CH. 2 ALTERNATIVES CONSIDERED

Chapter 2 explains how project alternatives were developed and evaluated to determine the Detailed Study Alternatives. The preliminary engineering designs for the Detailed Study Alternatives are described in ***Section 2.4****. The Recommended Alternative is presented at the end of this chapter in* ***Section 2.5****.*

2.1 INTRODUCTION

2.1.1 OVERVIEW OF THE ALTERNATIVES SCREENING PROCESS

The development and evaluation of alternatives to determine the Detailed Study Alternatives (DSA) included in this Draft Environmental Impact Statement (Draft EIS) is documented in detail in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008), incorporated by reference, and available on the NCTA Web site (www.ncturnpike.org/projects/gaston).

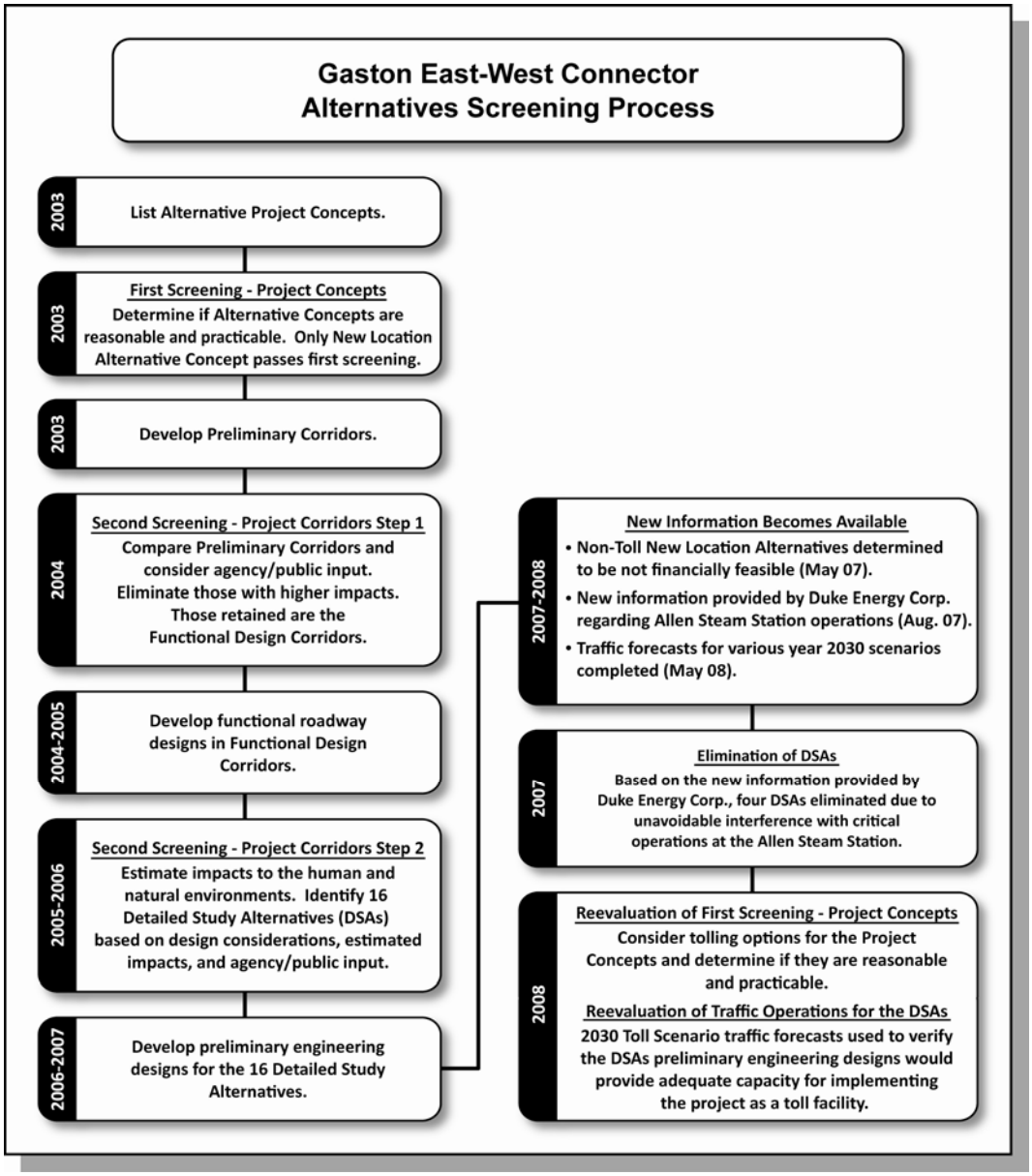
The Alternatives Screening Process flow chart presented below shows the overall alternatives evaluation process and the general timeframe for when the different screenings occurred.

In the First Screening – Project Concepts, six alternative concepts (listed in **Section 2.2.1)** were evaluated in an iterative process to determine if they were reasonable and practicable, based upon their ability to meet the project's purpose and need, potential impacts, and their financial feasibility. After the project became a candidate toll facility and 2030 traffic forecasts were completed, applicable project concepts were reevaluated considering tolling options.

In the First Screening (**Section 2.2**), each alternative concept was developed to the point needed to decide whether to retain or eliminate the alternative concept from detailed study. The Improve Existing Roadways Alternatives and the New Location Alternatives scenarios were developed in more detail than the other concepts. For these two concepts, traffic forecasts and traffic operations analyses were prepared. Impacts to the human and natural environments also were considered as part of the First Screening in the evaluation of the Improve Existing Roadways Alternatives.

In the Second Screening – Project Corridors (**Section 2.3**), the alternative concept (the New Location Alternative) that made it through the First Screening process was further refined and evaluated to determine the specific DSAs. In the Second Screening, approximately 116 miles of Preliminary Corridor Segments were developed for the New Location Alternatives. The Preliminary Corridors were then evaluated and compared in order to narrow that group down to the Functional Design Corridors. There were 90 endpoint-to-endpoint alternatives (from I-85 to I-485) that were created from the Functional Design Corridors. Functional roadway designs were prepared for this set of alternative corridor segments. Impacts to the human and natural environments were estimated based upon the functional roadway designs. DSAs were identified based upon design considerations, estimated impacts, and agency/public input.

Preliminary roadway designs were then prepared for the DSAs (**Section 2.4**). The preliminary engineering designs include more detail than the functional roadway designs. The impacts documented in this Draft EIS are based upon the preliminary engineering designs for the DSAs.



As shown in the flowchart, the DSAs were reevaluated in 2008 based on new information provided by Duke Energy Corporation regarding operations at the Allen Steam Station (**Section 2.3.4.2**). The preliminary engineering designs also were reevaluated to verify they would provide adequate capacity for implementing the project as a toll facility (**Section 2.4.4.2**).

Section 2.5 documents the DSA currently recommended by the Federal Highway Administration (FHWA) and the North Carolina Turnpike Authority (NCTA). This recommendation is a preliminary step toward identification of a Preferred Alternative, and is subject to change based on public and agency review of this Draft EIS and comments from the Public Hearing. The Preferred Alternative will be identified in the Final Environmental Impact Statement (Final EIS).

2.1.2 PUBLIC INVOLVEMENT AND AGENCY COORDINATION RELATED TO THE ALTERNATIVES SCREENING PROCESS

Public and agency coordination for the project is discussed in detail in **Chapter 9**. This section briefly summarizes the coordination and public involvement activities relating to the development and evaluation of the DSAs.

The first and second screenings of alternatives were originally discussed with the environmental resource and regulatory agencies through the NEPA/404 Merger 01 Process under the administration of the North Carolina Department of Transportation (NCDOT). A series of eight meetings regarding project alternatives were held from February 2004 through September 2005, resulting in concurrence on the DSAs on September 20, 2005 (**Section 9.2.3.3**). At that time, three agencies (US Environmental Protection Agency [USEPA], US Fish and Wildlife Service [USFWS], and NC Wildlife Resources Commission [NCWRC]) elected to abstain, rather than expressing concurrence or non-concurrence in the DSAs.

After the initial concurrence was achieved on the DSAs in September 2005, the FHWA and NCTA reevaluated the alternatives screening process in light of the project being determined a candidate toll facility and the receipt of updated travel demand forecasts. The FHWA and NCTA coordinated with the environmental resource and regulatory agencies on this reevaluation at several Turnpike Environmental Agency Coordination (TEAC) meetings held in January, June, and September 2007, and February, July, September and October 2008 (**Section 9.2.3.3**). The environmental resource and regulatory agencies confirmed concurrence on the DSAs at the October 2008 TEAC meeting, and the concurrence form is included in **Appendix A-1**. The three agencies that previously had abstained, the USEPA, USFWS and NCWRC, concurred at this stage along with all the other cooperating and participating agencies.

Public comment regarding alternatives was solicited at all three Citizens Informational Workshop series. Public comment on project concepts and preliminary alternatives was solicited at the first series of Citizens Informational Workshops held in September and December, 2003 (**Section 9.1.1.1**). A majority of commenters supported a new location roadway. However, about 20 percent of the comments supported other types of alternatives, including improving I-85 and US 29-74, and mass transit. Specific comments about locations and preferences regarding the preliminary new location alignments provided at Citizens Informational Workshop Series #1 are summarized in **Section 9.1.1.1**.

The Detailed Study Alternatives were presented for public comment and input at the second series of Citizens Informational Workshops held in January and February 2006 (**Section 9.1.1.2**). None of the comments received resulted in the addition, elimination, or substantial modification of the DSAs.

The third series of Citizens Informational Workshops, held in August 2008 (**Section 9.1.1.3**), provided the public an opportunity to comment on the elimination of Corridor Segment K1D from detailed study (due to interference with critical operations at Duke Energy Corporation's Allen Steam Station), presented the remaining DSAs, announced the availability of the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008) on the project web site, and showed the right-of-way limits for the preliminary engineering designs within the DSA corridors. None of the comments received resulted in the addition, elimination, or substantial modification of the DSAs.

2.2 FIRST SCREENING - PROJECT CONCEPTS

2.2.1 FIRST SCREENING METHODOLOGY

The project concepts evaluated in the First Screening include:

- No-Build Alternative
- Transportation System Management (TSM) Alternative
- Transportation Demand Management (TDM) Alternative
- Mass Transit Alternative and Multimodal Alternative
- Improve Existing Roadways Alternatives
- New Location Alternatives

The First Screening was iterative. Initially, the First Screening focused on the ability to meet Purpose and Need. Several alternatives were eliminated largely or entirely based on their inability to meet the Purpose and Need (TSM, TDM, Mass Transit, Multimodal). In response to requests from environmental resource and regulatory agencies, more detailed information about impacts and traffic forecasts was developed for the Improve Existing Roadways Alternatives and the New Location Alternatives. In some instances, financial feasibility also was addressed. This iterative process resulted in some alternatives being developed to a higher level of detail than others in order to determine whether they should be retained for the Second Screening or eliminated.

Qualitative and quantitative performance measures were used in the First Screening to the level of detail necessary to evaluate the ability of the various project concepts to meet the project's purpose, including the mobility and direct access components stated in **Section 1.3**. To meet the purpose and need, an alternative must provide more than a minor improvement. An improvement would be considered minor if it is localized, temporary, and/or largely unnoticeable to the typical user of the transportation system. Alternatives that provide only a minor improvement do not meet the purpose and need, and therefore are not reasonable alternatives.

To evaluate their ability to meet the purpose and need, alternative concepts were evaluated to determine whether they would:

- Reduce travel distances and/or travel times between representative origin/destination points within southern Gaston County and between southern Gaston County and Mecklenburg County.
- Provide a transportation facility that would operate at acceptable levels of service (generally Level of Service [LOS] D or better on the mainline) in the design year (2030) for travel between Gaston County and Mecklenburg County.
- Reduce congested vehicle miles traveled and/or congested vehicle hours traveled in Gaston County compared to the No-Build Alternative in 2030.

In the following sections, there is a description of each alternative concept followed by a discussion of the estimated effects that concept would have on traffic volumes and operations on

existing roadways. This is followed by a listing of reasons why that particular alternative concept was retained for the Second Screening or eliminated from further consideration. For the Improve Existing Roadways Alternatives, potential impacts to the human and natural environment also were evaluated and documented (**Section 2.2.6.4**).

Traffic forecasts and information for the year 2030 are included in this chapter for the No-Build Alternative, Improve Existing Roadways Alternatives, and the New Location Alternatives (*Gaston East-West Connector (U-3321) Traffic Forecasts for Toll Alternatives*, Martin/Alexiou/Bryson, August 2008), incorporated by reference, and available on the NCTA Web site (www.ncturnpike.org/projects/gaston). The traffic forecasts were developed using the 2030 Metrolina travel demand model (April 13, 2006 version). The Metrolina travel demand model is the traffic forecasting model for the region developed and maintained by the Charlotte Department of Transportation. The model has a horizon year of 2030, and it covers a thirteen-county region that includes both Gaston County and Mecklenburg County.

When the analyses were initially conducted for the development of project alternative concepts, the planning horizon year was 2025 and there were two travel demand models covering the Project Study Area—one for the Gaston County area and another for the Mecklenburg County area (*Gaston County East-West Connector Study- Transportation Demand Modeling Technical Memorandum,* Martin/Alexiou/Bryson, February 2005), incorporated by reference. Traffic information using the 2025 Gaston travel demand model is not included in this chapter, but is provided in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008).

2.2.2 NO-BUILD ALTERNATIVE

The No-Build Alternative

This alternative is retained for detailed study to provide a baseline for comparison to the Detailed Study Alternatives.

Alternative Description. The No-Build Alternative is the baseline alternative for the design year, which is 2030 for this project. In general, the No-Build Alternative assumes that the transportation systems for Gaston County and western Mecklenburg County would evolve as currently planned in the Gaston Urban Area Metropolitan Planning Organization (GUAMPO) *2030 Long Range Transportation Plan* (LRTP) and in the Mecklenburg-Union MPO (MUMPO) *2030 LRTP*, but without the proposed project. In addition, as noted in **Chapter 1 (Section 1.6.2.1)**, the No-Build Alternative also does not assume completion of the US 321 Bypass; funding for that project is too uncertain to assume that it will be completed by 2030.

Traffic operations analyses for the No-Build Alternative are summarized in **Section 1.6.2** and **Figure 1-5**. I-85 in the Project Study Area is projected to operate at LOS E and F in 2030. US 29-74 is projected to operate at LOS F east of McAdenville. I-485 is projected to operate at LOS E.

Decision to Retain as a Baseline for Comparison. The No-Build Alternative would not meet the project's purpose and need. It would not improve mobility, access, or connectivity in southern Gaston County, nor between southern Gaston County and western Mecklenburg County. Also, it would not improve travel times within southern Gaston County nor between southern Gaston County and western Mecklenburg County, nor would it provide a facility that operates at an acceptable level of service in the design year (2030). For this reason, the No-Build Alternative was eliminated from further consideration. However, in accordance with the National

Environmental Policy Act (NEPA) (40 CFR 1502.14(d)) and FHWA guidance (Technical Advisory T 6640.8A; p.16), the No-Build Alternative is given full consideration in this Draft EIS to provide a baseline for comparison with the DSAs.

2.2.3 TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE

Alternative Description. The TSM Alternative includes modest physical and operational enhancements to improve performance, safety, and management of traffic operations without major construction. These improvements may include installing or optimizing traffic signals, adding medians or turn lanes, ramp metering, and other simple measures to improve traffic flow within the Project Study Area. When used, these alternatives generally yield fewer impacts on the environment, shorter implementation schedules for various components, and lower costs; but also reduced benefits.

TSM Alternative

This alternative was eliminated from further study.

Fifty-eight intersection and ramp improvements at nineteen locations were included in the TSM Alternative. The locations and improvements are listed in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008). The nineteen locations include the ramps and/or ramp termini intersections at eleven exits along I-85, six intersections along US 29-74, and two intersections along US 321. The nineteen improvement locations are areas wherein potential deficiencies in intersection or ramp operations became apparent when evaluating year 2025 traffic operations for the Improve Existing Roadways Alternatives (*Phase II Traffic Analysis Technical Memorandum – Gaston County East-West Corridor Study*, PBS&J, February 2004), incorporated by reference.

It was not necessary to reanalyze potential TSM Alternative improvement locations using traffic volumes from the 2030 Metrolina travel demand model because, overall, traffic volumes were higher in the 2030 model, and this would result in the same locations having congestion issues.

Decision to Eliminate from Further Study. TSM improvements alone would not meet the purpose and need of the proposed project, as described below. Therefore, the TSM Alternative was eliminated from further study. Key factors considered in reaching this decision included:

- TSM improvements on I-85 ramps and ramp termini, US 29-74, and US 321 would not noticeably improve mobility, access, or connectivity within southern Gaston County, nor between southern Gaston County and western Mecklenburg County. Travel distances would remain the same, and travel times would not be noticeably reduced.
- Although signal coordination and intersection improvements at I-85 ramp termini and selected locations along US 29-74 and US 321 could provide minimal improvements to traffic flow along US 29-74, US 321, and cross streets over I-85, the volumes of projected traffic would cause congestion and poor levels of service (LOS E or F) on I-85, and congestion would continue on US 29-74 and US 321. These minimal improvements would not be expected to noticeably improve congested vehicle hours traveled or congested vehicle miles traveled in Gaston County compared to the No-Build Alternative.

