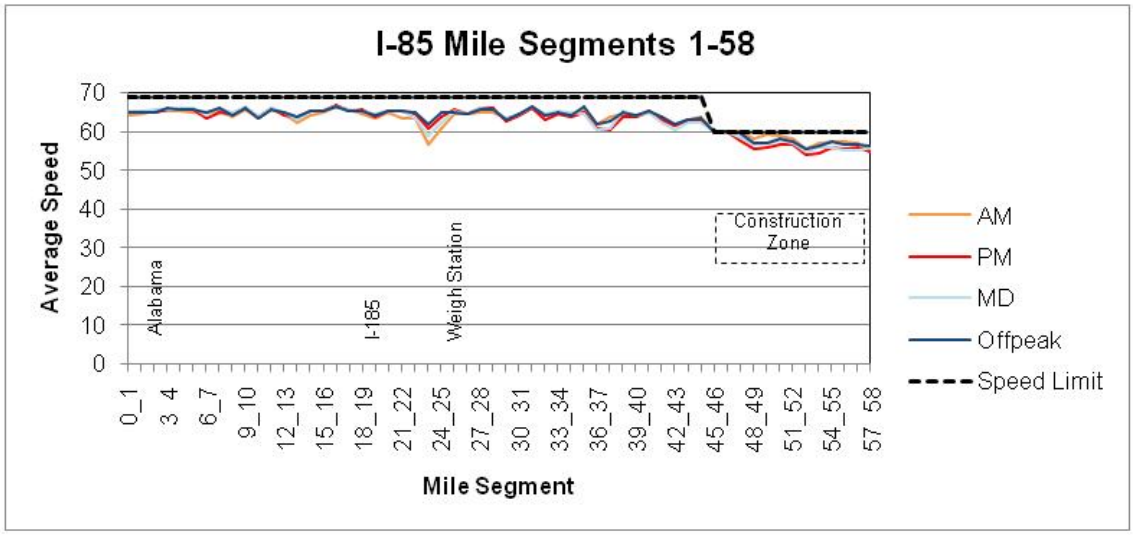
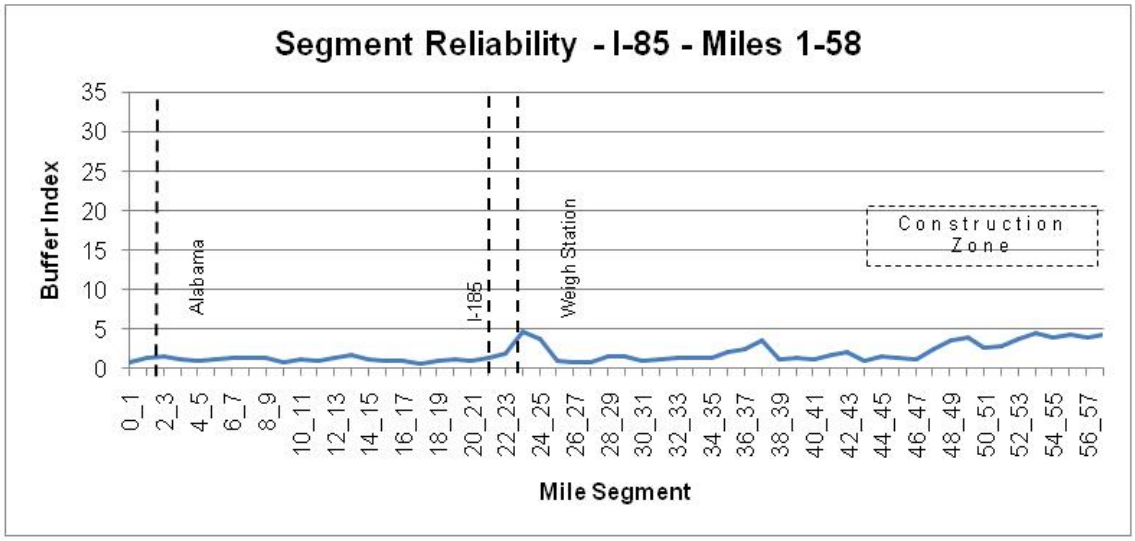
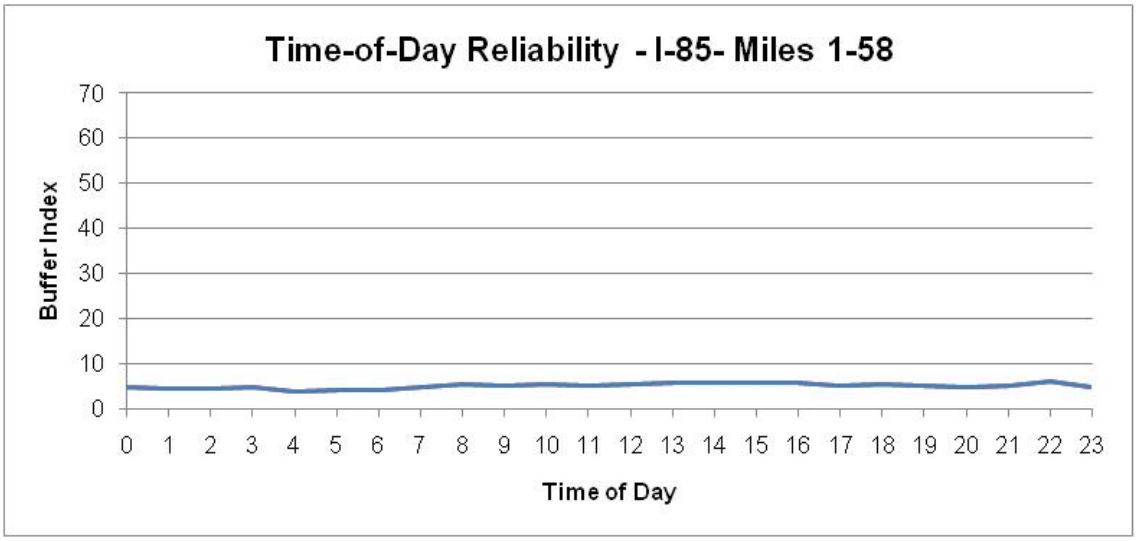
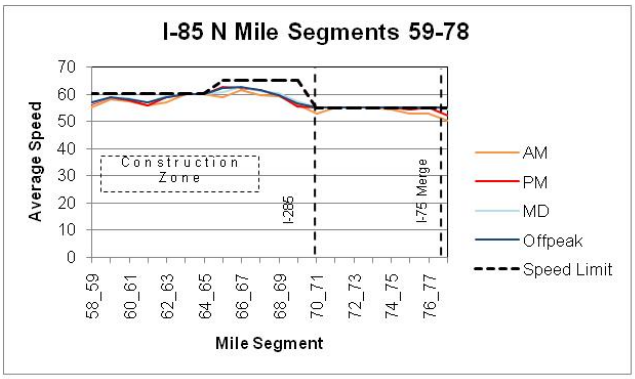
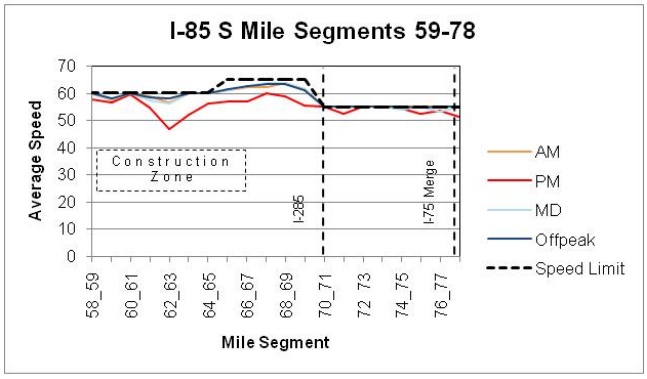
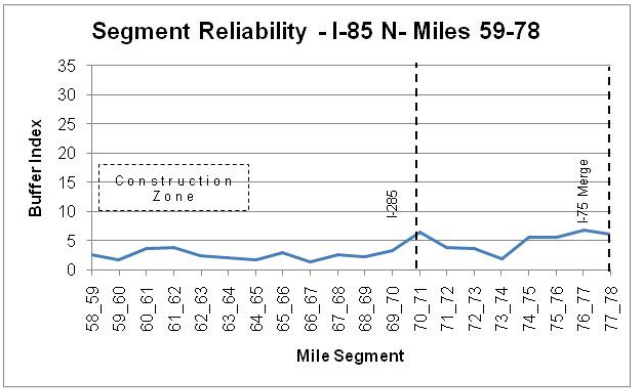

I-85 Mile Segments 1-58
Average Speed
Mile Segment
Alabama
I-185
Weigh Station
Construction Zone
AM
PM
MD
Offpeak
Speed Limit

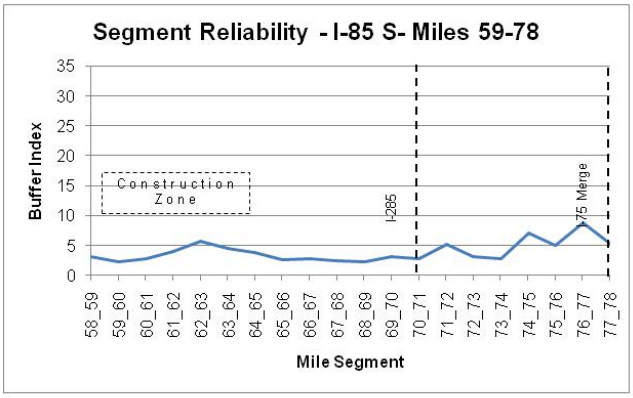

Segment Reliability - I-85 - Miles 1-58
Buffer Index
Mile Segment
Alabama
I-185
Weigh Station
Construction Zone

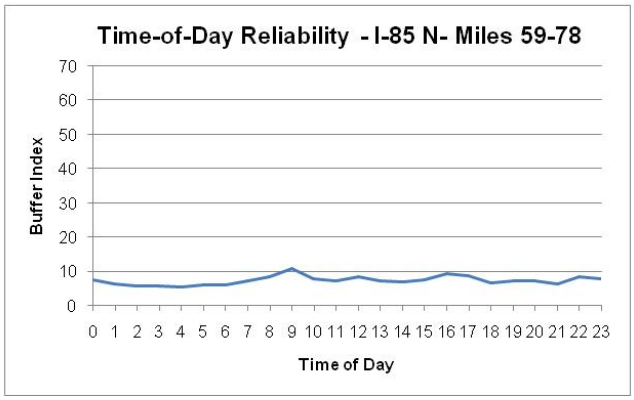

Time-of-Day Reliability - I-85- Miles 1-58
Buffer Index
Time of Day

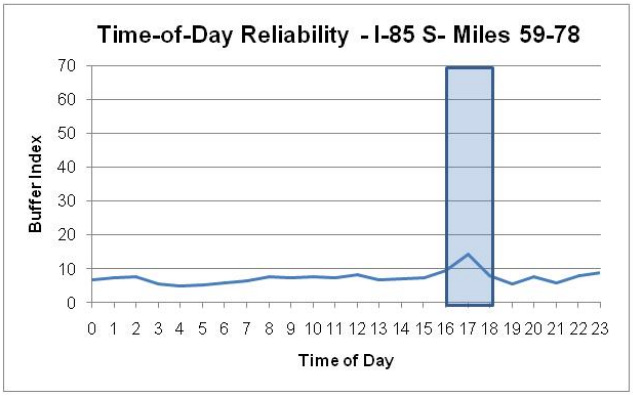

I-85 N Mile Segments 59-78
Average Speed
Construction Zone
I-285
I-75 Merge
AM
PM
MD
Offpeak
Speed Limit
Mile Segment

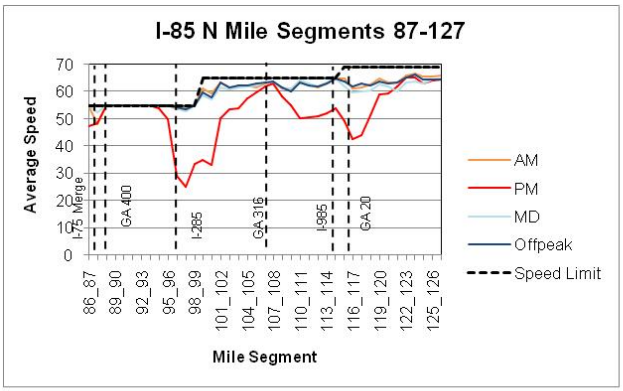

I-85 S Mile Segments 59-78
Average Speed
Construction Zone
I-285
I-75 Merge
AM
PM
MD
Offpeak
Speed Limit
Mile Segment

