ATLANTA REGIONAL MANAGED LANE SYSTEM PLAN

FINAL REPORT

PREPARED FOR

Georgia Department of Transportation
Office of Planning
600 West Peachtree Street NW
Atlanta, GA 30308
Phone: (404) 631-1796
Fax: (404) 631-1804
Contact: Michelle Caldwell

PREPARED BY

HNTB Corporation
3715 Northside Parkway
400 Northcreek, Suite 600
Atlanta, GA 30327
Phone: (404) 946-5708
Fax: (404) 841-2820
Contact: Andrew C. Smith, AICP

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Atlanta Regional Managed Lane System Plan

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Prepared for:

Georgia Department of Transportation
One Georgia Center, Suite 2700
600 West Peachtree Street NW
Atlanta, Georgia 30308

Prepared by:

HNTB Corporation

HNTB

STATE OF GEORGIA
COUNTY OF FULTON

A RESOLUTION
BY THE
STATE TRANSPORTATION BOARD

Whereas, the State Transportation Board's approved Mission Statement is: *"The Georgia Department of Transportation provides a safe, seamless, and sustainable transportation system that supports Georgia's economy and is sensitive to its citizens and environment"*; and

Whereas, the State Transportation Board adopted a resolution dated June 21, 2007 stating:

1. *"All new capacity lanes within limited access corridors in Metro-Atlanta shall be managed; and*
2. *Mobility shall be guaranteed in the managed lane; and*
3. *Lane management relies on eligibility, congestion pricing, and/or accessibility; and*
4. *Within the context of a system-wide plan, each solution will be tailored to individual corridor needs; and*
5. *Managed Lanes have applicability statewide"*

Whereas, the Department's Office of Planning was tasked with developing the Metro-Atlanta Managed Lane System Plan; and

Whereas, the Metro-Atlanta Managed Lane System Plan was developed with input from various offices within the Department and developed in accordance with the principles developed by the State Transportation Board and articulated within the June 21, 2007 Board resolution on Managed Lanes; and

Whereas, periodic updates on the progress of the Metro-Atlanta Managed Lane System Plan was provided to the State Transportation Board; and

Whereas, a presentation of the Metro-Atlanta Managed Lane System Plan findings and recommendations was presented to the State Transportation Board on September 17, 2009.

Now, therefore, let it be resolved that the Metro-Atlanta Managed Lane System Plan, developed by the Department's Office of Planning, be approved by the State Transportation Board as a guide for the Department to use in developing individual Managed Lane projects within Metro-Atlanta.

Adopted this 10th day of December, 2009.

APPROVED:

Vance C. Smith, Jr., Commissioner
Department of Transportation

Bill Kunlke, Chairman
State Transportation Board

ATTEST:

Elizabeth Osmon, Executive Secretary
State Transportation Board

Final Report

A. Introduction

Managed Lanes are an innovative solution to managing congestion and provide a valuable mobility option. Types of managed lanes include, High Occupancy Vehicle (HOV), High Occupancy Toll (HOT), Express Toll Lanes (ETL)[1], Truck Only Lanes (TOL) and Truck Only Toll Lanes (TOT)[2]. A variation of managed lanes would preserve mobility choices by applying tools such as pricing, eligibility (occupancy and/or vehicle type) and/or limiting system access. In addition to mobility, it is expected that managed lanes would be consistent with other goals and objectives including safety, the environment and man-made communities, financial and homeland security.

Managed lanes are characterized by the proactive implementation of operational strategies designed to respond to changing travel conditions. Managed lane strategies seek to optimize efficiency, performance and throughput by offering travel time savings and reliability through the application of vehicle occupancy and eligibility restrictions, pricing, and access control.

Purpose

The objective of this report is to provide a summary of the Georgia Department of Transportation's (GDOT's) Managed Lane System Plan (MLSP) that began in January 2007. This document focuses on the end results at each stage of the multi-step study process and provides references to specific technical reports for further detail. In addition to mobility, this document provides a summary of the purpose and intent of the MLSP, the goals and objectives of managed lanes, the justification and benefits associated with managed lanes, and the evaluation framework and implementation plan that emerged from this effort.

The MLSP is the first comprehensive system-wide evaluation of urban area managed lanes performed in the United States. GDOT believes that in most locations it is not feasible to construct additional general purpose lanes to meet current and future needs. Therefore, GDOT has developed the MLSP for Metro Atlanta that will utilize and expand the current HOV system footprint. Managed lane solutions would preserve mobility choices and provide financially feasible improvements.

GDOT has taken a comprehensive approach to its evaluation of managed lanes for Metro Atlanta. Through a multi-step analysis process, a range of alternatives has been studied to determine the optimal solution for a regional network of managed lanes. This analysis process included the following steps:

- Data collection, including traffic counts and surveys;
- Identification of candidate corridors;
- Planning-level traffic and revenue analysis;

1 ETL means that all vehicles in the managed lanes pay a toll. Trucks are not permitted in the managed lanes.

2 TOT means the managed lanes are reserved for trucks willing to pay a toll.

- Concept and operational analysis;
- Social and environmental impact analysis; and
- Financial feasibility.

Urban area traffic congestion presents a challenge to the continued growth and economic prosperity of the Atlanta region. Future job creation and economic development are inextricably linked to investment in infrastructure that improves mobility, and in order to maintain its competitive edge, there must be continued focus on improving Metro Atlanta's transportation network.

The provision of managed lanes in the region would ensure that mobility will be preserved even with projected population and employment growth. The purpose of the MLSP is to provide a comprehensive roadmap for GDOT as they move forward with this innovative approach to urban area mobility. More specifically, the MLSP seeks to address the following:

- Respond to transportation needs which have outpaced traditional revenue sources;
- Unite managed lane investments into a comprehensive "system plan" framework;
- Provide a valuable and reliable mobility option, in spite of congestion; and
- Lead and tackle policy and implementation issues.

Goals and Objectives

There are several goals and objectives associated with managed lanes. These center around the ability of managed lanes to deliver travel time reliability and transportation choice in an efficient manner. Not only do managed lanes provide a guaranteed mobility option, but also a flexible funding option that optimizes public sector resources. Detailed goals and objectives are shown in the following list.

- Protect Mobility in the Managed Lanes
  - Increase average travel speeds
  - Decrease delay
  - Increase access to major activity centers
  - Increase system efficiency
- Maximize Person/Vehicle Throughput in the Managed Lanes
  - Increase throughput
  - Decrease travel time variations
  - Improve transit on-time performance
- Minimize Environmental Impacts Associated with Constructing Managed Lanes
  - Improve air quality/decrease pollutants
  - Minimize impact to the built environment
- Provide a Financially Feasible Network for the Managed Lane Network
  - Leverage and optimize public cash outflows
  - Incorporate a market-driven approach to complement traditional funding sources
- Design and Maintain a Flexible Infrastructure for Varying Lane Management
  - Accommodate future lane management possibilities

Justification and Benefits

Acute congestion in Metro Atlanta poses challenges to economic competitiveness and quality of life. Traditional capacity expansion has become increasingly expensive, and over time this capacity would likely be consumed, resulting in congested travel conditions.

There is a value that people place on the ability to reach their destination in a reliable manner. Currently, the existing infrastructure in Metro Atlanta does not provide a system that meets that goal in peak periods. Implementing a system of managed lanes would create the means to meet transportation consumers' demand for reliable travel time, every time. Managed lanes also permit some vehicles to utilize the lanes free of charge including: transit vehicles, vanpools, eligible carpools, motorcycles and emergency vehicles.

Funds generated by tolling will *not* cover the entire cost of construction and the ongoing maintenance and operations of the managed lanes system. The revenue collected from tolls will likely be applied toward a portion of the debt for construction and will be used to maintain and operate the system. Current funding constraints pose a challenge to GDOT. With limited dollars available for the capital outlays required for implementation of managed lanes, it is important to consider innovative funding mechanisms. The use of non-traditional financing through Public-Private Partnerships (P3) is one alternative way to advance some corridors in the managed lane system. P3 opens the door to accelerated financing, design, construction, operation and/or maintenance of a project. GDOT's MLSP considered such financial arrangements for project delivery. However, no recommendations were made in this study regarding project financing.

The MLSP took into account the goals and objectives of a managed lane system as well as the justification and benefits associated with its implementation. The following sections outline the methodology and results for this plan, including next steps in the project development process.

B. Methodology

This section provides an overview of the methodology used to develop the MLSP. Specific steps in this process include the review of ongoing studies in the Atlanta region as well as a peer review of urban areas with existing managed lanes and of other areas that are pursuing managed lane strategies. Also included is a review of the stated preference survey effort and global demand estimation procedure that helped drive the traffic and revenue analysis used to evaluate managed lane alternatives. A review of the concept and operations evaluation that led to design recommendations and project cost estimates is provided in this section, as is a brief description of the screening process and financial feasibility assessment that led to the final recommendations for the managed lane system.

Previous and Ongoing Studies

There have been several studies in the Atlanta area evaluating managed lanes including High Occupancy Vehicle (HOV) lanes, High Occupancy Toll (HOT) lanes, Truck Only Lanes (TOL) and Truck Only Toll lanes (TOT) at a system-wide level or a corridor level. As part of the Atlanta Region Managed Lane System Plan, these studies were reviewed in order to understand their assumptions and recommendations with respect to evaluation of managed lanes feasibility, pricing and implementation.