2.2.4 TRANSPORTATION DEMAND MANAGEMENT ALTERNATIVE

TDM Alternative

This alternative was eliminated from further study.

Alternative Description. The TDM Alternative includes measures and activities that change traveler behavior. Typically, TDM improvements do not involve major capital improvements. The TDM Alternative includes demand management strategies currently being implemented in Gaston and/or Mecklenburg County—such as a freeway management system, staggered work hours, and flex-time (employer-focused); and one additional measure not currently being implemented, involving the conversion of existing lanes on I-85 to high-occupancy vehicle (HOV) lanes or high-occupancy toll (HOT) lanes. North Carolina legislation (NCGS 136-89.187) prohibits "converting any segment of the non-tolled state highway system to a toll facility," so a TDM Alternative involving conversion of existing free lanes on I-85 to HOT lanes is not possible without a change in state law.

The existing freeway management system in the Charlotte region is the Metrolina Transportation Management Center, operated by the NCDOT. This system, which helps optimize the efficiency of the region's traffic operations, includes features such as video cameras and other resources for incident management, dynamic message boards, and real time traveler information (NCDOT Web site: http://www.ncdot.org/doh/Operations/dp_chief_eng/its/aboutITS/tmc.html).

Decision to Eliminate from Further Study. The TDM Alternative was eliminated from further consideration because it would not meet the project's purpose and need. TDM measures would promote ride-sharing, dynamic message boards and other freeway management systems could help optimize traffic operations, and a HOV or HOT lane would provide travel time savings for users.

- TDM measures would not improve mobility, access, or connectivity within southern Gaston County nor between southern Gaston County and western Mecklenburg County. Travel distances would remain the same, and travel times would not be noticeably reduced.
- Freeway management system measures such as dynamic message boards, ramp meters, incident management systems, etc., would help optimize the efficiency of traffic flow on existing I-85, but I-85 would remain congested due to the projected high volumes of traffic. HOV or HOT lanes would improve traffic flow along existing I-85 for travelers using those lanes, but general purpose lanes on I-85 would remain congested. The TDM alternative also would not reduce congestion on US 29-74 and US 321.
- This minimal level of improvements would not be expected to noticeably improve congested vehicle hours traveled or congested vehicle miles traveled in Gaston County compared to the No-Build Alternative.

2.2.5 MASS TRANSIT AND MULTIMODAL ALTERNATIVES

2.2.5.1 Mass Transit Alternative

Mass Transit and Multimodal Alternatives

These alternatives were eliminated from further study.

Alternative Description. The Mass Transit would include bus or rail passenger service. A major advantage of mass transit is it can provide high-capacity, energy-efficient movement in densely traveled corridors. It also serves high- and medium-density areas by offering an option for automobile owners who do not wish to drive, as well as service to those without access to an automobile. For purposes of screening, this alternative is considered in two ways: (1) a version that only includes improvements to existing facilities, and (2) a version that includes construction of transit on dedicated new alignment. The version that only improves existing facilities would include expansion of existing bus routes on existing roadways or potential use of the existing rail corridor that generally parallels I-85 and is currently used for freight traffic and Amtrak passenger rail service (**Section 1.5.2.1**). The version that includes transit on new location would include a dedicated new alignment for light rail or bus rapid transit connecting southern Gaston County to west Mecklenburg County. This new-location transit facility would generally follow the corridors of the proposed new location roadway alternatives. Ideally, this transit service would connect to the planned transit service in the Charlotte Area Transit System (CATS) West Corridor, described below.

Existing transit services in the City of Gastonia and Mecklenburg County are described in **Section 1.5.2.3**. Rail operations (passenger and freight rail) are described in **Section 1.5.2.1**. Separate studies of mass transit are being undertaken in Gaston and Mecklenburg Counties. The status of these transit studies are described herein.

CATS is planning and implementing a major expansion of its mass transit service throughout Mecklenburg County. One of the five major corridors under study is the West Corridor, which extends from uptown Charlotte to Charlotte-Douglas International Airport along the US 29-74 corridor (*2030 Transit Corridor System Plan*, Metropolitan Transit Commission, November 2006). CATS plans to implement enhanced bus service to Charlotte-Douglas International Airport. A streetcar system is planned from uptown Charlotte to the airport beginning in 2024 (Charlotte-Mecklenburg Web site: www.charmeck.org/Departments/CATS/Rapid+Transit+Planning/West+Corridor/).

The City of Gastonia and the GUAMPO studied improving transit in the Gastonia-Charlotte corridor (*Gastonia Rapid Transit Alternatives Study: Corridor and Modal Options,* December 2005). Relevant recommendations from the report included increasing service for Route 85X, the express route from Gastonia to uptown Charlotte, and coordinating with CATS regarding the West Corridor and any improvements into Gaston County.

Decision to Eliminate from Further Study. The Mass Transit Alternative, using expanded bus service on existing roadways or expanded rail service on the existing rail line near I-85, was eliminated from further study because it would not meet the project's purpose and need. The Mass Transit Alternative including bus rapid transit or light rail on new alignment also was eliminated from further study because, although it could provide increased connectivity and mobility, it would not meet the project's purpose and need and would not be financially feasible.

- Mass Transit Improvements on Existing Locations. Expanded bus service that uses existing roadways or rail service that uses the existing rail line near I-85 would not establish direct connectivity within southern Gaston County or between southern Gaston County and west Mecklenburg County. The bus service would continue to use existing roadways projected to operate at poor levels of service (LOS E or F). Neither the bus service nor rail service and would attract enough trips to noticeably reduce vehicle miles traveled and/or congested vehicle miles traveled in Gaston County compared to the No-Build Alternative, nor would travel times or distances noticeably improve. Therefore, this version of the Mass Transit Alternative would not meet the Purpose and Need, and is not a reasonable alternative.

- Mass Transit on New Location. Rapid transit service (bus or light rail) on dedicated new alignment would provide increased mobility between Gaston County and Mecklenburg County by providing an alternative travel mode choice. It could also provide connectivity within southern Gaston County and between southern Gaston County and west Mecklenburg County and provide shorter travel times or distances for the transit users. However, the Mass Transit Alternative on new alignment would carry a much lower volume of trips than a new highway facility and would be ill-suited to the dispersed low-density land uses in southern Gaston County (resulting in even less trips). The resulting lower volume of trips accommodated would not noticeably reduce vehicle miles traveled and/or congested vehicle hours traveled in Gaston County compared to the No-Build Alternative. Therefore, this version of the Mass Transit Alternative would not meet the Purpose and Need, and is not a reasonable alternative.

- Cost Considerations for New Location Mass Transit. Construction costs for a Mass Transit Alternative that is on dedicated new alignment through southern Gaston County and connecting across the Catawba River to Mecklenburg County and CATS' West Corridor would be extensive. For example, the CATS South Corridor Light Rail Project, opened for service in November 2007, had a cost of $462.7 million for the 9.6-mile long project along an existing rail corridor (personal communication, CATS Assistant Project Manager, April 17, 2009). Mass transit on new alignment through the Gaston East-West Connector project study area would be at least 22 miles long (likely longer to connect to the West Corridor). If a 22-mile-long Gaston Mass Transit Alternative light-rail project could be built for the same per-mile cost as the South Corridor project, it would have a cost of at least $1.06 billion In fact, the per-mile cost of a Gaston East-West Connector new location light-rail facility would likely be substantially higher than the South Corridor project, due to inflation, the need to purchase right of way (very little new right of way was required for the South Corridor Light Rail Project since it utilized an existing rail corridor), and the major structures (bridges) that would need to be constructed over the South Fork Catawba River and the Catawba River. Therefore, a 22-mile Gaston East-West Connector new location light rail facility would likely cost much more than the South Corridor light rail project, while serving lower volumes of travelers due to the low-density land uses in the Gaston project area. In addition, there is no program currently in place within North Carolina or in Gaston County to fund such improvements. For all of these reasons, at this time the Mass Transit Alternative would not be financially feasible. The lack of financial feasibility is an additional reason for finding that this alternative is not a reasonable alternative.

2.2.5.2 Multimodal Alternative

Alternative Description. The Multimodal Alternatives would include the Mass Transit Alternative as described above, together with improvements to existing roadways. The roadway improvements could include those described for the TSM Alternative (**Section 2.2.3**) or those described for the Improve Existing Roadway Alternatives (**Section 2.2.6.1**). Thus, the Multimodal Alternative is essentially a combination of the TSM Alternative and the Mass Transit Alternative, or a combination of the Improve Existing Roadways Alternatives and the Mass Transit Alternative. For purposes of screening, this alternative is considered in two ways: (1) a version that only includes improvements to existing facilities, and (2) a version that includes improvements to existing facilities as well as construction of transit on new location.

Decision to Eliminate from Further Study. As described in **Sections 2.2.3, 2.2.5.1,** and **2.2.6.1**, the TSM Alternatives, the Improve Existing Roadways Alternatives, and the Mass Transit Alternatives would not meet the project's purpose and need. Combinations of these alternatives as Multimodal Alternatives also would not meet the project's purpose and need, as described below.

- Improvements on Existing Locations. A Multimodal Alternative could be defined to include expanded bus or rail service that uses existing roadways, together with either TSM improvements or improvements to existing roadways. These potential combinations of roadway and transit improvements would not meet the Purpose and Need. They would not establish direct connectivity within southern Gaston County nor between southern Gaston County and west Mecklenburg County. In addition, these potential combinations would not attract enough trips to noticeably reduce vehicle miles traveled and/or congested vehicle miles traveled in Gaston County compared to the No-Build Alternative, nor would they provide a facility with an acceptable level of service because they would not attract enough trips to change the poor levels of service projected to occur on I-85 and other area roadways under the TSM Alternative or Improvement Existing Roadways Alternatives. Travel times and distances also would not noticeably improve. Because this version of the Multimodal Alternative would not meet the Purpose and Need, it is not a reasonable alternative.
- Roadway Improvements on Existing Locations with Mass Transit on New Location. A Multimodal Alternative also could be defined to include transit on new location in combination with improvements to existing roadways. These potential combinations also would not meet the purpose and need, and would likely be cost-prohibitive. As discussed in **Section 2.2.5.1**, rapid transit service (bus or light rail) on dedicated new alignment would provide increased mobility between Gaston County and Mecklenburg County by providing an alternative travel mode choice. It could also provide some improved connectivity within southern Gaston County and between southern Gaston County and west Mecklenburg County and provide shorter travel times or distances for the transit users (for those who take transit). However, mass transit on new alignment would carry a much lower volume of trips than a new highway facility and would be ill-suited to the dispersed low-density land uses in southern Gaston County. Neither the bus service nor rail service on new alignment would attract enough trips to noticeably reduce vehicle miles traveled and/or congested vehicle miles traveled in Gaston County compared to the No-Build Alternative, nor would it attract enough trips to change the poor levels of service projected to occur on I-85 and other area roadways under the TSM Alternative or Improvement Existing Roadways Alternatives. Travel times and distances also would

not noticeably improve for non-transit users. Therefore, while a Multimodal Alternative with transit on new location would improve mobility for transit users, it would not meet the Purpose and Need and is not a reasonable alternative.

- Cost Considerations for New Location Mass Transit. As discussed in **Section 2.2.5.1**, construction costs for a Mass Transit Alternative that is on dedicated new alignment through southern Gaston County and connecting across the Catawba River to Mecklenburg County would be extensive. Adding TSM improvements or improvements to existing roadways under the Multimodal Alternative would make the Multimodal Alternative with new location mass transit even more expensive than the Mass Transit Alternative. There is no program currently in place within North Carolina or in Gaston County to fund the transit improvements, and at this time the Mass Transit Alternative, and consequently the Multimodal Alternative that includes mass transit on new alignment, are not financially feasible. The lack of financial feasibility is an additional reason for finding that this alternative is not a reasonable alternative.

2.2.6 IMPROVE EXISTING ROADWAYS ALTERNATIVES

2.2.6.1 Alternative Description

This chapter evaluates two versions of the Improve Existing Roadways Alternative using forecasts from the 2030 travel demand model: Scenario 4 and Scenario 8. As described below, these Improved Roadways Alternatives were modeled as Non-Toll Scenarios. Toll Scenarios for these Improve Existing Roadways Alternatives also were considered, as described in **Section 2.2.6.2**.

Improve Existing Roadways Alternatives

The Improve Existing Roadways Alternatives were eliminated from further study.

As analyzed in this chapter, Scenario 4 is a combination of two similar versions of the Improved Roadways Alternative that were known as Scenarios 4+ and 4a. Scenarios 4+ and 4a were developed using forecasts from the 2025 travel demand model. The 2025 forecasts for those two scenarios are documented in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008). Because the 2025 projected daily traffic volumes for these two scenarios were almost the same, and 2025 regional statistics were similar, a single scenario was modeled with the 2030 Metrolina model. This scenario was labeled as "4+/4a" in the October 2008 *Addendum*. For simplicity, it is labeled as "Scenario 4" in this Draft EIS.

Other scenario numbers (Scenarios 1, 2, 3, 5, 5a, 6, and 7), are documented in the *Gaston County East-West Connector Study- Transportation Demand Modeling Technical Memorandum (*Martin/Alexiou/Bryson, February 2005). Scenario 1 was the No-Build Scenario. Scenarios 2 and 3 were interim networks used strictly to evaluate sensitivities in the travel demand model for improvements to existing roadways, and were not developed, nor intended to be developed, as Improve Existing Roadways Alternatives. Scenarios 5, 5a, 6, and 7 were various configurations of the New Location Alternative used to determine sensitivities to number of lanes (four lanes for Scenario 5 or six lanes for Scenario 5a) and location of alignment (Scenarios 6 and 7).

Scenario 4 - Improve I-85 to 8-10 lanes and US 29-74 to 6 lanes plus TSM-type measures.

Roadway improvements included in Scenario 4 are shown in **Figure 2-1**. Scenario 4 would widen I-85 to eight lanes from Exit 10 (US 29-74) to Exit 26 (Belmont) and to ten lanes from Exit 26 to Exit 29 (I-485).

Along US 29-74, the roadway would be widened from four lanes to six lanes on the bridges over the Catawba River and the South Fork Catawba River and along the segment from Myrtle School Road (west of Gastonia) west to I-85. Widening US 29-74 to more than six lanes would not be practicable. There are numerous commercial driveways along US 29-74 and high demand for turn movements at intersections and along each block. It would not be desirable to have an eight-lane cross section on a non-controlled access roadway, as there would be too many lanes for drivers to maneuver across to make turns safely.

Scenario 4 also includes the 58 improvements referenced in the TSM Alternative and additional improvements to I-85 ramps and cross-streets. These are listed in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008).

Scenario 8 - Scenario 4 plus capacity improvements to north-south feeder roads.

Roadway improvements included in Scenario 8 are shown in **Figure 2-2**. Scenario 8 includes widening I-85 to eight lanes from Exit 10 (US 29-74) to Exit 19 (Ozark Avenue) and to ten lanes from Exit 19 (Ozark Avenue) to Exit 29 (I-485). Improvements to US 29-74 and I-85 ramps and cross-streets would be the same as those described for Scenario 4.

In addition, Scenario 8 would include capacity improvements (one lane in each direction) to north-south feeder roads that connect southern Gaston County to US 29-74 and I-85. This scenario was suggested in a general way by some of the state and federal environmental resource and regulatory agencies. This was suggested as a potential way for the Improve Existing Roadways Alternative to meet the connectivity aspect of the project's purpose and need by improving connectivity within southern Gaston County and between Southern Gaston County and Mecklenburg County.

Figure 2-2 shows the north-south feeder roads where capacity improvements were added. The improvements are listed in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008). The list was developed with input from GUAMPO. It does not include all the feeder roads that have exits on I-85, just those that GUAMPO determined would be most effective at improving access between southern Gaston County and I-85 and US 29-74.

2.2.6.2 Improve Existing Roadways Alternatives – Toll Options

Improve Existing Roadways Alternatives Scenario 4 and Scenario 8 include widening I-85 by one to two general purpose lanes in each direction. The new capacity on I-85 could be implemented as toll lanes. By North Carolina law (NCGS 136-89.187), the existing lanes on I-85 cannot be tolled, but the new capacity could be tolled. Tolling new or existing lanes on I-85 would require federal approval, since tolling generally is prohibited on highways constructed with federal-aid (Title 23) highway funds. FHWA could authorize tolling of new lanes under various pilot programs or other authorities. Obtaining permission to toll existing lanes is more difficult, but it

could be allowed under some circumstances. For further information, refer to FHWA Web site: http://ops.fhwa.dot.gov/tolling_pricing/index.htm.

The following paragraphs describe three toll options considered for the new capacity on I-85. These options, from most- to least-intensive improvements and right-of-way requirements, include constructing a fully barrier-separated toll facility, constructing toll or HOT lanes with a lower level of physical separation from the non-toll lanes (such as delineating buffer zones by pavement markings), or reconfiguring existing pavement to add the toll or HOT lanes.

