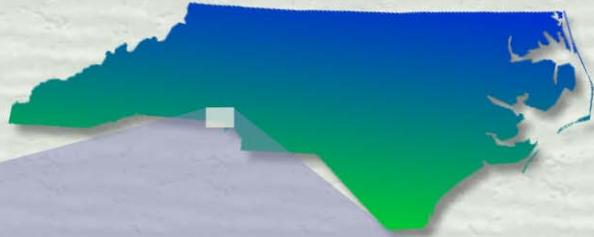


Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study

Final Report



Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study

Final Report

Prepared For



Prepared By



October 12, 2006



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October 12, 2006

Mr. David Joyner
Executive Director
North Carolina Turnpike Authority
5400 Glenwood Avenue
Suite 400
Raleigh, NC 27612

Re: **Preliminary Traffic and Revenue Study – Proposed Gaston East-West Connector**

Dear Mr. Joyner:

Wilbur Smith Associates (WSA) is most pleased to submit this report summarizing the results of our preliminary traffic and revenue study for the proposed Gaston East-West Connector.

The proposed Gaston East-West Connector would involve construction of approximately 22.3 miles of a new road through the southern portion of Gaston County. It would provide enhanced access for residents and businesses in the study area and most significantly would provide a new crossing of the Catawba River and access to I-485. Environmental studies are underway on 16 alternatives for the proposed Connector.

Three scenarios were analyzed for this preliminary traffic and revenue study. One scenario included the entire project length of approximately 22.3 miles. The other two scenarios were for shorter distances ranging from 5.7 miles to 14.1 miles in length. These two shorter scenarios were analyzed to assess the revenue effects of potential staged implementation of the connector.

Please note that this study was conducted at a preliminary level of detail and is not sufficient to be used in support of actual project financing. The study employed readily available information and the MPO's travel demand models. The findings are subject to refinement in a more detailed, comprehensive traffic and revenue study which would be conducted prior to financing.

Our project manager, David Danforth, and other key members of the project team including Will Letchworth, Jannine Miller, Paul Marcella, Jianhe Du, and Zubair Ghafoor gratefully acknowledge the assistance provided by NCTA staff, GUMPO, the City of Charlotte, and others contacted during the course of the study. We have appreciated this opportunity to be of service to the Authority.

Respectfully submitted,

WILBUR SMITH ASSOCIATES



Edward J. Regan, III
Senior Vice President

Albany NY, Anaheim CA, Atlanta GA, Austin TX, Baltimore MD, Bangkok Thailand, Binghamton NY, Burlington VT, Charleston SC, Charleston WV, Chicago IL, Cincinnati OH, Cleveland OH, Columbia SC, Columbus OH, Dallas TX, Dubai UAE, Falls Church VA, Greenville SC, Harrisburg PA, Hong Kong, Hot Springs AR, Houston TX, Iselin NJ, Jacksonville FL, Kansas City MO, Kenmore WA, Knoxville TN, Lansing MI, Lexington KY, Lisle IL, London UK, Milwaukee WI, Mumbai India, Myrtle Beach SC, Nashville TN, New Haven CT, Orlando FL, Philadelphia PA, Pittsburgh PA, Portland ME, Poughkeepsie NY, Raleigh NC, Richmond VA, Riyadh Saudi Arabia, Salt Lake City UT, San Diego CA, San Francisco CA, St. Paul MN, Savannah GA, Tallahassee FL, Tampa FL, Tempe AZ, Trenton NJ, Washington DC

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CHAPTER 1

INTRODUCTION

The proposed Gaston East-West Connector is one of several candidate toll projects now under consideration by the North Carolina Turnpike Authority (NCTA). The primary objective of the preliminary traffic and revenue study for the proposed Connector was to determine the potential toll revenue that could be expected from the facility.

The study was conducted at a preliminary feasibility study level, commonly referred to as a “level 2” traffic and revenue analysis. This level of analysis is intended to provide preliminary estimates of traffic, revenue and toll rate sensitivity. This level of study is not intended for use in direct support of project financing. A more detailed, comprehensive traffic and revenue study would be required for that purpose.

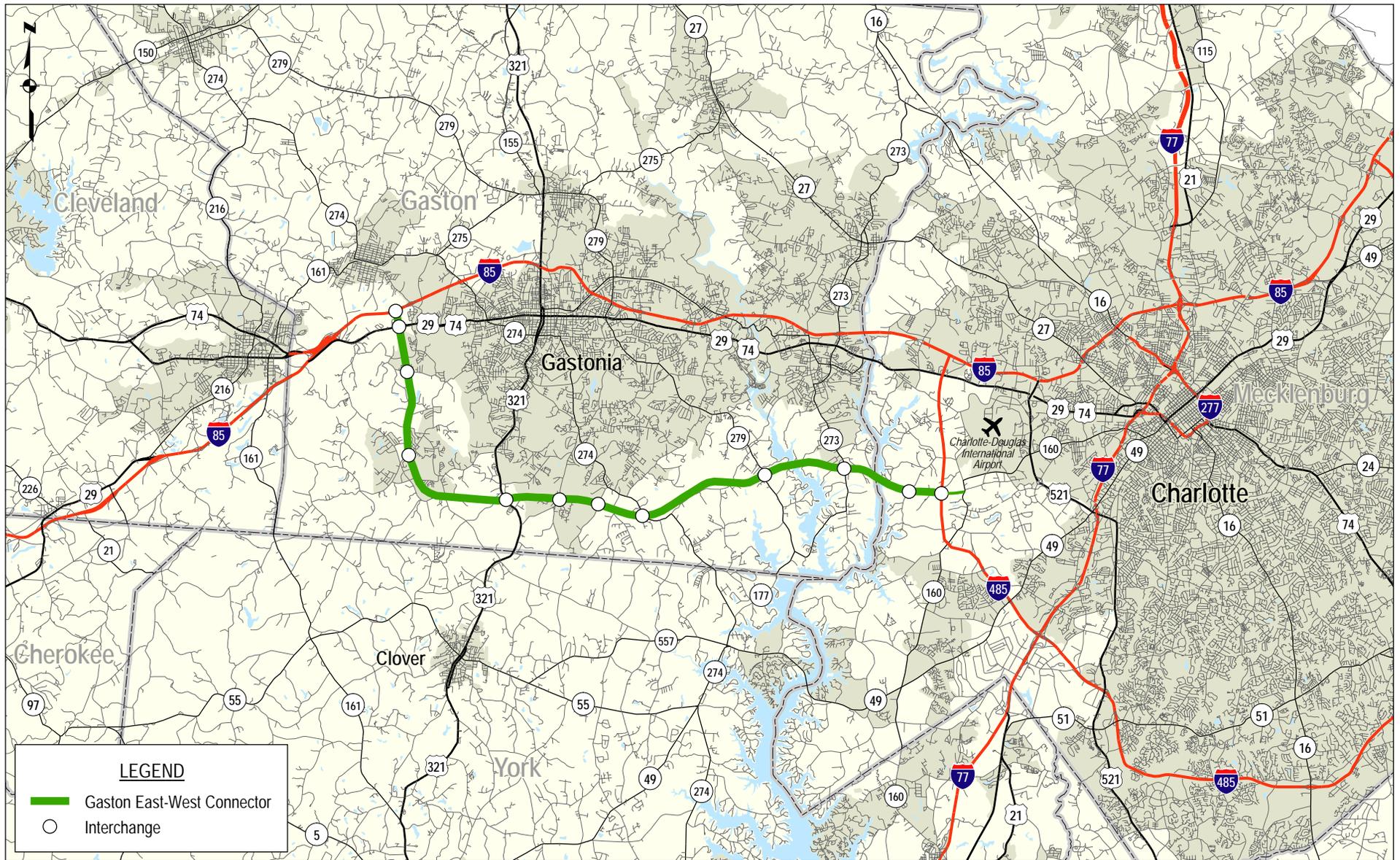
PROJECT DESCRIPTION

Figure 1-1 depicts the project location and its relationship to the surrounding transportation system. The proposed Gaston East-West Connector extends from I-85 west of the City of Gastonia to I-485 (the Charlotte Outer Loop) west of the City of Charlotte. The Connector would provide a major new crossing of the Catawba River and improved access to the Charlotte-Douglas International Airport in Mecklenburg County.

Over much of its length, the new toll facility would compete with I-85, located about 5 miles to the north. I-85 is a heavily traveled limited-access freeway, which carries traffic volumes in excess of 100,000 vehicles per day over most of its length that parallels the proposed Gaston Connector.

Environmental studies now underway are considering a number of alternatives for the proposed Connector. Three combinations of these project alternatives were selected for analysis in this preliminary traffic and revenue study. These combinations (or scenarios) range from the full project

Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study



length of approximately 22.3 miles to scenarios between 5.7 and 14.1 miles in length.

With the Gaston East-West Connector, drivers would have a high-speed, limited access facility through southern Gaston County and an additional crossing of the Catawba River and Lake Wylie. Currently only three options for crossing the river exist in the area including I-85, US 29/74, and NC/SC 49. While NC/SC 49 was recently upgraded to a four-lane facility, it is anticipated that the projected growth in the southwest Charlotte area will lead to traffic congestion on that river crossing. According to the regional transportation plan, I-85 and US 29/74 are expected to exceed capacity by 2025 even if the Gaston East-West Connector is constructed.

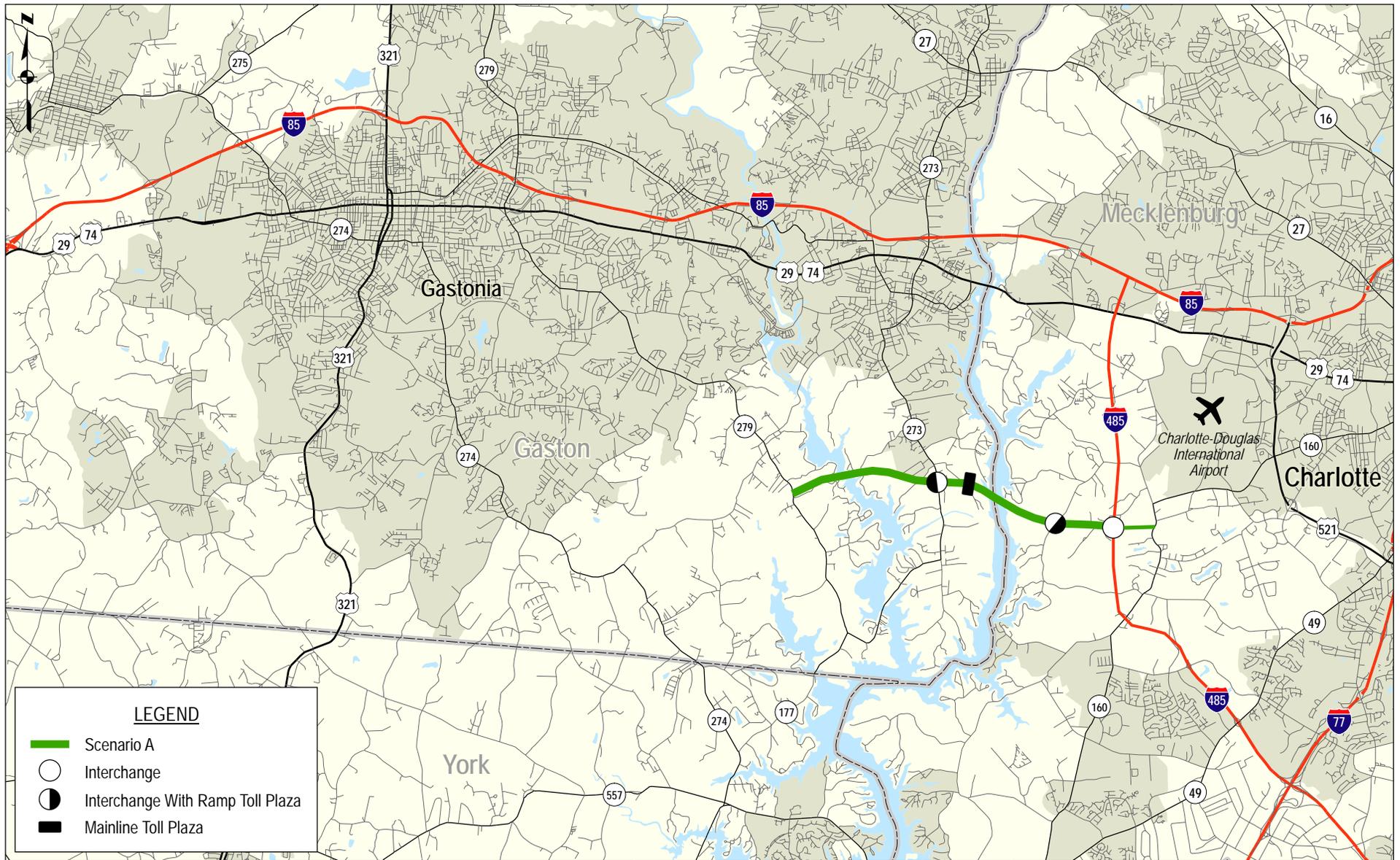
The Gaston East-West Connector would proceed southward from its western terminus essentially paralleling Stagecoach Road and Davis Park Drive. As the Connector approaches Crowders Creek and/or York Drive, the facility would turn due east and proceed for approximately 16 miles, before terminating at I-485 southeast of Charlotte-Douglas International Airport. The Gaston East-West Connector would essentially parallel US 29/74 to the north.

Three scenarios are analyzed in this report in order to provide decision makers information regarding the revenue potential of each scenario if they are constructed as toll roads. The first two scenarios would construct portions of the proposed project and the third would construct the full-length project.

All scenarios of the proposed Gaston East-West Connector addressed in this study are assumed to open to traffic as toll facilities beginning in 2015 presuming that the necessary environmental documentation is completed.

SCENARIO A

Figure 1-2 depicts Scenario A, which extends for approximately 5.7 miles between the Charlotte Outer Loop and NC 279. It is the shortest of the scenarios analyzed, but could be the most complex because it crosses two major bodies of water, the Catawba River and South Fork. It would have one mainline toll plaza between Dixie River Road and South Point Road (NC 273) and two ramp plazas. The interchange at Dixie River Road would have ramp plazas at the westbound off-ramp and the eastbound on-ramp. At South Point Road, the tolled ramps would be for the westbound on ramp and the eastbound off ramp. This configuration would “close the system” so that all motorists would pay a toll. The scenario would have



free ramps at the Charlotte Outer Loop and a signalized intersection at NC 279. Speed limits on the toll road would be 65 mph.

SCENARIO B

Scenario B builds upon Scenario A by extending the toll facility another 8.4 miles. Scenario B, depicted in Figure 1-3 would extend for approximately 14.1 miles from I-485 to US 321. It would provide a major new east-west facility in the study area. The speeds limit on the toll facility would be 65 mph. It would have four additional tolled ramps: NC 279, Bud Wilson Road, Robinson Road, and US 321. It would have one additional free interchange at NC 274.