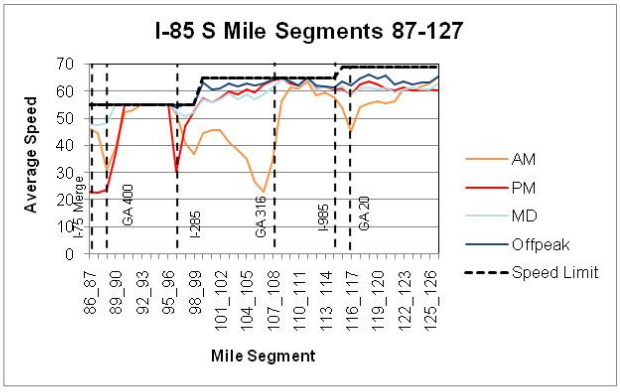

Segment Reliability - I-85 N- Miles 59-78
Buffer Index
Construction Zone
I-285
I-75 Merge
Mile Segment

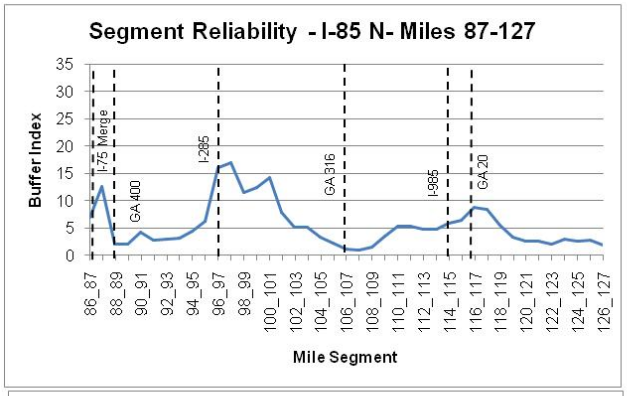

Segment Reliability - I-85 S- Miles 59-78
Buffer Index
Construction Zone
I-285
I-75 Merge
Mile Segment

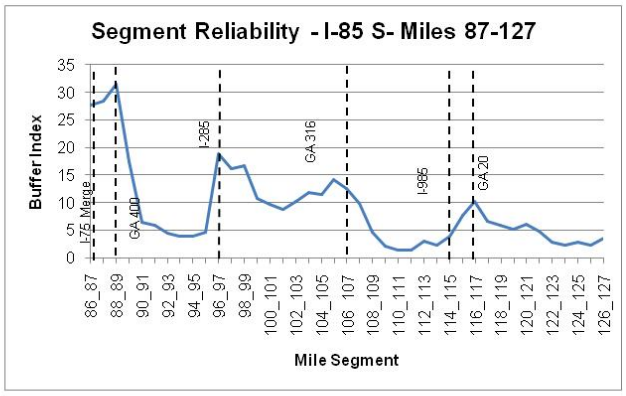

Time-of-Day Reliability - I-85 N- Miles 59-78
Buffer Index
Time of Day

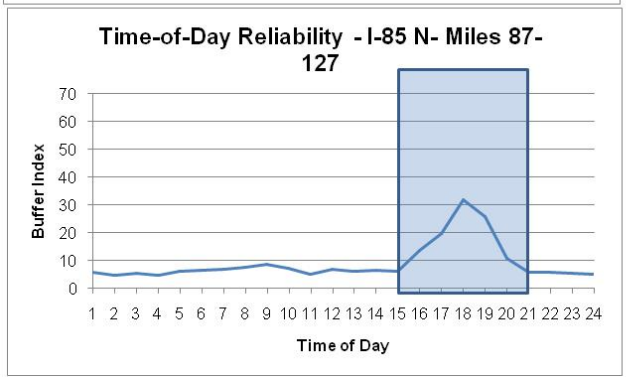

Time-of-Day Reliability - I-85 S- Miles 59-78
Buffer Index
Time of Day

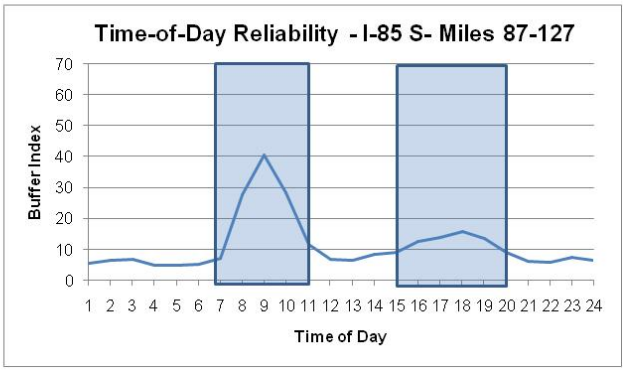

I-85 N Mile Segments 87-127
Average Speed
Mile Segment
I-75 Merge
GA 400
I-285
GA 316
I-985
GA 20
AM
PM
MD
Offpeak
Speed Limit

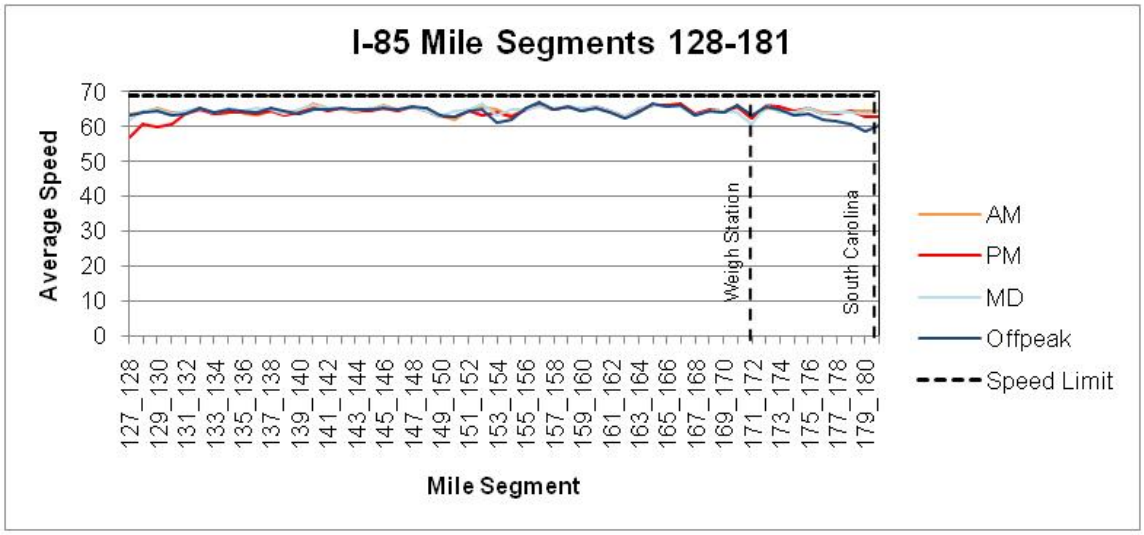

I-85 S Mile Segments 87-127
Average Speed
Mile Segment
I-75 Merge
GA 400
I-285
GA 316
I-985
GA 20
AM
PM
MD
Offpeak
Speed Limit

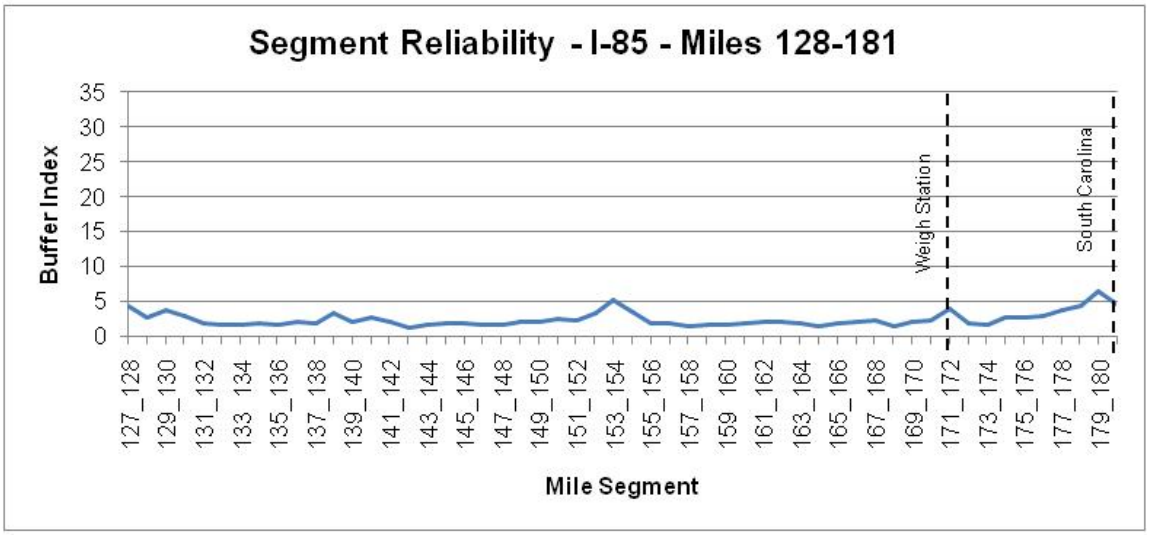

Segment Reliability - I-85 N- Miles 87-127
Buffer Index
Mile Segment
I-75 Merge
GA 400
I-285
GA 316
I-985
GA 20

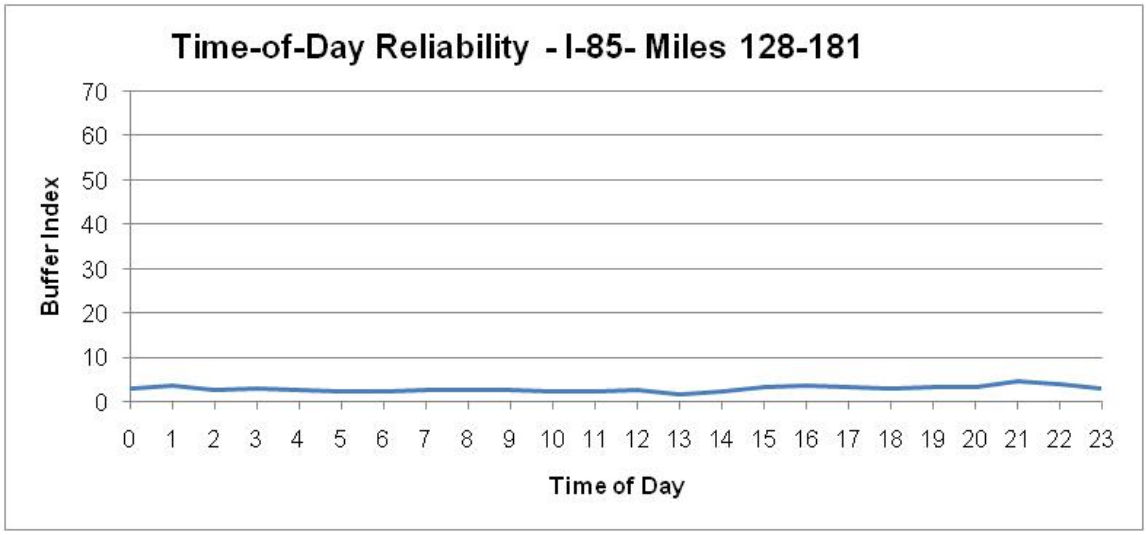

Segment Reliability - I-85 S- Miles 87-127
Buffer Index
Mile Segment
I-75 Merge
GA 400
I-285
GA 316
I-985
GA 20