Fully Barrier-Separated Toll Facility on I-85. If the additional one to two lanes were added as a physically-separated toll facility, the toll lanes would be located to the inside of the general purpose lanes. The additional capacity could be in the form of bi-directional or reversible toll lanes. Since there is only a narrow existing median (consisting of a jersey barrier and paved shoulders), new pavement would need to be added to the outside of the existing pavement and the lanes reconfigured.

The physical separation would include jersey barriers, additional shoulders, and access ramps to and from the toll lanes, which would require significantly more right of way than a standard widening. Also, significantly more right of way would be required at interchanges. In this option, the toll lanes would need their own ramps as either nested interchanges with existing non-toll facility ramps, or at new interchanges constructed solely for the toll lanes. The tight spacing of many of the interchanges through Gastonia east of US 321 (about 1 mile apart) would result in the toll lanes having fewer interchanges through Gaston County than the general purpose lanes, and less accessibility for people traveling to/from Gaston County. A fully barrier-separated toll facility could be used by vehicles with and without electronic toll collection, as the controlled access would provide the ability to capture video images of license plates entering and exiting, enabling the NCTA to identify and bill owners of vehicles that have used the toll lanes.

Separated reversible lanes on I-394 in Minneapolis, Minnesota
Source: FHWA

I-405 HOV Lanes in Orange County, CA separated by pavement markings
Source: Charlotte Region Fast Lanes Study

Toll or HOT Lanes on I-85 Not Fully Barrier-Separated. If the additional capacity added to I-85 was constructed with a lower level of physical separation, the right-of-way requirements would still be greater than if the additional lanes were general purpose lanes. As in the previous option, the new lanes would need to be

located to the inside of the general purpose lanes. The new pavement would need to be added to the outside of the existing pavement and the lanes reconfigured.

The separation between the toll/HOT lanes and general purpose lanes would be provided via pavement marking or a physical barrier (such as pylons). The toll/HOT lanes would need additional right of way to account for a recommended minimum four-foot buffer zone between the toll/HOT lanes and the general purpose travel lanes, and a wider (14-foot-wide) inside shoulder to provide room for enforcement activities (*HOV Systems Manual*, National Cooperative Research Program [NCHRP] Report 414, 1998). A separation, or buffer zone, of at least 4 feet is recommended by FHWA as a desirable condition for HOT lanes (*A Guide for HOT Lane Development,* available at the FHWA Web site: www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/13668.html).

Although there would be less physical separation between the toll/HOT lanes and the general purpose lanes, access into and out of the toll/HOT lanes would need to occur at specific locations along the highway in order to capture appropriate toll charges. The access areas could be indicated by changing buffer zone pavement markings to dashed lines, indicating that vehicles can pass into and out of the toll/HOT lanes. Access into and out of the toll/HOT lanes would need to be between interchanges, and designed with sufficient weaving length to allow vehicles to safely enter and exit. There would then need to be sufficient length provided from the access point to the next downstream interchange so vehicles would be able to cross the general purpose lanes to the interchange exit ramp.

Due to close spacing between interchanges on I-85 within the Project Study Area and existing horizontal curvature along the facility, access to/from the toll/HOT lanes would be limited and would not be provided between every interchange. The reduced access points would provide less accessibility to people traveling to/from Gaston County than with a non-toll option for widening I-85.

Reconfigure Existing Pavement on I-85 to Add Capacity. The third option for tolling lanes on I-85 is to reconfigure existing pavement to add one new lane in each direction. This type of option currently is being studied by transportation planners in the Charlotte region as part of the Fast Lanes Study. The Fast Lanes Study, expected to be completed in April 2009, is examining the feasibility of various types of managed lanes (e.g., HOV, HOT, and special use lanes) on major highways within the Charlotte region (Fast Lanes Study project Web site: www.charmeck.org/fastlanes).

For I-85 through the Gastonia area, the Fast Lanes Study is evaluating the feasibility of providing one additional managed lane in each direction by restriping the existing pavement. Currently, I-85 in the Gastonia area has three 12-foot-wide travel lanes in each direction and 10-foot-wide inside and outside shoulders. Restriping the existing pavement could accommodate one additional lane in each direction by reducing the existing inside shoulder to two feet and having the four lanes in each direction be 11 feet wide, which is substandard for an interstate facility.

The reduced shoulder and lane widths are major design exceptions that would need to be approved by NCDOT and FHWA before this reconfiguration could be implemented. The design exceptions likely would not be approved since they would not be consistent with the American Association of State Highway and Transportation Officials (AASHTO) *Policy on Design*

Standards- Interstate System (January 2005), which recommends minimum shoulder widths and states all traffic lanes shall be at least 12 feet wide.

If the new lane added as a result of restriping was a HOT lane, the two-foot shoulder would effectively eliminate the ability for enforcement of the occupancy requirement. Automated vehicle occupancy verification technologies are currently being tested in the United States. However, there is no existing facility that has deployed this technology. A two-foot inside shoulder would make enforcement almost impossible. In addition, installing toll-collection equipment would be a challenge since there would be little room in the center of the roadway for such equipment with such a narrow shoulder.

If the new lane added as a result of restriping was a toll-only lane, the limited two-foot shoulder would be undesirable from a customer-service standpoint. Any vehicles that break down within the single toll lane would block the toll lane until such time that they could be safely removed. Also, the installation of toll equipment within a narrow median/shoulder area could potentially pose design challenges if there are system limitations on the proximity of equipment located overhead and at ground level.

2.2.6.3 Traffic Operations – Improve Existing Roadways Alternatives

Various traffic operations analyses conducted for the Improve Existing Roadways Alternatives using the 2030 Metrolina travel demand model are described in detail in **Appendix C**. These analyses were run for Scenario 4, and the performance of Scenario 8 was assessed based on the results for Scenario 4 as well as previous traffic forecasts (for 2025) for Scenario 8. Conclusions from these analyses are summarized as follows:

- Based on the 2030 Metrolina travel demand model, latent demand for interstate travel exists in the area. As used here, latent demand refers to trips people desire to make over the Catawba River (between Gaston County and Mecklenburg County) that are not being made under existing conditions, but would be made if capacity over the Catawba River was increased.
- Year 2030 regional network statistics project an increase in congested travel with Scenario 4 as compared to the No-Build Alternative. Increased congestion under Scenario 4 is reflected in several measures: vehicle miles of travel (VMT), vehicle hours of travel (VHT), congested VMT, and congested VMT as a percentage of total VMT. This somewhat counter-intuitive result (i.e., improvements to existing roadways result in more congestion) is discussed in more detail in **Appendix C, Section C.1.2**. Briefly, the reason that Scenario 4 results in more congestion overall is that adding capacity to I-85 causes some reduction in congestion on I-85 itself, but I-85 still remains congested and congestion actually increases on other routes that feed into I-85.
- If Scenario 8 were modeled, the traffic forecasts would likely show less congestion than under Scenario 4 because Scenario 8 includes improvements to the north-south feeder routes that serve I-85. Unlike Scenario 4, Scenario 8 may represent a net improvement over the No-Build Alternative in terms of congestion levels. However, the improvements with Scenario 8 would likely be less than improvements achieved with the New Location Alternative. As stated in **Appendix C**, the feeder-road widening in Scenario 8 would allow more traffic to be delivered to the same bottlenecks faster. This alternative would

not produce enough improvements in congestion levels to compete with the New Location Alternatives.

- Only minimal improvements to traffic flow on I-85 would be achieved with the Improve Existing Roadways Alternatives, and I-85 would continue to operate at LOS E and F. Most improvements in traffic flow achieved by increasing additional capacity would be offset by the increase in traffic volumes attracted to the facility.
- If the new lanes on I-85 were tolled, the toll rate could be adjusted to manage the LOS in the tolled lanes, which would improve traffic flow for only those lanes. However, tolled lanes would have less accessibility than if the new capacity was used for general purpose lanes. The existing (non-tolled) lanes on I-85 would remain congested.
- The Improve Existing Roadways Alternatives would not improve east-west connectivity or mobility within southern Gaston County or between southern Gaston County and western Mecklenburg County, and travel times for most intra- and inter-county trips would lengthen compared to the No-Build Alternative. **Appendix C, Section C.2** explains this result. For example, improvements to existing roadways result in longer travel times because the north-south roads in the Project Study Area become more congested with travelers seeking access to the widened I-85.

2.2.6.4 Impact Evaluation – Improve Existing Roadways Alternatives

Several potential impacts were considered in the evaluation of the Improve Existing Roadways Alternatives. Impacts from the toll options for adding new capacity to I-85 under any of the scenarios would be greater than discussed due to the larger footprint required for right of way, particularly at interchanges under the toll option that would construct fully-separated toll lanes.

The estimates of potential impacts were based on information obtained from NCDOT and Gaston County GIS databases, aerial photography, and preliminary field observations.

Impacts to the Human Environment. The following human environment impacts are for improvements to I-85 and US 29-74 and for the improvements along the feeder roads. Potential impacts to the human environment would be greatest for improvements along I-85, US 29-74, US 321, and NC 279.

Relocations and Community Facilities. Widening sections of the north-south feeder roads would impact residences, businesses, churches, and community facilities along all these roadways. In general, potential residential impacts are greatest along existing two-lane routes (such as NC 273, NC 279, and NC 274) where single-family homes and their individual driveways are located on both sides of the roadway. Potential business impacts would be greatest at the intersections along US 29-74 and the I-85 ramps, and on the feeder roads near or between I-85 and US 29-74, such as along US 321 and NC 7.

Parks. Widening of NC 7 through Belmont could impact publicly-owned Crescent Park and the widening of NC 279 could impact the privately-owned Daniel Stowe Botanical Garden.

Historic Sites and Districts. There are approximately twenty historic sites potentially impacted by north-south feeder road improvements. The intersection of US 29-74 and US 321 is located in Gastonia's Downtown Historic District (which is listed in the National Register of Historic

Places), and impacts to the Historic District would be unavoidable. Improvements to US 29-74 (Wilkinson Boulevard) through Belmont could impact the Belmont Historic District.

Hazardous Materials Sites. Two known hazardous material sites could be impacted by widening US 321.

Impacts to the Natural Environment. Where improvements are proposed along US 29-74, there are several stream and floodplain crossings. Six new bridge crossings would be required: one over the Catawba River, one over the South Fork of the Catawba River, and four west of Myrtle School Road. Potential impacts to the natural environment also could occur where widening of I-85 and improvements to feeder roads would cross streams and floodplains.

Potential Engineering Issues. The discussion of potential engineering issues associated with widening I-85 applies whether the widening is tolled or non-toll. However, the engineering issues would be more complex and result in more impacts under the toll options.

Constructability. All interchanges along I-85 within the Project Study Area (a total of 11) would need to be reconstructed in order to meet current design standards (NCDOT and AASHTO) and to provide enough width under bridges to accommodate additional lanes. In addition, there are fifteen cross-street bridges and six railroad bridges that would need to be replaced because of inadequate horizontal clearances for additional lanes.

Maintenance of Traffic and Travel Delays. The reconstruction of interchanges and replacement of structures along I-85 would result in lengthy construction periods with significant travel delays through these construction zones for an extended period of time. There are no controlled-access routes between Gaston and Mecklenburg Counties that could serve as an alternate route to I-85 during construction.

Safety, Bridge Replacement, and Construction Schedule. The construction of new bridge structures would result in increased driver delay and could impact driver safety during the construction period. There could be a delay of ten years or more before widening of I-85 could be completed, resulting in continued driver delays. This estimated construction schedule was based on the NCDOT Division 12 Construction Engineer's professional judgment and experience (Meeting, June 25, 2004).

Diversion of Traffic Patterns. Construction of feeder road improvements outside of urban areas would be disruptive to traffic patterns in southern Gaston County. Improving the feeder routes (while at the same time constructing or making improvements along existing I-85 and US 29-74) would reduce mobility and increase travel times between Gaston and Mecklenburg County during the construction period. Completing I-85 and US 29-74 improvements before or after the feeder roads would extend the construction period, which is already extremely lengthy.

Inconsistency with Local Transportation and Land Use Plans. The Improve Existing Roadways Alternatives would not be consistent with local transportation and land use plans.

2.2.6.5 Decision to Eliminate the Improve Existing Roadways Alternatives Scenarios 4 and 8 from Detailed Study

The reasons for eliminating each of the Improve Existing Roadways Alternative Scenarios from further study are described below. The discussions also address adding the new capacity on I-85 as either non-toll or toll/HOT lanes.

Improve Existing Roadways Alternative Scenario 4. This version of the Improve Existing Roadways Alternative, with new I-85 lanes as non-toll or toll/HOT, was eliminated from further study based on the following reasons:

- Improving existing I-85 and US 29-74 under Scenario 4 (with two to four new I-85 lanes as non-toll or toll/HOT) would not meet the need for mobility, access, and connectivity between southern Gaston County and western Mecklenburg County. Drivers would still have to travel north on two-lane roadways (many through downtown areas and some through historic districts) in order to go east and west. If the new capacity under Scenario 4 was tolled, accessibility of these lanes through Gaston County would be even less than if the lanes were added as general purpose lanes because access would be provided at only limited locations along the roadway.
- Travel times between Gaston and Mecklenburg Counties would not improve compared to the No-Build Alternative, and in many instances would increase (**Appendix C**). If the new capacity on I-85 were tolled, travel-time savings for toll facility users may improve, but some of these savings would be offset because vehicles would still need to drive on congested roadways to reach the interstate. Year 2030 regional network statistics project an increase in congested travel in Gaston County with Scenario 4 as compared to the No-Build Alternative.
- South of US 29-74, there are no continuous east-west roadways in the southern half of Gaston County. Improvements to I-85 (with new I-85 lanes as non-toll or toll/HOT) and US 29-74 considered under Scenario 4 would not improve east-west mobility within southern Gaston County, and travel times for intra-county travel would generally be slightly longer.

PROS	CONS
• Provides additional capacity on I-85 and increases capacity over the Catawba River. • Avoids impacts associated with a new location facility. • If capacity on I-85 added by restriping existing pavement, limited right of way needed.	• Would not improve travel times, mobility, access, or connectivity between southern Gaston County and western Mecklenburg County. • Would not improve travel times, mobility, access, or connectivity within southern Gaston County. • Would result in the greatest construction delays of all alternative concepts. • Would disrupt local and through travelers for an extended period of time. • Bridge deck construction for I-85 widening would require intermittent closures of I-85, with poor alternatives available for off-site detours of I-85 traffic. • If capacity on I-85 added by restriping existing pavement, resulting substandard lane and shoulder widths would require a design exception not likely to be approved by FHWA.

- I-85 is projected to operate primarily at LOS E/F in 2030. Under the Improve Existing Roadways Alternative Scenario 4, most improvements in traffic flow that would be achieved along I-85 by adding additional lanes would be offset by the increase in traffic

volumes attracted to the facility. If the new lanes were toll lanes, traffic flow for those lanes would improve, but traffic flow for the general purpose lanes would not.

- Improving existing I-85 under Scenario 4 would result in travel delays during construction, long construction duration, and community disruption caused by the required improvements to existing I-85. At a minimum, Scenario 4 would require construction at eleven interchanges and fifteen cross-street bridges along I-85 and replacement of six bridges along US 29-74. Constructing the new capacity as a separated toll facility would incur more construction impacts due to the need for wider footprints at interchanges, and possibly new interchanges. There are no controlled-access routes between Gaston and Mecklenburg Counties that could serve as an alternate route to I-85 during construction.
- Improve Existing Roadways Alternative Scenario 4 would not be consistent with the local transportation plans or land use plans.
- Implementing Scenario 4 by reconfiguring existing pavement would avoid the need for additional right of way (and the issues associated with the increased footprint) described above. However, this option would result in substandard lanes and shoulders that would constitute major design exceptions for an interstate facility not likely to be approved by FHWA. Also, as a toll option, the substandard inside shoulder would not allow for toll enforcement activities and would not provide a breakdown lane for disabled vehicles that could block the toll/HOT lanes. Although this option (as an HOV facility or HOT facility) may be found to have merit under the purposes of the Fast Lanes Study (the results of which are to be released in April 2009), it would not meet the purpose and need for this project.

Improve Existing Roadways Alternative Scenario 8. Improve Existing Roadways Alternative Scenario 8, which includes two to four new lanes on I-85 as non-toll or toll/HOT lanes and widening of north-south feeder roads, was eliminated from further study based upon the following reasons:

- Unlike Scenario 4, Scenario 8 includes the widening of the north-south feeder roads from southern Gaston County to provide improved access to the widened I-85 and US 29-74. As a result, it would provide some improvements to connectivity

PROS	CONS
• Provides additional capacity on I-85 and increases capacity over the Catawba River. • Avoids impacts associated with a new location facility. • Provides improvements to congestion in the travel network of Gaston County. • If capacity on I-85 added by restriping existing pavement, limited right of way needed.	• Provides minimal improvements to connectivity between southern Gaston County and western Mecklenburg County. • Would not improve east-west mobility within southern Gaston County. • Provides no travel-time savings compared to the No-Build Alternative. • Would result in the greatest construction delays of all alternative concepts. • Would disrupt local and through travelers for an extended period of time. • Bridge deck construction for I-85 widening would require intermittent closures of I-85, with poor alternatives available for off-site detours for I-85 traffic. • Would have high levels of impacts to the human and natural environments. • If capacity on I-85 added by restriping existing pavement, resulting substandard lane and shoulder widths would require a design exception not likely to be approved by FHWA.

between southern Gaston County and western Mecklenburg County. However, these improvements in connectivity would be minimal. Motorists in southern Gaston County would still have to travel north on non-controlled access roadways, many through downtown areas, and some through historic districts, in order to travel east and west. Even considering the improvements to approximately 51 miles of north-south feeder roads included in Scenario 8, connectivity between southern Gaston County and western Mecklenburg County would still not be direct.