SCENARIOS C

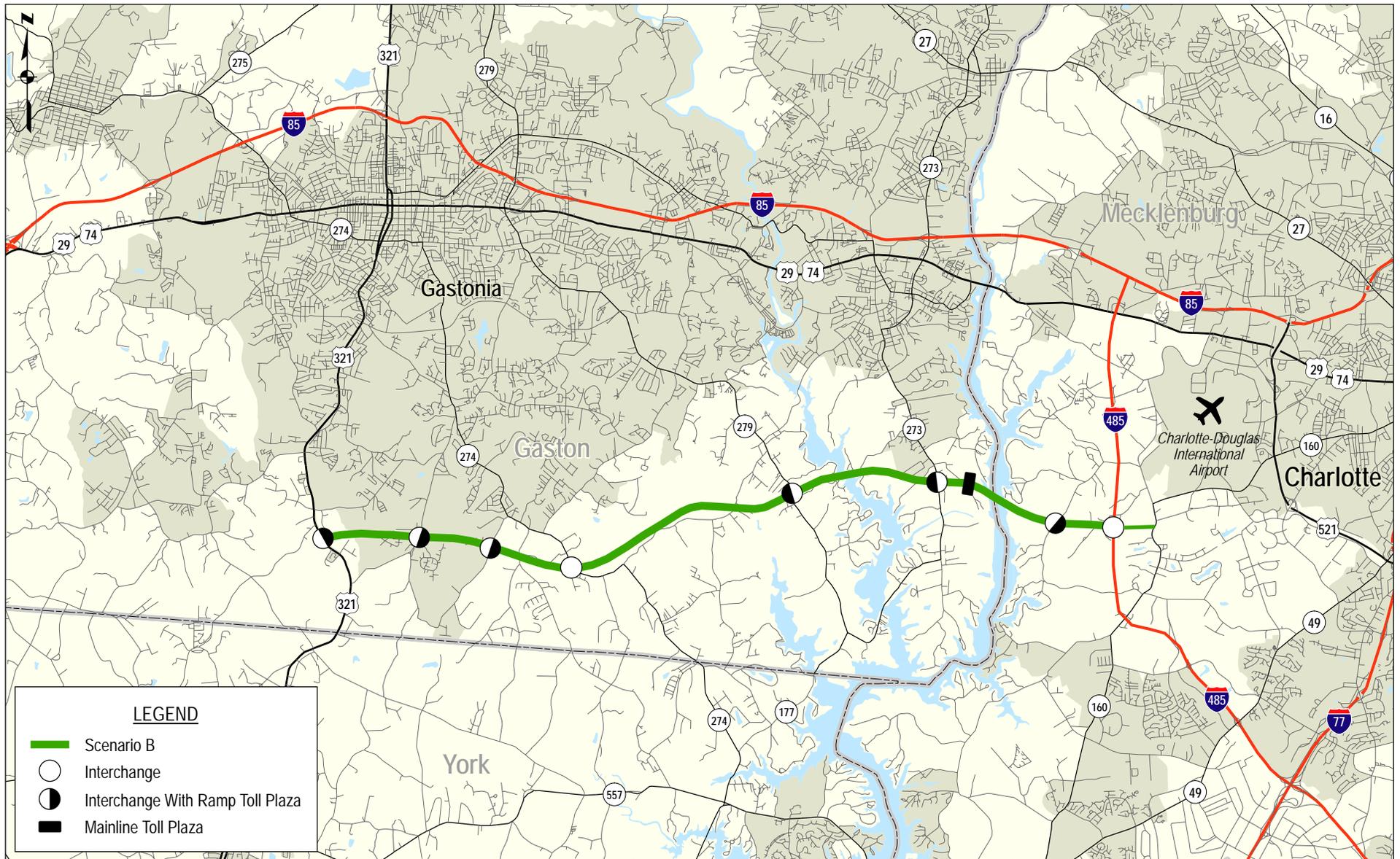
Scenario C, the full project, is shown in Figure 1-4 along with locations of its 2 mainline toll plazas. A second mainline plaza would be located between US 321 and Lewis Road. Additional tolled interchanges would include Lewis Road, Linwood Road, and US 29/74. The interchange at I-85 would not be tolled. The total length of the full project would be 14.1 miles.

SCOPE OF WORK

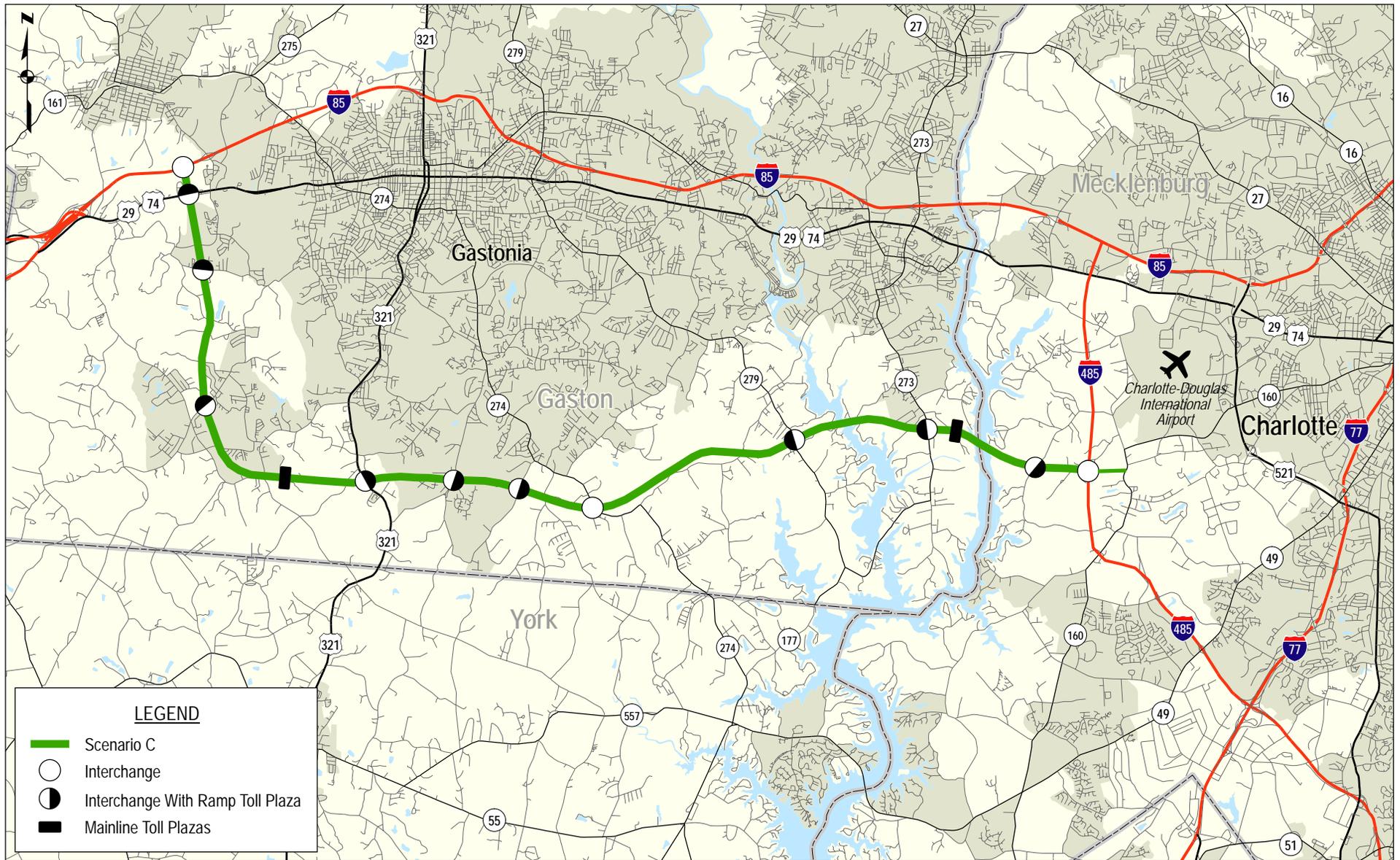
As a part of this study, inventories of the operating conditions including traffic counts and speed-delays on competing, complementary, and feeder routes within the study area were conducted. Additionally, the State Transportation Improvement Program was reviewed to determine the prospective impact of planned roadway improvements on the traffic and revenue potential of the proposed Gaston East-West Connector.

Previous reports and study materials related to the Gaston East-West Connector were reviewed also. This information included previous traffic analysis and transportation modeling analyses prepared by the Gaston Urban Area Metropolitan Planning Organization (GUMPO)

Supplemental traffic counts were conducted in the project study area. This information facilitated the calibration of the travel demand model used in the analysis and provided a “base” case count condition for use in the traffic impact analysis described below. The improvement to other roadways in the vicinity of the proposed project was taken into consideration in this preliminary study.



Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study



TRAFFIC MODEL REFINEMENT

As part of this study of the proposed Gaston East-West Connector, the most recent version of the Metrolina Regional Travel Demand Model (MRTDM) was obtained. This traffic model covers all of Mecklenburg, Union, Gaston, and Cabarrus Counties as well as adjacent portions of Stanly County.

Data obtained for the MRTDM included highway networks and trip tables for 2000, 2010, 2020, and 2030 as well as socioeconomic forecasts for each analysis year by traffic analysis zone. The base-year model was calibrated in the immediate project area to achieve the best traffic volume assignments as compared to observed volumes and speeds. The model was updated to reflect study scenarios as well as the other committed highway improvements.

A toll collection concept was developed in consultation with NCTA and HNTB, and the proposed Connector was coded into the network as a toll road. The project was coded in such a way that the project could be evaluated as separate configurations depicting the scenarios described earlier.

Information was also obtained regarding regional and study area income characteristics to aid in the development of estimated values of time for potential users of the proposed toll facility. This is a critical model parameter used to assess motorists' willingness to pay tolls and to estimate motorists' sensitivity to toll rates. Vehicle operating cost parameters were also established specifically for the study area.

CORRIDOR GROWTH ANALYSIS

Economic growth is particularly important for a start-up toll facility such as the proposed Gaston East-West Connector. The scenarios under study would provide significantly improved access to the rapidly developing southwestern Metrolina Region, which, as described further in Chapter 3, is projected to have notable increases in both population and employment over the next 25 years. As such, analysis and validation of the projected economic activity is particularly important.

The socioeconomic forecast incorporated in the MRTDM by the MPO was used in the analysis. Since this was a preliminary traffic and revenue study, an independent economic analysis was not conducted; however, an independent economic review would typically be necessary to support project financing.

TRAFFIC AND REVENUE ANALYSIS

The refined models were used to run a series of traffic assignments, both with and without the proposed Gaston East-West Connector. In each case, traffic assignments were made in the a.m. peak, p.m. peak and off-peak conditions. A review of the reasonableness of the travel demand estimates, particularly under a toll condition, using various evaluation techniques such as select link, corridor share, and capture rate was made.

Toll sensitivity curves were developed for 2010 traffic volumes to determine optimum toll rates. These optimum rates were then used to conduct traffic assignments for other years.

Based on the results of the traffic modeling analysis, annual estimates of traffic and revenue for the proposed Gaston East-West Connector were developed for the base case condition from opening year 2015 through 2030. Finally, to enable the formulation of annual traffic and revenue forecasts, revenue estimates in the early years of the projection period were adjusted to reflect “ramp-up,” a pattern of gradual build-up in demand for new toll facilities. This reflects the fact that the full demand along a facility is not typically realized when it opens, but gradually phases in over a period of two to four years.

REPORT STRUCTURE

The remainder of this report consists of three chapters.

- Chapter 2 presents the traffic conditions in the study area and surrounding area.
- Chapter 3 describes the socioeconomic characteristics of the study area.
- Chapter 4 describes the development of the traffic forecast model, assumed roadway improvements, toll scenarios, toll sensitivity, traffic and revenue forecasts, and the net toll operating revenue analysis.

CHAPTER 2

EXISTING TRAFFIC CONDITIONS

A major part of the effort involved in this phase of the study included collecting existing data and documenting the existing traffic conditions and travel behavior in order to:

- Predict future travel behavior after the proposed Gaston East-West Connector and other facilities planned over the forecast period are constructed; and
- Calibrate the travel demand model to observed traffic conditions to assure that the forecasting tools adequately replicate current conditions in the study area prior to forecasting future traffic.

To achieve these objectives, the latest travel data on traffic speeds, traffic volumes, and vehicle type in the study area were compiled. Additionally, an extensive route reconnaissance and a review of available traffic statistics on highways within the study area were conducted.

This empirical documentation of the traffic network in the study area was augmented through the collection of available traffic trend data from North Carolina Department of Transportation (NCDOT). Available information on programmed highway improvements in the study area were reviewed and incorporated into the analysis.

This chapter describes the collection of data used to characterize the operational performance of existing facilities in the Gaston East-West Connector study area that could compete with the proposed toll road. This approach is necessary because the Gaston East-West Connector is not yet built, and the only data available to calibrate the travel model are for existing facilities that would compete with the proposed toll road.

EXISTING HIGHWAY SYSTEM

The proposed Gaston East-West Connector would facilitate traffic movement in an east-west direction through southern Gaston County between I-85, US 29/74 and I-485. The facility would be located near major employment centers in Gaston County and western Charlotte, which are the dominant locations for employment in the area.

The Gaston East-West Connector would provide a new limited access roadway in an area currently served by the following major facilities both in southern Gaston County and northern York County in South Carolina.

- I-85 is the major east-west route in the Gastonia-Charlotte area. It extends from Georgia and South Carolina across the state through Charlotte and Durham to Virginia and provides access to major cities along its length. I-85 is six and eight lanes with multiple interchanges in the project vicinity. Speed limits are 60 to 65 mph in the vicinity of the proposed Gaston East-West Connector.
- US 29/74 extends east-west adjacent to and south of I-85 through Gastonia. It varies from two to four lanes with signalized and unsignalized intersections throughout its length. The posted speed limits are 35, 45, and 55 mph, but operating speeds are typically lower.
- NC 274 to the west of Gastonia (Bessemer City Road) generally provides east to west travel southwest of the Charlotte metropolitan area. It has numerous signalized intersections and is a two and four lane roadway with a 45 mph speed limit.
- US 321 (N. Chester Road and York Highway) extends from north of Gastonia into South Carolina with an interchange at I-85. It is a two to four lane roadway with 45 and 55 mph speed limits.
- Robinson Road extends from South Carolina to NC 274. It is a two lane roadway with a 45 mph speed limit.
- NC 279 (S. New Hope Road) serves north-south traffic, south of I-85. NC 279 is a two lane roadway with a 45 mph speed limit.
- South Linwood Road runs east to west, parallel to I-85. South Linwood Road is a two lane facility with a 45 mph speed limit.

- NC 274, south of Gastonia (Union Road), is primarily a north to south route. It connects Union New Hope Road to South Carolina. Union Road is a two lane undivided roadway with a posted speed limit of 45 mph.
- West Hudson Boulevard is a major east and west connector in Gastonia. It has multiple signalized and unsignalized intersections and is primarily a four lane undivided facility with a 45 mph speed limit.
- SC 557 runs primarily east to west in northern South Carolina. It is a two lane roadway with multiple unsignalized intersections. The speed limit on SC 557 is generally 55 mph.

TRAFFIC VOLUMES

Existing traffic data from the NCDOT database and supplemental data from various reports were reviewed to aid in the traffic model calibration. This information was supplemented by additional traffic counts within the Gaston East-West Connector study area corridor and other key locations.

