

**APPENDIX C**  
**SUPPORTING INFORMATION FOR CHAPTER 2 -**  
**ALTERNATIVES CONSIDERED**



## APPENDIX C – SUPPORTING TRAFFIC INFORMATION FOR CHAPTER 2 – ALTERNATIVES CONSIDERED

### Contents

- C.1 TRAFFIC OPERATIONS ON EXISTING ROADS
  - C.1.1 BACKGROUND AND ANALYSIS METHODOLOGY
  - C.1.2 REGIONAL STATISTICS FROM THE 2030 TRAVEL DEMAND MODEL
  - C.1.3 TRAFFIC VOLUMES AND LEVELS OF SERVICE ON AREA ROADWAYS
    - C.1.3.1 I-85
    - C.1.3.2 US 29-74
    - C.1.3.3 US 321
    - C.1.3.4 I-485
- C.2 MOBILITY AND CONNECTIVITY MEASURES
  - C.1.1 MOBILITY AND CONNECTIVITY WITHIN GASTON COUNTY
  - C.1.2 MOBILITY AND CONNECTIVITY BETWEEN GASTON COUNTY AND MECKLENBURG COUNTY

### C.1 TRAFFIC OPERATIONS ON EXISTING ROADS

#### C.1.1 BACKGROUND AND ANALYSIS METHODOLOGY

**Travel Demand Modeling.** The 2030 Metrolina travel demand model used for the project traffic forecasts covers a thirteen-county region (including Gaston County and Mecklenburg County) within a single model. The 2030 Metrolina travel demand model also uses population and land use forecasts that extend out to 2030. The April 13, 2006, version of the 2030 Metrolina travel demand model was used because this was the version current at the time the updated forecasting activities began. The Metrolina travel demand model is updated on a continual basis.

Using the 2030 Metrolina travel demand model, the following scenarios were modeled to estimate their effects on 2030 traffic operations region-wide and along existing major roadways: the No-Build Alternative, an Improve Existing Roadways Alternative Scenarios 4+/4a, and New Location Alternative Non-Toll and Toll Scenarios (using representative DSA 64). The forecasts are documented in the *Gaston East-West Connector Traffic Forecasts for Toll Alternatives* (Martin/Alexiou/Bryson, August 2008), incorporated by reference.

The modeled Improve Existing Roadways Alternative Scenario 4+/4a included widening I-85 to eight lanes where it is currently six lanes (west of Exit 26) and to ten lanes where it is currently eight lanes (east of Exit 26, where the demand is highest). These improvements are a mix of the improvements proposed under the two individual Scenarios (4+ and 4a). Scenario 4+ includes widening I-85 to eight lanes west of Exit 26. Scenario 4a included widening I-85 to eight lanes west of Exit 19 and to ten lanes east of Exit 19. Improvements to US 29-74 are the same under both scenarios. The 2025 forecasted daily traffic volumes for the two scenarios were almost the

same, and 2025 regional statistics were similar, so it was expected that the 2030 forecasts would be similar between the two scenarios. Therefore, the Alternative Scenario 4+/4a combination of improvements modeled in the 2030 Metrolina travel demand model provided a representative forecast that could be used for either individual scenario. For simplicity, it is labeled as “Scenario 4” in this Draft EIS.

Improve Existing Roadways Alternative Scenario 8 was not modeled because it was not necessary, as this alternative was eliminated due to its impacts to the human and natural environments. **Section 2.2.6.4** includes more discussion on why these scenarios were eliminated.

Of the three representative DSAs used to create forecasts for the New Location Alternative (Non-Toll and Toll Scenarios), DSA 64 was used to evaluate effects region-wide and on existing I-85, I-485, US 29-74, and US 321 for comparison to the No-Build Alternative and Improve Existing Roadways Alternative Scenarios 4. Based on year 2025 travel-demand modeling efforts for the DSAs as non-toll facilities, the DSAs were relatively close in projections, with DSA 64 appearing to divert the least traffic from I-85 and US 29-74. Using this alternative as a representative alternative provides an estimate of the lower range of the project’s ability to reduce traffic volumes on the area’s major roadways as either a toll facility or a non-toll facility. Other DSAs were estimated to be as or more effective at diverting traffic.

**Level of Service Analysis Methodology.** Traffic operations analysis was conducted to calculate levels of service for major roadways surrounding the proposed project (I-85, I-485, US 321, and US 29-74) under various build and no-build scenarios. This analysis is documented in the *Traffic Operations Technical Memorandum for I-85, I-485, US 29-74, and US 321 Under Various Scenarios* (PBS&J, July 2008), incorporated by reference.