- Travel times between Gaston and Mecklenburg Counties would not improve compared to the No-Build Alternative, and in many instances would get longer. 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 would need to use I-85 or US 29-74 to cross over the rivers, and this routing constrains traffic flow. Travel times under Scenario 8 likely would be shorter than under Scenario 4, as more capacity is provided on north-south feeder roads, but travel-time savings would not reach the levels achieved by a New Location Alternative, as discussed in **Appendix C**. Also, congested vehicle miles traveled and congested vehicle hours traveled likely would be less than under Scenario 4, but would not show the same improvements achieved by the New Location Alternative.
- Improvements to I-85 and US 29-74, and the additional improvements to north-south feeder roads proposed under Scenario 8, would not improve east-west mobility or travel times within southern Gaston County.
- Scenario 8 is neither a reasonable nor practicable alternative due to travel delays during construction, long construction duration, and community disruption caused by the required improvements to existing I-85 and, under Scenario 8, the 51 miles of north-south feeder roads in the Project Study Area to improve access to the interstate. Scenario 8 would, at a minimum, require construction at eleven interchanges and fifteen cross-street bridges along I-85 and replacement of six bridges along US 29-74. Constructing the new capacity as a separated toll facility would incur more construction impacts due to the need for wider footprints at interchanges, and possibly the need for new interchanges. Scenario 8 also would require replacing ten bridges along the feeder roads. There are no controlled-access routes between Gaston and Mecklenburg Counties that could serve as an alternate route to I-85 during construction.
- Scenario 8 would impact the human environment considerably within the entire Project Study Area, with impacts to businesses, residences, community facilities, historic sites, safety, and travel patterns.
- Improve Existing Roadways Alternative Scenario 8 would not be consistent with the local transportation plans and land use plans.

2.2.7 NEW LOCATION ALTERNATIVE

New Location Alternative

The New Location Alternative Toll Scenario was retained for detailed study. The New Location Alternative Non-Toll Scenario was eliminated from further study.

2.2.7.1 Alternative Description

During the First Screening, the New Location Alternative was developed as a controlled-access highway represented by the conceptual alignment and interchange locations in the GUAMPO *2030 LRTP* for STIP Project U-3321. The GUAMPO conceptual alignment for STIP Project U-3321 is shown in **Figure 1-2.**

The New Location Alternative would extend from I-85 west of Gastonia, through southern Gaston County, to connect to I-485 and NC 160 in western Mecklenburg County. There would be new bridge crossings of the South Fork Catawba River and the Catawba River.

Freeway-to-freeway interchanges would be provided at I-85 and at I-485. Service interchanges were assumed at nine to ten locations: US 29-74, Linwood Road, Lewis Road (only included in some alignments), US 321, Robinson Road, Bud Wilson Road, NC 274 (Union Road), NC 279 (New Hope Road), NC 273 (Southpoint Road), and Dixie River Road.

One of the primary needs for the project is to improve mobility, access, and connectivity within southern Gaston County and between southern Gaston County and western Mecklenburg County. Alignments in the northern half of Gaston County would not serve the southern half of Gaston County.

2.2.7.2 Traffic Operations – New Location Alternative

Various traffic operations analyses conducted for the New Location Alternative using the 2030 Metrolina travel demand model (Toll and Non-Toll Scenarios) are described in detail in **Appendix C**, together with the Improve Existing Roadways Alternatives. Conclusions from these analyses are summarized below:

- Based on the 2030 Metrolina travel demand model, some diversion of traffic off of I-85 and US 29-74 is projected to occur in 2030 if a New Location Alternative (Toll or Non-Toll Scenario) is built. Due to the latent demand for travel between Gaston and Mecklenburg counties, the diversion of some traffic off I-85 would be partially offset because some trips that currently use other facilities would be attracted *to* I-85 as it becomes less congested.
- Based on the 2030 Metrolina travel demand model, 2030 regional network statistics demonstrate a reduction in congested travel for a New Location Alternative, with the Toll Scenario demonstrating the best performance compared to all alternatives.
- Traffic operations would improve on I-85 and on segments of US 29-74 with the New Location Alternative (Toll or Non-Toll Scenario) compared to the No-Build Alternative, since there would be less traffic on I-85 and US 29-74 (**Appendix C, Table C-2**). The New Location Alternatives would provide travelers an alternate facility that would operate at acceptable levels of service (based on year 2030 projected traffic volumes).

- The New Location Alternative (Non-Toll and Toll Scenarios) would improve east-west transportation mobility, access, and connectivity within southern Gaston County and between southern Gaston County and western Mecklenburg County, and also would improve travel times for intra- and inter-county travel.

2.2.7.3 Decision to Retain the New Location Alternative Toll Scenario for Detailed Study and Eliminate the New Location Alternative Non-Toll Scenario

The New Location Alternative (Non-Toll and Toll Scenarios) would meet the project's purpose and need. Also, this alternative concept would be consistent with local transportation plans. However, only the Toll Scenario is retained for detailed study, because the Non-Toll Scenario is not financially feasible. The reasons for retaining the Toll Scenario and eliminating the Non-Toll Scenario are summarized below:

- The New Location Alternative Non-Toll or Toll Scenarios would both improve connectivity and shorten travel distances between southern Gaston County and western Mecklenburg County by linking the counties with a new crossing of the Catawba River.

PROS	CONS
• Improves connectivity and travel times between southern Gaston County and western Mecklenburg County by providing a new crossing of the Catawba River. • Improves connectivity, mobility, and travel times within southern Gaston County. • Improves traffic flow and some levels of service on I-85, US 29-74, and US 321. • Could serve as a controlled-access alternate route during incidents on I-85. • Legislation passed in July 2008 to fund bond financing for tolled facility.	• A New Location Alternative Non-Toll Scenario is not financially feasible within the long-range planning timeframe of 2030. • A new location highway would have substantial construction and right-of-way costs. • Impacts to the natural environment would likely be greatest compared to the other alternative concepts.

- Substantial travel time savings for inter-county travel would be achieved by the New Location Alternatives (Toll and Non-Toll) compared to the No-Build Alternative.

- The New Location Alternative Toll and Non-Toll Scenarios would both improve mobility, access, connectivity, and travel times within southern Gaston County by providing a direct and continuous east-west route across this part of the county on a facility that would operate at acceptable levels of service in the design year (2030).

- Traffic flow on I-85, US 29-74, and US 321 would improve under the New Location Alternative Toll and Non-Toll Scenarios because traffic would divert from these roads to use the new highway. Also, when incidents occur on I-85 (or on the New Location Alternative), there would be another controlled-access route available.

While the New Location Alternative Non-Toll Scenario would meet the purpose and need, it is not financially feasible. The current NCDOT *2009–2015 STIP* includes the project as a toll facility, and traditional (non-toll) transportation funding for this project is not likely in the foreseeable

future (as acknowledged in the May 21, 2007, letter from the NCTA to the NCDOT [**Appendix A-5**]). GUAMPO, as part of the metropolitan planning process, has decided to allocate the limited available federal and state funds to other projects. In the *2030 LRTP*, the Gaston East-West Connector is listed as the No. 1 project on the Unmet Needs List. In September 2000, the GUAMPO TAC passed a resolution stating that it supports the use of alternative funding methods, including methods that would require the payment of a toll by motorists (GUAMPO, *2030 LRTP*, May 2005).

Based on preliminary traffic and revenue forecasts, the NCTA determined that the Gaston East-West Connector is financially feasible with the collection of tolls. Using tolls, the NCTA can provide the funding and construct the project many years earlier than with traditional funding sources. Using tolls as the funding mechanism for construction and maintenance allows needed capacity to be added when budget shortfalls would other wise prevent or delay completion of critical projects.

Based on these planning decisions, the New Location Alternative Non-Toll Scenario is not financially feasible and, consequently, is not considered a reasonable alternative. The New Location Alternative Toll Scenario is considered financially feasible because toll revenues would provide a substantial funding source that could be used to support bond financing. In addition, legislation was passed in July 2008 authorizing $35 million annually for the life of the bonds to help cover the "gap" between toll revenues and revenues needed to cover bond financing needs (NCGS 136-176). Therefore, only the New Location Alternative Toll Scenario is carried forward for detailed study.

2.2.8 SUMMARY OF FIRST SCREENING RESULTS

Each of the basic alternative concepts listed in **Section 2.2.1** was evaluated to determine if they were reasonable and practicable, based upon their ability to meet the project's purpose and need, potential impacts, and their financial feasibility.

Table 2-1 summarizes the results of the First Screening – Project Concepts process. Based on the First Screening, the New Location Alternative Toll Scenario is carried forward for detailed study.

TABLE 2-1: Summary of Results for First Screening – Project Concepts

Project Concept	Ability to Meet Purpose and Need*			Decision to Eliminate/ Retain for Second Screening	Reason for Decision
	Reduces Travel Times/ Distances	Provides a Transportation Facility with Acceptable Levels of Service in the Design Year	Reduces Congested Vehicle Miles and/or Congested Vehicle Hours Traveled Compared to No-Build Alternative		
TSM Alternative	✖	✖	✖	Eliminated	Does not meet the project's purpose and need.
TDM Alternative	✖	✖	✖	Eliminated	Does not meet the project's purpose and need.

TABLE 2-1: Summary of Results for First Screening – Project Concepts

Project Concept	Ability to Meet Purpose and Need*			Decision to Eliminate/ Retain for Second Screening	Reason for Decision
	Reduces Travel Times/ Distances	Provides a Transportation Facility with Acceptable Levels of Service in the Design Year	Reduces Congested Vehicle Miles and/or Congested Vehicle Hours Traveled Compared to No-Build Alternative		
Mass Transit Alternative – Transit on Existing Alignment	✖	✖	✖	Eliminated	Does not meet the project's purpose and need.
Mass Transit Alternative – Transit on New Alignment	✓ (for transit users only)	✓ (for transit users only)	✖	Eliminated	Does not meet the project's purpose and need. Not financially feasible.
Multimodal Alternative – Transit on Existing Alignment	✖	✖	✖	Eliminated	Does not meet the project's purpose and need.
Multimodal Alternative – Transit on New Alignment	✓ (for transit users only)	✓ (for transit users only)	✖	Eliminated	Does not meet the project's purpose and need. Not financially feasible.
Improve Existing Roadways Alternative – Scenario 4 – Toll or Non-Toll on I-85	✖	✖	✖	Eliminated	Does not meet the project's purpose and need.
Improve Existing Roadways Alternative – Scenario 8 – Toll or Non-Toll on I-85	✖	✖	✖	Eliminated	Minimal improvements do not meet project's purpose and need. High levels of impacts.
New Location Alternative – Non-Toll Scenario	✓	✓	✓	Eliminated	Meets the project's purpose and need. Not financially feasible.
New Location Alternative – Toll Scenario	✓	✓	✓	Retained	Meets the project's purpose and need. Is financially feasible. Retained for detailed study.
No-Build Alternative	✖	✖	✖	Retained	Retained for comparison purposes.

***** See **Sections 1.2 and 1.3** of this Draft EIS for details on the purpose and need for the project. The column headings are abbreviations for the evaluation measures listed in **Section 1.3**.

✖ - means the alternative concept cannot meet this evaluation factor.

✓ - means the alternative concept does meet, or could be designed to meet, this evaluation factor.

2.3 SECOND SCREENING – PROJECT CORRIDORS

2.3.1 METHODOLOGY FOR SECOND SCREENING

2.3.1.1 Introduction

The Second Screening focuses on the alternative concept that made it through the First Screening (the New Location Alternative Toll Scenario). The Second Screening involves two main steps:

- Step 1 involved developing and analyzing "Preliminary Corridor Segments" for the New Location Alternative concept. Preliminary Corridor Segments were 1,200 feet wide. They were evaluated to determine which specific segments should be advanced for consideration as "Functional Design Corridors."
- Step 2 involved developing designs within the Functional Design Corridors that were selected in Step 1. The Functional Design Corridors were 1,400 feet wide. They were evaluated to determine the Detailed Study Alternatives (DSAs) – that is, the corridors that will be studied in detail in this Draft EIS. Preliminary engineering was then developed for each of the DSAs.

In the Second Screening, alternative corridors generally were eliminated based on being less "desirable" than other alternative corridors, rather than on a finding of unreasonableness. In accordance with guidance from the Council on Environmental Quality (CEQ), this approach is appropriate when there are large numbers of potentially reasonable alternatives. Only a reasonable number of examples must be analyzed and compared in the EIS (*Forty Most-Asked Questions Regarding CEQ's NEPA Regulations*, Question 1.b., CEQ Web site: www.nepa.gov/nepa/regs/40/40P1.htm).

The Second Screening process and decisions were originally based on a non-toll version of the New Location Alternatives, but they also apply to the toll facility version. The functional engineering designs of the alternatives would be similar enough to not make a significant, or even notable, difference in the construction footprint used to estimate impacts in the Second Screening.

There are few differences in the designs of the non-toll facility compared to the toll facility. The toll facility's toll-collection process is proposed to be solely electronic, avoiding the need for cash toll booths, which may have a construction footprint that would be wider than a non-toll facility. Some interchange ramps may have a slightly different alignment between a non-toll facility and a toll facility to ensure that electronic toll-collection sensors have adequate line-of-sight to vehicles. This difference in interchange ramp alignments would not change the basis of the decision-making, as documented in Part II of the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008).

2.3.1.2 Evaluation Process

The process used to develop and evaluate preliminary alternatives to ultimately determine DSAs is summarized in the flowchart in **Section 2.1.1** and described in detail below.

1. A **Refined Study Area** for the New Location Alternatives was identified, relying upon land suitability mapping (**Section 2.3.2.1**).
2. Numerous 1,200-foot-wide **Preliminary Corridor Segments** were developed within the Refined Study Area using the land suitability mapping and design criteria. These **Preliminary Corridor Segments** (approximately 116 miles of corridors) were presented to the public at the first series of Citizens Informational Workshops in September and December 2003 (**Chapter 9** provides more detail on public involvement).
3. **Second Screening Step 1 - Preliminary Corridor Segments** were reviewed with local, state, and federal resource and regulatory agencies to determine if any should be eliminated based upon "fatal flaws" or high levels of estimated impacts to the human and/or natural environments, as compared to other segments under consideration.
4. The remaining **Preliminary Corridor Segments** (approximately 72 miles) were connected to form endpoint-to-endpoint corridors from I-85 to I-485 and the corridor width was extended from 1,200 feet to 1,400 feet in order to allow for more flexibility in establishing alignments.
5. Functional designs were prepared within these corridors, taking into consideration engineering design constraints and the locations of known sensitive human and natural resources. These are referred to as the **Functional Design Corridors**. The 1,400-foot-wide Functional Design Corridor boundaries then were shifted to be centered around the functional design alignments.
6. **Second Screening Step 2** - Impacts to the natural and human environments based on the functional designs within the Functional Design Corridors were estimated and tabulated. There were 90 possible endpoint-to-endpoint combinations of **Functional Design Corridors** evaluated.
7. From the set of Functional Design Corridors, sixteen **DSAs** were recommended based upon estimated impacts to the natural and human environments, engineering design considerations, and input from local, state, and federal resource and regulatory agencies. These recommendations were presented to the public for comment and input at the second series of Citizens Informational Workshops in January and February 2006.
8. **Preliminary engineering designs** were developed for the 16 DSAs, based on 2030 Non-Toll Scenario traffic forecasts.
9. **New information** became available after the DSAs were identified and preliminary engineering designs completed. The new information included:
    - New information provided by Duke Energy Corporation regarding Allen Steam Station operations.
    - New traffic forecasts for various year 2030 scenarios, including the New Location Alternative Toll Scenario.
10. **Four DSAs were eliminated** due to unavoidable interference with critical operations at Duke Energy Corporation's Allen Steam Station.
11. The **2030 Toll Scenario traffic forecasts** were used to verify that the DSAs' preliminary engineering designs would provide adequate capacity for implementing the project as a toll facility.

2.3.1.3 Design Criteria

The design criteria used to develop the Preliminary Corridor Segments and Functional Design Corridors were based upon the project's location, function, classification, and design speed. The design criteria conform to the standards established in the *Roadway Design Manual* (NCDOT, 2002) and *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2004).

The typical roadway cross section for the New Location Alternative is shown in **Figure 2-3**. The design criteria and typical roadway cross-section are influenced by the type of facility required to fulfill the project's purpose and need. For the proposed project, a six-lane, median-divided, controlled-access highway was determined necessary for adequately carrying projected 2025 non-toll traffic volumes.

The 2025 Non-Toll Scenario traffic forecast was the one available at the time the Preliminary Corridor Segments and the Functional Design Corridors were developed. When the Functional Design Corridors were developed, the project was being potentially considered as either a toll facility or a non-toll facility, and traffic volumes for a non-toll facility were expected to be higher. Functional designs created based upon the higher volumes (non-toll) also would function if the project were a toll facility.