DAILY TRAFFIC

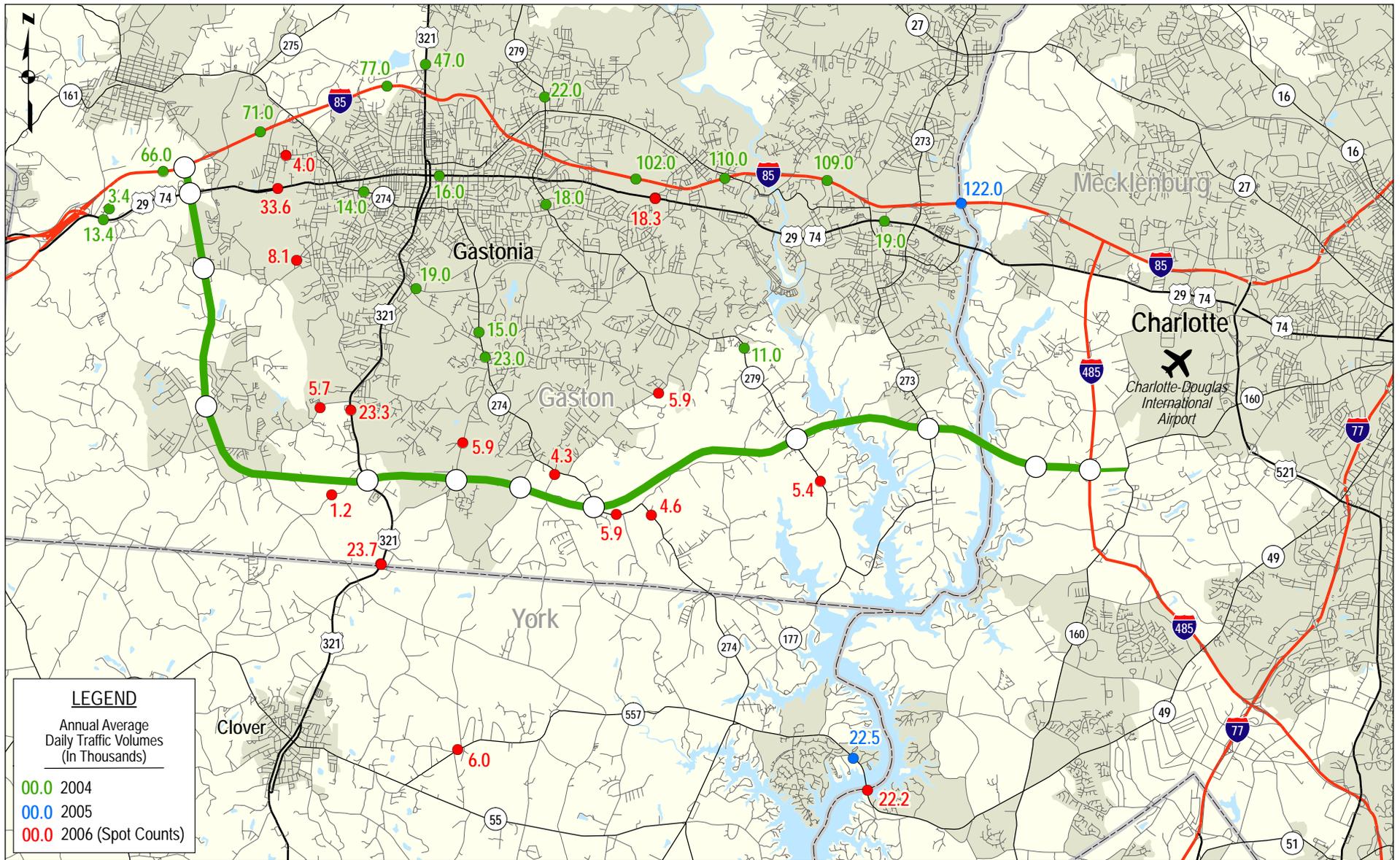
Figure 2-1 provides a summary of daily counts within the study area. All volumes are shown in thousands of vehicles. The dominant road within the study area is I-85 with daily volumes of 122,000 vehicles per day (vpd) at the eastern river crossing to 66,000 vpd east of the US 29/74 interchange.

Daily traffic volumes on major facilities south of I-85 are:

▪ US 74/29	33,600 vpd	(2006)
▪ NC 274 (Bessemer City Rd)	14,000 vpd	(2004)
▪ South Linwood Road	8,100 vpd	(2006)
▪ SC 557	6,000 vpd	(2006)
▪ Robinson Road	5,900 vpd	(2006)
▪ US 321	23,300 vpd	(2006)

Traffic counts obtained specifically for this study are shown in red in Figure 2-2. The major purpose of collecting these supplemental traffic counts was to aid in calibrating the MRTDM. This supplemental information included 7-day and 48-hour traffic count data by day, hour, and vehicle class on 15 key roads.

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ANNUAL AVERAGE DAILY TRAFFIC COUNTS AT SELECTED STUDY AREA LOCATIONS

HOURLY TRAFFIC VARIATIONS

Table 2-1 summarizes example hourly traffic percentages for eight selected locations that were studied. The peak period share of the daily traffic is shown below:

▪ Morning Peak, 3 hours (7:00 to 10:00 a.m.)	16 percent
▪ Midday Peak, 2 hours (Noon to 2:00 p.m.)	11 percent
▪ Afternoon Peak, 4 hours (4:00 to 8:00 p.m.)	<u>29</u> percent
▪ Total Peak Period	56 percent

VEHICLE CLASSIFICATIONS

As might be expected, passenger vehicles predominate on area roadways. Table 2-2 shows that 95.1 percent of the vehicles counted over a 7-day period were passenger vehicles and light trucks such as pickups. Heavy trucks constituted approximately 2 percent of the vehicles.

SPEED AND DELAY ANALYSIS

Speed and delay studies were performed on key roads in the study area:

- I-85 from NC 161 at Exit 8 to US 521 at Exit 33;
- US 29/74 at I-85 to US 521;
- NC 274 (Bessemer City Road) at I-85 to York Highway (US 321);
- York Highway (US 321) at Ferguson Ridge Road to Tulip Drive;
- Robinson Road from York Highway (US 321) to Union Road (NC 274);
- NC 279 (S. New Hope Road) at Teakwood Lane to Henry Chapel Road;
- South Linwood Road from Davis Park Road to Torence Road;
- Patrick Road from NC 274 (Union Road) to Scott Drive;
- NC 274 (Union Road) from Union New Hope Road to Duncan Drive;
- and
- West Hudson Boulevard at Davis Park Road to Armstrong Ford Road.

Studies were made during peak and off peak periods in order to provide information on average speeds for use in calibrating the traffic model. Speeds during off-peak periods were generally at or near the speed limits listed earlier.

Table 2-3 provides a summary of average observed speeds during peak periods on competing roads in the study area. The primary competing facility is I-85. Several travel time studies were made during A.M. and P.M. peak conditions. Eastbound speeds consistently averaged about 65 mph and westbound speeds averaged between 62 and 67 mph.

Table 2-1
Hourly Traffic Variations at Selected Locations

Hour	Percent of Total Day (7-day Counts)									
	Crawford Road between Ferguson Rodge Rd and US 321	Crescent Lane between Newcastle Road and Ralph Street	Crowders Creek Road between Crowders Trail and Jasper Trail	S. Linwood Road between Lake Wood Drive and Trinity Avenue	SC 557 between Bate Harvey/Griggs Glenn Road	US 74/29 between Shannon-Bradley Road and Tarkas Blvd	US 321 (York Highway) between Gateway Farm Rd and Salemview Road	US 321 (York Highway) between Hoyle Circle and Davis Heights Drive		
0:00	0.8%	1.3%	1.0%	0.5%	0.8%	0.7%	0.5%	0.5%	0.5%	0.5%
1:00	0.5%	0.7%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
2:00	0.3%	1.2%	0.2%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.3%
3:00	0.2%	0.3%	0.2%	0.0%	0.2%	0.3%	0.3%	0.3%	0.3%	0.4%
4:00	0.8%	0.6%	0.5%	0.5%	0.6%	0.3%	0.6%	0.6%	0.6%	1.5%
5:00	3.0%	2.0%	2.0%	1.5%	2.8%	1.3%	1.9%	1.9%	1.9%	3.6%
6:00	6.3%	3.7%	4.3%	3.2%	5.5%	4.2%	4.2%	4.2%	4.2%	4.5%
7:00	8.8%	4.2%	8.4%	9.0%	6.4%	6.0%	5.5%	5.5%	5.5%	5.7%
8:00	5.8%	3.7%	5.0%	5.6%	5.2%	5.4%	4.9%	4.9%	4.9%	4.7%
9:00	2.3%	4.0%	3.2%	3.9%	4.7%	4.4%	4.5%	4.5%	4.5%	4.9%
10:00	3.8%	3.8%	3.4%	3.3%	4.9%	4.8%	4.9%	4.9%	4.9%	5.3%
11:00	4.9%	3.5%	4.1%	4.4%	4.8%	5.4%	5.9%	5.9%	5.9%	5.7%
12:00	3.8%	4.7%	6.3%	4.5%	5.6%	6.0%	6.0%	6.0%	6.0%	6.4%
13:00	4.4%	5.3%	5.3%	5.0%	5.1%	5.8%	6.0%	6.0%	6.0%	5.9%
14:00	4.9%	6.0%	6.2%	6.6%	5.7%	6.9%	6.2%	6.2%	6.2%	6.8%
15:00	6.9%	6.6%	7.5%	7.2%	7.1%	7.7%	7.4%	7.4%	7.4%	7.8%
16:00	7.2%	7.2%	8.0%	7.4%	7.7%	7.6%	7.4%	7.4%	7.4%	7.5%
17:00	9.5%	7.2%	8.5%	8.9%	9.2%	8.3%	7.9%	7.9%	7.9%	7.1%
18:00	8.9%	7.2%	7.4%	8.4%	7.4%	6.0%	7.3%	7.3%	7.3%	6.2%
19:00	5.4%	6.2%	5.0%	5.7%	4.9%	4.9%	5.7%	5.7%	5.7%	5.5%
20:00	5.5%	6.7%	4.8%	6.3%	4.3%	4.9%	5.0%	5.0%	5.0%	4.1%
21:00	3.3%	5.8%	4.1%	3.8%	3.4%	4.0%	3.7%	3.7%	3.7%	2.7%
22:00	1.4%	5.1%	2.7%	2.5%	1.9%	2.6%	2.3%	2.3%	2.3%	1.7%
23:00	1.3%	3.0%	1.5%	1.2%	1.2%	1.9%	1.4%	1.4%	1.4%	0.9%
Total Day	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Counts in April, 2006.

**Table 2-2
Vehicle Classifications at Selected Locations**

Location	Between	Passenger Vehicles	Light and Medium Trucks	Heavy Trucks	Total Vehicles
US 74/29	Shannon-Bradley Road and Tarkas Blvd.	94.5%	3.3%	2.2%	100.0%
US 74/29 (EBWB)	S. Church Street and Lineberger Road	96.9%	2.0%	1.1%	100.0%
S. Linwood Road	Lakewood Drive and Trinity Avenue	97.0%	2.5%	0.5%	100.0%
York Highway (US 321)	Hoyle Circle and Davis Heights Drive	90.5%	4.8%	4.7%	100.0%
York Highway (US 321)	Gateway Farm Road and Salemview Road	92.6%	4.0%	3.4%	100.0%
Patrick Road	Union Road (NC 274) and Dorchester Road	97.2%	1.8%	1.0%	100.0%
Union Road (NC 274)	Wilson Farm Road and Lindsey Street	97.3%	2.4%	0.3%	100.0%
	Average	95.1%	3.0%	1.9%	

Source: Counts in April, 2006

**Table 2-3
Average Speeds on Selected Routes During Peak Periods**

Facility	Start Point	End Point	Direction	Distance	Average Observed Speed	
					AM Peak	PM Peak
I-85	SR 161 (exit 8)	US 521 (exit 33)	Eastbound	25.61	64.4	64.9
I-85	SR 27 (exit 34)	SR 161 (exit 8)	Westbound	25.62	67.3	61.7
US 74	I-85	US 521	Eastbound	22.05	38.7	36.4
US 74	US 521	I-85	Westbound	21.81	39.7	-
NC 274	I-85	York Highway (US 321)	Southbound	5.53	33.9	-
US 321	Ferguson Ridge Road (SR 4642)	Tulip Drive	Northbound	9.97	29.1	-
US 321	Tulip Drive	Ferguson Ridge Road (SR 4642)	Southbound	10.20	35.3	-
Robinson Rd.	York Highway (US 321)	Union Road (SR 274)	Eastbound	3.55	43.8	-
Robinson Rd.	Union Road (SR 274)	York Highway (US 321)	Westbound	3.13	48.4	-

Source: Speed-delay study in April, 2006

Traffic volumes on I-85 were quite heavy, approaching the capacity of the facility. However, relatively little congestion was observed during the travel delay studies. In future years, delays are likely to occur unless I-85 is widened. However, under current 2006 conditions, relatively little congestion was found.

Much lower average operating speeds were found on arterial roads, including US 74, which showed average speeds below 40 mph in all time periods. The lowest operating speeds were found on US 321, which averaged speeds as low as 29 mph. Most arterial facilities, which would compete with the proposed toll road, generally exhibited speed in the range of 30 to 45 mph, while the primary competing facilities such as US 29/74 operated in the range of 60 to 65 mph.

CHAPTER 3

■■■■■ CORRIDOR GROWTH REVIEW

Future economic growth potential is important for the study of any new start-up toll facility. However, for a facility such as the proposed Gaston East-West Connector, which is near Charlotte and the growing Metrolina Region, the significance of an economic analysis is particularly important.

The socioeconomic forecast developed by the GUMPO included in the MRTDM was used in the analysis. Since this was a preliminary traffic and revenue study, an independent economic analysis was not conducted; however, an independent economic analysis would be necessary for any study that would be used in support of project financing.

