GEORGIA DEPARTMENT OF TRANSPORTATION

Statewide Truck Lanes Needs Identification Study

TECHNICAL MEMORANDUM 2:
FORECASTING AND ANALYSIS

July 2007

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CHAPTER 1

INTRODUCTION AND FINDINGS

Traffic congestion has been identified as a major concern by numerous transportation plans prepared by GDOT and its partners. This congestion is forecast to become greater because the ability to increase highway capacity has not kept pace with the growth in traffic volumes. Additionally, GDOT's 2005 to 2035 Statewide Transportation Plan (SWTP) noted that truck traffic is increasing at a rate almost 50 percent higher than general traffic. Increasingly, members of the transportation community have discussed the potential of separating truck traffic from the general-purpose lanes as a means of relieving congestion. This would have the advantage of providing relief to general traffic while improving the operational efficiency and reliability for the truck traffic that is vital to maintaining Georgia's economic vitality. In addition, the fatality rate for truck crashes is higher than the fatality rate for auto crashes. Separating truck and auto traffic could be a means of improving the safety of Georgia's highways.

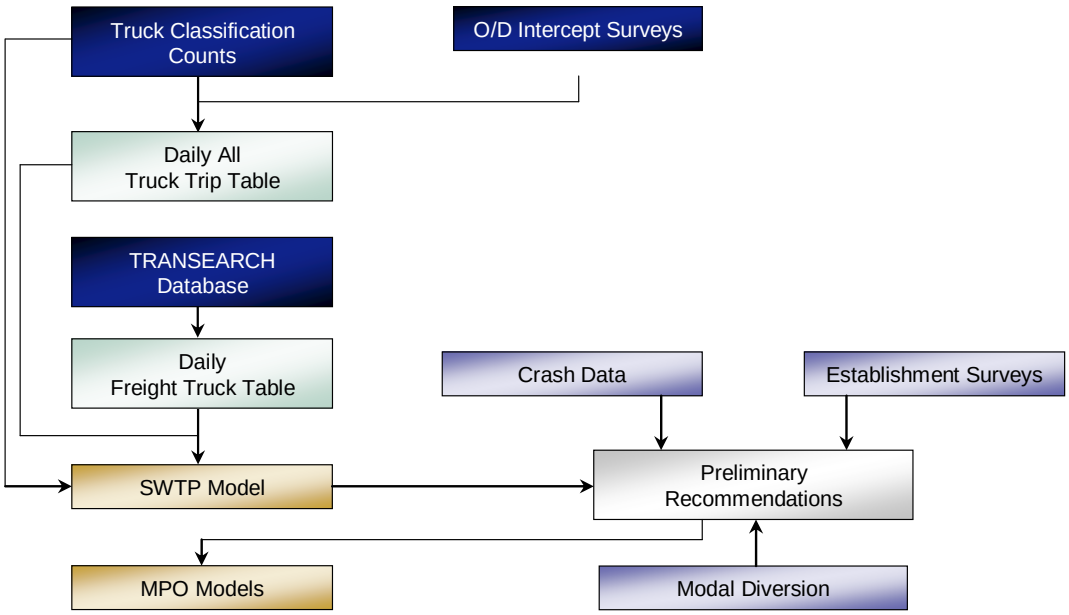
Georgia's State Road and Tollway Authority (SRTA) recently completed a study suggesting that constructing separate truck only lanes may improve congestion in the Metro Atlanta region. In an effort to build on SRTA's HOT/TOT study, GDOT has undertaken a more detailed Statewide Truck Only Lanes Needs Identification Study to investigate the potential benefits associated with constructing truck only lanes where needed on a statewide level. The focus of this study is on the interstates and other freeways in Georgia on which these truck only lanes could be safely operated and realistically managed.

This technical memorandum serves to document the second product of this study. It discusses the modeling analysis that was used to identify the needs that could be addressed by truck only lanes, and to provide a preliminary screening of the alternatives for implementing truck only lanes and concludes with a discussion of truck-only lane goals, objectives, and polices. This effort has taken advantage of GDOT's continual data collection efforts, data collection undertaken to support the Atlanta Regional Commission's (ARC) Regional Freight Plan, and data collection undertaken for this truck-only lane study, as documented in Technical Memorandum 1, Data Collection.

As reported in Chapter 2, these data items were used to improve the Statewide Travel Demand Model original developed for GDOT in their Instate System Plan and subsequently used in the Statewide Transportation Plan Update for 2005 (SWTP). The development and integration process is illustrated in Figure 1. The truck traffic counts were used to update the Daily Total Truck Trip Table in the statewide travel demand

model. The 2004 TRANSEARCH database[1] was used to prepare a new Daily Freight Truck Trip Table. A freight truck is distinguished from non-freight in its ability to transport commodities. Freight trucks include 18-wheelers, container trucks, and tankers, non-freight trucks include utility trucks, garbage trucks, etc. By subtracting the table of Daily Freight Trucks from the Daily All Truck Table, a Daily Non-Commodity Truck Table was created. The growth factors trends to 2035 for population, employment, freight tonnages by Georgia County and outside regions that were used in the SWTP were applied to the updated base year tables to create new forecast truck tables for 2035.

Figure 1: Overview of Analysis Methodology



As reported in Chapter 3, performance measures were developed for use in screening potential truck-only lane investment alternatives. These performance measures, developed in consultation with GDOT staff and the stakeholders, use outputs produced by the data collection and modeling efforts to quantify the congestion and safety benefits that would accrue to trucks utilizing the truck-only lanes and to autos and trucks that remain in the general-purpose lanes. These performance measures were used to identify segments of the transportation network that are considered candidate locations for truck-only Lanes. Candidate locations are defined as those segments that exhibit the greatest benefit to the corridor and warrant additional study in Phase II of this project. Other off-model data sources also were used to support the screening analysis as described in Chapter 5.

As reported in Chapter 4, the 2035 highway network that was developed for the SWTP was updated and existing and 2035 demand were used to screen truck-only lane candidate locations on the existing and 2035 GDOT Long-Range Program networks. The SWTP assumed the completion of all capacity improvement projects on state roads

[1] Global Insight, Inc., national commodity flow data by mode and origin/destination, customized for Georgia.

that are in GDOT's project database (Tpro). The 2035 network for the Study was updated to include all capacity improvement projects in Tpro. In addition to the 2035 (Tpro) highway network, a screening version of a truck-only lane network adjacent to all access controlled highway was created to preliminarily test the demand and performance of truck-only lanes.

In Chapter 5 additional off-model analysis was conducted. Because the SWTP Travel Demand Model uses Georgia counties as Traffic Analysis Zones, it is not able to determine the volumes of intra-county truck movements. Through dialog with the Port of Savannah, intra-county truck movements were found to be significant in Chatham County (Savannah); therefore an additional survey of warehouse and truck distribution centers in Chatham County was conducted to analyze truck-only lane potential in Savannah. The survey augments the prior survey of trucks exiting the gate at the Georgia Ports Authority (GPA) Garden City Terminal, described in Technical Memorandum 1. In addition to the modeling analysis, safety information, as documented in Technical Memorandum 1, was applied to the truck-only lanes locations to determine the safety benefits that might accrue from the creation of truck-only lanes. Finally, because the introduction of truck-only lanes might, by improving truck travel times and costs, result in an unintended diversion of freight from rail to truck, an analysis was undertaken to quantify the amount of freight that might be diverted.

A total of six modeling scenarios are presented in Chapter 4 for comparative purposes. However, the focus of the screening process is on three scenarios which combine future 2035 demand with three variations of a future build network:

- Base Case – 2035 Demand, Existing Network ***PLUS*** GDOT's Long-Range Program;
- Test Case A – 2035 Demand, Existing Network ***PLUS*** truck-only lanes; and
- Test Case B – 2035 Demand, Existing Network ***PLUS*** GDOT's Long-Range Program ***PLUS*** truck-only lanes.

Based on two of the key performance measures described in Chapter 3 – congestion and truck volumes, Tables 1 and 2 highlight the major findings of this technical memorandum. The data is grouped into three categories: I-75 from the Tennessee line to Macon (I-475 split), all other Atlanta interstates, and all other Georgia interstates outside of I-75 (as defined above) and Atlanta. I-75 is presented in isolation because it consistently exceeds the initial screening criteria for truck-only lanes.

As shown in Table 1, I-75 will have extremely high truck volumes (almost 48,000 daily trips on average) in 2035, double that of Atlanta's other interstates (although the latter volumes vary widely depending on the route, for example, I-285 west of the city having among the highest volumes statewide). When compared to existing truck volumes, future truck volumes are expected to grow across the entire network but more significantly on interstates outside of the Atlanta region.

Table 1: Truck Usage

Truck-Only Lane Analysis Segments	Base Case Average Daily Truck Volume	Shift of Trucks to Truck-Only Lanes	
		Test Case A (AADT)	Test Case B (AADT)
I-75 TN to Macon	47,971	40,664 (TOL) [a] 25,772 (gp) [b] 66,436 (both)	22,969 (TOL) 34,441(gp) 57,410 (both)
Other Atlanta Interstates	24,850	16,342 (TOL) 18,054 (gp) 34,396 (both)	13,384 (TOL) 17,768 (gp) 31,152 (both)
All other Interstates	34,195	5,096(TOL) 29,975 (gp) 35,071 (both)	1,831 (TOL) 32,702 (gp) 33,533 (both)

[a] TOL – Truck-Only Lane.
[b] gp – General purpose lanes.

In Test Case A, GDOT's Long-Range Program for general-purpose capacity expansions system-wide would be replaced by truck-only lanes on the Interstate system. For purposes of this screening analysis, the truck-only lanes were set to have very high capacity such that unconstrained demand would be attracted to them. Under these conditions, over 40,000 daily truck trips would be attracted to truck-only lanes on I-75, a very high number indeed and not surprising given the high levels of congestion which would be prevalent on I-75 absent other capacity expansion projects. Interestingly, there would still be almost 26,000 daily trucks in the general-purpose lanes, meaning that total truck volume in the corridor would increase from 48,000 in the base case to over 66,000 in Test Case A. This increase can be attributed to the lack of capacity expansion projects on other non-interstate routes that would result in additional truck trips being attracted to I-75 given the addition of the truck-only lanes.

The impact of Test Case A is somewhat less dramatic on the other Atlanta interstates (on average), although truck-only lane volumes may be sufficiently high to justify the investment on certain routes as shown in the maps in Chapter 4. Although there will be high truck volumes on interstates outside of the Atlanta region, with the exception of I-75, few trucks would attracted to the truck-only lanes predominantly due to the lack of congestion in the general-purpose lanes.

A similar pattern is evident in Test Case B, but because other capacity expansion projects also would be undertaken under GDOT's Long-Range Program, overall truck volumes are somewhat lower than Test Case A.

Table 2 illustrates the impacts to congestion in the general-purpose lanes for the three modeling scenarios. Under Test Case A, congestion would actually increase on all interstates if truck-only lanes were substituted for general capacity enhancement projects included in GDOT's Long-Range Program. This is because there are many more autos than trucks using the transportation network, and trucks are more likely to travel in less congested off-peak hours. Thus, truck-only lanes would not appear to be a

wise substitute for general capacity expansion projects. However, in Test Case B, where truck-only lanes are added to other capacity expansion projects, level of service does improve.

Table 2: Congestion

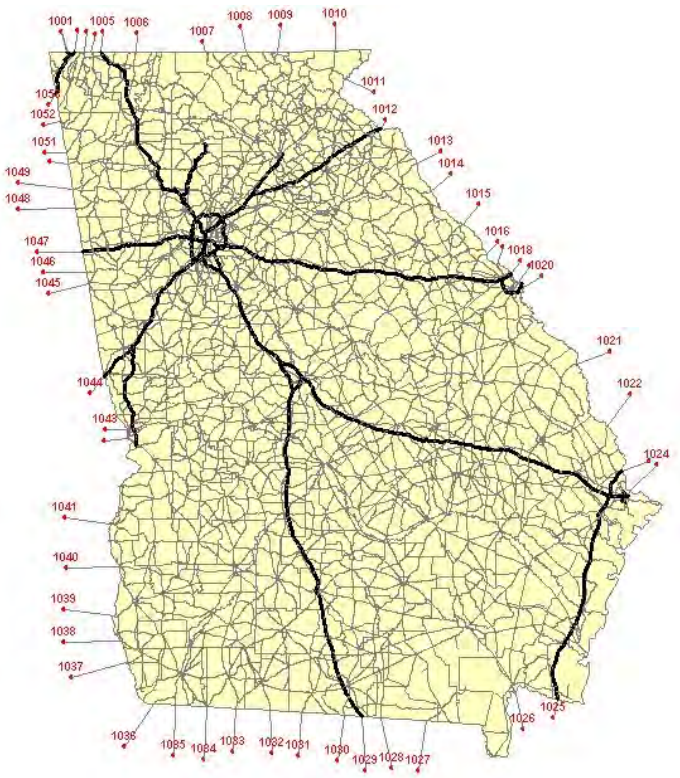
Truck-Only Lane Analysis Segments	Base Case	Average LOS after Shift of Trucks to Truck-Only Lanes	
	Average Level of Service (LOS)	Test Case A	Test Case B
I-75 TN to Macon	LOS E (V/C=0.82)	LOS E (V/C=0.89)	LOS D (V/C=0.78)
Other Atlanta Interstates	LOS E (V/C=0.82)	LOS E (V/C=0.85)	LOS E (V/C=0.80)
All other Interstates	LOS C (V/C=0.54)	LOS C (V/C=0.57)	LOS C (V/C=0.54)

CHAPTER 2

MODELING METHODOLOGY

A statewide Travel Demand Model (TDM) provides the ability to forecast volumes and speeds on the Interstate highways and their connector roads in response to changes in infrastructure, demand, and/or operations. A "virtual" statewide TDM was created for GDOT as part of the Interstate System Plan[2] and was updated for use in the 2005 SWTP, and will be hereafter referred to as the SWTP model. That SWTP model includes a highway network developed from attributes in GDOT's Road Characteristics (RC) file for all state roadways. Figure 2 shows the model roadway network for the existing and future No-Build conditions.

Figure 2: SWTP Model Network



[2] Georgia Department of Transportation, *Interstate System Plan*, April 2004. Please refer to the Interstate System Plan Task 16 Tech Memo, Section 4, entitled *Travel Demand Model*.

A single Traffic Analysis Zone (TAZ) was identified for each Georgia County and was connected to the roadway network with one or more connector roads depending on the county's population density. External zones for the network were located where either an interstate or other major roadway crosses the state boundary.

Trip tables for autos were developed from Annual Average Daily Traffic (AADT) data reported in GDOT's Road Characteristics (RC) file, using TransCAD's Origin Destination Matrix Estimation (ODME) procedure. The daily trip table was further divided by model (cars and trucks) utilizing GDOT's classification counts database. Further disaggregation of the truck trip table in freight and non-freight trucks was accomplished using commodity flow data from Global Insight's 1998 TRANSEARCH database. As stated previously, a freight truck is distinguished from non-freight in its ability to transport commodities. Freight trucks include 18-wheelers, container trucks, and tankers, non-freight trucks include utility trucks, garbage trucks, etc. It is important to recognize that freight trucks are the target market for truck-only lanes. In all, trip tables for three vehicle classes were developed.

For the 2005 Statewide Transportation Plan, 2035 trip tables were created by factoring the 2001 trip table based on changes in county-level employment and population. The future freight truck table was produced by applying state-to-state forecasts of truck shipments by Standard Transportation Commodity Classification (STCC) code[3] to Georgia's TRANSEARCH freight truck trip table.

For this study the following improvements were made to the SWTP model.

A. Improvements to the SWTP Model in Support of the Statewide Truck Lanes Needs Identification Study

A.1 Updated Base Year Commodity Truck Trip Table

As documented in Technical Memorandum 1, GDOT purchased the 2004 TRANSEARCH freight database for Georgia (the previous model used the 1998 TRANSEARCH database). The payload factors (tons per truck) by commodity developed for the SWTP, from the Vehicle Inventory and Usage Survey records for Georgia available from the U.S. Census, were used to convert flows between origin zone and destination zones by commodity in tons per year to trucks per year. A conversion factor of 306 working days per year (6 days per week for 52 weeks, less 6 major holidays) was used to convert the annual truck flows by commodity to daily truck flows. The equivalency table of TRANSEARCH zones to the SWTP model TAZs and External Stations, as developed for the conversion of the 1998 TRANSEARCH database to the SWTP model trip tables, was applied to develop a set of 2004 Daily Commodity Truck Tables for use in the truck-only lanes study. Since the commodity flow table was for 2004, the base year of the model was chosen to be 2004 for consistency. These tables can be readily factored to forecast years using available growth rates.

[3] Developed by the FHWA's Freight Analysis Framework Study.

A.2 Updated Total Truck and Non-Commodity Truck Trip Tables

The truck classification counts, obtained from GDOT Office of Transportation Data and collected for this study, were used to update the data used to develop the ODME Daily Total Truck Table. The ODME process uses a seed matrix of truck flows as an input. That seed table was adjusted using the origin-destination survey information for trucks, as reported in Technical Memorandum 1. The ODME process was then used to calculate a new Daily Total Truck Table based on the observed truck counts. The Daily Commodity Truck Table described above was subtracted from this new total truck table to create a new 2004 Daily Non-Commodity Truck Table.

A.4 Updated 2035 Truck Tables

In order to develop 2035 Daily Auto, Daily Commodity Truck, and Daily Non-Commodity Truck trip tables, growth rates from 2004 to 2035 established in the SWTP were used. For autos and non-commodity trucks, forecast trip ends by TAZ were developed from the population and employment forecasts for 2035. These trip ends were applied in an Iterative Proportional Fitting (i.e., Fratar) process to the 2004 tables in order to create the 2035 Daily Autos and 2035 Daily Non-Commodity Truck Tables. For the Daily Commodity Truck Table, the 2004 TRANSEARCH database was updated to 2035 using the annual growth rates used in the SWTP, which were themselves developed from the FHWA's Freight Analysis Framework. These growth rates were specific to each origin/ destination/commodity record. The 2035 TRANSEARCH database of annual tons by truck, was then converted to trucks per year and then converted to trucks per day (using the procedure previously described), and then reformatted to the SWTP model zone structure, all consistent with the process described for the 2004 flows above.

The unadjusted model volumes do differ from those reported in the 2005 SWTP. For the 2005 SWTP, the results of the travel model growth rates for each link were transferred to Georgia's Road Characteristics (RC) file. This transfer was made because the model, since the traffic zones are counties, cannot account for travel where the trips begin and end in the same county (i.e., the Statewide travel demand model does not assign intrazonal trips), nor can it represent the portion of the travel within the beginning or ending county for trip trips made between counties (i.e., centroids connector model volume does not accurately represent travel within the zone). The growth rate in model volumes between the base and forecast years was applied to observed traffic counts and these adjusted volumes were used to estimate needs and performance in the in the 2005 SWTP. The limitations of the statewide model are why the growth rates in this study will be applied to the MPO models in the selected corridors before design volumes are calculated. Since the statewide model is only being used for comparative purposes, and the same adjustments would be made to all alternatives, those adjustments will not be made in this analysis. The resulting performance measures should therefore **not** be considered to be absolute numbers. For the existing case, for illustrative purposes, comparisons to the adjusted performance measures will be shown in Chapter 4.

CHAPTER 3

PERFORMANCE CRITERIA

In the development of the SWTP, performance measures were developed to measure the extent to which plans and programs would accomplish the goals of the SWTP. Several of those performance measures are relevant and useful for this truck-only lanes assessment. Additionally GDOT, through the Request for Proposals issued for the project, required a discussion of congestion and safety, which suggests that these topics should have performance measures associate with this study. Based on these measures, and additional topics raised by GDOT and the stakeholders, performance measures were developed for congestion, truck volume, safety, reliability, mode shift, and intra-county movements.

A. Congestion

Truck-only lanes may reduce congestion for trucks by providing them with their own lanes. Less congestion means faster travel time for those trucks, as measured by Volume to Capacity[4] (V/C) ratio and Level of Service (LOS), using the relationships shown in Table 3. **The impact of trucks on congestion is roughly equivalent to the impact of two autos.** The performance measure for congestion is V/C (LOS) before the introduction of truck-only lanes with trucks and autos sharing lanes, and the V/C after the introduction of truck-only lanes with trucks that choose to use the truck-only lane in the in truck-only lanes and trucks that don't utilize the truck-only lanes and autos in general-purpose lanes.