The proposed design speed is 70 miles per hour (mph) for the mainline of the New Location Alternative, with a posted speed limit of 65 mph. The functional designs include three 12-foot lanes for each direction of travel, separated by a 46-foot median. The total right of way is proposed to be a minimum of 300 feet. Right-of-way requirements would be more extensive around interchanges. Interchange locations were chosen to be consistent with the GUAMPO *2030 LRTP*.

The functional designs were based on 2025 traffic forecasts for a Non-Toll Scenario. The traffic forecasts for the 2030 Toll Scenario may indicate that four lanes may be sufficient. If the number of lanes is reduced from six to four, that reduction would be achieved by removing the two lanes in the center. The outside footprint of the project would remain the same. The number of lanes and median width will be confirmed prior to the Final EIS.

2.3.1.4 Evaluation Criteria

The factors listed in **Table 2-2** were considered in the evaluation and screening (Second Screening Steps 1 and 2) of Preliminary Corridor Segments and/or the Functional Design Corridors. Data on these factors were obtained from GIS databases (NCDOT, Gaston County, Mecklenburg County), US Geological Survey (USGS), USFWS, state resource agency files, aerial photography, and field visits.

TABLE 2-2: Second Screening Evaluation Factors

Factor	Impact Estimate Method		Source of Data
	Second Screening Step 1 – Evaluate Preliminary Corridor Segments	Second Screening Step 2 – Evaluate Functional Design Corridors	
Length	Miles	Miles	Measured
Number of Interchanges	Number along corridor	Number along functional design	Based on proposed project as listed in the GUAMPO *2030 LRTP* and design constraints
Construction Cost (Millions $) (2005 dollars)*	Not calculated	2005 dollars based upon functional design estimated quantities	Based upon standard unit costs
Number of Minor Road Crossings	Number counted along corridor segments	Number counted along functional designs	GIS databases
Number of Major Power Easement Crossings	Number counted along corridor segments	Number counted along functional designs	GIS databases, aerial photography
Number of Railroad Line Crossings	Number counted along corridor segments	Number counted along functional designs	GIS databases, aerial photography
Residential Relocations	Number counted within corridor segments	Number counted within functional design footprints	GIS databases, tax-parcel mapping, aerial photography
Business Relocations	Number counted within corridor segments	Number counted within functional design footprints	GIS databases, tax-parcel mapping, aerial photography
Low-Income or Minority Populations	Present within corridor segments	Present within corridor segments	Census data
Parks/Recreation Sites	Number counted within a 300-foot- wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
Schools/Libraries/ Fire Stations	Number counted within a 300-foot- wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
Churches	Number counted within a 300-foot-wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
Cemeteries	Number counted within a 300-foot-wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
National Historic Register Sites	Number counted within a 300-foot-wide alignment centered in the corridor segments	Number counted within functional designs	NC State Historic Preservation Office, GIS databases
Properties Potentially Eligible for National Register	Number counted within a 300-foot-wide alignment centered in the corridor segments	Number counted within functional designs	*Phase I Historic Architectural Resources Survey for the Gaston East-West Connector* (Mattson, Alexander, and Associates, 2003)

TABLE 2-2: Second Screening Evaluation Factors

Factor	Impact Estimate Method		Source of Data
	Second Screening Step 1 – Evaluate Preliminary Corridor Segments	Second Screening Step 2 – Evaluate Functional Design Corridors	
Hazardous Materials and Superfund Sites	Number counted within corridor segments	Number counted within functional design footprints	GIS databases, NCDENR
Streams	Linear feet within the corridor segments	Linear feet within functional design footprints	GIS databases
	Number of crossings based on the corridor centerline	Number of crossings based on the functional design centerline	GIS databases
Wetlands	Acres within the corridor segments	Acres within functional designs	USFWS National Wetland Inventory Maps
Floodplains	Linear feet crossed by corridor centerline	Linear feet crossed by functional design centerline	GIS databases
Protected Species and Natural Heritage Program Occurrences/Sites	Number counted within corridor segments	Number counted within functional designs	NC Natural Heritage Program
Watersheds	Number counted within corridor segments	Number counted within functional designs	GIS databases
303(d) Listed Streams	Number counted within corridor segments	Number counted within functional design footprints	NCDENR Division of Water Quality
Groundwater Discharge Sites	Number counted within corridor segments	Number counted within functional design footprints	GIS databases

Source: *Addendum to the Alternatives Development and Evaluation Report* , PBS&J, October 15, 2008.

* Construction costs for the second screening were estimated in 2005 dollars because that is the time period in which the costs used in the second screening comparisons were calculated.

The criteria listed in **Table 2-2** are discussed below:

Design Factors. Length, number of interchanges, number of minor road crossings, number of major power easement crossings, and number of railroad line crossings affect the design and construction costs of an alternative. Longer corridors with higher numbers of interchanges, grade-separated road crossings, and easement crossings generally have higher costs.

Socioeconomic Criteria. Socioeconomic criteria included residential and business relocations and impacts to community facilities (churches, libraries, parks, etc.). Corridor locations contributing to excessive community disruption or isolation were avoided where possible. A higher number of minor road crossings can indicate more disruptions to neighborhoods. Relocations of residences and businesses (and associated social or economic impacts) are often of greatest concern to the public and local officials. A higher number of residential and business relocations also represents higher right-of-way costs.

Historic Resource Criteria. A *Phase I (Reconnaissance Level) Historic Architectural Survey for the Gaston East-West Connector* (Mattson, Alexander and Associates, May 2003), incorporated

by reference, was conducted to identify known historic sites and additional properties potentially eligible for the National Register of Historic Places. Known and potential historic properties were avoided to the extent possible in the development of Preliminary Corridor Segments and Functional Design Corridors. The Phase I study was later updated for the DSAs in the *Phase II Architectural Resources Report, Gaston East-West Connector* (Mattson, Alexander, and Associates, February 2008), incorporated by reference, and available on the NCTA Web site (www.ncturnpike.org/projects/gaston).

Hazardous Materials Sites. Known sites of hazardous materials or waste were obtained from the NCDOT GIS database, and more detailed information was obtained for some sites from research at the NC Department of Environment and Natural Resources (NCDENR). Remediation and acquisition activities associated with hazardous materials/waste sites can increase project costs and delay construction schedules. These types of sites were avoided in the development of Preliminary Corridor Segments and Functional Design Corridors, whenever practicable.

Natural Resource Criteria. Construction in jurisdictional resources (e.g., wetlands, ponds, and streams that would require mitigation if impacted) requires a permit from the USACE pursuant to Section 404 of the Clean Water Act, and a permit from NCDENR pursuant to Section 401 of the Clean Water Act. USACE and NCDENR require a permit applicant to demonstrate that all practical measures have been taken in order to avoid and minimize wetland and stream impacts.

Impacts to floodplains and streams indicate areas where culverts or bridges may be required, which represent increases in construction costs. Higher values for total lengths of streams and floodplains within a corridor can indicate that there will be less flexibility in designing roadway alignments within these corridors that avoid or minimize impacts to streams and floodplains.

None of the Preliminary Corridor Segments encroached upon recorded protected species sites or watersheds/public water resources. Therefore, these two factors are not discussed in the evaluations described below.

2.3.2 DEVELOPING THE PRELIMINARY CORRIDORS

2.3.2.1 Land Suitability Mapping

Land suitability mapping was developed for the Project Study Area by identifying constraints presented by major features of the natural and human environments. As described above, data sources included aerial photography, USGS topographic information, GIS databases from NCDOT, Gaston County, and Mecklenburg County, state resource agency files, stakeholder interviews, and field visits.

The land suitability mapping information was used to create a Refined Study Area within the overall Project Study Area that was suitable for developing Preliminary Corridor Segments for the New Location Alternatives. The Refined Study Area for New Location Alternatives is shown in **Figure 2-4**.

Primary constraints in establishing the northern boundary of the Refined Study Area included the more densely developed areas within the City of Gastonia municipal boundaries, Gastonia

Municipal Airport, and the water supply watershed located on either side of the Catawba River in Belmont.

To the south, constraints included the North Carolina/South Carolina state line and the Daniel Stowe Botanical Garden. I-485 and Charlotte-Douglas International Airport comprise the eastern boundary. The western boundary is Crowders Mountain State Park.

2.3.2.2 Preliminary Corridor Segments

Using the land suitability mapping described above, 107 Preliminary Corridor Segments (totaling approximately 116 miles) were developed. The Preliminary Corridor Segments are shown in **Figure 2-5a–b.**

Major constraints considered in the development of the Preliminary Corridor Segments are described below. The Refined Study Area was divided into three parts for this discussion: West Portion (from I-85 to US 321), Central Portion (US 321 to the vicinity of NC 279 or the South Fork Catawba River), and East Portion (from the vicinity of NC 279 or the South Fork Catawba River to I-485).

West Portion Preliminary Corridor Segments are labeled beginning with "A" or "B." They can be categorized into four general routes that link I-85 to US 321. The routes include corridors in the east that follow Crowders Creek, corridors in the west that are near Crowders Mountain State Park, and corridors that criss-cross between the east and west corridors.

Central Portion Preliminary Corridor Segments are labeled beginning with "C," "D," or "E." These corridors start at two general locations on US 321 and extend to one of five crossings of the South Fork Catawba River.

East Portion Preliminary Corridor Segments are labeled beginning with "F" or "G." They begin at the five crossings of the South Fork Catawba River and end at two locations on I-485. Most of these corridors are located north of the Duke Energy Corporation's Allen Steam Station power plant. Three preliminary corridor routes were located south of the Allen Steam Station power plant.

All Preliminary Corridor Segments were 1,200 feet wide. The Preliminary Corridor Segments were located to avoid or minimize impacts to known natural and human resources, whenever possible. Those segments that most closely correspond to the alignment shown in the GUAMPO Thoroughfare Plan and LRTP are noted in the descriptions below.

West Portion Preliminary Corridor Segments. Notable natural resources in the West Portion of the Refined Study Area include Crowders Creek and its named (Abernethy Creek, Oates Creek, Blackwood Creek, Ferguson Branch, and McGill Branch) and unnamed tributaries, and a Natural Heritage Program (NHP) site, Site No. A04 – Stagecoach Road Granitic Outcrop. Crowders Creek has a 100-year floodplain defined and is also a 303(d) listed stream, meaning its water quality has been determined by NCDENR Division of Water Quality (NCDWQ) as being impaired. The NC Natural Heritage Program (NCNHP) site is located on privately-owned land just south of Blackwood Creek and west of Stagecoach Road (SR 1136).

Belfast Drive – A Neighborhood Area in West Portion of Refined Study Area
Source: PBS&J

Notable human resources in the West Portion include numerous churches, neighborhoods, and subdivisions; several schools and potential historic sites; and the Linwood Springs Golf Course (which is privately-owned but open to the public). A parallel railroad track is directly adjacent and east of US 321. There is also a dormant Superfund site located between Forbes Road to the south and Crowders Creek Road to the north.

Engineering design considerations include the need to provide appropriate spacing between a new I-85 interchange and adjacent I-85 interchanges, and the need to provide adequate horizontal curvature along each corridor length to accommodate the 70 mph design speed. Bessemer City has expressed a need to maintain access to the interstate at Exit 13 (Edgewood Road).

The potential locations for a new interchange on I-85 in the Refined Study Area are highly constrained. Existing I-85 interchanges in the Refined Study Area include Exit 10 (US 29-74), Exit 13 (Edgewood Road), Exit 14 (NC 274 [Bessemer City Road]), and Exit 17 (US 321). At all potential locations, the first upstream and first downstream existing interchanges on I-85 would need to be modified to accommodate the new interchange. Also in this area, an interchange with US 29-74 is proposed. US 29-74is about one-half to one mile south of I-85 in this area and Crowders Creek runs parallel to the south of US 29-74. There are two major tributaries to Crowders Creek that run north-south, crossing under I-85 between Exit 13 (Edgewood Road) and Exit 14 (NC 274 [Bessemer City Road]). Crowders Mountain State Park constrains the western limits. Sadler Elementary School (opened in 2005) is located on the north side of US 29-74, just west of Edgewood Road.

The potential for the roadway to be extended north of I-85 sometime in the future (by constructing the US 321 Bypass) also was considered. The US 321 Bypass is shown on the Gaston Urban Area Thoroughfare Plan, but would be developed as an independent project if funded and programmed some time in the future. The alignment and location of the termini at I-85 took into account features to the north of I-85, including the downtown area of Bessemer City. The Gaston East-West Connector is being developed in a manner that allows for, but does not require, the future completion of the US 321 Bypass.

The segments that most closely correspond to the alignment shown on the Gaston Urban Area Thoroughfare Plan are Preliminary Corridor Segments A3, A6, and B3. Most of the area of these segments is within the 100-year floodplain of Crowders Creek. Therefore, Preliminary Corridor Segments A4, A7, and B4 were created and shifted eastward slightly to stay out of Crowders Creek's 100-year floodplain as much as possible, while still trying to minimize residential impacts.

Central Portion Preliminary Corridor Segments. Notable natural resources in the Central Portion of the Refined Study Area include tributaries of Crowders Creek, including a major tributary of Crowders Creek that runs north to south just east of US 321 and other unnamed tributaries. Other creeks in this area are Mill Creek and Catawba Creek (and their tributaries), which are tributaries of the Catawba River.

Catawba Creek (Source: S&ME)

There also is a 152-acre conservation easement that lies partially within Preliminary Corridor Segments E6 and E7 on property owned by Duke Ventures LLC (the real-estate arm of Duke Energy Corporation) (**Figure 2-5b**). This conservation easement was secured by the Catawba Lands Conservancy, a non-profit regional land trust serving the Lower Catawba River Basin. According to the conservancy, this property includes steep slopes, mature hardwood forests, pine forests, extensive wetlands, and important riparian buffers along Catawba Creek and numerous tributaries.

Carolina Speedway on Union Road
Source: PBS&J

Notable human resources in the Central Portion include numerous churches and subdivisions and several historic sites. Forestview High School, W.A. Bess Elementary School, and the Union Road Branch Library are located on NC 279 (Union Road) south of Beaty Road (**Figure 2-5b**). Just south of the NC 279 (Union Road) intersection with Union-New Hope Road, on the east side of Union Road, is the privately-owned Carolina Speedway. It is approximately 28 acres in size and includes a dirt-track speedway and bleachers.

The following Preliminary Corridor Segments, from west to east, are similar to the alignment shown on the Gaston Thoroughfare Plan: C1, C5, C8, D2, D4, D8, D9, E3, and E8.

South Fork Catawba River
Source: PBS&J

East Portion Preliminary Corridor Segments. Notable natural resources in the East Portion of the Refined Study Area include the South Fork Catawba River, Catawba River, and Beaverdam Creek. When possible, the Preliminary Corridor Segments cross these rivers at narrow areas and in a perpendicular manner.

In Mecklenburg County, there is undeveloped parkland (Berewick District Park, owned by the county) on the north side of Dixie River Road, directly west of I-485.

Notable human resources in this portion of the Refined Study Area include several historic sites and churches and numerous subdivisions, including riverfront developments. Other features include the Allen Steam Station power plant and associated facilities, and a planned intermodal facility and new runway at Charlotte-Douglas International Airport.

The Allen Steam Station is on the Belmont peninsula—the land between the South Fork Catawba River and Catawba River (**Figure 2-5b**). The Allen Steam Station is a major coal-fired power plant owned and operated by Duke Energy Corporation. It began operations in 1957 and currently serves more than one million homes. Facilities associated with the power plant include a water discharge canal, air pollution control facility and associated future landfill, fly ash basins, rail line, and numerous major power-line easements. These facilities are described below.

Allen Steam Station
Source: PBS&J

North of the power plant building, Duke Energy Corporation is constructing new pollution control devices at the Allen Steam Station to comply with the NC Clean Smokestacks Bill enacted in June 2002. In 2006, the Allen Steam Station began installing flue gas desulfurization equipment, commonly known as scrubbers. The project is expected to be completed in 2009 (Duke Energy Corporation Web site: www.duke-energy.com). The scrubbers are located within Preliminary Corridor Segments G3 and G-X14, which are the corridor segments similar to the Gaston Urban Area Thoroughfare Plan alignment (**Figure 2-5b**).

