Truck Only Toll Facilities:
Potential for Implementation in the Atlanta Region

Atlanta TOT Facilities Study

Final Report

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Forward

This study has significant implications for the future of transportation in the Atlanta region.

The current strategy for managed lanes as described in the current regional plan, ARC's *Mobility 2030,* is to build high occupancy vehicle (HOV) lanes that any vehicle with two or more passengers can use without paying a fee. This study suggests that high occupancy toll (HOT) or truck only toll (TOT) facilities may offer greater benefits to the region's passenger and freight movement than would a system of HOV lanes alone. Therefore, a major recommendation of this study is to broaden the region's concept of managed lanes to include HOT and TOT facilities.

The region is in a particularly critical stage now as it begins to implement a region-wide managed lane network. Thus, there is urgency behind any potential change to the region's concept of managed lanes. Open dialogue, further study, and outreach that encompass the full range of possible management strategies are necessary to ensure a system that best serves the movement of passengers and freight in the region.

The TOT study described in this report is an important step in considering nontraditional solutions to Atlanta's transportation needs. A study steering committee met throughout the study to review results, discuss next steps, and provide input to the study team. The steering committee consisted of staff from SRTA, GDOT, ARC, and representatives of the trucking industry. SRTA, along with its planning partners, would like to express our sincere thanks to the representatives of the trucking industry that participated on the TOT Study steering committee. Trucking industry representatives included Ed Crowell (Georgia Motor Trucking Association), Rebecca Brewster (American Transportation Research Institute), Ed Carter (Lithonia Lighting), David Hudson (Drug Transport, Inc.), and Corey LaCross (United Parcel Service). Without the commitment of and input from these representatives, the study could not have accomplished its goals. Furthermore, the trucking industry's positive reaction to the TOT study results, coupled with Atlanta's position as a national logistics center, provides a compelling reason to pursue the concept of truck facilities in the region.

This study shows that TOT lanes hold substantial promise in not only improving commercial vehicle mobility, but also in improving the performance of the regional network of limited access highways and local roads. Given the potential benefits of a broadened definition of managed lanes, SRTA would strongly suggest that any future study of managed lanes include HOT and TOT concepts as well as HOV. SRTA looks forward to working with our planning partners to improve the level of transportation services offered in the region.

Sincerely,

Douglas Hooker

Executive Director

Georgia State Road and Tollway Authority

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Executive Summary

This study examined the feasibility of introducing truck only toll (TOT) lanes in the Atlanta road network as a means of improving the reliability and mobility of freight and passenger movement within and through the Atlanta region. With increasing traffic expected over the next 20 years, particularly truck movements, the Atlanta region needs to look seriously at how such movements can be accommodated. The concept of TOT lanes is one option to consider.

What are TOT lanes?

Truck only toll lanes are highway lanes that are reserved for the use of commercial vehicles, primarily trucks and buses. By providing the option for commercial vehicles to use these lanes, freight movement can be more timely and more reliable. As considered in this study, the use of TOT lanes is optional: that is, commercial vehicles can pay a fee to use the lanes if so desired, or they can continue to use the regular lanes. Further, fees are only charged when necessary to manage the performance of the lanes. TOT lanes can either be newly constructed facilities, or they can be created by reallocating the use of existing lanes.

How does the pricing of TOT lanes work?

Similar in concept to HOT lanes, the pricing strategy for TOT lanes corresponds to a cost per mile that will keep the TOT lanes performing at a level of service that provides more reliable travel. The cost per mile has been determined through the application of network models. The pricing strategy for TOT lanes is thus similar in operation to HOT lane pricing. (See the companion HOT report for more information.) Drivers of commercial vehicles will be given information on how much travel time can be saved by using TOT lanes and what the fee is. The tradeoffs between these two would then be up to the driver or to company policy.

What are the potential benefits of TOT lanes?

TOT lanes offer a variety of potential benefits for commercial vehicles, other travelers and for transportation agencies. Such lanes can:

- *Enhance transportation options*. Shippers and service providers will have the option of traveling more reliable routes in the Atlanta region, especially during peak periods.
- *Improve safety and efficiency in the road corridor*. By encouraging commercial vehicles to use the TOT lanes, the mix of vehicles remaining in the freeway becomes more uniform. Thus, not as many trucks and personal vehicles will be sharing the same roadway as previously. This should improve the efficiency of travel on the road, as well as reduce the risk of truck/automobile crashes.
- *Improve freight productivity*. The efficiency of freight movement in and around major metropolitan areas will likely be even more of a concern to the business community in the future. In addition, for logistics centers like Atlanta, freight mobility and productivity could become an important factor in the competitiveness of Atlanta versus other comparable regions. TOT lanes can greatly improve commercial vehicle productivity.
- *Manage congestion levels for truck travel and improve general purpose highway congestion*. By imposing fees when demand levels reach capacity on TOT facilities, the level of congestion on TOT facilities is controlled. If a large number of trucks are removed from the general purpose lanes and the local road network, congestion levels might be reduced for other traffic as well.

- *Generate revenue for TOT lane operation*. Fees can provide an additional source of revenue to pay for transportation improvements, especially the operations and maintenance of the TOT lanes themselves.

Why are we interested in TOT lanes?

According to *Mobility 2030*, the Atlanta Regional Commission's most recently adopted regional transportation plan, approximately 93% of the freight moved in Atlanta is by trucks. In addition, the number of trucks on metropolitan area roadways is expected to increase dramatically over the next 25 years. According to the ARC travel demand projections, commercial vehicle travel will increase an additional 50% over current levels by 2030.

In addition, with more trucks on the road network, the likelihood of truck/automobile crashes increases as well. The severity of truck/auto crashes is already a concern. For example, in 2000, large (combination) trucks nationally made up only 1% of registered vehicles, but were involved in 12% of all fatal crashes and 13% of all passenger vehicle occupant fatalities (6).

Although only a few metropolitan areas have implemented truck-only lanes (e.g., Boston's truck-only road serving the port), it seems likely that those metropolitan areas that figure out a way to expedite freight movement in and through its jurisdictions will be considered some of the most desirable locations for business. For example, Tampa is currently planning a major TOT network that will provide safe and efficient access to the Port of Tampa.

What did we study?

In order to perform a broad feasibility analysis, this study examined three TOT lane alternative concepts (scenarios). Measures of the long term performance of each scenario were developed to determine if any fatal flaws exist in the TOT concept. These three scenarios are not an exhaustive list of the TOT options available to the region, but do provide regional results that are illustrative of the potential benefits of a TOT strategy.

The first scenario was based on analysis of truck flows on the limited access highway network in the region. This analysis suggested two major corridors as prime candidates for the implementation of TOT facilities. The first carries trucks around the region from I-75N across the western section of I-285 through to I-75S. The second corridor extends from I-75N across the northern quadrant of I-285 to I-85N. This scenario assumed that two TOT lanes in each direction could be constructed in these corridors, in addition to HOV lanes, with access provided to the local road network at appropriate locations.

The second scenario responds to the observation that the midday (10:00 a.m. to 3:00 p.m.) is the period of time that accommodates the most commercial vehicle movements in the region, and local deliveries, in particular, as opposed to truck trips passing through the region. This scenario assumes that the TOT lanes of scenario 1 are in place, but that in addition, during the midday, the current HOV lanes inside I-285 are reserved for light duty commercial vehicles willing to pay a fee. The rationale underlying this scenario is that HOV lanes serve their primary purpose during the peak periods, and that truck movements could benefit greatly from improved reliability during the midday off peak period.

The third scenario suggests that the shifting of truck movements from general purpose lanes to reserved lanes would benefit both truck flow and the movement of passenger vehicles. This scenario thus turns all existing and proposed HOV lanes into TOT lanes (except inside I-285, where the current prohibition for through truck trips is maintained). This scenario has the lowest capital cost associated with it in that separate TOT lanes no longer need to be constructed.

What did the study find?

The study found that under any of the three scenarios:

1. Total vehicle hours traveled are reduced with a negligible change in vehicle miles traveled;
2. Trucks traveling through the region can save a significant amount of time;
3. Congestion in general purpose lanes is significantly improved; and
4. Respectable amounts of revenue can be generated to cover operating and maintenance costs.

Table ES-1 shows the results of the analysis for the different TOT lane scenarios. As shown, all three scenarios show positive benefit in terms of reduced vehicle hours traveled. Scenario 3 shows a negligible reduction in vehicle miles traveled (VMT), while scenarios 1 and 2 result in slightly increased VMT. (It is logical that scenarios 1 and 2, which add TOT lanes to the regional transportation network, would result in higher VMT.)

Table ES-1: Summary of Weekday Vehicle Miles Traveled and Vehicle Hours Traveled under 2030 TOT Alternatives*

TOT Alternative Scenario	Weekday VMT (K)	Change in Weekday VMT (K) from Base	Weekday VHT (K)	Change in Weekday VHT (K) from Base
HOV 2+ Base	159,787	-	6,139	-
A1: Major Truck Corridors	160,108	321 (0.2%)	5,742	-397 (-6.5%)
A2: Service to Deliveries	160,138	351 (0.2%)	5,747	-392 (-6.5%)
A3: Regional TOT Network	159,692	-96 (-0.001%)	5,843	-296 (-4.8%)

* Regional measures include all vehicle types on all arterials, collectors, local roads and limited access facilities.

Table ES-2 shows travel time savings for selected trips under each scenario. As shown, TOT lanes can offer significant time savings to commercial vehicles willing to pay a fee to use the lanes. For example, in scenario 1, a commercial vehicle could save approximately 51 minutes in the PM peak period using a TOT lane going from I-75N to I-75S in 2030. Time savings offered by TOT lanes compared to the base case of future travel without TOT lanes are shown in the appendix.

Table ES-2 Comparison of General Purpose and TOT Lane Trip Times during 2030 PM Peak Period under Scenarios 1 and 3

Sample Trip and Destinations	Scenario 1 TOT Lane versus Scenario 1 GP Lane	Scenario 3 TOT Lane versus Scenario 3 GP Lane
I-75 north to I-285 west to I-75 south		
I-75 at I-285	6 minutes saved	14 minutes saved
I-285 E at I-75 S	32 minutes saved	45 minutes saved
I-75 S at end	51 minutes saved	70 minutes saved
I-75 north to I-285 east to I-85 north		
I-75 at I-285	6 minutes saved	14 minutes saved
I-285 E at I-85 N	27 minutes saved	39 minutes saved
I-85 N at end	68 minutes saved	80 minutes saved

Note:
Time savings are cumulative from origin at region's limits.
GP: General Purpose highway lanes

One of the important questions concerning the impact of TOT lanes is the effect they have on congestion in the road network. Assuming that a sufficient number of trucks are attracted to the TOT lanes, thus freeing up capacity in the general purpose lanes, the net effect of the TOT lane strategy could be a reduction in congestion levels. As shown in Table ES-3, this is in fact what is expected to happen. The use of TOT lanes reduces the number of lane miles of congested freeway operation from 29% in the base case, to 22% to 24% with the various TOT scenarios. This is a 17%-24% reduction of the congested directional miles of general purpose lanes in the region. This reduction represents a potentially significant change in the operation of the region's limited access roads during the afternoon peak hour and other travel periods.

Table ES-3: Travel Conditions on General Purpose (GP) Lanes during the PM Peak Hour

2030 Scenario	Percent GP Lanes Operating at Given Condition during Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base	40%	31%	29%
A1/A2: Major Truck Corridors	46%	32%	22%
A3: Regional TOT Network	48%	28%	24%

Note:
Scenarios 1 and 2 are identical during the AM, PM, and NT periods.
Percentages are calculated by dividing the distance operating under specific levels of service by the total regional GP facility directional mileage. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

Table ES-4 shows similar improvements in limited access road performance during the midday, when the largest number of trucks is on the region's road network. The increased proportion of general purpose facilities that are free flow represents a 13-18% increase in free flow directional miles.

Table ES-4: Travel Conditions on General Purpose (GP) Lanes during the Midday Peak Hour

2030 Scenario	Percent GP Lanes Operating at Given Condition during Midday Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base	69%	28%	3%
A1: Major Truck Corridors	78%	20%	2%
A2: Service to Deliveries	78%	20%	2%
A3: Regional TOT Network	81%	17%	2%

Note: Percentages are calculated by dividing the distance operating under specific levels of service by the total regional GP facility directional mileage. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

While revenue generation is not the primary goal of TOT lanes, charging a fee for using these lanes is part of the strategy for keeping the lanes operating at a reasonable level of performance. Table ES-5 shows the corresponding level of revenue generation for each TOT scenario. The comparative weekday revenue per TOT lane mile suggests that the first alternative, which assumes TOT lanes only on major truck corridors, does include those corridors with the most significant demand for the lanes. Cost estimates for the scenarios are included below.

Table ES-5 Summary of Regional Revenue Estimates for 2030 Scenarios

2030 TOT Scenario	Light Duty Truck Weekday Revenue (K)	Heavy Duty Truck Weekday Revenue (K)	Total Weekday Revenue (K)	Weekday Revenue per TOT Lane Mile	Projected Annual Revenue (K)
A1: Major Truck Corridors	$ 186	$ 142	$ 327	$ 694	$ 89,400
A2: Service to Deliveries	$ 219	$ 153	$ 372	$ 614	$ 101,000
A3: Regional TOT Network	$ 429	$ 296	$ 724	$ 554	$ 198,000

Note:
1. Heavy and light duty truck categories are as defined by the ARC travel demand model for heavy and light duty commercial vehicles, respectively.
2. Revenue projections are based on fees that vary across scenarios by direction on each TOT corridor.
3. Dollar values are in current (2004) dollars.

What are the challenges in implementing TOT lanes?

There are several challenges related to implementing TOT lanes in the Atlanta region. The first will be associated with the fee structure attached to the TOT strategy. The representatives from the trucking industry participating on the advisory committee strongly recommended that the TOT lanes remain voluntary; that is, commercial vehicles would not be required to use the lanes. Under the assumed scenarios in this study, commercial vehicle demand levels are so high in certain corridors that 1) mandatory facilities would not be able to accommodate the truck traffic and 2) a fee would be needed to maintain an operating condition on the TOT lanes that allows uncongested truck movements. The level of fees facing commercial vehicle users would clearly be a critical factor in their overall success. The industry representatives made it very clear that they recognize the growing problem of freight mobility in the Atlanta region and that something needs to be done.

The second challenge is associated with the actual placement of TOT lanes. Scenarios 1 and 2 assume that four TOT lanes can be constructed in the I-75, I-85N, and the I-285 northern and western sections. This study did not have the resources to conduct a detailed engineering analysis of whether this assumption is indeed reasonable. However, in the I-75N and the I-285 northern quadrant, public-private initiatives have been put forward by consortia of firms who have investigated the feasibility of additional truck only lanes in these corridors and have concluded that such a concept is possible.

A third challenge relates to public perception, especially for TOT alternative concepts such as this study's scenarios 2 and 3. In these scenarios, existing and/or planned HOV lanes are converted into TOT lanes. It is very difficult from a public policy perspective to take something away from the public once they become used to it. Thus, even though the strategy might very well show overall improvement for all travelers in the corridor, it might be politically difficult to implement.

