

2. ALTERNATIVES CONSIDERED

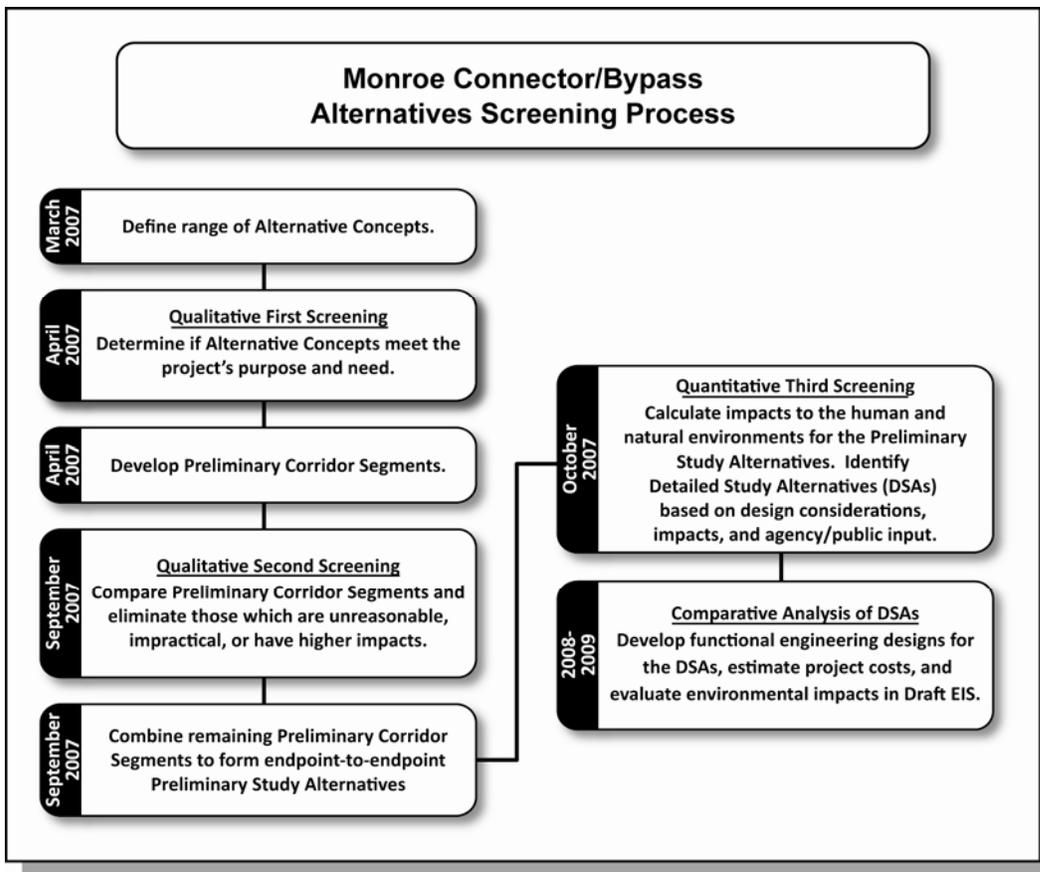


Section 2 explains how project alternatives were developed and evaluated to determine the Detailed Study Alternatives (DSAs). The functional roadway designs for the DSAs are described in **Section 2.5.1**. The Recommended Alternative is presented in **Section 2.8**.

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 *Alternatives Development and Analysis Report* (PBS&J, April 2008), incorporated by reference and available on the North Carolina Turnpike Authority (NCTA) Web site (www.ncturnpike.org/projects/monroe). The Alternatives Screening Process flow chart presented below shows the alternatives evaluation process and general time frames for when the different screenings occurred.



In the Qualitative First Screening of Alternative Concepts (**Section 2.2**), a range of Alternative Concepts were identified and considered for their potential to meet the purpose and need of the project. These Alternative Concepts were as follows: No-Build or No-Action Alternative;

Transportation Demand Management Alternative; Transportation System Management Alternative; Mass Transit/Multi-Modal Alternative; and other build alternatives, including Improving Existing Roadways Alternative, New Location Alternative, and New Location/Improve Existing Roadways Hybrid Alternative. Alternatives that do not have the potential to meet purpose and need are not reasonable and practicable and therefore were eliminated from further consideration.

In the Qualitative Second Screening of Preliminary Corridor Segments (**Section 2.3**), Preliminary Corridor Segments were developed for the Alternative Concepts retained from the Qualitative First Screening. The Preliminary Corridor Segments included new location and existing roadway segments. These segments were developed taking into consideration the previously studied corridors, route continuity, known natural and human environmental features, public and agency input. Due to funding constraints (**Section 2.3.2.5**), all alternatives would be toll facilities. Therefore, the ability to be tolled was also a factor in assessing the Preliminary Corridor Segments. The features and potential impacts of more than forty 1,000-foot wide Preliminary Corridor Segments were then qualitatively assessed and compared to identify those with relatively higher impacts to either the natural or human environment. Those with individually high or relatively higher impacts were eliminated from further consideration.

In the Quantitative Third Screening of Preliminary Study Alternatives (**Section 2.4**), the Preliminary Corridor Segments remaining following the Qualitative Second Screening process were combined to form 25 Preliminary Study Alternatives (from US 74 near I-485 to US 74 between the towns of Wingate and Marshville). Conceptual designs were created within these Preliminary Study Alternative Corridors, and these were used to quantitatively estimate impacts to the human and natural environments. Estimated impacts for the Preliminary Study Alternatives were compared, and 16 alternatives were selected as DSAs for detailed consideration in this Draft EIS.

Functional roadway designs were then prepared for the 16 DSAs, as described in **Section 2.5**, and a quantitative comparative analysis of the DSAs was conducted. The impacts documented in **Sections 3** through **7** of this Draft EIS are based on the functional engineering designs for the DSAs.

Section 2.8 documents the DSA currently recommended for the proposed project.

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

The general public, in addition to local, state and federal environmental resource and regulatory agencies, have been involved throughout the project development process. Several opportunities were provided for input and comment on the purpose and need for the project, preliminary alternatives, and the DSAs.

Environmental resource and regulatory agencies were involved throughout the development of alternatives and the alternatives screening process through monthly agency coordination meetings (see **Section 9** for a summary of these meetings).

To involve the public, a project newsletter was distributed to the project mailing list of more than 25,000 names in June 2007, early in the alternatives development process. The newsletter

provided an update on the project and invited comments, as well as advertised the Citizens Informational Workshops (CIW). CIWs were held on June 25 and June 26, 2007, to seek input from the public on the range of alternatives and Preliminary Corridor Segments to be evaluated.

Additionally, the public and environmental resource and regulatory agencies were invited to comment on the *Draft Alternatives Development and Analysis Report* (PBS&J, November 2007) and NCTA's recommended DSAs. The report was made available to the public via the NCTA Web site and distributed to the agencies. The public was notified of the report's availability and provided with a summary via a newsletter. **Section 9** of this Draft EIS provides details on public involvement activities and agency coordination.

2.1.3 TRAFFIC FORECASTS AND ANALYSES

For the alternatives analysis in this Draft EIS, traffic forecasts and operations analyses were prepared for the No-Build Alternative and for the DSAs. In addition, a separate traffic study was prepared for the Improve Existing US 74 Alternative as part of the screening process. All of these studies are described further below.

The traffic forecasts and operational analyses presented in this section are based on the year 2035. The 2030 traffic forecasts for the No Build Alternative were prepared by Martin/Alexiou/Bryson (MAB). The 2035 traffic forecasts for the No-Build and Build alternatives were prepared by Wilbur Smith Associates (WSA). PBS&J prepared traffic operations analyses based on the MAB and WSA forecasts. In addition to these studies, WSA also prepared a separate traffic forecast for the Improve Existing US 74 Alternative.

Please note that, for the Purpose and Need, traffic forecasts and analyses were developed for the year 2030, not 2035. See **Section 1** of this Draft EIS and the *Statement of Purpose and Need* (PBS&J, February 2008). Following completion of the *Statement of Purpose and Need*, traffic forecasts were updated to the design year 2035 for the No-Build Alternative, as well as for Build Alternative scenarios (as described in **Section 2.6**). Because forecasted traffic volumes for year 2035 for the No-Build Alternative were greater than the year 2030 forecasts, FHWA and NCTA determined that it was not necessary to update analyses completed for the Statement of Purpose and Need, as the need for the project was only amplified by the greater volumes in the 2035 forecasts. Therefore, the Purpose and Need section of this Draft EIS continues to be based on 2030, while this section of the Draft EIS, and subsequent sections, will reference the design year 2035.

Separately from the traffic forecasts used in the National Environmental Policy Act (NEPA) process, WSA also prepared a preliminary traffic and revenue (T&R) study, which is used to assess the project's potential to generate toll revenue. See *Proposed Monroe Connector Preliminary Traffic and Revenue Study* (Wilbur Smith Associates, October 2006), incorporated by reference and available on the NCTA Web site (www.ncturnpike.org/projects/monroe). While the NEPA Forecast is prepared to evaluate impacts and determine the design of the facility using standard procedures for FHWA NEPA

NEPA Traffic Forecasts vs. Traffic and Revenue Forecasts

The traffic forecast used in the Draft EIS (the NEPA Forecast) is separate from the traffic forecast used in the Preliminary Traffic and Revenue Study (the T&R Forecast). The NEPA Forecast is prepared to evaluate impacts and determine the design of the facility using standard procedures for FHWA NEPA documents. The T&R Forecast is a separate forecast used for predicting revenue. It is usually lower than the NEPA Forecast so that potential revenue is not overstated.

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.

For additional details on the traffic studies used in this Draft EIS, refer to **Section 2.6**.

2.2 QUALITATIVE FIRST SCREENING OF ALTERNATIVE CONCEPTS

The Qualitative First Screening of Alternative Concepts considered five basic Alternative Concepts. These concepts were screened against elements of the purpose and need to determine which of the concepts could be developed to meet all components of the project purpose and need. Those concepts that could not be developed to meet the defined purpose and need were removed from further consideration.

2.2.1 SCREENING CRITERIA

Each Alternative Concept was considered for its potential to meet the purpose and need for this project. The screening criteria listed below were applied.

- Does the alternative address the need to improve mobility and capacity in the US 74 corridor?
- Is the alternative consistent with the NC Strategic Highway Corridor (SHC) program and NC Intrastate System (i.e., does it allow for high-speed regional travel)?
- Does the alternative maintain access to properties along existing US 74?

A decision to carry an alternative forward beyond the first screening did not necessarily mean that the alternative would meet the purpose and need. Alternatives were carried forward beyond the first screening if, based on the information available, they appeared to have the potential to meet all elements of the purpose and need. Alternatives could also be eliminated later in the process if additional information and details made it clear that they could not meet the purpose and need.

Additionally, 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.

2.2.2 ALTERNATIVE CONCEPTS

The Federal Highway Administration (FHWA) recommends that the basic Alternative Concepts listed below should be considered “when determining reasonable alternatives” (FHWA Technical Advisory T 6640.8A, 1987):

- No-Build or No-Action Alternative
- Transportation Demand Management Alternative
- Transportation System Management Alternative

- Mass Transit/Multi-Modal Alternative
- Build Alternatives, including Improving Existing Roadways and New Location Alternatives

For the Monroe Connector/Bypass project, additional Alternative Concepts were considered, consisting of constructing part of the project on new location roadway, and improving existing roadways for the remaining part. These combinations of concepts are referred to as hybrid concepts. These Alternative Concepts and reasons why each was either retained for the second screening or eliminated from further consideration are described in the following sections.

There is a description of each Alternative Concept, followed by a discussion of the estimated effects that that concept would have on mobility and capacity within the US 74 corridor, as well as if the Alternative Concept is consistent with state and local plans and if it maintains access to properties along US 74. This is followed by a listing of reasons why that particular Alternative Concept was retained for the Qualitative Second Screening or eliminated from further consideration.

2.2.2.1 No-Build Alternative

Alternative Description. The No-Build Alternative is the baseline comparative alternative for the design year (2035). The No-Build Alternative assumes that the transportation systems for Union and Mecklenburg Counties would evolve as currently planned in the Mecklenburg-Union Metropolitan Planning Organization (MUMPO) *2030 Long Range Transportation Plan (2030 LRTP)*, but without major improvements to the existing US 74 corridor from near I-485 to between the towns of Wingate and Marshville. By definition, this alternative would not meet the project's purpose and need. For further information on projects planned in this corridor, refer to **Section 1.7** of this Draft EIS.

No-Build Alternative

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

Decision to Retain as a Baseline for Comparison. Although the No-Build Alternative concept would maintain existing access to properties along the US 74 corridor, it would not provide for high-speed regional travel, enhance mobility or increase capacity. It would not be consistent with the NC SHC program or the NC Intrastate System. However, in accordance with NEPA (40 CFR 1502.14(d)) and FHWA guidance (FHWA Technical Advisory T 6640.8A, 1987), the No-Build Alternative will be given full consideration in this Draft EIS to provide a baseline for comparison with the DSAs.