Level of service (LOS) is a “qualitative measure describing operational conditions within a traffic stream” (Transportation Research Board 2000: 2-2). The LOS is defined with letter designations ranging from A to F that can be applied to both roadway segments and intersections. LOS A represents the best operating condition and LOS F the worst.

All analysis was performed in accordance with the NCDOT Congestion Management Capacity Analysis Guidelines (February 15, 2006), as applicable. A freeway capacity analysis was performed for the I-85 and I-485 mainlines using the North Carolina Level of Service (NC LOS) software, Version 1.3. In addition, an arterial capacity analysis was performed for US 29-74 and US 321 using the same software.

A detailed analysis for merging/diverging/weaving was not conducted for every scenario because of the level of detail necessary to evaluate concepts and trends at this stage of alternatives development. Only basic segments between interchanges and intersections were modeled. However, the merging/diverging/weaving traffic could influence the LOS along the freeway. The effect could be to degrade LOS, with the possible result being the need for collector-distributor roads or auxiliary lanes. This type of effect would occur under any of the Improve Existing Alternative and New Location Alternative scenarios.

### **C.1.2 REGIONAL STATISTICS FROM THE 2030 TRAVEL DEMAND MODEL**

**Table C-1** lists the regional statistics for the year 2030 for the No-Build Alternative, Improve Existing Roadways Alternative Scenario 4, and the New Location Alternative Non-Toll and Toll Scenarios. The statistics are for the portion of the network in Gaston County and include: total and congested vehicle miles traveled (VMT), total and congested vehicle hours traveled (VHT),

## APPENDIX C

and congested VMT and congested VHT as percentages of total VMT and VHT.

Comparison of VMT and VHT. The values in **Table C-1** indicate that either widening I-85 (Improve Existing Roadways Alternative Scenario 4) or constructing a New Location Alternative as either a toll or non-toll facility would result in higher total VMT and VHT compared to the No-Build Alternative, with the New Location Alternative Toll Scenario having the smallest increase over the No-Build Alternative.

The 2030 VMT would be about the same for the New Location Alternative Scenarios and the Improve Existing Roadways Alternative Scenario 4, but the VHT would be less with a new location facility. This data indicates that the new location facility would provide a quicker trip for many drivers in Gaston County in 2030.

Under Improve Existing Roadways Alternative Scenario 8, the VMT and VHT would likely be higher than under Scenario 4 because more capacity is added to the network, enabling travelers to make longer trips.

**TABLE C-1: 2030 Regional Travel Demand Model Statistics for Gaston County For Various Scenarios**

Scenario	Description	2030 Vehicle Miles Traveled (VMT) in 1000's			2030 Vehicle Hours Traveled (VHT) in 1000's		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	8,512	2,058	2,308	234.9	70.3	78.6
4	Improve Existing Roadways Alternatives	9,559	2,431	2,580	267.0	84.5	89.1
Non-Toll	New Location Alternative	9,646	2,316	2,589	255.6	74.0	85.3
Toll	New Location Alternative	9,473	2,294	2,569	255.8	75.2	84.5
		2030 Congested VMT in 1000's			2030 Congested VHT in 1000's		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	1,536	691	783	129.2	66.6	58.5
4	Improve Existing Roadways Alternatives	1,884	875	911	168.4	82.3	79.0
Non-Toll	New Location Alternative	1,648	689	875	144.1	62.4	75.6
Toll	New Location Alternative	1,528	698	758	124.0	59.0	59.7
		2030 Congested VMT as a Percent of Total VMT			2030 Congested VHT as a Percent of Total VHT		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	18.0%	33.6%	33.9%	55.0%	94.7%	74.4%
4	Improve Existing Roadways Alternatives	19.7%	36.0%	35.3%	63.1%	97.4%	88.7%
Non-Toll	New Location Alternative	17.1%	29.7%	33.8%	56.4%	84.3%	88.6%
Toll	New Location Alternative	16.1%	30.4%	29.5%	48.5%	78.5%	70.7%

Source: *Gaston East-West Connector Traffic Forecasts for Toll Alternatives*, Martin/Alexiou/Bryson, August 2008.