The region is in a particularly critical stage now as it begins to implement a region-wide managed lane network. Thus, there is urgency behind any potential change to the region's concept of managed lanes. This urgency represents a challenge to the inclusion of truck facilities as a part of the overall managed lanes strategy for the region. However, a decision needs to be made soon concerning the desirability of moving ahead with such a strategy.

A final challenge for scenarios 2 and 3 could originate from the planning efforts already initiated to put HOV lanes in place for mobility and environmental quality purposes. Turning these lanes into TOT lanes will logically give the implementing agencies some concern.

What are the next steps?

This limited study of a regional TOT lane strategy for the Atlanta region resulted in some potentially significant results. The following recommendations represent the next steps that should be taken in the further consideration of a regional TOT lane strategy.

1. Both the Atlanta Regional Commission (ARC) and the Georgia Department of Transportation are about to begin freight studies. Both of these studies should further consider the potential of truck only facilities.
2. This preliminary study was based on limited data on truck and goods movement in the Atlanta Area, both in terms of quality and quantity. A more comprehensive examination of TOT lanes in the region should be based on a targeted data collection effort that can further define the benefits of such lanes to commercial vehicle movement in the region.
3. The ARC is about to embark on its next update of the region's transportation plan. This study and the companion HOT study have demonstrated the need for some form of

demand management, through strategies such as restricting vehicle eligibility, pricing or providing exclusive truck facilities, in order to manage future congestion. The results of this TOT study should be considered in the transportation plan update as the next investment strategy for the region is developed.

4. The transportation partner agencies have already established an informal mechanism for coordinating further activities associated with HOT lanes. This group should be formalized to further the development of a broader managed lane strategy for the region that encompasses HOV, HOT, and/or TOT facilities. This coordination mechanism should be formalized through a memorandum of understanding, or similar action, expressing the intent of the region's planning partners to develop a comprehensive managed lanes strategy.

5. Given the potential benefits of a broad definition of managed lanes, any regional or corridor study of managed lanes should include HOT and TOT concepts. HOV lane projects currently under design should proceed while HOT and/or TOT concepts are examined in more detail, and should include flexibility for future management strategies to the extent possible.

6. The linkage between HOV, HOT and TOT lanes, as they relate to constructability, needs to be better understood. Given the limited resources for this study, it did not analyze the combined effect of HOV, HOT and TOT lanes. This would be an important consideration for further development of a managed lane strategy. SRTA, along with its partner agencies, should consider further study of a combined managed lane concept strategy for the region.

Glossary of terms and abbreviations

Access locations: Points of entry to and egress from managed lanes

ARC: Atlanta Regional Commission

CID: Community improvement district

Eligibility: In the context of this document, eligibility refers to a vehicle occupancy requirement to use a facility such as a managed lane. Eligibility is one strategy for managing the use of a facility.

GDOT: Georgia Department of Transportation

General purpose lanes: Highway lanes that can be used without vehicle occupancy or pricing restrictions

GRTA: Georgia Regional Transportation Authority

HOV: High occupancy vehicle

HOV interchanges: Ramps on highways that are only for use by HOV vehicles.

HOT: High occupancy toll; A high occupancy toll (HOT) lane allows the use, with payment of a fee, of a managed lane for drivers of vehicles that do not meet the minimum passenger occupancy requirements. By charging a fee and by limiting the types of vehicles allowed in the lane, the lane can be "managed" to maintain uncongested traffic.

"Infostructure": The technology and technical components such as vehicle sensor equipment, fee collection devices, and other Intelligent Transportation Systems equipment associated with TOT operations.

Infrastructure: The physical components necessary to implement managed lane facilities including, but not limited to, pavement, structures, access facilities, separation devices, signage, and striping.

Managed lanes: Designated lanes such as HOV, HOT and TOT lanes where a variety of operating strategies may be employed to move traffic more efficiently. Throughout this document, the term managed lanes will be used to refer to HOV, HOT and TOT lanes in the Atlanta region.

Operations and maintenance (O&M) costs of TOT lanes: Costs associated with the following:

- Administration costs associated with fee collection, including marketing
- incident response (HERO) on the TOT lane(s) only
- maintenance of "infostructure" (including toll collection and other ITS equipment)
- infrastructure maintenance of TOT lane(s) only.

Pricing strategy: The policy that sets fee levels and the criteria (either time of day/day of week or managed lane congestion level) that determines when a specific fee amount will be charged.

Qualified transit vehicle: a transit vehicle that has registered with the appropriate entity and received a permit and transponder in order to travel on the HOT lanes.

Separation treatment: The device(s) used to delineate managed lanes from general purpose lanes; examples include concrete barriers, tubular barriers (pylons), raised pavement markings, painted pavement markings, and buffer areas.

SOV: Single occupant vehicle

SRTA: State Road and Tollway Authority

TMA: Transportation management association

TOT: Truck only toll; Truck only toll facilities are intended exclusively for authorized truck traffic that pay a fee for such use. This study assumed that use of all truck facilities was voluntary and that unless a fee was necessary to manage the performance of a TOT facility, there would be no charge to use the facility.

1 INTRODUCTION AND BACKGROUND

1.1 Historical Context

The types of strategies transportation officials use to manage effectively the transportation system reflect the concerns and policy goals of the times in which the decisions are made. Thus, for example, during the late 1960s and early 1970s, many metropolitan areas began to promote the concept of reserving highway lanes for buses to provide a travel speed advantage for transit vehicles. At the same time, some studies focused on providing dedicated facilities for freight traffic in order to improve safety (by limiting truck-auto interaction) and provide for more efficient movement of goods.

The transportation profession now considers lanes that provide access to certain types of vehicles (such as trucks, carpools and/or transit vehicles) to be "managed lanes." The term "managed lanes" incorporates facilities that operate under three strategies: limited access locations, vehicle eligibility requirements, and/or pricing. These three tools (applied together or separately) are meant to effectively manage the level of demand on the so-called managed lanes.

As an interstate and rail hub, as well as home to one of the top air cargo airports, freight traffic in Atlanta ranks among the highest in the nation. According to the Metro Atlanta Chamber of Commerce, metro Atlanta ranks 5th in the nation in transportation and logistics employment with more than 2,000 firms employing over 84,000 people (1). The Department of Transportation's "Freight Analysis Framework" is forecasting a 70 percent increase in total freight traffic by 2020 (2). As freight movement increases in the future, its importance will also grow. Thus, improving conditions for freight operators on the region's limited access highways has important implications for regional mobility, as well as for the regional economy.

1.2 Purpose of Study

The purpose of this study is to examine the feasibility of introducing the truck only toll (TOT) concept to the Atlanta metropolitan area. This study focused on determining the potential, if any, for further TOT study. The study is intended to supplement the High Occupancy Toll (HOT) lane feasibility study. The HOT lane feasibility study was undertaken in response to Georgia Senate Resolution (SR) 575 passed in 2003 that requested the Georgia Department of Transportation (GDOT) to "undertake a comprehensive study of the feasibility of implementing HOT lanes along the highways of the metropolitan Atlanta area and implementing HOV and HOT lanes along the GA 400 Corridor." Subsequent agreement with GDOT gave SRTA the responsibility for leading this collaborative study. In recognition of the importance of freight movement in the region, SRTA expanded the scope to include truck facilities.

1.3 Truck Only Toll (TOT) Concept

Truck traffic is given exclusive or preferential use of only a few facilities across the country (as on the New Jersey Turnpike's dual-dual roadway), but more jurisdictions (such as Virginia, California, and Texas) are studying the concept of dedicated truck facilities. There are currently no TOT facilities in operation in the United States. Therefore, determining the

feasibility of the TOT concept for the Atlanta region required a broad definition of the concept and assumptions about the operations of such facilities. The following sections describe in more detail the specific TOT concept characteristics assumed for the Atlanta region.

1.3.1 Definition of TOT Lanes

As noted before, the term "managed lanes" is used to describe the more general strategy of better utilizing a highway lane's capacity through access, vehicle eligibility and/or pricing strategies. In essence, the TOT concept is a way to provide dedicated facilities to trucks (light and heavy duty commercial vehicles) while controlling, through user fees, the volume in a managed TOT lane in order to best use the limited highway capacity that exists in a corridor. On a TOT lane, the performance of the lane is managed in order to provide travel time savings, reduced congestion, minimal interaction with personal automobiles, safety improvements, and other benefits to lane users.

1.3.2 Strategies for Managing Lane Use

Three primary strategies can be used to manage the use and operational performance of managed lanes: 1) restrict vehicle access to specific locations, 2) restrict eligibility of vehicles, and 3) use pricing or a fee structure to manage the demand for any available capacity in the lane.

The first strategy for managing lane use is to restrict access to the managed lanes at specified locations. In some cases, this might be an exclusive ramp or interchange that only eligible vehicles are allowed to use; in others, this might entail the entrance and egress of eligible vehicles into the managed lanes at specified locations along the highway (e.g., through special pavement markings).

The second strategy, referred to as vehicle eligibility, is to allow only certain types of vehicles to use the managed lane. For example, historically, carpools of two or more people (HOV 2+) have been allowed to use managed lanes in Atlanta. By defining which vehicles are eligible to use the managed lane, road managers can provide for efficient use of the available road capacity.

The third strategy is to price the use of facilities. The fee that TOT users would pay would vary according to the level of congestion in the TOT managed lane itself. This so-called variable pricing scheme maintains acceptable speeds for truck vehicles using the managed lane(s). High levels of congestion in the TOT managed lanes will cause the fee to increase; similarly, lower levels of congestion result in lower fees or, in many cases, no fees at all. This supply-demand relationship allows the managed lanes to operate as efficiently as possible while providing benefits to TOT lane users.

1.3.3 Benefits of TOT Managed Lanes

TOT lanes offer a variety of potential benefits for commercial vehicles, other travelers and for transportation agencies. Such lanes:

- *Enhance transportation options*. Shippers and service providers will have the option of traveling more reliable routes in the Atlanta region, especially during peak periods.
- *Improve safety and efficiency in the road corridor*. By encouraging commercial vehicles to use the TOT lanes, the mix of vehicles remaining in the freeway becomes

more uniform. Thus, not as many trucks and personal vehicles will be sharing the same roadway as previously. This should improve the efficiency of travel on the road, as well as reducing the risk of truck/automobile crashes. If a large number of trucks are removed from the general purpose lanes, congestion levels might also be reduced.

- *Improve freight productivity*. The efficiency of freight movement in and around major metropolitan areas will likely be even more of a concern to the business community in the future. In addition, for logistics centers like Atlanta, freight mobility and productivity could become an important factor in the competitiveness of Atlanta versus other comparable regions. TOT lanes can provide greatly improved productivity to commercial vehicles.
- *Manage congestion levels for truck travel and improve general purpose highway congestion*. By imposing fees when demand levels reach capacity on TOT facilities, the level of congestion on TOT facilities is controlled. If a large number of trucks are removed from the general purpose lanes and the local road network, congestion levels might be reduced for other traffic as well.
- *Generate revenue for TOT lane operation*. In order to manage traffic levels on the TOT lanes, fees may need to be imposed on facility users. Fees can provide an additional source of revenue to pay for transportation improvements, especially the operations and maintenance of the TOT lanes themselves.

TOT managed lanes are expected to provide benefits not only to truck operators and the businesses that rely upon their deliveries, but also to road users that will have a reduced interaction with trucks.

1.3.4 Basic Characteristics of TOT Facility Operations

Several assumptions of TOT facility operations had to be made in order to conduct the analysis in this study. These assumptions are presented here as characteristics of TOT managed lanes in the Atlanta region, but their policy implications should be studied further. They include:

- Use of TOT lanes is entirely optional. Truck operators may use parallel highway general purpose lanes or alternate routes.
- TOT users will experience a variable fee structure in which the fee changes based on different levels of congestion in the TOT lane(s).
- There is no minimum fee rate for the TOT lane network; fees are only imposed as necessary to provide operational benefits to TOT lane users.
- A maximum fee should be set in order to ensure that benefits of lane management are achieved. Regional TOT experience would help determine an appropriate maximum fee amount.
- Qualified transit vehicles will use any managed lane (including TOT) on the region's road network for free.
- Managed lanes will be operated 24 hours daily, seven days per week. No fees are charged for use of TOT lanes during the nighttime period (from 7 pm until 6 am).
- The restriction on heavy duty truck through movements inside of I-285 remains in place.

- Access to TOT facilities occurs at exclusive interchanges only. No intermediate access (e.g. through slip ramps) is provided except at system-to-system interchanges.[1]
- GDOT's typical cross section for managed lanes that is recommended in GDOT's HOV System Plan is assumed for all new managed lane projects in the study network. This cross section provides a phasing of managed lane design, starting with one lane in each direction, but possibly adding two or three more in each direction, if warranted. For analysis, two barrier-separated TOT lanes were assumed in each direction (where applicable) outside and on I-285.

1.4 Atlanta Regional Issues

The Atlanta region is facing significant challenges in keeping its transportation system operating at acceptable levels of performance. The latest regional transportation plan forecasts an additional 2.5 million people and 1.3 million more jobs in 2030 as compared to the year 2000. Several counties are expected to be near build-out conditions over the next 20 to 25 years. This tremendous growth will manifest itself on the transportation system with a 41% increase in vehicle miles traveled (VMT), a 52% increase in vehicle hours traveled, and a decrease of 10% in regional average speed (with average speeds in congested corridors declining even further). For both major highways and arterial roads, congestion is expected to increase significantly.

1.4.1 Regional Challenges and the Role of TOT Lanes

According the *Mobility 2030*, the Atlanta Regional Commission's most recently adopted regional transportation plan, just less than 93% of the freight moved in Atlanta is done so by trucks. In addition, the number of trucks on metropolitan area's road is expected to increase dramatically over the next 25 years. According to the ARC travel demand projections, the expected increase over current commercial vehicle travel is 50% additional trips per weekday.

Even with over $53 billion in investment in *Mobility 2030*, the Atlanta region is facing a serious challenge in providing the mobility that will be required to sustain a vibrant and healthy region. This is particularly true in the region's road network, especially the major highway system. Figure 1 shows the expected levels of congestion in the general purpose lanes of the region's major highway system in the year 2030 during the afternoon peak period. Many corridors (shown in orange) are approaching capacity at level of service 'D' and several more (shown in red) are congested at level of service 'E' or 'F'. This figure represents a significant challenge to the region's transportation officials.

Figure 1 perhaps represents the best rationale for providing managed lanes in the Atlanta highway network. This study focuses on whether or not those managed lanes could be for exclusive truck use.

[1] For the analysis, access locations were identical to those provided to the HOT alternative networks. These interchange locations are based upon the GDOT *HOV System Plan.* In reality, these locations are not ideal for truck traffic.