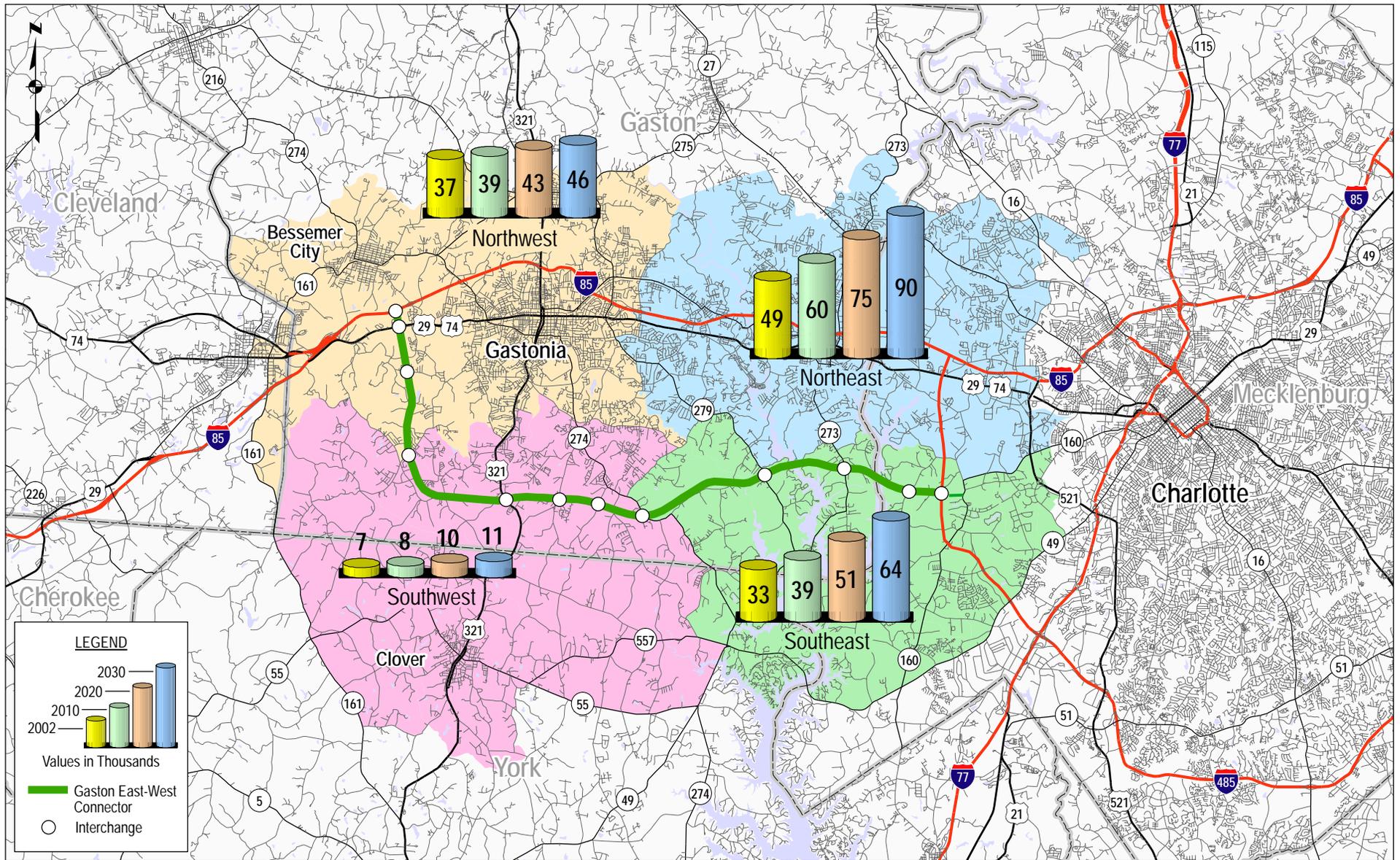
GROWTH TREND PROJECTIONS

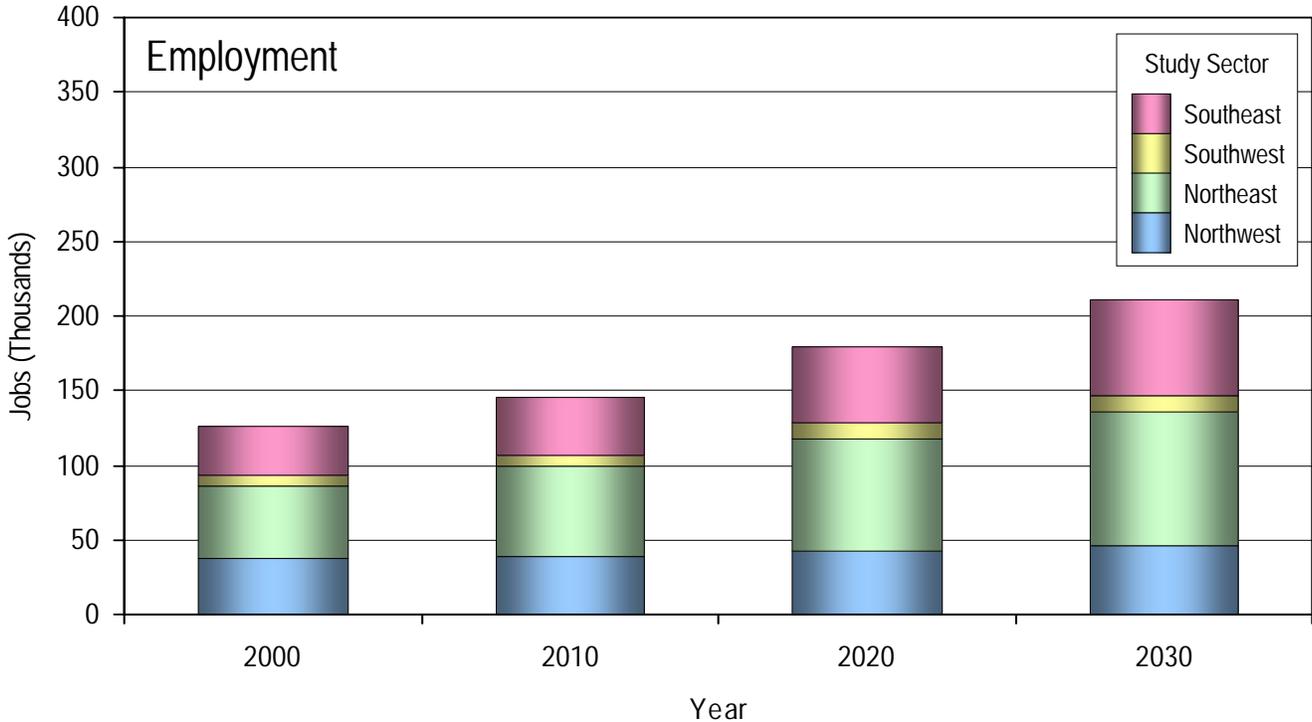
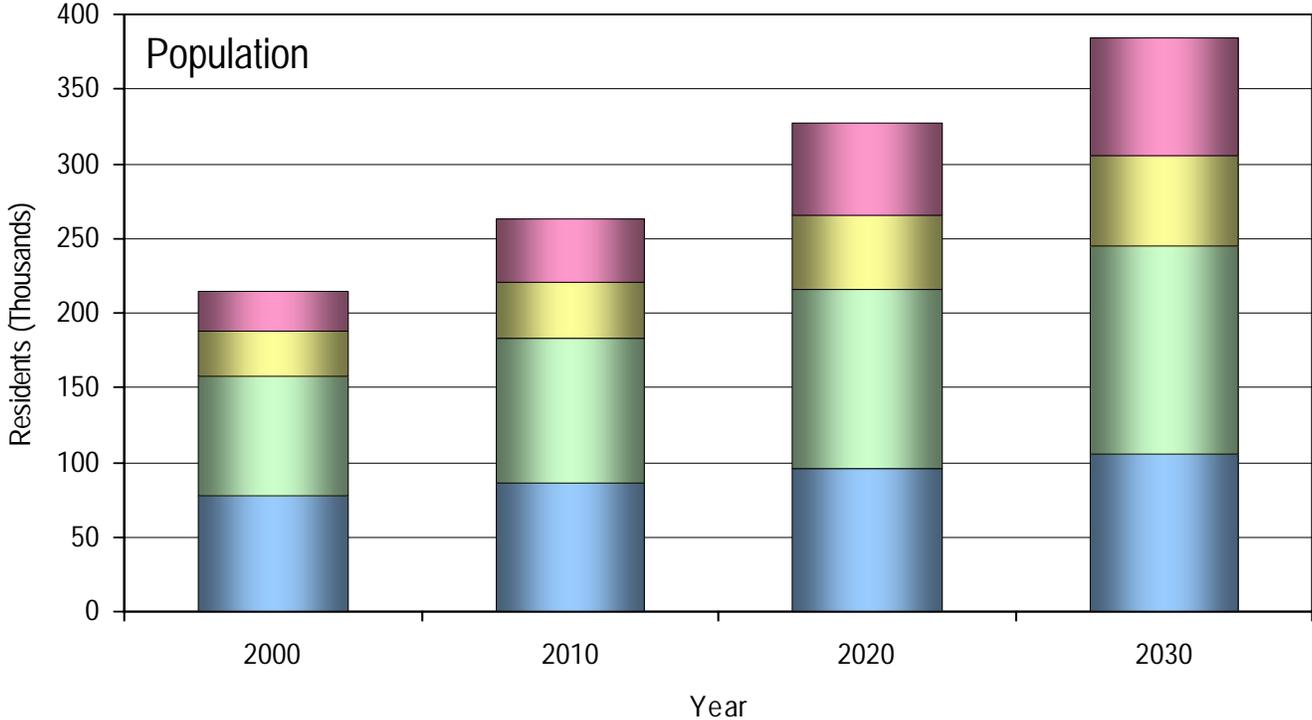
It is emphasized that the population and employment forecasts contained in the MRTDM directly relate to the traffic growth forecasted by the models. The Gaston East-West Connector and other planned highway improvements programmed for the analysis period are included in the model.

The population and employment within the Gaston East-West Connector study area is expected to grow considerably over the next three decades. Employment in the study area is expected to grow from over 126,000 jobs in 2000 to more than over 210,000 jobs by 2030. Population during the same period is expected to grow from around 214,000 to nearly 384,000. Figures 3-1, 3-2 and 3-3 depict this population and employment growth graphically.

This expansion represents an average annual growth rate of 2.0 and 1.7 percent for population and employment, respectively. The population growth rate for the study area between 2000 and 2030 is anticipated to be 36 percent higher than the population growth rate for the state.

Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study





The population projections contained in the model are slightly higher than the population projections formulated for Gaston County by the state. However, it is important to note that the methodology used by the state was based simply on historical trends using census data and estimates from a time of relative economic retraction for Gaston County.

The methodology employed by the MPO for developing population projections was considerably more detailed and based on tangible changes occurring in the area. First, the MPO assembled an expert panel which included a real estate appraiser and a representative from the Gaston County economic development commission. The expert panel assessed the development potential of the region considering existing and planned expansions of its water, wastewater, and thoroughfare systems. Finally, the MPO considered existing zoning and future land use plans, taking into account the growth pressures that are being exerted by the economic expansion of the City of Charlotte.

ECONOMIC INFLUENCE OF CHARLOTTE AND MECKLENBURG COUNTY

The proposed Gaston East-West Connector would be located in the US Census Bureau defined Metropolitan Statistical Area (MSA) of Charlotte-Gaston-Salisbury, which is estimated to have a population of just over 2 million people. The eastern terminus of the proposed Gaston East-West Connector is 6.5 miles from Charlotte's central business district. As a major employment center, the City of Charlotte and Mecklenburg County are economic drivers in the region. The Economic Development Department of the combined city/county government reports that employment in Mecklenburg County reached more than 412,000 jobs in 2005.

The City of Charlotte is the second largest banking center in the United States where, according to the Charlotte-Mecklenburg consolidated government, more than \$1 trillion of assets is controlled. Charlotte is ranked sixth in the nation for number of headquarters of Fortune 500 companies. These companies generate a combined total of \$157 billion of revenue annually and include the Bank of America, Lowe's, Wachovia Corporation, Duke Energy, and Goodrich Corporation.

The Charlotte-influenced growth in the Metrolina Region has been remarkable over the past several years. According to the US Census Bureau, the Charlotte MSA population area grew 10 percent between 2000 and 2004. Population forecasts for the Metrolina Region indicate that this growth is expected to sustain at about 2 percent per year. This population growth is likely the result of the high quality of life and the economic opportunity in the region.

Southern Gaston County is attractive to home buyers for multiple reasons. These primarily include the abundance of developable land and water resources, lower housing costs and lower tax rates. Accordingly, GUMPO anticipates that employees of the major companies and businesses in the growing Charlotte area who have chosen to live in Gaston County would be potential customers of the toll facility.

CHARLOTTE-DOUGLAS INTERNATIONAL AIRPORT

The Charlotte-Douglas International Airport is located approximately 0.5 mile northeast of the eastern terminus of the proposed Gaston East-West Connector and is readily accessed from I-485. It is the 16th largest airport in the United States logging more than 14 million passenger boardings in 2005. According to the Federal Aviation Administration's Terminal Area Forecasts, passenger enplanements at Charlotte-Douglas are expected to grow to more than 21 million by 2025. Cargo enplanements in 2005 reached nearly 7,000 tons.

Infrastructure improvements addressing freight flow and capacity are planned on the southern premises of the airport, an area known as the Charlotte Air Cargo Facility. Anticipated to open by 2009, these improvements include a rail-to-truck intermodal facility that will create a one-stop-shop for freight transfer. Also planned is a realignment of West Boulevard to provide a more direct connection from the Charlotte Air Cargo Facility to I-485 and NC 521. Additional offsite, privately-owned warehousing is expected to be built in the vicinity.

While the Metrolina Region will benefit from more efficient and coordinated movement of cargo, ground-level traffic at Charlotte-Douglas International Airport is anticipated to increase in the coming years as a result of the planned improvements. Upon completion of the Gaston East-West Connector, it is anticipated that both passenger and freight vehicles arriving at and departing from the airport could be customers of the proposed toll facility.

The Gaston East-West Connector toll road will terminate at I-485 but an access road will continue on to NC 160; which will provide direct access to the Airport, the Charlotte Air Cargo Facility, and related facilities. This direct access could generate toll traffic on the Gaston East-West Connector.

GEOGRAPHICAL SECTORS OF THE STUDY AREA

For purposes of developing population and economic forecasts, the study area was divided into four quadrants based on the traffic analysis zones contained within the MRTDM. A boundary for the study area was established to incorporate potential users of the toll facility in the Gastonia and western Charlotte areas of the Metrolina Region. Figures 3-1, 3-2 and 3-3 geographically illustrate the four study quadrants.

The west quadrant of the study area incorporates the Gastonia central business district, a new retail center in the western part of the city, and Rankin Lake Park. It extends approximately 3.6 miles north and 5.3 miles south of I-85.

The northeast quadrant includes the Charlotte-Douglas International Airport, Spencer Mountain and North Belmont Park. It is mostly contained in Gaston County and covers McAdenville, Cramerton, and Belmont. This quadrant also reaches into parts of western Mecklenburg County and includes the Town of Mount Holly. It incorporates approximately 12.6 miles of I-85 and portions of other major thoroughfares such as I-485, US 29/74, and US 521.

The southeast quadrant incorporates portions of the Catawba River, Lake Wylie, and the Daniel Stowe Botanical Gardens. Major thoroughfares in this sector include a 5.4 mile stretch of Charlotte's western portion of I-485 as well as portions of NC 49, NC 160, NC 273, NC 274, SC 55 and SC 177.

Finally, the boundaries of the southwest quadrant include southern portions of the City of Gastonia as well as portions of South Carolina between the City of York and the state line. Crowder's Mountain, a popular North Carolina State Park, is included in the southwest quadrant as is King's Mountain, a famous National Military Park and South Carolina State Park. Visitors to these recreational facilities are potential customers of the proposed Gaston East-West Connector. The Gastonia Municipal Airport is also situated in this sector of the study area. Major thoroughfares include US 321 and portions of NC 274.

POPULATION FORECASTS

Table 3-1 summarizes population growth within the Gaston East-West Connector study area in comparison to the rest of the Metrolina Region.

**Table 3-1
Study Area Population Projections**

Study Area Quadrant	2000		2010		2020		2030		2000-2030	
	Population	Average Annual Growth	Population	Average Annual Growth						
Northwest	77,926	1.0%	86,209	1.1%	95,933	0.9%	105,398	1.0%	35.3%	1.0%
Northeast	78,919	2.1%	97,416	2.1%	119,620	1.6%	139,982	1.9%	77.4%	1.9%
Southwest	30,890	2.0%	37,826	2.8%	49,644	1.9%	59,811	2.2%	93.6%	2.2%
Southeast	26,427	4.8%	42,384	3.7%	61,165	2.6%	78,707	3.7%	197.8%	3.7%
Total Study Area Population	214,162	2.1%	263,835	2.1%	326,362	1.6%	383,898	2.0%	79.3%	2.0%
Percent of Metrolina Region	12.7%		12.5%		12.5%		12.3%			
Gaston County	190,365	1.3%	216,603	1.5%	251,884	1.5%	292,063	1.4%	53.4%	1.4%
Total Metrolina Region Population	1,683,668	2.3%	2,106,216	2.1%	2,603,825	1.8%	3,117,160	2.1%	85.1%	2.1%
Study Area Quadrant										
Northwest	8,283	9,724	9,465	27,472						
Northeast	18,497	22,204	20,362	61,063						
Southwest	6,936	11,818	10,167	28,921						
Southeast	15,957	18,781	17,542	52,280						
Total Study Area Population Change	49,673	62,527	57,536	169,736						
Gaston County Change	26,238	35,281	40,179	101,698						
Metrolina Region Population Change	422,548	497,609	513,335	1,433,492						

Source: Metrolina Regional Transportation Demand Model

In 2000, the Metrolina Region had approximately 1.7 million residents with just over 214,000 people (12.7 percent) residing within the Gaston East-West Connector study area. By 2030, the regional population is forecast to grow to about 3.1 million people, and the study area population to more than 384,000. The average annual growth rate of the study area is projected at 2.0 percent, which is practically the same rate of growth expected for the Metrolina Region.

Figure 3-1 provides a pictorial representation of the projected growth by sector. The northwest quadrant of the Gaston East-West Connector study area is expected to have the lowest population expansion with a growth rate of one percent annually between 2000 and 2030. The northeast and southwest quadrants of the study area are expected to exhibit rates of growth near the area's average of 2 percent between 2000 and 2030.

The southeast quadrant, however, is anticipated to grow the fastest with projections at a 4.8 percent average annual increase through 2010. This growth is expected to sustain with a 3.7 average annual growth rate through 2030. This pattern would be expected to generate significant demand along the eastern portions of the Connector and across the Catawba River Bridge, in particular.

EMPLOYMENT FORECASTS

Employment in the Gaston East-West Connector study area represented 14 percent of the region in 2000, but is expected to decline slightly to about 12.4 percent of the region by 2030. However, as shown in Table 3-2 and Figure 3-2, increases in employment will still be notable, growing from 126,000 employees in 2000 to nearly 211,000 employees in 2030. This represents a 1.7 percent average annual growth rate in comparison to the regional growth rate of 2.1 percent per annum, which is forecast to increase from about 901,000 employees in 2000 to more than 1.7 million in 2030.

While employment growth is anticipated throughout the study area, the northeast quadrant is expected to add the most jobs (40,000 new jobs between 2000 and 2030). This is likely due to its proximity to the northern suburban area of Charlotte and the ripple effect of economic development. Accessibility to I-85 is a factor, although additional employment would further increase congestion on this heavily traveled route.