The main variable in the Metrolina travel demand model affecting trips in the project area is travel time. In general, the total number of trips changes very little between the alternatives modeled using the 2030 Metrolina model; however, their destinations are different. For example, a large concentration of residential development is projected in Gaston County not far west of the Catawba River (and in the vicinity of the proposed river crossing), and a large employment concentration is projected to the east of the river (within the Dixie-Berryhill area). In the No-Build scenario, a trip from one of these Gaston County residences to one of these Mecklenburg County employers (for work, shopping, or other purposes) that might be approximately 2 or 3 miles away requires a longer drive either to I-85 and back down, or traveling down to NC 49 and then back north. Most of these trip purposes can be satisfied more efficiently by remaining on the same side of the river, even though the trip attractor on the other side may be more desirable. Because of the travel costs involved, the less desirable destination may be selected.

Once a new river crossing is introduced (Toll or Non-Toll Scenario), a desirable destination that may have required a 20-mile, 35-minute trip might now be no more than a 3-mile drive requiring less than 10 minutes. The model shows a shift in the distribution of trips to new destinations, in addition to changes in the routes selected by some trips that are crossing the river to the same destination. Furthermore, there is a “domino effect” in the travel demand model: the re-distribution and re-assignment of traffic reduces congestion on some secondary routes (and increases it on others), resulting in another round of re-distribution and re-assignment. This cycle is repeated for several iterations of the travel demand model, until a stable equilibrium is achieved, in which no one can significantly reduce their travel costs by switching routes or destinations.

The widening of I-85 (Improve Existing Roadways Alternative Scenario 4) has a similar, though less pronounced, effect. Additional lanes provide more capacity, reducing both congestion and travel times, so some cross-river destinations become close enough (in terms of travel times) to cause a shift, and total crossing traffic volumes increase. The re-routing effect is less pronounced under this scenario, as is the domino (or ripple) effect described above.

Comparison of Congested VMT and VHT. The values in **Table C-1** indicate that Improve Existing Roadways Alternative Scenario 4 and the New Location Alternative Non-Toll Scenario would result in the most congested VHT and VMT. The New Location Alternative Toll Scenario and the No-Build Alternative result in about the same congested VMT and VHT, with the New Location Alternative Toll Scenario performing slightly better. Again, these results from the regional travel demand model are likely the result of high latent demand for additional capacity over the Catawba River between Gaston County and Mecklenburg County.

As a percent of total VMT and total VHT, the congested VMT and congested VHT are highest for the Improve Existing Roadways Alternative Scenario 4 compared to the No-Build Alternative and the New Location Alternatives (Toll and Non-Toll Scenarios). This may be due to higher congestion on roadways leading to the improved I-85, and the congestion projected to still occur on the improved I-85. The New Location Alternatives have the lowest percentages, with the Toll Scenario demonstrating the best performance.

As individual scenarios, Scenario 4+ likely would have slightly higher congested VMT and VHT values than what is shown in **Table C-1** for the combined Scenario 4, and Scenario 4a may have slightly lower congested VMT and VHT. This is because Scenario 4a does provide some additional capacity on I-85 (an additional lane in each direction between Exit 19 and Exit 26) compared to the combined Scenario 4. However, the lower values for congested VMT and VHT that may occur under Scenario 4a may be offset by slightly higher projected traffic volumes, and

would still be substantially higher than the values for the No-Build Alternative and the New Location Alternative (Toll and Non-Toll Scenarios).

It is notable that the 2030 Metrolina travel demand model indicates that adding capacity on I-85 under the Improve Existing Roadways Alternative Scenario 4 is projected to increase congestion throughout the network. This projected outcome is somewhat counter-intuitive. Adding lanes to I-85 increases capacity, which increases travel speeds, so travelers continue to shift to use I-85. Potential demand exceeds the additional capacity, and traffic keeps shifting to I-85 until congestion builds to the point at which a new equilibrium point is reached in the model. So, although I-85 has been widened, much of it remains congested, but with much higher volumes of traffic. However, the widened I-85 is not as severely congested as under the No-Build Alternative.

The other factor affecting the Improve Existing Roadways Alternative Scenario 4 results is that most of the trips diverted to the improved I-85 do not produce significant congestion benefits on other facilities. The New Location Alternative (Toll or Non-Toll Scenarios) has an added benefit of diverting traffic from congested facilities onto roads with reserve capacity (in general). When I-85 is widened under the Improve Existing Roadways Alternative Scenario 4, motorists diverted onto I-85 tend to come from highly-congested routes that get more congested carrying vehicles to I-85, so there is an increase in congested VMT. Because there are so few options for crossing the Catawba River, individual drivers can still benefit from taking a congested route, even while system-wide performance suffers. Braess's Paradox is the term for this phenomenon, recognized in complex networks (including telephone and Internet service) where increasing capacity on specific links can, in certain instances, increase congestion overall.