Table 3: Level of Service by Volume to Capacity Range

Volume to Capacity Range	Level of Service
< =0.2	A
0.20 < and <= 0.4	B
0.4 < and <= 0.7	C

[4] The capacity of each road section is based on the daily capacities coded into GDOT's Highway Performance Monitoring System (HPMS) submittal. These capacities reflect hourly capacities factored by the percentage of daily traffic that is accommodated in the peak hour.

Volume to Capacity Range	Level of Service
0.7 < and <= 0.8	D
0.8 < and <=.1.0	E
1.0<	F

B. Truck Usage

Trucks limit the maneuverability and visibility of autos. Locations where trucks comprise of a greater percentage of the traffic composition than the statewide average frequently exhibit the greatest degree of congestion due to deteriorating driving experience and a lack of maneuverability. Truck-only lanes will obviously have 100 percent trucks. Trucks are expected to shift to those lanes only if they provide more utility for the complete truck trip, consequently not all trucks will shift to the truck-only lanes. For example, if there is little or no congestion in the general-purpose lanes, trucks would have very little incentive to shift to the truck-only lanes. The performance measure is the truck percentage in general-purpose lanes before the introduction of truck-only lanes and the truck percentages in the general-purpose lanes after truck-only lanes are implemented. Additionally, the implementation of truck-only lanes might cause a shift of truck traffic from adjacent arterials to the general purpose lanes as the truck traffic is shifted from these lanes. The total truck traffic in the truck-only lanes and the adjacent general-purpose lanes will be considered a performance measure where appropriate.

C. Safety

Trucks and autos, as shown previously in Technical Memorandum 1, have similar crash rates for property damage and injury crashes. Crashes involving trucks are three times more likely to result in a fatality than crashes involving just autos. Most fatalities in truck/auto crashes are in the auto. The truck fatal crash rate was calculated in Technical Memorandum 1. The performance measure is the change in fatal truck crashes, expressed as the fatality rate times truck vehicle-miles traveled, in the general-purpose lanes before and after implementation of the truck-only lanes.

D. Reliability

Reliability is measured as the additional travel time (known as buffer time) that must be added to average travel times in order for a trip to arrive at its destination on schedule 95 percent of the time. Reliability is important to all travelers, but particularly to truckers under pressure to meet “Just-in-Time” delivery schedules. Research has shown that the buffer time is a function of the travel time index, which is itself a ratio of congested time to free flow time. Congested time and free flow time were used to calculate buffer time reliability. Reliability for trucks was calculated for the truck-only lanes from their congested and free flow travel times. The performance measure is the savings in time associated with improvements in reliability.

E. Mode Split

One concern that has been expressed about truck-only lanes is that improving truck freight level of service could have the unintended consequence of diverting some future freight shipments from rail to truck. Today, approximately 86 percent of freight by tons moves by truck versus about 11 percent by rail.[5] Most freight is bound to one mode or another due to the characteristics of the commodity, origin/destination patterns, and the service characteristics of the mode. However, some freight has the potential to shift among modes. The potentially divertible commodities moving in Georgia were identified, the likely amount which would be diverted was calculated, and the impact on truck traffic estimated. The performance measure is the potential increase in truck traffic.

F. Intra-county Movements

The SWTP model that is used in this phase of the study does not include intra-county truck trips. These movements may themselves generate significant usage of truck-only lanes. Identifying significant generators of intra-county truck trips that might shift to truck-only lanes will be a performance measure. For this purpose, significant intra-county truck movements are limited to Chatham County and are associated with the Port of Savannah and its associated warehouses. The performance measure is the impact of truck-only lanes on these truck movements as measured by the various other performance measures described above.

[5] 2004 TRANSEARCH database. Note: The remaining 3 percent move by air and water.

CHAPTER 4

MODELING RESULTS

The SWTP Model update, as described in Chapter 2, with autos, commodity trucks and non-commodity truck trip tables for the base and forecast years, was used to assign trips to the highway network. For purposes of this phase of the study the base year is 2004 and the forecast year is 2035. The networks are variations of the existing highway system in 2004 and the GDOT Long-Range Program highway network that will be in place after the capacity increasing projects (managed in GDOT's Tpro database) have been completed. For each of these networks, default truck-only lanes have been created adjacent to controlled access general-purpose lanes with usage limited to trucks, and where entry and exit is at all nodes in the highway network, without regard to the practical limitations as to where entry and exit would be allowed. Speeds in the truck-only lanes were set at three miles per hour less than in the general-purpose lanes to ensure that the model assigned truck trips to those lanes only when there was a clear advantage for trucks over travel times in the general-purpose lanes. The modeled per lane capacity assumed for truck-only lanes was set equal to that of the adjacent general purpose lanes. The total capacity of the truck-only lanes were deliberately set higher than the likely actual capacity to ensure that the unconstrained demand for truck-only lanes would be determined in the screening process. In Phase II of this study, actual conceptual design of the most promising truck-only lanes will be undertaken and modeled.

Table 4 shows the possible combinations of networks and demand. Six of the eight possible combinations were modeled and the results are presented in this Chapter. The focus of the analysis (as shown in bold) is on the three scenarios (called Base Case, Test Case A and Test Case B) matching 2035 travel demand with three variations of future network build conditions – GDOT's Long-Range Program; replacement of the Long-Range Program with truck-only lanes on the interstate system; and the combination of the Long-Range Program with truck-only lanes. Since it will take many years to approve and build truck-only lanes, it is logical to base this screening analysis on future conditions as opposed to existing conditions.

Table 4: Possible Test Scenarios

Demand (Trip Table)	Networks			
	2004	2035 Long-Range Program	2004 + Truck-Only Lanes	2035 Long-Range Program + Truck Only Lanes
2004	Yes	No	Yes	No
2035	Yes	**Yes**	**Yes**	**Yes**

The names of the six tested scenarios are as follows (again, the key 2035 scenarios are **bolded):**

- Existing – 2004 Demand and Network;
- Existing and Truck-only lanes – 2004 Demand, Existing Network plus truck-only lanes;
- No-Build – 2035 Demand and Existing Network;
- **Base Case – 2035 Demand, Existing Network *PLUS* Long-Range Program;**
- **Test Case A – 2035 Demand, Existing Network *PLUS* truck-only lanes; and**
- **Test Case B – 2035 Demand, Existing Network *PLUS* GDOT's Long-Range Program *PLUS* truck-only lanes.**

A. Existing – 2004 Demand and Network

The SWTP model was used to assign base year auto and truck trips to the base year existing network. As discussed in Chapter 2, these volumes do not include traffic moving within a county. In the SWTP, the percentage change in model volumes for a scenario compared to the base model volumes was applied to the observed traffic count in order to adjust for these missing intra-county trips. Table 5 shows the comparison between the unadjusted model volumes and Levels of Service and those of the observed volumes and Levels of Service. As explained in Chapter 2, since the model volumes in this study will only be used for comparison and screening of alternatives, an adjustment to the absolute observed conditions is not necessary. The resulting congestion, truck percents, and truck volumes are shown in Figures 3, 4, and 5. Reliability will be discussed in Section F. Safety will be discussed in Chapter 5.

Highway congestion (LOS D-F) is almost completely limited to the Atlanta region as shown in Figure 3. However, as shown in Figure 5, high truck percentages can be found

on many interstates outside of the Atlanta region, indicating a potential for truck lanes in the future as volume and congestion grow.

Table 5: Usage and Congestion – Existing Scenario

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes			Observed General Purpose Lanes		
	AADT	AADTT	LOS (V/C)	AADT	AADTT	LOS (V/C)
I-75 TN to Macon	105,971	25,038	C (0.60)	180,077	30,001	F (1.01)
Other Atlanta Interstates	85,348	12,905	C (0.53)	170,725	22,527	F (1.06)
All Other Interstates	35,642	13,902	B (0.31)	52,917	14,120	C (0.46)

Note: AADT: Annualized Average Daily Traffic.
AADTT: Annualized Average Daily Truck Traffic.
LOS: Level of Service.
V/C: Volume to Capacity Ratio.

Figure 3: Existing Scenario Truck Volumes

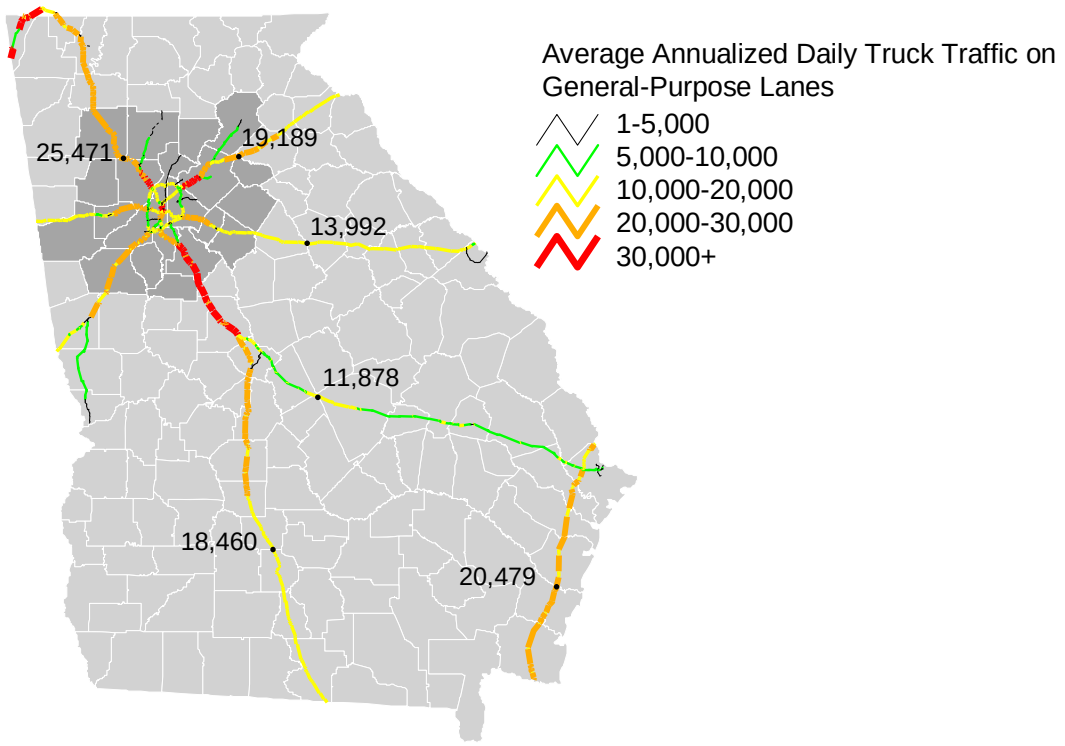


Figure 4: Existing Scenario Truck Congestion

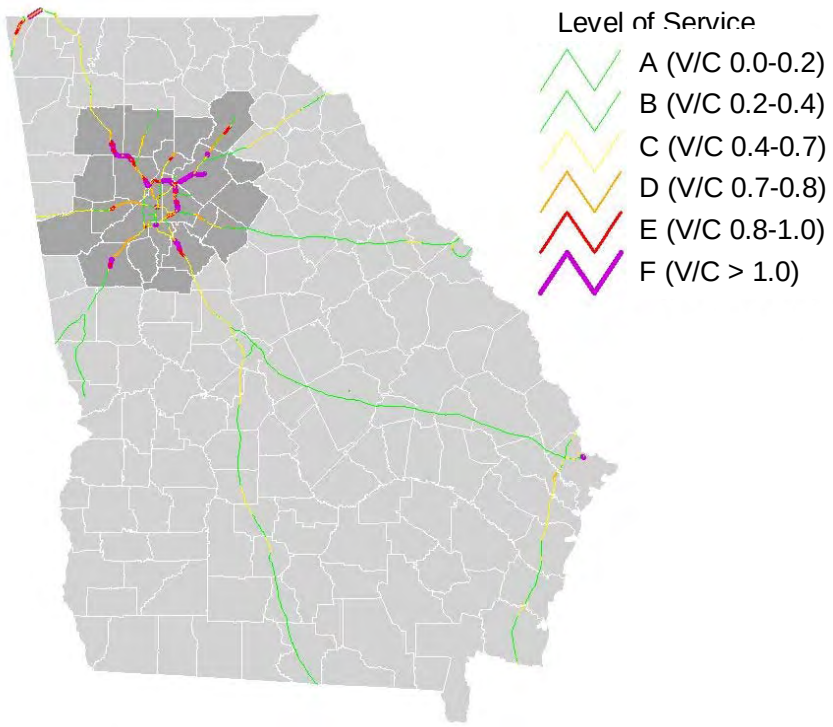
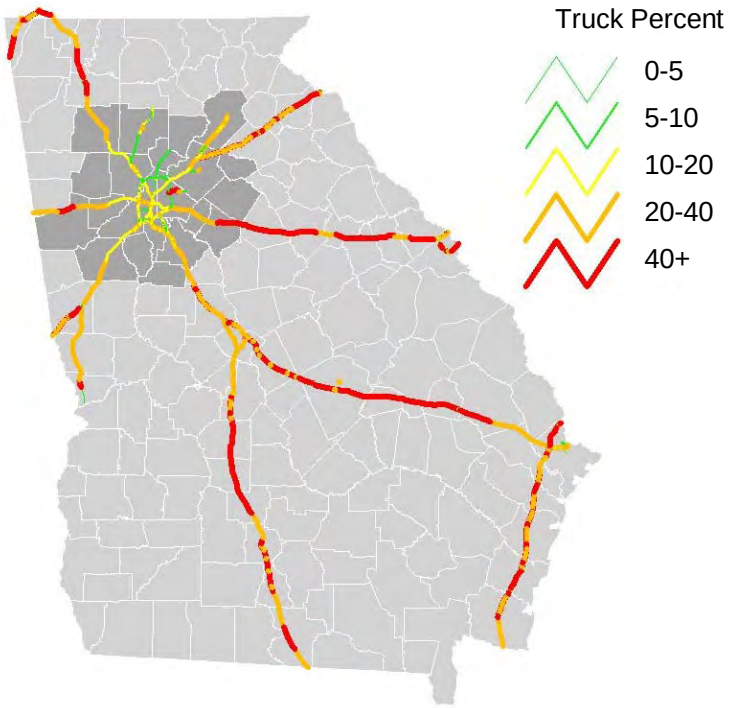


Figure 5: Existing Scenario Truck Percents



A. Existing plus Truck-Only Lane Network – 2004 Demand, Existing Network plus Truck-Only Lanes

While it is not possible to immediately construct truck-only lanes on all highways with truck-lane potential in Georgia, this scenario which assigns the base year trip table to the existing highway network with truck-only lanes added on all suitable roads is shown for illustrative purposes. It represents a scenario of how the highway system would be expected to perform today if truck-only lanes could be immediately implemented on the existing highway system. The resulting congestion, truck percents, and truck volumes in the general-purpose lanes are shown in Figures 6 to 8. In addition, the truck volumes on the truck-only lane are shown in Figure 9.

Under existing conditions, as summarized in Table 6, the addition of truck-only lanes to the existing highway network would marginally reduce congestion on the general-purpose lanes in the Atlanta region (Figure 7), while potentially attracting sufficient truck volume to support truck-only lanes on some Atlanta interstates (Figure 9). This marginal improvement in congestion in the general-purpose lanes maybe understated since the capacity being freed up by in the general-purpose lanes by the shift of trucks to the truck-only lanes could be consumed by trucks currently not using the corridor.

Figure 6: Existing plus Truck-Only Lane Scenario Truck Volumes on General Purpose Lanes

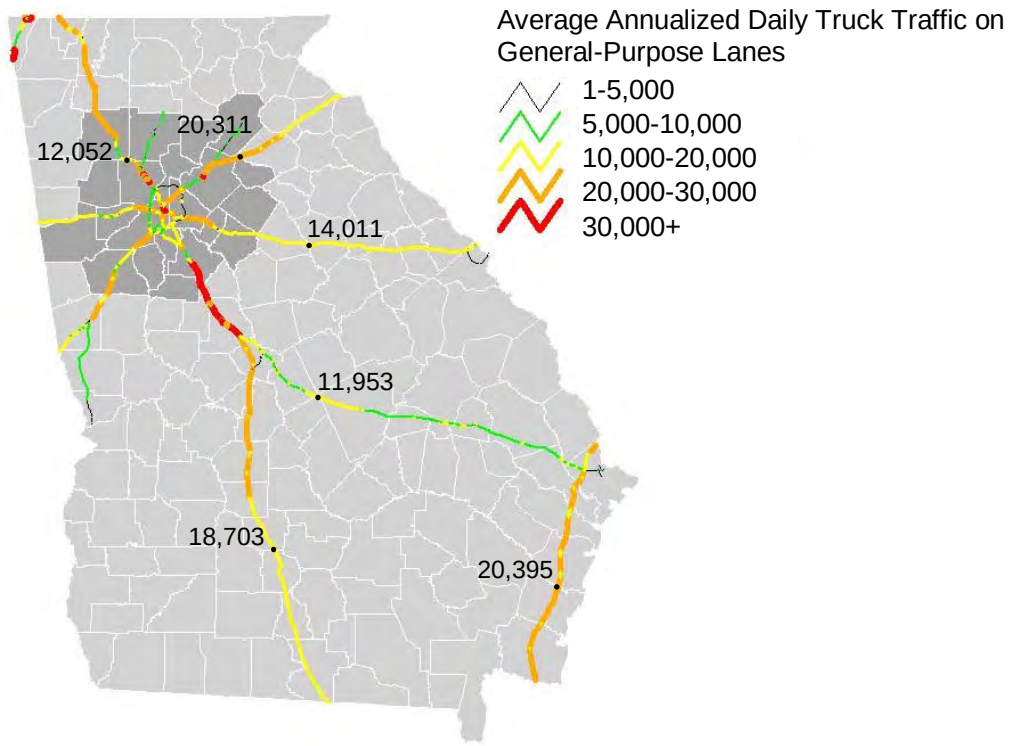


Figure 7: Existing plus Truck-Only Lane Scenario Truck Congestion on General Purpose Lanes

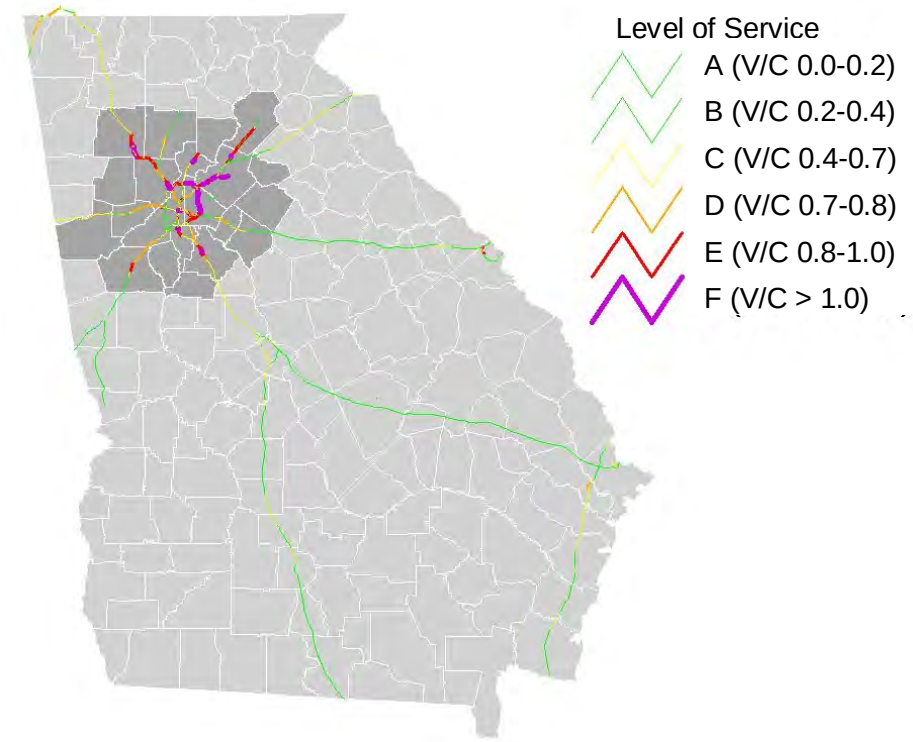


Figure 8: Existing plus Truck-Only Lane Scenario Truck Congestion on General Purpose Lanes