This section summarizes the level of detail and major policy and technical considerations addressed by these studies. Table 1 summarizes the utility of five different studies to various regional planning goals. These goals were established based on the range of dialogue currently taking place in the region – both among planning partners and political decision makers. The studies are ranked as providing average, good or significant information for making informed decisions – those supported with appropriate and sound technical analysis. This is intended to be a roadmap for policy and decision makers to compare and contrast the robustness of analysis and recommendations of different studies. The report titled *A Summary Review of Local Studies* contains the complete description of this topic.

Table 1: Utility of Study

STUDIES	HOT LANES DEVELOPMENT	TOT LANES DEVELOPMENT	PRICING STRATEGY	REVENUE ESTIMATION	CORRIDOR SAFETY	CONGESTION-RELIEF	ALTERNATIVE MODES	CONSTRUCTABILITY	PUBLIC INVOLVEMENT
Reducing Congestion in Atlanta: A Bold New Approach to Increasing Mobility	★	★	★★	★	★	★	★	★	—
High Occupancy Toll Lanes and Truck Only Toll Facilities: Potential for Implementation in the Atlanta Region	★	★★	★★	★	★	★★	★★	★★	★★★
I-285 Strategic Implementation Plan	★★★	★★★	★	—	★★★	★★★	★★	★★★	★
Value Pricing on the I-75 HOV/ BRT Project	★★★	★★	★★★	★★★	★★	★★	★★	★★	★★
SR 400 Managed Lanes Study	★★★	—	★★	★★★	★★	★★	★★	★★	★
Statewide Truck Only Lane Needs Identification Study	—	Tolled truck lanes were not considered as part of this study		★★★	★★	★★	★★	★★	★★

LEGEND

★ Average ★★ Good ★★★ Significant — Not Applicable

Peer Review

The peer review survey instrument developed for the MLSP was sent to several government agencies in order to learn more about managed lane planning and implementation throughout the United States. Responses were received from agencies in: Denver, Colorado, Dallas, Texas and Houston, Texas. These three regions are all in various stages of system implementation, and they each have had unique experiences that have provided valuable insight as GDOT continues to study managed lanes. The responses from these regions cover the following topics:

- Managed lane planning and development process;
- Design considerations;
- Systems operations and maintenance;
- Communications and outreach;
- Public-Private partnerships; and
- Lessons learned.

The peer review exercise was used as input for the establishment of managed lane alternatives and as a guide throughout the evaluation process. The previous experiences of these agencies proved to be invaluable resource during the course of this study. Detailed results of this peer review can be seen in the report titled *Peer Review*.

Stated Preference Survey

The purpose of the stated preference survey was to obtain detailed information that could be used to determine how sensitive travelers would be to the tolling and travel-time changes that would result from the addition of managed lanes to the highways being studied. Estimates of travelers' toll price sensitivities are used to support estimates of highway traffic and toll revenue. This survey was conducted by corridor and involved a wide range of participants, including people of different ages, genders, income levels, etc.

A stated preference survey was developed and implemented that gathered information from individuals who could use the proposed managed lanes on the highways being studied. The survey collected data on current travel behavior, presented respondents with information about the proposed managed lanes, and, with the use of stated preference experiments, collected information that can be used to estimate travelers' values of time and propensity to use managed toll lanes under a range of possible future conditions.

Data collection took place in the greater Atlanta area in May and June 2007. Survey data were collected by intercepting residents at activity sites and through online completion by residents and employees of local businesses, organizations, and colleges in the greater Atlanta area. A total of 4,173 respondents completed the survey designed for auto users, while 413 respondents completed the commercial vehicle survey.

Statistical analysis and discrete choice model estimation were carried out using the stated preference survey data segmented by vehicle type, highway used, trip purpose and time of day (AM peak, PM peak and off-peak periods). The

specification testing was completed using a conventional maximum likelihood procedure that estimated a set of coefficients for a multinomial logit model. More complex mixed multinomial logit models were then estimated to derive the distribution of values of time within each segment and allow diversion curves to be simulated.

Values of time for auto drivers estimated using the stated preference data were shown to vary by time of day, trip purpose, and within those segments, to vary by household income and trip distance. Commercial vehicle values of time were shown to vary by trip distance and vehicle size (number of axles). Mean values of time for autos (at average incomes and trip distances) varied from $7 to $15 per hours, while a 5-axle commercial vehicle making an average trip distance was found to have a value of time of $23 per hour. Output from this survey effort was then used to modify the travel demand model script which was used to generate traffic and revenue forecasts. A complete description of the stated preference survey can be seen in the MLSP technical report titled *Stated Preference Surveys*.

Global Demand Estimation

Quantifying the potential benefits of priced lanes requires a comprehensive understanding of the forces that drive travel demand. This is of particular importance for managed lanes since managed lanes typically:

- Higher usage rates correlating with deteriorating operating conditions in the general-purpose (GP) lanes;
- Function optimally within a system context.

As part of the MLSP, GDOT considered several potential lane management strategies including Truck Only Toll (TOT) lanes, Express Toll Lanes (ETL) and High Occupancy Toll (HOT) lanes with different occupancy requirements. It was imperative that analysis tools were refined appropriately to define not only the global demand within a corridor but also the composition of that global demand including heavy trucks, light trucks, passenger cars, commercial vehicles, varying HOV passenger rates (i.e. HOV 2+, HOV 3+, HOV 4+)[3] and others.

The global demand estimation procedure included the following:

- Overview of the travel demand model used by the Atlanta Regional Commission (ARC);
- Refinements to the ARC travel demand model to accurately represent the impact of global demand on managed lanes. The two refinements are:
  - Splitting the HOV demand tables into HOV2+, HOV3+ and HOV4+
  - Refining the four time periods in the Travel Demand Model; and
- Impact of “peak spreading.”

3 HOT2+ is a managed lane designation where vehicles with 2 or more occupants are permitted in the lanes at no charge, while single-occupant vehicles can access the lanes only by paying a toll. Trucks are not permitted in the managed lanes. HOT3+ means that vehicles with just 1 or 2 occupants are required to pay a toll. Vehicles with 3 or more occupants are permitted at no charge. Trucks are not permitted in the managed lanes. HOT4+ means that vehicles with 1, 2 or 3 occupants are required to pay a toll. Vehicles with 4 or more occupants are permitted at no charge. Trucks are not permitted in the managed lanes.

The result of this effort was an improved forecasting tool for managed lane applications. Detailed discussion of the modifications to the regional travel demand model is included in the MLSP technical report titled *Global Demand Estimation Process.*

Preliminary Traffic and Revenue Analysis

Using the data framework established through the peer review and stated preference survey, in concert with the global demand estimates, an initial assessment of traffic and toll revenue was conducted for potential managed lane corridors. The objective of this effort was to evaluate the overall financial and operational feasibility of implementing various management techniques on highways throughout the Atlanta region. It is important to note that this was a *preliminary* traffic and revenue analysis, and is not intended for use in support of project financing.

The work performed as part of this effort includes a summary of the study corridors for traffic and revenue (T&R) analysis; a series of base policy alternatives; an overview of the methodology used in developing T&R forecasts; the preliminary traffic and revenue streams resulting from the various managed lane investments; and the results of system analysis and risk analysis.

Toll sensitivity testing was performed for each managed lane candidate corridor under different policy alternatives, separately by time-of-day and direction. The goal of performing toll sensitivity analysis is to provide an understanding of the relationship between toll rates, traffic impacts and revenue levels. Using toll rates derived from the toll sensitivity exercise, model runs were conducted to determine traffic and revenue for the various system policies (HOT, ETL, TOT, etc.) and for the bi-directional and reversible systems. In addition to revenue forecasts, travel time and vehicle delay improvement were also examined both on the highway corridors and within a 4-mile buffer area, in order to capture secondary impacts to nearby arterials. The traffic and revenue analysis also considered risks associated with model input assumptions and alternative investment scenarios that may impact the market for managed lanes. The risk analysis provided an evaluation of the forecasting uncertainties to produce a baseline estimate and a range of uncertainty for revenue forecasts. Following is a listing of the risks considered as part of the traffic and revenue analysis. Values for these items were varied to represent both aggressive and conservative scenarios.

- Socio-economic Growth;
- Willingness-to-Pay (Cars and Trucks);
- Transportation Investments (Roadway and Transit);
- Transit Frequency;
- HOV Formation; and
- General Purpose Lane Speed.

Output from the traffic and revenue analysis provided the foundation for subsequent analyses, and helped drive the final recommendations and priorities for the managed lane system. Details associated with the preliminary traffic and revenue work can be seen in the MLSP technical report titled *Preliminary Traffic and Revenue Forecasts.*

Concept and Operations

Another group of key considerations in the evaluation of the managed lane system are the basic elements of design for the facilities, including desired design values, cross sections, and costs. As part of the MLSP, typical design issues were identified but did not attempt to address every possible design that may arise during detailed engineering analysis. Specific attention was given to the following:

- Geometric Considerations of Managed Lanes;
- Cross Section for Managed Lanes;
- Terminal and Access Treatments;
- Base Cost Estimates; and
- Cost Savings and Additional Opportunities Cost Estimates.

Design details that emerged from this effort guided the final recommendations for each corridor in the managed lane system. In addition, costs were used to evaluate the efficiency of various alternatives and were also used in the determination of financial feasibility. The complete details of the design discussion and cost output can be seen in the MLSP technical report titled *Managed Lane Engineering Analysis.*

Financial Feasibility

A financial analysis was conducted as part of the evaluation process for the managed lane corridors, assuming P3s were utilized for financing/project delivery. Using project costs and revenue forecasts as inputs, the planning team calculated key financial indicators, including capital distribution, the year of debt payoff, and public sector contribution (i.e. funding gap). These indicators were critical in determining the ultimate recommendations for managed lanes implementation in Metro Atlanta. The objective of this effort was to evaluate the overall financial feasibility of various managed lane concepts on the study corridors and to examine opportunities for minimizing any projected funding gap associated with these projects.