If Improve Existing Roadways Alternative Scenario 8 were modeled, the congested VMT totals would be expected to improve over Scenario 4, but likely not enough to show the same improvements in congested VMT achieved by the New Location Alternatives (Non-Toll or Toll Scenarios). Widening north-south feeder roads under Scenario 8 would allow more traffic to be delivered to the same bottlenecks faster. Travelers would have wider crossroads/feeder roads to idle on while waiting to reach I-85. The effects would be to have shorter queues and higher levels of services for other trips on the crossroads/feeder roads, but this would not produce enough improvements to congestion to compete with any of the New Location Alternatives.

### **C.1.3 TRAFFIC VOLUMES AND LEVELS OF SERVICE ON AREA ROADWAYS**

#### **C.1.3.1 I-85**

**Table C-2** shows the 2030 Annual Average Daily Traffic (AADT) and levels of service projected for I-85 from Exit 10 (US 29-74) to Exit 30 (I-485) within the project study area under various scenarios. The projected AADT under each scenario are graphically compared in **Exhibit 2-1**.

Improvements to I-85 under the Improve Existing Roadways Alternative Scenario 4 result in additional traffic volumes being attracted to I-85. Under the New Location Alternatives (Toll and Non-Toll Scenarios), traffic volumes increase slightly on I-85 west of US 321 and decrease east of US 321 compared to the No-Build Alternative, as travelers divert to the new highway.

**TABLE C-2: Year 2030 Traffic Volumes and Levels of Service on I-85 For Various Scenarios**

Between I-85 Exits (West to East)	No-Build Alternative		Improve Existing Roadways Alternative Scenario 4		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>
Exit 10B (US 29-74) to Gaston East-West Connector	105,000	E	115,200	D	111,200	E	111,800	E
Gaston E-W Connector to Exit 13 (SR 1307 – Edgewood Rd)	105,000	F	115,200	E	102,100	E	106,000	E
13 to 14 (NC 274 – Bessemer City Rd)	115,400	F	131,000	E	116,200	F	120,400	F
14 to 17 (US 321)	119,200	F	139,600	E	121,200	F	125,200	F
17 to 19 (Ozark Ave)	134,600	F	157,200	F	132,800	F	138,400	F
19 to 20 (NC 279)	147,200	F	174,600	F (E) <sup>3</sup>	142,200	F	148,200	F
20 to 21 (Cox Rd)	151,000	F	180,000	F (E) <sup>3</sup>	145,400	F	151,400	F
21 to 22 (Redbud Dr)	153,000	F	185,400	F (E) <sup>3</sup>	144,600	F	149,600	F
22 to 23 (NC 7 – McAdenville Rd)	161,600	F	195,200	F	149,800	F	157,400	F
23 to 26 (Abbey College)	169,200	F	202,200	F	155,000	F	162,800	F
26 to 27 (NC 273-Park St)	178,600	F	212,400	F	163,000	F	171,000	F
27 to 29 (Sam Wilson Rd)	193,600	F	228,200	F	175,800	F	185,200	F
29 to 30 (I-485)	198,400	F	234,600	F	181,200	F	190,800	F