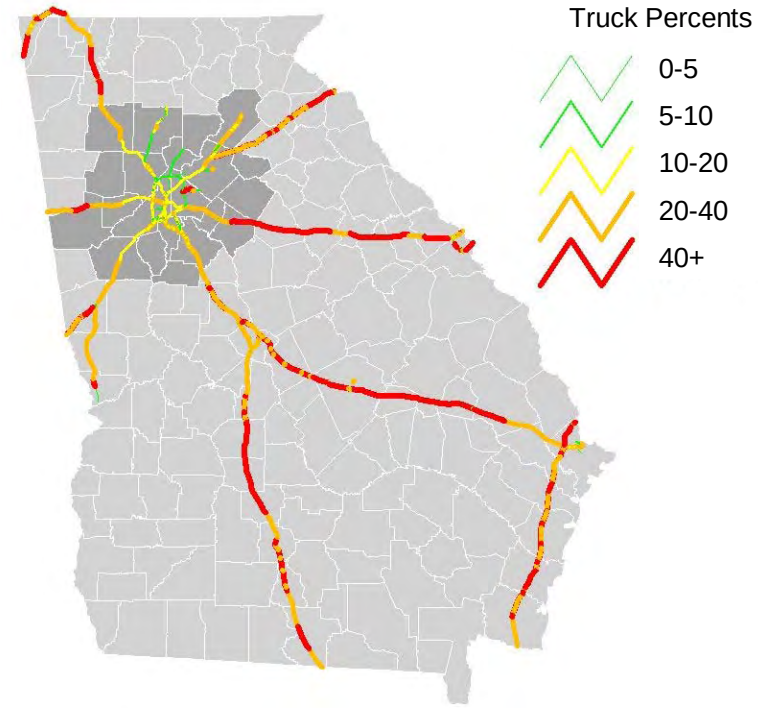


Figure 9: Existing plus Truck-Only Lane Scenario Truck-Only Lane Volume

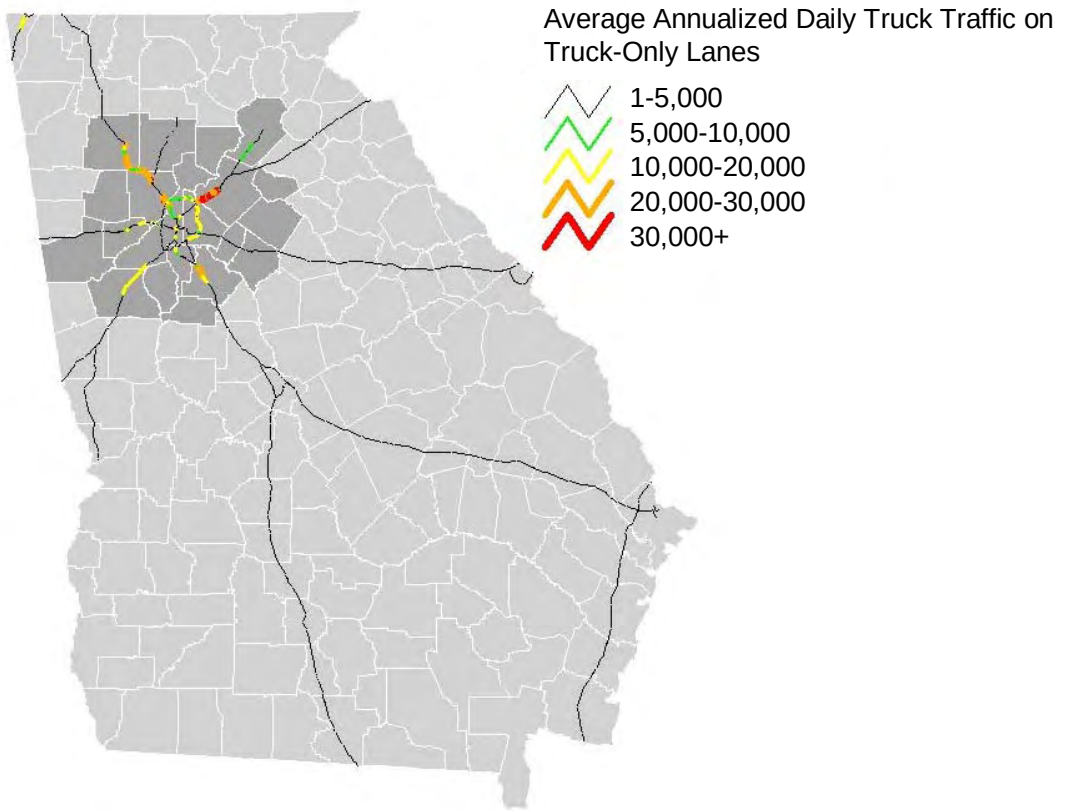


Table 6: Usage and Congestion – Existing plus Truck-Only Lane Scenario

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes AADTT	Modeled General Purpose Lanes LOS (V/C)	Modeled Truck-Only Lanes AADTT	Existing plus Truck-Only Lane Total Truck Volumes AADTT	Segment Truck Volumes Increase from Existing Scenario AADTT
I-75 TN to Macon	21,491	C (0.60)	4,284	25,775	738
Other Atlanta Interstates	11,481	C (0.55)	2,933	14,414	1,510
All Other Interstates	13,843	B (0.31)	94	13,937	35

Note: AADTT: Annualized Average Daily Truck Traffic.
LOS: Level of Service.
V/C: Volume to Capacity Ratio.
Existing Scenario volumes are shown in Table 5.

B. No-Build – 2035 Demand and Existing Network

It is not reasonable to assume that no capacity improvements will be made to the existing state highway system between now and 2035. This scenario is shown for illustrative purposes only. It represents a scenario of how the highway system would be expected to perform if no capacity improvements were constructed on the existing highway system. The SWTP model was used to assign 2035 future year auto and truck trip tables to the base year existing network using a capacity restrained assignment. The resulting congestion, truck percents, and truck volumes are shown in Figures 10 to 12.

As shown in Figures 10 and 11, increasing demand combined with no new capacity expansion projects, will result in severe congestion throughout the Atlanta interstate system, and on some interstates outside of the Atlanta region, including I-75 from Chattanooga to Macon, I-85 to the South Carolina border, and I-95 in coastal Georgia. For the first time using 2035 demand, one can see in Figures 10 and 12 marked increases in truck volumes and percents compared to existing conditions due to the forecast more rapid growth rate of truck traffic compared to auto traffic. High truck volumes and percents are forecast for much of the interstate system. As shown in Table 7, without any capacity increases, the relative congestion on Interstates in the Atlanta region and on I-75 from the Tennessee state line to Macon approaches level of service F.

Figure 10: No Build Scenario Truck Volumes

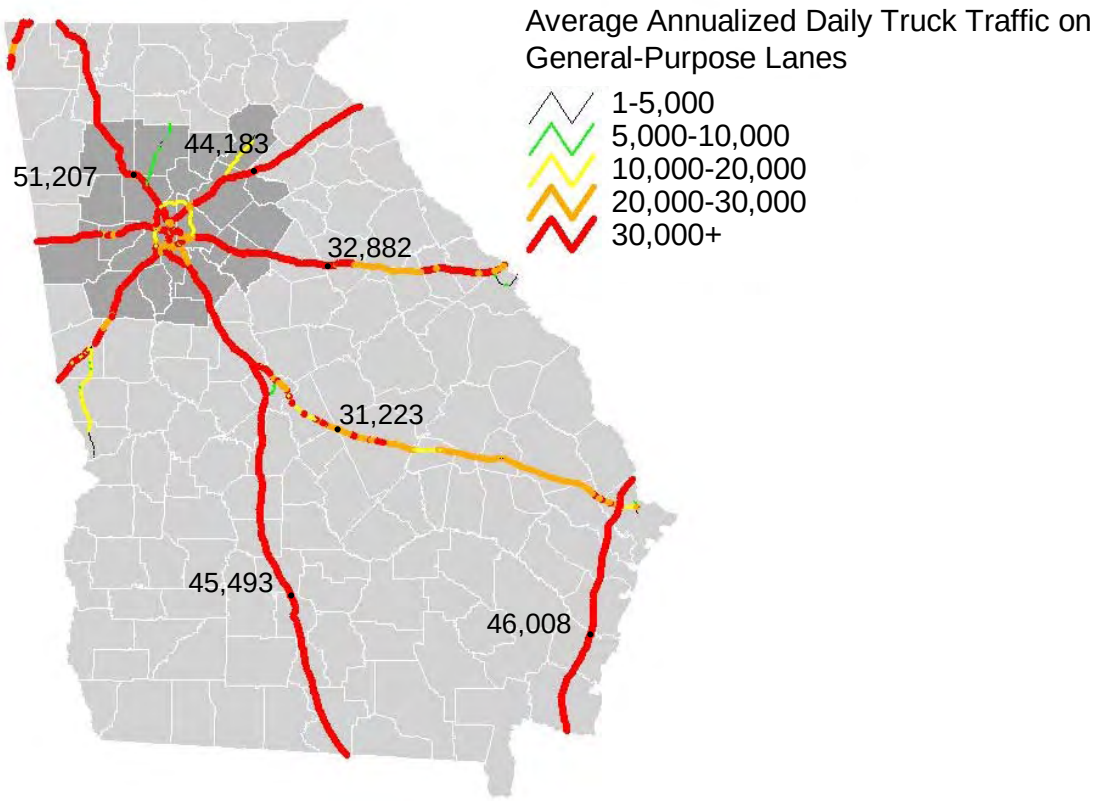


Figure 11: No Build Scenario Congestion

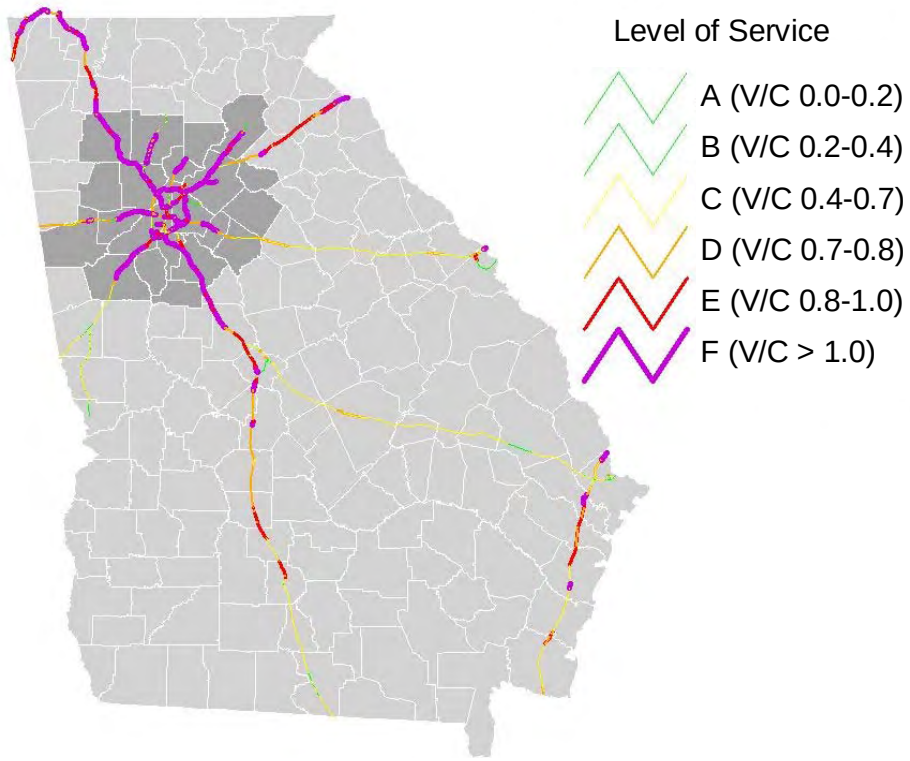


Figure 12: No Build Scenario Truck Percents

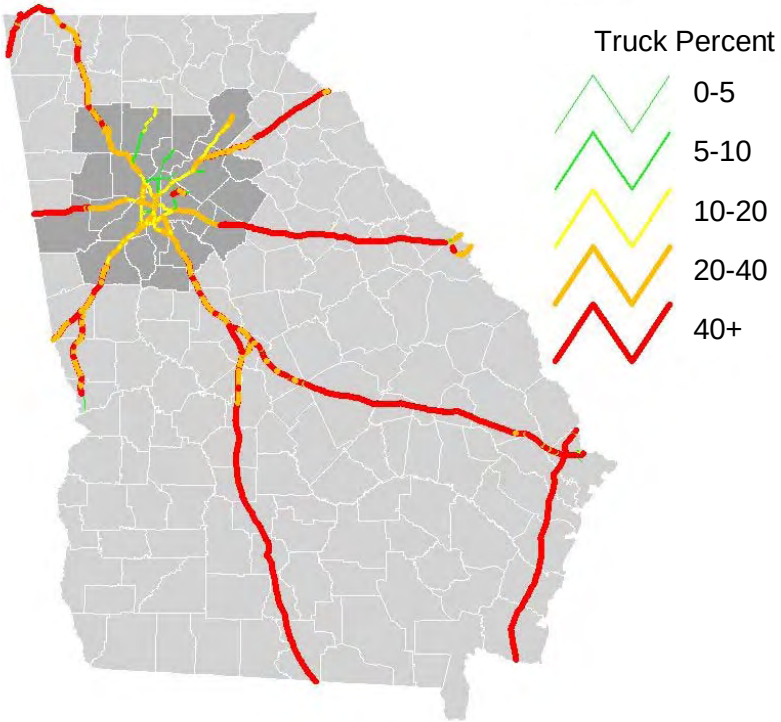


Table 7: Usage and Congestion – No-Build Scenario

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes AADTT	Modeled General Purpose Lanes LOS (V/C)
I-75 TN to Macon	52,284	E (0.99)
Other Atlanta Interstates	26,359	E (0.87)
All other Interstates	33,871	C (0.60)

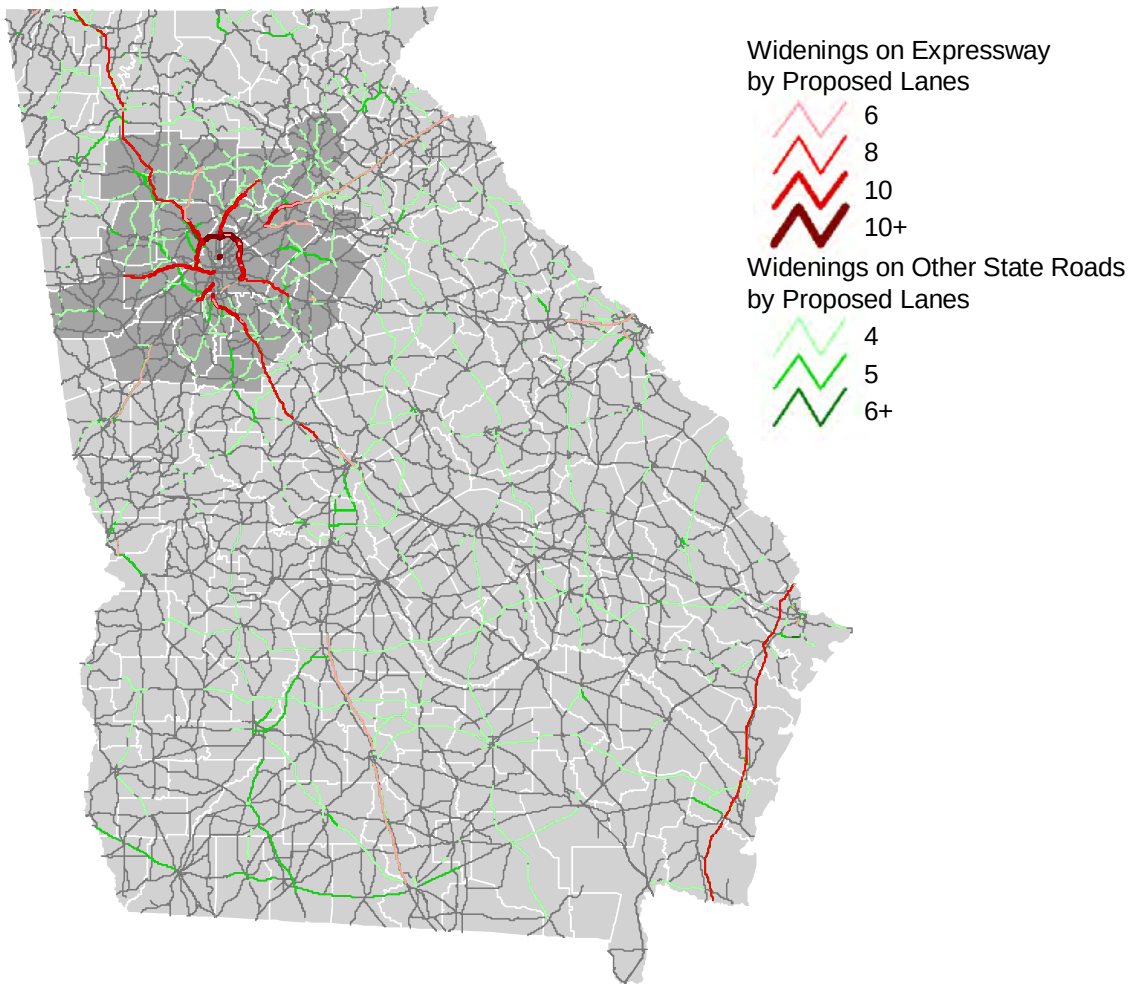
Note: AADTT: Annualized Average Daily Truck Traffic.
LOS: Level of Service.
V/C: Volume to Capacity Ratio.

C. Base Case – 2035 Demand and Existing plus Long-Range Program Network

This is the first of the core analyses looking at 2035 demand combined with variations of a future build network. GDOT maintains Tpro, a comprehensive database of all projects for which any planning, design, or construction work is anticipated. This database is used to develop GDOT's six-year Construction Work Program (CWP) and four-year State Transportation Improvement Program (STIP). The Tpro database was used to determine the nature and location of projects that would impact congestion. The information in Tpro was used to update the SWTP model in this scenario. While projects in Long-Range Transportation Plans (LRTP) prepared by MPOs are referred to as Planned and Programmed, those projects are financially constrained to forecast funding sources over the planning horizon. State requirements for financial planning have been much less stringent requiring only that the construction work program is financially balanced. The projects in Tpro are being called "Existing plus Long-Range Program" to indicate that they do not come from a financially constrained plan.

Projects in the Long-Range Program include all projects on state roads that increased the number of lanes on a roadway. Because Tpro may include separate records for all phases of work (i.e., PE, Environmental, ROW acquisition, etc.) for a single location, the identification of the widening was made only once. For the truck-only lanes study, GDOT provided a 2006 version of Tpro. From this listing, all projects that were on state roads, which increased the number of lanes, and had an identified location, were not previously in the 2003 Tpro were identified. The information from these records was used to update the capacity in the 2035 SWTP model's Existing plus Long-Range Program network to include projects added to Tpro since 2003. The Tpro projects which increase capacity are shown in Figure 13. The number of lanes shown represents the number of lanes that will be available (total in both directions) after the completion of the expansion projects.

Figure 13: Future Capacity Projects in TPRO on State Highway Links – *Number of Lanes after Completion*



The resulting congestion, truck percents, and truck volumes in the general-purpose lanes are shown in Figures 14 to 16. Implementation of GDOT's Long-Range Program would keep congestion primarily confined to the core of the Atlanta interstate system and isolated pockets elsewhere (Figure 15). As noted in the No-Build scenario where 2035 truck volumes were reported for the first time, high truck volumes and percents would be realized throughout the interstate system (Figures 14 and 16). As shown in Table 8, the level of service improves when compared to the No-Build scenario, but remains less desirable than the level of service forecast by the model for the existing scenario. It should be noted that the proper comparison here is the relative level of service. As shown in pervious sections, because the model volumes are not adjusted to the observed volumes, the model level of service is less (i.e. lower volumes and less congestion) than what would be observed.