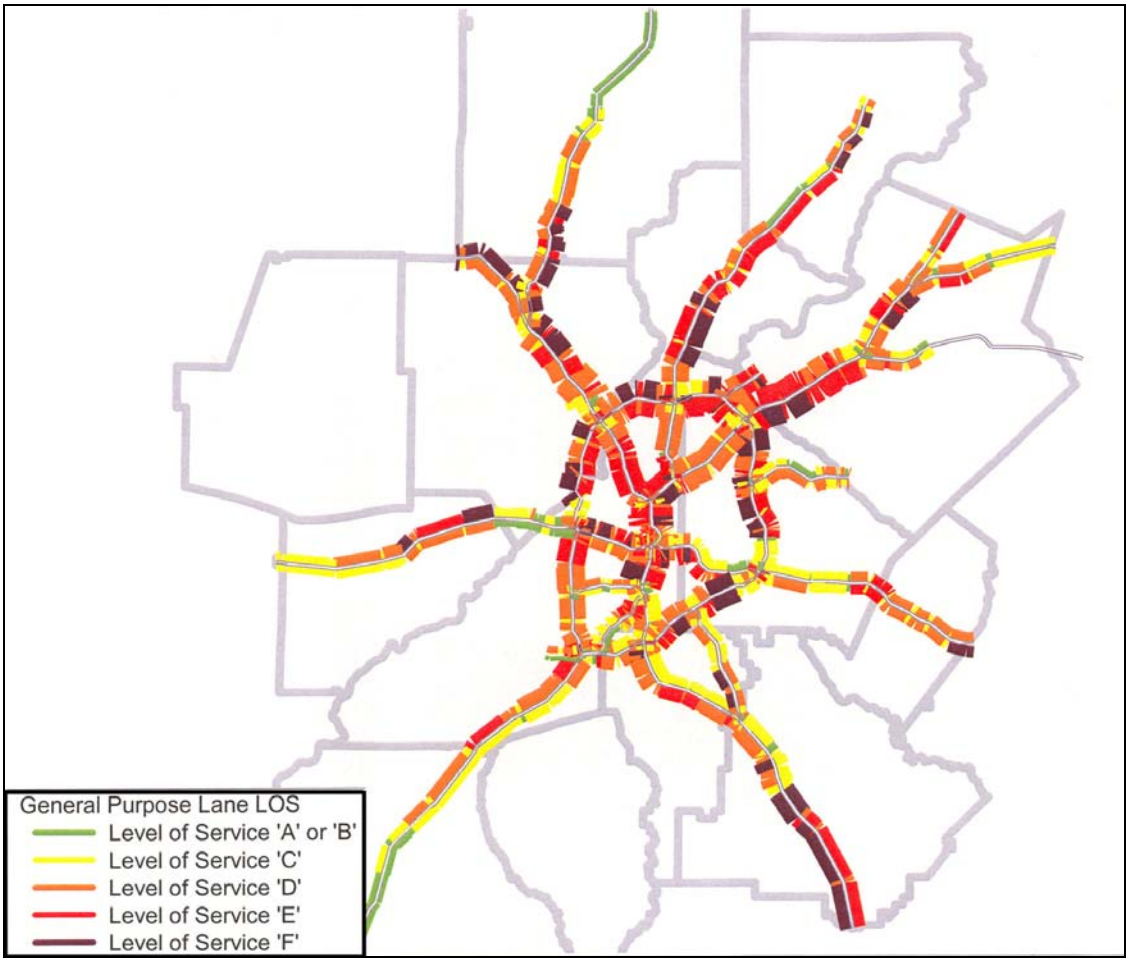

Figure 1 "The Challenge" General Purpose Lane Level of Service, 2030 PM Peak Hour

Note: the above figure represents projected level of service on the 2030 TOT analysis network. The TOT analysis network assumes managed lanes on all limited access facilities; while many of these facilities are included in the ARC's *Mobility 2030* regional transportation plan, the study team added managed lanes to the ARC network (where none are planned) and extended all managed lane corridors to the region's limits. The study team also made adjustments to commercial vehicle trips by assuming light and heavy duty proportions and by refining time-of-day distribution.

Although only a few metropolitan areas have implemented truck-only lanes (e.g., Boston's truck-only road serving the port), it seems likely that those metropolitan areas that figure out a way to expedite freight movement in and through its jurisdictions will be considered some of the most desirable locations for business. Several jurisdictions including Virginia, California, Texas, and Florida, are currently studying the concept of truck facilities.

2 STUDY APPROACH: IS THE TOT FACILITY CONCEPT FEASIBLE IN THE ATLANTA REGION?

In order to assess the feasibility of the voluntary truck only toll concept in the Atlanta region, this study included tasks focused on determining the potential, if any, for further TOT study and did not aim to set regional policy or future projects. This study consisted of several tasks: 1) convene a TOT study steering committee, 2) conduct a literature review on freight

operators' value of time, and 3) analyze the performance of TOT lanes and highways under varying assumptions of TOT facility locations. Throughout the study, a steering committee provided useful comments and feedback on study results and recommendations.

2.1 Steering Committee

The study steering committee consisted of representatives of transportation agencies as well as the trucking industry, as follows:

- Atlanta Regional Commission (ARC)
- Federal Highway Administration (FHWA)
- Georgia Department of Transportation (GDOT)
- State Road and Tollway Authority (SRTA)
- Georgia Motor Trucking Association
- American Transportation Research Institute
- Industry representatives (United Parcel Service, Lithonia Lighting, Drug Transport, Inc.)

The steering committee met four times to review study progress, discuss policy implications, and provide input. The primary purpose of the steering committee was to incorporate freight industry input and provide for coordination with planning partners in the region. Appendix A contains the minutes of the steering committee meetings.

2.2 Analysis of TOT Lane and Highway Performance

In order to assess the long-term performance of TOT managed lanes, the study team developed four managed lane networks on limited access facilities in the 10-county ARC region (note: these networks added lanes to the more limited proposed managed lane network found in *Mobility 2030*). The ARC's travel demand model that was used in developing *Mobility 2030* was used for all model analysis runs in this study. The study team made adjustments to commercial vehicle trips by assuming light and heavy duty proportions (as defined by ARC) and by refining time-of-day distribution of commercial vehicle trips. Both the research findings of freight operators' value of time and recommendations from the steering committee provided input into the travel demand analysis.

Common network assumptions for travel demand analysis include: a value of time of $18 per hour for light duty commercial vehicles and $35 per hour for heavy duty commercial vehicles; Light and heavy duty commercial vehicles are as defined by the ARC travel demand model; Heavy duty vehicle fees, where imposed, are twice that of light duty fees on a corridor; Level of service 'D' or better is sufficient to maintain the performance of TOT lanes. The first two TOT alternative scenarios also assumed the potential for additional highway lanes (dedicated to truck use) in major corridors in the region, as described below.

Performance measures such as vehicle-miles traveled, vehicle-hours traveled, travel time savings, managed lane operational costs and revenues generated were used to assess the feasibility of the alternative concepts. Measures were developed at the system and trip-specific level in order to assess potential TOT lane benefits as well as the impacts on general purpose and managed (in this case, HOV) lane operations.

2.2.1 Overall Analysis Logic

This study began by looking at the feasibility of TOT managed lanes in the horizon year of 2030, which corresponds to the horizon year for *Mobility 2030*. Different TOT managed lane strategies or scenarios for 2030 were defined in terms of vehicle eligibility (light and heavy duty commercial vehicles), and TOT lane locations. These voluntary TOT scenarios were assessed at the system (regional) level in order to determine the feasibility of the TOT concept in the region. Analysis focused on the potential benefits offered by TOT facilities, followed by impacts to highway general purpose lanes, and the local road network of arterials and collectors. As discussed above, performance of the TOT lanes was managed by imposing fees on those TOT lanes that became congested due to high demand on specific corridors. Comparative performance of general purpose lanes shows benefits offered to TOT lane users.

2.2.2 TOT Alternative Concepts

Different strategies for pricing and vehicle eligibility can be considered in a regional managed lane program. Given that the primary intent of these management strategies is to manage demand in the special purpose lanes, the application of these strategies will depend on the level of demand for use of the lanes (for those eligible). Based upon available truck travel pattern data and the methods used in evaluating HOT alternatives, the study team defined three alternative TOT concepts, or scenarios, and one base scenario. The regional TOT systems described below are by no means exhaustive but were chosen as illustrative of possible strategies for the region; there are other options of pricing strategies and corridors that may be worthy of study. The three TOT alternatives are an adequate basis for investigating any fatal flaws in the application of a TOT concept in the region. The time frame and resources constrained the list of alternatives examined.

Each of three TOT scenarios, in addition to one base scenario without TOT facilities, was analyzed for the 2030 horizon year. As a basis for comparison, the HOV 2+ base scenario permits only vehicles with two or more occupants to use the region's managed lanes. The three 2030 TOT scenarios are described below.

<u>Scenario 1: Major Truck Corridors</u>

- Voluntary TOT corridors are added to the region's highway network on I-75 (north and south of I-285), I-85 N (north of I-285), and on I-285 west between I-85 N and I-75 S. TOT corridors are 4 lanes, 2 lanes in each direction.
- The HOV network covers all limited access facilities with 4 HOV lanes (2 each direction) outside and on I-285 and 2 HOV lanes (1 each direction) inside I-285.
- HOV eligibility policy remains as it is today.
- Transit vehicles use the managed lane(s) for free.

Alternative Concept 1 is intended to serve major truck through trips. Initial analysis of projected travel patterns and steering committee input suggested that I-75 N, I-85 N, I-285, and I-75 S serve many through trips in the region. To assess TOT lane performance on those corridors, a network of TOT lanes on those corridors, in addition to the HOV managed lanes assumed in the base network, was developed. Figure 2 shows the network of four lane (two in each direction) TOT facilities.

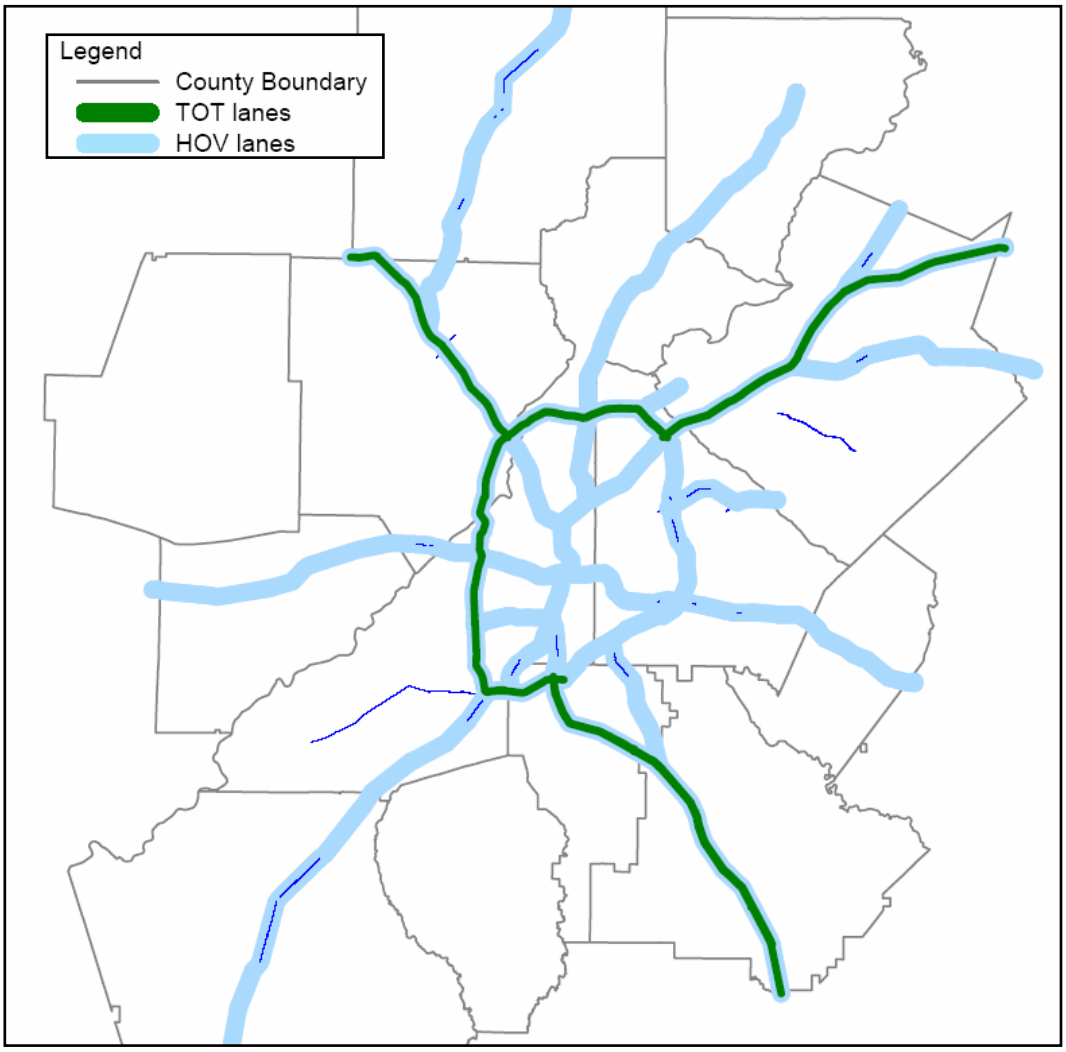

Figure 2 TOT Alternative Concept 1, Major Truck Corridors

Scenario 2: Service to Commercial Deliveries

- Voluntary TOT corridors are added to the region's highway network on I-75 (north and south of I-285), I-85 N (north of I-285), and on I-285 west between I-85 N and I-75 S. TOT corridors are 4 lanes, 2 lanes in each direction.
- During the midday period (from 10 am until 3 pm), HOV managed lanes inside the perimeter, I-285, operate as truck-only lanes for light-duty commercial vehicle use only.
- Existing HOV eligibility policy remains as it is today during the morning, evening, and night periods.
- Transit vehicles use the managed lane(s) for free.

In addition to serving through truck trips, alternative concept 2 provides TOT lanes for commercial deliveries inside I-285. TOT alternative concept 2 operates identically to alternative 1 with the exception of the midday period (from 10:00 am to 3:00 pm). Under scenario 2, HOV lanes inside I-285 operate as light duty truck lanes. This scenario assumes

that the primary purpose of HOV lanes is to encourage carpools during the commute trip at peak travel times and that those lanes might serve deliveries during off peak times.