2.2.2.2 Transportation Demand Management Alternative

Alternative Description. The Transportation Demand Management (TDM) Alternative concept 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 Mecklenburg and Union counties, such as staggered work hours and flex-time (employer-focused) and ride-sharing.

Transportation Demand Management Alternative

This alternative was eliminated from further study.

Ride-sharing, such as carpools and vanpools, is generally viewed as more convenient than bus transit with regard to access, door-to-door travel times, and comfort. However, the ability of these voluntary programs to reduce traffic volumes on particular roadways is minimal.

Presently, the Charlotte Area Transit System (CATS) promotes ride-sharing to employment destinations in the Charlotte area by providing a car ride-share matching service and a vanpool program. The CATS vanpool program currently has 85 vanpools (Charlotte-Mecklenburg Web site: www.charmeck.org/Departments/CATS/Commute+Options/Vanpool+List.htm). Two of these vanpools originate in Union County - one in Indian Trail and one in Waxhaw.

CATS also promotes employer programs for managing travel demand. There are 54 companies currently participating in CATS' Employee Transportation Coordinator (ETC) Program (Charlotte-Mecklenburg Web site: www.charmeck.org/Departments/CATS/Transit+Programs/ETC+Program.htm).

Decision to Eliminate from Further Study. The TDM Alternative was eliminated from further study because it did not meet the project's purpose and need. TDM measures would provide increased transportation choices in the area; however, it is likely that only a small percentage of travelers would take advantage of the TDM options. Therefore, TDM measures would only provide minor improvements to high-speed regional travel, enhanced mobility, and increased capacity for the majority of travelers on US 74. The TDM Alternative would not be consistent with the NC SHC program nor the NC Intrastate System program. The TDM Alternative would maintain access to properties along existing US 74.

2.2.2.3 Transportation System Management Alternative

Alternative Description. Transportation System Management (TSM) Alternative concept measures typically consist of low-cost, minor transportation improvements to increase the capacity of an existing facility. There are two main types of TSM improvements: operational and physical. Examples of TSM operational improvements include:

- Traffic law enforcement
- Access control
- Turn prohibitions
- Speed restrictions
- Traffic signal timing optimization

Examples of TSM physical improvements include:

- Turn lanes
- Intersection realignment
- Improved warning and information signs
- New signals or stop signs
- Intersection geometric and signalization improvements
- High Occupancy Vehicle (HOV) / High Occupancy Toll (HOT) / Managed lanes

Transportation System Management Alternative

This alternative was eliminated from further study.

The TSM Alternative concept considered minor operational and physical improvements along existing US 74 consisting of traffic signal timing optimization, access control measures (e.g. driveway consolidation, closing median breaks), and intersection improvements such as adding intersection turn lanes and extending turn lanes to accommodate longer queues.

TSM measures such as traffic law enforcement, speed restrictions, intersection realignment, improved warning and information signs and the addition of new signals or stop signs were not included in the TSM Alternative. As stated in the project need, US 74 lacks sufficient capacity to handle existing and projected traffic volumes. A need has been identified to provide increased roadway capacity to accommodate existing and projected traffic volumes in this corridor. These TSM measures would provide only minor improvements and not create any additional capacity along US 74.

Traffic signals along US 74 between I-485 and Fowler Secret Road (SR 1754) are spaced 0.7 to 1.3 miles apart. From Fowler Secret Road (SR 1754) to the US 74/US 601 intersection, the traffic signals are spaced about 0.25- to 0.5-mile apart. According to the *Highway Capacity Manual* (Transportation Research Board, 2000), the functional design for a high-speed facility would limit signal spacing to between 0.5 and 2 miles. This spacing is required in order to limit traffic disruptions and maintain a speed of 45 to 55 miles per hour (mph) (*Highway Capacity Manual* 2000, Table 10-4). As the number of intersections per mile increases, the opportunity for crashes increases. The existence of too many intersections per mile also increases delay and congestion by disrupting the traffic flow through the area and reducing travel speeds.

Coordinated traffic signals could result in minor improvement in traffic flow, particularly where the traffic signals are more closely spaced. However, there would continue to be delays experienced at the intersections and slowed traffic due to motorists turning into and out of driveways and at median breaks and due to the presence of tractor-trailer trucks.

The TSM measure of closing median breaks and some driveways would not be effective since limiting turning movements between signalized intersections would increase the turning movement volumes at signalized intersections.

Converting existing lanes on US 74 to HOV lanes as a TSM Alternative would not meet the project's purpose and need. They would not allow for a high-speed freeway for regional travel. They would not eliminate the numerous traffic signals present throughout the corridor nor would they provide for any access control along the existing corridor. Failure to accomplish either of these would not allow the corridor to provide for high-speed travel.

The NCDOT, in coordination with the Charlotte Department of Transportation (CDOT), the Metropolitan Planning Organizations (MPO) and Rural Planning Organizations (RPO) within the Charlotte region have undertaken a study, known as the Charlotte Region Fast Lanes Study, to examine the feasibility of HOV/HOT or managed lane applications on major highways in the Charlotte region (www.fastlanes.org). The purpose of the study is to determine the technical, financial, and institutional feasibility of dedicating lanes on major highways in the Charlotte region for active traffic management. The Monroe Connector/Bypass was not analyzed in detail in this study because it will be included in the MUMPO LRTP as a toll road (*Charlotte Region Fast Lanes Analysis Final Corridor Screening Report*, February 15, 2008 (page 1), Fast Lanes Web site: www.charmeck.org/fastlanes/PDFs/Ph_1_ScreeningReport.pdf). US 74 in the project study area also was not evaluated in detail for managed lanes as part of the study; however,

US 74 west of I-485 was analyzed in the study and recommended for further assessment. The Fast Lanes study is expected to be completed in April 2009.

Decision to Eliminate from Further Study. In general, TSM improvements are low-cost measures that can be effective in solving localized or site-specific capacity, safety, and operational problems in urban areas. TSM improvements for individual intersections, interchange ramps, or other similar types of improvements could result in a minor improvement in mobility due to increased intersection capacities at the specific locations of the improvements. However, it would not add new capacity to the transportation system. Therefore, the effectiveness of these TSM improvements likely would be overwhelmed by widespread existing traffic congestion, as well as the substantial increase in traffic volumes expected by 2035. In addition, the TSM Alternative concept would not provide for high-speed regional travel and is not consistent with the state or local transportation plans. Therefore, this alternative was eliminated from further consideration. The following points were considered in this determination:

- The TSM Alternative concept could have minor improvements to mobility and capacity due to increased intersection capacity resulting from improved traffic progression with coordinated signals. However, the amount of traffic projected for 2035 along US 74 would overwhelm the effectiveness of minor TSM improvements.
- A TSM Alternative concept would not serve high-speed regional travel. Coordinated signals might provide minor improvement in traffic flow in the area between I-485 and Monroe, but the continued presence of these signals, along with the numerous driveways and unsignalized intersections, would not result in a high-speed facility.
- The TSM Alternative concept would not be consistent with the NC SHC or Intrastate System programs' visions for the US 74 corridor as a freeway facility allowing for high-speed regional travel.
- The TSM Alternative would maintain access to properties along existing US 74.

2.2.2.4 Mass Transit/Multi-Modal Alternative

Alternative Description. The Mass Transit Alternative concept would include bus or rail passenger service. A major advantage of mass transit is that it can provide high-capacity, energy-efficient movement in densely traveled corridors. It also serves high 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. The Multi-Modal Alternative concept would combine mass transit with existing roadway improvements.

Mass Transit and Multi-Modal Alternatives

These alternatives were eliminated from further study.

Separate studies of mass transit are being undertaken in Mecklenburg County by CATS. Plans and existing services in Union County and between Union County and Mecklenburg County are described below.

Neither Union County nor the City of Monroe operates a public transportation system, with the exception of on-demand paratransit services. There are no plans to begin other public transportation services in the near future.

CATS operates an express bus service to and from Uptown Charlotte, stopping at three park and ride lots in Union County. The first is located at Union Towne Shopping Center off US 74 in Indian Trail. The second is located at the K-Mart at 2120 West Roosevelt Boulevard (US 74) in Monroe, and the third one is located at Christ Bible Teaching Center at 1103 Unarco Road off (US 74) in Marshville. (CATS Web site: www.charmeck.org/departments/CATS).

CATS is planning a major expansion of its mass transit service throughout Mecklenburg County. In November 1998, Mecklenburg County citizens approved a local sales tax (one-half percent) to support implementation of the *2025 Integrated Transit/Land Use Plan*, which identified five major mass transit corridors. One of these corridors, the Southeast Corridor, has a study area that extends from Center City Charlotte southeast along US 74 to Central Piedmont Community College just east of I-485 in Mecklenburg County. This project is also known as the LYNX Silver Line, and there are currently no plans to extend the project into Union County.

Decision to Eliminate from Further Study. Although the Mass Transit Alternative and Multi-Modal Alternative would provide improved mobility and capacity in the project study area, they were determined not to meet the purpose and need of the project based on the following considerations:

- The Mass Transit Alternative concept, particularly on a dedicated right of way, could improve mobility and capacity for transit users between Union County and Mecklenburg County by providing an alternative mode choice for commuters and other county-to-county and intracounty travelers. However, it would not noticeably improve mobility and capacity because it would not divert enough vehicular traffic.
- The Mass Transit Alternative concept would not be consistent with the NC SHC program vision for the corridor or the NC Intrastate System, as it would not allow for a high-speed freeway for regional travel in the US 74 corridor. Therefore, it would not meet these elements of the project's purpose and need.

2.2.2.5 Improve Existing US 74 Alternative

Alternative Description. Several versions of the Improve Existing US 74 Alternative concept were developed and evaluated, each of which would involve improvements to existing US 74 from near I-485 to between the towns of Wingate and Marshville:

- **Standard Arterial Widening.** This concept would include the addition of two to four lanes to create an eight-lane arterial facility; signalized intersections and driveways would remain. There would be no new location component to this concept.
- **Superstreet.** This concept would involve the conversion of the existing facility to a superstreet. The superstreet configuration adds capacity at intersections by restricting left turns and through movements from cross-streets. The US 74 mainline would operate as a pair of one-way streets controlled, when necessary, by two-phase signals. The left turning and through movements from the cross-streets would be rerouted to make a right turn onto US 74, travel to a downstream U-turn location (typically located 1,000 feet downstream) and make a U-turn on US 74 where they can continue on US 74 or make a

Improve Existing US 74 Alternative

The Improve Existing US 74 Standard Arterial Widening and Superstreet Alternative concepts were eliminated from further study. The Controlled-Access Freeway Alternative concept was retained for the Qualitative Second Screening.

right turn onto a cross-street. The U-turn locations on US 74 would operate as yield-controlled or signalized intersections, depending on traffic volumes and geometric conditions. There would be no new location component to this concept.

- Controlled-Access Highway. This concept would include upgrading existing US 74 from near I-485 to between the towns of Wingate and Marshville to a controlled-access highway. In accommodating a controlled-access facility, access to properties along existing US 74 would need to be maintained. Therefore, constructing the project along an existing roadway corridor would require frontage roads to provide the access to existing properties. This concept assumes a six-lane freeway section with two-lane, one-way frontage roads on either side to provide access to adjacent properties. There would be no new location component to this concept. Variations on this concept, including a four-lane freeway and/or three-lane frontage roads also were considered (**Section 2.4.4.3**).

Decision to Eliminate the Standard Arterial Widening Concept. Because it would not meet the purpose and need for this project, the Standard Arterial Widening concept was eliminated from further analysis. The following factors were considered in this determination:

- Widening existing US 74 would improve capacity in the US 74 corridor; however, because the numerous traffic signals along the existing road would remain, overall mobility would not be improved.
- Access to existing properties along US 74 would be maintained.
- Improving existing US 74 as a widened arterial would not be consistent with the NC SHC program or the NC Intrastate System, as it would not allow for a high-speed freeway for regional travel. It would not eliminate the numerous traffic signals present throughout the corridor nor would it provide for any access control along the existing corridor. Failure to accomplish either of these would not allow the corridor to provide for high-speed travel.

Decision to Eliminate the Superstreet Concept. The Superstreet concept was eliminated from further consideration because it would not fully meet the project's purpose and need, as described in the points below:

- Improving existing US 74 to a superstreet could improve mobility and increase capacity in the US 74 corridor. However, even with additional travel lanes, the concept would result in only a minor improvement in capacity. There would also only be a minor improvement in mobility because signalized intersections would still be required at many intersecting streets to efficiently serve through movements and turning movements.
- A superstreet would require consolidation of driveways along US 74. Although some driveways would be removed, overall access to US 74 likely could be maintained.
- This concept would not fulfill the NC SHC program's vision for the corridor as a freeway facility. It would also likely require use of signalized intersections, therefore not providing for high-speed regional travel. Failure to meet this vision would not allow this concept to meet the purpose and need.

Decision to Retain the Controlled-Access Highway Alternative. Improving existing US 74 to a controlled-access highway would enhance mobility and increase capacity in the US 74 corridor and provide for high-speed regional travel consistent with the NC SHC and NC Intrastate System plans. This Alternative Concept could be designed to maintain access to

properties along US 74 with frontage roads. Therefore, the concept meets the purpose and need for the project and was further evaluated in the Qualitative Second Screening.