Figure 14: Future Base Scenario Truck Volumes

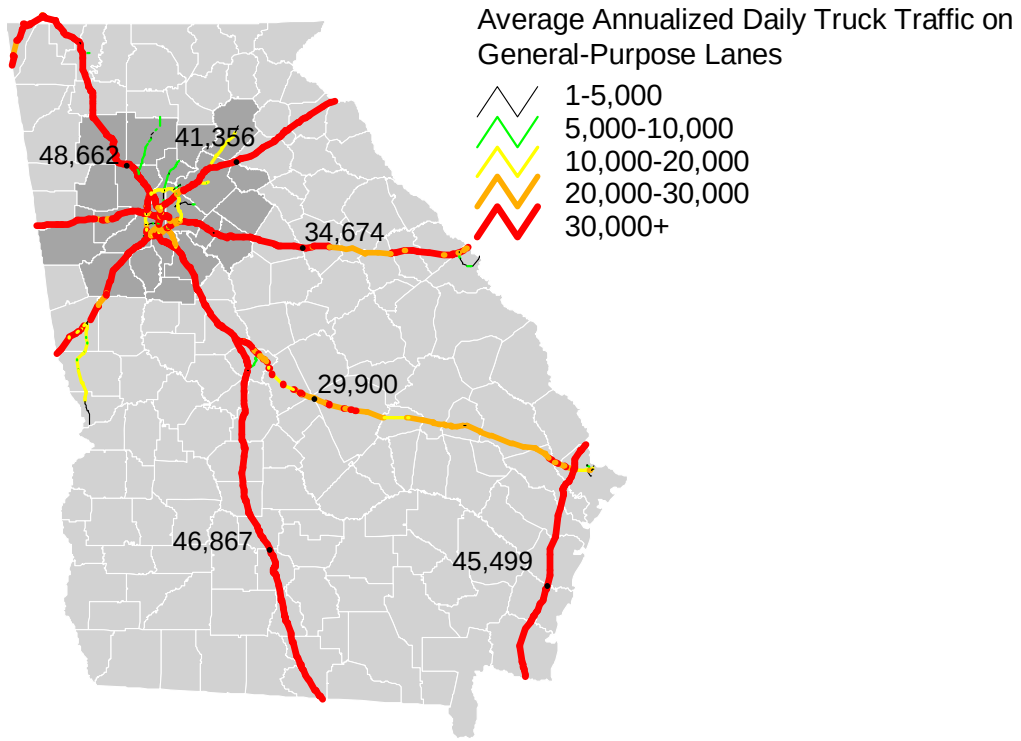


Figure 15: Future Base Scenario Congestion

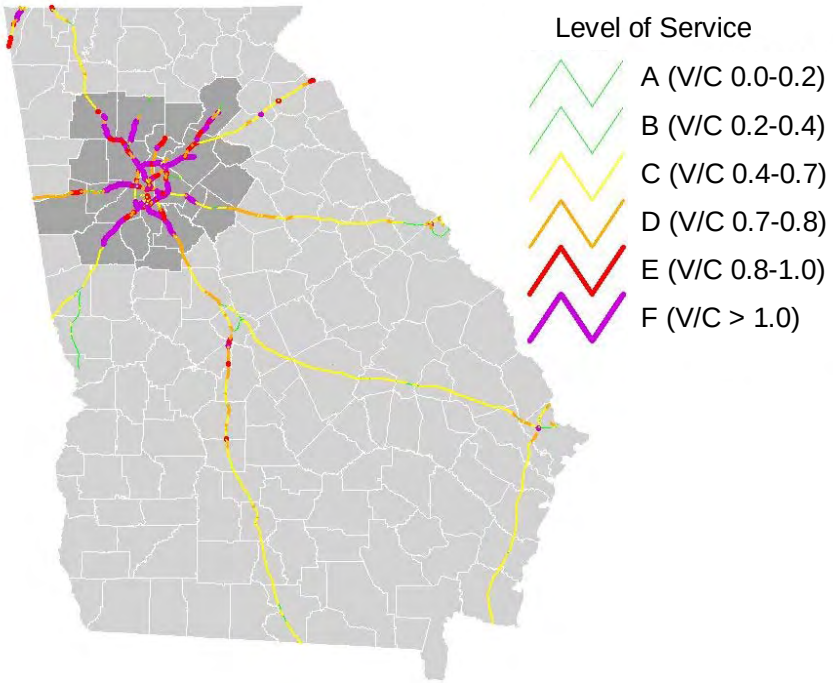


Figure 16: Future Base Scenario Truck Percents

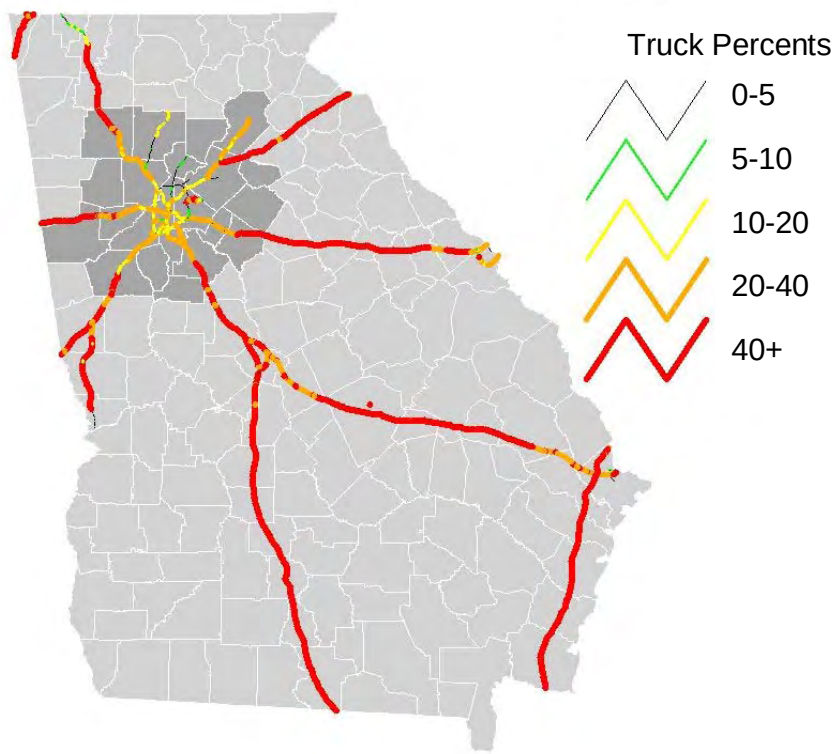


Table 8: Usage and Congestion – Base Scenario

	Modeled General Purpose Lanes		
Truck-Only Lane Analysis Segments	**AADT**	**AADTT**	**LOS (V/C)**
I-75 TN to Macon	173,033	47,971	E (0.82)
Other Atlanta Interstates	138,745	4,850	E (0.82)
All other Interstates	69,416	4,195	C (0.54)

Note: AADTT: Annualized Average Daily Truck Traffic.
LOS: Level of Service.
V/C: Volume to Capacity Ratio.

D. Test Case A – 2035 Demand and Existing plus Truck-Only Lane Network

This scenario represents the construction of only truck-only lanes as capacity improvements to the existing state highway system between now and 2035. The analysis represents how the highway system would be expected to perform under this scenario. The truck-only lanes would essentially replace other capacity improvements

described in GDOT's Long-Range Program. The resulting congestion, truck percents, and truck volumes in the general purpose lanes are shown in Figures 17 to 19. In addition, the truck volumes on the truck-only lane links are shown in Figure 20. This scenario exhibits an increase in congestion in the Atlanta region relative to the Long-Range Program scenario (Figures 14 and 18) because there are far more autos than trucks and trucks tend to travel in the off-peak period when congestion is lower. Thus, truck-only lanes do not appear to be a substitute investment for general-purpose lanes. High volumes of trucks would be attracted to the truck-only lanes in many locations on the interstate system (Figure 20) particularly in Atlanta, on I-75 from Chattanooga to Macon, and in isolated locations in Chatham County. This result is not surprising given the high levels of congestion prevalent in the general-purpose lanes. As shown in Table 9, building truck-only lanes without any other additional capacity increases, does improve level of service relative to the No-Build scenario, but not as much as the Base Case scenario. Table 9 also shows the attraction of trucks to the general purpose lanes from arterials where no capacity improvements would be made.

Figure 17: Test Case A – Existing plus Truck-Only Lane Scenario Truck Lane Volumes on General Purpose Lanes

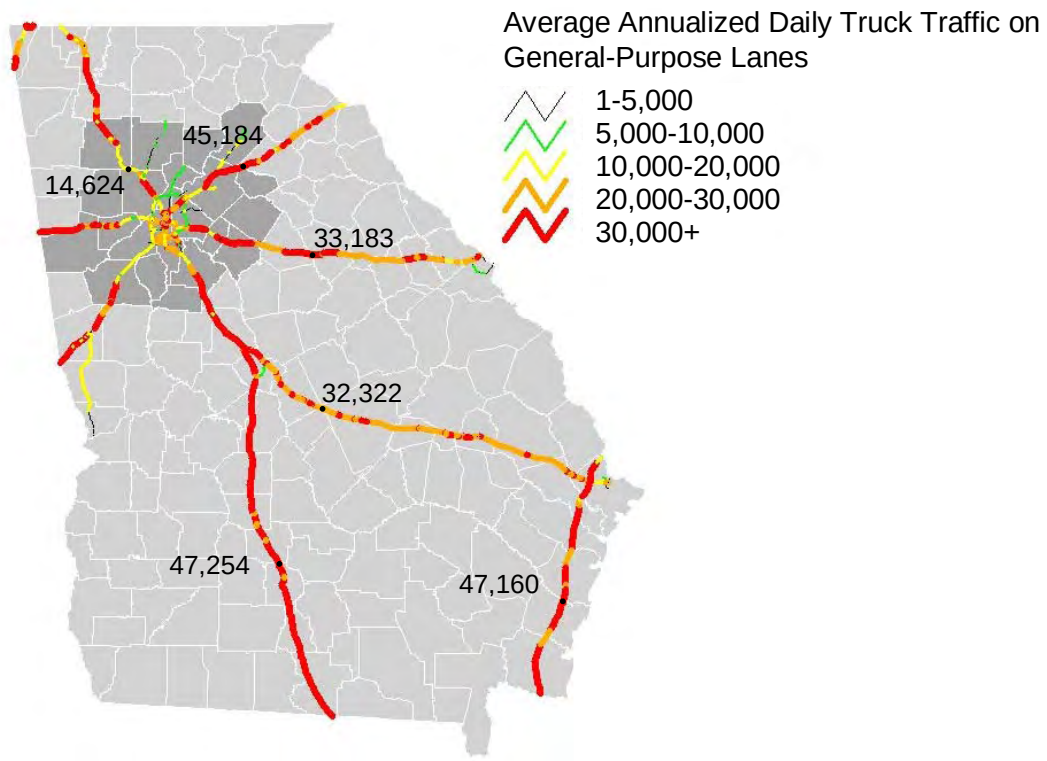


Figure 18: Test Case A – Existing plus Truck-Only Lane Scenario Congestion on General Purpose Lanes

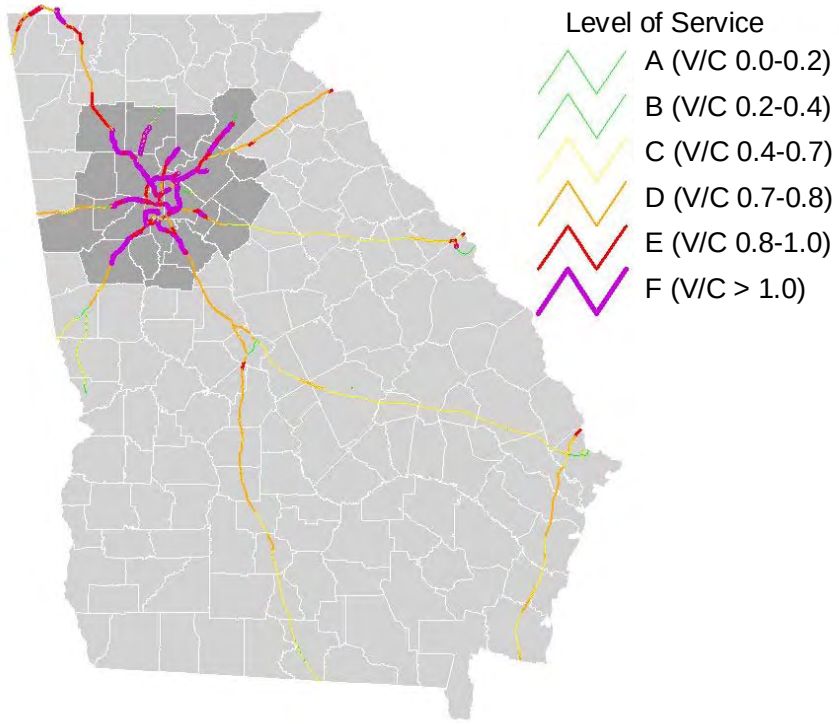


Figure 19: Test Case A – Existing plus Truck-Only Lane Scenario Truck Percents on General Purpose Lanes

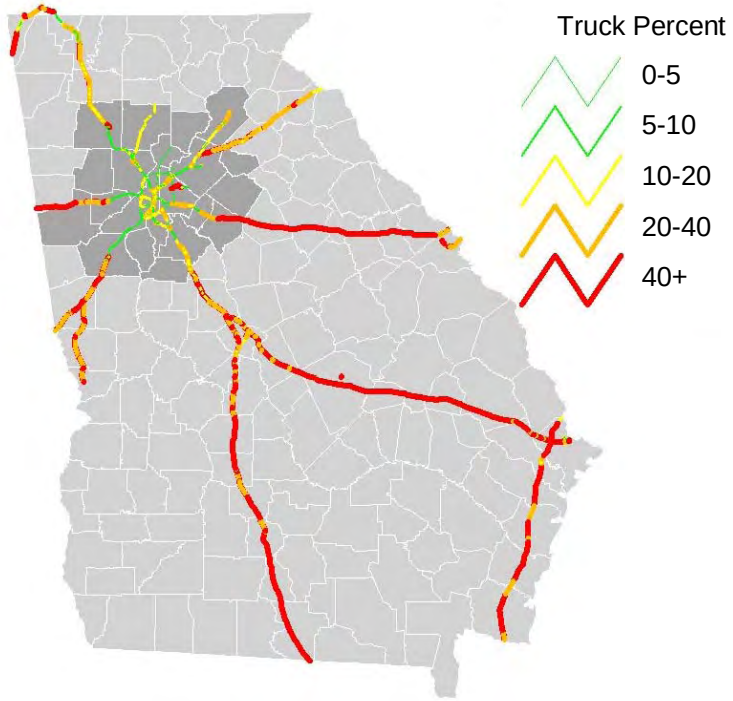


Figure 20: Test Case A – Existing plus Truck-Only Lane Scenario Truck-Only Lane Truck Lane Volumes

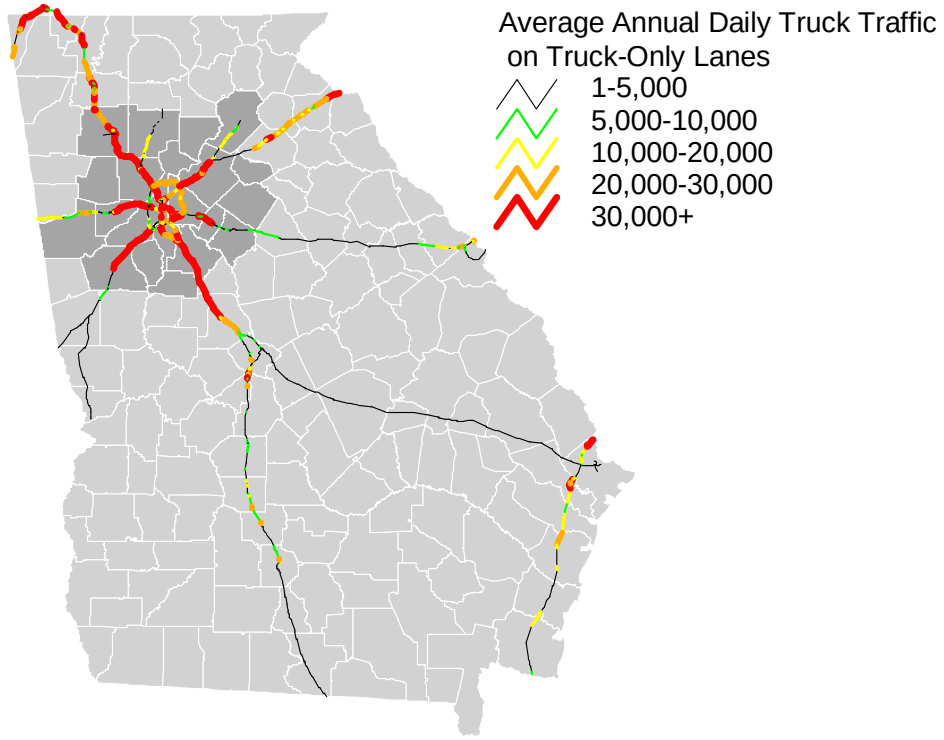


Table 9: Usage and Congestion – Test Case A

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes AADTT	Modeled General Purpose Lanes LOS (V/C)	Modeled Truck-Only Lanes AADTT	Test Case A Total Truck Volumes AADTT	Segment Truck Volumes Increase from Base Scenario AADTT
I-75 TN to Macon	25,772	D(0.89)	40,664	66,436	18,465
Other Atlanta Interstates	18,054	D(0.85)	16,342	34,396	9,547
All Other Interstates	29,975	C(0.57)	5,096	35,071	876

Note: AADTT: Annualized Average Daily Truck Traffic.
LOS: Level of Service.
V/C: Volume to Capacity Ratio.
Base Scenario volumes are shown in Table 8.

E. Test Case B – Existing plus Programmed plus Truck-Only Lane Network

This scenario represents the implementation of all of the capacity expansion projects described in Section C plus the implementation of Truck-Only Lanes adjacent to all of the suitable roads in that Future Tpro network. The analysis represents how the highway system would be expected to perform under this maximum investment scenario. The resulting congestion, truck percents, and truck volumes in the general purpose lanes are shown in Figures 21 to 23. In addition, the truck volumes on the truck-only lane links are shown in Figure 24. The construction of GDOT's Long-Range Program plus truck-only lanes would reduce congestion on Atlanta's interstates back to levels similar to what is experienced today (Figure 21) while attracting significantly high truck volumes to truck-only lanes primarily in the Atlanta region (Figure 24). As shown in Table 10, building truck-only lanes along with all other additional capacity increases, does improve level of service relative to the Base scenario, but does not return congestion to existing levels. Table 10 also shows the attraction of trucks to the general-purpose lanes from arterials where no capacity improvements would be made.