The traditional planning process can leave a gap between the policy-based/performance-based set of recommendations and the business case for revenue-generating projects. This feasibility analysis was performed to bridge this gap by tying together costs and traffic and revenue output through a financial assessment. The combination of these elements provided a more complete framework from which to develop an implementation program for managed lanes in Metro Atlanta. The financial analysis helped isolate the preferred managed lane treatment from among a set of potential opportunities. This analysis also provided insight into the extent to which corridor revenue streams could be leveraged to fund capital costs and annual operations and maintenance requirements. Details of this analysis can be seen in the report titled *Financial Analysis.*

Managed Lanes Screening Process

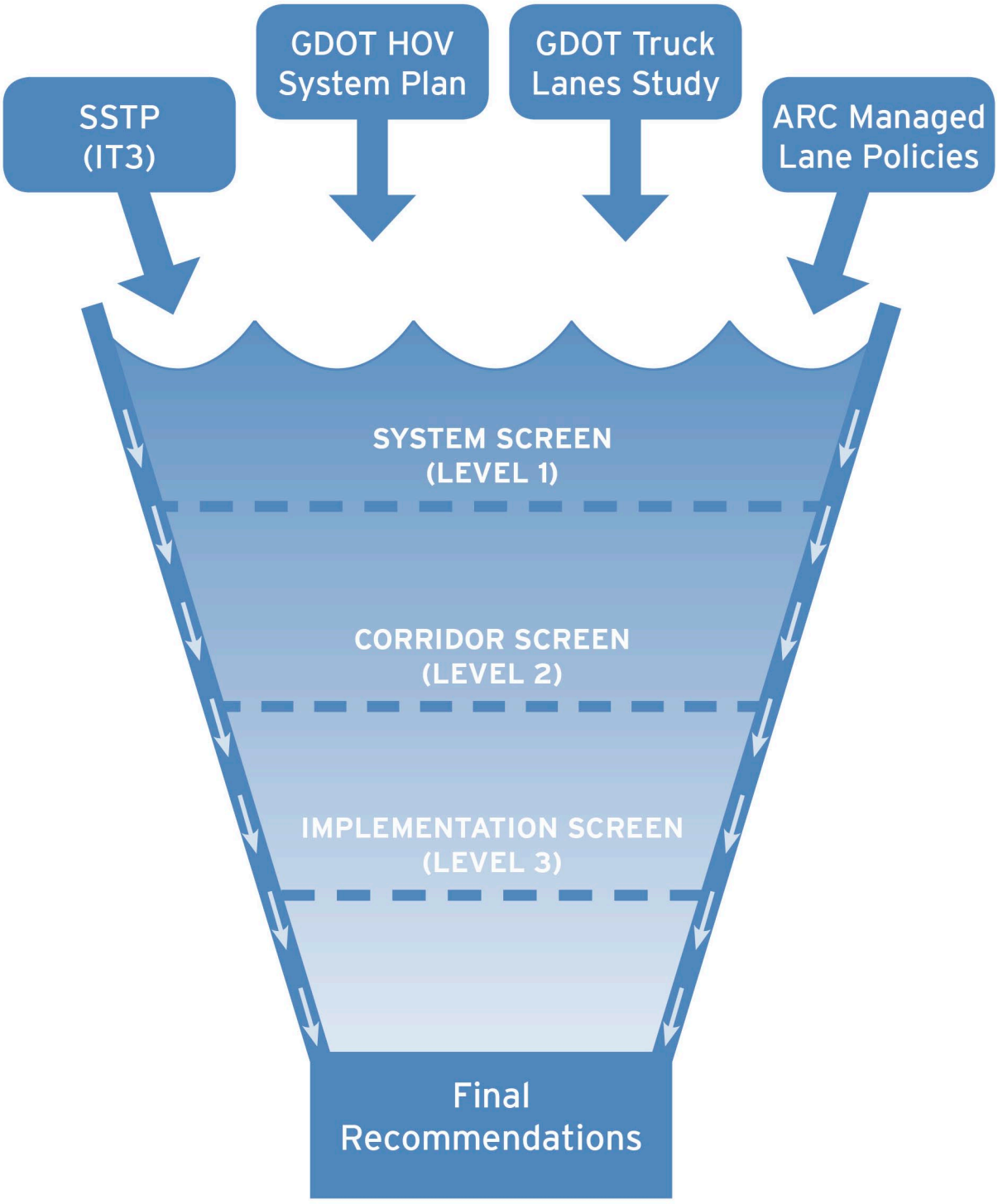
The objective of this task was to apply output from previous analyses (including transportation performance results, traffic and revenue results, project costs,

and financial feasibility) in order to generate a detailed plan for managed lanes in Metro Atlanta. This effort ultimately links the technical analysis to the final plan. In this task, a three-tiered screening approach was employed to arrive at corridor-specific, managed lane recommendations. Those recommendations were then prioritized to create a phased implementation plan that serves as the roadmap for a managed lane system in the Atlanta region.

In order to determine the final recommendations for managed lanes on each corridor, it was important to understand the trade-offs associated with specific decisions related to configuration, policies, etc. A three-tiered screening approach was designed to arrive at one preferred solution for each corridor in the managed lane network. This process sought balance between the system-optimal solution and what was best for each corridor, recognizing that individual projects would ultimately work in concert to provide transportation choice and improved mobility on a regional scale.

Initially, a comprehensive list of options was under consideration. Sources for these options included GDOT's HOV Strategic Implementation Study, completed in 2003, GDOT's Statewide Truck Lanes Needs Identification Study, completed in 2007, the Atlanta Regional Commission's managed lane policies, and Georgia's Statewide Strategic Transportation Plan Investing in Tomorrow's Transportation Today (IT3) initiative, completed in 2009. The first step in the evaluation process was application of the system-level screen. The purpose of this screen was to eliminate lower-performing alternatives for all corridors. Alternatives that survived the system-level screen were further analyzed in the corridor-level screen. Output from this included a limited set of potential solutions for each corridor. Finally, the implementation screen was employed to determine detailed managed lane recommendations. A schematic of this process can be seen in Figure 1. The screening process culminated in a recommended managed lane system for Metro Atlanta. Details of this process and the end results can be seen in the MLSP technical report titled *Corridor Evaluation and Recommendations*.

Figure 1: Screening Process Schematic



C. Recommendations

This section highlights the outcomes of the managed lanes evaluation process. Detailed below is a description of the phased implementation plan for a regional network of managed lanes in Metro Atlanta, including the scope and costs associated with each individual project. This is followed by a summary of the complete managed lane system and a description of the benefits associated with these recommendations. These results are shown in greater detail in the MLSP technical report titled *Corridor Evaluation and Recommendations*.

Managed Lane Policies

Outcomes from the screening process include recommendations for managed lane operations and policies. HOT3+ emerged from this process as the recommended eligibility policy for the managed lane system. Under the HOT3+ policy, high-occupancy vehicles with 3 or more occupants are permitted in the managed lanes at no charge, as are motorcycles, alternative fuel vehicles, and emergency vehicles. The managed lanes can also accommodate 60 buses per hour at no charge. Vehicles with one or two occupants can access the managed lanes by paying a toll. The recommended tolling strategy is designed to maximize lane utilization through variable tolling with a targeted speed in the managed lanes of 45 mph. In addition, the managed lanes are recommended to be separated from general purpose lanes through buffer separation. Another key assumption was that the managed lanes would, for the most part, be created by either converting existing HOV lanes or through new construction. General purpose lane conversion was considered only where construction of the recommended number of lanes is infeasible.

Implementation Plan

Several factors were considered in the establishment of an implementation plan for managed lanes in Metro Atlanta. The approach included separating individual projects into distinct tiers, that, when built over time, would result in the ultimate recommendations on each corridor. It was understood that there would not be resources available to construct the entire system at one time. It was also recognized that some corridors had significant momentum in terms of recent or active design and/or environmental work. By tiering projects, the focus could be placed on the most critical corridors first, allowing the system to gradually expand into a fully realized network of managed lanes.

Tiers were determined using a number of criteria. These included ease of implementation, recently completed and ongoing environmental analysis and design activities, the level of public financial contribution necessary to cover project costs, system connectivity, and regional equity. The screening process described in the methodology section fed directly into this process. Those projects that best met these criteria were targeted for early tiers. In some cases, a minimum alternative was assigned to an early tier, with ultimate build-out resigned to a later tier. This was done to capitalize on the most efficient pieces of managed lane corridors to build momentum for their completion later in the process.