2.2.2.6 New Location Alternative

Alternative Description. The New Location Alternative concept would involve construction of a controlled-access highway on new location from US 74 near I-485 to US 74 between the towns of Wingate and Marshville. This screening did not differentiate between potential alternative corridor locations. Preliminary Corridor Segments were developed for evaluation in the Qualitative Second Screening.

New Location Alternative

This alternative was retained for the Qualitative Second Screening.

The facility type for this alternative would be a controlled-access highway, as warranted by traffic projections for the project's design year. A controlled-access highway option would best preserve the capacity of the new location road, and would be consistent with the NC SHC designation and the NC Intrastate System designation.

Decision to Retain for Further Study. The controlled-access highway New Location Alternative concept was determined to meet the purpose and need for the project and was carried forward for additional consideration in the Qualitative Second Screening. This alternative concept would provide a controlled-access highway that would enhance mobility in the project study area by providing a higher capacity, more efficient and reliable route for the movement of goods and people. Trucks and other through-traffic would likely use the new location freeway, which would separate through-traffic from local traffic accessing businesses along existing US 74. The new location freeway would provide for high-speed regional travel, consistent with the NC SHC vision and the NC Intrastate System designation for the US 74 corridor. Additionally, the New Location Alternative concept would construct a new facility, the existing US 74 facility would be preserved, and access to properties along existing US 74 would be maintained.

2.2.2.7 New Location/Improve Existing Roadways Hybrid Alternative

Alternative Description. This alternative concept would involve building a portion of the project on new location and improving some combination of existing roadways (US 74 or other roadways) for the remainder of the project. In addition to including existing US 74, potential hybrid alternatives could include improvements to Secret Shortcut Road (SR 1501) or Old Monroe Road/Old Charlotte Highway (SR 1009), two roads that generally parallel US 74 west of US 601. This screening did not differentiate between potential locations.

New Location/Improve Existing Roadways Hybrid Alternative

This alternative was retained for the Qualitative Second Screening.

As with the New Location Alternative concept, the facility type for the new location portion of the hybrid alternative concepts would be a controlled-access highway. The facility type for the improve existing roadway portion also would be a controlled-access highway to provide a consistent facility type for the length of the project and to be consistent with the NC SHC program and the NC Intrastate System. A controlled-access highway option would maximize the capacity of the new/upgraded road and is warranted by 2035 traffic projections for the corridor.

Decision to Retain for Further Study. The New Location/Improve Existing Roadways Hybrid Alternative concept was determined to meet the purpose and need for the project and was retained for further consideration in the Qualitative Second Screening. This alternative concept would improve mobility and capacity in the project study area by providing a more efficient facility with additional travel lanes, both with the improvements to the existing facility and addition of a new location facility. The facility could provide for high-speed regional travel consistent with the NC SHC vision and the NC Intrastate System designation. In addition, the concept could be designed to maintain access to properties along existing US 74.

2.2.3 SUMMARY OF RESULTS OF QUALITATIVE FIRST SCREENING

The results of the Qualitative First Screening indicated that only a controlled-access highway type facility, either on new location or an upgrade of existing roadways, or a combination of new location and upgrade of existing facilities, would fulfill the identified needs and meet the purpose of the project. Therefore, the following four concepts were retained for evaluation in the Qualitative Second Screening:

- No-Build Alternative
- Improve Existing US 74 (Controlled-Access Highway)
- New Location Roadway (Controlled-Access Highway)
- New Location/Improve Existing Roadways Hybrid (Controlled-Access Highway)

Table 2-1 presents the results of the Qualitative First Screening. It lists each Alternative Concept and whether each Alternative Concept meets or does not meet the screening criteria. A ✓ was assigned if an alternative meets, or could be designed to meet, an element of the purpose and need. As stated above, an alternative “meets” an element of the purpose and need only if it provides 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. Therefore, in the first column of this table (“Enhances Mobility and Increases Capacity”), a ✓ was assigned to any alternative that achieves, or could be designed to achieve, a lasting and noticeable increase in mobility and capacity in the corridor.

Based on this standard, a ✓ was assigned to all alternatives in the first column, except for the Improve Existing US 74 Standard Arterial Widening alternative. However, it is important to note that the Transportation Demand Management, Transportation System Management, Mass Transit/Multi-Modal Alternative, and Improve Existing US 74 Superstreet Concept would provide a much lower level of improvement in mobility and capacity than the other alternatives. In addition, they would not meet other elements of the purpose and need and therefore are not reasonable or practicable alternatives.

TABLE 2-1: Qualitative First Screening – Ability of Alternative Concepts to Meet Purpose and Need

Alternative Concepts	Enhances Mobility and Increases Capacity	Consistency with Planning and Legislative Vision for the Corridor			Maintains Access to Properties Along Existing US 74
		Serves High Speed Regional Travel	NC SHC	NC Intrastate System	
Transportation Demand Management	✓	✗	✗	✗	✓
Transportation System Management	✓	✗	✗	✗	✓
Mass Transit/Multi-Modal	✓	✗	✗	✗	✓
Improve Existing US 74					
Standard Arterial Widening	✗	✗	✗	✗	✓
Superstreet	✓	✗	✗	✗	✓
Controlled-Access Highway	✓	✓	✓	✓	✓
New Location Highway	✓	✓	✓	✓	✓
New Location/Improve Existing Roadways Hybrid	✓	✓	✓	✓	✓

✗ - means the alternative concept cannot meet this element of purpose and need.

✓ - means the alternative concept does meet, or could be designed to meet, this element of purpose and need.

2.3 QUALITATIVE SECOND SCREENING OF PRELIMINARY CORRIDOR SEGMENTS

For the Qualitative Second Screening, a project study area to guide development of possible build alternative corridors was established. Then, 1,000-foot wide corridor segments on new location and on existing roadways were developed and qualitatively assessed and compared with respect to potential impacts to the human and natural environments, as well as with respect to reasonableness and practicability.

Corridor segments not eliminated by the second screening were combined to form 25 Preliminary Study Alternatives beginning at US 74 near I-485 and ending at US 74 between the towns of Wingate and Marshville. The goal of this second screening was to qualitatively evaluate Preliminary Corridor Segments with respect to potential impacts and to identify those corridors to include in the Quantitative Third Screening.

2.3.1 PROJECT STUDY AREA

As shown on **Figure 1-3**, a project study area for the Monroe Connector/Bypass project was identified for use in the development of possible build alternative corridors. The study areas from the previous studies for the Monroe Bypass (**Figure P-1**) and Monroe Connector (**Figure P-2**) were used as an initial guide in the development of the project study area for this project. Current conditions and comments received as part of those previous studies were also considered.

- **Overall.** The project study area is centered on the US 74 corridor because the purposes of the project are to improve mobility and capacity and to serve high-speed regional travel within the US 74 corridor.

- **Western Boundary.** To the west, the study area boundary is in the vicinity of NC 51 (just west of I-485) at US 74. I-485, the only controlled-access facility in the area, is a logical terminus for the proposed project, which would also be a controlled-access facility.
- **Eastern Boundary.** The eastern project study area boundary is along US 74 between the towns of Wingate and Marshville. In this area, the US 74 corridor becomes rural and there are few existing or projected congestion issues in this area. Farther west along US 74, west of Wingate, traffic volumes begin to increase.
- **Northern Boundary.** To the north, the boundary does not encroach on either the Goose Creek watershed or on Lake Twitty (a water supply). Previous studies included these areas, but because of concerns surrounding the presence of the federally-endangered Carolina heelsplitter mussel in Goose Creek and because Lake Twitty is a critical watershed, these areas were eliminated from the current project study area. Previously identified corridors for the Monroe Connector and Monroe Bypass that would result in direct impacts to the Goose Creek watershed or Lake Twitty are not included in this analysis.
- **Southern Boundary.** At the request of federal and state environmental resource and regulatory agencies, the southern boundary of the project study area extends to just south of Old Monroe Road/Old Charlotte Highway (SR 1009) to allow for consideration of alternative corridors south of existing US 74. The project study area does not extend farther south because identifying corridors that begin south of US 74 and remain south of US 74 would create a substantially longer route than routes north of US 74 due to the alignment of existing US 74. In addition, a more southerly alignment would potentially impact the Monroe Country Club, a regional hospital, and multiple residential areas, as well as the Lake Lee critical watershed. A corridor south of the Lake Lee critical watershed would not be reasonable or practical due to substantially greater length and potential impacts to the Waxhaw Creek watershed, which is also a known Carolina heelsplitter habitat.

2.3.2 DEVELOPMENT OF PRELIMINARY CORRIDOR SEGMENTS

Preliminary Corridor Segments were developed based upon a range of factors, including the corridors previously studied by the NCDOT for the Monroe Connector and Monroe Bypass projects, constraints identified on the land suitability mapping (natural and human environment features), basic design criteria, route continuity, project termini, ability to be tolled, and public and agency input. Based on the results of the Qualitative First Screening, it is assumed that a controlled-access facility would be constructed within the 1,000-foot wide corridors represented by the corridor segments developed in this Qualitative Second Screening.

The following sections describe general constraints considered in establishing the Preliminary Corridor Segments shown in **Figure 2-1**.

2.3.2.1 Route Continuity and Project Termini

The proposed project is intended to improve mobility and capacity in the US 74 corridor and to provide a facility that serves high-speed regional travel consistent with US 74's designation as a NC Strategic Highway Corridor and consistent with the NC Intrastate System. Therefore, the project is proposed as a controlled-access facility. In addition, the proposed project must begin

and end on existing US 74 in order to provide continuity for the US 74 corridor. With this in mind, potential locations for project termini were evaluated, as described below.

On the eastern end, the proposed project would terminate on US 74 between the towns of Wingate and Marshville. This is where existing and projected traffic volumes decrease and the study area transitions to a more rural character. See *Traffic Forecast for TIP Projects R-3329 & R-2559 Monroe Connector/Bypass*, 2008 No-Build Scenario, Sheets 7 & 8, and 2035 No-Build Scenario, Sheets 7 & 8 (Wilbur Smith Associates, September 2008), incorporated by reference and available on the NCTA Web site (www.ncturnpike.org/projects/monroe).

On the western end, several connections to I-485 were evaluated between the I-485/Idlewild Road (SR 1501) interchange to the north and the I-485/Old Monroe Road-John Street (SR 1009) interchange to the south. However, as described below, the only reasonable location for the project to terminate is along existing US 74 near I-485 or at the existing US 74/I-485 interchange. According to traffic forecasts for the Monroe Connector/Bypass project, approximately 50 percent of traffic projected to use the Monroe Connector/Bypass would continue on US 74 through the I-485 interchange.

Linking the proposed project to I-485 at a location other than US 74 would create a discontinuity in US 74 by forcing travelers on the new US 74 to access another facility (I-485) before continuing on US 74. Motorists traveling on US 74 between Monroe and Charlotte would be required to exit the Monroe Connector/Bypass at I-485, travel south on I-485 for approximately two miles and exit I-485 onto existing US 74 (Independence Boulevard).

In addition, to accommodate the projected traffic volumes, longer entrance ramps would be needed on I-485 to allow traffic from Idlewild Road and the proposed Monroe Connector/Bypass to merge before merging with traffic on I-485. Consequently, a collector-distributor roadway system would be needed between Idlewild Road (SR 1521) and US 74 to accommodate weaving movements along I-485. In addition, the loop ramp for the eastbound to northbound traffic movements from Independence Boulevard to I-485 may not provide sufficient capacity for the anticipated traffic volumes and could require reconstruction.

US 74 is a road of local, regional, and statewide importance. In this urban area, creating a discontinuity to US 74 and routing it along a segment of I-485, where existing traffic volumes also are heavy, would result in greater potential for congestion and delays.

Also, the I-485/Idlewild Road (SR 1501) interchange is not within the project study area for the Monroe Connector/Bypass. The project study area for the Monroe Connector/Bypass project was developed to avoid direct impacts to the Goose Creek watershed. Improvements needed to accommodate a highway-to-highway connection at this location would encroach on the Goose Creek watershed, which is known habitat of the federally-endangered Carolina heelsplitter mussel.

The addition of a new interchange between the existing I-485/Idlewild Road (SR 1501) interchange and the existing I-485/US 74 interchange was considered. However, a new interchange centrally located between the two existing interchanges would result in operational issues due to minimal spacing (approximately 1 mile) between each of the three interchanges on heavily traveled I-485, and the need to route through traffic from the proposed project onto I-485 to continue on existing US 74. Further, a new interchange in this area would have major unavoidable impacts to several densely developed residential areas, including Madison Ridge,

Independence Village, and Woodbridge subdivisions. It is also likely that improvements would be required at the I-485/Idlewild Road (SR 1501) interchange to allow for efficient operations at the new interchange and on I-485, which would encroach on the Goose Creek watershed.