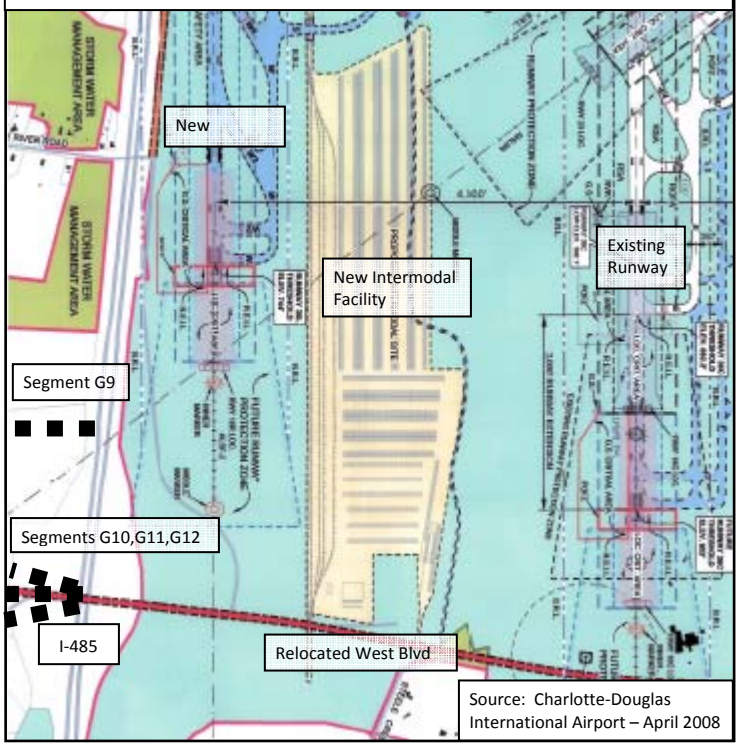
Fly ash basins are areas where by-products of the coal energy production processes are stored. There are two fly ash basins located just south of the power plant building (**Figure 2-5b**). The northern fly ash basin currently is inactive. The basin to the south is currently being used.

An active freight rail line that serves the Allen Steam Station is located along the west side of the Catawba River. Crossings of the Catawba River will also need to provide a minimum vertical clearance for the rail line.

As shown in **Exhibit 2-1**, Charlotte-Douglas International Airport is constructing a new major runway to the west of its existing runways. This new runway is near and parallel to I-485 to the east. Between the existing and new runway, the airport plans to construct an intermodal freight facility. The airport plans to relocate West Boulevard to the south of its property to accommodate the new intermodal freight facility. An interchange with I-485 along Preliminary Corridor Segment G9 (black dashed line labeled Segment G9 on **Exhibit 2-1**) would have ramps located within the new runway area. The airport completed a previous version of its master plan in September 2003, after the Preliminary Corridor Segments were developed in August 2003. The previous version of the site plan had the intermodal facility adjacent to I-485, with the new runway just east of it.

The project terminus at I-485 is constrained by the airport's new runway and intermodal facility (under either the previous or current site plans) and by the undeveloped Berewick District Park on the west side of I-485, north of Dixie River Road. The existing I-485 interchange to the north of the Preliminary Corridor Segments is with US 29-74 and the existing I-485 interchange to the south is with Steele Creek Road (NC 160).

Exhibit 2-1: Charlotte-Douglas International Airport Site Plan



2.3.3 STEP 1: ANALYZING THE PRELIMINARY CORRIDOR SEGMENTS TO IDENTIFY THE FUNCTIONAL DESIGN CORRIDORS

This section describes the Second Screening Step 1, and how the 107 Preliminary Corridor Segments (totaling approximately 116 miles) were evaluated to determine which corridor segments could be eliminated and which should be used to develop functional engineering designs for further screening. The 59 corridor segments making it through this screening process were named the Functional Design Corridor Segments. There were approximately 72 miles of Functional Design Corridor Segments.

2.3.3.1 Screening Methodology

Table 2-2 lists the evaluation factors used in the Second Screening Step 1 to estimate and compare potential impacts. Quantities of resources were estimated either within the Preliminary Corridor Segments or within a representative 300-foot-wide alignment in the center of the corridor segment, depending on the resource. The method used for each factor is listed in **Table 2-2** in the column "Impact Estimate Method – Second Screening Step 1 – Evaluate Preliminary Corridor Segments." A representative 300-foot wide alignment in the center of the corridor segment was used to estimate impacts to parks, community facilities, churches, cemeteries, and historic sites. It was assumed that many of these types of resources would be avoided when functional designs were developed and the use of a representative alignment better reflected the potential for impacts.

The estimates are for comparison purposes only and are intended to aid in deciding between segments, and should not be considered an estimate of the actual impact of a roadway within a corridor segment. When necessary, series of Preliminary Corridor Segments were connected to provide for a common basis of comparison, such as similar length and/or termini.

For example, the numbers of residences within a set of 1,200-foot-wide corridor segments compared to the numbers of residences within another set of corridor segments of similar length and/or termini can indicate the relative ability of developing an alignment that minimizes residential impacts. It does not indicate the projected number of residences that would actually be impacted. The quantities generated in this screening evaluation were considered together with other qualitative factors, as described under each decision point within the next section.

2.3.3.2 Screening Results

All evaluation factors listed in **Table 2-2** were used in comparing Preliminary Corridor Segments in the Second Screening Step 1. In some cases, impacts between Preliminary Corridor Segment combinations would be similar. In other cases, particular impacts would be different, and would be the differentiating factors. The evaluation emphasized the differentiating factors.

Below is a list of the 59 Preliminary Corridor Segments, totaling approximately 72 miles, retained for functional design. The 48 segments eliminated also are listed. **Figure 2-6a–b** shows these Preliminary Corridor Segments. The details of the evaluation are discussed in Section II.4.2 of the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008).

	Preliminary Corridor Segments Retained as Functional Design Corridor Segments
West Portion of Refined Study Area	A1, A4, A7, A7a, A5a B1a, B1, B2, B2a, B-X2a, B-X1, B4, B5, B6, B7, B9
Central Portion of Refined Study Area	C1, C5, C6, C8, C4, C-X4, C-X5 D2, D3, D4, D5, D-X6, D7, D8, D8a, D9 E1, E3, E-X8, E8, E-X9
East Portion of Refined Study Area	F2, F-X9a, F4, F5, F6, F7a, F8, F9, F10, F-X11, F-X13 G4, G5, G10, G11, G13, G14, G15, G16, G17, G18, G19
	Preliminary Corridor Segments Eliminated
West Portion of Refined Study Area	A2, A3, A3a, A5, A6, A6a, A3-XA7, A4-XA5, A4-XA6 B3, B8, B10, B-X1a, B-X2, B-X3
Central Portion of Refined Study Area	C2, C3, C3a, C9, C7 D1, D6 E2, E4, E5, E5a, E6, E7, E-X7
East Portion of Refined Study Area	F1, F3, F7, F-X10, F11, F12, F-X12, F13 G1, G2, G3, G6, G7, G8, G9, G12, G-X12, G-X13, G-X14

2.3.3.3 Functional Roadway Designs

The Functional Design Corridor Segments listed in **Section 2.3.3.2** and shown in **Figure 2-6a–b** were connected to form 90 endpoint-to-endpoint Functional Design Corridors from I-85 to I-485. Total lengths range from 21.4 to 25.6 miles. **Figure 2-7** shows the Functional Design Corridors.

The Functional Design Corridors were 1,400 feet wide. The corridor width was widened from 1,200 feet with the Preliminary Corridor Segments to allow for more flexibility in establishing alignments. Functional roadway designs were prepared within these corridors, taking into consideration the design criteria, traffic projections, engineering design constraints, and locations of known sensitive resources. Functional roadway designs include horizontal alignment for the roadway, basic layouts for interchanges, and consideration of major service roads to reconnect subdivisions.

The 1,400-foot-wide Functional Design Corridor boundaries then were shifted to be centered on the functional roadway design alignments. Because the corridor segments were modified somewhat when they were shifted, the Functional Design Corridor segments were renamed. Segments labels beginning with "H" are in the West Portion of the Refined Study Area. Segment labels beginning with "J" are in the Central Portion, and segment labels beginning with "K" are in the East Portion.

The typical section for the designs within the Functional Design Corridors included a six-lane highway with a 46-foot-wide grass median and 12-foot-wide paved shoulders. The functional roadway designs were prepared for a non-toll facility. However, the functional engineering designs would be similar enough between a non-toll and toll facility to not make a significant, or even notable, difference in the construction footprint used to estimate impacts.

2.3.3.4 Traffic Analysis of Functional Roadway Designs

After the Preliminary Corridor Segments were narrowed to those for which functional designs should be developed, year 2025 travel demand forecasting and traffic operations analyses for a non-toll facility were performed. These were the traffic forecasts available at the time of this screening.

The functional roadway designs created for the Functional Design Corridors were developed through an iterative process between design, environmental impact considerations, and traffic capacity analysis. Functional roadway designs were developed to accommodate projected traffic at LOS D or better. The traffic operations analysis is documented in the *Draft Traffic Technical Memorandum for the Gaston County East-West Connector Study* (PBS&J, May 2005), incorporated by reference.

At the time the Functional Design Corridors were developed, the project was being studied as both a toll facility and a non-toll facility. The Non-Toll Scenario 2025 forecasts indicated a six-lane facility would be needed. The traffic volumes for the Non-Toll Scenario were expected to be higher, so designing to these 2025 forecasts results in functional designs that could also accommodate the traffic volumes that would be generated in the Toll Scenario.

The traffic projections for the Toll Scenario may indicate that four lanes may be sufficient. If the number of lanes is reduced from six to four, that reduction would be achieved by removing the two lanes in the center. The outside footprint of the project would remain the same. The number of lanes will be confirmed prior to the Final EIS.

Although the New Location Alternative is planned to terminate at I-85, geometry for the I-85 system interchange was developed so it would not preclude an extension of the New Location Alternative to the north (the US 321 Bypass), if that project is funded and programmed at some time in the future. The Gaston East-West Connector allows for, but does not require, the future completion of the US 321 Bypass.

2.3.4 STEP 2: ANALYZING FUNCTIONAL DESIGN CORRIDORS TO IDENTIFY THE DETAILED STUDY ALTERNATIVES

This section describes how the Functional Design Corridors were evaluated in Second Screening Step 2 to identify those that should be carried forward as DSAs.

2.3.4.1 Impact Estimate Methodology

Impacts to the natural and human environments (based upon the functional roadway designs within the Functional Design Corridors) were estimated and tabulated. **Table 2-2** lists the evaluation factors used to estimate and compare potential impacts. Quantities of resources were estimated based upon the functional roadway designs. The method used for each factor is listed in **Table 2-2** within the column "Impact Estimate Method – Second Screening Step 2 – Evaluate Functional Design Corridors."

The quantities generated in this screening evaluation were considered together with other qualitative factors, as described in detail in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008).

2.3.4.2 Evaluation Results

From the set of 90 endpoint-to-endpoint Functional Design Corridors, sixteen DSAs were originally recommended based upon estimated impacts to the natural and human environments, engineering design considerations, and input from the public as well as the resource and regulatory agencies. These original sixteen DSAs are listed in **Table 2-3**. These recommendations were presented to the public for comment and input at the second series of Citizens Informational Workshops in January and February 2006 (**Chapter 9** provides more detail on public involvement).

TABLE 2-3: Sixteen Original Detailed Study Alternatives

Detailed Study Alternative	West Area – Generally west of US 321	Central Area – Generally east of US 321 and west of NC 279 or the South Fork Catawba River	East Area – Generally east of NC 279 or the South Fork Catawba River
	H Segments	J Segments	K Segments
4	H2A-H3	J4a-J4b-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
5	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
6	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K1D
9	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C
22	H2A-H2B-H2C	J3-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
23	H2A-H2B-H2C	J3-J2c-J2d-JX4-JIe-J1f	K1A-K1B-K1C-K4A
24	H2A-H2B-H2C	J3-J2c-J2d-JX4-JIe-J1f	K1A-K1B-K1C-K1D
27	H2A-H2B-H2C	J3-J2c-J2d-JX4-JIe-J1f	K1A-K3A-K3B-K3C
58	H1A-H1B-H1C	J1a-JX1-J2d-J5a-J5b	K2A-KX1-K3B-K3C
64	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K1B-K1C-K4A
65	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K1B-K1C-K1D
68	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K3A-K3B-K3C
76	H1A-HX2	J2a-J2b-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
77	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
78	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K1D
81	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C

Refer to **Figure 2-8** for a map of the DSAs and their corridor segments

The Functional Design Corridor Segments eliminated in Step 2 of the Second Screening are shown in **Figure 2-7** and listed below, along with a summary of the reasons for elimination. Eliminating these segments eliminated 74 of the 90 possible endpoint-to-endpoint segment combinations.

	Functional Design Corridor Segments Eliminated
West Portion of Refined Study Area	HX1
Central Portion of Refined Study Area	JX2, JX7, JX6
East Portion of Refined Study Area	K2B, K2C, K2D, KX2, KX3, KX4

Functional Design Corridor Segment HX1. Combinations of segments that include Corridor Segment HX1 were eliminated because these combinations had substantially more stream impacts than other segment combinations in the west portion of the Refined Study Area ("H" segment combinations) extending from I-85 to US 321 (about 4,080 linear feet more stream impacts than then the next highest impacts), and would be substantially more expensive.

Functional Design Corridor Segments JX2 and JX7. Combinations of segments that include Corridor Segments JX2 orJX7 were eliminated because the constraints resulted in a functional design in this corridor that was not desirable. The design in this area includes a half-clover interchange at US 321 due to a railroad paralleling the east side of US 321. Corridor Segments JX2 and JX7 would cause back-to-back horizontal curves in this interchange area, and superelevations (i.e., the slope of the lanes from side to side) of the ramps and the mainline that would be in opposite directions, making it difficult to tie the ramps into the mainline. This combination of design issues makes the design undesirable.

Functional Design Corridor Segment JX6. Combinations of segments that include Corridor Segment JX6 were eliminated because these combinations were longer and more expensive than other combinations that began and ended at the same points (US 321 and NC 279 [South New Hope Road]).

Functional Design Corridor Segments K2B, K2C, K2D, KX3, and KX4. These five segments (together with Functional Design Corridor Segments K3B and K3C) form the four northernmost segment combinations over the Catawba River east to I-485: K2B-K2C-K2D, K2B-KX4-K3C, KX1-KX3-K2D, and KX1-K3B-K3C. Corridor segment combinations that use Corridor Segment K2D have a less desirable design than those using Corridor Segment K3C due to a curve immediately east of the Catawba River Bridge and west of I-485. This curve cannot be flattened due to space constraints related to tying into I-485. Corridor segment combinations that use Corridor Segment K2D also have more stream impacts and would require a longer bridge to span the Catawba River and adjacent railroad tracks. Of the two corridor segment combinations that use Corridor Segment K3C, the combination K2B-KX4-K3C had substantially more residential impacts.

Corridor Segment KX2. This corridor segment was eliminated because it only connected to Corridor Segment K2D, which was eliminated from further study (as described above). Corridor segment combination KX2-K3C was not feasible due to horizontal curvature constraints.

Later Elimination of Corridor Segment K1D. As project studies progressed, new information became available regarding the viability of Detailed Study Corridor Segment K1D in relation to operations at Duke Energy Corporation's Allen Steam Station. As discussed below, this segment has been eliminated from further study, thereby eliminating DSAs 6, 24, 65, and 78 from further consideration. More detailed discussion of this decision is included in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008).

The Allen Steam Station is described in **Section 2.3.2.2**. Duke Energy Corporation is installing air pollution control equipment to comply with the NC Clean Smokestacks Act (enacted in 2002). As part of the installation, the Allen Steam Station needs to reuse, as a storage area for coal combustion products, a basin that is currently storing fly ash, which is a by-product of the power-generating process. The Allen Steam Station states several alternatives and sites were evaluated for the future storage area, but that the retired fly ash basin was the only viable site that provided the required capacity (**Appendix A-5**, Letter from Duke Energy Corporation to NCTA, August 7, 2007).

This fly ash basin is located within Corridor Segment K1D and spans the corridor. As described above, use of this retired fly ash basin by the Allen Steam Station as an active storage area is

critical to the operation of the air pollution control facilities at the Allen Steam Station. Therefore, the four DSAs using Corridor Segment K1D (DSAs 6, 24, 65, and 78) have been eliminated from study.

The environmental regulatory and resource agencies agreed that DSAs 6, 24, 65, and 78 should be eliminated from detailed study in a Turnpike Environmental Agency Coordination meeting on September 27, 2007 (**Section 9.2.3.3**). The elimination of Corridor Segment K1D and its associated DSAs was presented to the public at the third series of Citizens Informational Workshops in August 2008.

2.3.4.3 Twelve Final Detailed Study Alternatives

Figure 2-8a–b and **Table 2-4** present the 1,400-foot wide Corridor Segments that comprise the twelve DSAs. **Figure 2-9a–ii** shows the corridor boundaries and the preliminary engineering design right-of-way limits in each Corridor Segment. Corridor Segments are wider than 1,400 feet at areas for which interchanges and/or service roads will be considered. These twelve DSAs are carried forward for detailed study as toll facilities only.

In addition to the twelve new location DSAs, the No-Build Alternative is being retained for comparison purposes throughout the planning process, in accordance with NEPA regulations (40 CFR Part 1502.14(d)) and FHWA guidelines (Technical Advisory T 6640.8A; Section V.E.1). The No-Build Alternative does not assume any capacity improvements to I-85 or to US 29-74. The No-Build Alternative would not meet the project's purpose and need.