**Table 3-2
Study Area Employment Projections**

Study Area Quadrant	2000		2010		2020		2030		2000-2030	
	Employment	Average Annual Growth	Total Growth	Average Annual Growth						
Northwest	37,118	0.5%	38,993	0.9%	42,523	0.8%	45,961	0.7%	8,843	23.8%
Northeast	49,399	2.0%	60,318	2.2%	75,066	1.8%	89,739	2.0%	40,340	81.7%
Southwest	6,975	1.0%	7,693	2.4%	9,723	1.7%	11,489	1.7%	4,514	64.7%
Southeast	32,717	1.9%	39,383	2.6%	50,903	2.2%	63,528	2.2%	30,811	94.2%
Total Study Area Employment	126,209	1.5%	146,387	2.0%	178,215	1.7%	210,717	1.7%	84,508	67.0%
Percent of Region	14.0%		13.4%		12.8%		12.4%			
Gaston County Total Metrolina Region Employment	69,850	0.7%	75,063	1.4%	86,214	1.2%	96,753	1.1%	26,903	38.5%
	901,814	1.9%	1,089,552	2.5%	1,394,951	2.0%	1,702,272	2.1%	800,458	88.8%
Study Area Quadrant	2000-2010		2010-2020		2020-2030		2000-2030			
Northwest	1,875	3,530	3,438	8,843						
Northeast	10,919	14,748	14,673	40,340						
Southwest	718	2,030	1,766	4,514						
Southeast	6,666	11,520	12,625	30,811						
Total Study Area Employment Change	20,178	31,828	32,502	84,508						
Gaston County Change	5,213	11,151	10,539	26,903						
Metrolina Region Population Change	187,738	305,399	307,321	800,458						

Source: Metrolina Regional Transportation Demand Model

The most rapid rate of employment growth is predicted for the southeast quadrant (2.2 percent average annual growth over the study period). The greatest annual employment expansion expected for the southwest quadrant would occur between the years 2010 and 2020 (2.6 percent per year). This coincides with the first decade of the proposed tollway being open to traffic.

The northeast quadrant of the study area with the lowest employment growth also has the lowest rate of population growth. Jobs are anticipated to grow only about 0.7 percent over the study period.

NUMBER OF HOUSEHOLDS

The growth in the number of households in the study area is relative to the growth in population. Table 3-3 summarizes the households as contained in the MRTDM.

In 2000, the number of households in the study area was estimated at nearly 83,000, which is 12.8 percent of the regional households. By 2030 the number of the households in the study area is expected to increase by nearly 67,000, which is a growth of almost 45 percent. This equates to an annual average growth rate of 2 percent annually, which is nearly equal to the 2.1 percent annual growth rate for the region. Persons-per-household would remain steady at 2.6 throughout the study period.

The highest growth rate in the number of households is expected to be in the southeast quadrant of the Gaston East-West Connector study area with 3.7 percent annual growth between 2000 and 2030.

HOUSEHOLD INCOME

Average household incomes are summarized by quadrant in Table 3-4 (all values shown are in 2000 dollars). In 2000, the average household income in the Metrolina Region was \$58,338. The Gaston East-West Connector study area average household income was \$51,446 in 2000 and is anticipated to increase to 53,697 in 2030, which would be about 89 percent of the Metrolina Region average household income. By 2030, the household income for the region is anticipated to increase to \$60,082.

A closer look at each of the four quadrants of the study area reveals that the household income in the southeast quadrant, the quadrant closest to Charlotte, is 114 percent of the regional average in 2030.

**Table 3-3
Study Area Household Projections**

Study Area Quadrant	2000		2010		2020		2030		2000-2030	
	Households	Average Annual Growth	Households	Total Growth						
Northwest	30,477	1.1%	33,890	1.1%	37,698	0.9%	41,284	1.0%	10,807	35.5%
Northeast	30,833	2.2%	38,235	2.1%	47,088	1.6%	55,126	2.0%	24,293	78.8%
Southwest	11,237	2.2%	14,026	2.9%	18,634	1.9%	22,585	2.4%	11,348	101.0%
Southeast	10,393	4.9%	16,722	3.7%	24,047	2.6%	31,029	3.7%	20,636	198.6%
Total Study Area Number of Households	82,940	2.2%	102,873	2.2%	127,467	1.6%	150,024	2.0%	67,084	80.9%
Percent of Metrolina Region	12.8%		12.7%		12.7%		12.5%			
Gaston County	73,936	1.4%	85,045	1.5%	99,126	1.5%	114,804	1.5%	40,868	55.3%
Total Metrolina Region Number of Households	646,204	2.3%	810,769	2.2%	1,003,850	1.8%	1,200,352	2.1%	554,148	85.8%
Study Area Quadrant	2000-2010		2010-2020		2020-2030		2000-2030			
Northwest	3,413	3.808	3,808	3.586	10,807	3.586	10,807	10,807		
Northeast	7,402	8.853	8,853	8.038	24,293	8.038	24,293	24,293		
Southwest	2,789	4.608	4,608	3.951	11,348	3.951	11,348	11,348		
Southeast	6,329	7.325	7,325	6.982	20,636	6.982	20,636	20,636		
Total Study Area Number of Households Change	19,933	24,594	22,557	67,084	67,084	67,084	67,084	67,084		
Gaston County Change	11,109	14,081	15,678	40,868	40,868	40,868	40,868	40,868		
Metrolina Region Number of Households Change	164,565	193,081	196,502	554,148	554,148	554,148	554,148	554,148		

Source: Metrolina Regional Transportation Demand Model

**Table 3-4
Study Area Annual Household Income
2000 Dollars**

Study Area Quadrant	2000	2010	2020	2030
Northwest	\$44,532	\$44,801	\$44,990	\$51,966
Northeast	51,524	51,750	51,900	51,966
Southwest	53,999	53,707	53,624	53,485
Southeast	68,734	69,698	69,142	68,262
Total Study Area	51,446	52,645	53,361	53,697
Percent of Metrolina Region	88.2%	88.4%	89.0%	89.4%
Gaston County	48,955	49,273	49,687	50,051
Metrolina Region	58,338	59,554	59,967	60,082

Source: Metrolina Regional Transportation Demand Model

SOCIOECONOMIC CONCLUSIONS

This chapter summarizes the socioeconomic forecasts that underlie the traffic and revenue forecasts presented in the next chapter.

In general, the study area is forecast to exhibit relatively high economic growth based on the socioeconomic forecasts contained in the MRTDM. Strongest growth in the study period is between 2000 and 2010, and is expected in the southeastern and southwestern quadrants.

A prudent observer would want to confirm that these basic socioeconomic growth rates can be sustained. As this analysis is considered to be preliminary in nature and not to be used in support of project financing, the socioeconomic forecasts (as well as other parameters and techniques) will be subject to considerable review in any subsequent, more detailed study.

CHAPTER 4

TRAFFIC AND REVENUE ANALYSIS

Chapter 4 presents a summary of the traffic and revenue analysis conducted for the proposed Gaston East-West Connector. In addition to an overview of the travel demand modeling process, this chapter also presents information on the regional highway improvement program, basic assumptions upon which the traffic and revenue forecasts are based, a toll rate sensitivity analysis, and traffic and revenue forecasts for the proposed Gaston East-West Connector.

TRAFFIC MODEL DEVELOPMENT AND REFINEMENT

The Charlotte Department of Transportation maintains the Metrolina Regional Travel Demand Model (MRTDM) that was used for this preliminary traffic and revenue analysis. The GUMPO used this model to develop the regional 2030 Transportation Improvement Program, which contains the highway projects identified for construction through 2030. Certain refinements and adjustments were made to the MRTDM in order to conduct this analysis. This section describes the model refinement process.

Data obtained from the MRTDM included highway networks and trip tables for years 2000, 2006, 2015, 2020, and 2030 as well as socioeconomic forecasts for each year by traffic analysis zone. The model was calibrated in the base year (2002) to achieve the best traffic volume assignments in the study area in comparison to observe traffic counts and speeds. The model also was updated to reflect the proposed Gaston East-West Connector as a tolled facility.

Highways proposed for improvement in the model were compared with proposed roadway improvements in the State Transportation Improvement Program and in the MPO's Long Range Transportation Plan. Special attention was paid to proposed roadway improvements within the Gaston East-West Connector study area. Detailed coding was added to represent the interchanges and toll plaza locations.

The model was run for the base year using inputs supplied by the MPO. Traffic assignments from the model run were compared with ground counts supplied by the NCDOT and those collected specifically for this study. Adjustments were made to the input data regarding speeds and trips within the project study area in order to improve the calibration of the model.

The 2002 trip tables provided with the model consistently showed a general “over assignment” of traffic crossing the Catawba River. Minor refinements to network speeds and other link characteristics were made and a “global” reduction in trips crossing the Catawba River was made using a select link technique. This same downward adjustment factor was made to the future-year trip tables, also, to eliminate the possibility of over assignments across this critical river screenline.

The future-year trip tables used in this analysis were developed by the Charlotte Department of Transportation assuming the proposed Gaston East-West Connector was open to traffic. This resulted in an improved trip distribution, primarily because the project provides a major new river crossing south of I-85.

After the best calibration was obtained, a series of traffic assignments were made at the future years of 2015, 2020, and 2030 under no build, toll free, and tolled conditions. Several toll rates were tested for the years 2015 and 2030 in order to estimate the optimum toll rates.

Toll traffic assignments were made using a diversion assignment technique. This process involved a comparison of travel time and distance for trips that might use the Gaston East-West Connector with the best toll-free alternative routes. The estimated share of total traffic that would be expected to use the facilities is a function of travel time and distance savings. A monetary value was placed on these savings, and the cost was compared to the toll rate being tested in any given assignment. In general, as the total costs to use the proposed Gaston East-West Connector increased, in comparison to the best alternative routes, the share of traffic on the Gaston East-West Connector decreased. At lower toll levels, a higher share would be estimated.

The model recognizes capacity constraints on roadways. Speeds were adjusted in future conditions to reflect increasing congestion on the toll facility and the competing free roadways. The proposed Gaston East-West Connector was assumed to be four lanes at all locations for purposes of this preliminary analysis.

BASIC ASSUMPTIONS

The preliminary traffic and revenue estimates for the Gaston East-West Connector are predicated on the following basic assumptions, which are considered reasonable for purposes of this preliminary analysis:

1. The scenarios analyzed would be opened to traffic by January 1, 2015.
2. Improvements in the current state and regional Transportation Improvement Program, including some widening of competing routes were assumed to be implemented.
3. The necessary environmental analysis for the project would be completed in sufficient time to allow for the design and construction of the facility as a toll road.
4. Toll rates and tolling plaza locations would be as shown in this report.
5. No other competing facilities or additional capacity would be constructed during the project period other than those in the current Transportation Improvement Program.
6. For purposes of this preliminary analysis, both cash and electronic toll collection options would be available at all toll plaza locations, although it is assumed that at least 75 percent of users would use electronic toll collection.
7. Economic growth in the study area, and associated travel demand would be as represented in the Metrolina Regional Travel Demand Model used in this analysis.
8. Inflation would average 2.5 percent per year.
9. The Gaston East-West Connector would be effectively signed and promoted to encourage maximum usage.
10. Motor fuel would remain in adequate supply and no national or regional emergency would arise that would abnormally restrict the use of motor vehicles.

Any significant departure from these basic assumptions could materially affect traffic and revenue estimates for the proposed Gaston East-West Connector.

ROADWAY IMPROVEMENTS

Travel behavior and traffic volumes on the proposed Gaston East-West Connector in the future would be heavily influenced by the operating conditions of other area roadways. The process of transportation project development and funding makes it impossible to know with certainty which proposed transportation improvements will be implemented and when. However, it is important that reasonable assumptions are made regarding future improvements, since such improvements could have a substantial effect on the number of vehicles using the Gaston East-West Connector.

The MRTDM contains all future highway improvements listed in the MPO's fiscally constrained 2030 Long Range Transportation Plan. A list of the planned road improvements that could affect traffic volumes on the Gaston East-West Connector is provided in Table 4-1. The improvements that would have the most significant impact on the operations of the Gaston East-West Connector and the year that they are programmed for construction in the MRTDM include:

- **Model Year 2020**
 - New Roads – Belmont – Mt. Holly Loop, Lineberger Road from US 29/74 to Gastonia - Mt. Holly Connector;
 - Widening of NC 274 (Union Road) from Robinson Road to Beaty Road;

- **Model Year 2030**
 - New Road – Garden Parkway (free extension of Gaston East-West Connector) from I-85 to US 321 north of Dallas;
 - Replacement of US 29/74 bridge over the Catawba River; and
 - Widening of Lowell-Bethesda Road/Beaty Road and NC 273 (Southpoint Road from Lower Armstrong Road to R.L. Stowe Boulevard).

**Table 4-1
Major Highway Improvements Contained in
Metrolina Regional Transportation Travel Demand Model**

Name and Location	Project Description	Model Year
NC 274 Widening (Phase 2)	NC 274 (Dallas-Bessemer City Highway) to US 29/74 (Franklin Boulevard), 2-Lane to 5-Lane	2010
NC 274 Widening (Phase1)	Main Avenue (Bessemer City) to NC 274 (Dallas-Bessemer City Highway), 2-Lane to 5-Lane	2010
NC 274 (Union Road)	Niblick Drive to Osceola Street, 4-Lane to 5-Lane	2020
NC 279 (New Hope Road)	Burtonwood Drive-Garrison Boulevard to Robinwood Road-Armstrong Park Road, 4-Lane to 5-Lane	2020
NC 274 (Union Road)	Robinson Road to Beaty Road, 2-Lane to 4 & 5 Lane	2020
US 321 (York Road)	Hudson Boulevard to Beam Avenue, 4-Lane to 5-Lane	2020
NC 274 (New Hope Road)	Titman Road to Union-New Hope Road, 2-Lane to 5-Lane	2020
US 29/74 (Franklin Boulevard west bound)	Cox Road to Church Street, 6-Lane to 7-Lane	2020
Groves Street/Lowell-Bethesda Road	Groves Street to Lowell-Bethesda Road, 2-Lane to 4-Lane	2020
Titman/Cramerton Road	NC 297 (New Hope Road) Woodlawn Avenue, 2-Lane to 4-Lane	2020
Belmont-Mt. Holly Loop	South Point Road to Eagle Mill Road, 4 New Lanes	
Belmont-Mt. Holly Loop	Eagle Mill Road to Gastonia-Mt. Holly Connector, 4 New Lanes	2020
Lineberger Road	US 29/74 (Franklin Boulevard) to Gastonia-Mt. Holly Connector, 4 New Lanes	2020
North Dallas Loop	NC 279 (New Hope Road) to NC 279 (Dallas Cherryville Highway), 2-Lane to 3-Lane	2020
US 29/74 South Fork River Bridge	Market Avenue to Albert Avenue, 4-Lane to 6-Lane	2020
Garden Parkway	I-85 to US 321 (north of Dallas), 4 New Lanes	2030
US 29/74 Catawba River Bridge	NC 7 (Catawba Street) to Mecklenburg County, 4-Lane to 6-Lane	2030
Lowell-Bethesda Road/Beaty Road	NC 274 (Union Road) to Westover Street, 2-Lane to 5-Lane	2030
Puttes Chapel Road Widening	Maine Avenue to NC 274 Bypass, 2-Lane to 3-Lane	2030
Gastonia-Mt. Holly Connector	Aberdeen Boulevard to NC 27 (Charles Raper Jonas Highway), 4 New Lanes	2030
Ratchford Road/US 321 Interchange	Ratchford Road to US 321 (North of Dallas)	2030
Market Avenue	Eighth Avenue to US 29/74 (Franklin Boulevard), 2-Lane to 3-Lane	2030
Spencer Mountain Road	NC 7 (Ozark Avenue) to Central Avenue, 2-Lane to 4-Lane	2030
ND 274 Bypass	NC 274 Bessemer City Highway) to Costner School Road, 3 New Lanes	2030
NC 273 (South Point Road)	NC 237 (Lower Armstrong Road) to NC 237 (R.L. Stowe Boulevard), 2-Lane to 4-Lane	2030
Mitchem Road Extension	NC 7 (Ozark Avenue) to Mitchem Road, 2 New Lanes	
Crowders Mountain Parkway	US 29/74 (Franklin Boulevard) to Edgewood Drive, 3 New Lanes	2030
Stanley Southern Connector	NC 27 (Dallas Stanley Highway) to NC 27 (Charles Raper Highway)	2030
NC 279 (Dallas Cherryville Highway)	Old US 321 to Costner School Road, 2-Lane to 5-Lane	2030
Belmont-Mt. Holly North Loop & Bridges	NC 273 east of 273 to Catawba River, New 4-Lane	2030

Source: 2030 Long Range Transportation Plan.
Gaston Urban Area Metropolitan Planning Organization.