Time-of-Day Reliability - I-85 N- Miles 87-127
Buffer Index
Time of Day

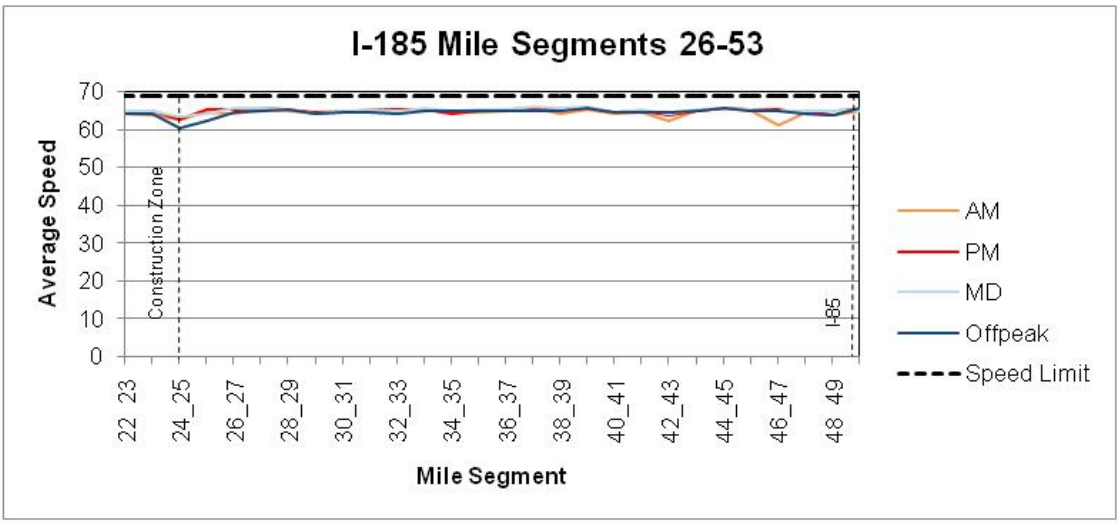

Time-of-Day Reliability - I-85 S- Miles 87-127
Buffer Index
Time of Day

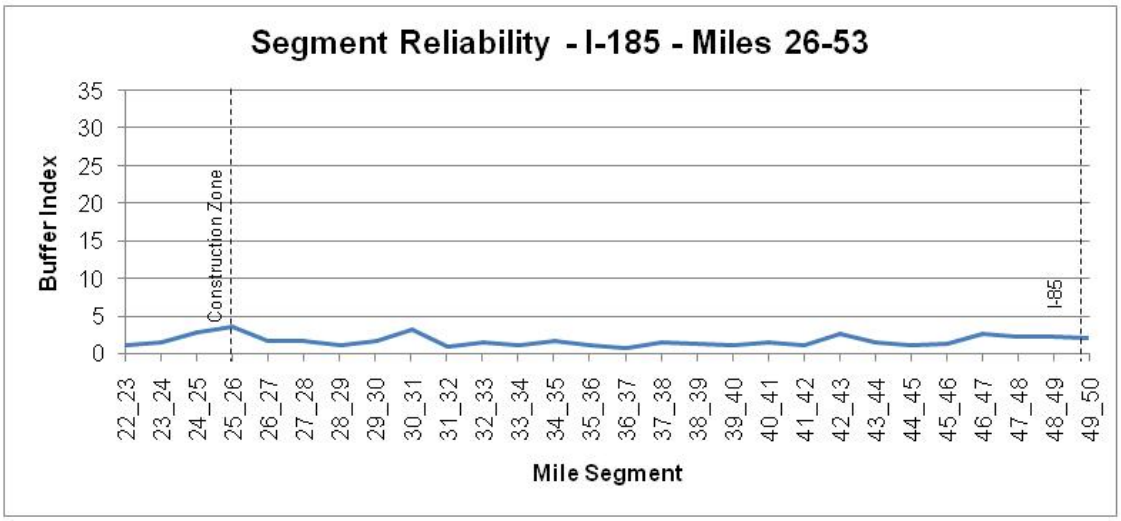

I-85 Mile Segments 128-181
Average Speed
Mile Segment
Weigh Station
South Carolina
AM
PM
MD
Offpeak
Speed Limit

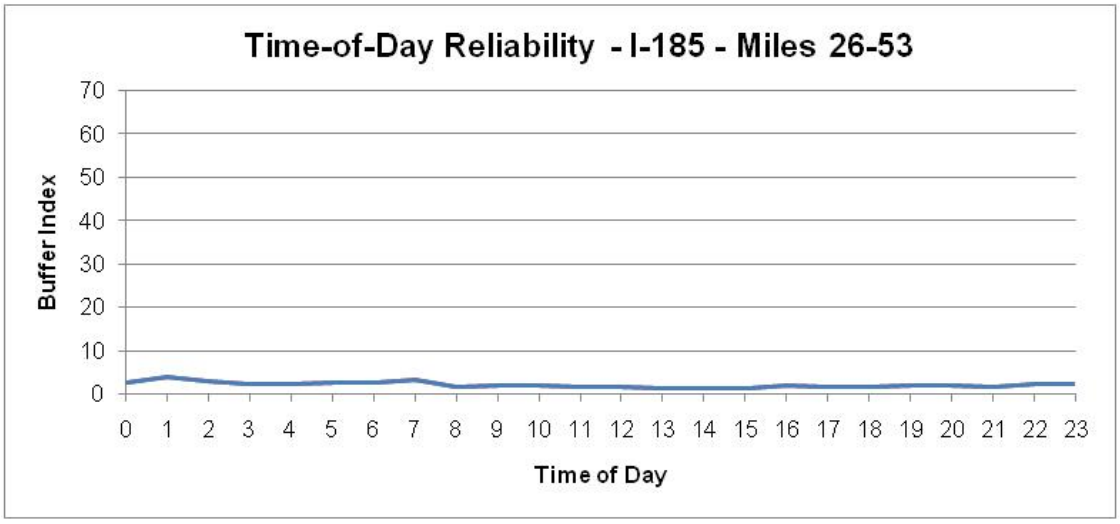

Segment Reliability - I-85 - Miles 128-181
Buffer Index
Mile Segment
Weigh Station
South Carolina


Time-of-Day Reliability - I-85- Miles 128-181
Buffer Index
Time of Day

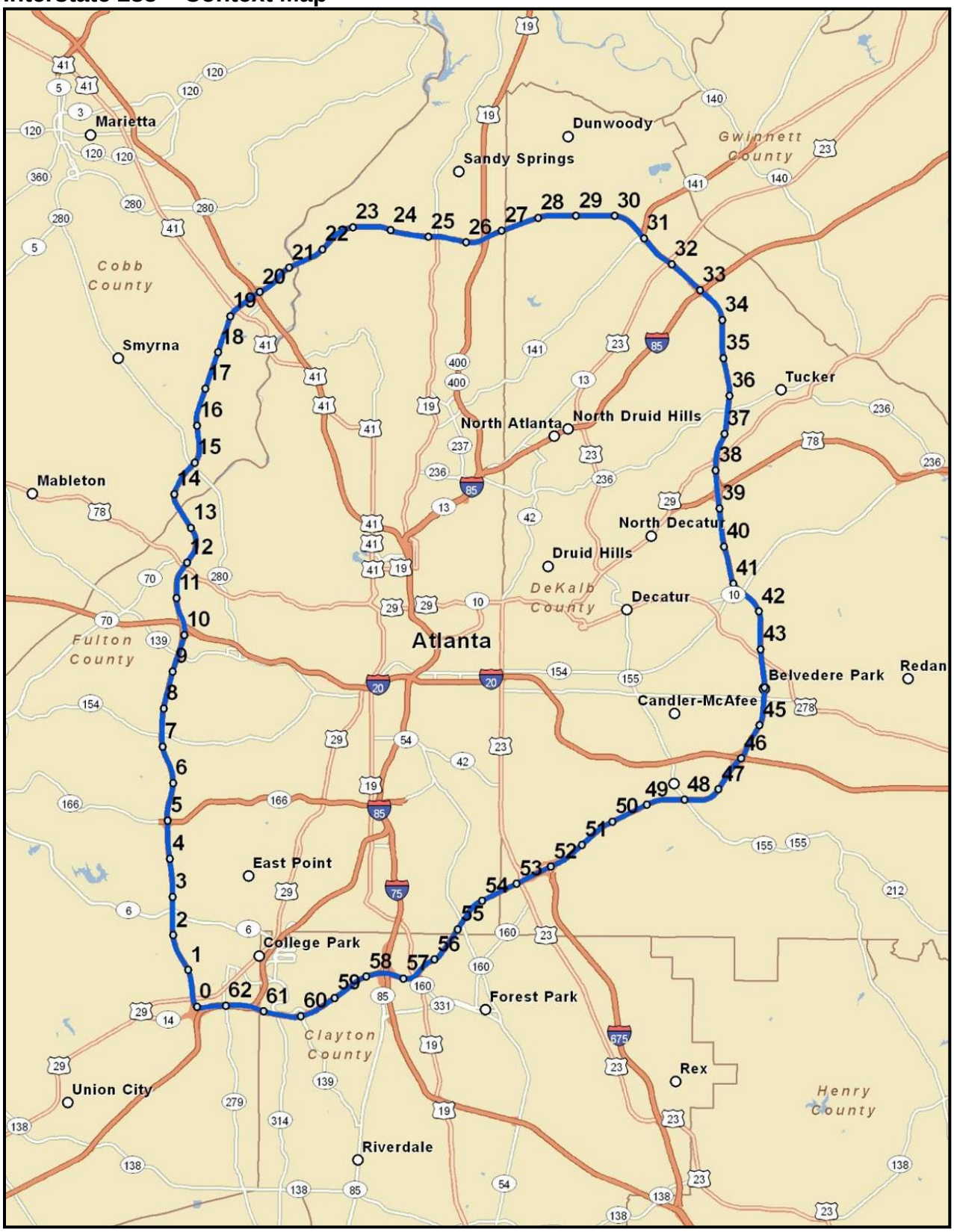
Interstate 185 – Context Map

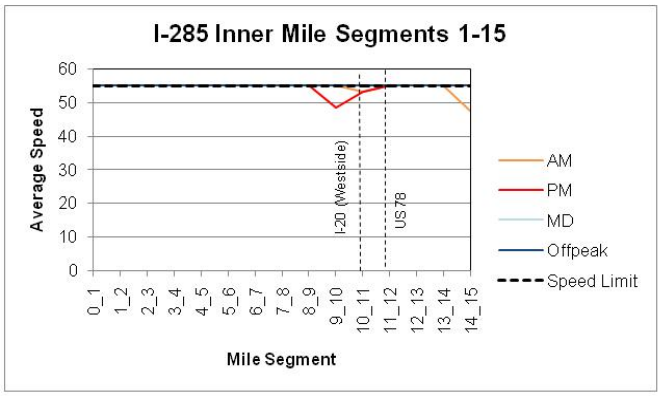

I-185 Mile Segments 26-53
Average Speed
70
60
50
40
30
20
10
0
Construction Zone
I-85
22_23
24_25
26_27
28_29
30_31
32_33
34_35
36_37
38_39
40_41
42_43
44_45
46_47
48_49
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

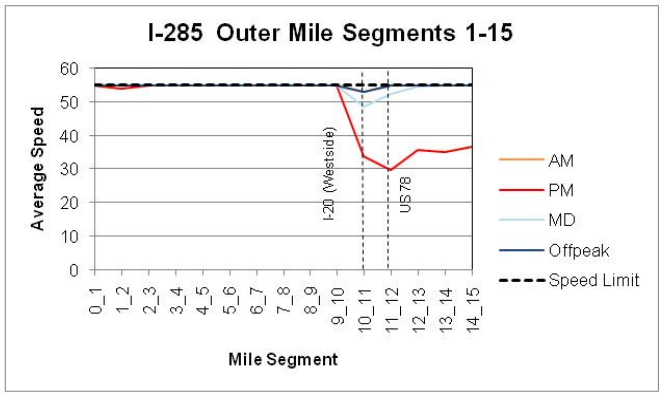

Segment Reliability - I-185 - Miles 26-53
Buffer Index
35
30
25
20
15
10
5
0
Construction Zone
I-85
22_23
23_24
24_25
25_26
26_27
27_28
28_29
29_30
30_31
31_32
32_33
33_34
34_35
35_36
36_37
37_38
38_39
39_40
40_41
41_42
42_43
43_44
44_45
45_46
46_47
47_48
48_49
49_50
Mile Segment

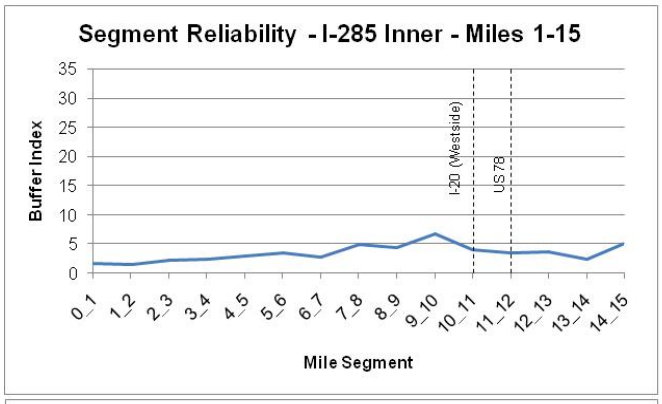

Time-of-Day Reliability - I-185 - Miles 26-53
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