TABLE 2-4: Twelve Final Detailed Study Alternatives

Detailed Study Alternative	West Area – Generally west of US 321	Central Area – Generally east of US 321 and west of NC 279 or the South Fork Catawba River	East Area – Generally east of NC 279 or the South Fork Catawba River
	H Segments	J Segments	K Segments
4	H2A-H3	J4a-J4b-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
5	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
9	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C
22	H2A-H2B-H2C	J3-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
23	H2A-H2B-H2C	J3-J2c-J2d-JX4-JIe-J1f	K1A-K1B-K1C-K4A
27	H2A-H2B-H2C	J3-J2c-J2d-JX4-JIe-J1f	K1A-K3A-K3B-K3C
58	H1A-H1B-H1C	J1a-JX1-J2d-J5a-J5b	K2A-KX1-K3B-K3C
64	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K1B-K1C-K4A
68	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K3A-K3B-K3C
76	H1A-HX2	J2a-J2b-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
77	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
81	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C

Refer to **Figure 2-8a-b** for a map of the DSAs and their corridor segments

2.4 PRELIMINARY DESIGNS FOR THE DETAILED STUDY ALTERNATIVES

2.4.1 DESIGN CRITERIA FOR THE PRELIMINARY ENGINEERING DESIGNS

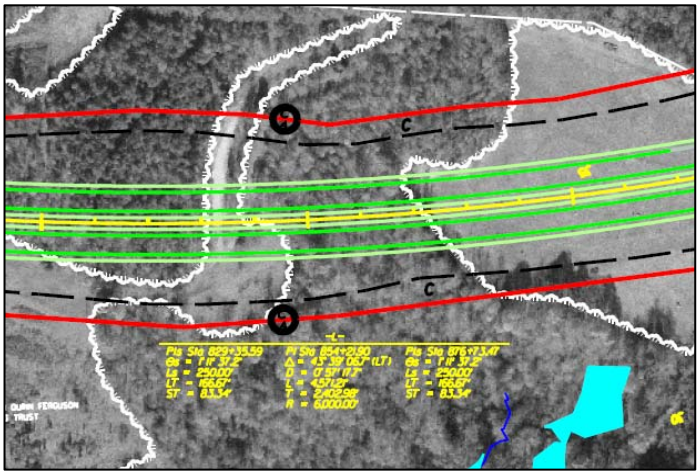
The design criteria used to develop the preliminary engineering designs are included in **Appendix D**. The preliminary engineering designs for the DSAs are based upon a controlled-access highway with six lanes and a 46-foot-wide grass median. The typical cross section for the mainline is shown in **Figure 2-3**. The mainline design speed is 70 mph, with a planned posted speed limit of 65 mph.

The development of the preliminary engineering designs was initially based upon traffic projections for DSAs for the Non-Toll Scenario. At the time the preparations of traffic projections and preliminary engineering designs were begun in 2006, the proposed alternatives were being studied as both non-toll and toll facilities. The Non-Toll Scenarios were expected to generate higher volumes of traffic along the DSAs. Preliminary engineering designs prepared using the Non-Toll Scenario traffic volumes were expected to also accommodate the Toll Scenario traffic volumes at an acceptable LOS because the Toll Scenario projected traffic volumes are less than the Non-Toll Scenario projected traffic volumes (**Section 2.4.4.2**).

Traffic projections may be updated during preparation of the Final EIS, and will be for the Toll Scenario. The traffic projections may indicate that four lanes may be sufficient. If the number of lanes is reduced from six to four along the Preferred Alternative, that reduction would be achieved by removing the two lanes in the center. The outside footprint of the project would remain the same. The width of the grass median in the middle would change from 46 feet to 70 feet.

2.4.2 DEVELOPING THE PRELIMINARY ENGINEERING DESIGNS

The preliminary engineering designs within the DSAs are shown in **Figure 2-9a–ii**. This figure shows the study corridor boundaries and the preliminary engineering design right of way on GIS-based resource mapping.



Example of preliminary engineering design
Source: PBS&J

After the DSA corridors were identified, aerial photography and more detailed mapping of the corridor areas were created to aid in preparing the preliminary engineering designs. The more detailed mapping (which includes topographic contour lines and locations of items such as electric power transmission towers) is needed because the preliminary engineering designs include vertical as well as horizontal elevations of the roadway, ramps, and cross streets.

Additional information available during the development of the preliminary engineering designs that was not available for the functional designs included: delineated wetlands and streams inside the corridors (**Section 6.4**), updated information on parcel boundaries and buildings, and a *Final Preliminary Hydraulic Technical Memorandum, Gaston East-West Connector* (a study to identify major drainage culverts and bridges) (PBS&J, December 2007), incorporated by reference, and available on the NCTA Web site (www.ncturnpike.org/projects/gaston).

The horizontal alignment of the functional designs was reviewed and adjusted where possible to avoid or minimize impacts to resources such as neighborhoods, churches, streams, wetlands, historic resources, and major electric power transmission towers.

Interchanges and major cross streets were evaluated to determine whether the project's mainlines should go over or under the crossing roadway (this type of evaluation is known as an "over/under study").

All the DSAs were reviewed to identify where apparent service roads should be included in the preliminary engineering designs to provide access to existing neighborhoods or other major facilities. However, all properties were not reviewed at this stage. A detailed service road study will be conducted during final design of the Preferred Alternative.

The appropriate configuration for each interchange was determined through review of year 2030 traffic forecasts for the Non-Toll Scenario and the wetlands, streams, residences, businesses, churches, and other resources within the interchange area. Impacts to resources were avoided and minimized to the extent possible in the selection of the interchange form. The year 2030 non-toll forecasts were used because, at the time the preliminary engineering design effort began in 2006, the project was still being studied as both a toll facility and a non-toll facility. The traffic volumes for the non-toll forecasts were higher, so designing according to these forecasts would result in designs that could also accommodate the Toll Scenario forecasts (**Section 2.4.4**).

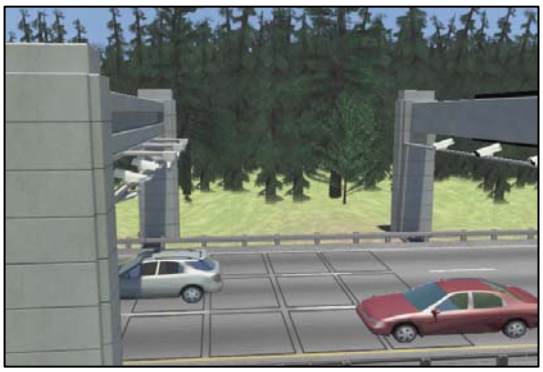
The potential for the roadway to be extended north of I-85 sometime in the future (by constructing the US 321 Bypass) also was considered. The US 321 Bypass is shown on the Gaston Urban Area Thoroughfare Plan, but would be developed as an independent project if funded and programmed some time in the future. The preliminary engineering designs for the interchange at I-85 would not preclude a future extension. The Gaston East-West Connector is being developed in a manner that allows for, but does not require, the future completion of the US 321 Bypass.

The preliminary engineering design alignments and major drainage crossings were reviewed by the Agency Coordination Team at meetings on February 5, March 4, and April 8, 2008. The Agency Coordination Team agreed that the preliminary engineering design alignments avoid and minimize impacts to wetlands and streams where practicable. In addition, bridges were added at other locations to span particularly sensitive wetlands and streams based upon input from the Agency Coordination Team (**Section 6.4.5** and **Section 9.2.3.3**).

2.4.3 CONSIDERING TOLLING IN THE PRELIMINARY ENGINEERING DESIGNS

For the New Location Alternative Toll Scenario, access to any portion of the facility will require payment of a toll. *The Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study Final Report* (Wilbur Smith Associates, October 12, 2006, available on the NCTA Web site at www.ncturnpike.org/projects/gaston/documents.asp) was prepared for the project. This study recommends a toll of about $2.50 in the estimated opening year (2015) to drive the length of the project, which equates to approximately $0.11 per mile.

The NCTA has not made any decisions about toll rates. The actual initial price of the toll will be recommended following preparation of the Investment Grade Traffic and Revenue Study, to be completed around the time of the issuance of a Record of Decision (ROD). The price of the toll will increase over time, based upon variables such as managing demand, financing the initial construction of the project, and paying for roadway operations and maintenance. The toll rate likely will differ for cars and trucks.



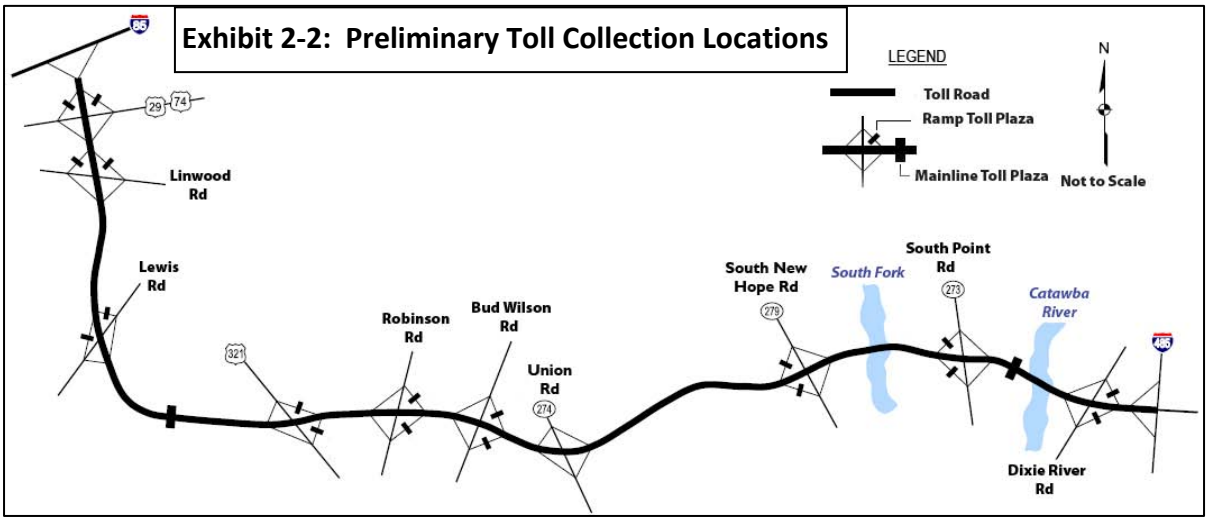
Electronic toll collection site
Source: NCTA

Tolls will be collected by an electronic toll collection (ETC) system. There will be no cash toll booths. The primary means of ETC will involve pre-registration with NCTA and use of a transponder/receiver system. The transponder may be mounted on the windshield of a vehicle. This allows the vehicle to move through the toll-collection locations at highway speeds. The user's account is then debited for the cost of the toll. The NCTA will work with other toll authorities to enable, where possible, other system's transponders to work on the Gaston East-West Connector. For travelers who do not have a transponder, a video system will capture license plate information and NCTA will bill the vehicle's registrant. In addition, in accordance with State law (NCGS 136-89.213), NCTA will operate a facility in the immediate vicinity of the project that accepts cash payment for prepaid tolls, so establishing an account is not required. It is anticipated that this facility will operate from an existing commercial building within the project area.

There are few differences in the designs for a facility with and without an ETC system. The ETC equipment, which is primarily an overhead structure like the one shown in the photo simulation above, takes up little space, and can be accommodated within the standard right of way for the proposed highway. No additional right of way is needed specifically for this equipment. While the right-of-way requirements may not differ between a non-toll facility and a toll facility, the alignment of some interchange ramps that have ETC equipment may slightly differ. At these locations, the ramp is lengthened to provide a straight segment that facilitates accurate video capture of license plates.

The *Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study Final Report* (Wilbur Smith Associates, October 2006) also recommends preliminary locations for the toll collection locations. These preliminary locations, shown in **Exhibit 2-2**, capture all trips entering and exiting the facility. The preliminary toll collection locations are also shown on

Figure 2-9a–ii. These toll collection locations may change after the Investment Grade Traffic and Revenue Study is completed.



Source: *Proposed Gaston East-West Connector Preliminary Traffic and Revenue Study Final Report,* Wilbur Smith Associates, October 12, 2006
Note: Interchanges are drawn as schematics and are not intended to show the preliminary engineering design ramp configurations

2.4.4 TRAFFIC FORECASTS AND OPERATIONS ALONG THE DETAILED STUDY ALTERNATIVES

An important factor in developing the preliminary engineering designs for the DSAs was consideration of traffic operations. As described below in **Section 2.4.4.1**, 2030 traffic forecasts were developed for the DSAs. Using these forecasts, traffic operations analyses were performed concurrently with the preliminary engineering design preparations so that an acceptable LOS was projected along the roadway mainline and at the interchanges (LOS D or better) (**Section 2.4.4.2**).

2.4.4.1 Travel Demand Modeling

The April 13, 2006 version of the 2030 Metrolina travel demand model was used for all year 2030 project-related traffic forecasts because this was the current version when the updated forecasting activities began. The 2030 Metrolina travel demand model 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 Metrolina travel demand model is updated on a continual basis.

Two travel demand forecasts for the toll scenario were prepared, the NEPA Forecast and the Traffic and Revenue Forecast. The NEPA Forecast is prepared to evaluate impacts and determine the design of the facility using standard procedures for FHWA NEPA documents. The Traffic and Revenue Forecast is a separate forecast used for predicting revenue. It is usually lower than the NEPA Forecast so that potential revenue is not overstated. The Traffic and Revenue Forecast is documented in the *Proposed Gaston East-West Connector Preliminary Traffic and Revenue Forecast Final Report* (Wilbur Smith and Associates, October 12, 2006). The Traffic

and Revenue Forecast was not used to evaluate impacts or determine the facility design documented in this Draft EIS.

The NEPA Forecast is documented in the *Gaston East-West Connector Traffic Forecasting and System Level Analysis for the Detailed Study Alternatives* (Martin/Alexiou/Bryson, April 2007), incorporated by reference. Year 2030 Non-Toll Scenario traffic volume forecasts for the sixteen original DSAs were developed by modeling six representative DSAs: 4, 5, 58, 64, 76, and 77. At the time when the forecasts were prepared, the group of sixteen original DSAs had not yet been narrowed down to the final twelve DSAs.

The regional model lacks sufficient precision to accurately distinguish among some of the DSAs. Coding these alignments and assigning traffic to them would yield results that would not differ in any meaningful way. Therefore, traffic forecasts for the DSAs not specifically modeled were obtained by manually adjusting forecasts from the most similar coded alternative that was modeled.

Year 2030 Toll Scenario traffic volumes were developed by modeling three representative DSAs: DSA 4 (the northernmost DSA), DSA 64 (the southernmost), and DSA 77 (a crossover DSA). The modeling effort and the forecasts are documented in the *Gaston East-West Connector (U-3321) Traffic Forecasts for Toll Alternatives* (Martin/Alexiou/Bryson, August 2008). **Appendix E** provides the 2030 daily traffic volume forecast sheets. A review of the Non-Toll Scenario forecasts showed that these three representative alternatives would provide the full range of volumes forecasted along the DSAs, and all DSAs are represented by various portions of these three DSAs. **Table 2-5** shows the forecasted 2030 Toll Scenario traffic volumes along the mainline for DSAs 4, 64, and 77.

TABLE 2-5: Year 2030 Traffic Volumes Along the Detailed Study Alternatives

Segment	Modeled Detailed Study Alternative (Toll Scenario)		
	4*	64	77*
I-85 to US 29-74	12,800	10,000	12,200
US 29-74 to Linwood Rd (SR 1133)	20,800	11,400	18,000
Linwood Rd to Lewis Rd (SR 1126)	15,400	9,600	17,400
Lewis Rd to US 321	15,400	14,200	17,400
US 321 to Robinson Rd (SR 2416)	20,000	18,800	21,400
Robinson Rd to Bud Wilson Rd (SR 2423)	29,200	29,400	30,400
Bud Wilson Rd to NC 274 (Union Rd)	28,000	28,600	28,200
NC 274 to NC 279 (S New Hope Rd)	31,600	35,000	34,800
NC 279 to NC 273 (Southpoint Rd)	42,200	44,200	43,400
NC 273 to Dixie River Rd (SR 1155)	58,400	61,800	60,600
Dixie River Rd to I-485	55,400	54,400	53,000

Source: *Gaston East-West Connector - (U-3321) Traffic Forecast for Toll Alternatives* (Martin/Alexiou/Bryson, August 2008)

* Alternatives 4 and 64 do not have an interchange at Lewis Rd, and therefore the volumes in the 3rd and 4th rows are repeated.

2.4.4.2 Traffic Operations along the Detailed Study Alternatives

Traffic operations analyses performed for the DSAs are documented in two reports, both incorporated by reference. The first, *Traffic Operations Technical Memorandum – Gaston East-West Connector* (PBS&J, December 2007), incorporated by reference, used the year 2030 Non-Toll Scenario traffic forecasts. The second, *Final Toll Traffic Operations Technical Memorandum – Gaston East-West Connector* (PBS&J, September 2008), incorporated by reference and available on the NCTA Web site (www.ncturnpike.org/projects/gaston), used the year 2030 Toll Scenario traffic forecasts.

The traffic operations analysis using the Non-Toll Scenario forecasts initially were used in the preparation of the preliminary engineering designs. For most of the analyzed interchanges, more than one modeled corridor passes through the interchange. In those cases, to assume a worst-case operations scenario, the corridor with the largest overall volumes for that location was used.

All freeway element and intersection analysis was performed following the *Capacity Analysis Guidelines for TIP Project Traffic Analyses* (NCDOT Congestion Management, February 15, 2006). LOS D was assumed as the minimum standard for all operational elements related to new location alignments. All elements of the preliminary engineering designs (mainlines, ramps, and interchanges) met LOS D or better in 2030 under the Non-Toll Scenario.