Tier 1

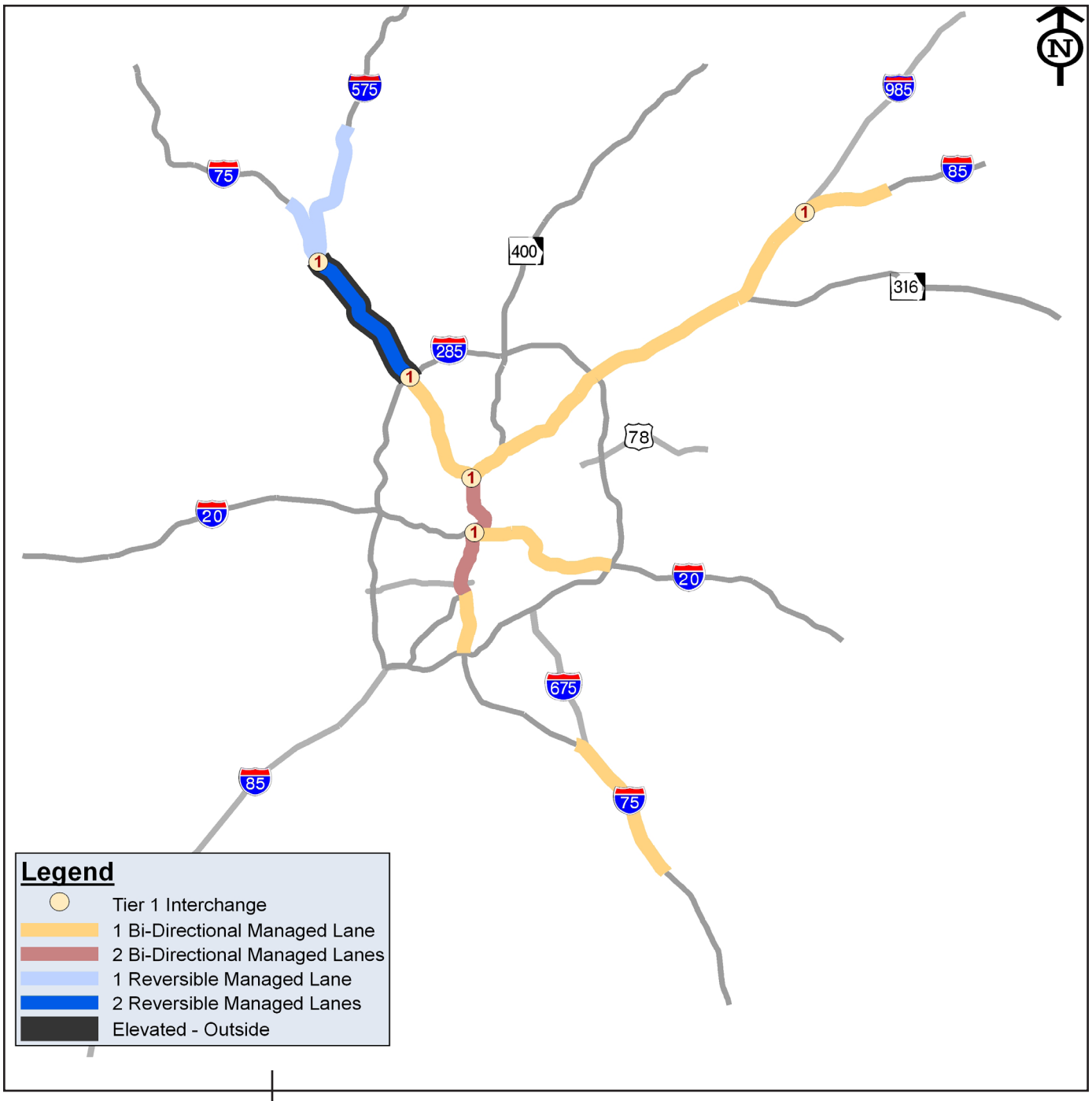
The first tier included projects with significant momentum in terms of design and environmental work. Also included were HOV-to-HOT lane conversions along the existing HOV system. These projects would not require a tremendous amount of construction, but in some cases would generate significant revenue. Table 2 and Figure 2 show the projects assigned to Tier 1. Included in the cost listed for each project is the amount required for dedicated access locations. The total cost for the tier is estimated to be approximately $3.0B, and the funding gap assuming a 35-year financing period under a Public Private Partnership (P3) arrangement is projected to be $240M.

Table 2: Implementation Plan Tier 1 Projects

CORRIDOR	FROM	TO	SCOPE	COST
I-75 North Outside I-285	I-285	North of Hickory Grove Rd	Build 2 HOT3+ reversible lanes, elevated to I-575 and 1 reversible lane, at-grade from I-575 to Hickory Grove Rd	$1.1B
I-575	I-75 North	South of Sixes Rd	Build 1 reversible HOT3+ lane, at grade	
I-75 South Outside I-285	SR 138	SR 155	Build 1 HOT3+ lane in each direction from SR 138 to SR 155	$75M
I-85 North Outside I-285	I-285	Old Peachtree Rd	Convert existing HOV lanes (one in each direction) to HOT3+ lanes from I-285 to Old Peachtree Rd	$249M
I-85 North Outside I-285	Old Peachtree Rd	South of Hamilton Mill Rd	Build 1 HOT3+ lane in each direction from Old Peachtree Rd to Hamilton Mill Rd	$135M
Downtown Connector	Brookwood Interchange	I-75/I-85 Split, South	Convert existing HOV lanes (one lane in each direction), convert 1 GP lane in each direction to provide 2 HOT3+ lanes in each direction	$84M
I-75 North Inside I-285	I-285	Brookwood Interchange	Convert existing HOV lanes to HOT3+ to provide 1 HOT3+ lane in each direction	$122M
I-85 North Inside I-285	I-285	Brookwood Interchange	Convert existing HOV lanes (one lane in each direction) to HOT3+ to provide 1 HOT3+ lane in each direction	$170M
I-75 South Inside I-285	I-285	Airport Split	Convert existing HOV lanes (one lane in each direction) to HOT3+ to provide 1 HOT3+ lane in each direction	$38M
I-20 East Inside I-285	I-285	Downtown Connector	Convert existing HOV lanes (one lane in each direction) to HOT3+ to provide 1 HOT3+ lane in each direction	$122M

INTERCHANGE	INTERCHANGE MOVEMENTS INCLUDED	COST
Downtown Connector/ I-75N/I-85N	DC to I-75; DC to I-85; I-85 to DC; I-75 to DC	$69M
Downtown Connector/ I-20E	DC SB to I-20EB; I-20EB to DC NB	$177M
I-75N/I-285	I-75SB to I-285EB&WB; I-75NB to I-285WB; I-285EB to I-75NB&SB; I-285WB to I-75NB	$542M
I-75N/I-575	I-75NB to I-575NB; I-575SB to I-75SB	$36M
I-85N/I-985	I-85NB to I-985NB; I-985SB to I-85SB	$36M

Figure 2: Managed Lanes System Tier 1



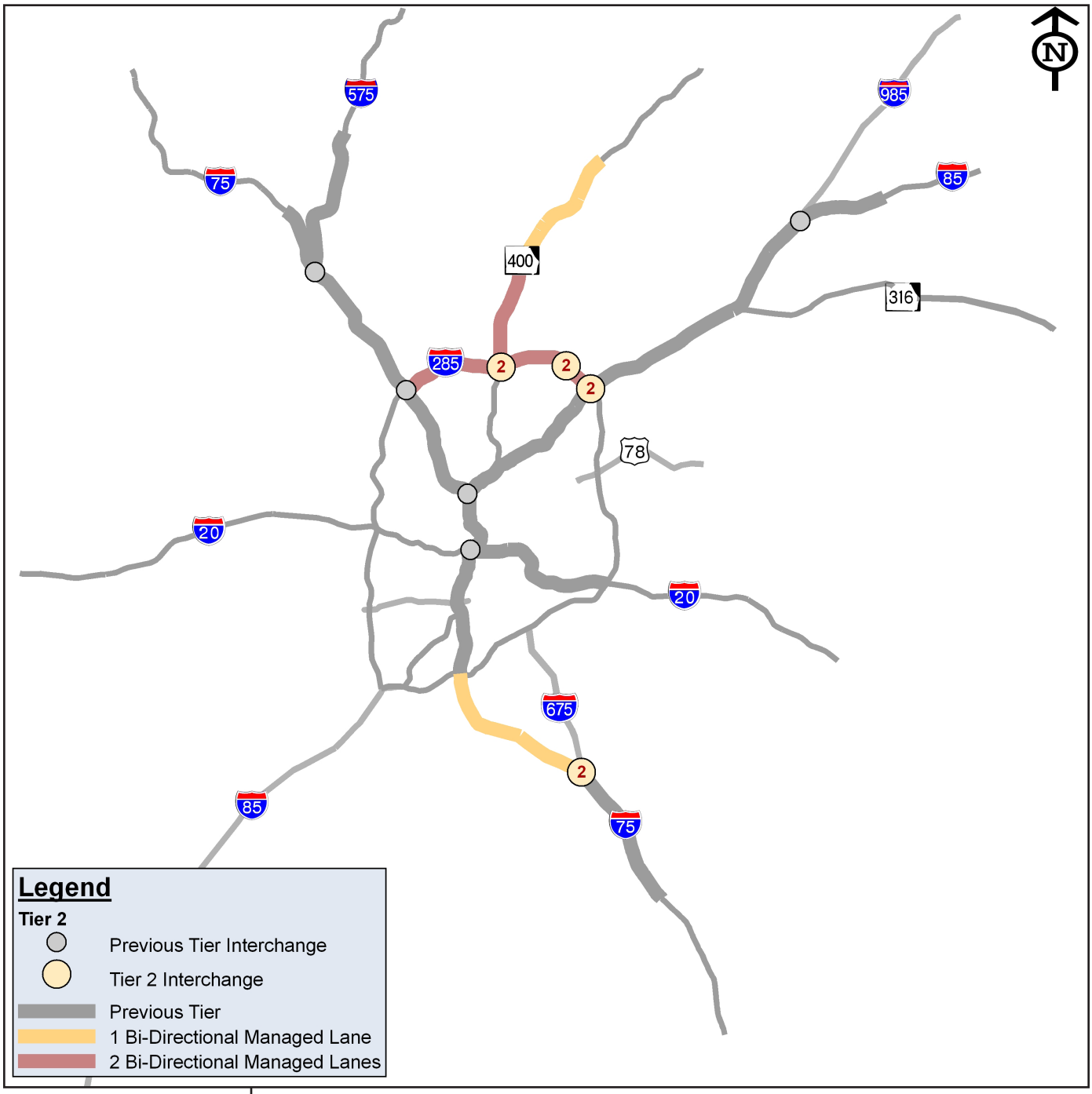
Tier 2

Projects in the second tier also have some level of momentum in terms of previous and ongoing studies and design work. But in contrast to many of the Tier 1 projects, there is significant construction associated with these, including four system-to-system interchanges. The estimated total capital cost associated with this tier is $2.9B. If combined with Tier 1, the cumulative gap for these two tiers over a 35-year period is $1.6B. Table 3 and Figure 3 show the specific projects associated with Tier 2.