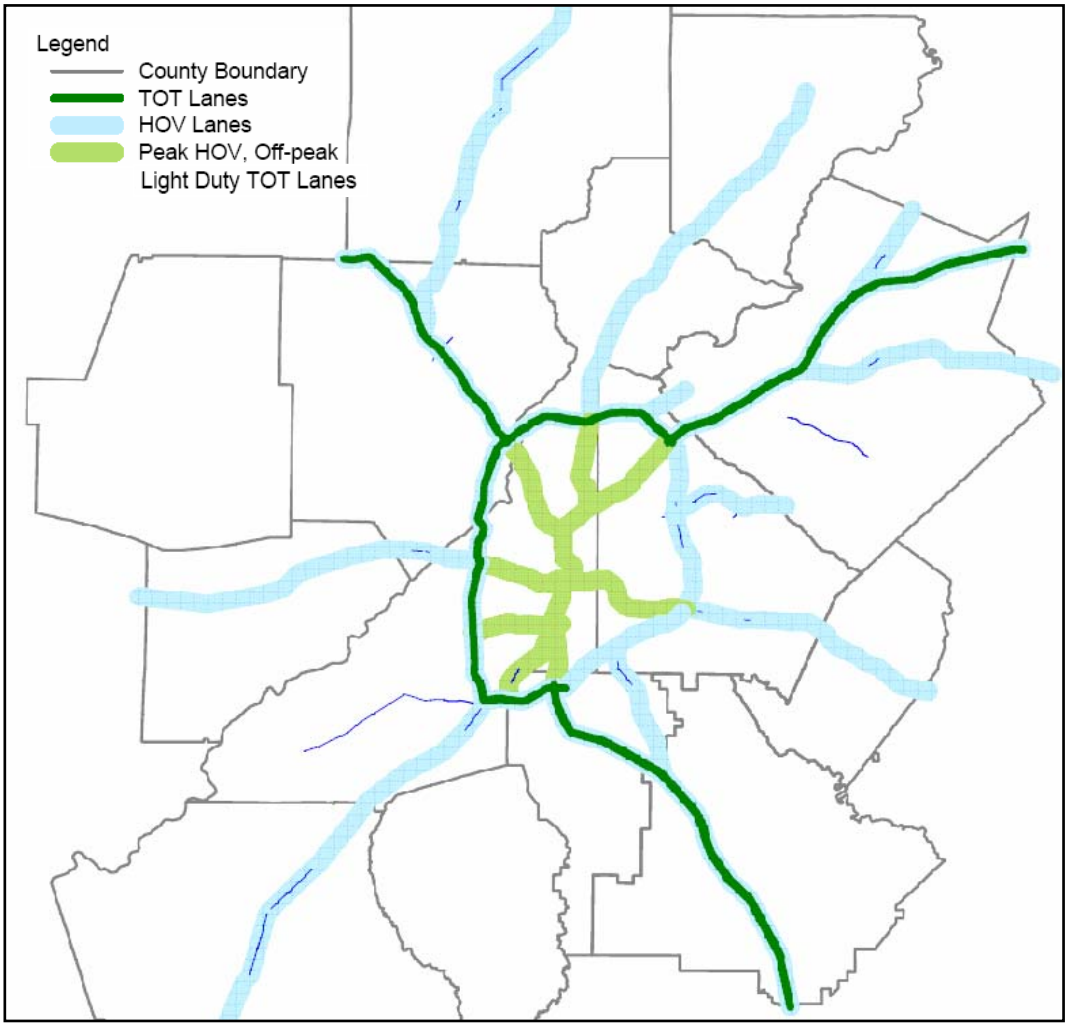

Figure 3 TOT Alternative Concept 2, Service to Deliveries

Scenario 3: TOT Regional Network

- Voluntary TOT corridors are operated in place of the HOV lanes outside and on I-285. TOT corridors are 4 lanes, 2 lanes in each direction.
- The HOV network operates on all limited access facilities inside I-285with 2 HOV lanes (1 each direction).
- HOV eligibility policy remains as it is today.
- Transit vehicles use the managed lane(s) for free.

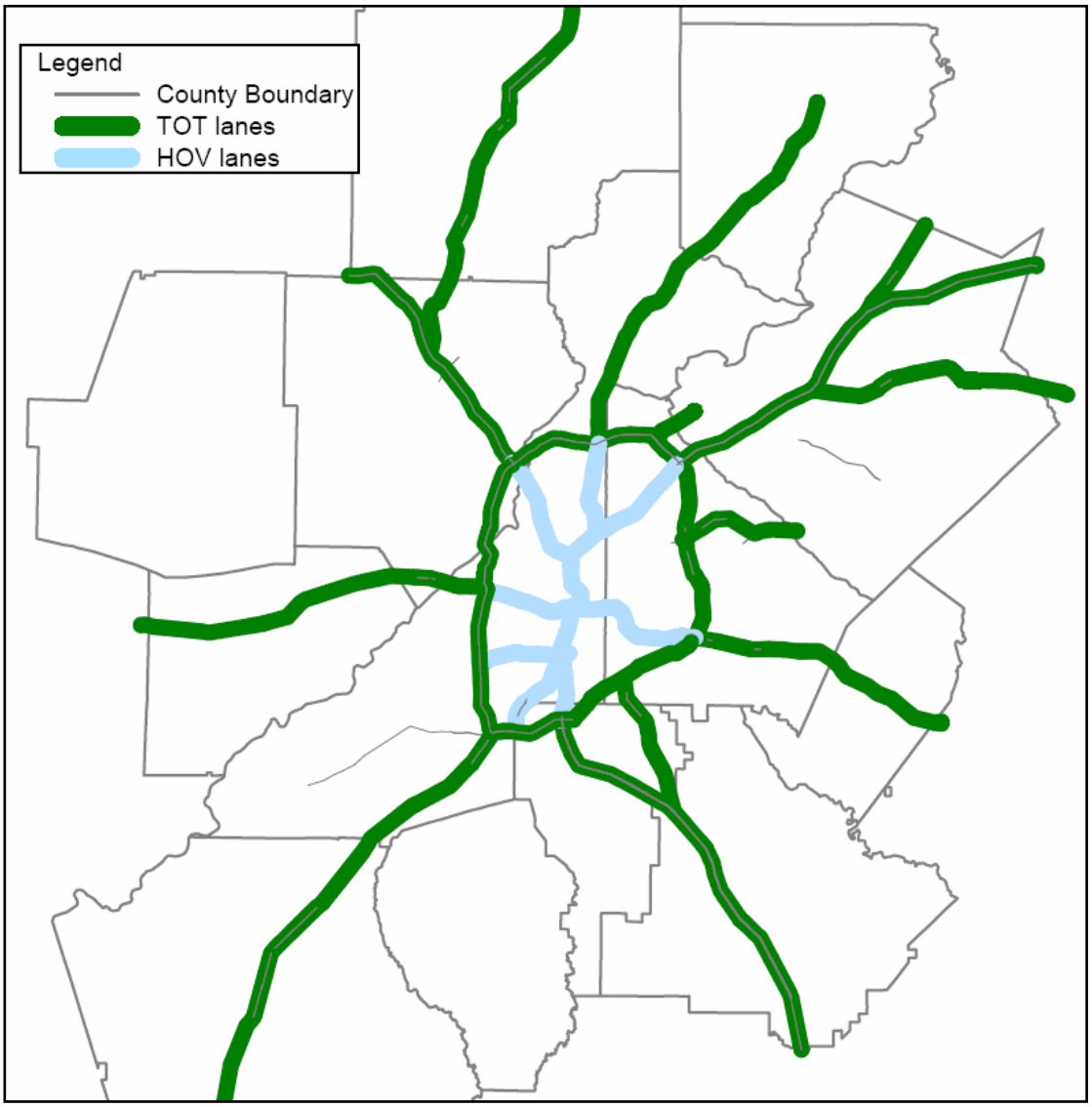

Figure 4 TOT Alternative Concept 3, Regional TOT Network

Alternative concept 3 provides an opportunity to assess the performance of a network of TOT lanes outside and on I-285 relative to a network of HOV lanes in the base scenario. This alternative assumes four TOT lanes (two in each direction) on all limited access facilities outside and on I-285 in place of HOV managed lanes. Figure 4 shows the analysis network for scenario 3.

3 ANALYSIS RESULTS

This section presents the results of a literature review regarding truck operators' value of time and analysis results for the 2030 horizon year. This preliminary analysis focused on the feasibility of the TOT concept for currently proposed (in the *2030 Mobility* plan) and additional highway lanes. Therefore, the region-wide performance of the highway network as well as TOT lane performance measures are presented below for each scenario.

3.1 Value of Time Research Results

Among the potential benefits to truck operators, travel time savings offered by optional TOT lanes is one of the most measurable. Therefore, truck operators' perceived value of time is essential to estimating the value of TOT lanes. Because there are no existing facilities on which to observe truck operators' behavior given tolled alternatives, revealed preference value of time data does not exist. Stated preference data is therefore the basis for the value of time used in modeling TOT operations.

Two recent surveys (Kawamura, 1999 and Smalkowski, 2003) suggest a range for (heavy) truck operators' value of time from $30 to $60 per hour. Both studies also tested various operator characteristics for significance in determining value if time. One important variable suggested by both in determining value of time is business type, that is, whether operators are for-hire or private. Survey results suggested that for-hire operators have a higher value of time than do private carriers (3,4). Because business type and other operator characteristics are not available from the travel demand model, a representative value of time for the entire heavy truck category was desired.

The study team presented the value of time research to the steering committee in order to gain feedback from industry representatives regarding the values used for the TOT analysis. The committee agreed that for the purposes of this study, a value of time of $35 per hour for heavy duty commercial vehicles and $18 per hour for light duty commercial vehicles (as defined by the ARC model) is sufficient. These values were used in the travel demand model and were adjusted (with average speed) to estimate initial toll rates. As discussed above, toll rates were then adjusted according to conditions on each TOT corridor.

3.2 2030 Analysis Results at the Systems Level

Five primary performance measures were used in determining the feasibility of the alternative TOT concepts. These criteria were: 1) illustrative trip time savings for TOT lane users, 2) vehicle hours traveled in the region, 3) vehicle miles traveled in the region, 4) impact on conditions in the general purpose lanes of limited access highways, and 5) impact on the region's local road network.

3.2.1 Trip Time Savings for Trucks in the TOT Lanes

One important measure of the performance of TOT lanes is the potential time savings that TOT managed lanes could offer to transit riders and light and heavy duty commercial vehicles. The following four figures show important through-trip routes for truck operators using interstates in the region. Each figure shows one of two PM peak period trips with a comparative time savings offered by the TOT lanes along the route indicated. Trip time savings indicates the difference between general purpose lane trip time and TOT lane trip time using the same route. Appendix B also shows time savings by comparing the base scenario general purpose lane travel time to TOT lane travel time under the alternative TOT scenario. The comparison in the Appendix shows the difference in trip times with TOT lanes versus trip times if no TOT lanes are added and indicates that general purpose lanes will also benefit from some time savings under the TOT scenarios.

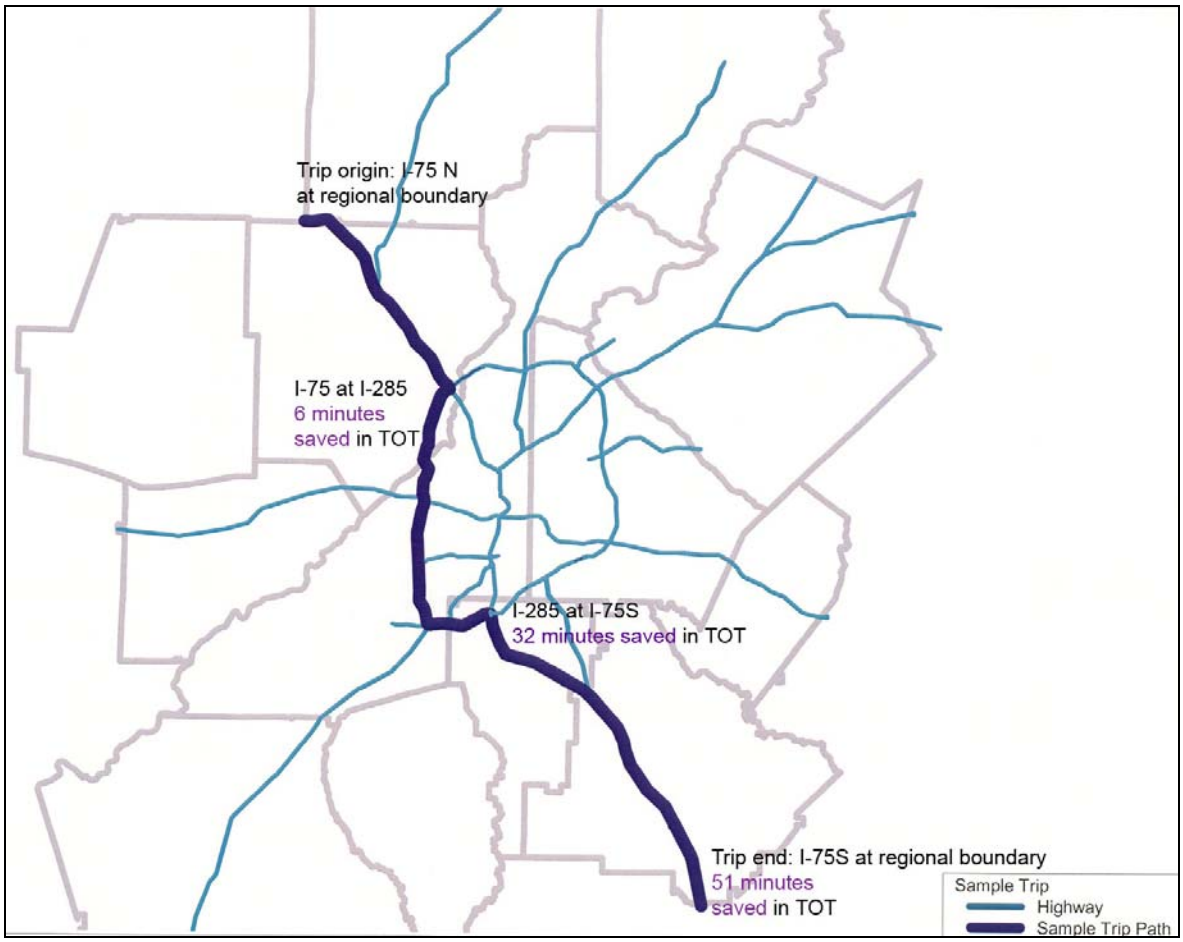

Figure 5 Comparison of Alternative 1 Trip Times in General Purpose and TOT Lanes (minutes saved in TOT lanes during weekday PM peak period)

Figure 5 shows that the TOT lanes in alternative 1, which are in addition to the currently planned managed lane network, would offer a time savings of 51 minutes for the north-south through trip from I-75 north to I-75 south of the region during the PM peak period. For a truck operator traveling from I-75 at the region's boundary in Cherokee County to the intersection with I-285, the TOT lanes offer a comparative time savings of 6 minutes.