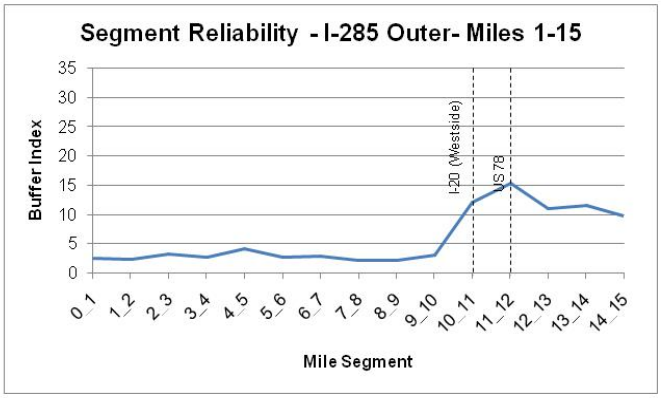
Interstate 285 – Context Map

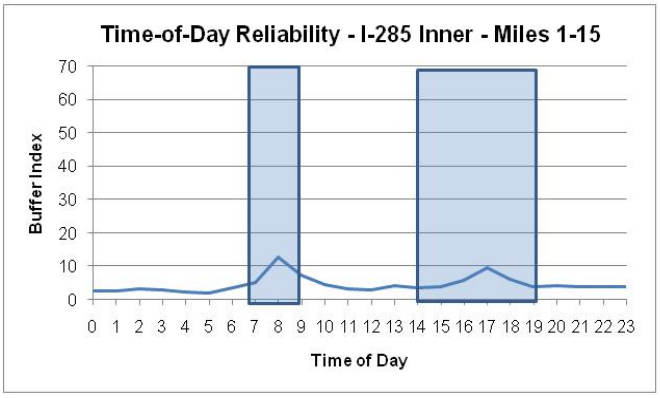


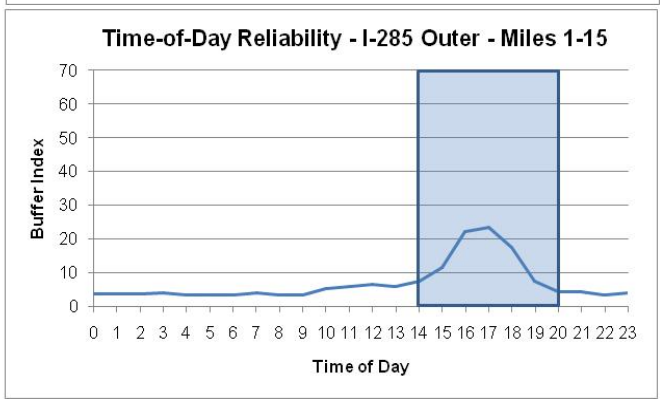

I-285 Inner Mile Segments 1-15
Average Speed
Mile Segment
I-20 (Westside)
US 78
AM
PM
MD
Offpeak
Speed Limit

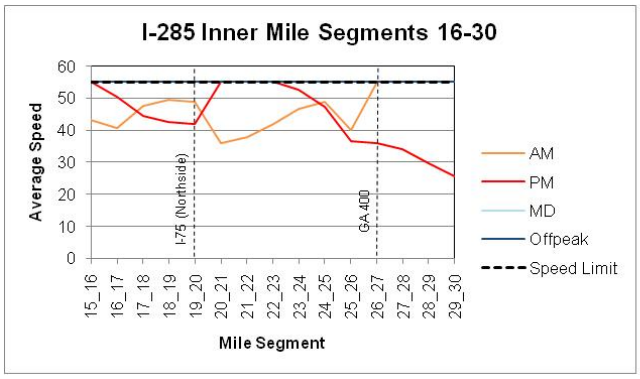

I-285 Outer Mile Segments 1-15
Average Speed
Mile Segment
I-20 (Westside)
US 78
AM
PM
MD
Offpeak
Speed Limit

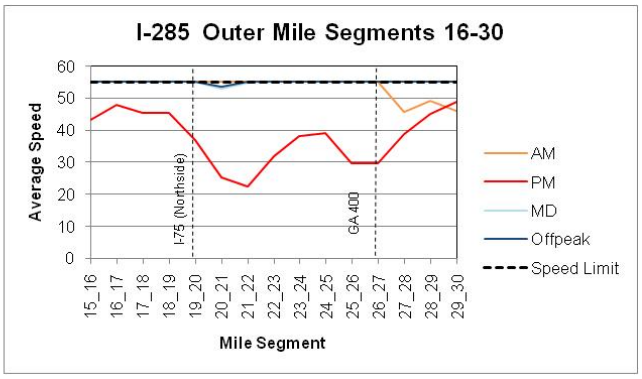

Segment Reliability - I-285 Inner - Miles 1-15
Buffer Index
Mile Segment
I-20 (Westside)
US 78

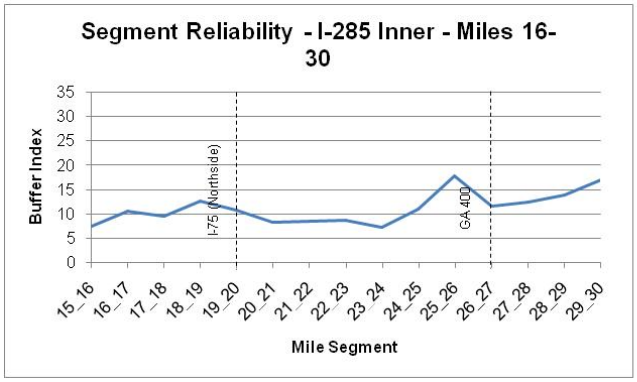

Segment Reliability - I-285 Outer- Miles 1-15
Buffer Index
Mile Segment
I-20 (Westside)
US 78

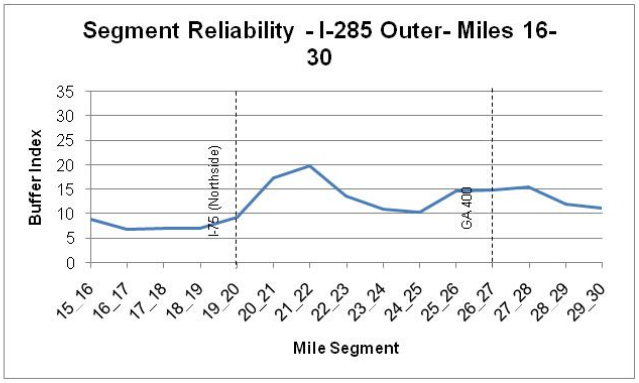

Time-of-Day Reliability - I-285 Inner - Miles 1-15
Buffer Index
Time of Day

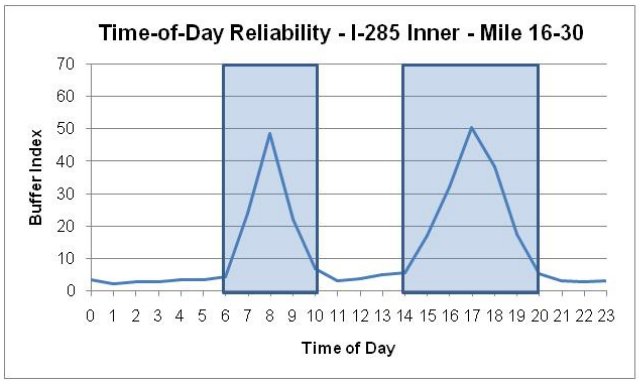

Time-of-Day Reliability - I-285 Outer - Miles 1-15
Buffer Index
Time of Day

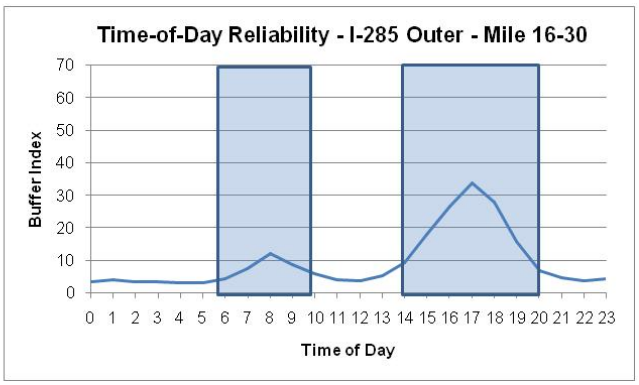

I-285 Inner Mile Segments 16-30
Average Speed
Mile Segment
I-75 (Northside)
GA 400
AM
PM
MD
Offpeak
Speed Limit

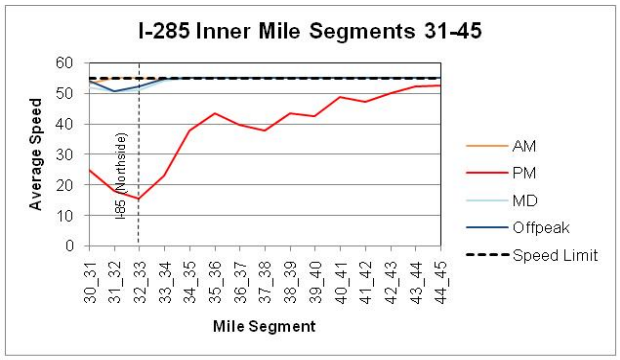

I-285 Outer Mile Segments 16-30
Average Speed
Mile Segment
I-75 (Northside)
GA 400
AM
PM
MD
Offpeak
Speed Limit

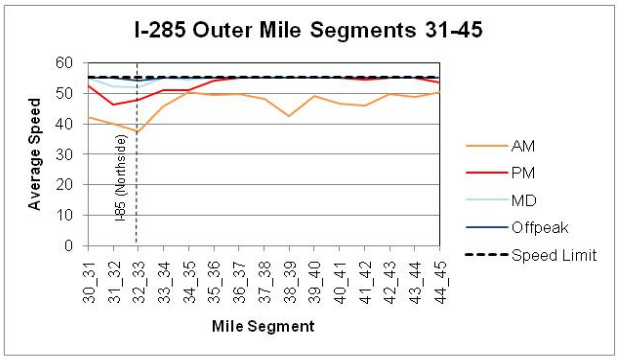

Segment Reliability - I-285 Inner - Miles 16-30
Buffer Index
Mile Segment
I-75 (Northside)
GA 400

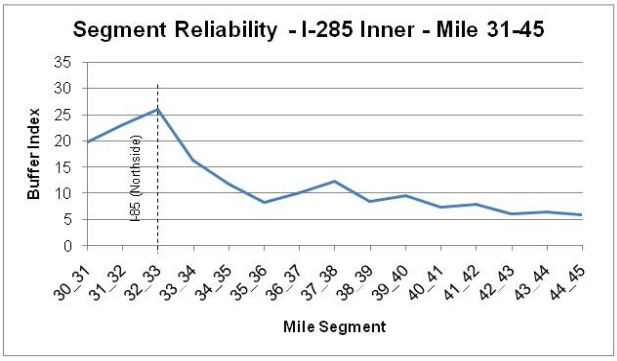

Segment Reliability - I-285 Outer- Miles 16-30
Buffer Index
Mile Segment
I-75 (Northside)
GA 400

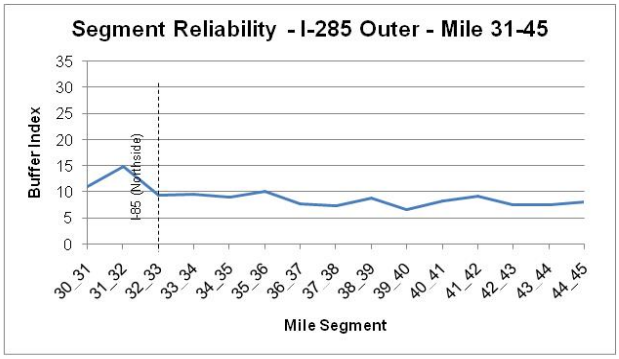

Time-of-Day Reliability - I-285 Inner - Mile 16-30
Buffer Index
Time of Day

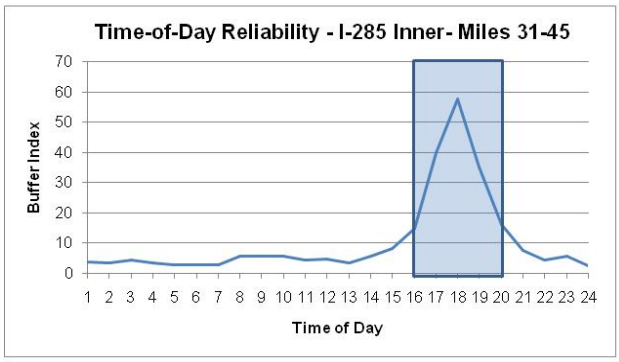

Time-of-Day Reliability - I-285 Outer - Mile 16-30
Buffer Index
Time of Day

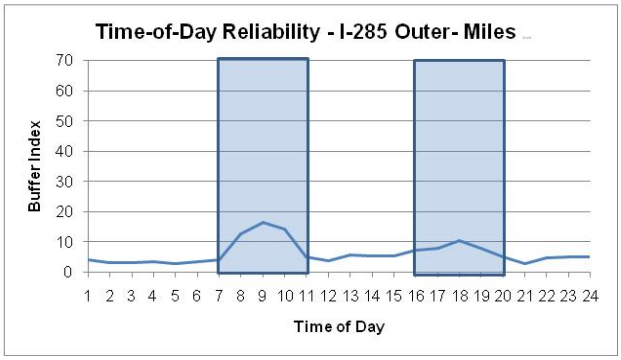

I-285 Inner Mile Segments 31-45
Average Speed
Mile Segment
I-85 (Northside)
AM
PM
MD
Offpeak
Speed Limit