Table 3: Implementation Plan Tier 2 Projects

CORRIDOR	FROM	TO	SCOPE	COST
SR 400 North Outside I-285	I-285	South of McFarland Rd	Build 2 HOT3+ lanes in each direction to Holcomb Bridge Rd, build 1 HOT3+ lane in each direction to McFarland Rd	$411M
I-285 North	I-75N	I-85N	Build 2 HOT3+ lanes in each direction from I-75N to I-85N	$976M
I-75 South Outside I-285	I-285	SR 138	Build 1 HOT3+ lane in each direction from I-285 to SR 138	$512M
INTERCHANGE	**INTERCHANGE MOVEMENTS INCLUDED**			**COST**
I-85N/I-285	I-85SB to I-285WB&EB; I-285WB to I-85NB; I-285EB to I-85NB			$393M
SR400/I-285	SR400SB to I-285EB&WB; SR400NB to I-285EB; I-285EB to SR400NB; I-285WB to SR400NB&SB			$381M
Peachtree Industrial Blvd/I-285	All Movements Provided			$210M
I-75S/I-675	I-75NB to I-675NB; I-675SB to I-75SB			$44M

Figure 3: Managed Lanes System Tier 2



Tier 3

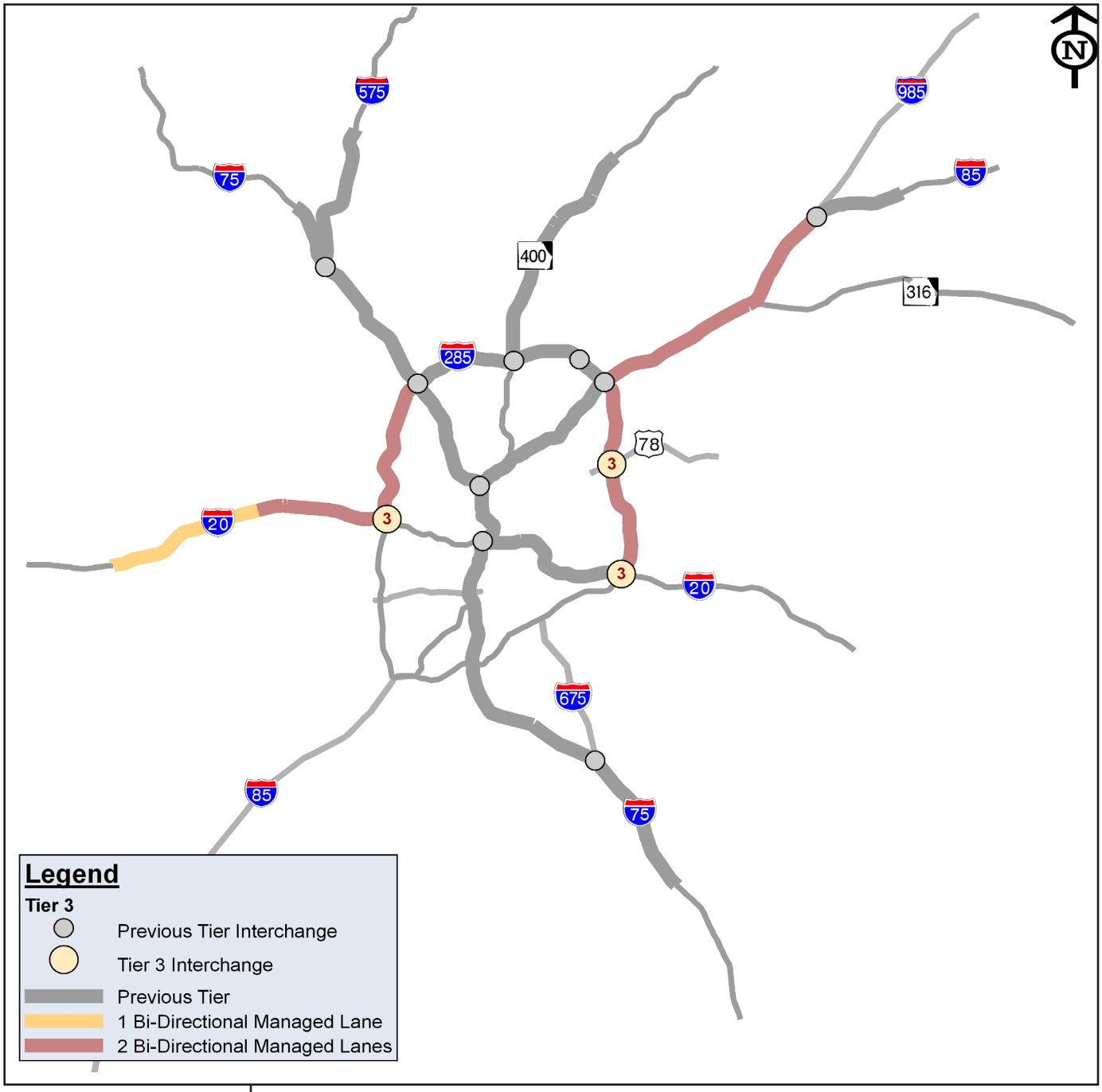
The third tier of projects expands the system further and includes expansion of the Tier 1 HOT lanes project on I-85 North outside I-285. In this expansion, a second lane is added on I-85 North in each direction from I-285 to I-985, which brings that corridor to the ultimate recommendation identified in the screening process. Total costs for Tier 3 are estimated to be $3.7B, making the cumulative cost for the first three tiers $9.6B with a cumulative gap of $3.2B. Table 4 and Figure 4 show the Tier 3 projects.

Table 4: Implementation Plan Tier 3 Projects

CORRIDOR	FROM	TO	SCOPE	COST
I-85 North Outside I-285	I-285	I-985	Build 1 additional HOT3+ lane in each direction from I-285 to I-985 (for a total of 2 HOT3+ lanes in each direction from I-285 to I-985)	$1,024M
I-285 East	I-85	I-20	Build 2 HOT3+ lanes in each direction from I-85 to I-20	$734M
I-285 West	I-75	I-20	Build 2 HOT3+ lanes in each direction from I-75 to I-20	$536M
I-20 West Outside I-285	I-285	West of Bright Star Rd	Build 2 HOT3+ lanes in each direction from I-285 to Mt. Vernon Rd, build 1 HOT3+ lane in each direction to Bright Star Rd	$589M

INTERCHANGE	INTERCHANGE MOVEMENTS INCLUDED	COST
I-20E/I-285	I-20WB to I-285NB&SB; I-285SB to I-20EB; I-285NB to I-20EB	$296M
US78/I-285	All Movements Provided	$153M
I-20W/I-285	I-20EB to I-285NB&SB; I-285SB to I-20WB; I-285NB to I-20WB	$335M