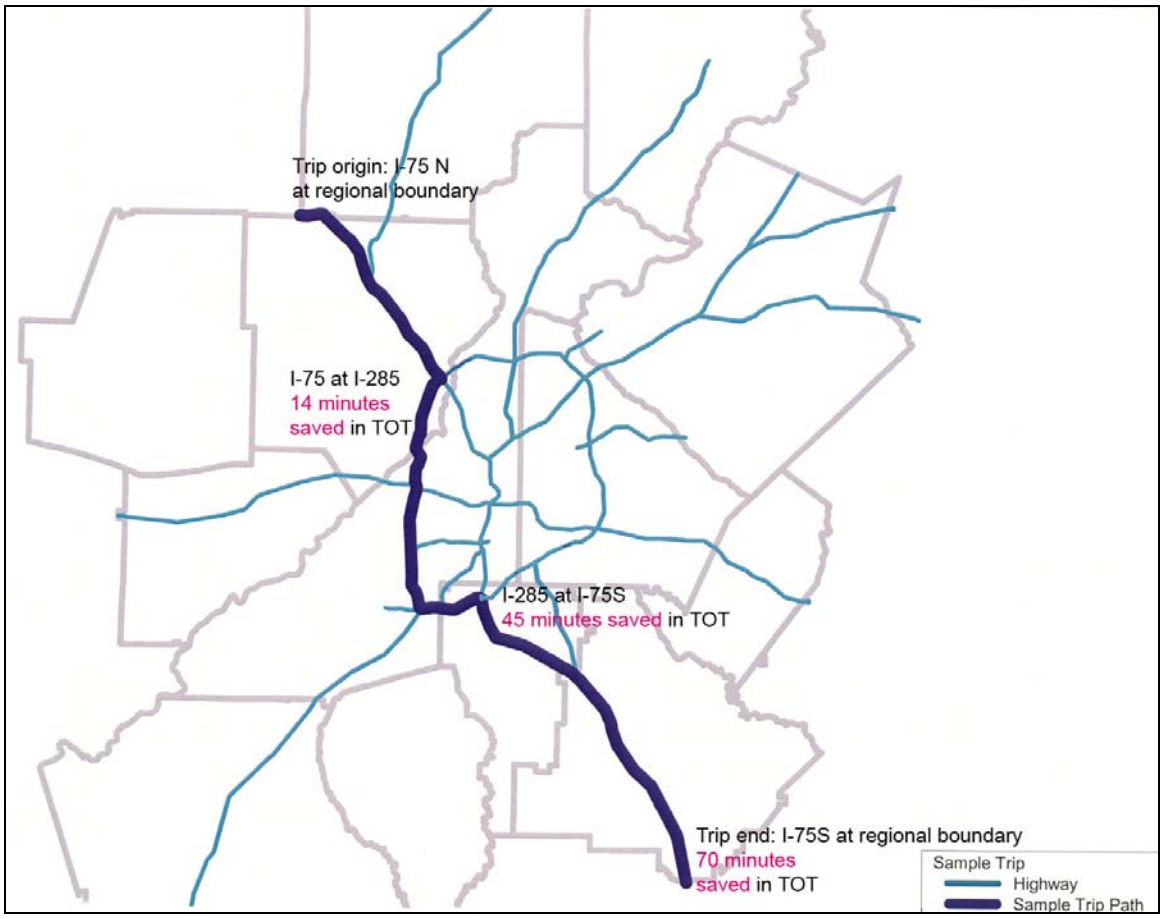

Figure 6 Comparison of Alternative 3 Trip Times in General Purpose and TOT Lanes (minutes saved in TOT lanes during weekday PM peak period)

Figure 6 shows that the TOT lanes in alternative 3, which are in place of the currently planned managed lane network, would offer a time savings of 70 minutes for the north-south through trip from I-75 north to I-75 south of the region during the PM peak period. Similarly, for a truck operator traveling from I-75 at the region's boundary in Cherokee County to the intersection with I-285, the TOT lanes offer a comparative time savings of 14 minutes.

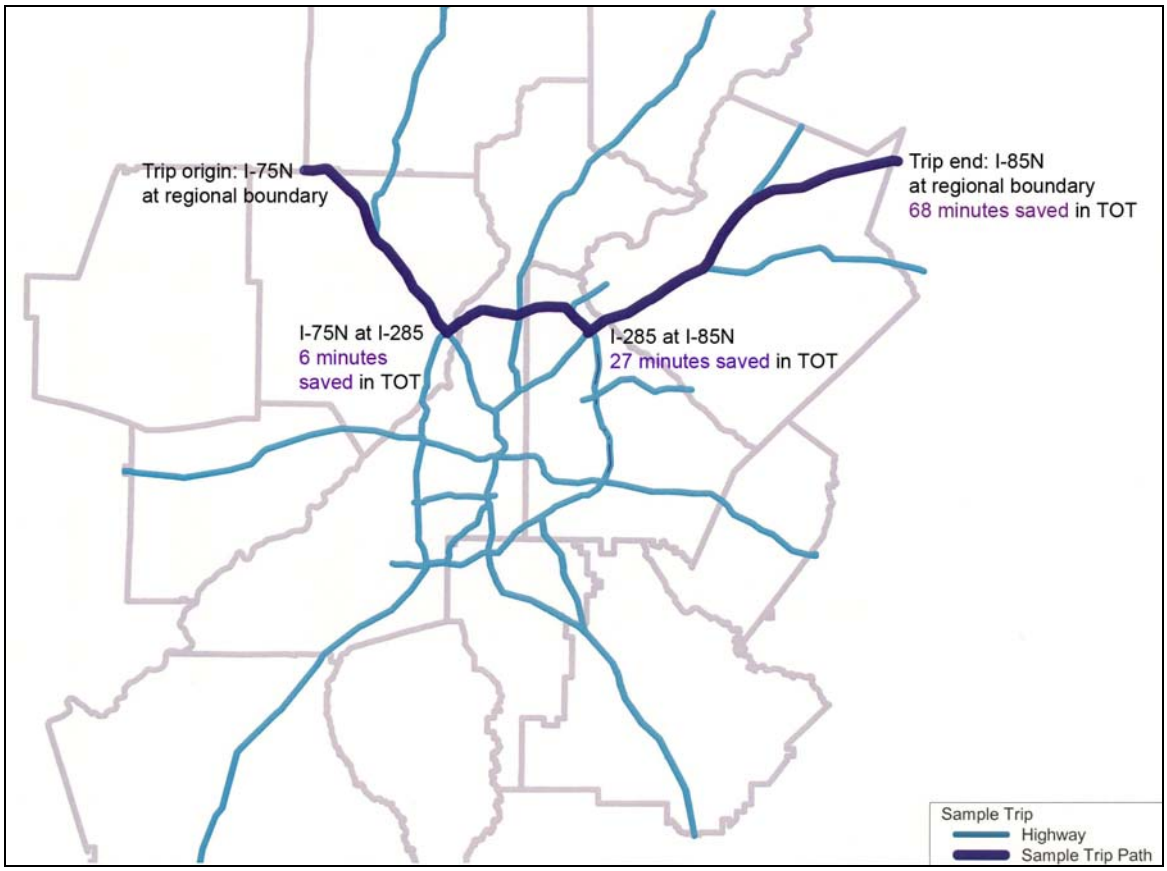

Figure 7 Alternative 1 Comparison of General Purpose and TOT Lane Trip Times (minutes saved in TOT lane) during PM Peak Period

Figure 7 shows that the TOT lanes in alternative 1 would offer a time savings of 68 minutes for the east-west through trip from I-75 north to I-85 north of the region during the PM peak period. Similarly, for a truck operator traveling from I-75 at the region's boundary in Cherokee County to the intersection with I-285, the TOT lanes offer a comparative time savings of 6 minutes versus the general purpose lanes.

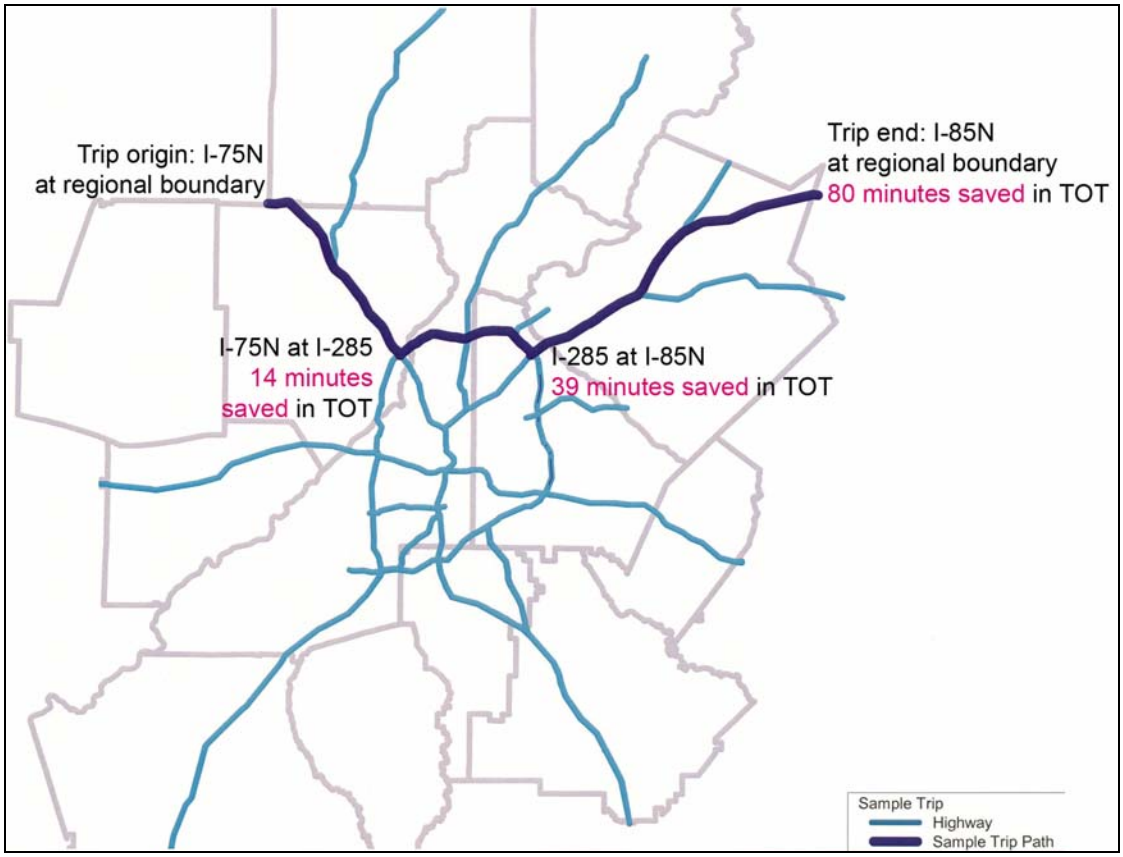

Figure 8 Alternative 3 Comparison of General Purpose and TOT Lane Trip Times (minutes saved in TOT lane) during PM Peak Period

Figure 8 shows that the TOT lanes in alternative 3, which are in place of the currently planned managed lane network, would offer a time savings of 80 minutes for the east-west through trip from I-75 north to I-85 north of the region during the PM peak period. Similarly, for a truck operator traveling from I-75 at the region's boundary in Cherokee County to the intersection with I-285, the TOT lanes offer a comparative time savings of 17 minutes.

The time savings indicated above show that under each scenario TOT managed lanes can offer savings to those willing to pay a fee (where applicable). The savings varied according to congested travel times estimated by the regional travel demand model under each scenario. Therefore, a savings of 51 minutes offered by scenario 1 for a trip between I-75 N and I-75 S indicates that the general purpose lanes were not as congested as they were under scenario 3 (with a 70 minute savings) and/or that the TOT lane travel time was greater under scenario 1 when compared scenario 3.

3.2.2 Vehicle Miles Traveled and Vehicle Hours Traveled

Vehicle miles traveled (VMT) during a typical weekday is an indication of the utilization of highway facilities. In the Atlanta region, in particular, VMT is also an important input into air quality analysis; potential policies that increase regional VMT threaten the attainment of air quality standards. Table 1 shows the regional VMT on all roadway facilities calculated for each scenario.

Table 1 Summary of Weekday Vehicle Miles Traveled and Vehicle Hours Traveled under 2030 TOT Alternatives*

TOT Alternative Scenario	Weekday VMT (K)	Change in Weekday VMT (K) from Base	Weekday VHT (K)	Change in Weekday VHT (K) from Base
HOV 2+ Base	159,787	-	6,139	-
A1: Major Truck Corridors	160,108	321 (0.2%)	5,742	-397 (-6.5%)
A2: Service to Deliveries	160,138	351 (0.2%)	5,747	-392 (-6.5%)
A3: Regional TOT Network	159,692	-96 (-0.001%)	5,843	-296 (-4.8%)

* Regional measures include all vehicle types on all arterials, collectors, local roads and limited access facilities.

Table 1 indicates that total highway VMT is lowest under scenario 3 and the greatest under scenario 2. It is logical that VMT would increase in scenarios 1 and 2 in comparison to the base given the additional miles of highway capacity that were assumed for TOT lanes on I-285, I-85 and I-75. The regional VMT under the TOT scenarios represent a range of difference from an increase of 0.2% over the base scenario VMT under alternative 2 to a 0.001% decrease in regional VMT under alternative 3. These relatively low differences suggest that the concept of TOT lanes on the region's highway network does not threaten the attainment of air quality standards in the Atlanta region due to VMT.

Table 1 indicates that each TOT alternative resulted in lower regional VHT than the base scenario. The change in VHT ranges from a decrease of 5% to 6% over the base scenario regional VHT. This suggests an improvement across the region. Given the study's assumptions of value of time for noncommercial vehicles and light and heavy duty truck operators, vehicle hours of travel saved over the base scenario can be converted into an annual dollar amount. Table 2 shows the commercial vehicle VHT saved on all facilities in the region on a typical weekday versus the base scenario. The table also shows an estimate of the annual equivalent in dollars of this time savings (in millions of dollars). (Fees imposed on truck operators using TOT lanes are not included in these values. See below for system-wide fee revenue.) These figures suggest that the trucking industry could save a substantial amount should the region implement TOT lanes.

Table 3 shows the estimated value of time saved by noncommercial vehicles and commercial vehicles, as well as the regional total value of time saved, based upon assumed value of time, as shown. The Table 3 results under scenario 3, which has no managed HOV lanes outside of I-285, indicate a negative time savings for HOVs. This suggests the logical result that HOVs would spend more time traveling than if the HOV 2+ Base Scenario HOV lanes were in place; however, the scenario 3 "Total Annual Value of Time Savings" shows that the region as a whole saves travel time if those managed lanes are operated as TOT lanes. This figure, in particular, demonstrates a potential efficiency to be gained by using the same managed lanes as

TOT lanes rather than HOV lanes. Table 3 also shows that comparative regional time savings is higher for scenarios 1 and 2 than for scenario 3, which is logical given the additional highway capacity of the TOT lanes on I-75, I-85, and I-285 under scenarios 1 and 2.

Table 2 Summary of Annual Time Savings to Truck Operators in the Region

TOT Alternative Scenario	*Weekday* Light Duty VHT Saved (K)	*Weekday* Heavy Duty VHT Saved (K)	Annual Value of Light Duty Savings ($M)	Annual Value of Heavy Duty Savings ($M)	Total Annual Value of Time Savings ($M)
A1: Major Truck Corridors	83	33	$ 408	$ 313	$ 721
A2: Service to Deliveries	85	33	$ 418	$ 311	$ 729
A3: Regional TOT Network	100	38	$ 492	$ 367	$ 859

Note: VHT savings is compared to HOV 2+ Base Scenario; Scenarios 1 and 2 assume TOT lanes in addition to the currently planned managed lane network.