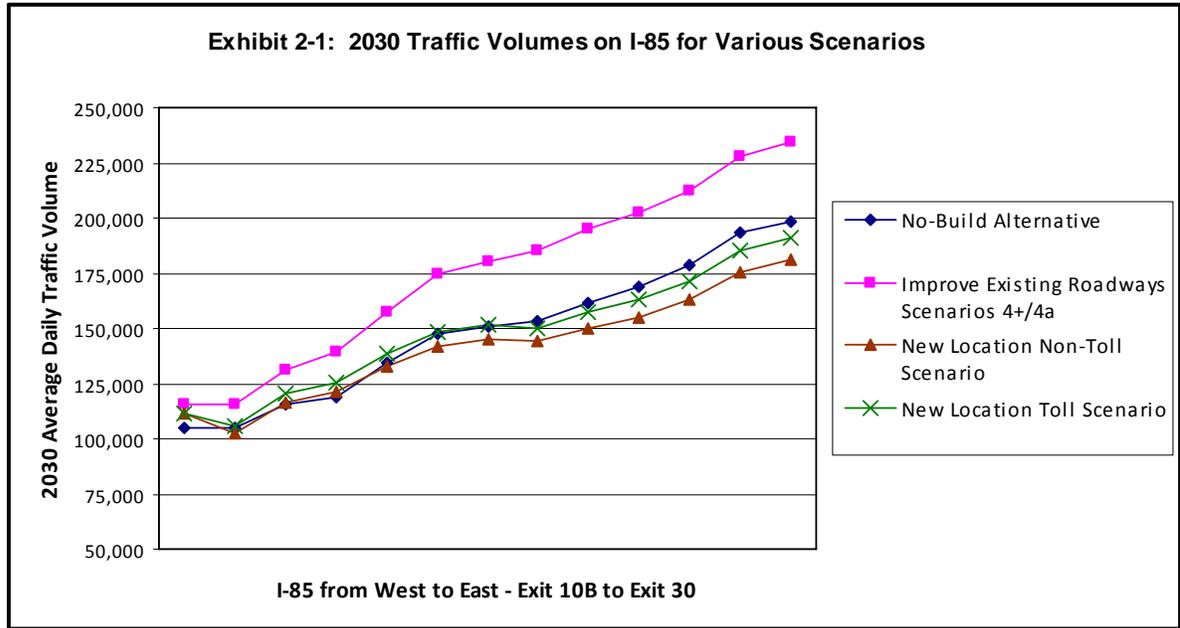
1. AADT = Annual Average Daily Traffic volumes

2. LOS = Level of Service

3. LOS F for Scenario 4+ and LOS E for Scenario 4a

Source: *Traffic Operations Technical Memorandum for I-85, I-485, US 29-74, and US 321 Under Various Scenarios, PB&J, July 2008*

The graph in **Exhibit C-1** shows the traffic volume information from **Table C-2**. As the exhibit indicates, there is so much latent demand in the study area for highway travel that adding one to two lanes in each direction on I-85 under Scenario 4 attracted an average of 17 percent more vehicles per hour compared to the No-Build Alternative. Widening the north/south feeder roads to the Interstate (as suggested under Scenario 8) would be expected to attract even more vehicles to I-85.



I-85 is projected to operate primarily at LOS E or F, regardless of the alternative. Under the Improve Existing Roadways Alternative Scenario 4, most improvements in traffic flow achieved by adding additional lanes would be offset by the increase in traffic volumes attracted to the facility.

Under the New Location Alternative (either the Toll or Non-Toll Scenario), traffic flow would improve somewhat due to decreases in traffic volumes compared to the No-Build Alternative, even though the LOS remains LOS F.

**C.1.3.2 US 29-74**

Table C-3 shows the AADT volumes and levels of service projected for US 29-74 in the project study area under various scenarios.

**TABLE C-3: Year 2030 Traffic Volumes and Levels of Service on US 29-74 For Various Scenarios**

US 29-74 Segment (West to East)	No-Build Alternative		Improve Existing Roadways Alternative Scenario 4		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>
Sparrow Springs Rd to Gaston East-West Connector	37,200	D	41,900	B	48,400	F	43,600	F
Gaston East-West Connector to Edgewood Rd	37,200	D	41,900	B	33,600	E	35,500	E
Edgewood Rd to Shannon Bradley Rd	35,600	C	37,300	B	32,200	C	36,400	C
Shannon Bradley Rd to Myrtle School Rd	35,400	E	37,200	C	32,100	D	36,300	F
Myrtle School Rd to Bessemer City Rd	32,200	F	34,300	F	29,700	F	34,600	F