Figure 21: Test Case B – Existing plus Programmed plus Truck-Only Lane Scenario Truck Volumes

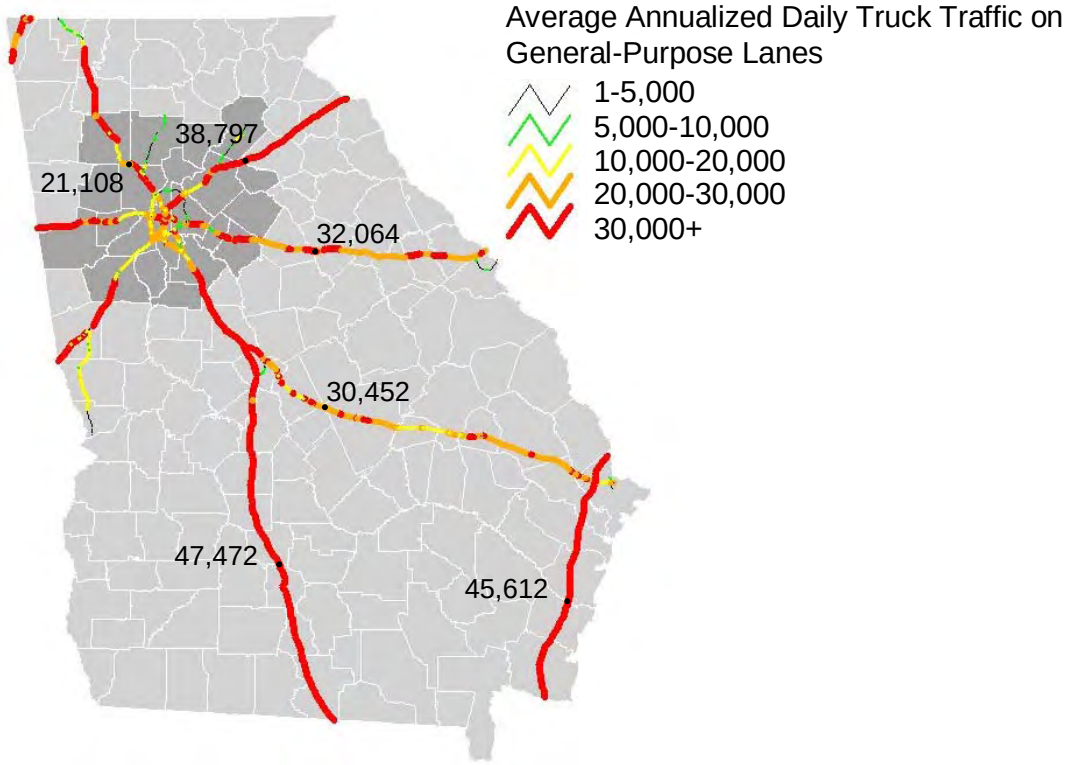


Figure 22: Test Case B – Existing plus Programmed plus Truck-Only Lane Scenario Congestion

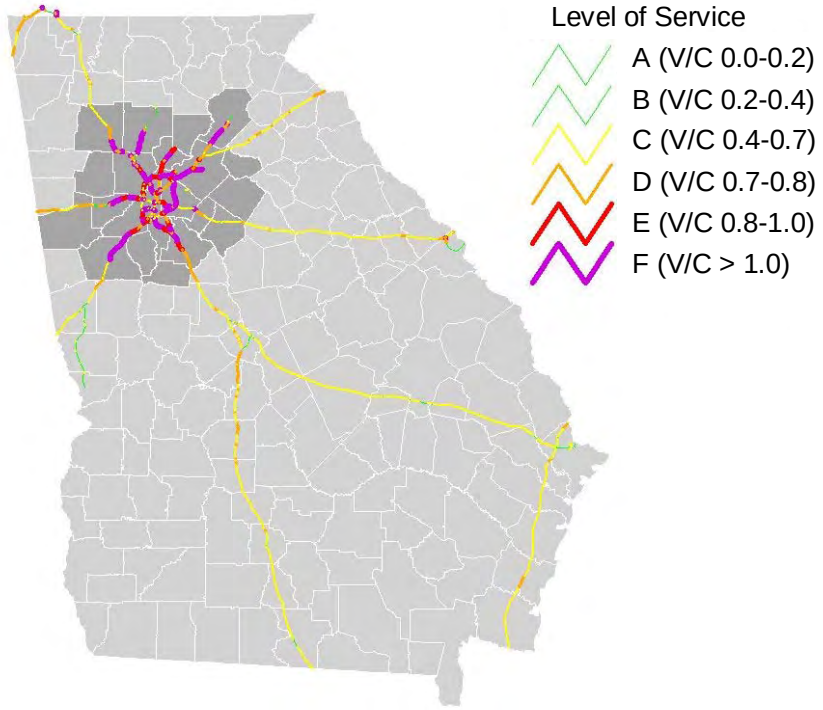


Figure 23: Test Case B – Existing plus Programmed plus Truck-Only Lane Scenario Truck Percents

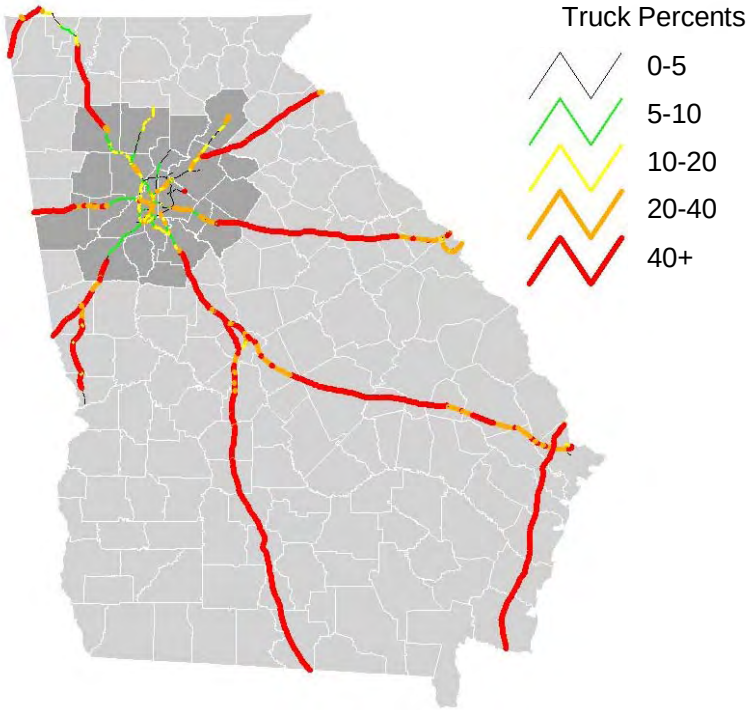


Figure 24 **Test Case B – Existing plus Programmed plus Truck-Only Lane Scenario Truck-Only Lane Truck Volumes**

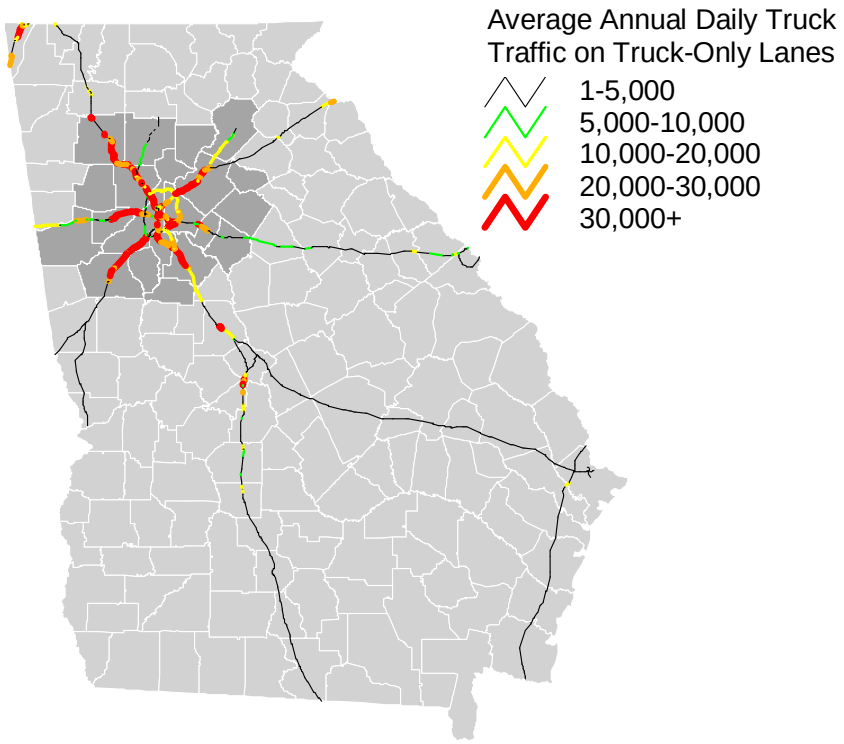


Table 10: **Usage and Congestion – Test Case B**

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes AADTT	Modeled General Purpose Lanes LOS (V/C)	Modeled Truck-Only Lanes AADTT	Test Case B Total Trucks AADTT	Segment Truck Volumes Increase from Base Scenario AADTT
I-75 TN to Macon	34,411	D (0.78)	22,969	57,380	9,409
Other Atlanta Interstates	17,768	E (0.81)	13,384	31,152	6,301
All Other Interstates	32,702	C (0.53)	1,831	34,533	338

Note: AADTT: Annualized Average Daily Truck Traffic.
LOS: Level of Service.
V/C: Volume to Capacity Ratio.
Base Scenario volumes are shown in Table 8.

F. Impact of Reliability

One of the potential benefits of truck-only lanes is an increase in the reliability of truck shipments. This memorandum describes a methodology for estimating the current reliability of trucking activity and estimates the changes in reliability from an investment in truck-only lanes. Reliability is particularly important for truck operations, since truck shipments are ordered to arrive on specific days within specific time windows. Late truck shipments negatively impact goods movement supply chains, decrease the competitive position of the trucking firms, and oftentimes result in direct monetary penalties imposed on the offending trucking firm. This problem of unreliability has become particularly important in recent years with the advent of "Just-in-Time Delivery" requirements as part of the normal supply chain process. In addition, if unreliability becomes a significant regional problem, it could negatively impact the region's overall business climate and growth potential. Since Atlanta is a crossroads for goods shipments across the entire Southeastern U.S., unreliability in Atlanta could also negatively impact through traffic to other subregional markets. Therefore, there is a strong incentive for trucking firms and metropolitan regions to have reliable operations. Changes in truck travel-time reliability should to be measured to accurately convey all of the potential benefits of truck-only lanes.

F.1 Defining Reliability

The Federal Highway Administration operates the Mobility Monitoring Program to track and report traffic congestion and travel reliability across the country. In this program, reliability is measured using a buffer index. The buffer index is defined as the percent of minutes that need to be added to the average travel time of a trip in order to insure that the traveler will arrive on time at least 95 percent of the time. The buffer index was developed to account for the variability in travel time between origins and destinations. For example, suppose the average travel time from Marietta to Decatur is 30 minutes during peak-hour conditions. However, in 100 field observations of peak-hour travel time between Marietta and Decatur, five of the travel times were over 45 minutes, while the rest were less than 45 minutes. This would mean that a driver would need to allow 45 minutes of travel time to be on time to Decatur from Marietta 95 percent of the time. This extra 15 minutes that is added to travel time is a measure of the reliability of the trip travel time. The buffer index for this trip would be 50 percent, 15 divided by 30. In other words a driver would need to add 50 percent more time (i.e., 15 minutes in this case) to the average peak-period travel time of 30 minutes to ensure on-time arrival for 95 percent of trips between the two locations. The higher the buffer index, the less reliable is the trip travel time.

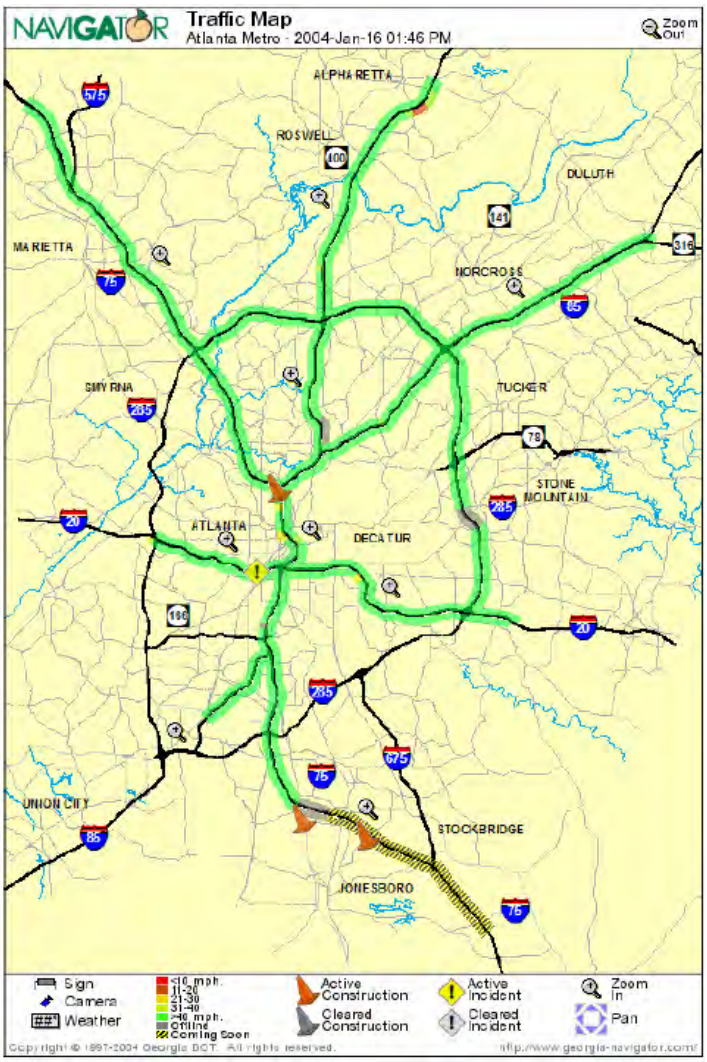
F.2 Measuring Reliability

According to the Mobility Monitoring Report[6], the buffer index varies for different road segments depending on several variables, including congestion, road geometry, road construction activity, and weather. However, for purposes of measuring reliability for a large geographic area, the level of congestion is the primary driving factor. For the

[6] Federal Highway Administration, Monitoring Urban freeways in 2003: Current Conditions and Trends from Archived Data, December 2004.

Mobility Monitoring Report, buffer indexes were estimated by using traffic detector data that were originally collected for traffic operations purposes in 10 different cities. One of the monitored cities for the report is Atlanta. The data source for Atlanta is the Navigator database collected by the Georgia DOT's Transportation Management Center (TMC) in Atlanta. The TMC collects real-time operational data of freeway conditions for 91 of the 302 freeway miles in the Atlanta metropolitan area using video imaging and microwave radar detectors. The coverage area is shown below in green and yellow highlights in Figure 25. Data collection is 24 hours a day and 365 days a year allowing for the estimation of free flow speeds, congested speeds, 95th percentile speeds, and buffer indexes for the metropolitan area.

Figure 25: Atlanta TMC Coverage Area (2004)



Source: FHWA Monitoring Urban Freeways in 2003

The buffer indexes and travel time indexes as measured on Atlanta freeways from 2000 to 2003 are shown below in Table 11 for various corridors of the freeway system. The travel time index is a measure of congestion of the corridor. It is the ratio of peak-period travel times to free flow travel times.

Table 11: Travel Time Index and Buffer Index for Atlanta

Corridor	Travel Time Index			
	2000	2001	2002	2003
ATLANTA				
I-75A, NB (I-285 to I-20 7.72 miles	1.09	1.13	1.11	1.14
I-75A, SB (I-20 to I-285 7.36 miles)	1.05	1.10	1.08	1.15
I-75B, NB (I-20 to I-85 Split 3.73 miles)	1.21	1.32	1.30	1.58
I-75B, SB (I-85 Split to I-20 4.04 miles)	1.38	1.66	1.56	1.88
I-75C, NB (I-85 Split to I-285 8.95 miles)	1.11	1.17	1.09	1.11
I-75C, SB (I-285 to I-85 Split 9.63 miles)	1.05	1.09	1.12	1.19
I-85A, NB (Camp Creek Parkway to I-75 4.18 miles)	1.02	1.01	1.01	1.02
I-85A, SB (I-75 to Camp Creek Parkway 4.05 miles)	1.02	1.01	1.01	1.01
I-85B, NB (I-75 to Jimmy Carter Boulevard 14 miles)	1.07	1.16	1.49	1.13
I-85B, SB (Jimmy Carter Boulevard to I-75 13.6 miles)	1.10	1.12	1.09	1.14
	Buffer Index			
I-75A, NB (I-285 to I-20 7.72 miles)	21%	29%	33%	35%
I-75A, SB (I-20 to I-285 7.36 miles)	12%	22%	25%	33%
I-75B, NB (I-20 to I-85 Split 3.73 miles)	48%	59%	58%	100%
I-75B, SB (I-85 Split to I-20 4.04 miles)	24%	36%	32%	56%
I-75C, NB (I-85 Split to I-285 8.95 miles)	30%	39%	32%	35%
I-75C, SB (I-285 to I-85 Split 9.63 miles)	13%	29%	42%	50%
I-85A, NB (Camp Creek Parkway to I-75 4.18 miles)	6%	1%	1%	3%
I-85A, SB (I-75 to Camp Creek Parkway 4.05 miles)	7%	8%	5%	8%
I-85B, NB (I-75 to Jimmy Carter Boulevard 14 miles)	22%	49%	19%	23%
I-85B, SB (Jimmy Carter Boulevard to I-75 13.6 miles)	41%	37%	31%	34%

Source: FHWA Mobility Monitoring Reports 2000 to 2003.

F.3 Estimating the Buffer Index

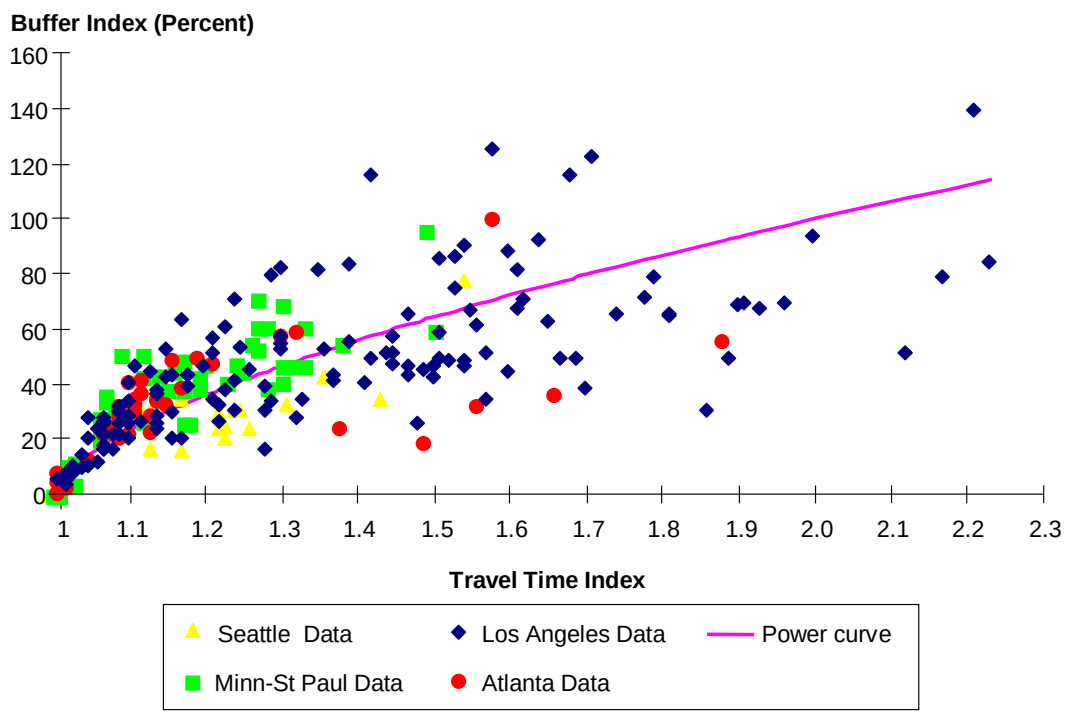
By plotting the buffer index relative to the travel time index a relationship can be observed between these two variables. The scatterplot of the data in Table 11 is shown below in Figure 26 and augmented by similar data collected in Seattle, Los Angeles, and Minneapolis-St. Paul. The data indicate that there is a power curve relationship between

the travel time index (TTI). A regression of these data confirms this relationship quantitatively with an R-square of 71 percent and a regression equation of

$$BufferIndex = (TTI - 1)^{0.634}$$

This implies that there is a predictable relationship between the reliability of a freeway segment and the congestion of a freeway.

Figure 26: Buffer Time verses Travel Time Index (2000-2003)



F.4 Implications for GDOT Truck Lanes Needs Identification Study

This analysis has established a relationship between congestion and reliability. This relationship will be used in upcoming analyses on this study to estimate of the benefits of truck-only lanes. This will be particularly important for monetizing the benefits of the truck-only lanes during the financial feasibility assessment. It may be more meaningful to use the increased reliability rather than the decrease in average travel time as the benefit that may occur due to truck-only lanes. This is because most trucking companies operate their trucks with buffers built into their travel times to account for the unreliability of the road system. Also, since truck volumes and percentages are highest during off-peak hours, when commuter traffic and overall congestion is relatively low, the truck lanes may not impact congestion as much as reliability. The next step in this process is to develop a relationship between the TTI that is used in this analysis and the congested and free flow travel times, which are used to compute TTI that is available through the model application process.

The reliability times, as a buffer index are shown for the six truck-only lane scenarios described in previous section are shown in Figures 28 though 32 and Tables 12 through 17 are summarized in Table 18.

The SWTP model was used to assign base year auto and truck trips to the base year existing network. As discussed in Chapter 2, these volumes do not include traffic moving within a county. In the 2005 SWTP, the percentage change in model volumes for a scenario compared to the base model volumes was applied to the observed traffic count in order to adjust for these missing intra-county trips. Table 12 shows the comparison between the Existing Scenario Travel Time Indexes and Buffer Indexes as calculated from the model and those calculated based on the observed V/C ratios. Since the Buffer Indexes in this phase of the truck-only lane study will only be used for the comparison and screening of alternatives, an adjustment to the absolute observed conditions is not necessary.