Table 3 Annualized Value of Time Saved by the Traveling Public in the Atlanta Region

Managed Lanes Scenario *	Noncommercial Vehicle Savings (at $15 per hour)		Light Duty Commercial Vehicle Savings (at $18 per hour)	Heavy Duty Commercial Vehicle Savings (at $35 per hour)	Total Annual Value of Time Savings
	SOV	HOV			
A1: Major Truck Corridors *	$ 1,052 M	$ 100 M	$ 408 M	$ 313 M	$ 1,873 M
A2: Service to Deliveries *	$ 1,042 M	$ 82 M	$ 418 M	$ 311 M	$ 1,852 M
A3: Regional TOT Network	$ 905 M	- $ 260 M	$ 492 M	$ 367 M	$ 1,054 M

Note: Time savings is based upon VHT savings as compared to the HOV 2+ Scenario and value of time assumptions, as shown, for each vehicle class.

* Scenarios 1 and 2 have the added capacity of 2 TOT lanes in each direction on I-75, I-285, and I-85 (as detailed above) compared to the HOV 2+ scenario or scenario 3. This additional capacity impacts the projected costs of the scenarios as shown in Section 3.3, Revenues and Costs, below.

3.2.3 Weekday Performance of TOT Lanes, Operating Conditions

In order to assess the performance of TOT lanes for through truck trips, the study team examined travel conditions for two sample trips. The base scenario, where limited access highway truck trips use the general purpose (GP) lanes, offers a basis of comparison for the three alternative concepts. The first sample trip, an east-west through trip, is from I-75 north of the region to I-85 north of the region. Table 4 shows that in either scenario 1 (which is the same as scenario 2) or 3, the TOT lane performance is free flow for much more of the trip

(90% and 87%, respectively) than under the base scenario, where only 23% of the trip is during free flow conditions. Table 5 shows similar results for a north-south sample through trip from I-75 north of the region to I-75 south of the region. These tables show that for both trips, the TOT lanes offer a congestion free ride through the Atlanta region. This congestion-free performance of the TOT lanes is the result of imposing fees where necessary to manage the number of trucks on the TOT lane(s). The lanes therefore offer a more reliable, safer, and faster trip to truck operators.

Table 4 Travel Conditions for Trucks using during the PM Peak Hour

East-west Sample Trip: From I-75 N to I-285 E to I-85 N

2030 TOT Alternative Scenario	Percent of Trip at Given Condition during PM Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base General Purpose Lanes	23%	39%	38%
A1/A2: Major Truck Corridors TOT Lanes	90%	10%	0%
A3: Regional TOT Network TOT Lanes	87%	13%	0%

Note:
Scenarios 1 and 2 are identical during the PM peak period.
The Base scenario represents conditions on general purpose (GP) lanes. Scenarios 1-3 represent conditions on TOT lanes.
Percentages are calculated by dividing the distance operating under specific levels of service by the total trip length. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

Table 5 Travel Conditions for Trucks during the PM Peak Hour

North-south Sample Trip: From I-75 N to I-285 W to I-75 S

2030 TOT Alternative Scenario	Percent of Trip at Given Condition during PM Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base General Purpose Lanes	14%	48%	38%
A1/A2: Major Truck Corridors TOT Lanes	84%	16%	0%
A3: Regional TOT Network TOT Lanes	92%	8%	0%

Note:
Scenarios 1 and 2 are identical during the PM peak period.
The Base scenario represents conditions on general purpose (GP) lanes
Scenarios 1-3 represent conditions on TOT lanes.
Percentages are calculated by dividing the distance operating under specific levels of service by the total trip length. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

Table 6 and Table 7 show the performance of TOT lanes during the midday period. The TOT lanes operate under free flow conditions for a majority, if not all, of the trip. This represents a faster, more reliable, trip time for freight operators in the TOT lanes. Thus, TOT lanes offer increased productivity for midday delivery services and movement of goods.

Table 6 Truck Travel Conditions during the MD Peak Hour
East-west Sample Trip: From I-75 N to I-285 E to I-85 N

	Percent of Trip at Given Condition during Peak Hour		
2030 TOT Alternative Scenario	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base General Purpose Lanes	49%	48%	3%
A1: Major Truck Corridors TOT Lanes	100%	0%	0%
A2: Service to Deliveries TOT Lanes	100%	0%	0%
A3: Regional TOT Network TOT Lanes	89%	11%	0%

Note:
The Base scenario represents conditions on general purpose (GP) lanes; Scenarios 1-3 represent conditions on TOT lanes.
Percentages are calculated by dividing the distance operating under specific levels of service by the total trip length. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

Table 7 Truck Travel Conditions during the MD Peak Hour
North-south Sample Trip: From I-75 N to I-285 W to I-75 S

	Percent of Trip at Given Condition during Peak Hour		
2030 TOT Alternative Scenario	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base GP Lanes	56%	29%	15%
A1: Major Truck Corridors	100%	0%	0%
A2: Service to Deliveries	100%	0%	0%
A3: Regional TOT Network	100%	0%	0%

Note:
The Base scenario represents conditions on general purpose (GP) lanes; Scenarios 1-3 represent conditions on TOT lanes.
Percentages are calculated by dividing the directional distance operating under specific levels of service by the total trip length. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

The tables above represent operating conditions on this study's assumed TOT networks. These alternatives do not represent an exhaustive range of TOT scenarios. Further study should specifically examine the arterial highway network and include other freight facilities such as the Moreland Avenue terminals, the Austell multimodal yard, and the I-20 corridors.

3.2.4 Weekday Performance of General Purpose Lanes

The impact of TOT lanes on adjacent general purpose lanes is one of the important questions that will likely arise in any discussion on the feasibility of the TOT lane concept. Table 8 shows that conditions on the region's general purpose lanes may actually improve with the presence of TOT lanes during the PM peak hour. The portion of general purpose lanes operating under free flow conditions increases from 40% to 46% and 48% for alternatives 1 and 3, respectively while the portion of congested GP lanes decreases from 29% to 22% and 24%, respectively. These conditions represent a 17 to 24% reduction in congested GP directional miles under the TOT alternatives. Note that alternative 1 (which is the same as 2 during the PM period) includes additional highway capacity for TOT use; therefore the improved GP lane operations are logical. The improved GP lane performance under alternative 3 suggests that use of the region's managed lanes for truck operation may be more efficient than the currently planned use as HOV lanes. The projections in Table 8 suggest that the TOT concept is not only feasible, but offers potential benefits to all highway users.

Table 8 Travel Conditions on General Purpose (GP) Lanes during the PM Peak Hour

	Percent GP Lanes Operating at Given Condition during the PM Peak Hour		
2030 TOT Alternative Scenario	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base	40%	31%	29%
A1/A2: Major Truck Corridors	46%	32%	22%
A3: Regional TOT Network	48%	28%	24%

Note:
Scenarios 1 and 2 are identical during the AM, PM, and NT periods.
Percentages are calculated by dividing the distance operating under specific levels of service by the total regional GP directional facility mileage. Free flow denotes levels of service 'A'-'C'. Near Capacity denotes level of service 'D'. At capacity/congested denotes levels of service 'E'-'F'.

Table 9 shows similar improvements in limited access road performance during the midday, when the largest number of trucks are on the region's road network. The figures represent a 13-18% increase in free flow GP directional miles during the midday.

Table 9 Travel Conditions on General Purpose (GP) Lanes during the Midday Peak Hour

2030 TOT Alternative Scenario	Percent GP Lanes Operating at Given Condition during Midday Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base	69%	28%	3%
A1: Major Truck Corridors	78%	20%	2%
A2: Service to Deliveries	78%	20%	2%
A3: Regional TOT Network	81%	17%	2%

Percentages are calculated by dividing the distance operating under specific levels of service by the total regional GP directional facility mileage.

The general purpose lane improvements shown in the above tables suggest not only efficient operation of the region's road network, but also an increase in safe operating conditions. Any reduction in unstable traffic conditions, categorized above as "at capacity/congested", contributes to safe operation. Furthermore, the safety benefits of separating commercial and personal vehicle traffic is a significant, although difficult to quantify, benefit of operating exclusive truck facilities. Operations on the New Jersey Turnpike dual-dual roadway, which limits truck traffic to the outer roadway of the Turnpike, suggest safety improvements. According to data from the NJ Turnpike Authority for the period from 1994-2003, "in each of the ten years, the crash rate on the dual-dual roadways was 28-40% less than on the segments of the Turnpike without separated roadways" (5). That is, where trucks are required to use a parallel roadway (which also allows auto traffic), there is a much lower crash rate than where trucks operate in the general purpose lanes.

3.2.5 Weekday Performance of Arterials and Collectors

Impacts on the regions' local road networks are also important in considering the feasibility of TOT facilities. The following two tables show regional performance of arterials and collectors under the base scenario and the TOT alternatives. These tables suggest that minor improvements may result from implementation of TOT lanes. Scenarios 1 and 2, which include additional miles of (TOT) limited access facilities (over the base scenario) have slightly better impacts on the local road network than scenario 3, which converts the operation of several assumed HOV lanes to TOT lanes. The change in afternoon peak "at capacity/congested" miles represents a 10-15% reduction in congested miles on arterials and collectors under the TOT concepts. The change in midday "at capacity/congested" miles on arterials and collectors represents a 15-27% reduction in congested miles under the TOT concepts.

Table 10 Travel Conditions on Arterials and Collectors during the PM Peak Hour

2030 TOT Alternative Scenario	Percent Arterials and Collectors Operating at Given Condition during PM Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base	66%	16%	18%
A1/A2: Major Truck Corridors	69%	16%	15%
A3: Regional TOT Network	68%	16%	16%

Note:
Free flow conditions include levels of service 'A'-'C'. Near capacity conditions include level of service 'D'. At capacity/congested conditions include level of service 'E' and 'F'. Percentages are calculated by dividing the distance operating under specific levels of service by the total regional facility mileage.

Table 11 Travel Conditions on Arterials and Collectors during the MD Peak Hour

2030 TOT Alternative Scenario	Percent Arterials and Collectors Operating at Given Condition during MD Peak Hour		
	Free Flow	Near Capacity	At Capacity / Congested
HOV 2+ Base	89%	8%	3%
A1: Major Truck Corridors	92%	6%	2%
A2: Service to Deliveries	92%	6%	2%
A3: Regional TOT Network	91%	6%	3%

Note:
Free flow conditions include levels of service 'A'-'C'. Near capacity conditions include level of service 'D'. At capacity/congested conditions include level of service 'E' and 'F'. Percentages are calculated by dividing the distance operating under specific levels of service by the total regional facility mileage.

3.2.6 Commercial Vehicle Trips on Limited Access Facilities, Weekday

Efficient utilization of the managed lane, indeed of the entire highway corridor, is one of the assumed benefits of managed lanes. Table 12 shows the number of weekday commercial vehicle trips that are accommodated on the highway system.

Table 12 Weekday Commercial Vehicle Trips on Limited Access Facilities

2030 Scenario	Light Duty	Heavy Duty	Total
HOV 2+ Base	897,000	327,000	1,224,000
A1: Major Truck Corridors	945,000	341,000	1,286,000
A2: Service to Deliveries	953,000	341,000	1,295,000
A3: Regional TOT Network	996,000	357,000	1,353,000

Note:
Scenarios 1 and 2 include TOT lanes on I-75N, I-85N, I-285, and I-75S that are in addition to the highway network assumed for the other alternatives.

Table 12 shows that limited access facilities under scenarios 1 and 2 carry slightly more trips than the base scenario. This is logical given the addition of truck lanes to the highway network. Table 12 also shows that under TOT alternative concept 3, the region's limited access facilities (including TOT and GP lanes) carry the most commercial vehicle trips. This comparison of scenario 3 and the base scenario suggests that the highway network is more efficiently carrying commercial vehicle trips with truck lanes than with HOV lanes. It suggests that the local road network will have to support fewer commercial vehicle trips (under the TOT alternatives) as well.

3.3 Revenues and Costs

While revenue generation is not the primary goal of TOT managed lanes, pricing users is a necessary tool to achieve the benefits of TOT operations. In order to assess the cost effectiveness of TOT operations, potential revenues were calculated based on miles traveled in a TOT corridor and the fee rate for that corridor. Using ARC's regional travel demand model, fee rates for three weekday time periods (morning, midday, and evening) were set in order to manage the TOT volume, and therefore manage the operating conditions of the managed lane(s). No minimum fee rate was assumed for the purpose of analysis. Therefore, many TOT corridors with lower demand levels do not generate any projected revenue. The fee collection mechanism was not explored as part of this study. However, the steering committee did discuss alternatives to the point of service collection assumed in the demand model; additional development of the TOT concept should examine alternative models for both permitting use of truck lanes and potential fee collection from lane users, as recommended below.

Table 13 shows the regional revenue estimates for the three alternative concepts. Scenarios 1 and 2 only differ during the midday period when certain HOV corridors inside I-285 are open to light duty truck traffic. Due to the resulting shifts in demand for TOT lanes during the midday, fees charged on TOT corridors outside of I-285 also changed between scenarios 1 and 2. The resulting weekday revenue reflects this change.

Table 13 shows that scenario 3, with an assumed TOT network on all limited access facilities outside and on I-285, generates the greatest gross revenue. However, the revenue per TOT lane mile suggests that the major truck corridor TOT lanes under scenarios 1 and 2 have greater fee-paying demand than do many corridors under scenario 3.

Table 13 Summary of Regional Revenue Estimates for 2030 Scenarios

2030 TOT Scenario	Light Duty Truck Weekday Revenue (K)	Heavy Duty Truck Weekday Revenue (K)	Total Weekday Revenue (K)	Weekday Revenue per TOT Lane Mile	Projected Annual Revenue (K)
A1: Major Truck Corridors	$ 186	$ 142	$ 327	$ 694	$ 89,400
A2: Service to Deliveries	$ 219	$ 153	$ 372	$ 614	$ 101,000
A3: Regional TOT Network	$ 429	$ 296	$ 724	$ 554	$ 198,000

Note:
1. Heavy and light duty truck categories are as defined by the ARC travel demand model for heavy and light duty commercial vehicles, respectively.
2. Revenue projections are based on fees that vary across scenarios by direction on each TOT corridor.
3. Assumes 30 year bonds at 5% interest; annualized costs include TOT incremental capital, and operations and maintenance costs. These are 2004 dollar values.

Cost estimates were developed assuming both incremental TOT-related capital expenditures (over the cost of building the GDOT preferred managed lane cross section) and operations and maintenance costs. Operations and maintenance (O&M) costs include the incremental costs associated with the operations and maintenance of the TOT lanes themselves. These include administrative costs associated with fee collection, maintenance of TOT infostructure (including fee collection and other ITS equipment), and infrastructure maintenance. Table 14 shows the breakdown of operations and maintenance costs associated with each scenario per year. Logically, scenario 3, with the largest TOT network, has the highest projected O&M costs.