**TABLE C-3: Year 2030 Traffic Volumes and Levels of Service on US 29-74 For Various Scenarios**

US 29-74 Segment (West to East)	No-Build Alternative		Improve Existing Roadways Alternative Scenario 4		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>	AADT <sup>1</sup>	LOS <sup>2</sup>
Bessemer City Rd to Linwood Rd	21,500	D	21,300	D	20,000	D	23,100	D
Linwood Rd to US 321 (Chester Rd)	16,400	D	18,600	D	17,100	D	19,700	D
US 321 (Chester Rd) to Avon St	21,800	D	23,800	E	21,100	D	23,000	D
Avon St to Thomas St/Belvedere Ave	22,700	D	23,800	D	22,400	D	24,700	D
Thomas St/Belvedere Ave to NC 279 (New Hope Rd)	27,100	C	28,400	C	26,300	C	32,100	D
NC 279 (New Hope Rd) to Cox Rd/Armstrong Park Rd	24,700	C	23,000	C	22,300	C	26,000	C
Cox Rd/Armstrong Park Rd to Franklin Square	39,200	D	35,000	D	36,700	D	39,900	D
Franklin Square to Lineberger Rd	39,200	F	35,400	E	40,300	F	43,500	F
Lineberger Rd to S Main St/Redbud Dr	39,500	D	35,400	D	38,300	D	40,700	D
S Main St/Redbud Dr to Wesleyan Dr/Market St	42,300	D	39,300	D	38,700	D	40,400	D
Wesleyan Dr/Market St to Lakewood Rd	59,700	F	56,800	F	53,000	F	56,100	F
Lakewood Rd to NC 273 (Park St)	60,100	F	58,100	F	47,500	D	51,800	F
NC 273 (Park St) to NC 7 (Catawba St)	72,700	F	71,200	F	56,100	F	61,500	F
NC 7 (Catawba St) to Old Dowd Rd	70,500	F	69,900	F	58,600	F	63,900	F
Old Dowd Rd to Sam Wilson Rd	52,600	F	52,100	E	39,600	F	45,400	F
Sam Wilson Rd to I-485 SB Ramps	58,400	F	59,000	F	48,400	F	51,000	F
I-485 SB Ramps to I-485 NB Ramps	55,100	F	57,300	F	47,000	F	49,300	F
East of I-485 NB Ramps	45,000	F	48,400	E	38,800	F	40,800	F

1. AADT = Annual Average Daily Traffic volumes

2. LOS = Level of Service

Source: *Traffic Operations Technical Memorandum for I-85, I-485, US 29-74, and US 321 Under Various Scenarios, PB&J, July 2008*

As shown in **Table 2-5**, compared to the No-Build Alternative, the New Location Alternative Non-Toll Scenario is the most effective at reducing traffic volumes on US 29-74, with the most reduction on the eastern end of the project area. The Improve Existing Roadways Alternative Scenario 4 are the least effective, resulting in slightly higher traffic volumes on US 29-74 west of NC 279 (New Hope Road) compared to the No-Build Alternative. This is likely due to the fact that travelers wanting to use the widened I-85 under Improve Existing Roadways Alternative Scenario 4 would use portions of improved US 29-74 to get there. The New Location Alternative Toll Scenario would have similar traffic volumes on US 29-74 as the Improve Existing Roadways

Alternative Scenario 4, except east of South Main Street/Redbud Drive, where traffic volumes would be less compared to the No-Build Alternative.

The higher volumes on the segment from Edgewood Road to Shannon Bradley Road that would occur under the New Location Alternatives (compared to the No-Build Alternative) are due to the new interchange providing access to the Gaston East-West Connector. This also results in lower volumes between Shannon Bradley Road and Myrtle School Road for the New Location Alternatives compared to the Improve Existing Roadways Alternative Scenario 4.

Under the No-Build Alternative, US 29-74 is projected to operate primarily at LOS D or better west of McAdenville and LOS F east of McAdenville. Under the Improve Existing Roadways Alternative Scenario 4, LOS would improve compared to the No-Build Alternative west of Myrtle School Road, where US 29-74 would be widened to six lanes. Under the New Location Alternative (Non-Toll and Toll Scenarios), the LOS would be similar to the No-Build Alternative, even though traffic volumes would be less.

### **C.1.3.3 US 321**

Improve Existing Roadway Alternatives Scenario 4 would result in an increase in traffic volumes along US 321 in the study area by an average of approximately 15 percent, as more people use US 321 to travel to a widened I-85. Compared to the Improve Existing Roadways Alternatives, the New Location Alternatives would increase traffic volumes more on US 321 south of the Gaston East-West Connector, but decrease the volumes from the Gaston East-West Connector north to downtown Gastonia. North of downtown, the volume increases would be about the same between the New Location Alternatives and the Improve Existing Roadways Alternatives.

Levels of service along US 321 are similar for all evaluated alternatives. Levels of service are LOS D or better through the project area, except near the I-85 ramps, where LOS would be LOS F.

### **C.1.3.4 I-485**

Improve Existing Roadways Alternative Scenario 4 would result in higher traffic volumes on I-485 compared to the No-Build Alternative. The New Location Alternatives (Toll and Non-Toll) would result in higher traffic volumes south of the new Gaston East-West Connector interchange at I-485, and slightly less traffic volumes north of the new interchange.