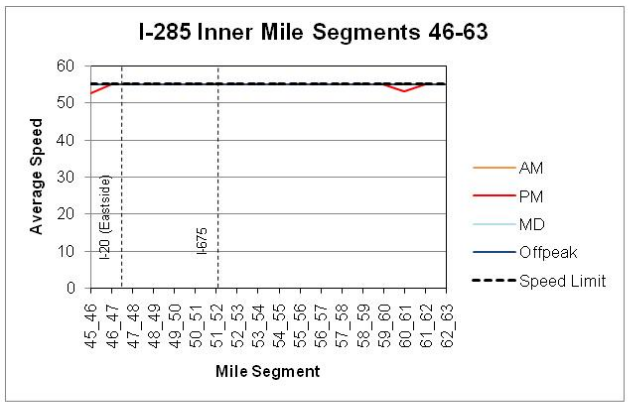

I-285 Outer Mile Segments 31-45
Average Speed
Mile Segment
I-85 (Northside)
AM
PM
MD
Offpeak
Speed Limit

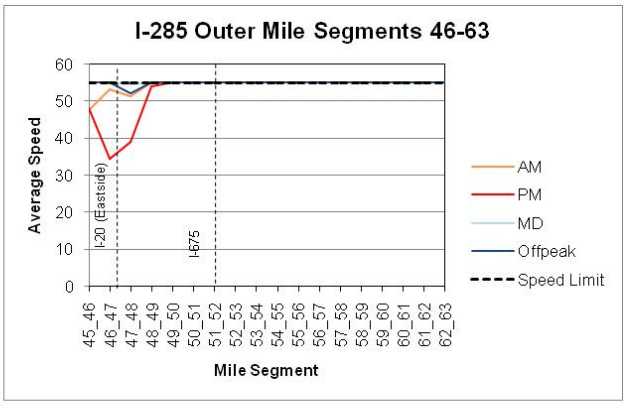

Segment Reliability - I-285 Inner - Mile 31-45
Buffer Index
Mile Segment
I-85 (Northside)

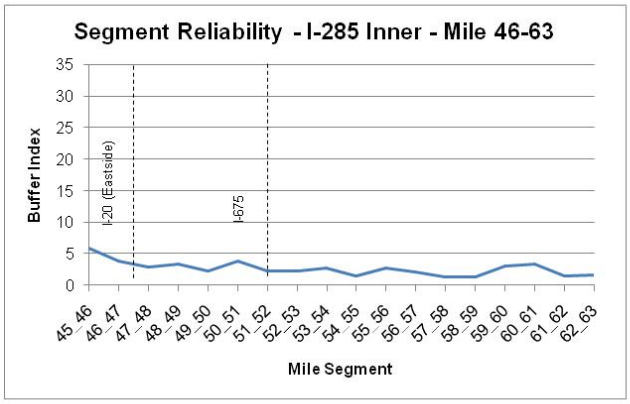

Segment Reliability - I-285 Outer - Mile 31-45
Buffer Index
Mile Segment
I-85 (Northside)

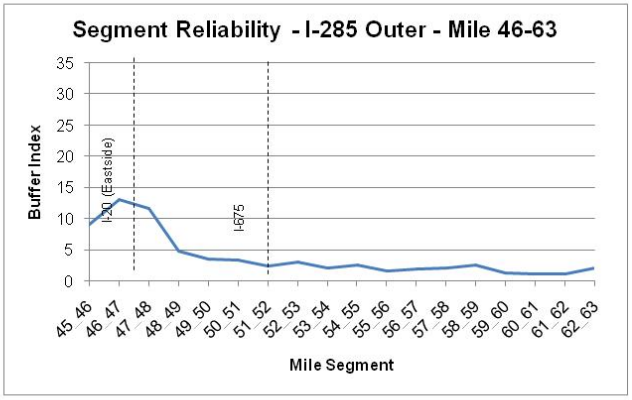

Time-of-Day Reliability - I-285 Inner- Miles 31-45
Buffer Index
Time of Day

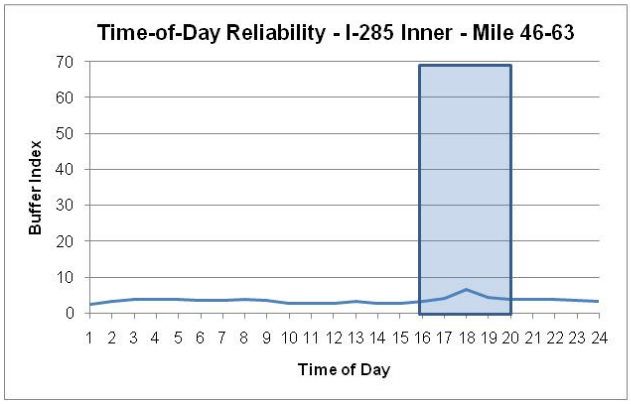

Time-of-Day Reliability - I-285 Outer- Miles
Buffer Index
Time of Day

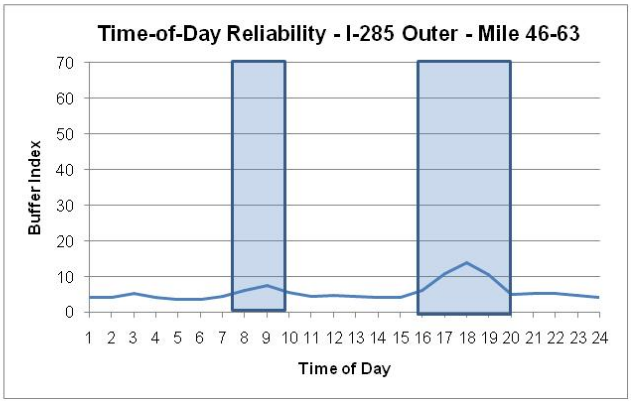

I-285 Inner Mile Segments 46-63
Average Speed
Mile Segment
I-20 (Eastside)
I-675
AM
PM
MD
Offpeak
Speed Limit


I-285 Outer Mile Segments 46-63
Average Speed
Mile Segment
I-20 (Eastside)
I-675
AM
PM
MD
Offpeak
Speed Limit

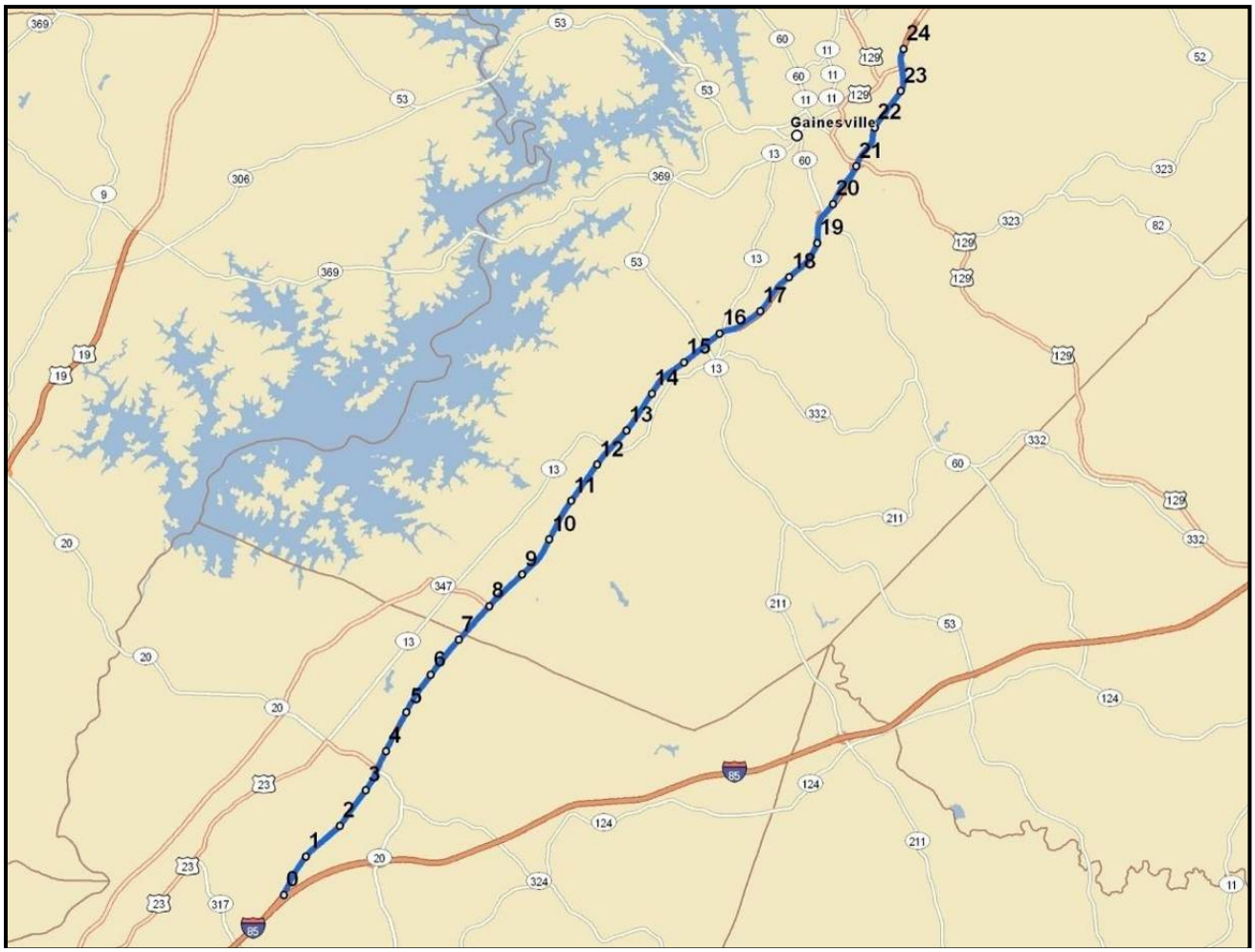

Segment Reliability - I-285 Inner - Mile 46-63
Buffer Index
Mile Segment
I-20 (Eastside)
I-675

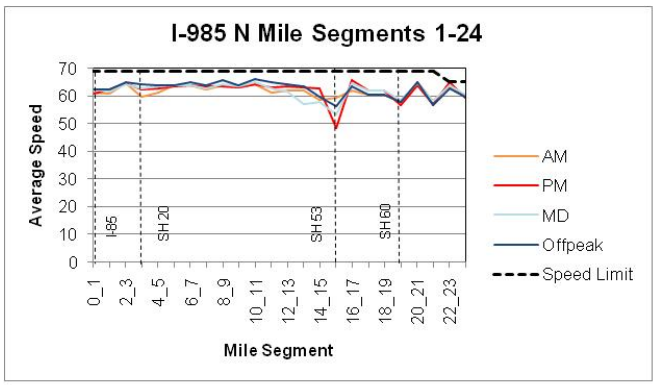

Segment Reliability - I-285 Outer - Mile 46-63
Buffer Index
Mile Segment
I-20 (Eastside)
I-675