Table 14 TOT Annual Operations and Maintenance Cost Projections, 2030*

Annual Costs	Administrative Costs (K)	Maintenance Costs (K)	Potential Annual O&M Costs * (K)
A1: Major Truck Corridors	$ 8,800	$ 7,600	$16,400
A2: Service to Deliveries	$10,100	$10,400	$20,500
A3: Regional TOT Network	$20,100	$21,100	$41,200

Note:
*Assumes 30 year bonds at 5% interest. These are 2004 dollar values.
These are general numbers; more detailed numbers will be developed in further studies. Operations and maintenance costs include administration and equipment/infrastructure maintenance.

Detailed capital expenditures such as the cost of building infrastructure such as new highway lanes are beyond the scope of this study; however, infrastructure capital cost estimates (including cost estimates to build managed lanes derived from the GDOT *HOV System Plan*) are included below for comparison purposes. Projected TOT capital costs include the

incremental capital costs for such things as barriers on existing lanes, fee collection structures, and communications and other ITS equipment. Table 15 shows the projected infrastructure costs, assuming that the infrastructure costs to build additional lanes would be comparable to those projections for HOV lane construction in the GDOT *HOV System Plan* and the projected TOT "infostructure" capital costs. The managed lane infrastructure capital costs include those lanes assumed to operate as HOV lanes in addition to the assumed TOT lanes. Should the region decide to pursue the TOT concept, a policy stating the degree to which fee revenues may be used to cover capital and annual O&M costs should be developed.

Table 15 Projected Annualized Capital Costs

Annual Capital Cost*	Projected TOT Infostructure Capital Costs [1] (K)	Projected TOT Infrastructure Cost[2] (K)	Projected Managed Lane Infrastructure Cost [2] (K)
A1: Major Truck Corridors	$ 4,700	$ 331,800	$ 909,900
A2: Service to Deliveries	$ 7,000	$ 331,800	$ 909,900
A3: Regional TOT Network	$ 11,000	$ 507,100	$ 578,000

Note:
1. TOT capital costs include TOT "infostructure" such as electronic toll collection equipment and infrastructure such as pylons (where needed).
2. Capital infrastructure cost projections are assumed to be similar to those developed as part of the GDOT *HOV System Plan*; Managed Lane infrastructure costs include the entire managed lane system of assumed HOV/HOT and TOT lanes and do not include additional costs associated with infrastructure requirements (such as pavement design) for exclusive truck use.
*Assumes 30 year bonds at 5% interest; values are expressed in 2004 dollars.

These cost and revenue projections represent general estimates; more detailed numbers could be developed in further studies.

4 FINDINGS AND RECOMMENDATIONS

This limited study of a regional TOT lane strategy for the Atlanta region resulted in some potentially significant results. The three alternative concepts suggest that TOT is a feasible and potentially beneficial policy for the region's transportation system. As a logistics center, the Atlanta region will need to provide for current and future mobility by managing the highway system as efficiently as possible. As part of a regional management strategy, TOT facilities are an opportunity to improve network efficiency and productivity for freight and person movement, offer time savings, improve reliability and improve safety for all system users. The assumed TOT scenarios benefit not only TOT lane users, but also travelers on general purpose highway lanes and the local road network.

This study found substantial demand for truck facilities on the region's limited access highways. Because of this demand, TOT facilities showed potential revenues that could be used to leverage system funding requirements. The commercial vehicle traffic on the region's limited access facilities was so high that a mandatory system could not have accommodated the demand under the assumed TOT alternatives. A voluntary system, as assumed, offered the benefits discussed above without constraining the options available to truck operators.

4.1 Challenges to developing a regional TOT concept

There are several challenges related to implementing TOT lanes in the Atlanta region. The first will be associated with the fee structure attached to the TOT strategy. The representatives from the trucking industry participating on the advisory committee strongly recommended that the TOT lanes remain voluntary; that is, commercial vehicles would not be required to use the lanes. Under the assumed scenarios in this study, commercial vehicle demand levels are so high on certain corridors that 1) mandatory facilities would not be able to accommodate the truck traffic and 2) a fee would be needed to maintain the performance of the TOT lanes. The level of fees facing commercial vehicle users would clearly be a critical factor in their overall success. Industry representatives made it very clear that they recognize the growing problem of freight mobility in the Atlanta region and that something needs to be done.

The second challenge is associated with the actual placement of TOT lanes. Scenarios 1 and 2 assume that four TOT lanes can be constructed in the I-75, I-85N, and the I-285 northern and western sections. This study did not have the resources to conduct a detailed engineering analysis of whether this assumption is indeed reasonable.

A third challenge relates to public perception, especially for TOT alternative concepts such as this study's scenarios 2 and 3. In these scenarios, existing and/or planned HOV lanes are converted into TOT lanes. It is very difficult from a public policy perspective to take something away from the public once they become used to it. Thus, even though the strategy might very well show overall improvement for all travelers in the corridor, it might be very politically difficult to implement.

The region is in a particularly critical stage now as it begins to implement a region-wide managed lane network. Thus, there is urgency behind any potential change to the region's concept of managed lanes. This urgency represents a challenge to the inclusion of truck facilities as a part of the overall managed lanes strategy for the region. However, a decision needs to be made soon concerning the desirability of moving ahead with such a strategy.

A final challenge for scenarios 2 and 3 could originate from government agencies that have spent considerable time putting HOV lanes in place for mobility and environmental quality purposes. Turning these lanes into TOT lanes will logically give the implementing agencies some concern. Furthermore, broadening an institution's concept of managed lanes to include truck facilities may be difficult.

4.2 Recommendations

The following recommendations represent the next steps that should be taken in the further consideration of a regional TOT lane strategy.

1. Both the Atlanta Regional Commission (ARC) and the Georgia Department of Transportation are about to begin freight studies. Both of these studies should further consider the potential of truck only facilities.

2. This study was based on limited data on truck and goods movement in the Atlanta Area, both in terms of quality and quantity. A more comprehensive examination of TOT lanes in the region should be based on a targeted data collection effort that can further define the benefits of such lanes to commercial vehicle movement and the general traveling public in the region. This data collection effort should encompass several freight movement characteristics including, but not limited to, commercial vehicle intraregional and through trip patterns, operator characteristics (such as value of time, willingness to pay, routes, and flexibility in trip-making) and business types (private vs. for-hire carriers), regional freight distribution needs, and coordination with state-wide freight needs. Potential TOT facility users, at the operator and corporate levels, should be interviewed to determine preferred implementation strategies, such as fee collection/permitting mechanisms and facility operations. Specifics regarding the costs to companies for current trip-making would be important data to determine a break-even fee for those companies to use TOT facilities.

3. The ARC is about to embark on its next update of the region's transportation plan. This study and the companion HOT study have demonstrated the need for some form of demand management, through strategies such as restricting vehicle eligibility, pricing or providing exclusive truck facilities, in order to manage future congestion. The results of this TOT study should be considered in the transportation plan update as the next investment strategy for the region is developed.

4. The transportation partner agencies have established an informal mechanism for coordinating further activities associated with HOT lanes. This same group should be formalized to further the development of a broader managed lane strategy for the region that would encompass TOT facilities as well. The regional dialogue should focus on both region-wide policy decisions and specific corridor plans as necessary to provide for the efficient use of the region's planned and existing managed lanes. The coordination mechanism should be formalized through a memorandum of understanding, or similar action, expressing the intent of the region's planning partners to develop a managed lanes strategy. When appropriate, this group should coordinate with representatives of the trucking industry in an effort to further the efforts begun by the TOT steering committee.

5. The linkage between HOV, HOT and TOT lanes, as they relate to constructability, needs to be better understood. Given the limited resources for this study, it did not analyze the combined effect of HOV, HOT and TOT lanes. This would be an

important consideration for further development of managed lane strategies. SRTA, along with its partner agencies, should consider further study of a combined managed lane concept strategy for the region. Further regional consideration of the TOT concept should rely upon additional study of operational strategies such as access locations and design standards, as well as implementation strategies such as regional planning partner institutional roles, fee structures and payment mechanisms, and the potential for public-private partnerships.

6. Given the potential benefits of a broad definition of managed lanes to freight and person movement, any regional or corridor study of managed lanes should include HOT and TOT concepts. HOV lane projects currently under design should proceed while HOT and/or TOT concepts are examined in more detail, and should include flexibility for future management strategies to the extent possible. Further study should include specific corridors which show promise for the application of truck only toll lanes. It is anticipated that fewer interchanges would likely be needed or desirable in a TOT corridor potentially reducing the cost of implementation below that estimated in this report. Access should be restricted to locations where the addition of trucks to the arterial network would not have an adverse impact on the immediate community.

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APPENDIX A. TOT STEERING COMMITTEE MEETING MINUTES

The steering committee meeting minutes from each of four meetings from January to April 2005 follow.

State Road and Tollway Authority

State of Georgia

Sonny Perdue, Governor
Chairman

Tim Connell
Vice Chairman

Roy Lambert
Member

Harold Linnenkohl
Member

J. Alton Wingate
Member

MEMORANDUM

TO: Attendees

FROM: Erik Steavens

DATE: January 20, 2005

SUBJECT: TOT Steering Committee Meeting #1 Minutes

Attached for your use are minutes from the January 18, 2005 meeting of the TOT Study Steering Committee.

LOCATION: SRTA Atlanta, GA

ATTENDEES:

Daniel Drake, SRTA	Erik Steavens, SRTA
David Weir, SRTA	Doug Hooker, SRTA
Erik Fischer, GDOT	James Gordon, GDOT
Verdell Hawkins, GDOT	Joe Palladi, GDOT
Caroline Marshall, ARC	Rachel Cogburn, ARC
Max Azizi, FHWA	Mark Bartlett, FHWA
Brian Pilger, MACOC	Bob Pertierra, MACOC
Ed Crowell, GMTA	Ed Carter, Lithonia Lighting
Corey LaCross, UPS	Rebecca Brewster, ATRI
David Hudson, DTI	Benita Dodd, GPPF
Larry Saben, PB	Mike Meyer, Georgia Tech
Whitney Shephard, PB	

MEETING SUMMARY:

1. D Hooker welcomed the attendees.
2. E Steavens presented TOT Study expectations; the primary purpose of the study is to determine the feasibility of the voluntary truck-only toll facility concept in the region. The study will focus on determining the potential, if any, for further TOT study, and will not set policy or future projects. The purpose of the Steering Committee is to incorporate freight industry input and coordination with planning partners.
3. L Saben presented a review of the HOT Study and the TOT Study work program. The following comments and questions arose:

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- The scope of the study will include the Atlanta region and will assume the potential for new lanes on existing corridors.
- Other studies lead by GDOT and ARC will examine statewide freight issues including rail, ports, highways, and impacts on air quality. Several strategies will be examined including, but not limited to, tolls.

4. E Crowell presented a look at the trucking industry.
    - Issues identified include the inconsistency in data collection on trucking in Georgia and the rest of the country.
    - Other industry representatives gave examples of typical freight movements.
5. C Marshall discussed the upcoming ARC freight study.
    - The RFP is under development. The study will develop an intermodal regional freight plan.
6. J Gordon presented the GDOT Truck Study.
    - Tier 1 recommendations include a range of strategies such as truck information on the GDOT website and variable message signs, enforcement, data collection and further freight studies.
7. E Steavens asked for questions or comments,
    - D Hudson raised trucking industry issues including margin, infrastructure fees paid, the potential for truck delivery windows, and the desire to explore other options to fund infrastructure and relieve congestion.
    - J Palladi commented that the Statewide Transportation Plan process is beginning and that trucking industry input will be needed.
    - There was discussion regarding the value of time saved in TOT lanes and general agreement that the industry may be willing to pay a portion of the value of time saved as a toll. Potential impacts of tolling such as industry relocation and the use of alternate truck routes were also discussed.
8. There was consensus that the group would meet again on February 15, 2005 at 10:30 am in the same location.
9. E Steavens adjourned the meeting at 12:00 pm.

State Road and Tollway Authority

State of Georgia

Sonny Perdue, Governor
Chairman

Tim Connell
Vice Chairman

Roy Lambert
Member

Harold Linnenkohl
Member

J. Alton Wingate
Member

MEMORANDUM

TO: Attendees

FROM: Erik Steavens

DATE: March 14, 2005

SUBJECT: TOT Steering Committee Meeting #2 Minutes

Attached for your use are minutes from the February 15, 2005 meeting of the TOT Study Steering Committee.

LOCATION: SRTA Atlanta, GA

ATTENDEES:

Erik Steavens, SRTA	Bob Pertierra, MACOC
Caroline Marshall, ARC	Daryl Cranford, GDOT
Corey LaCross, UPS	James Gordon, GDOT
David Hudson, DTI	Joe Palladi, GDOT
Ed Carter, Lithonia Lighting	Rachel Cogburn, ARC
Rebecca Brewster, ATRI	Mike Meyer, Georgia Tech
Dike Ahanotu, CSI	Andrew Smith, HNTB
Paula Dowell, Wilbur Smith	Doug Allen, HNTB
Larry Saben, PB	Whitney Shephard, PB

MEETING SUMMARY:

1. E Steavens welcomed the attendees.
2. P Dowell presented an overview of the USDOT freight study. The following questions and comments arose:
   - The study will examine both concepts of optional and mandatory TOT facilities. The threshold of benefits for optional facilities differs from mandatory facilities.
   - The study will apply simulation and focus on short trips and logical origin-destination pairs; short trips are defined as 3-500 miles roughly.
3. W Shephard presented Atlanta truck traffic data from the GDOT Study of Hourly Truck Movements, GDOT vehicle class counts, and the ARC travel demand model commercial vehicle trip distribution. The following comments and questions arose:

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- D Hudson commented that the hourly distribution from the traffic counts reflect heavy duty vehicles taking advantage of the midday window between peak periods.
- L Saben asked the committee for feedback regarding the data presented and suggestions for potential corridors to study. There were several comments that estimated volumes for individual corridors appeared low (or high) compared to observed traffic patterns. Refinement of the commercial vehicle trip estimates will continue.
- D Hudson commented that the productivity of the driver determines whether using a tolled facility would be worthwhile. If one facility offers time savings but a bottleneck further down stream still occurs, then the time savings will not likely be worth the toll.
- There were several comments regarding potential benefits of TOT facilities. D Ahanotu commented that 2030 truck volumes will be sufficient to fill truck lanes. He suggested that truck lanes may offer the benefit of an additional delivery per day. E Carter commented that two potential benefits of TOT facilities could be savings on capital investment in delivery vehicles and time savings between production and distribution. C LaCross suggested that delivery cutoff times for manufacturers are progressively getting earlier in the Atlanta area in order to guarantee the last delivery of the day; a potential benefit is an increase in these cutoff times. E Carter commented that given just-in-time delivery, TOT facilities would provide a benefit if inventory could be reduced. D Hudson commented that although reliability may be a benefit, it would not improve competitiveness among operators since the same infrastructure is available to everyone.
- Comments regarding daily distribution of trips included the following: through trips are primarily at night while deliveries must be made during business operating hours during the day. C LaCross commented that 11 pm to 2-3 am is the peak period for UPS heavy duty truck traffic while medium and light delivery trucks travel more during the day.
- C Marshall commented that freight strategies need to address both the needs of warehousing and distribution as well as package and parcel delivery.