After completion of the preliminary engineering designs, it was determined that the project would be studied only as a toll facility, and the Toll Scenario traffic analysis was completed (**Section 2.2.7.2**). The traffic operations analysis was performed to verify that the preliminary engineering designs for the DSAs would provide adequate capacity for implementing the project as a toll facility (*Final Toll Traffic Operations Technical Memorandum – Gaston East-West Connector*, PBS&J, September 2008).

Based on the reassessment of the preliminary engineering designs using Toll Scenario traffic forecasts, all individual freeway and ramp merge-and-diverge elements would operate at an acceptable LOS without adjustment to the preliminary engineering designs for each DSA.

Analysis of the ramp terminal intersections using the toll scenario traffic forecasts show that all intersections would operate with acceptable LOS, except at the Bessemer City Road interchange, which is included in the preliminary engineering designs for the I-85 interchange for DSAs 4, 5, 9, 22, 23, and 27. Due to the higher traffic volumes at this interchange, minor modifications to the preliminary engineering designs were recommended to achieve an acceptable LOS. These modifications include adding a second turn lane at the northbound and westbound approaches of the southbound I-85/Bessemer City Road ramp terminal intersection. These modifications can be accommodated within the proposed right of way in the preliminary engineering designs. If DSA 4, 5, 9, 22, 23, or 27 is selected as the Preferred Alternative, the change will be incorporated into the designs.

2.4.5 DETAILED STUDY ALTERNATIVE DESCRIPTIONS AND COST ESTIMATES

2.4.5.1 Descriptions of the Detailed Study Alternatives

Table 2-6 presents the length of each DSA, number of proposed interchanges, and preliminary estimates of construction costs, environmental mitigation costs, and right-of-way costs. Cost estimates are discussed in **Section 2.4.5.2**. The preliminary engineering designs are presented in **Figure 2-9a–ii**.

The lengths of the DSAs are similar, ranging from 21.4 miles for DSA 4 (the northernmost DSA) to 23.7 miles for DSA 68.

TABLE 2-6: Cost Estimates for the Detailed Study Alternatives

DSA	Approximate Length (miles)	Number of Interchanges	Probable Range of Costs Through Year of Expenditure				Median Total Project Cost (millions $)
			Construction Cost (millions $)*	Environmental Mitigation Cost (millions $)*	Right-of-Way Cost (millions $)*	Total Cost (millions $)*	
4	21.4	11	955.0-1,140.8	38.9-41.1	186.7-228.5	1,180.6-1,410.4	1,280.5
5	21.5	11	980.2-1,173.2	34.8-36.7	199.1-243.0	1,214.1-1,452.9	1,316.9
9	21.9	11	974.5-1,168.4	32.2-34.0	173.9-213.0	1,180.6-1,415.4	1,282.0
22	21.9	11	999.5-1,195.0	40.4-42.6	197.0-241.1	1,236.9-1,478.7	1,342.2
23	22.0	11	1,022.6-1,228.2	36.4-38.4	208.8-255.5	1,267.9-1,522.0	1,378.4
27	22.4	11	1,019.7-1,221.7	33.8-35.7	183.5-224.5	1,237.1-1,481.9	1,342.9
58	23.1	12	978.2-1,171.3	41.5-43.7	197.3-241.3	1,217.0-1,456.3	1,321.2
64	23.3	12	992.4-1,188.6	34.3-36.1	215.7-263.2	1,242.4-1,488.0	1,348.2
68	23.7	12	986.2-1,180.9	31.8-33.5	190.8-233.2	1,208.7-1,447.6	1,312.6
76	21.8	11	982.1-1,174.0	37.7-39.8	182.4-223.2	1,202.1-1,436.9	1,304.3
77	21.9	11	1,007.4-1,209.6	33.2-35.0	194.6-237.6	1,235.2-1,482.3	1,341.9
81	22.2	11	1,000.5-1,199.7	31.1-32.8	169.6-207.3	1,201.2-1,439.8	1,305.0

Source: Gaston Cost Estimation Support Memorandum, HNTB, March, 2009

* Assumptions and notes regarding costs:

1. Total cost may not add up exactly due to rounding.
2. Construction costs include construction, utility relocations, and agency costs.
3. Year of expenditure costs were modeled using a range of possible inflation rates.
4. Future construction costs were modeled to mid-year of construction using inflation rates ranging from 5%-10%, with 6.02% being most likely.
5. Future right-of-way costs were modeled to anticipated year of acquisition using inflation rates ranging from 5%-12%, with 8% being most likely.
6. Future agency costs (included in construction costs) were modeled to anticipated year of expenditure using inflation rates ranging from 2.5%-4.5%, with 4% being most likely.
7. Ranges of costs are based on cost projections in which the lowest 10% and highest 10% were discarded. There is an 80% probability associated with these costs.
8. Year of expenditure costs assume an award date of December 2010 and an opening in August 2015.
9. Environmental mitigation costs are based on current costs of estimated impacts to streams and wetlands.
10. Utility relocation costs (included in construction costs) were estimated in the *Utility Impact Report for the Gaston East-West Connector (*TBE Group, Inc.*,* August 2008).
11. Right-of-way costs were provided in the *Relocation Reports for the Gaston East-West Connector* (Carolina Land Acquisitions, Inc., April 2008).

As discussed in **Section 2.4.1**, each DSA is a controlled-access toll facility. The preliminary engineering designs show a six-lane facility with a 46-foot-wide grass median. Each DSA currently is proposed to have 11 to 12 interchanges (depending upon the DSA), as listed below from west to east.

- I-85
- US 29-74
- Linwood Rd (SR 1133)
- Lewis Rd (SR 1126) (DSAs 58, 64, and 68 only)
- US 321
- Robinson Rd (SR 2416)
- Bud Wilson Rd (SR 2423)
- NC 274 (Union Rd)
- NC 279 (South New Hope Rd)
- NC 273 (Southpoint Rd)
- Dixie River Rd (SR 1155)
- I-485

For this Draft EIS, all interchanges listed in this section were included in the impact evaluations. However, once a Preferred Alternative is identified, the need for each interchange will be reevaluated. Traffic and revenue studies will be conducted for the Preferred Alternative and will include a review of all interchange locations to optimize traffic and revenue, as well as toll operations.

I-85 and I-485 Interchanges. The interchanges at I-85 and I-485 would be system interchanges, meaning they would be freeway-to-freeway interchanges with no traffic signals or stop signs. The other interchanges would be service interchanges, meaning that there would be a traffic signal or stop sign on the cross street where the highway ramps would connect.

Due to the close spacing of interchanges along I-85, the construction of the Gaston East-West Connector interchange at I-85 would require the reconfiguration of adjacent interchanges. For the DSAs that tie into I-85 using Corridor Segment H1A (DSAs 58, 64, 68, 76, 77, and 81), the existing I-85 interchange at Edgewood Road would need to be reconfigured to maintain access to I-85 at that interchange (**Figure 2-9a**). The ramps for the Edgewood Road interchange would be braided with the ramps for the Gaston East-West Connector interchange, so that motorists using the Edgewood Road interchange could access I-85 but not the Gaston East-West Connector. Travelers on the Gaston East-West Connector would have access to I-85, but would not be able to exit I-85 at the Edgewood Road interchange.

For the DSAs that tie into I-85 using Corridor Segment H2A (DSAs 4, 5, 9, 22, 23, and 27), the same situation occurs with the existing interchange at NC 274 (Bessemer City Road). The NC 274 (Bessemer City Road) interchange would need to be reconfigured to maintain access to I-85 at that interchange (**Figure 2-9c**). The ramps for the Bessemer City Road interchange would be braided with the ramps for the Gaston East-West Connector interchange, so that motorists using the Bessemer City Road interchange could access I-85 but not the Gaston East-West Connector. Travelers on the Gaston East-West Connector would have access to I-85, but would not be able to exit I-85 at the Bessemer City Road interchange.

All DSAs would tie into I-485 at the same location (**Figure 2-9gg, hh, and ii**), due to constraints described in **Section 2.3.2.2**. East of I-485, the Gaston East-West Connector would tie into relocated NC 160 (West Boulevard), which is being constructed as part of the Charlotte-Douglas International Airport runway expansion project. Relocated NC 160 will not be access-controlled.

US 29-74 Interchange. After a Preferred Alternative is selected, the NCTA has committed to considering the potential elimination of the US 29-74 interchange.

The NCTA met with the environmental resource and regulatory agencies (USACE, USFWS, USEPA, NCDWQ, NCWRC) at Turnpike Environmental Agency Coordination (TEAC) meetings on February 5, March 4, and April 8, 2008, to discuss bridging and alignment decisions for the DSAs' preliminary engineering designs. In the NEPA/404 Merger Process (**Section 9.2**), this is Concurrence Point 2a – Bridging and Alignment Review.

As a result of those meetings, the environmental resource and regulatory agencies requested that NCTA consider eliminating the US 29-74 interchange due to impacts to floodplains, streams, and high-quality wetlands associated with Crowders Creek. The interchange's proximity to the I-85 interchange for all the DSAs restricts design options available to avoid and minimize impacts. (**Figure 2-9d** and **2-9e**).

The estimated reductions in impacts to wetlands and streams resulting from the removal of the US 29-74 interchange from the preliminary engineering designs are listed in **Table 2-7**. As shown in the table, there would be substantial reductions in impacts to wetlands and streams if this interchange were removed from the project.

TABLE 2-7: Estimated Impact Reductions Without the US 29-74 Interchange

Detailed Study Alternative	Estimated Reduction in Impacts if US 29-74 Interchange Not Included in the Project	
	Reduction in Wetland Impacts (acres)	Reduction in Stream Impacts (linear ft)
4, 5, 9	1.4	1,336
22, 23, 27	1.9	2,708
58, 64, 68, 76, 77, 81	2.0	553

Source: Memorandum – Gaston County East-West Connector – TIP Project U-3321 - *Effects on Impacts if the US 29-74 Interchange is Removed from the DSAs* (PBS&J, September, 2008), incorporated by reference.

The option of removing the US 29-74 interchange from the project was presented to the public at the third series of Citizens Informational Workshops held in August 2008 (**Section 9.1.1**). Of the 205 written comment forms received, 48 comments specifically included or indicated a preference regarding the US 29-74 interchange, with 23 comments stating there was no need for the interchange and 25 comments stating there was a need. After a Preferred Alternative is selected, the NCTA will coordinate with the FHWA, NCDOT, GUAMPO, and the environmental resource and regulatory agencies, to determine whether the US 29-74 interchange should remain a part of the proposed project. The decision will be documented in the Final EIS.

2.4.5.2 Cost Estimates for the Detailed Study Alternatives

The cost estimates presented in **Table 2-6** are based on the preliminary engineering designs and are in year-of-expenditure dollars, as described in the table notes. Cost estimates are provided as a range of probable project costs by DSA for construction, right-of-way acquisition, and environmental mitigation (mitigation of impacts to streams and wetlands).

The total estimated median costs range from $1.280 billion for DSA 4 to $1.378 billion for DSA 23, a range of approximately $100 million. DSA 4 is the shortest alternatives, and is the least expensive due to having some of the lowest right-of-way and environmental mitigation

costs. DSA 9 has the second lowest total cost at $1.282 billion. In order from lowest estimated median total cost to highest, the DSAs are: DSA 4, 9, 76, 81, 68, 5, 58, 77, 22, 27, 64, and 23.

2.5 RECOMMENDED ALTERNATIVE

Based on the information available to date, including this Draft EIS, the FHWA, NCTA and NCDOT have identified DSA 9 as the Recommended Alternative. This alternative is comprised of Corridor Segments H2A-H3-J4a-J4b-J2c-J2d-JX4-J1e-J1f-K1A-K3A-K3B-K3C, as shown in **Figure 2-8a-b**.

It should be noted that the "Recommended Alternative" is only a recommendation; it is not a Preferred Alternative and it is not a final decision. FHWA, NCTA and NCDOT have identified a Recommended Alternative as a way of giving readers of the Draft EIS an indication of the agencies' current thinking. After the Draft EIS comment period ends, FHWA, NCTA and NCDOT will identify a Preferred Alternative based on consultation with local transportation planning agencies, and state and federal environmental resource and regulatory agencies, as well as consideration of agency and public comments on this Draft EIS and at the public hearings.

The Preferred Alternative may be developed further in the Final EIS. The NEPA process will conclude with a Record of Decision, which will document the Selected Alternative to be constructed.

DSA 9 has been identified as the Recommended Alternative based on the following considerations. Please note this list is not in order of importance, but is organized by issues as they are presented in the Draft EIS. Also, this list does not represent all benefits or impacts of DSA 9, just those elements that differentiated DSA 9 when compared to the other DSAs.

Cost and Design Considerations

- DSA 9 is one of the shortest alternatives at 21.9 miles (all alternatives range from 21.4 to 23.7 miles).
- DSA 9 has the second-lowest median total cost ($1,282 million) (all alternatives range from $1,281 million to $1,378 million).

Human Environment Considerations

- DSA 9 is one of the four DSAs with the fewest numbers of residential relocations at 348 residential relocations (the range being 326 to 384 residential relocations).
- Although DSA 9 is higher in the range of business relocations at 37 (the range being 24 to 40 business relocations), it would avoid impacts to Carolina Specialty Transport (provides transportations services to special needs groups) that would occur under DSAs 58, 64, 68, 76, 77 and 81.
- DSA 9 is in the middle of the range of total neighborhood impacts at 25 impacted neighborhoods (the range being 21 to 31 impacted neighborhoods).
- DSA 9 would have no direct impacts to schools. (DSAs 5, 23, and 27 also avoid direct impacts to schools.)

- DSA 9 would not require relocation of known cemeteries. (DSAs 27, 68, and 81 also would not require relocation of known cemeteries.)
- At Linwood Road, DSA 9 is one of three alternatives (DSAs 4, 5, and 9) that would avoid impacting either the Karyae Park YMCA Outdoor Family Center or the Pisgah Associate Reformed Presbyterian Church (part of the church property is also an historic site eligible for listing on the National Register of Historic Places).
- DSA 9 is one of the three alternatives (DSAs 4, 5, and 9) farthest from Crowders Mountain State Park.
- DSA 9 would avoid right-of-way requirements from Daniel Stowe Botanical Garden. (DSAs 4, 22, 27, 58, 68, 76, and 81 also avoid these right-of-way requirements.)
- DSA 9 would avoid the relocation of Ramoth AME Zion Church and cemetery, which is part of the Garrison Road/Dixie River Road community. (DSAs 4, 22, 27, 58, 68, 76, and 81 also avoid this church.)
- DSA 9 is one of the eight alternatives (DSAs 4, 9, 22, 27, 58, 68, 76, and 81) with the least amount of right of way required from future Berewick District Park in Mecklenburg County.

Physical Environment Considerations

- DSA 9 is in the middle range of estimated numbers of receptors impacted by traffic noise at 245 receptors (the range being 204 to 309 impacted receptors).
- DSA 9 is one of the alternatives (DSAs 4, 5, 9, 22, 23, and 27) that would impact the least acreage of land in Voluntary Agricultural Districts. DSA 9 also is one that is expected to have the least indirect and cumulative effects to farmlands.
- DSA 9 is one of the alternatives with the fewest power transmission line crossings at 14 crossings (the range being 13 to 18).

Cultural Resources Considerations

- DSA 9 is one of six alternatives (DSAs 4, 5, 9, 22, 23, and 27) that would not require right of way from the Wolfe Family Dairy Farm historic site. Selection of DSA 9 makes it more likely that, if the US 321 Bypass is constructed at some future time, the project would also avoid the Wolfe Family Dairy Farm historic site.
- DSA 9 is one of four alternatives (DSAs 5, 9, 23, and 27) with low to moderate potential to contain archaeological sites requiring preservation in place or complex/costly mitigation.

Natural Resources Considerations

- DSA 9 is one of eight alternatives (DSAs 4, 9, 22, 27, 58, 68, 76, and 81) that would cross the South Fork Catawba River and the Catawba River where the rivers have been more affected by siltation and they are less navigable, and water-based recreation would be affected less than with DSAs that cross farther south.
- DSA 9 would impact the least amount of Upland Forested Natural Communities at 882 acres (all alternatives range from 882 to 1042 acres).

- DSA 9 is one of the alternatives (DSAs 4, 9, 22, and 76) having the lowest potential to indirectly affect upland wildlife species due to habitat fragmentation.
- DSA 9 is lower in the range of impacts to ponds at 4.1 acres (all alternatives range from 2.1 to 6.3 acres).
- DSA 9 is lower in the range of impacts to wetlands at 7.5 acres (all alternatives range from 6.9 to 13.2 acres).
- DSA 9 is lower in the range of impacts to perennial streams at 38,894 linear feet (all alternatives range from 36,771 to 50,739 linear feet).
- DSA 9 would have the fewest number of stream crossings at 91 (all alternatives range from 91 to 120 crossings).
- DSA 9 is one of eight alternatives (DSAs 5, 9, 23, 27, 64, 68, 77, and 81) that has a biological conclusion of No Effect relating to the federally endangered Schweinitz's sunflower.