Preliminary corridors that would connect to I-485 south of the I-485/US 74 interchange, either at the existing I-485/Old Monroe Road-John Street (SR 1009) interchange or a new intermediate interchange, were also considered but eliminated. There is insufficient spacing for a new interchange between the existing interchanges at I-485/US 74 and I-485/Old Monroe Road-John Street (SR 1009), as the existing interchanges are only approximately 1.25 miles apart. At the I-485/Old Monroe Road-John Street (SR 1009) interchange, necessary improvements to accommodate the new facility, as well as the alignment of new corridors to tie to this interchange, would have substantial impacts on downtown Stallings and Central Piedmont Community College. There would also be operational and continuity issues with traffic being routed north on I-485 to continue west on US 74.

2.3.2.2 Natural and Human Environment Features

Land suitability mapping shows the natural and human environment features in the project study area. These features include wetlands, streams, floodplains, known federally-protected species locations, water supply watersheds, hazardous wastes/materials locations, historic resources, churches, schools, businesses, community facilities, and neighborhoods/subdivisions.

The land suitability mapping for the project study area is shown on **Figure 2-2a-c**, and was developed using data layers obtained from a variety of Geographic Information System (GIS) databases (NCDOT, Union County, Mecklenburg County, US Geological Survey (USGS), and US Fish and Wildlife Service [USFWS]), state resource agency files, aerial photography, and field visits.

Examples of major natural features in the project study area include numerous wetlands and streams. Named streams include, from west to east; North Fork Crooked Creek, South Fork Crooked Creek, Stewarts Creek, and Richardson Creek.

The downtowns of several municipalities are within the project study area, including Stallings, Indian Trail, Lake Park, Monroe and Wingate. In addition, the area is developing rapidly, and neighborhoods are located throughout the project study area. Some examples of larger neighborhoods include Hamilton Place, Fairhaven, Village of Lake Park, Bonterra Village, Suburban Estates, and many other subdivisions. Central Piedmont Community College is located to the southeast of the I-485/US 74 interchange. Wingate University is located north of US 74 in the Town of Wingate. There are also numerous churches and several known historic resources in the project study area. Existing US 74 is a relatively densely developed commercial corridor important to the economy of Union County, and land uses adjacent to this roadway are primarily commercial and industrial.

2.3.2.3 Previously Studied Corridors

All corridors identified for NCDOT's Monroe Connector and Monroe Bypass studies (**Section P.4**), both preliminary study corridors and detailed study alternatives, were reevaluated to determine if they should be considered as part of this Monroe Connector/Bypass project. In some cases, corridors considered in the previous studies are no longer viable options

due to changes in the project area since the corridor's development; while in other instances, corridors eliminated from consideration in the previous studies appeared to be viable, or with slight modifications could be made viable.

As noted above, the project study area for the Monroe Connector/Bypass project differs from the project study areas for the previous studies; therefore, preliminary corridors that extended beyond the limits of the current study area were considered no longer viable and were removed from consideration. This included several corridors that terminated at the I-485/Idlewild Road (SR 1501) interchange and several corridors east of US 601 that extended into the Lake Twitty critical watershed.

Some corridors identified during previous studies but eliminated during those studies were found to be viable options for the Monroe Connector/Bypass project; either as they were previously identified or as previously identified with minor modifications. These corridors were evaluated in the Qualitative Second Screening. This includes Corridor Segments 22, 24, 34, and 35 (**Figure 2-1**).

As discussed in **Section P.4.1**, NCDOT purchased right of way for the Monroe Bypass project (R-2559 Sections B and C) in 2000 and 2001. This right of way was purchased for the Preferred Alternative identified in a federally-approved Finding of No Significant Impact (FONSI) for Project R-2559 (June 1997), which concluded the NEPA process for that project. This corridor is generally represented by Corridor Segments 36 and 40. Although substantial right of way has already been acquired for this corridor, this previous acquisition cannot influence the NEPA process and its outcomes for the Monroe Connector/Bypass project.

2.3.2.4 Public and Agency Input

Some Preliminary Corridor Segments were developed as a result of comments from federal and state environmental resource and regulatory agencies and/or public input as described in **Section 9** of this Draft EIS. This includes additional corridors that utilize existing roadways (Old Monroe Road/Old Charlotte Highway (SR 1009) [Corridor Segments 5 and 6] and Secrest Shortcut Road (SR 1501) [Corridor Segment 13]).

Maps showing Preliminary Corridor Segments were presented to the public in a project newsletter distributed in early June 2007 and at Citizens Informational Workshops on June 25 and 26, 2007. Please see **Section 9.1** for additional information on public involvement and agency coordination efforts. Public input received following the workshops resulted in development of two additional Preliminary Corridor Segments, 18A and 22A, in the areas around the subdivisions of Fairhaven (located east of Stevens Mill Road (SR 1524)) and Bonterra Village (located north of Secrest Shortcut Road (SR 1501) and west of Wesley Chapel Stouts Road (SR 1377)). These corridor segments, shown on **Figure 2-3**, were developed in response to public comments to minimize direct impacts to residential areas and community facilities.

2.3.2.5 Tolling

The proposed action is included in the NCDOT *2009–2015 State Transportation Improvement Program (STIP)* as Project R-3329 (Monroe Connector) and Project R-2559 (Monroe Bypass) as a toll facility. The project is known as the “Monroe Connector/Bypass.”

North Carolina roads traditionally have been built with taxpayer funds, either through the state transportation budget or federal-aid highway funds allocated to the state. There are many other priority projects statewide and, due to funding constraints, there is not enough funding available from traditional sources in the foreseeable future to construct all priority projects.

MUMPO, as part of the metropolitan planning process, has decided to allocate the limited available federal and state funds to other projects, while developing the Monroe Connector/Bypass as a toll road. This funding decision provided the basis for MUMPO's financial plan for its LRTP, which in turn provided the basis for FHWA's finding of fiscal constraint for the plan. Based on this planning decision, a non-toll option to construct the Monroe Connector/Bypass is not economically feasible and therefore is not a reasonable alternative.

Based on preliminary traffic and revenue forecasts, the NCTA determined that the Monroe Connector/Bypass is financially feasible with the collection of tolls. Using tolls, the NCTA can provide the funding need 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 otherwise prevent or delay completion of critical projects.

Based on the discussion above, the ability to design an alternative as a toll facility was a requirement in the development of the Preliminary Corridor Segments. Toll collection for this project is assumed to be all electronic (no booths for on-site payment), and new location corridors were assumed to be able to accommodate a toll facility within the standard right of way for the controlled-access facility (approximately 350 feet). Please see **Section 2.5.1.3** for additional information.

Corridors along existing roadways had additional considerations when incorporating tolls into the corridor segment. State law prohibits tolling of existing roadways and requires a free alternate route (NCGS 136-89.197). To accommodate this, constructing the project along an existing roadway corridor would require frontage roads to provide the free alternate route, which would require additional right of way along the existing facility. Design options to reduce the right of way required would include use of retaining walls to elevate either the toll road or frontage roads; however, these options are only cost effective where right-of-way cost savings offset the increase in construction costs. Existing corridors considered for upgrading were US 74 (in its entirety or in part), Old Monroe Road/Old Charlotte Highway (SR 1009), and Secret Shortcut Road (SR 1501).

2.3.3 QUALITATIVE SECOND SCREENING METHODOLOGY AND RESULTS

Preliminary Corridor Segments, mapped in **Figure 2-3**, were evaluated in the Qualitative Second Screening using the strategies described in the following sections. No specific alignments or designs were developed within the Preliminary Corridor Segments at this stage of the evaluation process. Four general groups of options were evaluated: improve existing US 74; construct a new location facility north of US 74; and construct a new location facility/improve existing roadway hybrid either north or south of US 74.

It should be noted that segments shown on **Figure 2-3** are not sequential and do not include all Preliminary Corridor Segments 0 through 44. Those numbers were used for identification purposes only as segments were developed and evaluated. Several corridor segments (Corridor

Segments 4, 10, 11, 15, 17, 23, 28, 32 and 38) were originally developed but then “absorbed” into other corridor segments and are no longer listed.

2.3.3.1 Individual Segment Assessment

In instances where a Preliminary Corridor Segment provided a route where there were no other similar options, and additional information and evaluation would be helpful in demonstrating whether a Preliminary Corridor Segment was viable and reasonable, the segment was carried forward into the Quantitative Third Screening. Corridor Segments 2, 24+26, 31 and 7, as well as the segments comprising the existing US 74 corridor (Corridor Segments 0, 1, 9, 8, 44, 42, and 43), have no similar segments. These corridor segments were therefore carried forward for further evaluation in the Quantitative Third Screening.

Preliminary Corridor Segments for which there were no other similar options, but that did appear to have substantial potential impacts to the natural or human environment, were qualitatively evaluated on an individual basis to determine if the impacts would make the segment impractical or unreasonable to implement. Based on this evaluation, Corridor Segments 5, 6, and 13 (from Willis Long Road (SR 1509) east to US 74) were recommended for elimination from further study primarily based on their individual impacts to existing developed areas and associated relocations, which would make them unreasonable to implement. Corridor Segments 5 and 6 followed existing Old Monroe Road/Old Charlotte Highway (SR 1009), and Corridor Segment 13 followed existing Secret Shortcut Road (SR 1501) (see *Alternatives Development and Analysis Report*, Section 3.2.2 (PBS&J, April 2008) incorporated by reference).

Corridor Segment 5 would construct a toll road along existing Old Monroe Road/Old Charlotte Highway (SR 1009) (**Figure 2-3**). Upgrading the existing facility would require construction of the new toll road, and also frontage roads parallel to the freeway to provide a free alternate route and allow access to adjacent properties, many of which have access only to Old Monroe Road/Old Charlotte Highway (SR 1009). The existing roadway has a right-of-way width of only 60 feet, so substantial additional right of way (at least 200 feet) would be needed to make any improvements or upgrades to the existing road.

The combination of impacts to resources and properties along Corridor Segment 5 make this segment unreasonable to implement. These include impacts to the entrances of Charlotte Pipe and Foundry and South Piedmont Community College (across the road from each other). There would be impacts to numerous subdivisions and other uses along Old Monroe Road/Old Charlotte Highway (SR 1009), including seven subdivisions containing more than 500 lots that have access only to this road. Buildings and access to Sun Valley High School would be impacted, along with impacts to businesses at the Wesley Chapel Stouts Road (SR 1377) intersection.

Corridor Segment 6 would construct a toll road along existing Old Charlotte Highway (SR 1009) through downtown Monroe (**Figure 2-3**), a densely developed urban area. As with Corridor Segment 5, upgrading existing Old Charlotte Highway to a multilane toll road with frontage roads would require additional right of way and impact an established downtown area. Adjacent properties are densely developed with businesses and neighborhoods. There would be access changes, and possible acquisition, of the Union County Courthouse and the publicly-owned Belk Tonawanda Park. Improvements would impact historic resources on or eligible for listing on the National Register of Historic Places that are directly adjacent to the existing roadway, including the Malcolm K. Lee House, John C. Sikes House, and the Monroe Residential Historic District.

Buildings and land would be needed from Monroe High School, and land would be needed from East Elementary School. Parking at Carolina's Medical Center-Union also would be affected.

Corridor Segment 13 would construct a toll road with frontage roads along existing Secrest Shortcut Road (SR 1501) (**Figure 2-3**). These improvements would impact nine subdivisions which have access only from Secrest Shortcut Road (SR 1501) and contain approximately 500 residences. There is potential for impacts to a church and acquisition of 45 residences located near the existing right of way. This segment also would cross Stewarts Creek and Lick Branch and associated floodplains.

2.3.3.2 Relative Segment Comparison Assessment

For Preliminary Corridor Segments in areas where several options exist to provide the same route, a relative segment comparison method was used to evaluate the corridor segments. Those corridor segments that had greater impacts to natural or human environment features compared to other corridor segments providing a similar function were recommended for elimination from further study. As shown on **Figure 2-4a-e**, this evaluation focused on four areas within the project study area: AREA 1, AREA 2, AREA 3, and AREA 4. The evaluation of natural and human environment features and comparisons are detailed in the *Alternatives Development and Analysis Report* (PBS&J, April 2008). The conclusions of this assessment are presented below:

- AREA 1 (from I-485 to west of Indian Trail Fairview Road [SR 1520]) – Corridor Segment 18 was eliminated due to greater impacts to neighborhoods and community facilities. Corridor Segment 18A was carried forward for further evaluation. The corridors had similar impacts to natural resources.
- AREA 2 (from Faith Church Road [SR 3014] to east of Willis Long Road [SR 1509]) – Due to higher potential for impacts to human environment features (business and residential relocations) and natural environment features (wetlands, streams and floodplains), Corridor Segments 22, 13, and 14+26 were eliminated from further study. Corridor Segments 30 and 22A were retained for the Quantitative Third Screening.
- AREA 3 (from east of Olive Branch Road [SR 1006] to east of Austin Chaney Road [SR 1758]) – Corridor Segment 36 would require the fewest acquisitions of, and therefore have the least impacts to, residences and agricultural lands. In addition, Corridor Segment 36 avoids severing Farmwood Road. Corridor Segment 34+37 has a lower potential for residential relocations than Corridor Segment 35+37 and would have less disruption to Farmwood Road. Impacts on natural resources were comparable for these segments. As a result, Corridor Segment 35+37 was eliminated from further study. Corridor Segments 36 and 34+37 were retained for the Quantitative Third Screening. Corridor Segment 34+37 was renamed Corridor Segment 34.
- AREA 4 (from west of Forest Hills School Road to existing US 74) – Corridor Segments 40 and 41 exhibited similar potential impacts to both the natural and human environments. Both corridors were carried forward into the Quantitative Third Screening.

