PHASE III RESULTS SUMMARY

PURPOSE OF PHASE III

In 2007, the Charlotte Department of Transportation (CDOT), the North Carolina Department of Transportation (NCDOT), the Mecklenburg-Union Metropolitan Planning Organization (MUMPO), the South Carolina Department of Transportation (SCDOT) and other agencies in the Charlotte region began a study of existing and planned major highways throughout a 10-county area to identify where Fast Lanes – high-occupancy vehicle (HOV), high-occupancy toll (HOT) or truck-only toll facilities – could help manage congestion during peak travel periods. In Phase I, freeways and other Strategic Highway Corridors were screened to identify the most promising corridors for Fast Lanes. In the study’s second phase, physical designs, operational requirements, revenues and costs were evaluated for those roadways that remained after the Phase I screening.

In 2009, the City of Charlotte submitted a proposal to the Federal Highway Administration (FHWA) to receive funding from the Value Pricing Program in order to advance to a third phase of the Fast Lanes Study. The application was approved in 2010, and NCDOT provided the required non-federal match in 2011.

The objectives of Phase III of the Fast Lanes Study include:

- Familiarize the public with the concept of congestion pricing.
- Develop a better understanding of policy and technical issues associated with congestion pricing.
- Determine public acceptance for the next Fast Lanes project(s). US-74 East between Charlotte and Matthews and I-485 South between Pineville and Matthews were the primary study corridors in Phase III.
- Define the preferred Fast Lanes projects for the above two corridors.

Phase III was started in Spring 2012 and completed in Spring 2013. The three corridors studied for Fast Lanes projects are shown in Figure 1. NCDOT is currently considering a public-private partnership (P3) to implement the I-77 North HOV-to-HOT lanes conversion and extension project.

I-85 East and I-77 South were not studied in Phase III because it would be very costly to add Fast Lanes to the existing cross-sections due to the physical attributes of each corridor.
In MUMPO’s 2035 Long Range Transportation Plan (LRTP), only 34 of 310 projects nominated for state and federal funding can be funded over the next 25 years using traditional federal and state revenue sources. The projected need for transportation projects far exceeds available funding. Fast Lanes provide an additional revenue source for improving, operating and maintaining key corridors.

PUBLIC OPINION FINDINGS

The Need for Outreach

Without an effective process to involve the public, the likelihood of success of the I-485 South and US-74 East Fast Lanes projects could be at risk. The responses accumulated from two types of public assessment activities were essential for evaluating the Fast Lanes proposed for I-485 South and US-74 East. Acceptance of a Fast Lanes strategy as a desirable travel and funding option depends on the support of respected public figures willing to act as vocal concept champions and a general understanding by the public of the concept and its benefits.

Public assessment activities were designed to “take the temperature” of the existing understanding of the concept of Fast Lanes, and create a template for tracking the community’s support for the proposed I-485 South and US-74 East Fast Lanes.

Public opinion was interpreted using a two-pronged approach: 1) gather information and document the findings, and 2) communicate with local elected officials, environmental organization leaders, community/civic organization directors and major business representatives. Table 1 summarizes the two types of public outreach activities that were implemented in Phase III.

In 2012, over 900 telephone interviews were conducted with residents from the three areas of Mecklenburg and Union Counties shown in Figure 2. The areas were defined by zip codes and the survey questions related directly to travel on I-77 North, I-485 South and US-74 East. The survey process was designed so the results of the 300 surveys in each area would represent how the persons who live in the corridors would respond if every one of them was asked the survey questions.

The study also included five focus group sessions, held during 2012. These meetings allowed the gathering of detailed opinions and reactions to Fast Lanes. The sessions involved extensive discussions of managed lanes strategies.

<table>
<thead>
<tr>
<th>TABLE 1. Public Outreach Elements</th>
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<tbody>
<tr>
<td>Information Gathering &amp; Documentation</td>
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<tr>
<td>Stakeholder Database</td>
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<td>Statistically-Valid Public Opinion Telephone Survey</td>
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<td>Focus Group Sessions</td>
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<td>Stakeholder Interaction</td>
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<tr>
<td>One-on-One Meetings with Local Leaders</td>
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<td>Stakeholder Workshops</td>
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FIGURE 2. Survey Areas
Major Findings

During the public outreach effort, the term “express toll lanes” was used to better convey the purpose or goal of these managed lanes. The primary conclusions drawn from the gathering of public and stakeholder opinions were:

- **Express toll lanes have significant support in the Charlotte region.**
  - Over 85 percent of interviewed stakeholders preferred this approach over raising taxes.
  - Approximately 56 percent of telephone respondents favored the concept.
  - The majority of focus group participants supported tolling over tax increases.