Figure 27: Existing Scenario Reliability

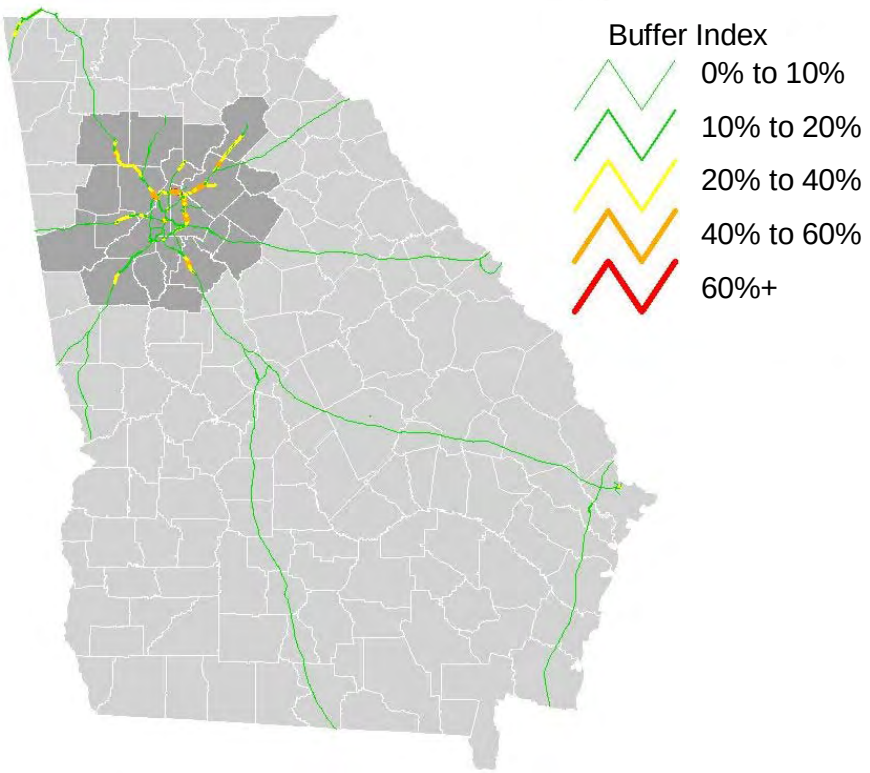


Table 12: Existing Scenario Reliability

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes		Observed General Purpose Lanes	
	Travel Time Index	Buffer Index	Travel Time Index	Buffer Index
I-75 TN to Macon	1.07	18%	1.54	68%
Other Atlanta Interstates	1.07	18%	1.75	83%
All Other Interstates	1.01	4%	1.01	5%

Note: TTI: Travel Time Index, the ratio of congested travel time to uncongested travel time.
BI: Buffer Index: The additional planned time, as a percentage of congested travel time, that must be allowed to meet a scheduled arrival for 95 percent of all trips.

Figure 28: Existing plus Truck-Only Lane Scenario Reliability

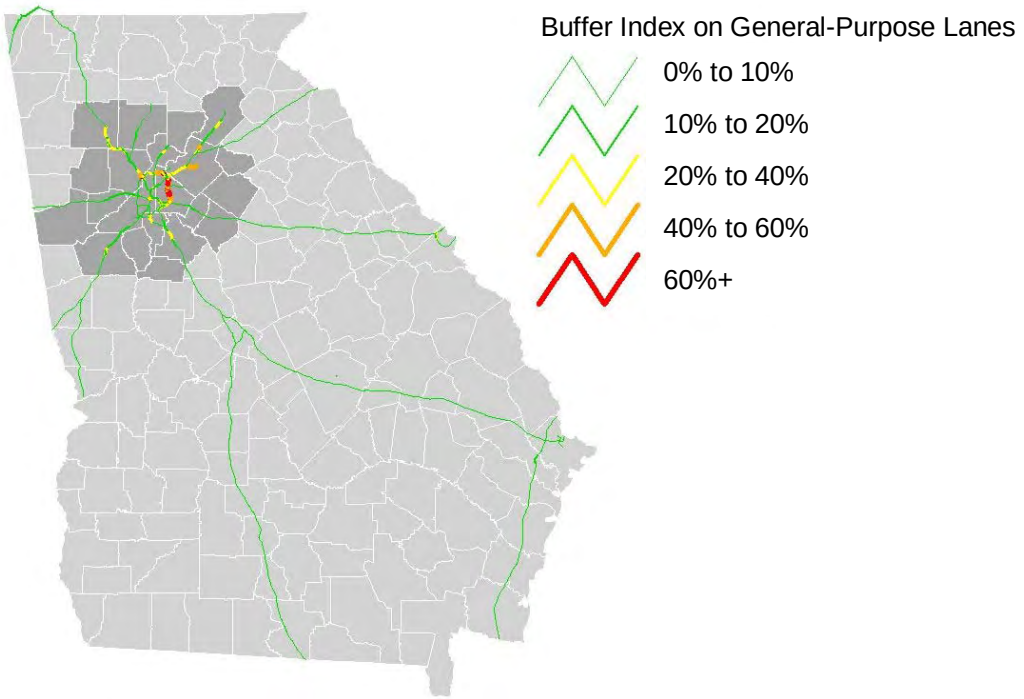


Table 13: Existing plus Truck-Only Lane Scenario Reliability

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes Travel Time Index	Modeled General Purpose Lanes Buffer Index
I-75 TN to Macon	1.06	16%
Other Atlanta Interstates	1.08	20%
All Other Interstates	1.01	3%

Figure 29: Future No-Build Reliability

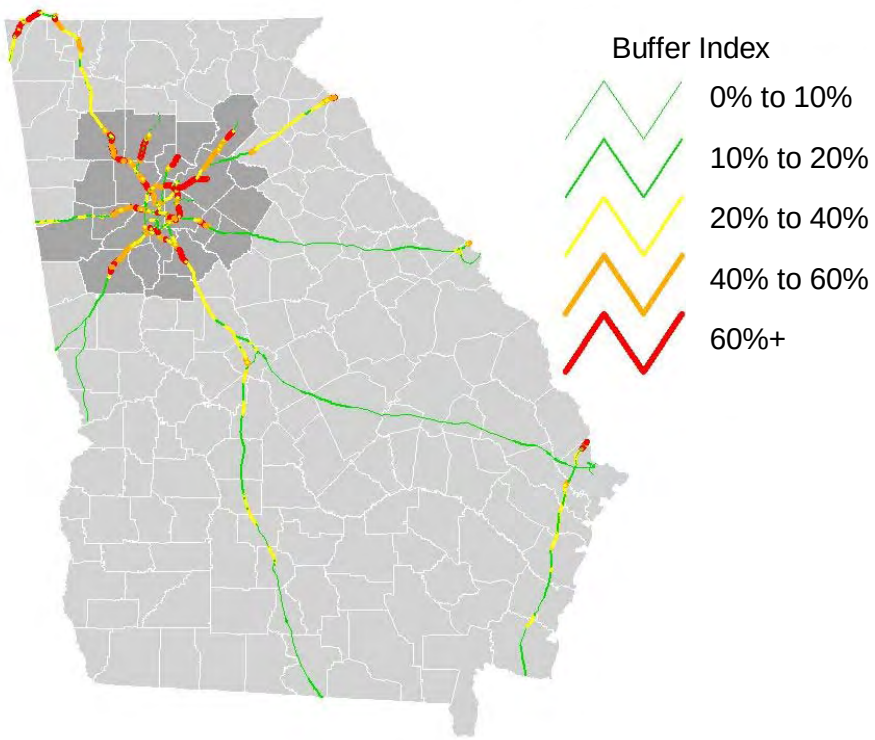


Table 14: Future No-Build Reliability

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes Travel Time Index	Modeled General Purpose Lanes Buffer Index
I-75 TN to Macon	1.34	51%
Other Atlanta Interstates	1.32	49%
All Other Interstates	1.06	17%

Figure 30: Base – Existing plus Long-Range Program Scenario Reliability

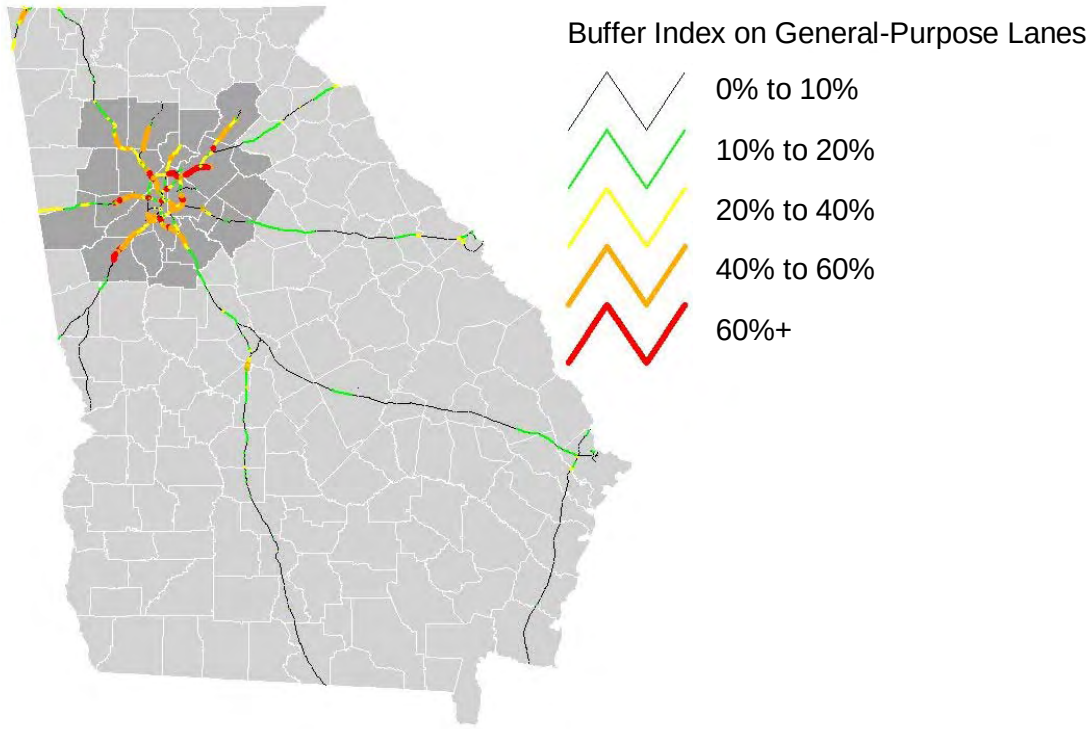


Table 15: Base – Existing plus Long-Range Program Scenario Reliability

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes Travel Time Index	Modeled General Purpose Lanes Buffer Index
I-75 TN to Macon	1.20	36%
Other Atlanta Interstates	1.24	40%
All Other Interstates	1.03	11%

Figure 31: Test Case A – Existing plus Truck-Only Lane Reliability

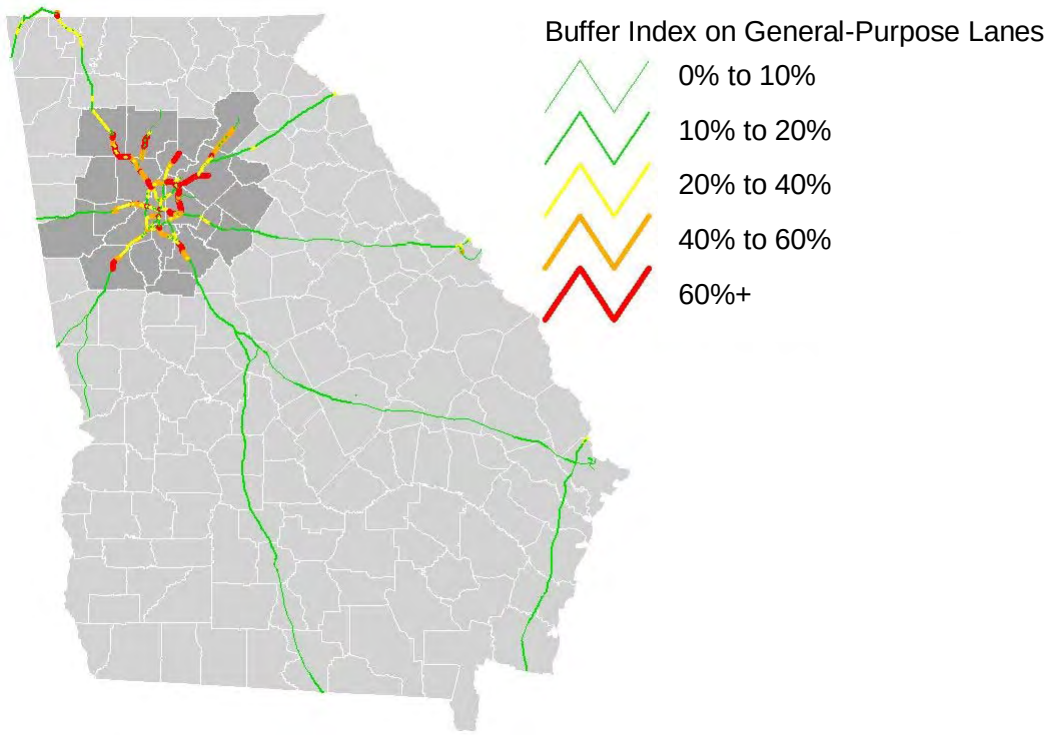


Table 16: Test Case A – Existing plus Truck-Only Lane Reliability

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes Travel Time Index	Modeled General Purpose Lanes Buffer Index
I-75 TN to Macon	1.26	43%
Other Atlanta Interstates	1.27	44%
All Other Interstates	1.03	11%

Figure 32: Test Case B – Existing plus Long Range Program plus Truck-Only Lane Scenario Reliability

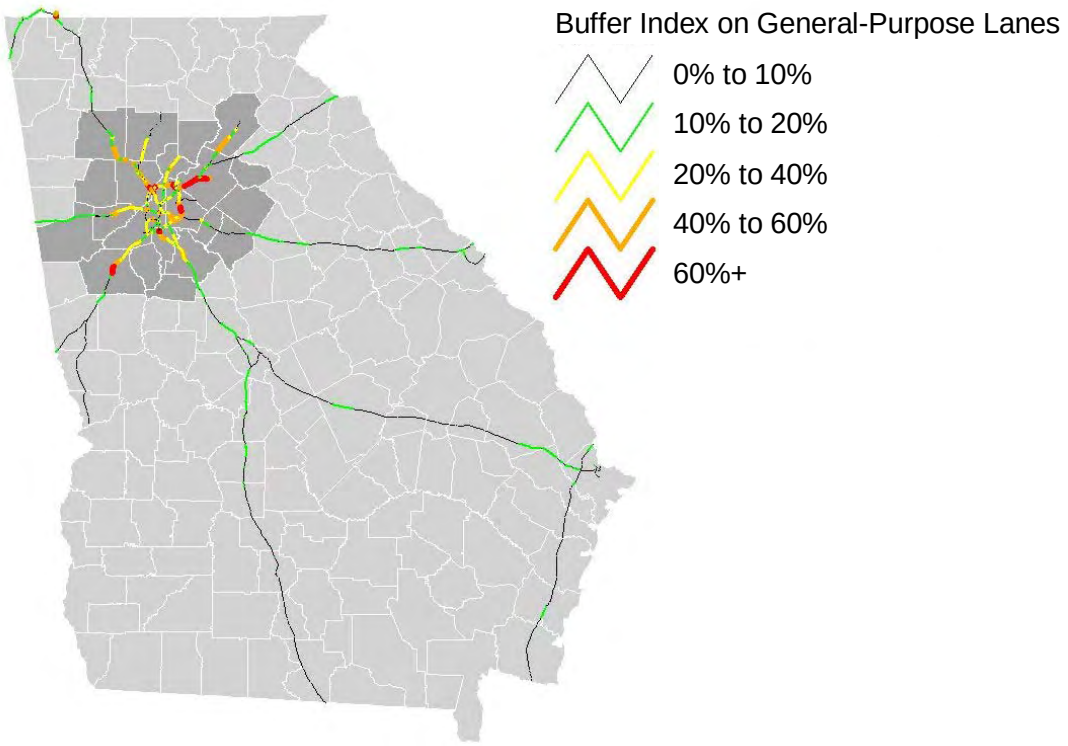


Table 17 Test Case B – Existing plus Long-Range Program plus Truck-Only Lane Scenario Reliability

Truck-Only Lane Analysis Segments	Modeled General Purpose Lanes Travel Time Index	Modeled General Purpose Lanes Buffer Index
I-75 TN to Macon	1.16	31%
Other Atlanta Interstates	1.21	37%
All Other Interstates	1.02	9%

Table 18: Summary of Reliability

Truck-Only Lane Analysis Segments	Base Case Buffer Index	Reduction from Base Case Test Case A	Reduction from Base Case Test Case B
I-75 TN to Macon	36%	43% (+7%)	31% (-5%)
Metro Atlanta	40%	44% (+4%)	37% (-3%)
All other Interstates	11%	11% (0%)	9% (-2%)

CHAPTER 5

OFF-MODEL ANALYSES

The statewide travel demand model was not used to support all of the analyses in this memorandum. Certain topics such as safety and mode shift did not lend themselves to modeling and the analyses were conducted using other available data. Those analyses are discussed in this section.

A. Potential Rail to Truck Mode Shift

The trucking industry and the rail industry often compete for the business of shipping companies. As one of these freight modes improves its infrastructure or operations, its competitive position may improve compared to the other mode and it has the potential to increase its mode share. The purpose of this analysis is to describe the potential impact of truck-only lanes on the truck-rail mode split. This was done by estimating a reasonable range of diversion that might be expected based on divertible markets in the State and the commodity flow data in the TRANSEARCH database.

B. Divertible Commodities

Due to the operational characteristics of railroads, they are better suited to carry some commodities as compared to others. In particular, railroads often carry bulk goods. However, rail is starting to carry a wider range of goods by increasing the use of intermodal containers. The trucking mode is more flexible relative to rail, but operates at a higher cost for long-distance shipments. These characteristics narrow the field in terms of commodities that can reasonably be transported by either truck or rail and in turn limits the divertible commodities for a truck-rail mode split analysis. One method to identify the divertible commodities is to determine which commodities truck and rail modes currently compete. This can be done by analyzing the 2004 TRANSEARCH commodity flow database. It is a good rule of thumb that commodities for which truck and rail each have at least a 10 percent market share relative to the total combined market for truck and rail are considered to be divertible commodities. Tables 19 and 20 show the divertible and non-divertible commodities based on the truck and rail percent.

Table 19: Divertible Commodities

Divertible Commodities	Truck Percent	Rail Percent
Farm Products	71%	29%

Divertible Commodities	Truck Percent	Rail Percent
Transportation Equipment	78%	22%
Pulp, Paper or Allied Products	80%	20%
Chemicals or Allied Products	80%	20%
Clay, Concrete, Glass or Stone	83%	17%
Primary Metal Products	86%	14%
Petroleum or Coal Products	89%	11%
Food or Kindred Products	90%	10%

Table 20: Non-divertible Commodities

Non-divertible Commodities	Truck Percent	Rail Percent
Captive to Truck		
Apparel or Related Products	92%	8%
Nonmetallic Minerals	92%	8%
Lumber or Wood Products	92%	8%
Electrical Equipment	96%	4%
Furniture or Fixtures	97%	3%
Printed Matter	97%	3%
Rubber or Miscellaneous Plastics	97%	3%
Miscellaneous Manufacturing Products	98%	2%
Leather or Leather Products	98%	2%
Machinery	99%	1%
Textile Mill Products	99%	1%
Fabricated Metal Products	99%	1%
Instrum, Photo Equipment, Optical Equipment	100%	0%
Tobacco Products	100%	0%
Secondary Traffic	100%	0%
Captive to Rail		
Coal	0%	100%
Waste or Scrap Materials	0%	100%
Metallic Ores	0%	100%
Shipping Containers	0%	100%
Miscellaneous Freight Shipments	0%	100%
Waste Hazardous Materials	0%	100%
Shipper Association Traffic	0%	100%
Freight Forwarder Traffic	0%	100%
Forest Products	0%	100%
Fresh Fish or Marine Products	0%	100%
Small Packaged Freight Shipments	0%	100%
Crude Petroleum or Natural Gas	0%	100%
Miscellaneous Mixed Shipments	0%	100%
Ordnance or Accessories	2%	98%
Mail or Contract Traffic	7%	93%

The main divertible commodities are farm products, transportation equipment, pulp and paper products, and chemicals. In contrast, products such as tobacco and photo equipment are fully captured by truck, while coal and metallic ores are fully captured by rail.

B.1 Divertible Origin-Destination Combinations

Rail freight has high-fixed costs and low-variable costs relative to the trucking industry. The high-fixed costs of rail are the result of expensive infrastructure that is developed and maintained by the railroads compared to highway infrastructure which is funded by fuel taxes paid by both truck and auto users. The high-fixed costs of rail are also due to the cost of the trains themselves which are much more expensive than trucks on a per vehicle basis. The low-variable costs of freight rail are due to the high volumes of goods that can be carried by a train relative to a truck. These lower variable costs also translate into rail being cost-competitive with truck for shipments of 500 miles or more. Therefore, the divertible origin-destination combinations are those whose origins are at least 500 miles from their destinations. Of particular relevance for Georgia freight flows is that no intrastate flows would be candidates for diversion. Only interstate and through flows are likely to be diverted between truck and rail.