Figure 4: Managed Lanes System Tier 3



Tier 4

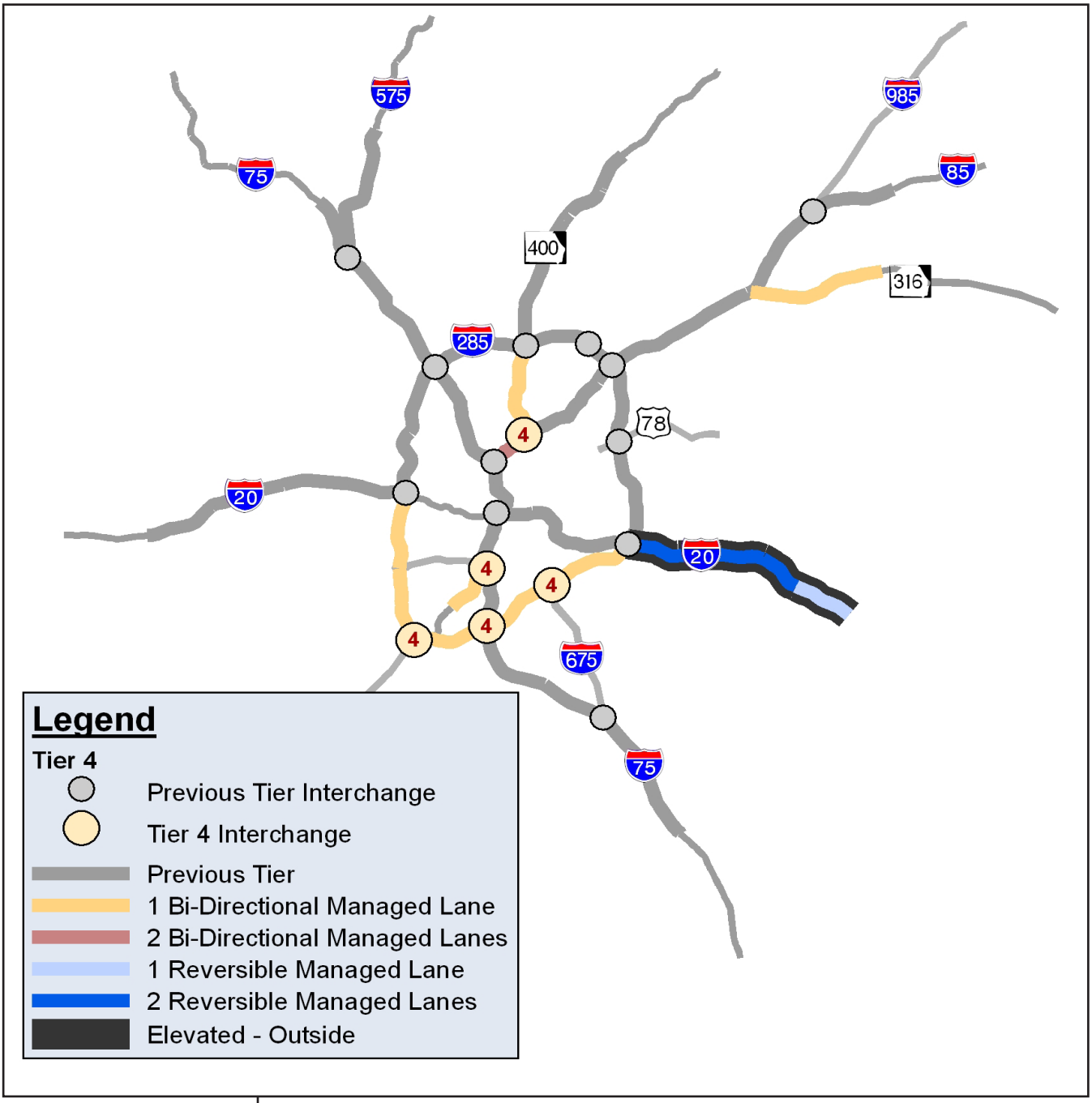
Tier 4 projects include significant investment on much of I-285 and I-20 East, along with the addition of one managed lane on I-85 North inside I-285 from the Brookwood Interchange (I-75/I-85) to SR 400. This additional lane supports the managed lane project along SR 400 inside I-285 and would help mitigate potential merging problems associated with this section. Total costs for Tier 4 are estimated to be $3.6B, making the cumulative cost for the first four tiers $13.2B with a cumulative gap of $5.2B. Table 5 and Figure 5 show the Tier 4 projects.

Table 5: Implementation Plan Tier 4 Projects

CORRIDOR	FROM	TO	SCOPE	COST
I-20 East Outside I-285	I-285	West of Salem Rd	Build 2 elevated reversible lanes to Sigman Rd, and build 1 elevated reversible lane to Salem Rd	$724M
SR 316	I-85 North Outside I-285	East of High Hope Rd	Build 1 HOT3+ lane in each direction from I-85 to High Hope Rd	$316M
I-85 South Inside I-285	I-75/I-85	Loop Rd	Build 1 HOT3+ lane in each direction from the I-75/I-85 Split to Loop Rd	$235M
I-85 North Inside I-285	Brook-wood In-terchange	SR 400 North Inside I-285	Build 1 HOT3+ lane in each direction from the Brookwood Interchange to SR 400 North Inside I-285	$500M
SR 400 North Inside I-285	I-285	I-85 North Inside I-285	Build 1 HOT3+ lane in each direction from I-285 to I-85 North Inside I-285	$60M
I-285 South/ I-285 West	I-20 East	I-20 West	Build 1 HOT3+ lane in each direction from I-20 East to I-20 West	$713M

INTERCHANGE	INTERCHANGE MOVEMENTS INCLUDED	COST
I-675/I-285	I-675NB to I-285EB; I-285WB to I-675SB	$59M
I-75S/I-285	I-75NB to I-285EB&WB; I-75SB to I-285EB; I-285WB to I-75NB&SB; I-285EB to I-75SB	$366M
I-85/SR400	I-85NB to SR400NB; SR400SB to I-85SB	$258M
I-85S Outside/I-285	I-85NB to I-285WB&EB; I-285EB to I-85SB; I-285WB to I-85SB	$248M
Downtown Connector/ I-75S/I-85S	DC SB to I-75 SB; DC SB to I-85 SB; I-85 NB to DC NB; I-75 NB to DC NB	$80M

Figure 5: Managed Lanes System Tier 4



Tier 5

The managed lane network is completed in Tier 5. This tier includes a number of projects throughout the region totaling $3.0B in capital expenditures. The total cost for all five tiers in the system is $16.2B, and the cumulative gap for the system is $7.0B. That is, for an upfront public sector investment of $7.0B, the region could receive over $16B in managed lane infrastructure. The remaining costs would rely on toll revenues, which would be used to pay down the debt over time (over a 35-year period in this case). The assumptions behind these calculations include a 35-year revenue generating period, a public-private partnership financial arrangement, and an opening year for traffic of 2020. Additional detail on these calculations can be seen in two MLSP technical reports: *Financial Analysis* and *Corridor Evaluation and Recommendations*. Table 6 shows the Tier 5 projects.

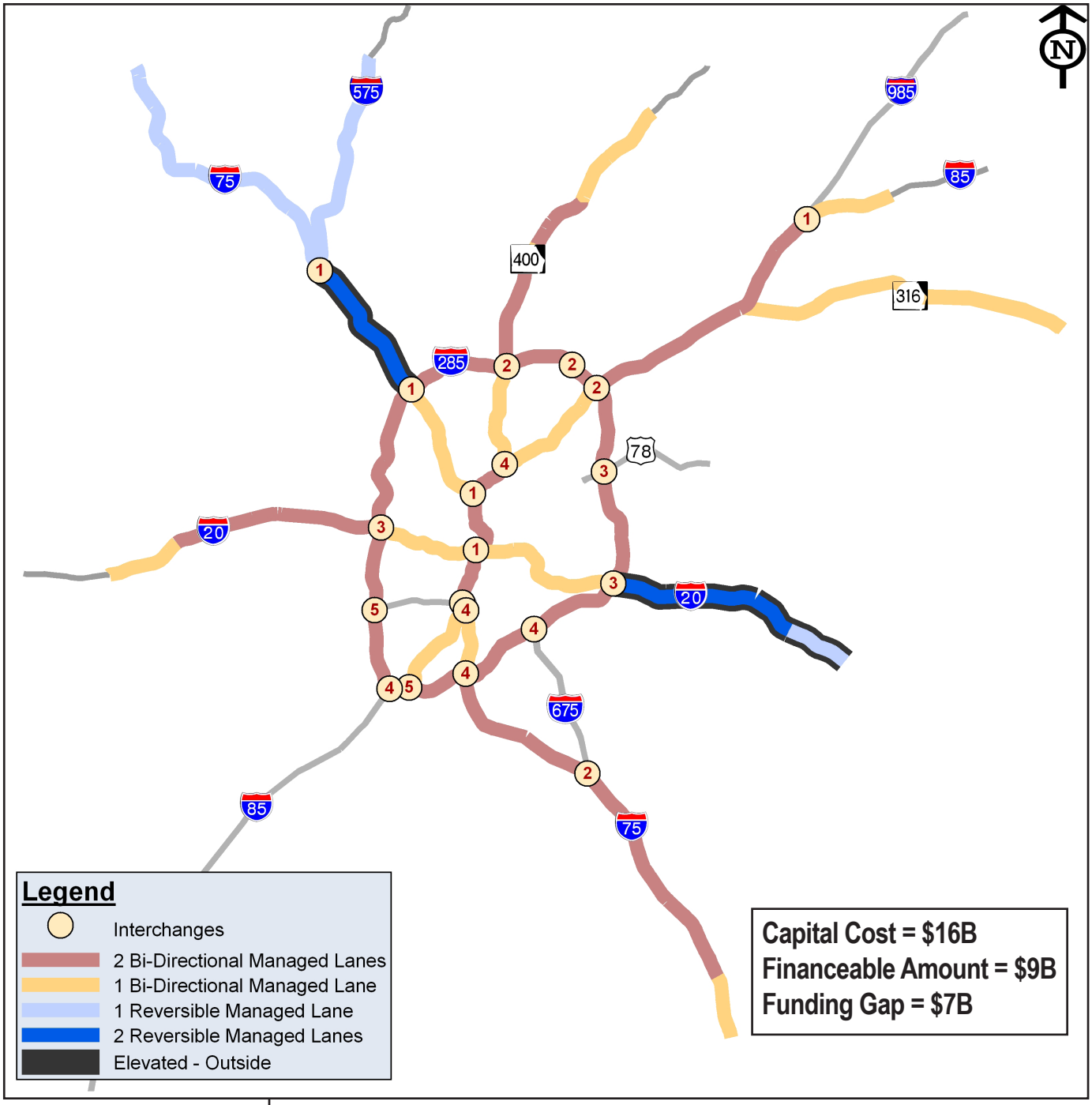
Table 6: Implementation Plan Tier 5 Projects