4. W Shephard presented a summary of recent value of time research. The following comments and questions arose:
    - There was general consensus that value of time for heavy duty vehicles around $35/hour is valid and that $18/hour for light and medium duty vehicles is valid. C LaCross stated that UPS has used $26/hour. R Brewster commented that value depends on availability of an alternate route especially if the operator has to

pay a toll out of pocket. The value of additional benefits (discussed above) may add to the return for private industry.

5. L Saben presented the next steps for the TOT study.
    - J Palladi suggested that analysis of potential corridors consider feasibility of improvements.
6. C Marshall announced a March 16 FHWA web seminar on truck lanes.
7. There was consensus that the group would meet again on March 15, 2005 at 10:30 am in the same location.
8. E Steavens adjourned the meeting at 12:00 pm.

MEMORANDUM

TO: Attendees

FROM: Daniel Drake

DATE: March 25, 2005

SUBJECT: Steering Committee Meeting #3 Minutes

Attached for your use are minutes from the March 15, 2005 meeting of the HOT and TOT Study Steering Committee.

MEETING DATE: March 15, 2005, 10:30am
LOCATION: SRTA Atlanta, GA
ATTENDEES:

Daniel Drake, SRTA	Caroline Marshall, ARC
Daryl Cranford, GDOT	Joe Palladi, GDOT
Max Azizi, FHWA	Rachel Cogburn, ARC
Ed Crowell, GMTA	Paula Dowell, Wilbur Smith
Florence Ngai, PB	Doug Allen, HNTB
Whitney Shephard, PB	Andrew Smith, HNTB
Michael Meyer, Georgia Tech	

MEETING SUMMARY:

1. D Drake welcomed the attendees.
2. M Meyer presented the TOT analysis alternatives and the preliminary results. The following comments and questions arose:
    - Regarding Alternative 3, E Crowell asked why the TOT lanes replace HOV lanes but assume fees. A scenario without fees will be tested.
    - D Cranford stated that during the public involvement for the HOV Plan, there were requests for truck lanes instead of HOV lanes. E Crowell stated that generally, truck drivers would prefer to use the left lanes of highways.
    - There was some discussion of timing lane restrictions and general agreement that 24-hour restrictions are simplest and best understood by the public.

- D Cranford stated that Alternative 3 will allow a comparison of the effectiveness of HOV lanes and truck lanes. This will have important implications for the region's investments.
- There was some discussion regarding the implementation of fees. E Crowell commented that fees would be more practical if implemented at the corporate level, rather than as an out-of-pocket cost for drivers. For example, user fees could be charged to corporations per month, per truck. D Drake commented that a flat monthly rate may conflict with the need to control the congestion in the truck lanes at certain times of the day.
- Discussion regarding the assumed access locations included comments that locations are distributed evenly enough for the purposes of the study. Arterials with access to the truck lanes appear to have increased volumes compared to the base, while others have decreased volumes.
- Trip reliability is an important potential benefit of TOT lanes that cannot be readily measured.
- Truck volumes will likely continue to grow in the region into 2030 due to growth in the GDP, use of ports such as Savannah, Brunswick, and the airport, and the prevalence of "just in time" delivery.
- C Marshall commented that the three alternatives presented do not provide for a through east-west movement, but focus on north-south movement through the region.
- D Cranford commented that although this study is not suggesting new corridors, the analysis may suggest potential routes that would benefit from new truck lane alignments.

3. The committee agreed to meet again on April 27 at 10:30 am.
4. D Drake adjourned the meeting at 12:00 pm.

MEMORANDUM

TO: Attendees

FROM: Daniel Drake

DATE: April 27, 2005

SUBJECT: Steering Committee Meeting #4 Minutes

Attached for your use are minutes from the meeting of the TOT Study Steering Committee.

MEETING DATE: April 27, 2005, 10:30am
LOCATION: SRTA Atlanta, GA
ATTENDEES:

Daniel Drake, SRTA	Erik Steavens, SRTA
Daryl Cranford, GDOT	Doug Hooker, SRTA
James Gordon, GDOT	Caroline Marshall, ARC
Corey LaCross, UPS	Joe Palladi, GDOT
Ed Carter, Lithonia Lighting	Rachel Cogburn, ARC
Whitney Shephard, PB	Brian Pilger, MACoC
Michael Meyer, Georgia Tech	Larry Saben, PB

MEETING SUMMARY:

1. E Steavens welcomed the attendees.
2. W Shephard presented the TOT concept alternatives and performance measures for the 2030 analysis. The following comments and questions arose:
    - J Palladi suggested that the TOT lane access assumptions (including exclusive interchanges and locations at assumed HOT interchanges) be listed along with other analysis assumptions.
    - The assumption, particularly under alternative 3, that transit vehicles would use the managed TOT lanes should be reviewed with the FTA and other parties; there may be safety concerns in sharing lanes with the trucks. This issue might fit into the "Challenges" section of the report.
    - There are public perception issues related to the assumption that TOT lanes are voluntary. If trucks are using the general purpose lanes, the public may question the effectiveness of truck lanes.

- C Marshall commented that the projected growth in national freight movement should be included in the background information in the report.
- J Palladi asked if the analysis suggested feasibility and/or a justification to convert current general purpose (GP) lanes to truck lanes. [While there was more demand for the assumed TOT lanes than could be accommodated by the lanes (2 in each direction), this study did not test any conversions of existing GP lanes.]
- M Meyer commented that the travel conditions on the region's highway network (and TOT lanes) suggest that the air quality impacts of TOT lanes would be positive. In particular, emissions of PM 2.5 would lessen from a reduction of stop-and-go truck traffic.
- B Pilger commented that the comparison between HOT and TOT alternatives should be included in the main report, rather than in the appendix.

3. W Shephard presented the draft findings and recommendations of the TOT study. The following comments and questions arose:

    - The study refers to safety improvements resulting from separating truck and personal auto traffic flows. D Cranford suggested that, while this makes intuitive sense, additional explanation or justification of the finding should be included in the final report.
    - Focus groups should be part of further study in order to gauge public perception and concerns, and facilitate education regarding the TOT concept.
    - The limitations of existing regional freight movement data is a challenge to any potential implementation of TOT lanes.
    - C Marshall commented that recommendations for further study should encompass exclusive truck facilities (without fees) as well as TOT lanes.
    - D Cranford asked if other regions are studying the TOT concept with similar results. M Meyer commented that the Los Angeles area has been studying TOT facilities for many years but has not yet implemented any; however, Tampa has current plans for a TOT facility for port access.
    - This study should recommend broad consultation with federal agencies such as FHWA, FTA and the EPA regarding transition to a managed lanes concept that includes TOT lanes and the potential benefits of TOT compared to HOV lanes in particular.
    - B Pilger commented that 12% of Georgia's GDP is related to truck movements through Atlanta. Therefore, the results of this study are very positive in terms of economic growth for the region and state.

- L Saben asked the trucking industry representatives present to react to the presentation. C LaCross commented that voluntary TOT lanes were a possibility that should be considered, adding that the worst outcome would be to delay consideration of TOT and end up in gridlock in the future. E Carter agreed and added that the safety benefits of separating truck and personal auto traffic, while difficult to quantify, would be significant. E Carter also stated that the productivity gains (through time savings and increased reliability) could result in fewer truck trips needed, which would reduce pollution.
- D Drake summarized the committee's comments stating that four major areas should be recommended for further study of the TOT concept, including: 1. air quality impacts; 2. safety impacts; 3. productivity gains; 4. public perception issues. There was consensus that these major areas should be highlighted in future presentations and the final report.
- J Palladi suggested that the report amplify the analysis assumptions and the sensitivity of the results to potential changes in the assumptions.

4. W Shephard reviewed next actions, including revising the draft TOT lanes report and a presentation to the agency heads currently scheduled for May 16, 2005.
    - Material for the presentation will be sent to agency staff the prior week to allow for staff briefings.
    - There was general consensus that the presentation should include comparative results from the HOT and TOT alternatives.
5. D Drake requested comments on the draft final report from the steering committee by Friday, May 6, 2005.
6. D Drake adjourned the meeting at 12:20 pm.

APPENDIX B. ADDITIONAL ANALYSIS RESULTS

B.1 Travel Time Savings for Commercial Trips

As discussed above, trip time savings was calculated by comparing general purpose lane travel times to that offered by traveling in the TOT lane(s). The difference in travel time is the time savings that truck operators could benefit from if they chose to use the TOT lanes. The trade-off between this savings and the fee, if any, to use the lanes will be an important factor in the success of any regional TOT concept.

Table 16, Table 17, and Table 18 show sample trip time savings that TOT managed lanes could offer to transit riders and light and heavy duty commercial vehicles. Trip time savings indicates the difference between general purpose lane trip time and TOT lane trip time using the same route. In addition to comparing trip times between general purpose and TOT lanes within the alternative TOT scenario, time savings is shown in comparison to general purpose lanes under the base scenario. This comparison shows the savings available with TOT lanes versus trip times if no TOT lanes are added.

Table 16 Comparison of General Purpose Lane and Scenario 1 TOT Lane Trip Times during 2030 PM Peak Period (minutes saved by using TOT lanes)

Sample Trip and Destinations	Scenario 1 TOT Lane versus Scenario 1 GP Lane	Scenario 1 TOT Lane versus *Base Scenario* GP Lane
I-75 north to I-285 west to I-75 south		
I-75 at I-285	6 minutes saved	16 minutes saved
I-285 E at I-75 S	32 minutes saved	44 minutes saved
I-75 S at end	51 minutes saved	97 minutes saved
I-75 north to I-285 east to I-85 north		
I-75 at I-285	6 minutes saved	16 minutes saved
I-285 E at I-85 N	27 minutes saved	43 minutes saved
I-85 N at end	68 minutes saved	90 minutes saved

Note:
Scenarios 1 and 2 are identical during the PM peak period.
Time savings are cumulative from origin at the region's limits.
GP: General Purpose highway lanes

Table 17 Comparison of General Purpose Lane and Scenario 3 TOT Lane Trip Times during 2030 PM Peak Period (minutes saved by using TOT lanes)

Sample Trip and Destinations	Scenario 3 TOT Lane versus Scenario 3 GP Lane	Scenario 3 TOT Lane versus *Base Scenario* GP Lane
I-75 north to I-285 west to I-75 south		
I-75 at I-285	14 minutes saved	19 minutes saved
I-285 E at I-75 S	45 minutes saved	48 minutes saved
I-75 S at end	70 minutes saved	103 minutes saved
I-75 north to I-285 east to I-85 north		
I-75 at I-285	14 minutes saved	19 minutes saved
I-285 E at I-85 N	39 minutes saved	46 minutes saved
I-85 N at end	80 minutes saved	90 minutes saved

Note:
Scenarios 1 and 2 are identical during the PM peak period.
Time savings are cumulative from origin at the region's limits.
GP: General Purpose highway lanes

Table 18 shows the midday period trip time savings offered by light-duty TOT lanes under scenario 2. While the TOT lanes may not offer time savings for this sample trip when compared to GP lanes under the same scenario, the same trip does represent a savings over base scenario GP lane trip times. It appears that the GP lane trip times under scenario 2 are improved when compared to the base.

Table 18 Comparison of General Purpose Lane and Scenario 2 TOT Lane Trip Times during 2030 Midday Period (minutes)

Sample Trip and Destination	Scenario 2 TOT Lane versus Scenario 2 GP Lane	Scenario 2 TOT versus Base Scenario GP Lane
GA 400 to Airport from Forsyth County		
GA 400 at I-85	0 minutes saved	2 minutes saved
I-85 at I-20	0 minutes saved	16 minutes saved
I-85 at airport	0 minutes saved	22 minutes saved

Note:
Time savings are cumulative from origin at the region's limits.
GP: General Purpose highway lanes

B.2 Commercial Vehicle Miles Traveled on Corridors with TOT Lanes

As discussed above, this study assumed that use of TOT lanes under each alternative concept is voluntary. Therefore, even on corridors with TOT lanes, commercial vehicles may still travel on general purpose lanes. On corridors where commercial vehicle travel demand exceeded the assumed capacity of the TOT lanes, fees were imposed to maintain the performance of the TOT lanes. Therefore, the assumed capacity of the TOT lanes, in some cases, ensured that

some truck traffic would remain on the general purpose (GP) lanes. To assess the level of truck traffic on those general purpose lanes with parallel TOT lanes, commercial vehicle miles traveled on both general purpose and TOT lanes was evaluated. Analysis assumptions which impact truck travel patterns, such as TOT network capacity and access locations, would likely affect these results.

Table 19 shows that under Alternative 1, for five TOT corridors, general purpose lanes carry 50% of the commercial vehicle VMT. Three TOT corridors experienced such high demand during at least one period fees were imposed to ensure the performance of the TOT lanes. Thus, parallel general purpose lanes carry a portion of the commercial vehicles. Total weekday commercial VMT under Alternative 1 on the five corridors is 8,980,000.

Table 19 TOT Alternative 1 Commercial Vehicle Miles Traveled on Corridors with TOT Lanes

Commercial Vehicle Miles Traveled on TOT Corridors	Percent on GP Lanes	Percent on TOT Lanes
Heavy Duty	45%	55%
Light Duty	52%	48%
Total Commercial VMT	**50%**	**50%**

Table 20 shows that under Alternative 2, for fourteen TOT corridors (where nine of them operate only during the midday as light duty TOT lanes), general purpose lanes carry 51% of the commercial vehicle miles traveled. Five TOT corridors experienced such high demand at some point during the day that fees were imposed to ensure the performance of the TOT lanes. Total weekday commercial VMT under Alternative 2 on the fourteen corridors is 9,825,000.

Table 20 TOT Alternative 2: Commercial Vehicle Miles Traveled on Corridors with TOT Lanes

Commercial Vehicle Miles Traveled on TOT Corridors	Percent on GP Lanes	Percent on TOT Lanes
Heavy Duty	45%	55%
Light Duty	54%	46%
Total Commercial VMT	**51%**	**49%**

Note: includes midday light duty truck traffic inside I-285

Table 21 shows that, under Alternative 3, for all fifteen corridors with TOT lanes in the region, 40% of commercial VMT occurred on the general purpose lanes, while 60% occurs on the TOT lanes themselves. On corridors where the truck traffic does not exceed the capacity of the TOT lanes, the TOT lanes carry a larger portion of the truck traffic. For example, on I-20 east of I-285, 27% of the commercial VMT occur on the general purpose lanes, while 73% occurs on the TOT lanes. Total weekday commercial VMT on the fifteen TOT corridors is 15,842,000. Analysis assumptions which impact truck travel patterns, such as TOT network capacity and access locations, would likely affect these results.

Table 21 TOT Alternative 3: Commercial Vehicle Miles Traveled on Corridors with TOT Lanes

Commercial Vehicle Miles Traveled on TOT Corridors	Percent on GP Lanes	Percent on TOT Lanes
Heavy Duty	37%	63%
Light Duty	42%	58%
Total Commercial VMT	**40%**	**60%**