B.2 Potential Diversion Scenarios

For this study, potential diversion from rail to truck was analyzed. This is because the truck-only lanes have the potential to improve the efficiency of trucks and therefore increase their competitiveness relative to rail. Using the truck trip table developed for the statewide model, diversionary commodities and origin-destination pairs were identified. To estimate the diversion potential, the divertible flows from the TRANSEARCH database were extracted from the rail portion of the database. These potentially divertible flows total over 61 million tons out of the total 104 million rail tons in the database.

A practical method for examining the impact of potential rail-to-truck diversions is to analyze the impact of rail diversions at various levels on trucking activity in the State. A reasonable range of diversions is between 5 and 15 percent of current rail flows. The cross elasticity of demand for truck and rail is 0.52,[7] which means that a 1 percent decrease in truck costs will result in a 0.52 percent shift in rail demand to truck. A 5 to 15 percent diversion from truck to rail would therefore only be expected to occur if truck costs were reduced by 9.6 to 28.8 percent, respectively. While the impact of the 5 to 15 percent diversion from rail will be discussed further, it is noted that the implementation of truck-only lanes in Georgia, which would only impact a small portion the long-distance travel between markets served by rail, would be unlikely to achieve even the 9.6 reduction in truck time and costs associated with the 5 percent rail diversion.

Using a ton per truck payload factor of 17 and a ratio of 306 for average weekday truck volume relative to annual truck volume, the potential truck trips generated per day by the rail-to-truck diversion ranges from 586 to 1,757. Table 21 below shows the rail tons diverted in each scenario, the increase in truck trips generated and the percent increase

[7] The Intermodal Competition Model, Association of American, Railroads, Washington, D.C., September 1988 as reported in Characteristics and Changes in Freight Transportation Demand, prepared by Cambridge Systematics for NCHRP 8-30, June 1995.

over the base year number of truck trips in the model. The total number of daily truck trips in the model is 299,094.

Table 21: Truck Trips Generated by Diversion Scenarios

Percent of Rail Traffic Diverted to Truck	Annual Rail Tons Diverted (Millions)	Daily Equivalent Truck Trips Generated	Percent Increase in Total Daily Truck Trips
5%	3.047	586	0.2%
10%	6.095	1,172	0.4%
15%	9.142	1,757	0.6%

A corridor analysis also was used to gain another perspective of the potential for truck-rail diversion. Using the commodity flow data and routing information provided in the TRANSEARCH database, diverted truck flows were routed onto I-75 to determine the impact under different scenarios. I-75 was chosen for this analysis due to its high truck volume. Table 22 shows the volume of tons routed on to the corridor at different diversion levels.

Table 22: Truck Tons on I-75 Corridor Before and After Diversion

Percent of Rail Traffic Diverted to Truck	Tons Diverted to Truck on I-75 Corridor (Millions)	Percent Increase in Truck Tons on I-75 Corridor
5%	1.739	0.93%
10%	3.477	1.86%
15%	5.216	2.78%

B.3 Implications for GDOT Truck Lanes Needs Identification Study

As shown in Table 21, the percent increase in total truck trips for even the most aggressive diversion scenario is relatively small. The 0.6 percent increase in total daily truck trips under a 15 percent diversion scenario represents half of the amount of truck trips added to the State based on normal economic growth in just one year. Similarly, the percent increase on the I-75 corridor is 2.78 percent under the most aggressive diversion scenario and only 0.93 percent under a more likely scenario, amounts which are also more typical with annual growth rates. These increases would only be realized at the end of *30 years* of increasing attractiveness of truck versus rail due to truck-only lanes. Both of these analyses indicate that the impact of rail-to-truck diversion in the truck-only lane analysis would be negligible, typically the amount experienced by normal growth in a *single year (2.9 percent as currently forecast)*.

This study is only considering truck lanes, and not improvements to rail infrastructure. Clearly, there is ample freight to go around for both modes, and freight demand is growing rapidly. Since private railroads control the rail freight infrastructure, it is more difficult for the public sector to influence infrastructure investment decisions. The public and private sectors should work together to ensure continued investment in both truck and rail freight infrastructure.

C. Safety: Truck-Related Fatal Crashes

As shown in Tables 23 and 24, which are taken directly from Technical Memorandum 1, while the property damage and injury crash rates for auto and trucks are similar, the fatal crash rate of trucks (0.89 per 100 MVMT) is almost 2.5 times greater than the fatal crash rate of all vehicles (0.34 per 100 MVMT) on controlled-access state-administered roads.

Table 23: Annual Crash Rates per 100 Million Vehicle Miles of Travel (100 MVMT) for All State-Administered Roads

	Crash Rate Trucks	Crash Rate All Vehicles	Injury Crash Rate Trucks	Injury Crash Rate All Vehicles	Fatal Crash Rate Trucks	Fatal Crash Rate All Vehicles
Total	145.93	145.38	32.28	32.84	1.11	0.40

Table 24: Annual Crash Rates per 100 Million Vehicle Miles of Travel (100 MVMT) for Controlled-Access State-Administered Roads

	Crash Rate Trucks	Crash Rate All Vehicles	Injury Crash Rate Trucks	Injury Crash Rate All Vehicles	Fatal Crash Rate Trucks	Fatal Crash Rate Trucks
Total	165.40	144.93	35.24	31.46	0.89	0.34

Further investigation of the truck fatal crashes suggests that this higher rate is almost exclusively due to truck crashes involving autos. It is understood that due to vast differences in size and weight, that crashes between trucks and autos are much more likely to result in fatalities. Shifting of trucks into truck-only lanes will reduce conflicts with autos and the potential for trucks and autos to be involved in crashes with each other. It should not decrease the fatal crash rate for autos (although changes in volume may change the total number) and should not change the fatal crash rate for trucks, consisting of single truck or multi-truck crashes. For purposes of this analysis, it was assumed that shifting trucks to truck-only lanes should reduce the crash rate associated with travel in those lanes to a rate comparable to autos and that the safety benefit will be

the difference in fatal truck crash rates, (0.87 to 0.34) or 0.53 per 100 MVMT. This difference should be applied to the truck travel that is shifted to the truck-only lanes. This truck travel, as Daily VMT, determined for the truck-only lanes as presented in this report.

It should be noted that a number of simplifying assumptions are being made. It is assumed that the crash rate for trucks in the truck-only lanes is similar to that of all other vehicles. Design features of the truck-only lane may make these rates increase or decrease. The route shifting of trucks into the general-purpose lanes is not considered because crashes associated with these trucks would have occurred on arterials from which they are diverted. This assumption does not consider changes in truck VMT that might result from this diversion. Additionally, it is assumed that the auto-truck fatal crash rate will remain unchanged in the general-purpose lanes after trucks have shifted into the truck only lanes. Also, advances in vehicle and road design or driver behavior in the future that might reduce truck or all vehicle fatal crash rates cannot be estimated and are not considered.

According to the Base Case, as described at the beginning of Chapter 4, daily truck VMT on all state roads is 35 million miles and expressed on an annual basis would be 12.8 billion miles. The fatal crash rate for trucks on all state roads is 1.11 per 100 MVMT (the 0.89 rate is on expressways only), there would be an expected 142 fatal crashes where at least one vehicle was a truck in 2004 on all state roads. The National Highway Safety Administration's Fatal Accident reporting system reports that in 2004 there were 233 fatal truck crashes in Georgia on all roads. Considering that the model does not include any travel on non-state roads, intra-county travel, and travel from the freight loading point (centroids) in the county to the state road network, the estimated and observed fatal truck crashes compare favorably.

According to the 2035 Long-Range Program Scenario model assignment annual truck VMT on state-administered expressways that are the focus of this study, not all state roads, is expected to be 16.1 billion miles. If the fatal crash rate of 0.87 fatal truck crashes per 100 MVMT for state-administered expressway is assumed to remain the same in 2035, the estimated number of fatal truck crashes on state-administered expressways would be 140 fatal crashes per year.

The hypothesis in this section is that the trucks shifted to the truck-only lanes would have fatal crash rates of only 0.34 per 100 MVMT, which is the rate for all vehicles, not the fatal crash rate of 0.87 per 100 MVMT which is the rate for trucks in general-purpose lanes. From the model assignment described in Section D, Test Case A – Future No-Build plus Truck-Only Lane Scenario, annual truck VMT on the Truck Only Lanes would be 6.1 billion miles. If the fatal crash rate associated with these trucks was 0.87 per 100 MVMT, there would be an expected 53 fatal truck-related crashes associated with this travel. If the fatal crash rate was reduced to 0.34 per 100 MVMT, there would be an expected 20 fatal truck-related crashes. The difference attributable to the shift of trucks to the truck-only lanes would be a reduction of 33 fatal truck-related crashes in 2035.

From the model assignment described in Section E, Test Case B – Future Tpro plus Truck-Only Lane Scenario, annual truck VMT on the Truck Only Lanes would be 3.7 billion miles. If the fatal crash rate associated with these trucks was 0.87 per 100 MVMT, there would be an expected 32 fatal truck-related crashes associated with this travel. If the fatal crash rate was reduced to 0.34 per 100 MVMT, there would be an

expected 12 fatal truck-related crashes. The difference attributable to the shift of trucks to the truck-only lanes would be a reduction of 20 fatal truck-related crashes in 2035.

These reductions are only meant to convey the relative reduction in fatal truck crashes. The occurrence and actual number of fatal truck crashes is highly random and subject to additional forces and circumstances not considered in this analysis.

D. Savannah Establishment Surveys

This section reports on the collection and processing of survey data of freight facilities along the Savannah River. The primary purpose of this data collection effort was to determine if there are a significant number of trucks coming to and from warehouse and terminal facilities in Chatham County. These short drayage trips are not explicitly accounted for in the Savannah regional travel demand model available for use at beginning of this study but could representative a significant number of trips accessing the Port of Savannah on a daily basis. Newer versions of the regional travel demand model developed in support of GDOT's current Chatham County Interstate Study and SRTA's current Northwest Tollway Study use more recent data to remedy some of these deficiencies. Additionally, this data collection effort was used to determine the origin-destination patterns of trucks from these facilities and determine if this traffic is related to the Port of Savannah.

The companies in this survey were identified by Georgia Ports Authority staff as having significant facilities located along the Savannah River. There were 12 companies identified in total. Seven companies agreed to participate in the survey; two declined participation and the other three did not respond to inquiries. Unresponsive companies were contacted at least four times to attempt to gain participation. Table 25 lists the survey participants.

Table 25: Survey Participants

Company	Response
Newport Terminals	Agreed to participate
East Coast Terminals	Agreed to participate
Weyerhauser Paper	Agreed to participate
GAF Materials Corporation	Agreed to participate
Kerr McGee Chemical	Agreed to participate
International Paper	Agreed to participate
Atlantic Wood Industries	Agreed to participate
Vopak Corporation	Declined to participate
Colonial Land Company	Declined to participate
National Gypsum of Georgia	No response
Citgo Asphalt Refining	No response
Georgia Pacific Gypsum Products	No response

The survey consisted of the following seven questions:

1. What is the number of trucks entering your facility on a daily, weekly, or monthly basis?
2. For inbound trucks, what percent are coming from the Port of Savannah?
3. For inbound trucks, what percent are coming from elsewhere in the Savannah region?
4. For inbound trucks, what percent are coming from outside the Savannah region?
5. For outbound trucks, what percent are coming from the Port of Savannah?
6. For outbound trucks, what percent are coming from elsewhere in the Savannah region?
7. For outbound trucks, what percent are coming from outside the Savannah region?

Survey questions were kept simple to respect the time of the survey participants. Therefore, a short questionnaire was used to maximize the response rate of surveyed firms. The responses of individual firms are shown below in Table 26. The identity of the firms is not shown to ensure that competitive information remain anonymous.

Table 26: Survey Responses

Truck Volumes per Day	Inbound			Outbound		
	Port of Savannah	Savannah Region	Outside the Savannah Region	Port of Savannah	Savannah Region	Outside the Savannah Region
160 trucks	0%	20%	80%	0%	20%	80%
75 to 90 trucks	47%	47%	6%	47%	47%	6%
40 to 60 trucks	0%	0%	100%	0%	0%	100%
50 to 75 trucks (per month)	0%	1%	99%	0%	1%	99%
65 trucks	0%	25%	75%	0%	25%	75%
400 trucks	0%	50%	50%	0%	50%	50%
45 trucks	Declined to respond					

The survey results illustrate key information relative to travel demand. First, the number of trucks departing from these facilities is not significant relative to the trucks generated by the Port of Savannah, which itself is in excess of 5,000 trucks per day from its two

main gates.[8] The largest firm had 400 trucks per day. All seven responding firms combined account for between 767 and 823 trucks per day. The second key result is that truck trips between these facilities and the port are relatively minimal. Only one of six responding firms had truck trips between their facilities and the Port of Savannah. It can be concluded from this response that the primary reason for these facilities location along the Savannah River was due to the industrial nature of that location, not necessarily to utilize any waterborne transportation services. The last observation from these results is that there is a large fraction of trucks from these facilities do not make any stops within the region, but are actually connecting to points further inland from the Savannah region. A weighted average of the responses shown in Table 26 indicates that 57 percent of the trucks from the surveyed firms have their inbound and outbound trips outside of the Savannah region.

The survey results suggest that the industrial facilities that are located along the Savannah River are not overly significant in terms of the number of trucks generated on an average day and movement between the facility and the Port of Savannah represents a fraction of the total number of truck entering and exiting the Port on a daily basis. None of the surveyed warehouse facilities are large enough to warrant truck lanes connecting between each facility and the larger regional road network. Additionally, truck volumes in and out of the facilities are not large enough to require special consideration in the Savannah regional travel demand model being used to estimate the impacts of truck-only lanes in Phase II of this study.

However, as determined in Technical Memorandum 1 and the related studies, there is substantial truck traffic moving between the Port, nearby warehouse and distribution centers, and origins and destinations outside of the region. The recent improvements to the MPO's regional model will better capture these complex movements and will be available to support Phase II analyses.

[8] The Port-related trips were previously described and accounted for in Technical Memorandum 1 and the Port gate survey described therein.

CHAPTER 6

GOALS, OBJECTIVES AND POLICIES

A. Introduction

The purpose of this chapter is to define goals, objectives, and policies that reflect the values of the State of Georgia and the challenges facing the state in providing transportation infrastructure and transportation services for current and future truck travel. These goals are the basic building blocks for developing Georgia's Statewide Truck Only Lanes Needs Identification Study.

To develop these goals, federal, state, and local guidelines were reviewed to assure statewide consistency. Goals adopted by other state, regional, and local transportation agencies were also examined.

To promote consistency with local preferences, the goals and objectives were presented to the study Advisory Committee and were shaped by stakeholder response.

In addition to creating an investment vision and framework of achievement, establishing goals, objectives, and policies during the study process is important because they relate to the state's long-term freight transportation challenges and opportunities. This report describes how each of the goals, objectives, and policies respond to identified challenges or opportunities.

Before this study was initiated, modal needs specific to transportation services (such as aviation, rail, transit, and bicycle and pedestrian) were identified for the Georgia Department of Transportation (GDOT) in the form of a Statewide Transportation Plan. This chapter discusses the general themes and principles represented in the statewide transportation plan and their relationship to the specific goals, objectives and policies developed for the Statewide Truck Lanes Needs Identification Study.

For the successful long-term implementation of truck-only lanes, an evaluation and continuous monitoring process must be established. The next steps in the truck lane development program will be to develop performance measures that will identify specific projects that have a desired impact on meeting the state's long-term vision.

The first Phase of the Statewide Truck Lanes Needs Identification Study brought GDOT and its stakeholders to an understanding of the core principles that will help guide

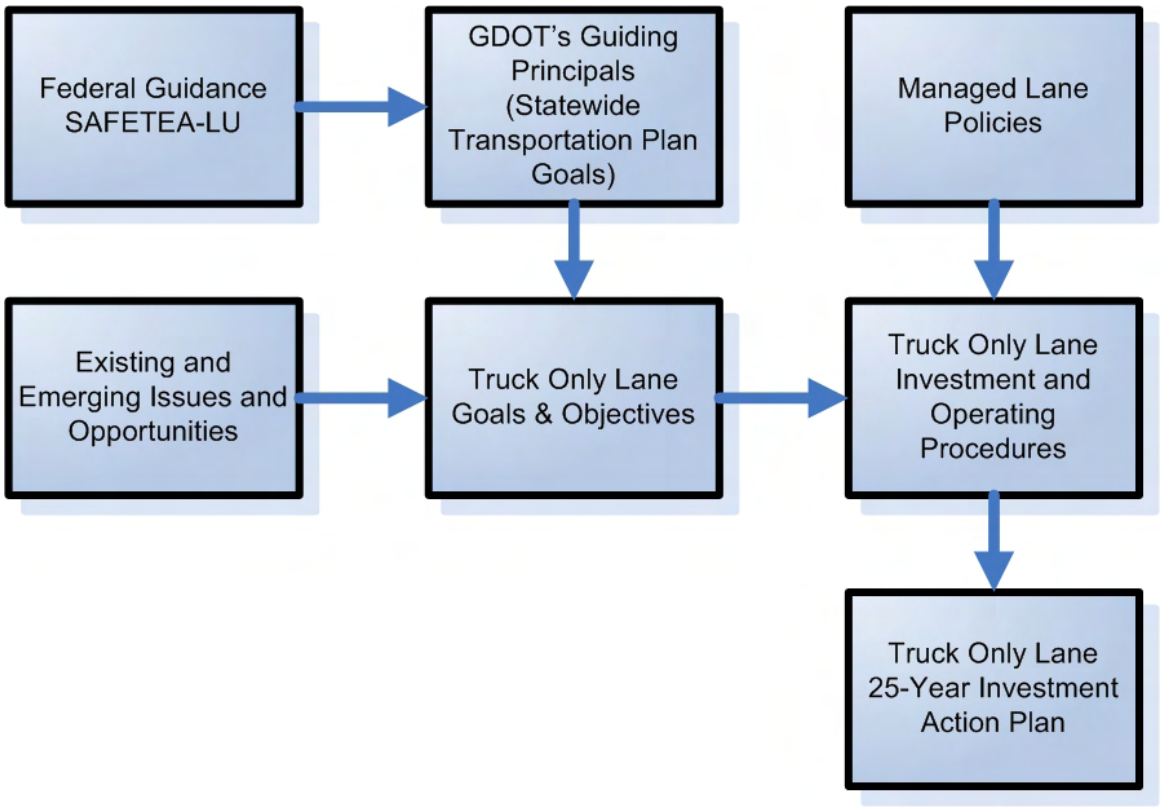
GDOT's actions over the long term. Ultimately, supporting policies will guide the state's future truck lane investments in the long-range (25-year), intermediate-range (10-year), and short-range programs (6-year State Construction Work Program).

The truck-only lane vision emphasizes efficient freight mobility and other socio-economic and social goals of Georgia, such as fostering a robust state economy linked to global markets, reducing congestion and improving levels of service, and enhancing safety on all transportation systems.

The proposed Guiding Principles are designed to describe the foundation for Georgia's transportation system and are adopted directly from the Statewide Transportation Plan. Goals are broad concepts that, when realized, fulfill the State's vision for exclusive truck infrastructure. The objectives nested within each goal are specific, achievable improvements that advance a particular goal. When linked with performance measures, they will form the basis for evaluating progress in implementing the overall investment vision as defined in the Statewide Needs Identification Study and companion documents such as the Statewide Transportation Plan and Managed Lanes System Plan for metropolitan Atlanta.

The relationship of the Guiding Principles to the goals and objectives is shown below.

Figure 33: Goals, Objectives and Policies Framework



B. Transportation Planning Guidance

The Statewide Truck Only Lanes Needs Identification Study must be responsive to both federal guidelines and state regulations; both of these serve to form a framework for the study and to define the basic content.

B.1 Federal Guidelines

In providing mobility for people and goods, all levels of government are confronted with a rapidly changing environment. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), coupled with the Clean Air Act Amendments of 1990, provide an impetus for change in transportation planning and project implementation. This legislation directed the focus of transportation planning away from providing capacity for vehicles to efficiency for multimodal movement of people and goods, use of management systems in decision making, an enhanced role for Metropolitan Planning Organizations (MPO), air quality considerations, and similar elements.