In this analysis, Preliminary Corridor Segments were eliminated based on being less desirable than other alternative corridors, rather than on a finding of inherent 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).

2.3.3.3 Consolidation of Corridor Segments

In some areas, several corridor segments remaining were in proximity to one another, and these were consolidated into a single study corridor. The consolidated corridor segments were made wide enough to encompass the Preliminary Corridor Segments, and in some cases, were greater than 1,000 feet. The following segments were consolidated and renamed:

- Corridor Segments 16, 20, 21, 19, 12, and 21A → Corridor Segment 21
- Corridor Segments 27, 25, and 29 → Corridor Segment 29
- Corridor Segments 33A, 33, 36, and 36A → Corridor Segment 36
- Corridor Segments 38 and 39 → Corridor Segments 40 and 41

2.3.4 QUALITATIVE SECOND SCREENING CONCLUSIONS

The results of the Qualitative Second Screening are summarized below.

- Corridor Segments recommended for elimination: 5, 6, 18, 13, 14, 22, and 35+37.
- Corridor Segments recommended for further study: 0, 1, 2, 7, 8, 9, 18A, 21 (consolidation of 16, 20, 21, 19, 12, 21A), 22A, 24+26, 29 (consolidation of 25, 27, 29), 30, 31, 34 (formerly 34+37), 36 (including 33A, 33, 36, 36A), 40, 41, 42, 43, and 44.

The elimination of the seven corridor segments listed above results in the elimination of three additional corridor segments that only provide connections to these segments. They are:

- Corridor Segment 3 (connects to Corridor Segment 5)
- Corridor Segment 19 (connects to Corridor Segment 22)
- Corridor Segment 20 (connects to Corridor Segment 22)

In conclusion, this Qualitative Second Screening resulted in the elimination of ten corridor segments and consolidation of several others. **Figure 2-5** shows the Preliminary Corridor Segments remaining for evaluation in the Quantitative Third Screening.

2.4 QUANTITATIVE THIRD SCREENING OF PRELIMINARY STUDY ALTERNATIVES

This section describes how the corridor segments remaining after the Qualitative Second Screening were combined to form end-to-end Preliminary Study Alternatives, how design criteria and conceptual alignments were developed within the 1,000-foot wide study corridors, and how preliminary impacts were quantified for the Preliminary Study Alternatives to compare and evaluate them. The purpose of the Quantitative Third Screening was to identify those alternatives that should be carried forward as Detailed Study Alternatives (DSA) in this Draft EIS.

2.4.1 PRELIMINARY STUDY ALTERNATIVES

Combining the remaining corridor segments into end-to-end alternatives resulted in twenty-five Preliminary Study Alternatives evaluated in the Quantitative Third Screening (**Figure 2-6a-d** and **Table 2-2**).

Twenty-five Preliminary Study Alternatives provide a range of reasonable alternatives to be evaluated in the Quantitative Third Screening; including sixteen new location Preliminary Study Alternatives, an improve existing US 74 alternative (Preliminary Study Alternative [PSA] G), and eight Preliminary Study Alternatives that combine new location segments with segments along existing US 74 (Preliminary Study Alternatives E, F, E1, F1, E2, F2, E3, and F3).

TABLE 2-2: Preliminary Study Alternatives Summary

Preliminary Study Alternative	Corridor Segments	Type
A	0 18A 21 22A 31 36 40 42 43	New Location
B	0 18A 21 30 31 36 40 42 43	New Location
C	0 1 2 21 22A 31 36 40 42 43	New Location
D	0 1 2 21 30 31 36 40 42 43	New Location
E	0 1 9 24 29 31 36 40 42 43	Hybrid: New Location & Improve US 74
F	0 1 9 8 7 36 40 42 43	Hybrid: New Location & Improve US 74
G	0 1 9 8 44 42 43	Improve US 74
A1	0 18A 21 22A 31 34 40 42 43	New Location
B1	0 18A 21 30 31 34 40 42 43	New Location
C1	0 1 2 21 22A 31 34 40 42 43	New Location
D1	0 1 2 21 30 31 34 40 42 43	New Location
E1	0 1 9 24 29 31 34 40 42 43	Hybrid: New Location & Improve US 74
F1	0 1 9 8 7 34 40 42 43	Hybrid: New Location & Improve US 74
A2	0 18A 21 22A 31 36 41 43	New Location
B2	0 18A 21 30 31 36 41 43	New Location
C2	0 1 2 21 22A 31 36 41 43	New Location
D2	0 1 2 21 30 31 36 41 43	New Location
E2	0 1 9 24 29 31 36 41 43	Hybrid: New Location & Improve US 74
F2	0 1 9 8 7 36 41 43	Hybrid: New Location & Improve US 74
A3	0 18A 21 22A 31 34 40 42 43	New Location
B3	0 18A 21 30 31 34 41 43	New Location
C3	0 1 2 21 22A 31 34 41 43	New Location
D3	0 1 2 21 30 31 34 41 43	New Location
E3	0 1 9 24 29 31 34 41 43	Hybrid: New Location & Improve US 74
F3	0 1 9 8 7 34 41 43	Hybrid: New Location & Improve US 74

2.4.2 DESIGN CRITERIA

The design criteria used to develop the conceptual designs are based on the project's location, function, classification, and design speed. The design criteria conform to the standards established by the American Association of State Highway and Transportation Officials (AASHTO) in 2004.

The design criteria and typical roadway cross-section are influenced by the type of facility required to fulfill the project's purpose and need and accommodate projected traffic volumes. For the alignments on new location, a four-lane, median-divided, controlled-access toll road was assumed. The proposed design speed is 70 mph for the travel lanes of the new location alternatives. Two 12-foot lanes are proposed for each direction of travel, separated by a 70-foot median. This median width is consistent with the *NCDOT Roadway Design Standards Manual*, and would allow for a future widening to three 12-foot travel lanes in each direction without having to provide a concrete median barrier or purchasing any additional right of way. The typical roadway cross-section for alignments on new location is shown in **Figure 2-7**. The total right of way is proposed to be a minimum of 300 feet, but would be greater around interchanges. A conceptual right-of-way boundary was established for each new location Preliminary Study Alternative based on this typical section.

For the alignments on existing US 74, a frontage road system would be needed in addition to the main travel lanes to provide access to adjacent properties and to serve as the free alternate route to the toll facility. Major cross-streets would be grade separated from the controlled-access travel lanes. These major cross-streets would have a signalized intersection with both frontage roads. A dedicated U-turn lane (sometimes referred to as a Texas U-turn) would be provided for alignments on existing US 74 at each major cross-street to allow frontage road traffic to change direction without traveling through the signalized intersection. No additional right of way would be required to provide these U-turn lanes.

For all alignments on existing US 74, the improvements were assumed to include three toll lanes in each direction and two one-way frontage roads on either side, for a total of ten lanes. Six lanes were assumed for the toll facility on existing US 74 (as opposed to four lanes for the new location toll alternatives) based on traffic forecasts for the facility. Six lanes are needed because the facility could carry both through traffic and local traffic for a short distance and the extra lanes would allow for adequate weaving distances of vehicles entering and leaving the toll road. The right of way required for this section would be a minimum of 350 feet. The typical roadway cross-section for alignments on existing US 74 is shown in **Figure 2-7**. A conceptual right-of-way boundary was established based on this typical section and used for quantifying impacts. Variations on this concept, including a four-lane freeway and/or three-lane frontage roads also were considered (**Section 2.4.4.3**).

For any of the Preliminary Study Alternatives, it is assumed that all toll collection would be made using an open road tolling technology, which allows for tolls to be collected at highway speeds and eliminates the need for conventional toll plazas. Different electronic tolling options are currently being evaluated and are discussed further in **Section 2.5.1.3**.

2.4.3 QUANTITATIVE THIRD SCREENING CRITERIA

The factors listed in **Table 2-3** were considered in the evaluation and screening of Preliminary Study Alternatives. These factors were discussed with the project team, which includes representatives of federal and state environmental resource and regulatory agencies and MUMPO, on April 18, 2007. The meeting was an opportunity to provide comments and input into these criteria. Comments were incorporated and the screening criteria were finalized on May 17, 2007. Data on these screening factors were obtained from geographic information systems (GIS) databases (NCDOT, Union County, Mecklenburg County, USGS, USFWS), state resource agency files, aerial photography, and field visits.

The ability to meet the project's purpose and need was considered as part of the Qualitative First Screening and was considered in the development of conceptual designs for the Preliminary Study Alternatives. It is assumed that all alternatives considered in the third screening meet the requirements of purpose and need. Therefore, purpose and need was not included as criteria in the third screening.

TABLE 2-3: Quantitative GIS Analysis Screening Criteria

Screening Factor	Impact Estimate Method	Data Source
Number of Interchanges	Number along Corridor	Based on proposed project as listed in MUMPO 2030 L RTP
Construction Cost (Millions \$)	Calculated	Based on per mile costs for conceptual plans for the mainline
Number of Minor Road Crossings	Number counted along corridors	GIS databases
Number of Major Power Easement Crossings	Number counted along corridors	GIS databases, aerial photography
Number of Railroad Line Crossings	Number counted along corridors	GIS databases, aerial photography
Residential Relocations	Number counted within conceptual right of way	GIS databases, tax parcel mapping, aerial photography
Business Relocations	Number counted within conceptual right of way	GIS databases, tax parcel mapping, aerial photography
Low-Income or Minority Populations	Presence within corridors	US Census Bureau data
Parks/Recreation Sites	Number counted within conceptual right of way	GIS databases, Alexandria Drafting Company (ADC) Mapping, aerial photography, and site visits
Schools/Libraries/Fire Stations	Number counted within conceptual right of way	GIS databases, ADC Mapping, aerial photography, and site visits
Churches	Number counted within conceptual right of way	GIS databases, ADC Mapping, aerial photography, and site visits
Cemeteries	Number counted within conceptual right of way	GIS databases and ADC Mapping
Properties on or eligible for the National Register of Historic Places	Number counted within conceptual right of way	NC State Historic Preservation Office, GIS databases, previous studies for Monroe Connector and Monroe Bypass
Hazardous Materials and Superfund Sites	Number counted within corridors	GIS databases, NCDENR
Streams Intermittent and perennial	Linear feet within conceptual right of way	GIS databases and previous surveys
	Number of crossings based on the corridor centerline	GIS databases and previous surveys
Wetlands & Ponds	Acres calculated within conceptual right of way	USFWS National Wetland Inventory Maps and previous surveys
Floodplains	Linear feet crossed by corridor centerline	GIS databases
Natural Heritage Program Occurrences/Sites	Number counted within corridors	NC Natural Heritage Program
Protected Species	Known locations	NC Natural Heritage Program, USFWS, previous surveys
Watersheds	Number and type counted within corridors	GIS databases, NCDENR-DWQ
303(d) Listed Streams	Number counted within conceptual right of way	NCDENR-DWQ

2.4.4 RESULTS OF QUANTITATIVE THIRD SCREENING

Twenty-five Preliminary Study Alternatives, as described in **Section 2.4.1**, were quantitatively screened. The results of this screening are shown in **Table 2-4**. Preliminary Study Alternatives that were eliminated from further study are indicated by orange cells.

2.4.4.1 Quantitative Third Screening Conclusions

From the set of 25 endpoint-to-endpoint Preliminary Study Alternatives, 16 end-to-end DSAs were selected for further study based on the estimated impacts to the natural and human environments and engineering design considerations (**Figure 2-8a-c**). In addition to the No-Build Alternative, the DSAs are: A, B, C, D, A1, B1, C1, D1, A2, B2, C2, D2, A3, B3, C3, and D3

The Preliminary Study Alternatives that use all or a substantial length of existing US 74 (Preliminary Study Alternatives G, E, F, E1, F1, E2, F2, E3, and F3) were eliminated from further study. These Preliminary Study Alternatives would have a significant adverse impact on businesses and the economy of Union County. Preliminary Study Alternative G, which would improve the entire length of existing US 74 in the study area, would result in total relocations of approximately 499 individual businesses along existing US 74, which is about 11.5 percent of all businesses in Union County. According to estimates from the NC Department of Commerce, there were approximately 4,373 private business establishments in Union County in 2007 (*Union County Profile-January 2009*, NC Department of Commerce Web site: <https://edis.commerce.state.nc.us/docs/countyProfile/NC/37179.pdf>).