I-485 within the study area is projected to operate primarily at LOS E under the No-Build Alternative. Under the Improve Existing Roadways Alternative Scenario 4, LOS would degrade to LOS F. Under the New Location Alternatives (Toll and Non-Toll Scenarios), the LOS would be LOS F on I-485 south of the Gaston East-West Connector and LOS E north of the Gaston East-West Connector.

## C.2 MOBILITY AND CONNECTIVITY MEASURES

### C.2.1 MOBILITY AND CONNECTIVITY WITHIN SOUTHERN GASTON COUNTY

South of I-85 in southern Gaston County, a lack of connecting east-west roadways makes travel circuitous and limits mobility. Currently, there are no continuous east-west routes in southern Gaston County. The roads in southern Gaston County generally run in a north-south direction.

As can be seen in **Figure 1-3**, a person wishing to travel from the residential subdivisions on the Belmont peninsula (the land between the South Fork Catawba River and Catawba River) to businesses and industries along US 321 in southern Gaston County cannot do so directly. They must first travel north on NC 273 (Southpoint Road) to use westbound I-85 or US 29-74 to US 321, then south on US 321 or travel a circuitous route that might include NC 273 (Armstrong Road), NC 279 (South New Hope Road), SR 2435 (Union New Hope Road), NC 274 (Union Road), SR 2416 (Robinson Road), SR 2412 (Little Mountain Road), SR 2420 (Forbes Road) to US 321. NC 273, NC 279, SR 2435, NC 274, SR 2416, and SR 2420 are all two-lane roadways with no access control.

Using the existing routes in southern Gaston County described above, a person would travel approximately 17 miles across southern Gaston County. A person using Southpoint Road to I-85 to US 321 would travel approximately 22 miles. A person using the Gaston East-West Connector would have approximately an 11-mile trip.

The approximate travel times for a person traveling within southern Gaston County were estimated using the travel time contour feature of the 2030 Metrolina travel demand model. The model generates contour lines showing various travel time increments (in this case, 10-minute increments) from an input starting point (origin), and can also give approximate travel times to specified destinations. The travel time contours were run for the morning peak hour for the No-Build Alternative, Improve Existing Roadways Alternative Scenario 4, and the New Location Alternative Toll Scenario. As representative trips for the study area, selected origins included the Belmont peninsula near the intersection of Southpoint Road and Armstrong Road, and southwest Gaston County near the intersection of Lewis Road and Chapel Grove Road. Selected destinations were US 321 at Robinson Road, downtown Gastonia, downtown Bessemer City, and Daniel Stowe Botanical Garden.

**Table C-4** shows the results for the modeled origins and destinations within Gaston County. Travel times for travel within southern Gaston County would lengthen somewhat under the Improve Existing Roadway Alternative Scenario 4. Under these scenarios, more vehicles are using the network roads to reach I-85 and US 29-74, which reduces speeds on roadways throughout the network. Travel times under Scenario 8 may be slightly less, as more capacity is provided on north-south feeder roads, but these roads are used only for short distances in east-west cross-county travel. Also, if the new capacity on I-85 were tolled, this would not have an effect on travel within southern Gaston County.

**TABLE C-4: Estimated Travel Times for Trips within Gaston County for Various Scenarios**

Origin	Destination	Peak Period	Approximate Travel Time in 2030 (minutes)				
			No-Build Alternative	Improve Existing Roadways Alternative Scenario 4		New Location Alternative - Toll Scenario	
			Travel Time	Travel Time	Time Change <sup>1</sup>	Travel Time	Time Change <sup>1</sup>
Belmont Peninsula – Southpoint Rd/ Armstrong Rd Intersection	US 321 at Robinson Rd	AM	22	25	↑ 3	13	↓ 9
	Downtown Gastonia	AM	20	22	↑ 2	18	↓ 2
	Downtown Bessemer City	AM	27	32	↑ 5	25	↓ 2
Southwest Gaston County – Lewis Rd/ Chapel Grove Rd Intersection	Daniel Stowe Botanical Garden	AM	30	31	↑ 1	22	↓ 8
	Downtown Gastonia	AM	13	13	0	10	↓ 3
	Downtown Bessemer City	AM	15	14	↓ 1	12	↓ 3

1. Time change is the difference compared to the No-Build Alternative.  
 Source: Travel Time Contour Maps produced by M/A/B using the 2030 Metrolina travel demand model, July 2008. Included as Appendix C in the *Addendum to the Final Alternatives Development and Evaluation Report*, PBS&J, October 2008.