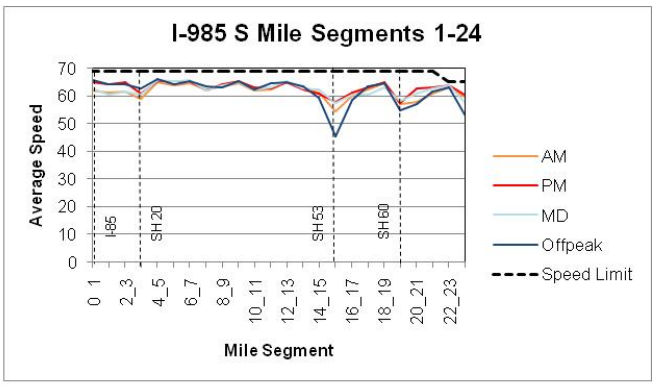

Time-of-Day Reliability - I-285 Inner - Mile 46-63
Buffer Index
Time of Day

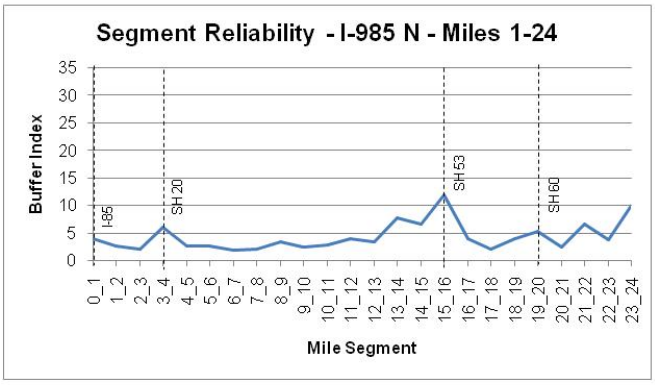

Time-of-Day Reliability - I-285 Outer - Mile 46-63
Buffer Index
Time of Day

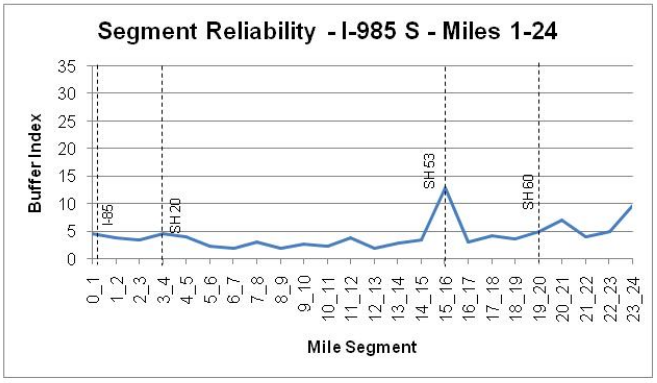
Interstate 985 – Context Map

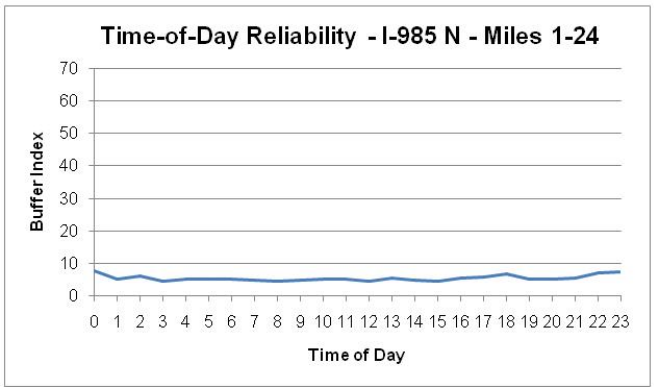


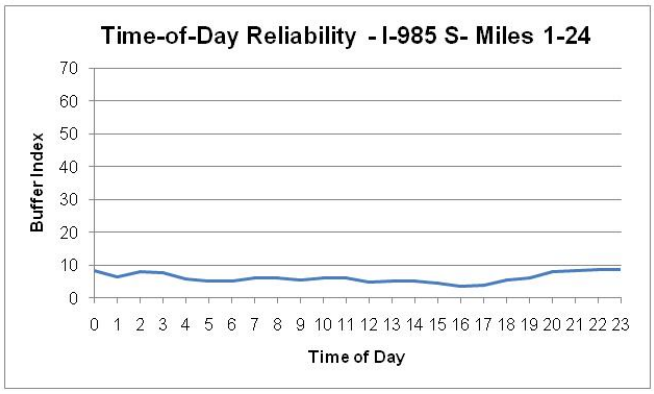

I-985 N Mile Segments 1-24
Average Speed
Mile Segment
I-85
SH 20
SH 53
SH 60
AM
PM
MD
Offpeak
Speed Limit


I-985 S Mile Segments 1-24
Average Speed
Mile Segment
I-85
SH 20
SH 53
SH 60
AM
PM
MD
Offpeak
Speed Limit

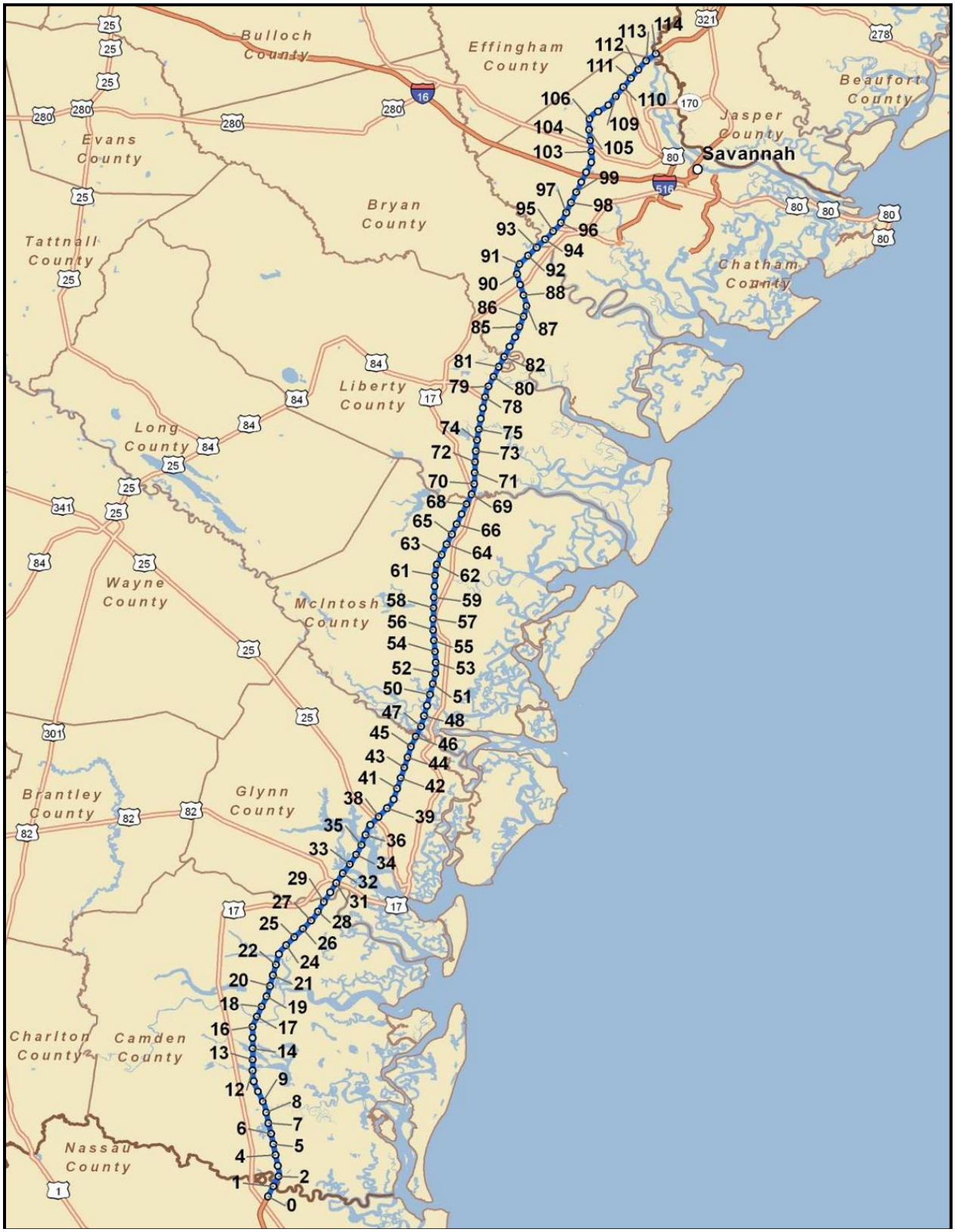

Segment Reliability - I-985 N - Miles 1-24
Buffer Index
Mile Segment
I-85
SH 20
SH 53
SH 60

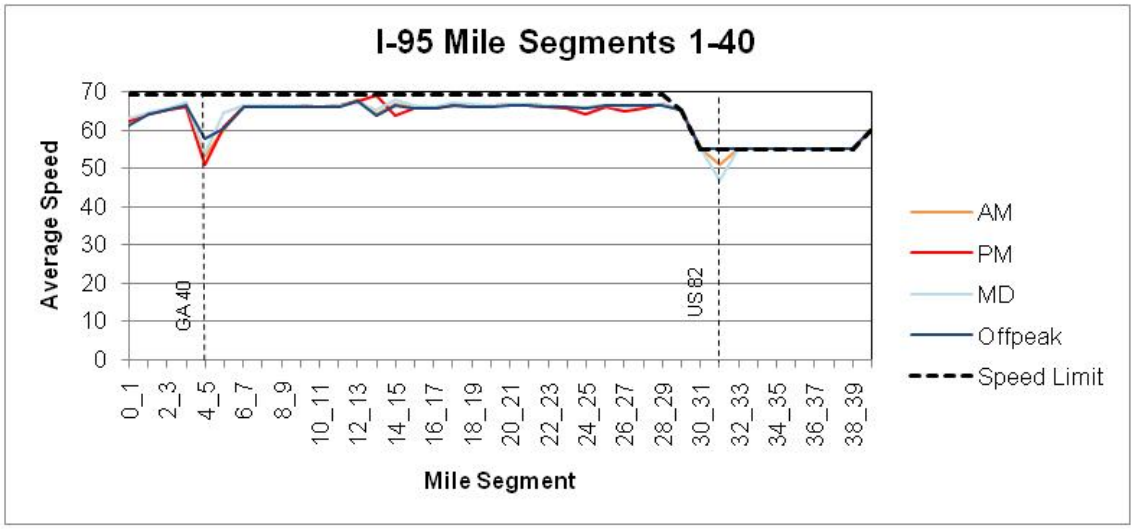

Segment Reliability - I-985 S - Miles 1-24
Buffer Index
Mile Segment
I-85
SH 20
SH 53
SH 60