These business relocations are a result of either significant impact to business operations and property or the loss of parking for the businesses. Preliminary Study Alternatives F, F1, F2, and F3 would impact 315 to 317 businesses, which is about 7 percent of Union County's businesses and Preliminary Study Alternatives E, E1, E2, and E3 would impact 207 to 209 businesses, which is 5 percent of Union County's businesses. These alternatives would widen existing US 74 from NC 51 to just west of Wesley Chapel-Stouts Road, a distance of about 6 miles. These alternatives had comparatively greater impacts to the following screening criteria: streams, minor road crossings, hazardous material sites, and construction costs.

It would be difficult for Union County to recover economically from the magnitude of business impacts resulting from Preliminary Study Alternatives G, E, F, E1, F1, E2, F2, E3, and F3, particularly since access to/from and along US 74, one of the main commercial corridors where businesses locate, would be drastically altered under these alternatives.

2.4.4.2 Public and Agency Input

In accordance with Section 6002 of SAFETEA-LU, the *Draft Alternatives Development and Analysis Report* (PBS&J, November 2007) was circulated to federal and state environmental resource and regulatory agencies and made available to the public for review and comment. Copies of the report were distributed directly to agency representatives. Project newsletters were distributed to the project mailing list of more than 25,000 names announcing the availability of the report on the NCTA Web site and soliciting public comment.

TABLE 2-4: Quantitative Screening of Preliminary Study Alternatives

Screening Factor ¹	A	B	C	D	E	F	G ⁴	A1	B1	C1	D1	E1	F1	A2	B2	C2	D2	E2	F2	A3	B3	C3	D3	E3	F3
Interchanges	9	10	9	10	8	7	9	9	10	9	10	8	7	9	10	9	10	8	7	9	10	9	10	8	7
Construction Cost (\$ millions, 2007 dollars) ²	276.5	293.6	297.2	314.4	349.2	403.8	387.0	276.1	293.3	296.9	314.1	348.9	403.5	273.4	290.6	294.1	311.3	346.2	400.8	276.1	290.2	298.3	311.0	345.8	400.4
Minor Road Crossings	21	21	25	25	38	43	63	23	23	27	27	40	45	21	21	25	25	38	43	23	23	27	27	40	45
Major Power Easement Crossings	5	4	5	4	3	1	1	5	4	5	4	3	1	5	4	5	4	3	1	5	4	5	4	3	1
Railroad Line Crossings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Residential Relocations	67	99	47	79	98	58	12	88	120	68	100	119	79	68	100	48	80	99	59	88	121	69	101	120	80
Business Relocations	70	39	141	110	209	317	499	70	39	141	110	209	317	68	37	139	108	207	315	70	37	139	108	207	315
Low-Income Populations	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Minority Populations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parks/Recreation Sites ³	0	0	0	0	1	2	2	0	0	0	0	1	2	0	0	0	0	1	2	0	0	0	0	1	2
Schools/Libraries/ Fire Stations	0	0	0	0	0	1 (fire)	0	0	0	0	0	0	1 (fire)	0	0	0	0	0	1 (fire)	0	0	0	0	0	1 (fire)
Churches	0	0	0	0	2	2	0	0	0	0	0	2	2	0	0	0	0	2	2	0	0	0	0	2	2
Cemeteries	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Properties on or eligible for the National Register of Historic Places	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Materials/Superfund Sites	0	0	6	6	17	17	17	0	0	6	6	17	17	0	0	6	6	17	17	0	0	6	6	17	17
Streams (# of crossings)	83	84	81	82	77	79	62	82	83	80	81	76	78	78	79	76	77	72	74	82	78	75	76	71	73
Perennial (linear feet within conceptual ROW)	3,167	3,373	3,074	3,281	8,415	6,397	5,018	3,048	3,255	2,956	3,162	8,297	6,279	2,516	2,722	2,423	2,629	7,764	5,746	3,048	2,604	2,305	2,511	7,646	5,628
Intermittent (linear feet within conceptual ROW)	31,940	35,088	33,623	36,771	38,324	36,804	25,493	32,703	35,851	34,386	37,534	39,087	37,567	30,474	33,622	32,157	35,305	36,858	35,338	32,703	34,385	32,920	36,068	37,621	36,101
NWI Wetlands (acres)	12.4	14.1	11.3	13.0	14.2	9.5	2.6	11.2	12.9	10.1	11.8	12.9	8.3	12.2	13.9	11.1	12.8	14.0	9.3	11.2	12.7	9.9	11.6	12.7	8.1
Ponds (acres)	6.6	8.6	6.9	9.0	5.7	6.0	2.4	7.4	9.4	7.8	9.8	6.5	6.9	6.6	8.6	6.9	9.0	5.7	6.0	7.4	9.4	7.8	9.8	6.5	6.9
Floodplains (feet)	7,184	7,451	5,701	5,968	6,284	4,234	4,364	7,156	7,423	5,673	5,941	6,256	4,207	7,182	7,449	5,699	5,967	6,282	4,233	7,156	7,422	5,671	5,939	6,255	4,205
Natural Heritage Program Occurrences/Sites	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0
Protected Species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Watersheds (Lake Twitty)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
303(d) Listed Streams (# within conceptual ROW)	4	4	2	2	2	2	2	4	4	2	2	2	2	4	4	2	2	2	2	4	4	2	2	2	2

Legend: Eliminated from study

¹ Impacts are identified as those within right-of-way limits.

² Construction costs based upon per mile estimates for typical type facility and are for comparison purposes only. Cost estimates reflect construction costs only in 2007 dollars and do not reflect the effects of inflation. Therefore, actual costs would be higher than the estimates shown in this table. Updated cost estimates for the DSAs are included in **Table 2-8**.

³ Impacts are to privately-owned golf courses.

⁴ Refer to **Section 2.4.4.3** for updated analysis of PSA G, as well as an analysis of a Revised PSA G.

Six agencies, including the US Army Corps of Engineers (USACE), US Environmental Protection Agency (USEPA), USFWS, NC Department of Environment and Natural Resources Division of Water Quality (NCDENR-DWQ), NC Wildlife Resources Commission (NCWRC), and the NC Historic Preservation Office (HPO), submitted comments on the *Draft Alternatives Development and Analysis Report* (letters included in **Appendix A-8**). The majority of the agency comments pertained to potential indirect and cumulative effects of a new location alternative compared Preliminary Study Alternative G and the general desire to further consider improving existing US 74 (Preliminary Study Alternative [PSA] G). A number of public comments were received; however, none were specific to the alternatives development or screening process. Instead, comments related to specific corridor segments under consideration or questions about impacts to individual properties. These comments are summarized in **Section 9**.

2.4.4.3 Further Consideration of Preliminary Study Alternative G (Improve Existing US 74 Alternative)

In response to agency comments requesting additional information regarding Preliminary Study Alternative (PSA) G (improving existing US 74), NCTA further assessed PSA G. In addition, a Revised PSA G also was developed and assessed. These assessments of PSA G and Revised PSA G included additional analyses of traffic and operations, cost, and potential impacts.

Preliminary Study Alternative G. PSA G consists of improvements to the US 74 corridor from near I-485 to near Forest Hills School Road between the towns of Wingate and Marshville, a distance of approximately 20 miles. PSA G includes upgrading existing US 74 to a tolled, controlled-access highway with adjacent one-way non-tolled frontage roads to provide access to adjacent properties. These frontage roads would serve as the alternative free route. The controlled-access toll road would have three lanes in each direction for a total of six lanes, and would provide for high-speed regional travel. Each one-way frontage road would have two lanes.

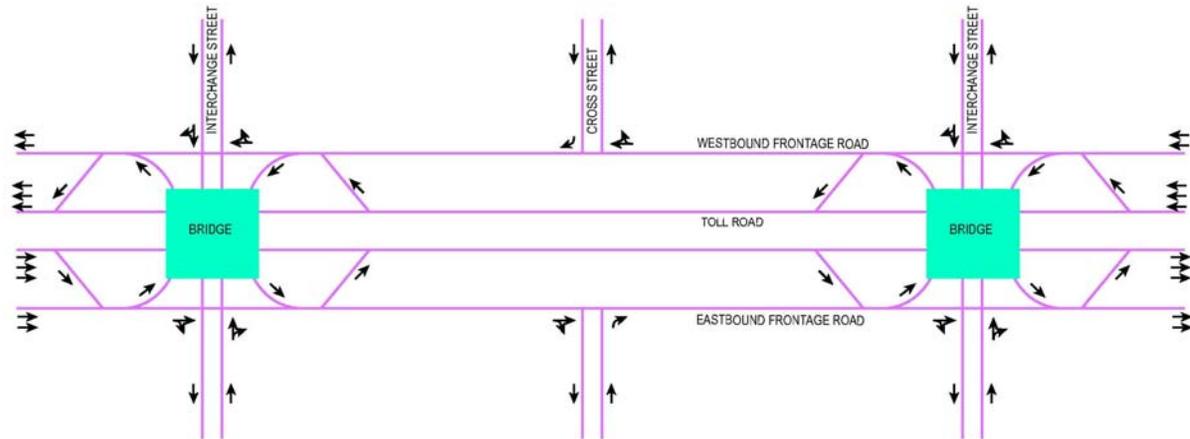
For PSA G, interchanges would be provided at the following locations:

- Stallings Road (SR 1365)
- Indian Trail-Fairview Road (SR 1520)
- Unionville-Indian Trail Road (SR 1367)
- Rocky River Road (SR 1514)
- US 601/NC 200
- NC 200/Morgan Mill Road
- Metro Medical Center/Pageland Highway (US 601)
- Austin Chaney Road (SR 1758)
- Forest Hills School Road

Cross streets that intersect existing US 74 but would not have an interchange included as part of PSA G would not be grade-separated (i.e. would not have access across US 74). These cross streets would tie into the non-tolled one-way frontage roads. Some of these cross-streets are projected to carry substantial volumes of traffic, including Wesley-Chapel Stouts Road (SR 1377), Fowler-Secret Road, and Secret Shortcut Road (SR 1501).

As illustrated in **Exhibit 2-1**, in order for a vehicle on a cross street to access the tolled highway or to cross US 74 to continue on the cross street, a vehicle would first have to turn right onto the non-tolled one-way frontage road. A vehicle would then have to travel along the non-tolled one-way frontage road to the next interchange. At the interchange the vehicle would have access to the tolled freeway in either direction of travel. To cross US 74 to continue on the cross street, the vehicle would then make a U-turn onto the non-tolled one-way frontage road going in the other direction until the frontage road intersects the cross street. This configuration adds substantial additional trips to the frontage roads.

EXHIBIT 2-1: Preliminary Study Alternative G



For example, a vehicle traveling northbound on a cross street that desires to continue north on the cross street across US 74, would first need to turn right onto the frontage road, proceed to the next interchange, make a U-turn crossing the controlled-access portion of US 74, and then proceed back along the opposite frontage road to turn right and continue the northbound cross street trip. This example adds two trips to the US 74 east/west corridor. Similar processes would be required for vehicles turning left from the cross street onto the frontage roads and for vehicles on the frontage roads to turn left on to a cross street. The cumulative effect of these rerouted trips is substantial additional traffic volumes along the frontage roads and reduced capacity for through trips. For comparison purposes, this rerouting of trips does not occur with the new location alternatives.

Traffic Studies for PSA G. Traffic forecasts for an upgrade of the existing US 74 corridor from near I-485 to between the towns of Wingate and Marshville were prepared and are documented in the *Technical Memorandum for TIP Projects R-2559 & R-3329 US 74 Upgrade Scenario* (Wilbur Smith Associates, July 25, 2008).

For purposes of these forecasts, the tolled freeway section and the non-tolled frontage roads were modeled as two separate facilities. This was done to match the model developed for the NEPA forecasts and to allow for comparison between the forecasts. The tolled highway section was modeled as a single bi-directional (east/west) facility. The non-tolled frontage roads were also modeled as a single bi-directional (east/west) facility and not as two one-way facilities (one for eastbound and one for westbound). Then, in order to develop the project-level forecast for the frontage roads, these bi-directional traffic volumes were split into one-way eastbound and one-way westbound traffic volumes.

Since the freeway and frontage roads are modeled separately, the model will not divert traffic from the frontage roads onto the freeway regardless of how congested the frontage roads get. Therefore, it is possible that some of the congestion on the frontage roads is simply a function of the limitations of the model; it is reasonable to anticipate that, under the highly congested conditions projected for the frontage roads, some trips would divert from the frontage roads onto the tolled freeway lanes of US 74. Nonetheless, the main conclusion of the analysis – that the frontage roads would be highly congested under PSA G – remains valid. A major contributor to the high level of congestion on the frontage roads is the need for north-south trips to use the east-west frontage roads, as described above.

The traffic forecasts indicated that traffic volumes on the proposed two-lane frontage road systems would exceed the capacity of those roads in the design year 2035. In fact, all but two segments of the frontage road systems would operate at level of service (LOS) F, and the average annual daily traffic (AADT) on portions of the frontage road system would exceed the maximum projected volumes on the tolled US 74 freeway facility due to the toll diversion (diversion of traffic to the free facility to avoid paying the toll).

Projected traffic volumes on the tolled highway facility portion of PSA G would be adequately accommodated by the six lanes assumed on the tolled highway facility. (Note: The New Location Alternative Concept is four lanes and would provide adequate level of service through the design year. It also would not preclude the expansion to six lanes in the future, within the median, as traffic volumes warrant.)