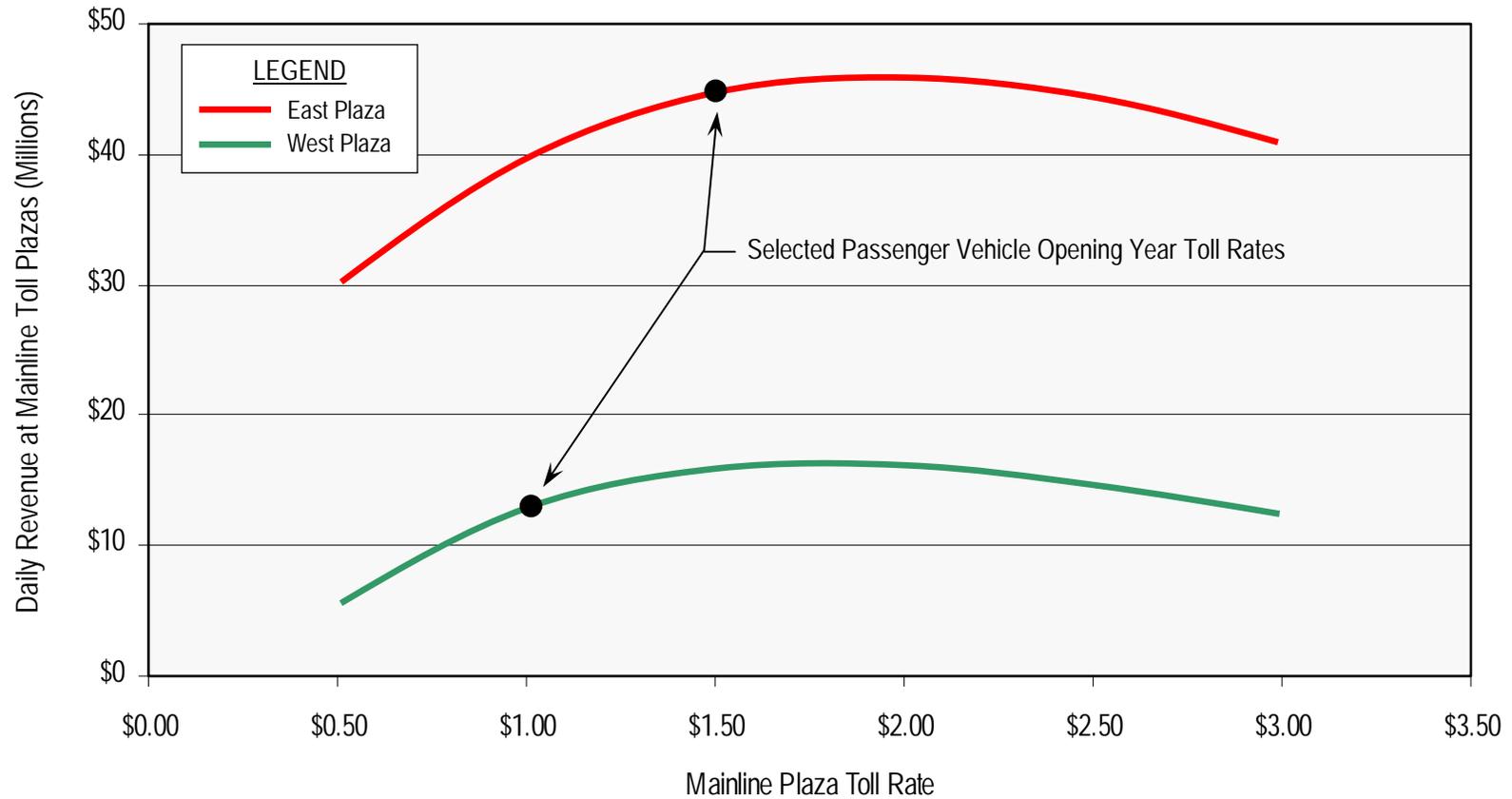
Several of these highway improvements would either compete directly with or complement the proposed Gaston East-West Connector. For example, the Lowell-Bethesda Road/Beaty Road widening would provide additional north-south capacity that could attract additional toll road users at the nearby interchange. Similarly, the northern extension of the Gaston East-West Connector could attract users from the northern part of Gaston County. The replacement of the US 29/74 Catawba River Bridge could provide additional capacity at the river and make the US 29/74 route more attractive than it would be otherwise.

TOLL RATES AND CONFIGURATIONS

As described previously, each of the three scenarios were studied assuming use of a “closed barrier” toll collection system concept. Scenario C would include two mainline plazas and a series of ramp tolls at selected interchange locations. Scenarios A and B are shorter than Scenario C and would have only one mainline plaza and fewer ramp toll plazas.

A toll sensitivity analysis was undertaken using Scenario C. It was assumed that optimum rates would be similar for each of the other scenarios. The results of the toll sensitivity analysis are shown in Figure 4-1. The two mainline plazas are shown separately, with the west plaza shown in green and the east plaza shown in red. Considerably higher traffic and revenue potential is shown at the east plaza location, due both to anticipated high levels of development in this area and to the lack of competing facilities crossing the Catawba River. The selected optimum toll rates for opening year 2015 is shown at \$1.50 at the east plaza and \$1.00 at the west plaza. While slightly higher revenue could be obtained at higher toll rates at each location, it is prudent to select an optimum rate slightly below the maximum point on the curve to allow for future revenue enhancement through toll increases.

The “through-trip” toll for vehicles using the entire facility would be \$2.50 (passenger cars). This is equivalent to an average toll rate per mile of \$0.112. As shown in Table 4-2, this would be in the low end of the range of toll rates now in effect on urban toll facilities nationwide. It is also important to recognize that the toll rates shown in Figure 4-1 are in year 2015 dollars. Toll rates on the facilities shown in Table 4-2 will likely have increased by 2015.



**Table 4-2
Comparison of Per-Mile Rates for Selected Urban Toll Roads
Passenger Car Toll Rates**

Facility	Length (1) (miles)	Cash	ETC	Per Mile Rate: Cash	Per Mile Rate: ETC
Barrier Systems					
San Joaquin Hills Transportation Corridor - CA (Peak)	15.0	\$4.25	\$3.50	\$0.2833	\$0.2330
San Joaquin Hills Transportation Corridor - CA (Off-Peak)	15.0	\$3.75	\$3.00	\$0.2500	\$0.2000
Eastern Transportation Corridor (East Leg) - CA	16.9	\$4.00	\$3.50	\$0.2367	\$0.2071
Gratigny Expressway	5.4	\$1.25	\$1.00	\$0.2315	\$0.1852
E-470 - Colorado	46.1	\$9.75		\$0.2115	
Northwest Parkway - CO	9.5	\$2.00		\$0.2105	
Foothill Transportation Corridor - CA	13.5	\$2.75	\$2.50	\$0.2037	\$0.1852
Dulles Greenway - Virginia	14.0	\$2.70		\$0.1929	
Richmond Expressway- Downtown	2.6	\$0.50		\$0.1923	
Holland East West Expressway - Florida	21.0	\$3.75		\$0.1786	
Don Shula Expressway	7.3	\$1.25	\$1.00	\$0.1712	\$0.1366
Richmond Expressway - Virginia	6.3	\$1.00		\$0.1587	
Airport Expressway - Florida (2)	4.1	\$1.25	\$1.00	\$0.1520	\$0.1219
Tampa South Crosstown Expressway -Florida	15.5	\$2.25	\$1.75	\$0.1452	\$0.1129
Richmond Expressway Powhite Pkwy	3.8	\$0.50		\$0.1316	
Sam Houston Tollway - Texas (5)	60.0	\$7.50	\$6.00	\$0.1250	\$0.1000
President George Bush Turnpike - Texas	30.5	\$3.75	\$3.00	\$0.1230	\$0.0984
Hardy Toll Road - Texas	21.7	\$2.50	\$2.00	\$0.1152	\$0.0922
Gaston East-West Connector (Scenario C)	22.3	\$2.50		\$0.1121	
Dallas North Tollway	22.0	\$2.25	\$1.80	\$0.1023	\$0.0818
Dulles Toll Road - Virginia	13.0	\$1.25		\$0.0961	
Kilpatrick Turnpike - Oklahoma City, Oklahoma	24.5	\$2.00	\$1.90	\$0.0816	\$0.0776
Creek Turnpike - Tulsa, Oklahoma	35.2	\$2.45	\$2.30	\$0.0696	\$0.0653
East-West Expressway (2)	11.8	\$1.25	\$1.00	\$0.0530	\$0.0847

(1) Full-length trip on the facility
(2) Round-trip toll and distance (one-way toll system).

The use of a differential toll rate between the east and west mainline plaza may be easily justified by the presence of the major river crossing at the east plaza location. Motorists tend to expect to pay higher rates for major bridge crossings; and it is likely that a disproportionate share of project costs would be associated with this section of the proposed Connector. By contrast, the western portions of the Connector would be constructed in less developed areas, with more competing routes and lower levels of economic activity.

Toll rates at ramp plazas would be proportionally lower than the mainline rates shown in Figure 4-1. In addition, tolls for larger commercial vehicles would be higher.

TOLL CONCEPTS AND RATES

Table 4-3 shows the rates used at the mainline plazas for the Gaston East-West Connector for the opening year through 2030. Rates at the eastern mainline plaza would start at \$1.50 and increase to \$2.50 with increases assumed in 2020, 2025 and 2030. Similarly the rates at the western mainline plaza would begin at \$1.00 and increase to \$2.00.

<u>Year</u>	<u>Scenario C Only Western Plaza</u>	<u>All Scenarios Eastern Plaza</u>
2015	\$1.00	\$1.50
2020	\$1.25	\$1.75
2025	\$1.50	\$2.00
2030	\$2.00	\$2.50

Rates for the ramp plazas would be proportionately lower. Figures 4-2 through 4-4 show the rates at each plaza for the three scenarios for 2015 and 2030. All rates are in future-year dollars; that is, already adjusted for inflation, assumed for this study to average 2.5 percent per year. The increase in tolls between the opening year and the later years of operation is slightly greater than the direct effect of inflation, reflecting the significant increases in traffic demand, which require a “real increase” in rates beyond inflation.

Rates shown in these figures are for passenger cars; trucks would have proportionally higher toll rates. In developing revenue estimates for this preliminary study, it was assumed that truck rates would average 2.5 times passenger car rates at each toll plaza location.

ESTIMATED WEEKDAY TRAFFIC VOLUMES

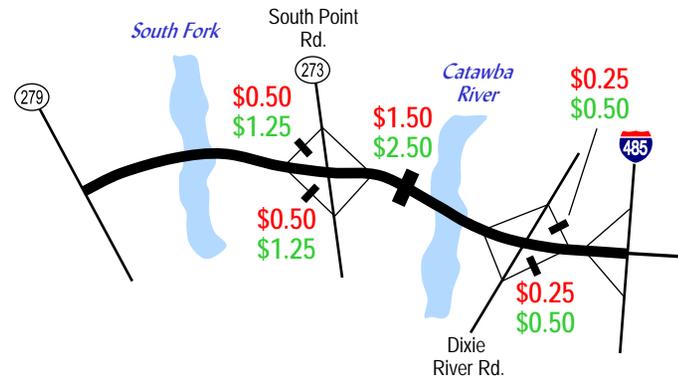
Preliminary estimates of weekday toll traffic on the proposed Gaston East-West Connector are shown for years 2015 and 2030 in Figures 4-5, 4-6

Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study



LEGEND

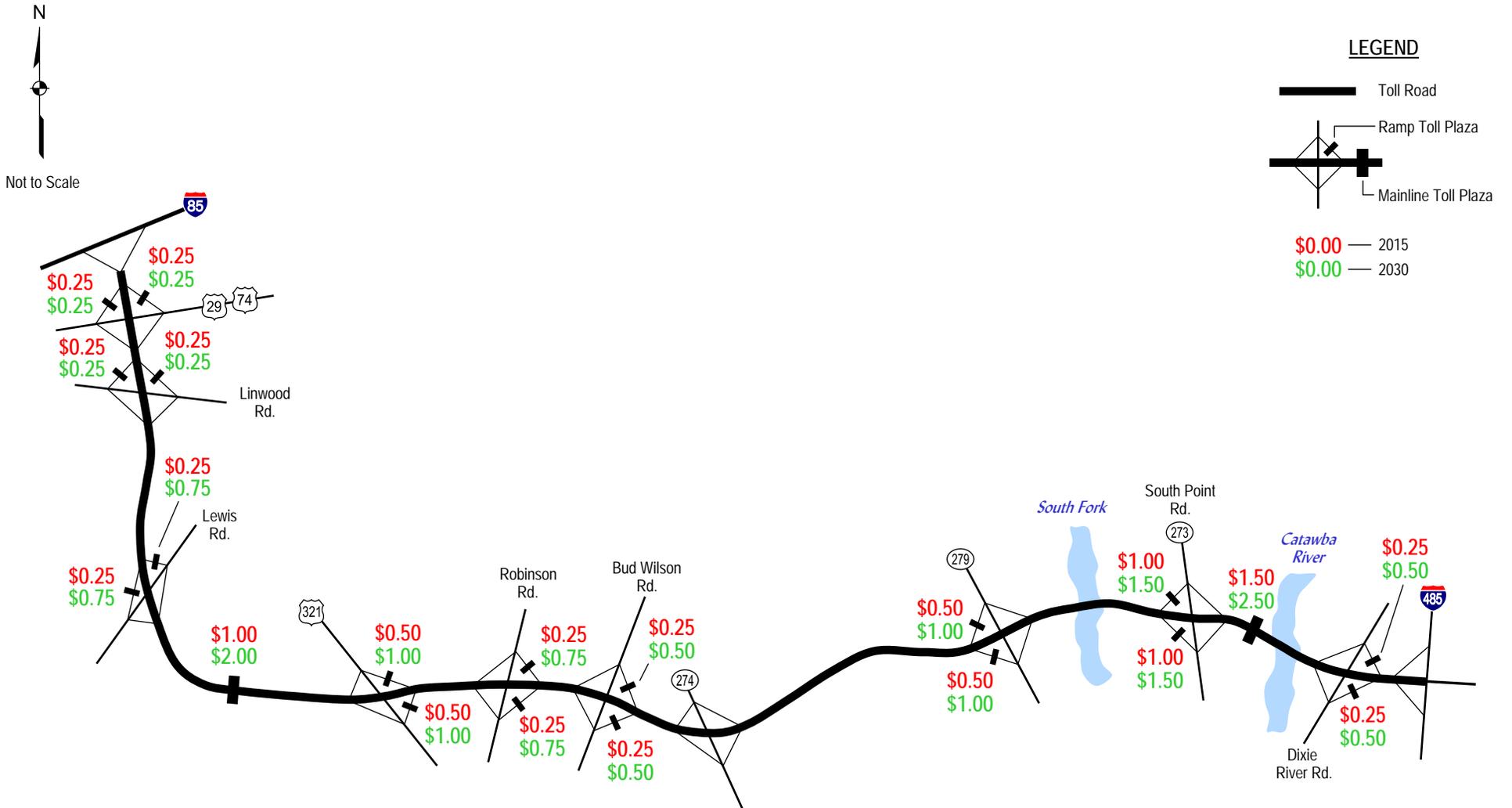
- Toll Road
- Ramp Toll Plaza
- Mainline Toll Plaza
- \$0.00 — 2015
- \$0.00 — 2030



Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study



Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study

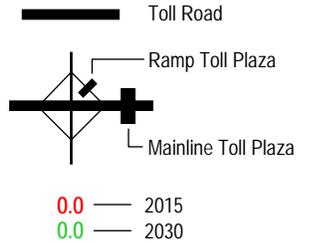


Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study

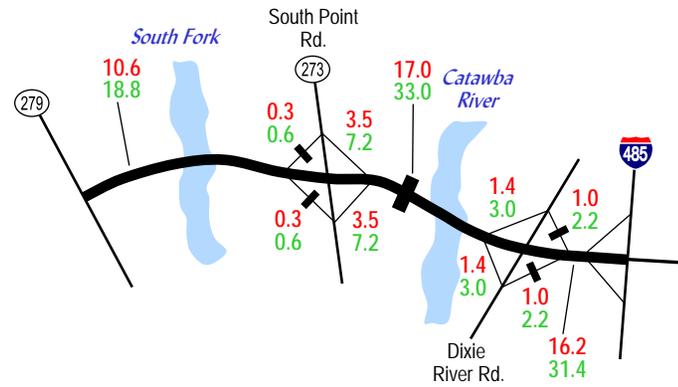


Not to Scale

LEGEND



Note: All traffic volumes shown represent thousands of vehicles.