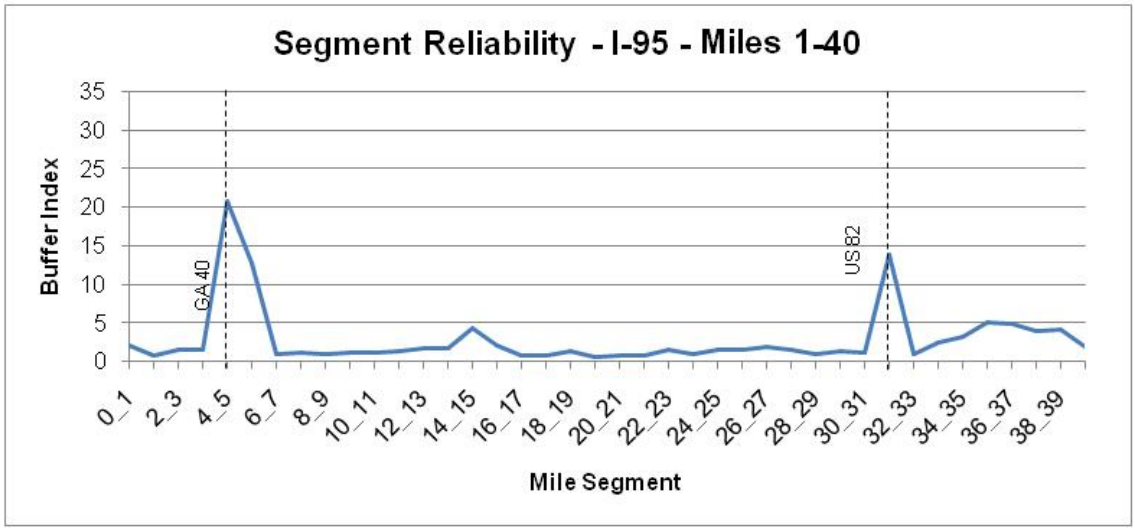

Time-of-Day Reliability - I-985 N - Miles 1-24
Buffer Index
Time of Day

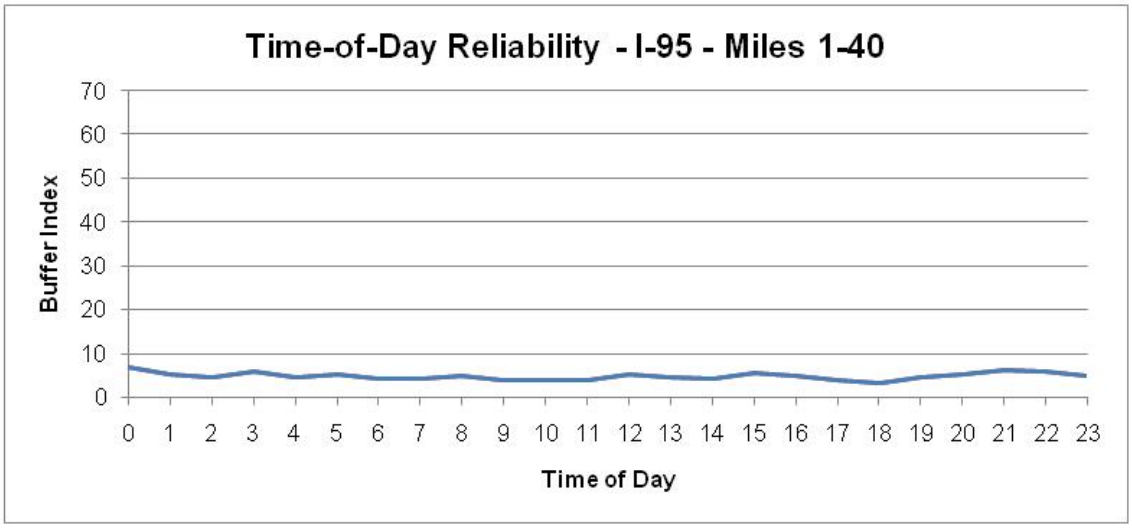

Time-of-Day Reliability - I-985 S- Miles 1-24
Buffer Index
Time of Day

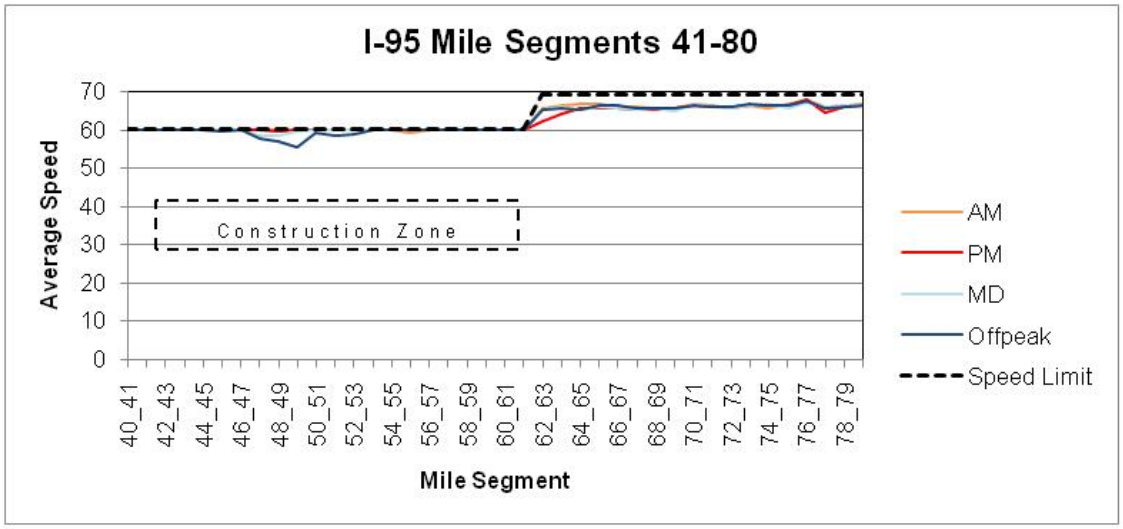
Interstate 95 – Context Map

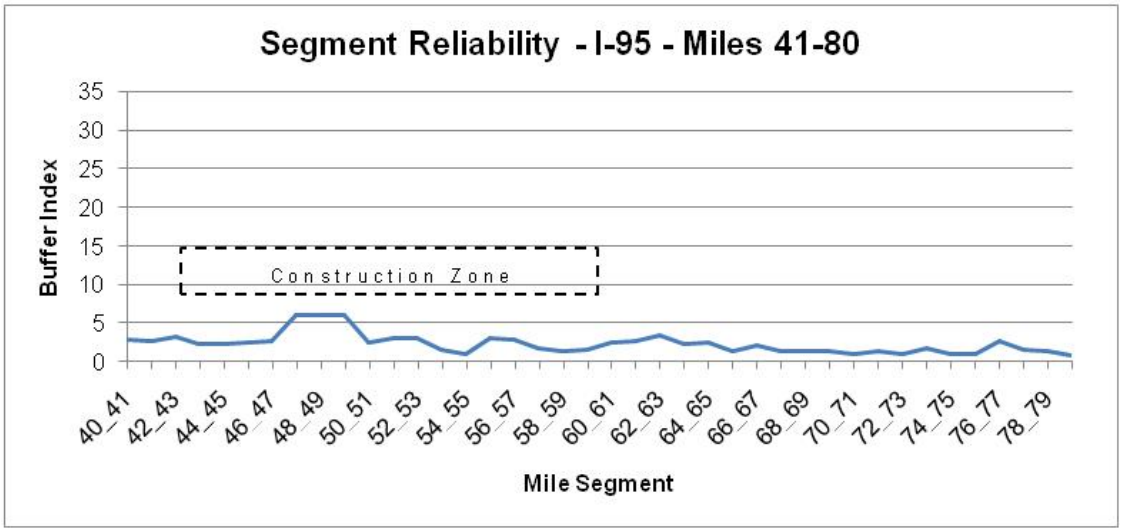


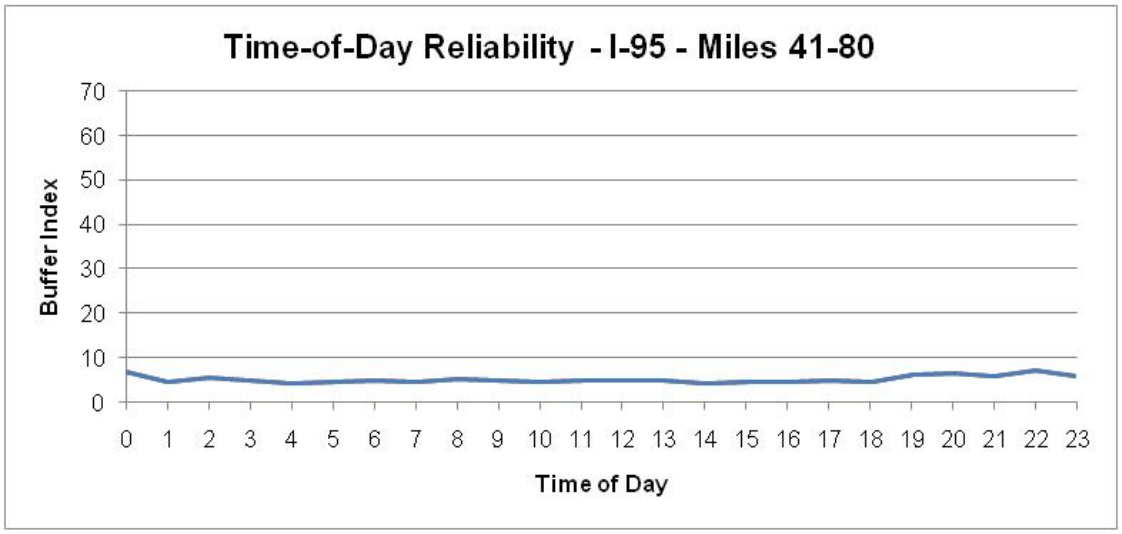

I-95 Mile Segments 1-40
Average Speed
70
60
50
40
30
20
10
0
GA 40
US 82
0_1
2_3
4_5
6_7
8_9
10_11
12_13
14_15
16_17
18_19
20_21
22_23
24_25
26_27
28_29
30_31
32_33
34_35
36_37
38_39
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

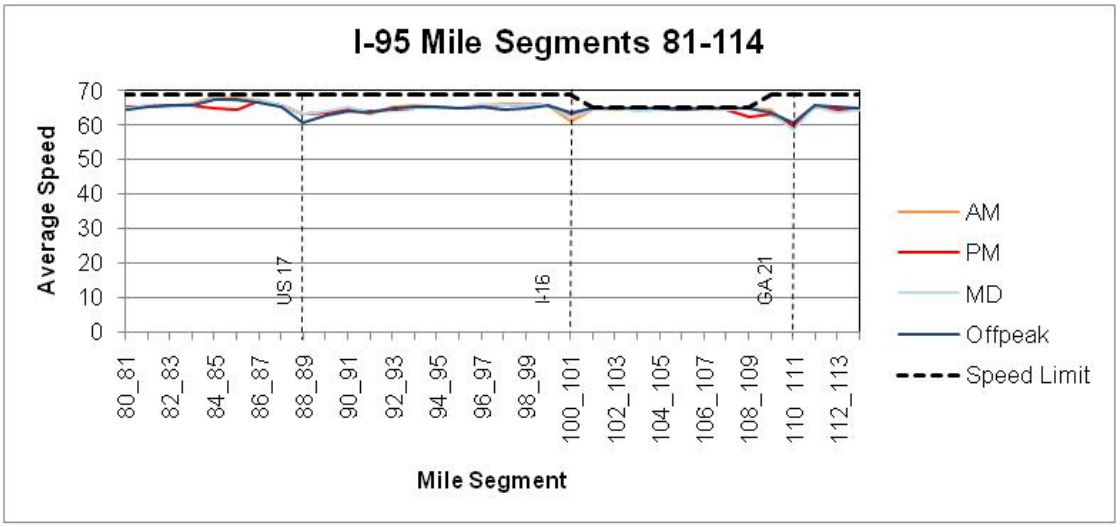

Segment Reliability - I-95 - Miles 1-40
Buffer Index
35
30
25
20
15
10
5
0
GA 40
US 82
0_1
2_3
4_5
6_7
8_9
10_11
12_13
14_15
16_17
18_19
20_21
22_23
24_25
26_27
28_29
30_31
32_33
34_35
36_37
38_39
Mile Segment

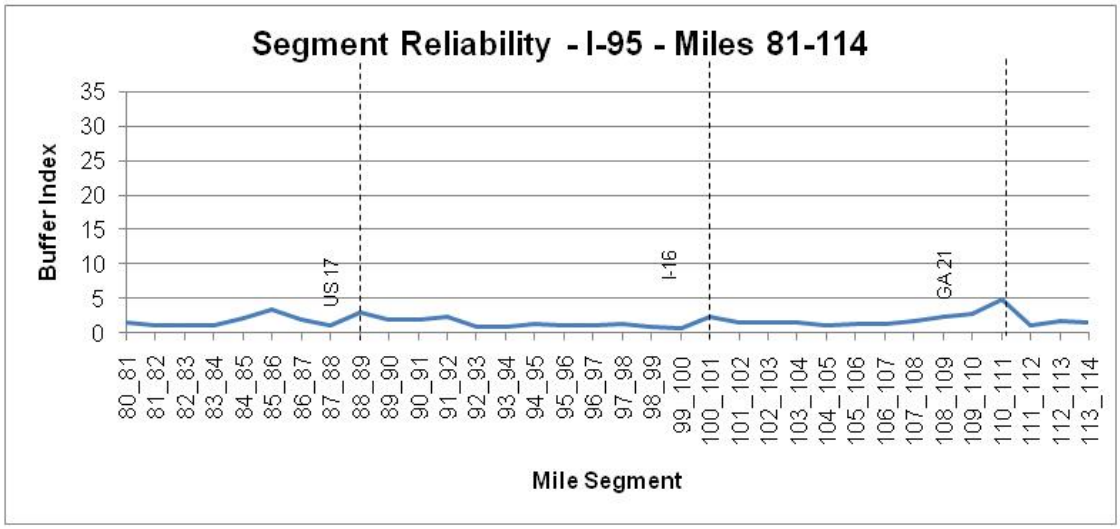

Time-of-Day Reliability - I-95 - Miles 1-40
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

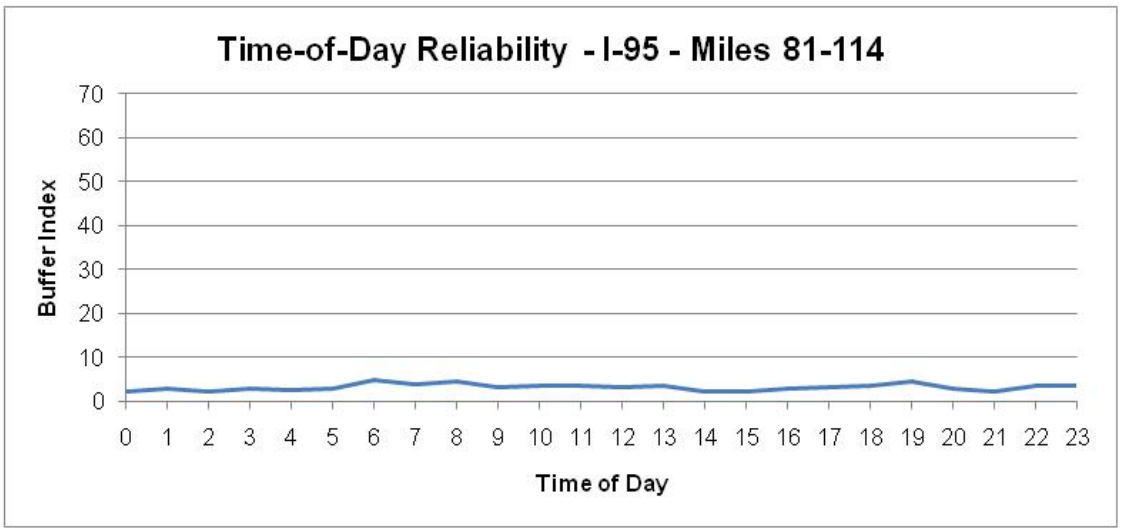

I-95 Mile Segments 41-80
Average Speed
70
60
50
40
30
20
10
0
Construction Zone
40_41
42_43
44_45
46_47
48_49
50_51
52_53
54_55
56_57
58_59
60_61
62_63
64_65
66_67
68_69
70_71
72_73
74_75
76_77
78_79
Mile Segment
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - I-95 - Miles 41-80
Buffer Index
35
30
25
20
15
10
5
0
Construction Zone
40_41
42_43
44_45
46_47
48_49
50_51
52_53
54_55
56_57
58_59
60_61
62_63
64_65
66_67
68_69
70_71
72_73
74_75
76_77
78_79
Mile Segment