CORRIDOR	FROM	TO	SCOPE	COST
I-75 North Outside I-285	North of Hickory Grove Rd	South of SR 113	Build 1 at-grade HOT3+ reversible lane from Hickory Grove Rd to SR 113	$425M
I-575 North	Sixes Rd	North of Canton Rd	Build 1 at-grade HOT3+ reversible lane from Sixes Rd to Canton Rd	$114M
SR400 North Outside I-285	Holcomb Bridge Rd	South of Peachtree Pkwy	Build 1 additional HOT3+ lane in each direction from Holcomb Bridge Rd to Kimball Bridge Rd, build 1 HOT3+ lane in each direction from McFarland Rd to Old Peachtree Pkwy	$294M
I-75 South Outside I-285	I-285	South of Locust Grove Rd	Build 1 HOT3+ lane in each direction from I-285 to S of Locust Grove Rd (for a total of 2 HOT lanes in each direction from I-285 to Bill Gardner Pkwy)	$736M
SR 316	East of High Hope Rd	East of SR 81	Build 1 HOT3+ lane in each direction from High Hope Rd to SR 81	$208M
I-20 West Outside I-285	East of Mt Vernon Rd	East of Presley Mill Rd	Build 2 HOT lanes from Mt Vernon Rd to E of Presley Mill Rd (for a total of 2 HOT lanes in each direction from I-285 to Presley Mill Rd)	$107M
I-85 South Inside I-285	Loop Rd	I-285	Build 1 HOT3+ lane in each direction from Loop Rd to I-285	$94M
I-285 South/ I-285 West	I-20 East	I-20 West	Build 1 additional HOT3+ lane in each direction from I-20E to I-20W (for a total of 2 HOT lanes in each direction from I-20E to I-20W)	$568M
I-20 West Inside I-285	Downtown Connector	I-285	Convert 1 GP in each direction where there are 4+ in each direction, build 1 HOT3+ lane in each direction where there are 3 or fewer GP lanes in each direction	$68M
INTERCHANGE	**INTERCHANGE MOVEMENTS INCLUDED**			**COST**
I-85S Inside/I-285	I-85SB to I-285WB; I-285EB to I-85NB			$248M
Downtown Connector/ Langford Pkwy	DC SB to Langford Pkwy WB; Langford Pkwy EB to DC NB			$78M
I-285/ Langford Pkwy	Langford Pkwy WB to I-285 NB&SB; I-285 NB to Langford Pkwy EB; I-285 SB to Langford Pkwy EB			$111M
Downtown Connector/ I-20W	No access provided between I-20W and DC			N/A

The complete managed lane system is shown in Figure 6. Final build out includes both one and two-lane managed lane applications based on specific corridor needs. The vast majority of the system is bi-directional, at-grade, with the exception of I-75 north, I-575, and I-20 East outside of I-285. These are the only recommended reversible lane applications in the system. These corridors are elevated where indicated in the figure: I-75 North between I-285 and I-575, and I-20 East between I-285 and Salem Road. The I-575 corridor and I-75 North corridor between I-575 and SR 113 are designated reversible at-grade. The proposed system to system interchanges are significant elements in this network, and contribute significantly to the overall cost of the system. The numbered dots indicate the location and respective tier of each interchange improvement. These have been strategically phased in the implementation plan to capitalize on revenue potential as specific corridors open to traffic.

As noted in Figure 6, the total capital cost is $16B. Of this amount, $9B is potentially financeable based on the projected revenues tied to the managed lanes, and $7B is expected by the public sector or some other funding source. Again, the assumptions behind these calculations include a 35-year revenue generating period, a public-private partnership financial arrangement, and an opening year for traffic of 2020. Additional detail on these calculations can be seen in MLSP technical reports *Financial Analysis* and *Corridor Evaluation and Recommendations.*

Figure 6: Complete Managed Lanes System



System Benefits

As noted previously, the recommended managed lane system presented in Figure 6 will *not* generate enough revenue to cover capital cost operations and maintenance. Managed lane users experience an 83% reduction in delay compared to a 2030 no-build scenario. This delay benefit equates to a $47B system-wide net reduction in the cost of congestion and a $37B decrease in congestion cost for the managed lane users. In addition, the managed lanes do produce significant public benefits, including an 8% system-wide reduction in vehicle delay (the system is defined as all roads in the Atlanta Regional Commission's 20-county Travel Demand Model).

Figures 7 and 8 highlight the impact of the managed lane system to the Atlanta region. These figures show travel time contours with and without the managed lanes in place. Figure 8 shows a tremendous increase in accessibility from the Downtown Atlanta employment center to the surrounding area. With managed lanes in place, there is a 196% increase in workers within 45 minutes of Downtown by car, for motorists travelling in the managed lanes. In addition, there is a 132% increase in workers within 90 minutes of Downtown by car, for motorists travelling in the managed lanes. Managed lanes provide up to a 40% travel time savings over travelling in the general purpose lanes.

In spite of the funding gap associated with the managed lane system, there are significant benefits to its implementation in terms of travel time savings and delay reduction. While primary benefits are realized by managed lane users, there are secondary, system-wide benefits that extend to all vehicles in the region.

Figure 7: 2030 PM Period Travel Time Contour without Managed Lanes

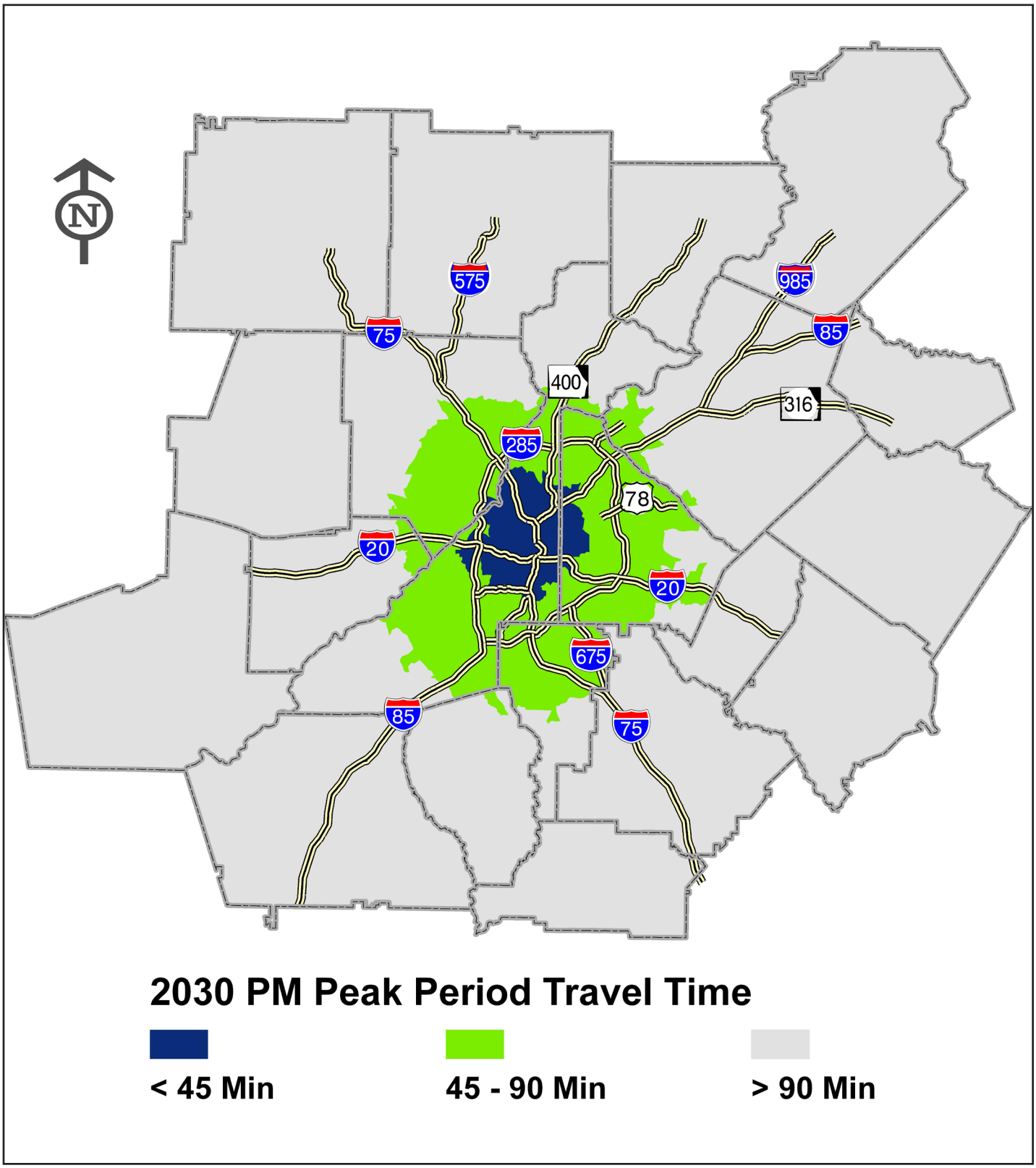
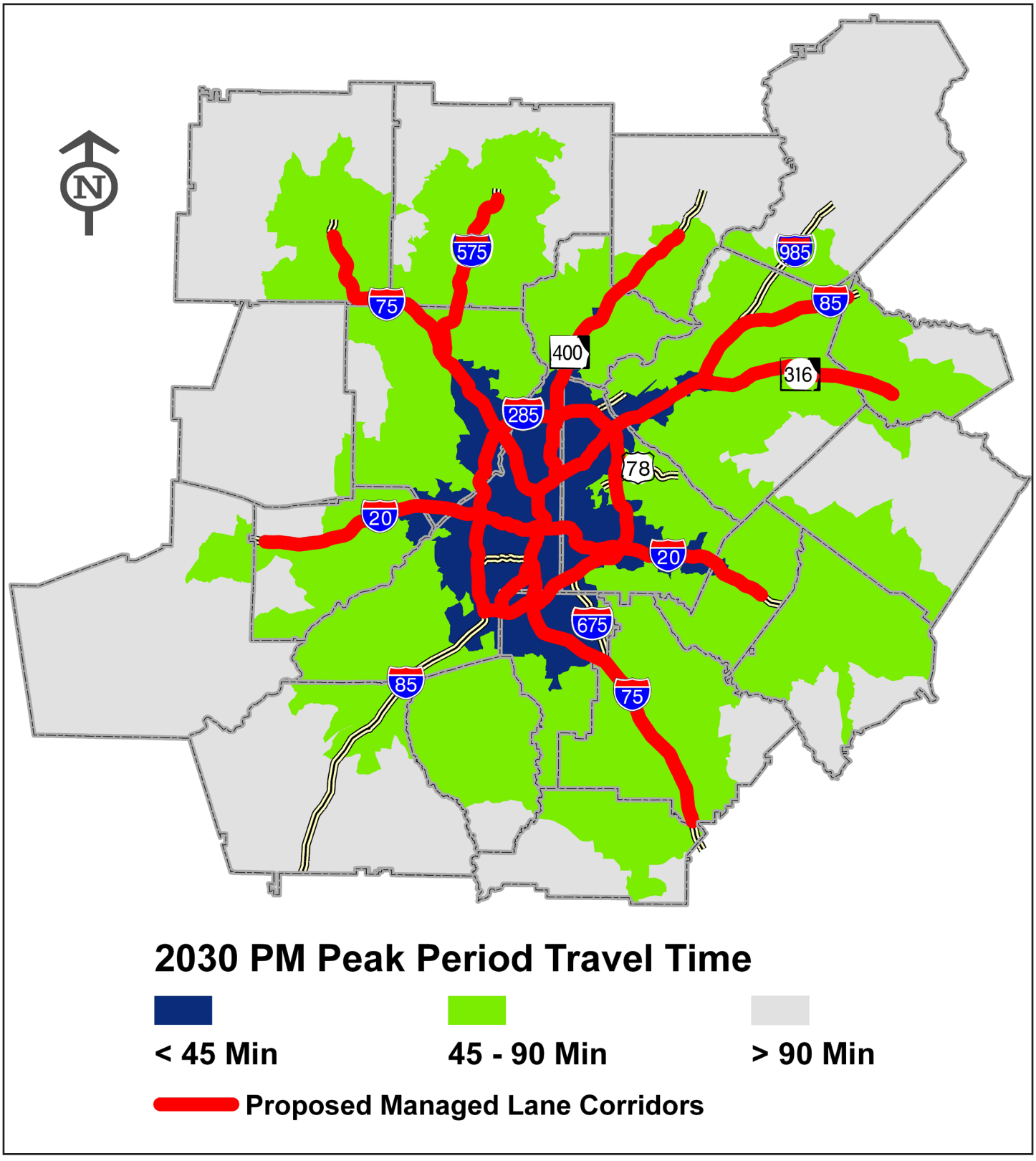