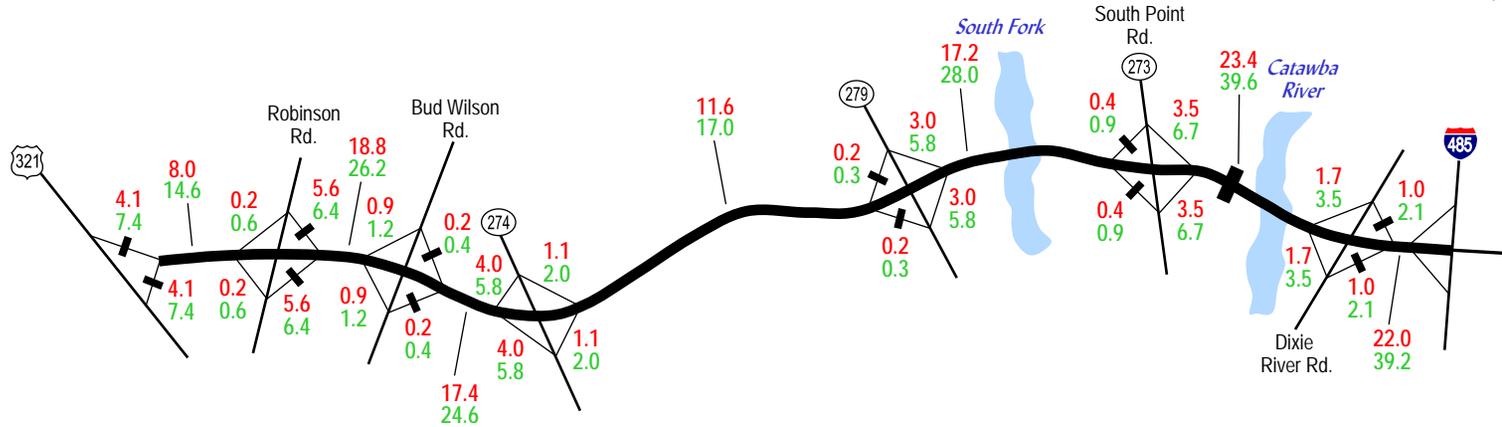
Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study



LEGEND

- Toll Road
- Ramp Toll Plaza
- Mainline Toll Plaza
- 0.0 — 2015
- 0.0 — 2030

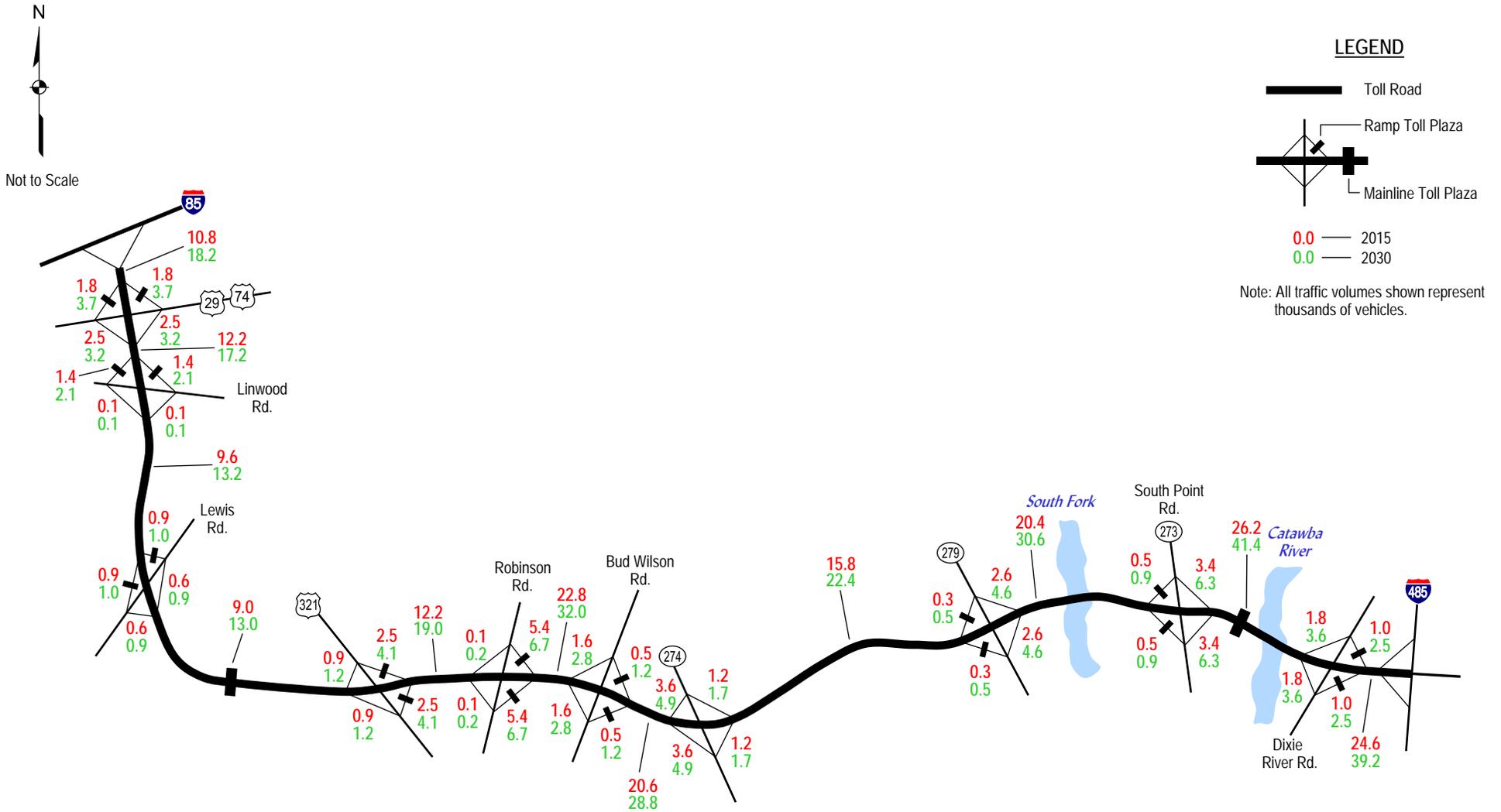
Note: All traffic volumes shown represent thousands of vehicles.



ESTIMATED 2015 AND 2030 WEEKDAY TRAFFIC VOLUMES SCENARIO B

FIGURE 4-6

Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study



ESTIMATED 2015 AND 2030 WEEKDAY TRAFFIC VOLUMES SCENARIO C

FIGURE 4-7

and 4-7. Toll-free traffic would be somewhat higher. The traffic volumes shown do not reflect ramp-up effects, which are incorporated later in the annual forecasts.

Traffic volumes for Scenario A are shown in Figure 4-5. This scenario extends 5.7 miles from NC 279 to the Charlotte Outer Loop and includes one toll plaza and two ramp plazas. Although it provides a new river crossing for southeastern Gaston County, it does not continue west of NC 279 and thus does not provide good east-west access for the rest of the County. In the opening year, the forecast traffic is 17,000 vpd at the mainline plaza. By 2030, approximately 33,000 vpd would use the new Catawba River crossing. Lower volumes are forecast for the ramps at South Point Road and Dixie River Road, but both would provide access to the bridge and additional revenue for this scenario.

Scenario B provides an additional 8.4 miles of toll road are added. As shown in Figure 4-6, the opening year traffic at the mainline plaza is forecast to be 23,400 vpd, which is a 38 percent increase in traffic in comparison to the traffic at the mainline plaza in Scenario A. By 2030, the mainline plaza traffic is forecast to reach 39,600 vpd, which is 20 percent higher than the traffic in Scenario A. The effect of the additional 8.4 miles is apparent. This area of Gaston County does not have good east-west routes, and extending the toll road from US 321 to I-485 meets that need. Traffic levels in the opening year are forecast to be nearly 19,000 vpd between Robinson Road and Bud Wilson Road. Thus the extended facility provides an attractive alternative for drivers who need to travel east and west in the southern portion of the county.

As shown in Figure 4-3 traffic at the eastern and western mainline plazas for Scenario C is estimated at 26,200 and 9,000 vehicles per day (vpd), respectively, in the opening year. By 2030 the traffic at these mainline plazas would rise to 41,400 and 13,000 vpd, respectively.

In general, traffic volumes are consistently higher on the eastern half of the project, ranging from 15,800 vpd and 26,200 vpd between Robinson Road and I-485 in the opening year. West of US 321, estimated traffic volumes were found to be consistently lower, between 9,000 and 12,200 vpd.

All of the forecasted weekday traffic volumes for each of the three scenarios are generally within the capacity of a four-lane roadway. It is possible that volumes could ultimately exceed this capacity, but this would likely occur at some point later than 2030.

ESTIMATED WEEKDAY TRANSACTIONS AND REVENUE

Table 4-4 provides a summary of estimated weekday transactions and revenue at each toll plaza for the three scenarios studied. The toll rates and revenue are shown in future year dollars. The average toll rates assume 3 percent trucks at each location.

The total weekday transactions for Scenario C in 2015 are estimated at 66,600 per day, resulting in average weekday revenue of \$60,195. This is before any adjustment for “ramp-up” as discussed subsequently.

Weekday transactions would be expected to reach 100,000 for Scenario C by 2030, with weekday revenue reaching \$166,940.

Transactions and revenues for the shorter scenarios would be lower than for Scenario C.

Weekday traffic and revenue estimates were “annualized” using a factor of 319 equivalent weekdays per year. This recognizes the fact that weekend traffic is typically lower than weekday traffic on toll facilities such as the proposed Connector.

Finally, annual transaction and revenue estimates for 2015 were further adjusted downward to reflect the impact of “ramp-up”. In general, traffic and revenue during the first few years of a new toll facility are generally below normalized demand expectations. It typically takes several months or years for demand to “ramp-up” to full potential levels as motorists become more familiar with the benefits of the project and the facility begins to appear on maps.

Preliminary estimates of annual toll revenue were prepared for each of the scenarios between the assumed opening years of 2015 and 2050. These estimates were based on the toll rates shown previously; the modeling results for 2015, 2020, 2025, and 2030 levels; and the assumed ramp-up years. Intermediate years between these control points were estimated through interpolation. Traffic and revenue growth between 2030 and 2040 and 2040 and 2050 were assumed to grow at constant annual rates.

**Table 4-4
Estimated Weekday Transactions and Revenue
Gaston East-West Connector**

Toll Plaza Location	2015					
	Scenario A		Scenario B		Scenario C	
	Traffic	Average Toll *	Traffic	Average Toll *	Traffic	Average Toll *
US 29			3,600	\$0.2613	3,600	\$0.2613
Linwood Road			2,800	0.2613	2,800	0.2613
Lewis Road			1,800	0.2613	1,800	0.2613
West Mainline			9,000	1.0450	9,000	1.0450
US 321			8,200	\$0.5225	8,200	\$0.5225
Robinson Road			11,200	0.5225	11,200	0.5225
Bud Wilson Road			400	0.2613	400	0.2613
NC 279			400	0.5225	400	0.5225
NC 273 (South Point)	600	\$0.5225	800	1.0450	800	1.0450
East Mainline	17,000	1.5675	23,400	1.5675	23,400	1.5675
Dixie River Rd.	2,000	0.2613	2,000	0.2613	2,000	0.2613
Total Traffic and Revenue	19,600	\$27,485	46,400	\$48,490	66,600	\$60,195
Annualization Factor (Days)	319	319	319	319	319	319
Annual Traffic and Revenue Before Ramp-up - 2015	6,252,000	\$8,768,000	14,802,000	\$15,468,000	21,245,000	\$19,202,000
First Year Ramp-up Factor	0.61	0.61	0.61	0.61	0.61	0.61
Annual Traffic and Revenue After Ramp-up - 2015	3,814,000	\$5,348,000	9,030,000	\$9,435,000	12,960,000	\$11,713,000
2030						
Toll Plaza Location	Scenario A		Scenario B		Scenario C	
	Traffic	Average Toll *	Traffic	Average Toll *	Traffic	Average Toll *
US 29			7,400	\$0.2613	7,400	\$0.2613
Linwood Road			4,200	0.2613	4,200	0.2613
Lewis Road			2,000	0.7838	2,000	0.7838
West Mainline			13,000	2.0900	13,000	2.0900
US 321			14,800	\$1.0450	14,800	\$1.0450
Robinson Road			12,800	0.7838	12,800	0.7838
Bud Wilson Road			800	0.5225	800	0.5225
NC 279			600	1.0450	600	1.0450
NC 273 (South Point)	1,200	\$1.3063	1,800	1.5675	1,800	1.5675
East Mainline	33,000	2.6125	39,600	2.6125	39,600	2.6125
Dixie River Rd.	4,400	0.5225	4,200	0.5225	4,200	0.5225
Total Weekday Traffic and Revenue Annualization Factor (Days)	38,600	\$90,080	74,600	\$135,015	100,000	\$166,840
Annual Traffic and Revenue - 2030	12,313,000	\$28,736,000	23,797,000	\$43,069,000	31,900,000	\$53,253,000

* Average toll based on following assumptions:
Percent Truck = 3% of total traffic.
Truck Tolls = 2.5 times higher than car toll.

Forecasts of annual toll traffic and revenue are shown in Table 4-5. For Scenario C, 2015 opening-year revenue after ramp-up is estimated at about \$11.7 million, increasing to \$53.3 million by 2030. Lower opening-year revenue is expected for Scenarios A and B.

As noted above, the annualized transactions and revenues from 2015 to 2017 were adjusted to reflect “ramp-up.” Ramp-up is the phenomenon experienced on most start-up toll facilities in which high levels of growth may be experienced over the first three years or so of operation as the motoring public gradually begin to use the facility.

There are a number of reasons for the “ramp-up” phenomenon. For example, since not all motorists who will use the facility are from the local area, it may take several months before certain travelers are aware that the facility is open. It will also take several months for the project to begin to appear on new maps and for motorists to become accustomed to using the facility. The duration and level of ramp-up adjustments can be directly affected by a well-conceived promotion and signing program.

For purposes of this study, a 36-month ramp-up period was assumed. The nominal traffic and revenue estimates prepared for the opening three years were adjusted downward to reflect the time it will take to gradually build up demand. For example, in the first year of operation, traffic is estimated to be 61 percent of the baseline, increasing to about 95 percent of nominal by the end of the third full year of operation.

These increases in traffic and revenue illustrate a significant level of sustained growth, and are indicative of the long-term economic growth potential of the study area especially on the eastern end. It should be recognized that the growth in revenue for each scenario reflects both the significant increases in traffic demand and the effect of toll increases every five years.