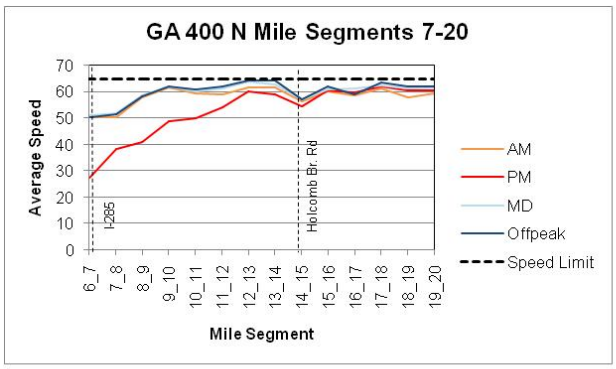

Time-of-Day Reliability - I-95 - Miles 41-80
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

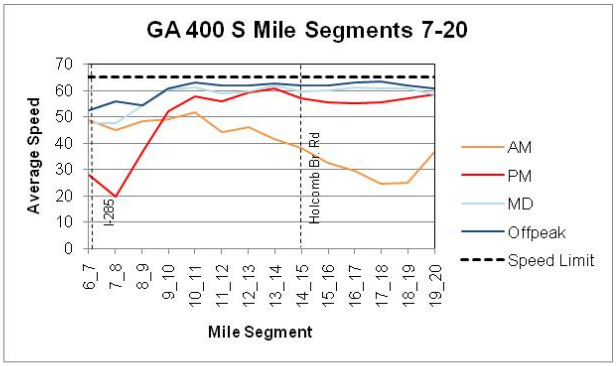

I-95 Mile Segments 81-114
Average Speed
70
60
50
40
30
20
10
0
US 17
I-16
GA 21
80_81
82_83
84_85
86_87
88_89
90_91
92_93
94_95
96_97
98_99
100_101
102_103
104_105
106_107
108_109
110_111
112_113
Mile Segment
AM
PM
MD
Offpeak
Speed Limit

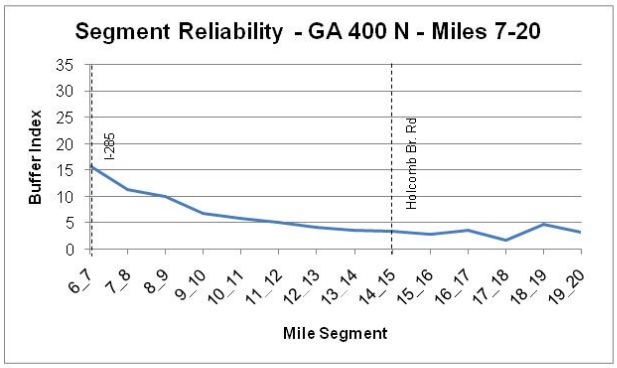

Segment Reliability - I-95 - Miles 81-114
Buffer Index
35
30
25
20
15
10
5
0
US 17
I-16
GA 21
80_81
81_82
82_83
83_84
84_85
85_86
86_87
87_88
88_89
89_90
90_91
91_92
92_93
93_94
94_95
95_96
96_97
97_98
98_99
99_100
100_101
101_102
102_103
103_104
104_105
105_106
106_107
107_108
108_109
109_110
110_111
111_112
112_113
113_114
Mile Segment

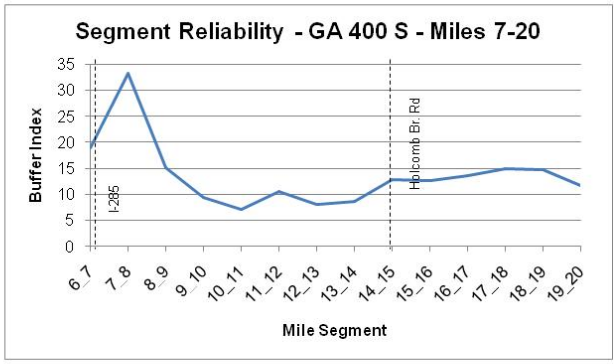

Time-of-Day Reliability - I-95 - Miles 81-114
Buffer Index
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time of Day

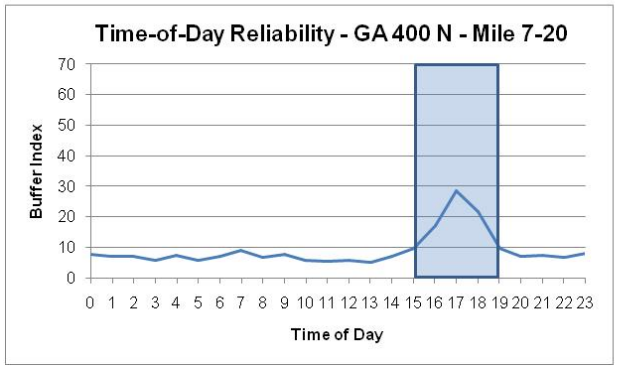
Georgia State Route 400 – Context Map

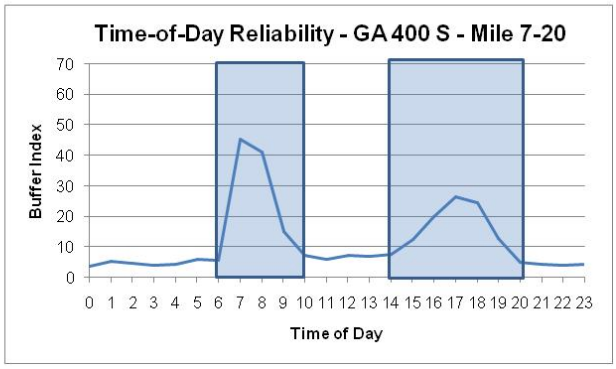

GA 400 N Mile Segments 7-20
Average Speed
Mile Segment
I-285
Holcomb Br. Rd
AM
PM
MD
Offpeak
Speed Limit

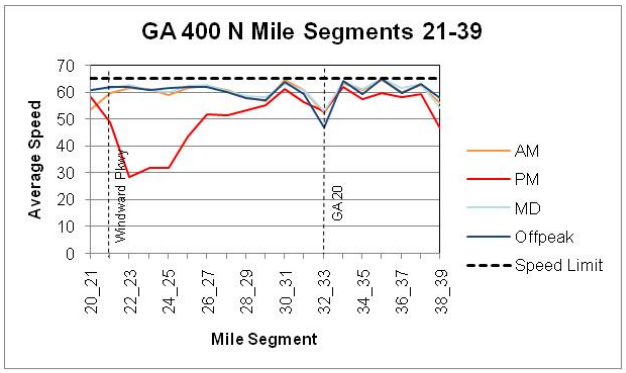

GA 400 S Mile Segments 7-20
Average Speed
Mile Segment
I-285
Holcomb Br. Rd
AM
PM
MD
Offpeak
Speed Limit

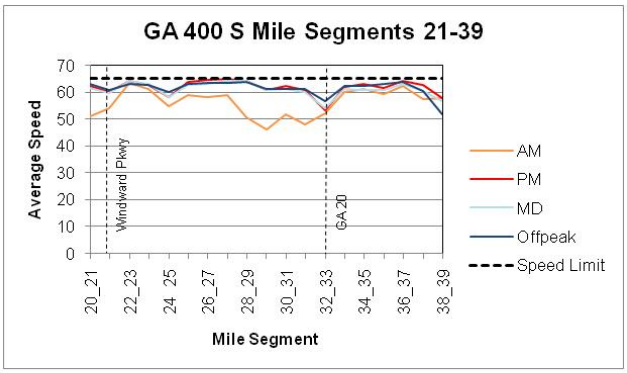

Segment Reliability - GA 400 N - Miles 7-20
Buffer Index
Mile Segment
I-285
Holcomb Br. Rd

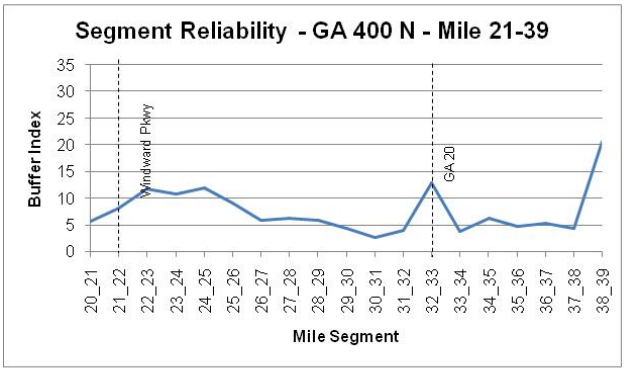

Segment Reliability - GA 400 S - Miles 7-20
Buffer Index
Mile Segment
I-285
Holcomb Br. Rd

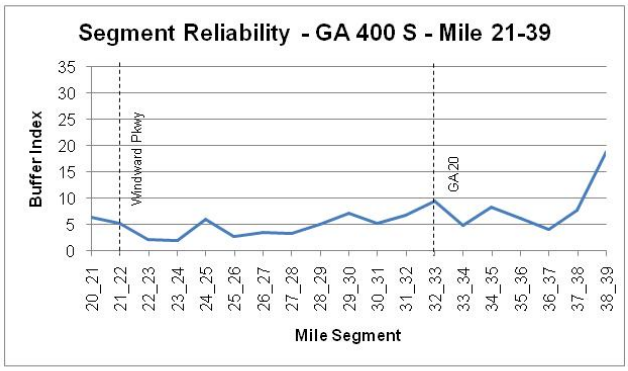

Time-of-Day Reliability - GA 400 N - Mile 7-20
Buffer Index
Time of Day

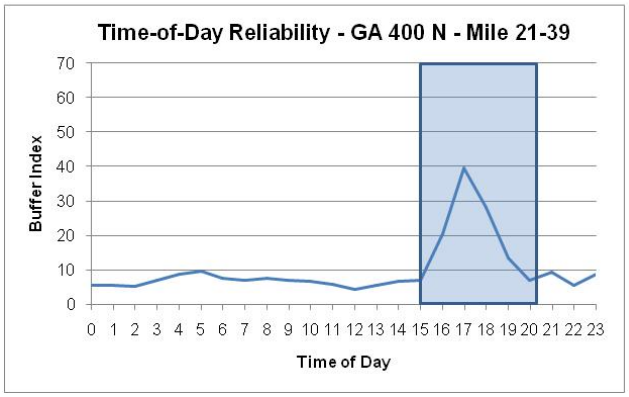

Time-of-Day Reliability - GA 400 S - Mile 7-20
Buffer Index
Time of Day

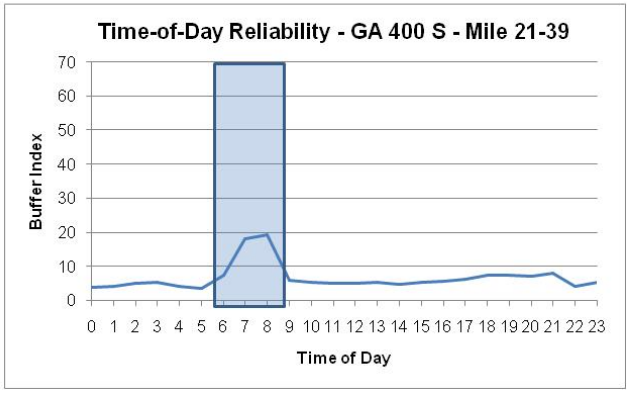

GA 400 N Mile Segments 21-39
Average Speed
Mile Segment
Windward Pkwy
GA 20
AM
PM
MD
Offpeak
Speed Limit


GA 400 S Mile Segments 21-39
Average Speed
Mile Segment
Windward Pkwy
GA 20
AM
PM
MD
Offpeak
Speed Limit


Segment Reliability - GA 400 N - Mile 21-39
Buffer Index
Mile Segment
Windward Pkwy
GA 20


Segment Reliability - GA 400 S - Mile 21-39
Buffer Index
Mile Segment
Windward Pkwy
GA 20


Time-of-Day Reliability - GA 400 N - Mile 21-39
Buffer Index
Time of Day


Time-of-Day Reliability - GA 400 S - Mile 21-39
Buffer Index
Time of Day