Based on projected traffic volumes, the addition of a third through lane in each direction to the frontage road systems could improve expected operations in some areas; however, up to four or five lanes in each direction would be required in other sections to improve operations to an acceptable LOS (LOS D). These additional lanes would result in substantial additional right-of-way acquisition, parcel impacts, and relocations.

Cost of PSA G. Cost estimates for PSA G were updated to allow for comparison with the new location DSAs. The costs for this alternative included in **Table 2-4** were based on per-mile average construction costs for similar facilities (i.e., comparable numbers of lanes, etc.) and did not incorporate other costs for the DSAs from **Table 2-8**, such as right-of-way costs, environmental mitigation costs, administrative costs, and utility costs (**Section 2.7**). Also, costs in **Table 2-4** are presented in 2007 dollars, while costs in **Table 2-8** are inflated to “year of expenditure” based on the projected opening date of the facility and when dollars would actually be spent. Therefore, costs from **Table 2-4** for PSA G could not be compared with costs included in **Table 2-8** for the DSAs.

To allow for a more accurate comparison between alternatives, an updated cost estimate for PSA G was prepared using anticipated construction quantities based on design schematics and accounting for other costs (right of way, environmental mitigation, administrative, and utilities). This cost was then inflated to the anticipated year of expenditure for this alternative based on a projected opening year of 2018. The cost for PSAG would be approximately \$1,126 million to \$1,404 million, with a median cost of \$1,251 million.

Impacts of PSA G. PSA G would generally have fewer impacts to natural resources than the DSAs. Impacts to perennial streams (approximately 5,000 linear feet) would be about half the amount impacted by the DSAs, but impacts to intermittent streams (approximately 25,500 linear

feet) would be about twice the amount impacted by the DSAs. Wetland impacts would also be less (approximately 2-3 acres). However, the reductions in impacts to natural resources are overshadowed by the substantial increases in impacts to the human environment compared to the DSAs.

As discussed in **Section 2.4.4.1** and **Table 2-4**, PSA G was estimated to require relocation of 499 businesses along US 74. These estimates included improvements to US 74 west of I-485 to NC 51. However, none of the new location DSAs would involve widening along this segment of US 74 (**Section 2.5**). Removing this segment from PSA G to make PSA G more comparable to the DSAs reduces the estimated number of business impacts to 481, still a significant number of businesses. All of these business impacts would occur in Union County, and represent about 11 percent of all businesses in the county.

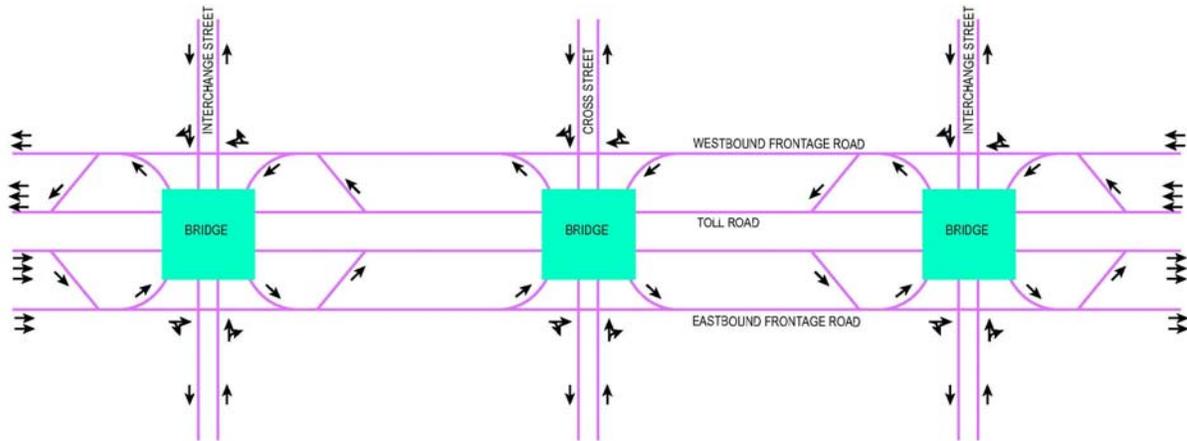
Upgrading the existing corridor would require a substantially longer construction timeframe than building a new location facility, as traffic would need to be maintained in the corridor throughout the construction period. While construction for the New Location Alternatives would take approximately three and a half years, it is likely that upgrading the existing US 74 corridor would require 6-10 years to complete. The impacts of this lengthy construction schedule on commuters and travelers through the corridor would be substantial, including numerous and constant lane closures and shifts, potential temporary detours, and disruptions to business visibility and access along the corridor.

PSA G also was evaluated in the *Indirect and Cumulative Effects Assessment* (HNTB, January 2009) as a qualitative analysis scenario based on agency requests to compare the potential indirect impacts and cumulative effects of this alternative with those of a new location alternative. The assessment found that the indirect impacts and cumulative effects of the improve US 74 scenario and the new location alternatives would be similar in terms of their potential for induced development in portions of the project study area east of US 601, where accessibility and travel time to Charlotte and Mecklenburg County would be improved substantially with either option. Many of the businesses relocated under PSA G may choose to relocate within the project study area. Construction of new facilities to accommodate these relocations would be considered an indirect effect of this alternative.

Revised PSA G. In an attempt to improve operations, minimize impacts and reduce cost associated with an upgrade of the existing US 74 corridor, a Revised PSA G was developed.

As discussed above, traffic operations analysis showed that the frontage roads in the original PSA G would operate at failing levels of service, primarily as a result of forcing north/south through traffic and left-turn traffic to circulate on the frontage roads. As noted, due to substantial impacts to businesses, adding additional lanes to the frontage roads was not feasible; therefore, removing trips from the frontage roads by identifying potential locations for providing grade separations at cross streets between interchanges was analyzed for Revised PSA G. Providing grade separations at selected cross streets would reduce congestion on the frontage roads by removing some of the north/south cross street trips from the frontage roads and decreasing the travel distance of some of the rerouted cross street trips. The tolled highway portion would still have three lanes in each direction for a total of six lanes that would adequately accommodate forecasted traffic volumes and provide for high-speed regional travel. Each one-way frontage road would still have two lanes (**Exhibit 2-2**) and serve as the free alternate route.

EXHIBIT 2-2: Revised Preliminary Study Alternative G



Revised PSA G was developed to include interchanges at the following locations listed below. Revised PSA G includes an additional interchange at Concord Avenue, an interchange at Sardis Church Road (SR 1516)/Wesley Chapel-Stouts Road (SR 1377) instead of at Unionville-Indian Trail Road (SR 1367), and no interchange at Forest Hills School Road.

- Stallings Road (SR 1365)
- Indian Trail-Fairview Road (SR 1520)
- Sardis Church Road (SR 1516)/Wesley Chapel-Stouts Road (SR 1377)
- Rocky River Road (SR 1514)
- Concord Avenue
- US 601/NC 200
- NC 200/Morgan Mill Road
- Metro Medical Center/Pageland Highway (US 601)
- Main Street/Austin Chaney Road (SR 1758)

This alternative would terminate just west of Forest Hills School Road to avoid costs associated with upgrading the Forest Hills School Road signalized intersection to an interchange. Revised PSA G would be approximately 19.7 miles long.

Revised PSA G also would include cross street grade separations over the tolled highway at the following locations. Additional crossovers would be difficult to provide due to spacing and grade issues.

- Unionville-Indian Trail Road
- Fowler-Secret Road
- Wal-Mart/Williams Road Extension
- future Northern Loop/Dickerson Boulevard
- Sutherland Avenue
- Secret Avenue/Old Pageland Monroe Road

The business impacts associated with original PSA G were significant. Therefore, in developing Revised PSA G, a variety of typical sections were evaluated to determine if business impacts could be reduced. For the final analysis, a combination of two typical sections was used (**Figure 2-9**). A narrower 230-foot wide curb and gutter typical section was used in areas with higher concentrations of businesses and development adjacent to the existing right of way. At interchanges or cross streets with crossovers, this widens to 270 feet to accommodate ramps between the frontage roads and toll road, and uses retaining walls to maintain the narrow section. The second typical section, used in areas with less development, is a 275-foot wide section with a shoulder. This section would also be wider (approximately 315 feet) in areas at interchanges or crossovers to accommodate ramps. The shoulder section was used where possible because it is substantially less expensive than using the curb and gutter section throughout.

Cost of Revised PSA G. A cost estimate was prepared for Revised PSA G for comparison with original PSA G, as well as the new location DSAs (**Table 2-8**). The cost for Revised PSA G was calculated based on estimated construction quantities from a schematic design, as well as estimated right of way, environmental mitigation, administrative, and utilities costs. The cost for Revised PSA G would range between \$888 million to \$1,103 million, with a median cost of \$980 million. The median cost for Revised PSA G is approximately 20-23 percent greater than the median costs for the DSAs.

Impacts of Revised PSA G. Similar to PSA G, Revised PSA G would generally have fewer impacts to natural resources than the DSAs. Impacts to perennial streams (approximately 4,800 linear feet) would be about half the amount impacted by the DSAs, but impacts to intermittent streams (approximately 16,500 linear feet) would be about 35-40 percent more than the amount impacted by the DSAs. Wetland impacts would also be less (approximately 1-2 acres). However, as with PSA G, the reductions in impacts to natural resources are overshadowed by the substantial increases in impacts to the human environment compared to the DSAs, even though Revised PSA G would impact less businesses than the original PSA G due to the use of the narrower typical section in more densely developed areas. Approximately 235 businesses (in approximately 124 buildings) would be taken by Revised PSA G. However, this is still more than five times greater than any of the new location DSAs (14 to 49 business relocations), and would be approximately 5.5 percent of the businesses in Union County.

As with the original PSA G, Revised PSA G would require 6-10 years to construct in the existing US 74 corridor. There would be substantial impacts to traffic and lengthy delays throughout the corridor for a long period of time.

As noted in the description of Revised PSA G, this alternative would require the extensive use of retaining walls to maintain the narrower cross section that minimizes relocations of businesses. Approximately 7.6 miles of Revised PSA G (or 38 percent of the 19.7-mile long alternative) would be on retaining walls. Constructing this long length of retaining wall along US 74, which is located in relatively level topography, would be a substantial adverse visual impact. The retaining walls also would reduce visibility to the remaining businesses along the frontage roads.

Operations of Upgrading Existing US 74 Compared to New Location Alternatives. The toll road portions of PSA G and Revised PSA G generally perform at an acceptable level of service through the design year 2035, as do the new location toll roads (the DSAs).

However, the Improve Existing US 74 Alternatives (PSA G and Revised PSA G) and the DSAs would differ substantially in terms of their effects on traffic operations on existing US 74. In the case of PSA G and Revised PSA G, existing US 74 would be served by the frontage roads, while with the DSAs, existing US 74 would remain US 74 in its current configuration. The DSAs would have the greatest benefit for traffic continuing to use existing US 74.

As shown in **Table 2-5**, the traffic volumes continuing to use existing US 74 are the least with the DSAs. The traffic volumes are the greatest with PSA G due to the north/south trips circulating on the frontage roads. The addition of crossovers to Revised PSA G would reduce the volumes substantially on the frontage roads by eliminating a portion of the circulating traffic, but Revised PSA G would still cause much greater volumes on the US 74 frontage roads than would use US 74 with the DSAs.

TABLE 2-5: Projected 2035 Traffic Volumes Along Existing US 74

US 74 Segment	2035 Average Daily Traffic Volumes on Existing US 74			
	PSA G*	Revised PSA G*	DSAs A, A1, A2, A3, B, B1, B2, B3	DSAs C, C1, C2, C3, D, D1, D2, D3
Stallings Rd (SR 1365) to Rocky River Rd (SR 1514)	71,500	76,200	66,300	67,400
Rocky River Rd (SR 1514) to Dickerson Blvd	129,700	69,200	45,800	48,000
Dickerson Blvd to Metro Medical Center Campus/Pageland Hwy	129,100	81,700	59,300	60,000
Pageland Hwy/Metro Medical Center Campus to S Secrest Ave	47,100	37,300	35,700	36,600
S Secrest Ave to Forest Hills School Rd	47,200	45,800	33,200	34,100
Forest Hills School Rd to Monroe Connector/Bypass	21,700	37,100	21,700	20,700

Source: *Upgrade US 74 Alternative Study* (HNTB/PBS&J, March 2009).

* Volumes in these columns are for the frontage roads only and do not included the volumes on the controlled-access tolled highway.

Conclusion. Although substantial improvements to the Improve Existing US 74 Alternative are possible over what was initially assumed in the *Alternatives Development and Analysis Report* (PBS&J, April 2008), there is no configuration that would provide an upgraded US 74 facility that would operate efficiently, that could be constructed with an acceptable level of impacts, and that is cost effective.