- **Public understanding is critical to implementing express toll lanes.**
  - Focus group participants suggested developing easy-to-understand instructions on how to use toll lanes.
  - Interviewed stakeholders recommended widespread distribution of tolling transponders to encourage trial use of express toll lanes.

- **Existing trust in local and state governments shape public perceptions of tolling.**
  - The public must see a clear connection between the cost and benefits of using express toll lanes.
  - Focus group participants were adamant that revenues from express toll lanes remain in the Charlotte region, if not in the corridor where they are collected.
Driving alone is the primary mode of transportation for getting to and from work or school. Carpooling and riding public transit rank highest in the I-77 North corridor where an HOV lane has existed since 2004.

Over 64 percent of telephone survey respondents believe that express toll lanes are better than waiting for funds to be available later for construction of highway improvements.

Over 70 percent of telephone survey respondents said that express toll lanes will reduce commuting time and congestion and give travelers a more predictable travel time.

**TECHNICAL FINDINGS**

This phase of managed lanes studies included the definition and analysis of conceptual capital projects, order-of-magnitude capital costs, potential operation and maintenance costs, and ranges of toll-generated revenues. These analyses were done for I-485 South (between I-77 in South Charlotte and US-74 in Matthews) and US-74 East (between I-277 in Uptown Charlotte and I-485 South) because these were deemed to be high-priority corridors.

**I-485 South**

Before 2012, NCDOT’s TIP Project R-4902 included the following additions to I-485 South:

- Between I-77 and NC-51, additional general purpose lanes in the median to provide three lanes in each direction.

In 2012, NCDOT expanded Project R-4902 to add:

- Wide paved median shoulders between I-77 and Johnston Road.

- A general purpose lane between Johnston and Rea Roads, for a total of three lanes in each direction.

The widened median shoulders were designed to accommodate future conversion to an eight-lane interstate (three general purpose lanes and an express toll lane in each direction) between I-77 and Johnston Road. The project currently under construction is shown in Figure 6.

In July 2012, the North Carolina Board of Transportation added a new project (I-5507) to the State’s TIP in order to construct one express toll lane in each direction along I-485 South between I-77 and US-74. The proposed lane configurations for Projects R-4902 and I-5507 are reflected in the I-485 South express lane alternatives evaluated in this study. Figure 7 shows that the full-depth paved shoulder in R-4902 would become the western segment of the express toll lanes in Project I-5507.
FIGURE 6. NCDOT Project R-4902

FIGURE 7. NCDOT Project I-5507
The progression of construction underway and proposed for I-485 South is shown in Figures 8 through 11. Figure 8 illustrates the existing I-485 cross-section. Figures 9 and 10 illustrate how the I-485 cross-section will change when NCDOT expands the interstate with the two TIP projects. Figure 11 is a visualization of the possible express toll lanes along I-485.

As part of this study, flyover (or direction connection) concepts were developed so that I-485 express toll lane users could connect directly to future I-77 and US-74 express lanes. Figure 12 illustrates a possible design connecting I-485 to I-77 at an estimated cost of $30 million. Figure 13 shows a flyover connection for express lanes between I-485 and US-74.