Figure 8: 2030 PM Period Travel Time Contour with Managed Lanes (for Travelers in the Managed Lanes)



D. Conclusions

This executive summary has outlined the methodology and results associated with GDOT's Managed Lane System Plan. Data collection and outreach efforts supported the analysis and evaluation phases of the study, which then ultimately drove the screening process. Output from the screening process was linked with other key criteria to develop a 5-tiered implementation plan that resulted in a complete managed lane network for Metro Atlanta. These final recommendations were based on a comprehensive analysis that included traffic and revenue, cost, engineering, and financial analyses, along with stakeholder input, to produce the best possible proposal for Atlanta's managed lane system. The completion of this planning study, however, is the first step toward project implementation and the full realization of the managed lane system. Coordination with Transportation Planning Partners, a coordinated public outreach effort, environmental documentation, and right-of-way acquisition (for some projects) is still needed before construction can begin.

Legal and Regulatory Issues

In order to move forward with a system of managed lanes in the Atlanta region, a number of steps need to be taken. These are detailed in the MLSP technical report titled *Implementation Strategy*. Initial steps include coordination with Transportation Planning Partners, defining the need and purpose of specific projects, and establishing a funding need for those projects. Next would be the establishment of a public involvement plan, which would incorporate many of the ideas discussed in the previous section. Then it would be necessary to develop a strategy for proceeding with developing environmental documents to implement the managed lanes projects.

Communication and Public Attitudes

The managed lanes system for metro Atlanta has the potential to be bigger and bolder than any other managed lanes system in the country. As a result, the effects may be felt locally and regionally. Decision makers and the public must be educated on managed lanes concepts. The goals of the system need to be clearly defined to create a program identity. A solid and consistent message should be communicated about managed lanes – what they are, what they do, and how they benefit citizens in the metropolitan Atlanta region.

The concept of managed lanes and tolling are relatively new to the Atlanta region. An education campaign will be required to promote the managed lanes concept, its implication and its benefits. The vast scope of the MLSP means that it affects a variety of geographic areas and touches upon an array of demographics. The "public" represents a broad spectrum of individuals with different needs. To reach these groups an assortment of public involvement techniques may be employed. Tailored outreach efforts may help to produce active and meaningful participation from selected groups.

The education approach needs to be regional in nature and canvas the Atlanta metropolitan area. The potential users of the managed lanes reside throughout the region are diverse in characteristics. The purpose of education is to develop a general public understanding about the managed lanes concept. Media outlets, businesses, local governments, and civic organizations are all potential resources to use to disseminate the message. Clearly defining what managed

lanes are and what they do is vital.

Lessons learned from the implementation of managed lanes elsewhere in the U.S. will help to prepare an effective public perception assessment approach for the Atlanta region. Understanding that there will be common themes to address based on what other managed lanes systems have faced will help gear the outreach strategy to educate the targeted audience.

Emphasis should be placed on connecting with the local groups and people that will be directly impacted by managed lanes. Gaining knowledge of the public's potential reception to managed lanes will be an important input into the decision process. While the system is regional, the direct effects may be experienced at the local level. Identifying the groups that will bear the most direct impacts will be essential, and their involvement will be fundamental to create a project whereby the public feels ownership. Further detail regarding the communication strategy associated with the MLSP can be seen in the report titled *Communications and Public Attitudes*.

Organizational Framework

Another important consideration related to project implementation and managed lane system operations is the organizational framework of the governing agency. In the MLSP technical report Chapter 15, *Organizational and Administrative Arrangements of Tolling Agencies,* discusses various administrative structures. It draws upon case studies to illustrate how toll agencies are organized in the United States. This report also compares the organizational and administrative arrangements utilized by the case study toll agencies to the current structure of Georgia's State Road and Tollway Authority.

Historically, several states have established turnpike and toll authorities with legislative mandates to finance, build and operate tolled facilities. In addition, local or regional toll authorities have been created to meet specific regional needs and may have jurisdiction over an extensive area within the state. Several states, including Georgia, have legislation in place as a basis for public-private partnerships. Public-private models may vary by state, but the intent is to encourage private sector participation in the various aspects of the development and operation of a toll facility.

The following public-private models may be considered:

i. Blended Public-Private Financing for New Public Toll Road Delivery – Under this arrangement, the public sector retains control and oversight of the project while the financing comes from a private source.

ii. Public-Private Partnerships for Capital Projects – In this arrangement, the private sector usually leads the financing, construction and operation of a facility while the public sector frames the agreement and retains ownership of the road.

iii. Privately Supplied New Facility – The private sector develops the new facility, providing all the finance and bearing all the risk.

There are several potential structural arrangements for a tolling agency, and careful thought must be given to the organizational framework of this governing body as the Atlanta region purses managed lanes.

Next Steps

Immediate next steps related to the implementation of managed lanes in Metro Atlanta include working with the Atlanta Regional Commission (ARC) to incorporate managed lane projects in the next update to the Regional Transportation Plan (RTP). Inclusion in the RTP is required to secure federal funds for projects in metropolitan areas. In order to accomplish this, individual projects would need to be extracted from the system of managed lanes. These individual projects could be broken out by corridor (e.g. I-75 North from I-285 to Hickory Grove road) or, alternatively, could be combinations of corridors (e.g. I-75 North from I-285 to Hickory Grove road and I-575 from I-75 to Sixes Road). These projects would then be subjected to the planning process to determine if they are to be included in the RTP. Key information required for inclusion in the RTP involves estimates for preliminary engineering costs, right-of-way costs, utility costs, and construction costs, as well as the years in which these costs would be incurred. As determined as part of the MLSP, most of the managed lane projects would require some level of public sector contribution. As such, it is imperative that GDOT work closely with ARC to get managed lane projects included in the next RTP.

Other key activities revolve around project delivery. Further analysis is needed to determine preferred delivery mechanisms for individual projects (e.g. public-private partnerships or public-public arrangements). These decisions will drive project implementation time frames, operations and maintenance responsibilities, and sources of capital. Also, in order to secure project financing from toll-backed revenue bonds, it will also be necessary to complete an investment grade traffic and revenue (IGT&R) study for each project. An IGT&R serves as a prospectus for investors and provides a detailed finance plan. Results from an IGT&R are applicable for both public-private and public-public delivery methods. Providing the MLSP results to GDOT's Office of Innovative Program Delivery and the Division of Public Private Partnerships is the appropriate step for further investigation of the identified managed lanes concepts.

GDOT's MLSP provides a holistic vision of managed lanes in Metro Atlanta. It is now up to GDOT and their planning partners to take steps to include these projects in future plans and to refine the analysis for purposes of individual project delivery and financing. A concerted effort from the region's transportation agencies could soon bring managed lanes to fruition in Atlanta, resulting in significant benefits to both the Atlanta region and the State Georgia.

ATLANTA REGIONAL MANAGED LANE SYSTEM PLAN

JANUARY 2010

FINAL REPORT