Statewide and metropolitan transportation planning processes, required if federal highway or transit funds are used for transportation investments, are specified by federal law (23 USC 134 and 135). These federal planning regulations are codified in 23 CFR 450.

Statewide transportation plans integrate planning for multiple transportation modes to balance the mobility needs of the state with future revenue sources. To support this requirement, the Federal Highway Administration and the Federal Transit Administration have issued statewide transportation planning guidelines. These guidelines identify the following seven factors to be addressed in statewide plans:

(1) Support the economic vitality of the nation, the state, and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;

(2) Increase the safety of the transportation system for all motorized and non-motorized users;

(3) Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users;

(4) Increase accessibility and mobility of people and freight;

(5) Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;

(6) Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;

(7) Promote efficient system management and operation; and

(8) Emphasize the preservation of the existing transportation system.

The federal guidelines provide latitude to accommodate individual state needs and experiences. In creating its own set of Guiding Principles, GDOT has adopted these

guidelines and planning factors to suit its own unique circumstances. This convergence is described in this report.

B.2 State Guidelines[9]

The Federal government requires that each state develop, maintain, and update a Statewide Transportation Plan (SWTP). These requirements are codified in 23 CFR 450.212 and 450.214. Georgia's State Transportation Board has adopted the following policy for the Georgia Department of Transportation (GDOT) to follow:

> *The Department shall develop and maintain a long-range state transportation plan for all areas of the State as required under Title 32 of the Georgia Code, Section 32-2-3, and 23 Code of Federal Regulations, Part 450, Section 214. This plan shall provide for the development of transportation facilities that will function as an intermodal state transportation system and that will be a guide for implementation of transportation facilities in the State of Georgia.*

B.3 Georgia's Statewide Transportation Plan Goals

Reflecting both the federal and state guidance, GDOT has identified a set of Guiding Principles or Goals, which the Department has come to view as the basic building blocks for long-range planning. From these Guiding Principles, specific goals, objectives, and policies have been derived for the Statewide Truck Lanes Needs Identification Study, also reflecting perceived trends and resulting challenges. The seven Guiding Principles of Georgia's Statewide Long-Range Transportation Plan are:

- Preserve the existing system in good working order;
- Enhance safety on all transportation systems;
- Reduce congestion and improve levels of service;
- Facilitate connections among the various regions of the State;
- Improve access and mobility for all citizens;
- Support economic growth; and
- Enhance the quality of life.

C. Context for Goals and Objectives

To create a context for the development of truck-only lane (TOL) goals and objectives, and to reflect the Guiding Principles defined in Section B, it is helpful to draw on the work of others who have recently completed similar studies. Similarly, the goals should reflect the transportation challenges facing Georgia's freight community, and to the extent practical, should reflect and build upon the work done by the planning agencies of the state and by GDOT itself.

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[9] Georgia Department of Transportation, 2005-2035 Georgia Statewide Transportation Plan Update, January 2006.

C.1 Georgia Freight Transportation Trends and Challenges

The proposed GDOT Guiding Principles help to express a statewide vision, reach beyond the minimum state and federal planning guidelines, and respond specifically to identify state social and economic trends and the transportation challenges and opportunities posed by those trends.

As part of the Challenges and Opportunities element of this study, GDOT examined trends likely to influence the extent and magnitude of freight transportation services required to drive the state's economy and to meet mobility and reliability needs. Trends were identified in the following areas:

- Nationwide Freight Growth
- Goods Movement
- Energy
- Air Quality
- Financial Resources

These trends, and the challenges they imply, are summarizes in the table below.

Table 27: Freight Transportation Trends and Opportunities in Georgia

Nationwide Freight Growth	Challenges
Overall freight growth within the state, in surrounding states, and nationwide will contribute to increasing demand on the state's transportation system	▪ Maintaining and preserving the transportation network for current and future demand. ▪ Balancing the high-growth areas such as the Port of Savannah with non-freight-intensive but heavily traveled areas of the State. ▪ Investing in all mode of freight transportation. ▪ Improving our infrastructure to accommodate increasing numbers of trucks. ▪ Economic realities in the freight marketplace are increasing reliant on the (time and transportation) transit costs which in turn are tied to the performance of the transportation system.
Dispersing distribution facilities and a broadening marketplace will generate longer distance local deliveries and constitute an increasing amount of freight entering the state creating greater demand for transportation services.	▪ Improving the effectiveness and efficiency of the transportation system. ▪ Locating and bridging key distribution centers to each other and the transportation network.
Georgia's population will also be expanding and diversifying placing demands on the transportation network	▪ Meeting the transportation needs of a diverse traveling populations including autos, light and heavy-duty trucks. ▪ While we can look to the past to help us understand current travel trend, the past may not be a direct indication of future travel patterns.

Goods Movement	Challenges
Georgia's highway system will continue to serve as a conduit for interstate and intrastate freight and goods movement. The role of heavy trucks is expected to increase, contributing to highway congestion and highway maintenance challenges.	▪ Maintaining the interstate system at acceptable operating levels. ▪ Managing the spill-over affect of overcrowded interstates to state, county, and local routes. ▪ Providing truck-friendly, highly-classified routes to support the interstate system of highways. ▪ Providing alternative routes around congested metro areas and city centers. ▪ Providing transportation facilities in a fashion that does not negatively impact Georgia's communities or environment.
Georgia's supply chain is becoming more intermodal every day, increasing the need for improved, safe and efficient, connections between modes.	▪ Provide facilities to support the growing need to move freight between modes safely and efficiently. ▪ Improve transportation system reliability. ▪ Ensure the security of intermodal shipments traveling through the state.
The growth at the Port of Savannah is expected to be tremendous. This explosive growth will test the transportation system and spur a myriad of Port related warehouse and distribution facilities.	▪ Quantify the role of the Port of Savannah in Georgia's economic future. ▪ Providing the transportation infrastructure to support a doubling of freight movement at the Port. ▪ Providing supporting land-use in and around the Port. ▪ Continue to highlight the Port's economic attractiveness, market assessability, and world class supporting infrastructure.
Real-time logistics, such as "just-in-time" deliveries will tax all modes and place a premium on system reliability.	▪ Develop seamless modal connections and supporting transportation system to facilitate the efficient movement of high value commodities. ▪ Remain competitive in the national market to strengthen and boost the state's economy. ▪ Remain competitive in the national market and continue to promote Atlanta as a world logistics center.
Energy	**Challenges**
Georgians will continue to relay on petroleum as the primary driver of the transportation system, despite global concerns over supply, price, and security. Increasing energy costs negatively impact transportation system users. If price and supply fears are realized, this will ultimately lead to a paradigm shift in the way people and goods travel.	▪ Controlling energy costs to minimize negative impacts to operating budgets. ▪ Planning flexible infrastructure that can accommodate alternatives energies and changing travel patterns. ▪ Addressing idling trucks that impact air quality and consume more energy (especially in congested areas of the state). ▪ Increasing the efficiency of the transportation system to optimize the economy of its users. ▪ Providing educational material on alternative fuel sources. ▪ Providing incentives for the use of cleaner burning, more environmentally conscious fuels such as clean diesel.
Air Quality	**Challenges**
Increases in motor vehicle travel have contributed to poor air quality. Air quality requirements may slow or stop projects from being constructed during periods of conformity lapse – as was the case in metro Atlanta in the late 1990s. Trucks, as the primary mode for freight travel in Georgia, contribute significantly to the unacceptable air quality in Georgia	▪ Reducing mobile source emissions attributed to traffic and congestion. ▪ Migrating to more environmentally friendly transportation decision-making.

especially when idling or in stop and go traffic.	
Financial Resource Trends	**Challenges**
Continued diversion of discretionary transportation revenue to support political agenda, a siphoning or masking transportation revenue into non-dedicated funding categories such as the state general fund will exacerbate the challenge of meeting tomorrows (today's for that matter) needs and further extenuate the "funding gap". Increasing demand for transportation services coupled with weakening buying power of the transportation trust fund will require states to tap into capital markets.	▪ Identifying alternate funding sources. ▪ Managing the buying power of the transportation dollar with respect to project cost escalations, increasing needs and public and political priorities. ▪ Developing financial self-sustaining (full or partial) infrastructure. ▪ Broadening our financial markets to the private sector through public-private partnerships (PPP). ▪ Considering geographic challenges that require more capital investment in select part of the state.

C.2 Regional and State Plan Goals and Objectives

The sections below discuss the various regional and state plan goals and objectives

Metropolitan Planning Organizations

Pursuant to SAFETEA-LU, Metropolitan Planning Organizations (MPOs) are required to prepare Long-Range Transportation Plans (LRTPs) every 5 years for urbanized areas with populations over 50,000. For MPOs classified in non-attainment of federal air quality standards, the LRTPs are required to be updated every 3 years. As part of the LRTP process, MPOs develop goals and objectives with input from the public and committee membership structure (i.e. elected officials, jurisdictional transportation staff). The goals are used to measure the MPO area's transportation system performance and guide the programming of projects into the (State) Transportation Improvement Program. The LRTPs of Atlanta and Savannah MPOs were reviewed. A summary of the MPO goals are presented below.

Atlanta Regional Commission[10]

The four goals of Mobility 2030 are:

- Improve accessibility and mobility options for all people and goods;
- Maintain and improve system performance and preservation;
- Protect and improve the environment and quality of life; and
- Increase the safety and security of the transportation system.

[10] Atlanta Regional Commission, *Mobility 2030*, Volume I: 2030 RTP, December 2004.

The ARC Board developed the following guiding principles to develop a Mobility 2030 plan that used only the expected amount of funding that was to be available over the next 25 years (Financially Constrained). Priorities were to be given to strategies and projects that:

- Supported Regional Development Plan policies;
- Established and maintained a connected system that improves connectivity between and within Activity Centers, Livable Center Initiative areas, and transit station areas; and
- Reduced traffic congestion in the most congested corridors based on the congestion management monitoring network with specific consideration given to duration of congestion.

These criteria were used to identify short-term (2005-2010), mid-term (2011-2020) and long-term (2021-2030) transportation projects in the plan.

Savannah Metropolitan Planning Commission[11]

Goal 1: Economic Activity

Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.

Goal 2: Safety and Security

Increase the safety and security of the transportation system for motorized and non-motorized users.

Goal 3: Accessibility, Mobility and Connectivity

Increase the accessibility, mobility and connectivity options available to people and freight.

Goal 4: Environmental and Quality of Life

Protect and enhance the environment, promote energy conservation, and improve quality of life.

Goal 5: System Management and Preservation

Promote system preservation and efficient system management and operation.

[11] Chatham County-Savannah Metropolitan Planning Commission, *2030 Long Range Transportation Plan*, Volume 1 Final Report, September, 2004.

C.3 Existing Modal Plans

Truck-only lanes are an emerging concept that has not been the subject of extensive study. However, freight and goods mobility is an issue on the forefront of the majority of the major metropolitan areas public policy agenda. Due to the lack of specific truck-only experience and study, freight and goods movement studies provide a proxy for the robust growth expected over the next 30 years and the results challenges. Four regional freight plans were selected to compare the overall direction of freight and freight growth, how the region is addressing critical issues in the planning and implementation processes, and how the performance of the transportation system impacts logistical operations.

Nashville Regional Freight and Goods Movement Study[12]

The Nashville Regional Freight and Good Movement Study employed the MPO's long-range planning goals as a springboard for further dissemination into specific elements related to freight and goods movement. The basis for specific public policy objectives related to freight planning is a derivative of the MPO's Policy Goal 2: Regional Mobility through a Multimodal System. The objectives of this root goal are to achieve enhanced mobility by providing intermodal and multimodal transportation systems that support safe, efficient and convenient travel options for the movement of people and goods.

Three primary objectives provide the basis for achieving regional freight network goals:

- Freight Mobility- A typical objective of freight planning is the enhancement of freight mobility; i.e. improving the efficiency of freight movements in the Region. All policies, strategies or projects implemented in the Region should be evaluated to determine the impacts on freight mobility.
- Urban Design and Growth Management - Another objective in support of developing a sound freight network is the need to manage urban design and growth. By employing measures and policies to improve urban design, one can also improve the reliability of the system. Zoning and building codes can be used both in shaping urban design and improving transport efficiency and reliability.
- Economic Vitality and Quality of Life - Mobility objectives must be balanced with public safety, overall economic vitality and quality of life. Regional planning activities should be evaluated to determine the impact on the environment, safety and the community (environmental justice), i.e. projects that improve freight mobility and relieve congestion can also lower emissions, improving air quality and quality of life in the Region.

Chatham County Intermodal Freight Study[13]

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[12] Nashville Area Metropolitan Planning Organization, *Nashville regional Freight and Goods Movement Study, Executive Summary*

[13] Georgia Department of transportation, *Chatham County Intermodal Freight Study, Draft final Report*, May 1998.

The Chatham County Intermodal Freight Study researched and prepared a series of recommendations to improve the overall efficiency of the movement of goods between modes in Chatham County. This study effort focused on the freight movement and the exchange of freight between modes commonly called intermodalism.

The goals of the study included:

- Quantifying freights movement in Chatham County;
- Identify key points of modal transfer i.e. freight moving from ocean to rail, rail to truck, etc.;
- Optimize intermodal activity to improve transportation efficiency;
- Detail improvements to each modal transportation system, highway, rail, ocean, pipeline, which will be required to accommodate future growth; and
- How do external forces (background traffic in this instance) impact the ability of freight shippers and carriers efficiency?

METROPLAN Orlando Freight, Goods and Service Mobility Strategy[14]

METROPLAN Orlando's Freights, Goods, and Service Mobility Strategy Plan detail a set of specific actions to improve the region's transportation infrastructure to support overall planning goals. Rather that stating a series of specific goals and objectives of the Plan to fulfill, the study identifies a set of national and regional trends and challenges that the Plan must tackle to ensure continued freight prosperity in the Central Florida region. These trends include:

National Freight Transportation Trends

- Importance of trade and globalization of the economy;
- Growth of service industries;
- Restructuring of traditional manufacturing to increase competitiveness and emergence of high technology and knowledge-based industries;
- Industrial locations demographic trends, including increased flexibility for business in their location decisions and an aging population; and
- Reduced government roles in increased privatization.

Central Florida Freight Planning Challenges

- Freight Mobility
    - Congestion

[14] METROPLAN ORLANDO*, Freight, Goods and Services Mobility Strategy Plan*, 2002

- Traffic Design
- Truck Safety
- Intermodalism
- Market Dynamics
- Business Dynamics
- Distribution Imbalance

- Urban Design and Growth Management
  - Land-Use Planning and Zoning
  - Transportation Planning
  - Bicycle Lanes and truck Route
  - Weight and Size Provisions
- Vitality and Quality of Life
  - Environmental Impact
  - Security
  - Environmental Justice
  - Public-Private Partnerships
  - Funding

In summary, central Florida's vitality is dependant on an efficient transportation system. Whether proving a pleasant experience for the millions of tourist that visit central Florida every year or serving as the logistical center for Florida, the transportation system must be flexible and accommodate a wide range of users. This study recognizes the range of users and their needs and works systematically to develop transportation policies that respond to changing markets, diverse users, explosive population growth, and both full time and part time residents all contributing to the stress placed on the transportation system over the next 30 years.

D. Guiding Principals, Goals and Objectives

The Guiding Principles presented earlier are designed to provide the foundation for truck-only lane investment in Georgia. The goals are broad concepts that, when realized, will create the transportation system embodied in the Statewide Truck Only Lane Needs Identification Study. The objectives nested within each goal are more specific, achievable improvements that advance a particular goal. When linked with performance monitoring systems, they will be the basis for evaluating progress in implementing the plan, moving Georgia toward its goals. The Guiding Principles, goals and objectives are shown in Table 28.

Table 28: Guiding Principals, Goals and Objectives

Guiding Principal	Goal	Objectives
Enhance safety on all transportation systems	Improve safety for cars and trucks on Georgia's highway network	▪ Improve passenger and freight transportation safety throughout the state of Georgia by reducing truck/car conflicts. ▪ Educate the traveling public by focusing a safety campaign on sharing the road with trucks. ▪ Focus on high truck crash areas for transportation improvements. ▪ Decrease the number of trucks parking on the shoulders and on-/off-ramps on Georgia's highways.
	Promote security of highway network for all motorists	▪ Evaluate security for freight movements on Georgia's interstates. ▪ Enhance ITS for freight efficiency and security.
Reduce congestion and improve levels of service & Improve access and mobility for all citizens	Protect and improve mobility.	▪ Enhance operational efficiency of the transportation system. ▪ Ensure greater reliability of travel/delivery times for trucks. ▪ Provide congestion relief for autos and trucks during peak travel periods. ▪ Communicate road and travel conditions to all motorists via changeable message signs and radio addresses. ▪ Establish an incident removal plan that quickly, efficiently, and thoroughly clears crash from roadway to allow traffic to start flowing again. ▪ Identify and address freight bottlenecks
Facilitate connections among the various regions of the state	Provide a plan for truck lanes that is fiscally responsible, economically feasible, and equitable to all parts of the state.	▪ Consider cost-effectiveness, initial capital cost, and life cycle costs when selecting potential truck-only lane projects for implementation. ▪ Explore a range of funding strategies including public private partnerships, tolling and other innovative strategies. ▪ Investigate truck-only lane implementation opportunities throughout the state using evaluation factors that support established goals and objectives. ▪ Consider user equity when evaluating truck-only lane implementation opportunities.
Support economic development and growth	Support local, regional, state, and national economic development initiatives	▪ Ensure transportation investments are consistent with economic development goals at the local, regional, state and national level. ▪ Provide appropriate truck access to/from existing and future land uses that promote economic development at the local, regional, and state level.
Enhance the quality of life	Avoid, minimize, and	▪ Improve quality of life by reducing

Guiding Principal	Goal	Objectives
	mitigate adverse impacts to the built, natural, social, and cultural environment.	transportation related pollution. ▪ Protect community character and assets. ▪ Ensure appropriate communication with affected communities, with a focus on Environmental Justice communities. ▪ Assess environmental impacts of proposed projects.

E. Next Steps

E.1 Policy Development

Policies are the principles or procedures established by an agency, institution, or government, generally with the intent of reaching a long-term goal. The final element of the Goals, Objectives, and Policies task of the Statewide Truck Lanes Needs Identification Study is to develop and recommend a set of policies by which GDOT could act to implement its adopted goals and objectives.

Building upon the Guiding Principles, goals, and objectives, policy statements will define how GDOT invests its funds in truck-only lanes, how these lanes should be designed and integrated into the transportation system, and how the lanes will operate. These policies will be drafted and reviewed by study stakeholders as part of the public involvement process. Policy statements will reflect GDOT's intent and implementation strategy as it pursues truck-only lane goals and objectives in the coming years.

E.2 Performance Measures

The goals and objectives reflect the input of truck-only lane stakeholders and transportation professionals. The next step is to identify specific performance measures for each goal. Performance measures are critical tools used to determine achievement of goals. Specifically, performance measures are developed to:

- Establish system performance and measure against established benchmarks that define expected or desired performance standards;
- Serve to identify system problems or deficiencies and opportunities for improvement via an iterative process;
- Guide allocation of resources to high impact investments; and
- Assess success of resource allocation.

Many states have incorporated performance measures into their transportation planning and program development processes. While the measures differ depending upon the needs and unique circumstances of each state's transportation program, some lessons and guidance are relevant; for example:

The number of performance measures should be kept manageable and maintain a clear purpose (i.e. reflect established goals, objectives, and Guiding Principles). The performance measures should be periodically reviewed for relevance and refined or modified as appropriate to reflect changing economic conditions, new technologies, additional resources, and similar external factors. This is especially important once truck-only facilities are implemented and on the ground and actual benefits can be measured.

Stakeholders should be involved in the development of performance measures. Stakeholders might include consumers, the transportation private sector, and local or regional government agencies.

Performance measures should focus on gauging the progress of achieving specific goals and objectives and on improvement measured against established benchmarks.

E.3 Performance Measures and Plan Implementation

Performance measures are critical to the successful implementation of truck-only lanes in Georgia. Developing performance measures that can clearly and concisely prove achievement of study goals, quantify the corridor and system benefits, and demonstrate that truck-only lanes are a smart investment for Georgians will position truck-only lane projects ahead of the pack when it comes to competing for scarce transportation funding dollars.

Further, strategically selected performance measures will allow GDOT's strategic planning process and performance measuring systems to periodically test the system to ensuring the facility, and its operations, are exceeding the minimum performance standards established by the Department.

HNTB