NCDOT is proposing to implement Project I-5507 based on toll revenues covering 60 percent ($134.5 million) of the estimated construction costs of $221 million. The toll revenues to be used for project construction would be in addition to the revenues required to pay for operating and maintaining the express toll lanes. Additional feasibility studies will be undertaken in order to determine the capital costs, physical impacts and operational effects of the express toll lanes, as well as connections to and from adjacent managed lanes described above.
Proposed Managed Lanes
Typical Section with 4’ Buffer

FIGURE 10. I-485 (I-77 to NC-51) Cross-Section with TIP Project I-5507

Proposed Typical Cross-Section | NC 51 to Johnston Road

FIGURE 11. I-485 (NC-51 to Johnston Road) Visualization of Potential Express Toll Lanes
FIGURE 12. Possible Express Lanes Connection from I-485 to I-77

FIGURE 13. Possible Express Lanes Connection from I-485 to US-74
US-74 East

In the 1980s, NCDOT and the City of Charlotte received federal funding to implement a reversible high-occupancy vehicle (HOV) lane along US-74 between I-277 and Albemarle Road. The HOV facility located in the median of Independence Boulevard was part of an overall conversion of US-74 from an urban arterial to a freeway/expressway (NCDOT Project U-209). When an initial phase of Project U-209 was completed in 1998, the HOV facility was opened as a two-way transitway for use only by Charlotte Area Transit System (CATS) express buses traveling along US-74. In 2013, the transit agency operated 33 inbound bus trips between 6 AM and 9 AM and 33 outbound bus trips between 4 PM and 7 PM along the transit way each weekday.

In October 2011, the Metropolitan Transit Commission decided that the US-74 median no longer had to be reserved exclusively for a future rapid transit project and directed CATS to work with NCDOT to determine how to best incorporate bus operations in the design of US-74 express toll lanes. During 2012, NCDOT revised the design plans for US-74 between Albemarle Road and Conference Drive (Project U-209B) to accommodate construction of an express toll lane in each direction (as shown in Figure 14).

In order for non-transit users to take advantage of the travel time savings from the exclusive lanes along US-74, this study recommends the incremental implementation of express toll lanes along US-74. In Phase I, the median bus lanes would be converted to a reversible express toll lane as shown in Figure 15. The reversible facility would connect to the concurrent flow express lanes being built under Project U-209B to provide a six-mile express lanes facility which could be opened as early as 2016. The estimated capital cost of the starter project would be about $14 million, with annual operating and maintenance costs estimated to be $750,000. The annual estimated revenues from the Phase I project would be about $1 million, exceeding the amount required for yearly operating and maintenance costs.

![FIGURE 14. US-74 (Albemarle Road to Conference Drive) Visualization of Potential Express Toll Lanes](image-url)
Phase II of the US-74 express toll lanes project would involve converting the reversible express lanes between I-277 and Albemarle Road to concurrent flow lanes similar to the cross-section being built under Project U-209B. During this phase, a flyover (as shown in Figure 16) could connect the express lanes to Charlottetowne Avenue to provide direct access to Presbyterian Hospital and Central Piedmont Community College. This phase could also include improved connections between the US-74 express toll lanes and I-277 (Brookshire and Belk Freeways).

NCDOT is analyzing the feasibility of converting the six-mile eastern arterial segment of US-74 between Conference Drive and I-485 to a six-lane or eight-lane freeway/expressway with express toll lanes in the median. That feasibility study also would include cost estimates for both full and partial access control and should be completed by 2013.

In this study, preliminary traffic and revenue forecasts were prepared for express lanes on US-74 from I-277 to I-485. Although revenues would vary significantly based on vehicle occupancy and optimization objectives, annual revenues are projected to range from $7 million to $13 million by 2035. Figure 17 shows the potential phases for implementing express lanes along US-74.
FIGURE 16. Possible Express Lanes Connection from US-74 to Charlottetowne Avenue

FIGURE 17. Potential Phases for Implementing US-74 Express Lanes

<table>
<thead>
<tr>
<th>Feature</th>
<th>NCDOT Expressway Project</th>
<th>Managed Lanes</th>
<th>Target Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purple I-277 to Albemarle Rd</td>
<td>Barrier-Separated, Median-Running Bus-Only Lanes</td>
<td>Convert to Reversible Shared Lane within Barrier-Separated Median</td>
<td>2015</td>
</tr>
<tr>
<td>Orange Albemarle Rd to Conference Dr</td>
<td>Paint-Separated, Shared Bus/HOV Lanes</td>
<td>Included in NCDOT Project (Redesign of U-209B)</td>
<td>2015</td>
</tr>
<tr>
<td>Blue Conference Dr to I-485</td>
<td>Unfunded</td>
<td>Unfunded</td>
<td>Before 2025</td>
</tr>
<tr>
<td>Gates for Reversible Lanes</td>
<td></td>
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Decision-Making Recommendations

In order to implement the technical recommendations of Phase III, a formal interagency process should be established to ensure coordination among state and regional partners in the planning and funding of potential Fast Lanes projects. The formal group (which could involve the preparation of a memorandum of agreement) would address the following questions:

- What is the primary purpose of Fast Lanes?
- How does the purpose get reflected in policy choices?
- How are these choices communicated to the public?
- What is “on the table” for refinement, and what is not?