Under the New Location Alternative (Toll Scenario), travel times would noticeably improve for cross-county travel in southern Gaston County. For example, travel from the Belmont Peninsula westward to US 321 would be reduced by about 9 minutes (about 40 percent) compared to the No-Build Alternative. Likewise, travel times from southwest Gaston County eastward to the Daniel Stowe Botanical Garden area would be reduced about 8 minutes (about 27 percent) compared to the No-Build Alternative. Travel times under the New Location Alternative (Non-Toll Scenario) are expected to be approximately the same as under the Toll Scenario.

The need for improved connectivity and east-west mobility within southern Gaston County will continue to grow as the population in this area increases. Between 1990 and 2000, southeastern Gaston County had the largest population increase in the county. According to the Gaston County Comprehensive Plan, the southeastern part of the county is expected to continue experiencing high residential growth through 2020.

**C.2.2 MOBILITY AND CONNECTIVITY BETWEEN GASTON COUNTY AND MECKLENBURG COUNTY**

As was estimated for travel within southern Gaston County, the travel time contour feature of the 2030 Metrolina travel demand model also was used to estimate travel times for various origins and destinations between Gaston County and Mecklenburg County. The selected origins included the Belmont peninsula near the intersection of Southpoint Road and Armstrong Road, southwest Gaston County near the intersection of Lewis Road and Chapel Grove Road, south Gastonia near the intersection of Hoffman Road and Robinwood Road (about halfway between the New Location Alternative corridors and I-85), and Charlotte-Douglas International Airport.

Table C-5 shows the results for the modeled origins and selected destinations between the two counties.

**TABLE C-5: Estimated Travel Times for Trips between Gaston and Mecklenburg Counties for Various Scenarios**

Origin	Destination	Peak Period	Approximate Travel Time in 2030 (minutes)				
			No-Build Alternative	Improve Existing Roadways Alternative Scenario 4		New Location Alternative – Toll Scenario	
			Travel Time	Travel Time	Time Change <sup>1</sup>	Travel Time	Time Change <sup>1</sup>
Belmont Peninsula – Southpoint Rd/ Armstrong Rd Intersection	Charlotte-Douglas International Airport	AM	57	65	↑ 8	34	↓ 23
Southwest Gaston County – Lewis Rd/ Chapel Grove Rd Intersection	Charlotte-Douglas International Airport	AM	83	87	↑ 4	60	↓ 23
South Gastonia – Hoffman Rd/ Robinwood Rd Intersection	Charlotte-Douglas International Airport	AM	68	75	↑ 7	50	↓ 18
	West of I-485 near Steele Creek Parkway	AM	55	62	↑ 7	45	↓ 10
Charlotte-Douglas International Airport	Southpoint Rd near Southpoint High School	PM	52	58	↑ 6	29	↓ 23
	Daniel Stowe Botanical Garden	PM	62	69	↑ 7	34	↓ 28
	US 321 at Robinson Rd	PM	66	85	↑ 19	45	↓ 21
	Downtown Gastonia	PM	57	75	↑ 18	46	↓ 11
	Downtown Bessemer City	PM	66	80	↑ 14	57	↓ 9

1. Time change is the difference compared to the No-Build Alternative.  
 Source: Travel Time Contour Maps produced by M/A/B using the 2030 Metrolina travel demand model, July 2008. Included as Appendix C in the Addendum to the Final Alternatives Development and Evaluation Report, PBS&J, October 2008.

Like travel within southern Gaston County, travel times for travel between Gaston and Mecklenburg Counties would lengthen under the Improve Existing Roadway Alternative Scenario 4 compared to the No-Build Alternative. If the new capacity on I-85 were tolled, travel time savings may improve, but some of these savings would be offset because vehicles would still need to drive on congested roadways to reach the Interstate. Also, for inter-county travel, travelers must use I-85 or US 29-74 to cross over the river, and this routing constrains traffic flow. Travel times under Scenario 8 likely would be better, as more capacity is provided on north-south feeder roads, but travel time savings would not reach the levels achieved by the New Location Alternative.

Under the New Location Alternative (Toll Scenario), travel times savings would be substantial for most inter-county trips. For example, a trip to/from southern Gaston County (Belmont Peninsula or southwest Gaston County) or south Gastonia from/to Charlotte-Douglas International Airport would take about 20 minutes less (30–40 percent reduction). A trip from Charlotte-Douglas International Airport to downtown Gastonia or downtown Belmont would be reduced by approximately 10 minutes (about a 15 percent reduction). Travel times under the New Location Alternative (Non-Toll Scenario) are expected to remain approximately the same as under the Toll Scenario.