**Table 4-5
Annual Toll Transactions and Gross Revenue Forecasts
Gaston East-West Connector
(Thousands)**

Year	Scenario A		Scenario B		Scenario C	
	Total Transactions	Total Revenue	Total Transactions	Total Revenue	Total Transactions	Total Revenue
2015	3,814	\$5,348	9,029	\$9,435	12,960	\$11,713
2016	5,634	7,937	12,810	13,521	17,550	16,733
2017	7,254	10,264	15,866	16,900	21,632	20,836
2018	8,509	12,091	17,929	19,257	24,300	23,637
2019	9,435	13,460	19,177	20,754	25,812	25,346
2020	9,698	16,168	19,523	23,835	25,329	29,819
2021	10,303	17,121	20,611	25,179	26,252	30,856
2022	10,947	18,130	21,763	26,601	27,214	31,934
2023	11,633	19,200	22,984	28,107	28,215	33,051
2024	12,364	20,334	24,277	29,699	29,258	34,212
2025	12,696	23,752	24,372	35,686	29,074	39,463
2026	12,867	24,019	24,726	36,170	30,416	41,204
2027	13,042	24,292	25,087	36,664	31,826	43,028
2028	13,220	24,568	25,457	37,167	33,306	44,939
2029	13,403	24,849	25,835	37,680	34,861	46,940
2030	12,313	28,735	23,797	43,069	31,900	53,253
2031	12,560	30,028	24,273	45,008	32,538	55,650
2032	12,811	31,380	24,759	47,033	33,189	58,154
2033	13,067	32,792	25,254	49,149	33,853	60,771
2034	13,328	34,267	25,759	51,361	34,530	63,506
2035	13,595	35,809	26,274	53,672	35,220	66,364
2036	13,867	37,421	26,800	56,088	35,925	69,350
2037	14,144	39,105	27,336	58,612	36,643	72,471
2038	14,427	40,864	27,882	61,249	37,376	75,732
2039	14,716	42,703	28,440	64,005	38,123	79,140
2040	15,010	44,625	29,009	66,886	38,886	82,701
2041	15,235	46,410	29,444	69,561	39,469	86,009
2042	15,464	48,266	29,886	72,343	40,061	89,449
2043	15,696	50,197	30,334	75,237	40,662	93,027
2044	15,931	52,205	30,789	78,247	41,272	96,748
2045	16,170	54,293	31,251	81,377	41,891	100,618
2046	16,413	56,465	31,720	84,632	42,520	104,643
2047	16,659	58,723	32,195	88,017	43,157	108,829
2048	16,909	61,072	32,678	91,538	43,805	113,182
2049	17,162	63,515	33,168	95,199	44,462	117,709
2050	17,420	66,056	33,666	99,007	45,129	122,418

Note:
Forecasts for 2015 - 2017 reflect an assumed ramp-up to full traffic levels beginning in 2018.

Figures 4-8 and 4-9 show the transaction and revenue forecasts for the Gaston East-West Connector in graphical form for the recommended toll rates. As tolls increase, traffic decreases as fewer drivers are willing to pay higher tolls. However, total system revenue would rise until the increased toll rate resulted in enough drivers leaving the system that total revenues would begin to decline.

As noted previously, trip tables from the MRTDM were used through 2030. Subsequent to that year, annual transaction and revenue estimates were prepared assuming nominal rates of growth. Between 2031 and 2040, traffic was assumed to increase at an average rate of 2 percent per year, while revenue was assumed to increase at a rate of 4.5 percent per year, recognizing periodic inflationary toll increases. For the last 10 years of the forecast period, traffic was estimated to grow at 1.5 percent per year, while revenue was increased at 4 percent per year. More refined longer-term traffic and revenue forecasts would be developed in a detailed comprehensive traffic and revenue study prior to project financing.

ESTIMATED NET REVENUE

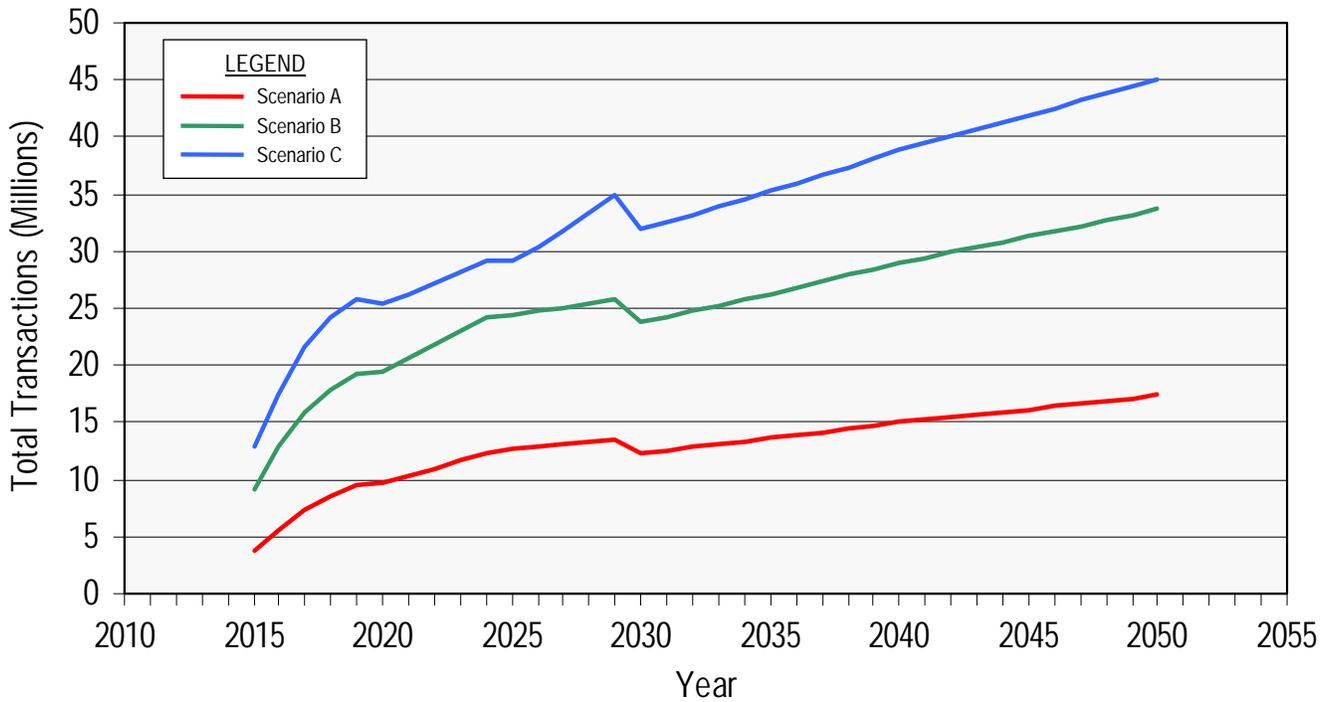
Table 4-6 provides estimates of annual net revenue. Preliminary estimates of operating costs related to toll collection were developed for the analysis, including a nominal fixed component and a variable component per transaction. The nominal fixed component was assumed to increase at 2.5 percent per year for inflation, while a variable component of operating cost increased in proportion with traffic growth. Note, these operating costs do not include costs for roadway maintenance and rehabilitation.

Under the Scenario C, net revenue is estimated at \$5.8 million in 2015, increasing to \$22.5 million by 2020 and \$43.9 million by 2030. Net revenue estimates for the other scenarios would follow the same pattern as the gross revenue forecasts and would be lower than the Scenario C values.

CONCLUSIONS

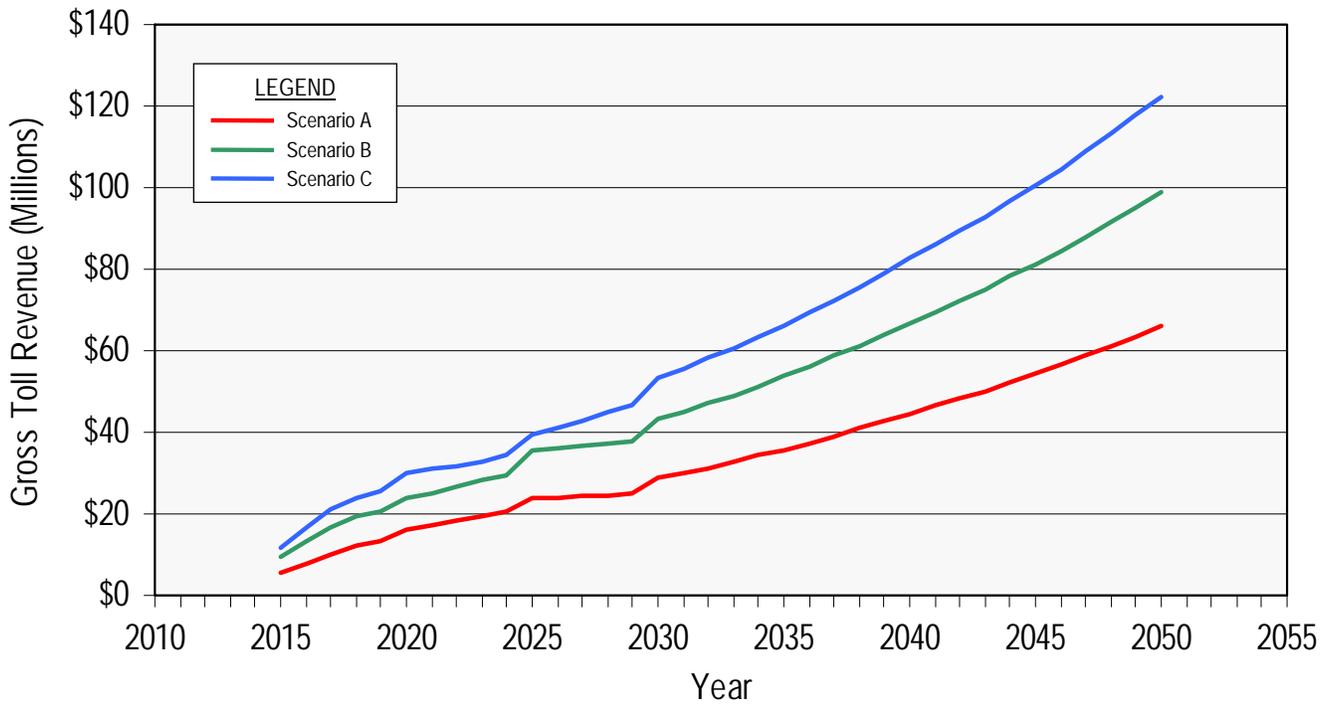
The conclusions of this preliminary study of the proposed Gaston East-West Connector can be summarized as follows:

- **Gaston East-West Connector Generates Significant Revenue** – This new facility will provide a major east-west link across southern Gaston County and will include a new crossing of the Ca-



ANNUAL TRANSACTION FORECAST

FIGURE 4-8



ANNUAL GROSS REVENUE FORECAST

FIGURE 4-9

**Table 4-6
Annual Net Toll Revenue Forecastss
Gaston East-West Connector
(Thousands)**

Year	Scenario A			Scenario B			Scenario C		
	Gross Toll Revenue	Toll Operating Expense	Net Toll Operating Revenue	Gross Toll Revenue	Toll Operating Expense	Net Toll Operating Revenue	Gross Toll Revenue	Toll Operating Expense	Net Toll Operating Revenue
2015	\$5,348	\$2,949	\$2,399	\$9,435	\$3,591	\$5,844	\$11,713	\$5,918	\$5,795
2016	7,937	3,126	4,811	13,521	3,895	9,626	16,733	6,322	10,411
2017	10,284	3,293	6,971	16,900	4,156	12,744	20,836	6,698	14,138
2018	12,091	3,440	8,651	19,257	4,360	14,897	23,637	6,984	16,643
2019	13,460	3,568	9,892	20,754	4,517	16,237	25,346	7,223	18,123
2020	16,168	3,659	12,509	23,835	4,622	19,213	29,819	7,336	22,483
2021	17,121	3,773	13,348	25,179	4,773	20,406	30,856	7,536	23,320
2022	18,130	3,890	14,240	26,601	4,931	21,670	31,934	7,743	24,191
2023	19,200	4,012	15,188	28,107	5,095	23,012	33,051	7,956	25,095
2024	20,334	4,139	16,195	29,699	5,265	24,434	34,212	8,175	26,037
2025	23,752	4,244	19,508	35,686	5,366	30,320	39,463	8,324	31,139
2026	24,019	4,341	19,678	36,170	5,485	30,685	41,204	8,570	32,634
2027	24,292	4,441	19,851	36,664	5,607	31,057	43,028	8,823	34,205
2028	24,568	4,543	20,025	37,167	5,731	31,436	44,939	9,084	35,855
2029	24,849	4,648	20,201	37,680	5,859	31,821	46,940	9,355	37,585
2030	28,735	4,678	24,057	43,069	5,845	37,224	53,253	9,359	43,894
2031	30,028	4,791	25,237	45,008	5,984	39,024	55,650	9,583	46,067
2032	31,380	4,907	26,473	47,033	6,126	40,907	58,154	9,813	48,341
2033	32,792	5,026	27,766	49,149	6,272	42,877	60,771	10,048	50,723
2034	34,267	5,148	29,119	51,361	6,421	44,940	63,506	10,289	53,217
2035	35,809	5,273	30,536	53,672	6,574	47,098	66,364	10,536	55,828
2036	37,421	5,401	32,020	56,088	6,730	49,358	69,350	10,789	58,561
2037	39,105	5,531	33,574	58,612	6,890	51,722	72,471	11,048	61,423
2038	40,864	5,665	35,199	61,249	7,054	54,195	75,732	11,313	64,419
2039	42,703	5,803	36,900	64,005	7,223	56,782	79,140	11,585	67,555
2040	44,625	5,943	38,682	66,886	7,395	59,491	82,701	11,863	70,838
2041	46,410	6,083	40,327	69,561	7,562	61,999	86,009	12,136	73,873
2042	48,266	6,226	42,040	72,343	7,733	64,610	89,449	12,416	77,033
2043	50,197	6,372	43,825	75,237	7,909	67,328	93,027	12,702	80,325
2044	52,205	6,522	45,683	78,247	8,088	70,159	96,748	12,996	83,752
2045	54,293	6,676	47,617	81,377	8,272	73,105	100,618	13,296	87,322
2046	56,465	6,833	49,632	84,632	8,460	76,172	104,643	13,603	91,040
2047	58,723	6,994	51,729	88,017	8,653	79,364	108,829	13,917	94,912
2048	61,072	7,159	53,913	91,538	8,850	82,688	113,182	14,240	98,942
2049	63,515	7,327	56,188	95,199	9,051	86,148	117,709	14,569	103,140
2050	66,056	7,500	58,556	99,007	9,258	89,749	122,418	14,907	107,511

Note:
Forecasts for 2015 - 2017 reflect an assumed ramp-up to full traffic levels beginning in 2018.

tawba River. It is not surprising that this improved access to the Charlotte area would attract travelers.

- **Major Differences in Demand Along the Corridor** – The forecast toll traffic at the eastern mainline plaza is much higher than for the western plaza. The traffic volumes imply that through trips, which would pass through both mainline plazas, are less than the demand for shorter trips that would use only one of the mainline plazas. Thus it appears that most of the trips are relatively “local” in nature.
- **Potential for Staging the Implementation of this Project** – Given the differences in traffic as discussed above, staging the construction might be considered. Scenarios A and B were prepared to provide estimates of the effects on traffic and revenue of constructing only parts of the Connector
- **Economic Growth** – The socioeconomic forecasts contained in the MRTDM would be subject to considerable review should this project move forward. The risks of having much of the toll traffic dependent upon significant economic growth in the corridor would need to be evaluated carefully.

DISCLAIMER

Current professional practices and procedures were used in the development of these preliminary traffic and revenue study findings. However, there is considerable uncertainty inherent in future traffic and revenue forecasts for any toll facility. There may sometimes be differences between forecasted and actual results caused by events and circumstances beyond the control of the forecasters. These differences could be material. Also, it should be recognized that traffic and revenue forecasts in this document are intended to reflect the overall estimated long-term trend. Actual experience in any given year may vary due to economic conditions and other factors.

It is also emphasized that this study is considered preliminary and findings are subject to considerable refinement. It was not performed at a sufficient level of detail to be used in project financing and is not intended for that purpose. Considerably more detailed studies would be required prior to project financing.