The inter-agency group should include staff members from:

- MUMPO
- City of Charlotte - CDOT - CATS
- NCDOT - Division 10 - Division 12 - North Carolina Turnpike Authority (NCTA) - Project Development and Environmental Analysis (PDEA) - Roadway Design Unit - Feasibility Studies Unit - FHWA
- Jurisdictions located in study corridors

The inter-agency group would discuss the following issues impacting implementation:

- Who decides which corridors get priority for Fast Lanes?
- Who decides user eligibility for Fast Lanes? Is it corridor-by-corridor?
- Who decides financing or operating mechanism (Public Private Partnership; Design, Build, Operate and Maintain, etc.)?
- Who decides toll rates? Is it corridor-by-corridor?

Beginning a process to address the aforementioned issues now is important because Phase III has shown that the public has strong opinions about a Fast Lanes network. The results of the public outreach effort indicate that citizens are very interested to know who will control the toll revenues, who will receive the benefits of managed lanes, and how will implementation of Fast Lanes affect general purpose lanes.

Evaluating the Effectiveness of Fast Lanes Facilities

Establishing goals and objectives is an essential step in the planning process for Fast Lanes or express toll lanes. As discussed in the preceding section, the establishment of operational objectives should be a collaborative process involving interagency group members. The interagency committee can be used to determine system performance priorities, operations objectives, data availability, and funding opportunities.

Table 2 lists five possible objectives for implementing a Fast Lanes network in the Charlotte region. The table includes performance categories and measures of effectiveness for each objective. Table 2 summarizes measures that can be used to compare the benefits of Fast Lanes projects along different corridors within the Charlotte region.
<table>
<thead>
<tr>
<th>Objectives</th>
<th>Performance Categories</th>
<th>Measures of Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accommodate long-term future demand</strong></td>
<td>Peak Period Vehicle Traffic Volumes</td>
<td>Change from baseline in peak hour volumes</td>
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<tr>
<td></td>
<td></td>
<td>Change in peak period VMT at congested speeds in general purpose or managed lanes</td>
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<td></td>
<td>Temporal Extent of Congestion</td>
<td>Hours per day operating with congestion</td>
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<td>Change in freeway links operating with congestion</td>
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<td>Change in congestion on non-freeway corridors</td>
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<tr>
<td></td>
<td></td>
<td>Change in congested VMT</td>
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<tr>
<td></td>
<td></td>
<td>Change in congested VHT</td>
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<td></td>
<td>Facility Performance</td>
<td>Lane miles at volume/capacity &gt; 0.95</td>
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<tr>
<td></td>
<td></td>
<td>Average speed by facility/lane type</td>
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<tr>
<td><strong>Increase the people-moving capacity of the Charlotte regional roadway system</strong></td>
<td>Person Throughput</td>
<td>Person Miles Traveled (PMT) at uncongested speeds</td>
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<tr>
<td></td>
<td></td>
<td>Vehicle Miles Traveled (VMT) at uncongested speeds for private vehicles and buses</td>
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<tr>
<td></td>
<td>Transit Mode Split</td>
<td>Change in corridor mode share</td>
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<tr>
<td></td>
<td></td>
<td>Change in regional mode share</td>
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<tr>
<td><strong>Increase trip reliability</strong></td>
<td>Travel Time Reliability</td>
<td>Variability of travel time by mode and lane type</td>
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<td></td>
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<td>Change in travel time index (congested travel time compared to a free-flow travel time)</td>
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<td></td>
<td>Travel Time Savings</td>
<td>Travel time by facility and lane type (general purpose or managed)</td>
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<td>Change in travel time</td>
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<td>Differentiation of travel time by mode</td>
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**TABLE 2. Evaluation of Fast Lanes Facilities**