Although Revised PSA G would operate more efficiently and would be more cost effective than the original PSA G; the levels of impacts associated with Revised PSA G, which have been minimized to the maximum extent, are still considered unreasonable. The number of business relocations (235) would have a significant impact on the economy and tax base of Union County, by impacting one out of every eighteen businesses countywide, or 5.5 percent. In addition, the length of the construction period (which would be 6-10 years along the existing corridor), and constant lane closures and delays, would impose substantial delay costs on commuters, freight shippers, and other travelers and would impact the remaining businesses. The visual impacts associated with 7.6 miles of retaining wall along US 74 through Union County also would be adverse.

This additional analysis confirms that improving US 74 as a controlled-access highway with frontage roads is not a reasonable or practicable alternative. Therefore, PSA G and Revised

PSA G have been eliminated from consideration and are not being considered as DSAs for evaluation in this Draft EIS.

2.5 DETAILED STUDY ALTERNATIVES

Sixteen endpoint-to-endpoint DSAs (**Figure 2-8a-c**) were selected for further study based upon the outcome of the alternatives screening process, estimated impacts to the natural and human environments, and engineering design considerations. The DSAs are listed in **Table 2-6**.

TABLE 2-6: Detailed Study Alternatives

DSA	DSA Segments*	Length (miles)
A	18A, 21, 22A, 31, 36, 36A, 40	20.6
B	18A, 21, 30, 31, 36, 36A, 40	20.5
C	2, 21, 22A, 31, 36, 36A, 40	19.7
D	2, 21, 30, 31, 36, 36A, 40	19.6
A1	18A, 21, 22A, 31, 34, 34B, 40	20.5
B1	18A, 21, 30, 31, 34, 34B, 40	20.5
C1	2, 21, 22A, 31, 34, 34B, 40	19.6
D1	2, 21, 30, 31, 34, 34B, 40	19.6
A2	18A, 21, 22A, 31, 36, 36B, 41	20.6
B2	18A, 21, 30, 31, 36, 36B, 41	20.5
C2	2, 21, 22A, 31, 36, 36B, 41	19.7
D2	2, 21, 30, 31, 36, 36B, 41	19.6
A3	18A, 21, 22A, 31, 34, 34A, 41	20.5
B3	18A, 21, 30, 31, 34, 34A, 41	20.4
C3	2, 21, 22A, 31, 34, 34A, 41	19.6
D3	2, 21, 30, 31, 34, 34A, 41	19.6

*Preliminary Corridor Segments 0, 1, 1A, 42, and 43 were combined with other segments during development of the DSAs. DSA Segments 34A, 34B, 36A, and 36B were added within existing DSA Segment corridor limits during preparation of the functional design plans to allow combinations of all DSA Segments to form end-to-end alternatives.

Sections 3 through **8** of this Draft EIS evaluate the DSAs in more detail to reveal the potential effects each DSA may have on the environment. The analyses in these sections serve as the basis for the decision on the Recommended Alternative included in **Section 2.8**.

In addition, the No-Build Alternative is being retained to provide a baseline for comparison with the DSAs 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 assumes that the transportation systems for Union and Mecklenburg Counties would evolve as currently planned in the MUMPO 2030 LRTP, but without major improvements to the existing US 74 corridor from I-485 near US 74 to between the towns of Wingate and Marshville. However, the No-Build Alternative would not meet the project's purpose and need.

The following list describes the limits of each DSA Segment:

- DSA Segment 2 – Follows existing US 74 from just east of I-485 to east of Stallings Road (SR 1365); then on new location alignment from east of Stallings Road (SR 1365) to east

- of Indian Trail – Fairview Road (SR 1520). Includes a frontage road system (two-lane, one-way on each side of the mainline) along existing US 74 and interchanges at US 74 and Indian Trail-Fairview Road (SR 1520).
- DSA Segment 18A – New location alignment from I-485 to east of Indian Trail-Fairview Road (SR 1520), including partial interchanges at I-485 and Stallings Road (SR 1365) and an interchange at Indian Trail-Fairview Road (SR 1520).
 - DSA Segment 21 – New location alignment from east of Indian Trail-Fairview Road (SR 1520) to just west of Unionville-Indian Trail Road (SR 1367). This DSA Segment is common to all DSAs and was developed within an extra wide study corridor.
 - DSA Segment 22A – New location alignment from west of Unionville-Indian Trail Road (SR 1367) to east of Roanoke Church Road (SR 1505), including interchanges at Unionville-Indian Trail Road (SR 1367) and Rocky River Road (SR 1514). This segment is north of Segment 30.
 - DSA Segment 30 – New location alignment from west of Unionville-Indian Trail Road (SR 1367) to east of Roanoke Church Road (SR 1505), including interchanges at Unionville-Indian Trail Road (SR 1367) and Rocky River Road (SR 1514). This segment is south of Segment 22A.
 - DSA Segment 31 – New location alignment from east of Roanoke Church Road (SR 1505) to west of NC 200, including an interchange at US 601. This DSA Segment is common to all DSAs.
 - DSA Segment 34 – New location alignment from west of NC 200 to just west of Ansonville Road (SR 1002), including an interchange at Morgan Mill Road (NC 200). This segment is north of Segment 36.
 - DSA Segment 36 – New alignment from west of NC 200 to just west of Ansonville Road (SR 1002), including an interchange at Morgan Mill Road (NC 200). This segment is south of Segment 34.
 - DSA Segment 40 – New alignment from just west of Ansonville Road (SR 1002) to the project terminus on existing US 74 between the towns of Wingate and Marshville, including partial interchanges at Forest Hills School Road and US 74.
 - DSA Segment 41 – New alignment from just west of Ansonville Road (SR 1002) to the project terminus on existing US 74 between the towns of Wingate and Marshville, including partial interchanges at Forest Hills School Road and US 74.

In addition to the DSA segments described above, DSA Segments 34A, 34B, 36A, and 36B were added within existing DSA Segment corridor limits during preparation of the functional design plans to allow combinations of all DSA Segments to form end-to-end alternatives.

2.5.1 FUNCTIONAL DESIGNS FOR THE DETAILED STUDY ALTERNATIVES

Functional engineering designs were prepared for each DSA within the 1,000-foot wide minimum study corridors established during the alternatives screening process. These designs are shown in **Figure 2-10a-cc**.

2.5.1.1 Design Criteria for the Functional Engineering Designs

Design criteria and typical sections were established for the functional engineering designs based on existing (2008) and projected (2035) traffic forecasts and the long-range vision for the US 74 corridor as defined by the NC Strategic Highway Corridor program and the NC Intrastate Corridor System. Future traffic projections for the facility are based on a design year of 2035 and assume the facility is tolled. Design guidelines were based on desirable roadway standards from AASHTO's *A Policy on Geometric Design of Highways and Streets* (2004) and the *NC DOT Roadway Design Standards Manual*. Design criteria for the functional engineering designs are included in **Appendix B**.

Two typical sections were developed for the project – one for DSA Segments on new location and one for DSA Segment 2, which includes upgrading a short portion of existing US 74. These typical sections are depicted in **Figure 2-11**. The roadway typical section for DSA Segments on new location has four 12-foot travel lanes with a 70-foot median and 4-foot inside paved shoulders. The right of way needed for this typical section would be approximately 300 feet, with additional right of way required for interchanges, frontage roads, and improvements to intersecting roads.

DSA Segment 2 would include upgrading an approximately one mile portion of existing US 74 to a controlled-access highway facility with frontage roads. The typical roadway section for this DSA Segment would be six lanes for the upgraded US 74 facility and include two- or three-lane, one-way frontage roads on either side, for a total of ten to twelve lanes. The number of lanes on the frontage roads would vary depending on the proximity to on and off ramps. In areas where ramps are present, three lanes are necessary to provide adequate distance to allow vehicle to merge into traffic. Six lanes along the toll road would be needed based on traffic forecasts for upgraded US 74 because a facility constructed along existing US 74 would handle through traffic and local traffic (See *Year 2035 Build Traffic Operations Technical Memorandum* (PBS&J February 2009) incorporated by reference and available on the NCTA Web site at www.ncturnpike.org/projects/monroe). The current assumption for the six-lane tolled highway portion of DSA Segment 2 includes reconstructing US 74 on fill with retaining walls to allow the frontage roads to be built immediately at the base of the retaining walls. The right of way required for this section would be approximately 260 feet. This was modified from the typical section used during the screening process (see **Section 2.4.2** and **Figure 2-7**) in order to minimize impacts to businesses along existing US 74 by reducing the width of right of way required.

The design speed for the tolled highway segments is 70 mph, which would accommodate a posted speed limit of 65 mph. The design speed for the frontage roads on DSA Segment 2 is 40 mph, which would allow for a posted speed limit of 35 mph.

2.5.1.2 Developing the Functional Engineering Designs

Functional engineering designs were prepared for the purposes of evaluating DSAs and selecting a Preferred Alternative for this project. The only difference between functional level design and preliminary level design is the type of mapping used to prepare designs. In this case, GIS data was utilized to identify parcel boundaries and structure/building data in lieu of field-verifications. Functional designs include vertical and horizontal alignments, edges of pavement, slope stake (construction) limits, right-of-way limits, and interchange layouts. Other data used in the

preparation of the functional engineering designs for the DSAs included delineated wetlands and streams, design year traffic projections and operational analyses, and preliminary hydraulic analyses.

Functional engineering designs were developed considering engineering design constraints such as topography, interchange forms, design criteria, and maintenance of traffic, as well as the locations of human and natural environment features such as residences, businesses, farms, neighborhoods, community facilities, streams, wetlands, and historic resources. The horizontal alignment of the designs were determined based on aerial mapping and GIS data with some field data, as noted above, and adjusted where possible to avoid or minimize impacts to resources such as neighborhoods, churches, streams, wetlands, and historic resources.

Interchanges and major cross streets were evaluated to determine whether the project's mainline should go over or under the cross street (known as an over/under study by NCDOT). However, this study would likely be revisited during preparation of final designs for the Preferred Alternative.

The appropriate configuration for each interchange was determined through a review of year 2035 traffic forecasts for the toll facility, and the wetlands, streams, residences, businesses, churches, and other resources in the interchange area. Impacts to resources were minimized to the extent possible in the selection of the interchange form. At least two interchange forms were investigated for each interchange location to balance operational needs with resource impacts.

With some exceptions for major neighborhoods or facilities, the functional designs do not incorporate service roads to provide access to existing properties whose access would be cut off by the project. A detailed service road study of all properties would be conducted during final design of the Preferred Alternative.

The functional designs and major drainage crossings were reviewed by the environmental resource and regulatory agencies at meetings on September 23 and October 21, 2008. Bridges are proposed at five to nine locations, depending on the DSA, to minimize impacts to streams and wetlands. This is discussed in more detail in **Section 4.7.3**.

2.5.1.3 Considering Tolling in the Functional Engineering Designs

As shown in Table 6-2 of the MUMPO 2030 LRTP, and noted in **Section 2.3.2.5**, tolls are indicated as the funding source for the Monroe Connector (I-485 to US 601) portion of this project. MUMPO is currently updating its LRTP for year 2035 and will include tolls as the funding source for the Monroe Bypass (US 601 to US 74) portion of the project as well. In addition, the *Proposed Monroe Connector Preliminary Traffic and Revenue Study* (Wilbur Smith Associates, October 2006) concluded that tolling the entire Monroe Connector/Bypass project would result in a financially feasible toll project. Therefore, tolling was incorporated into the alternatives development and screening during the Qualitative Second Screening, and the functional designs for all DSAs have been developed to accommodate toll collection.

The NCTA has not made any decisions about toll rates. The actual initial price of the toll would be recommended following preparation of an 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 likely would vary 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.

Tolls would be collected by an electronic toll collection (ETC) system. There would be no cash toll booths. The primary means of ETC involves setting up an account with NCTA and using a transponder/receiver system. The transponder is a small device usually mounted on the windshield of a vehicle. The receiver is typically mounted over the roadway, and it electronically collects tolls from a driver's account as the vehicle travels under it at highway speed. The NCTA will work with other toll authorities to enable, where possible, other systems' transponders to work on the Monroe Connector/Bypass. Toll road users also will have the option of acquiring transponders with prepaid tolls. 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 payments for prepaid tolls, so establishing an account is not required. It is anticipated that this storefront-type facility would operate from an existing commercial building or strip shopping center within the project area. The facility is not expected to generate a high volume of traffic.

There are minimal differences between a roadway design with and without an ETC system. The ETC equipment, which is primarily mounted on an overhead structure, takes up little space, and would not require additional right of way. While the right-of-way requirements may not differ between a non-toll facility and a toll facility, the alignment of loop ramps that have ETC equipment may slightly differ. At these locations, the loop ramp is modified slightly to provide a tangent section that facilitates accurate video capture of license plates.

There are no significant differences in the impacts of tolling on the various DSAs. As discussed above, only minimal roadway design modifications are required to include the ETC system.

2.6 TRAFFIC FORECASTS AND OPERATIONS ANALYSIS

For the alternatives analysis in this Draft EIS, FHWA and NCTA relied upon several traffic studies. The traffic studies included traffic forecasts and operations analyses.

- A "traffic forecast" provides projected traffic volumes for a future year. Traffic volumes are measured in annual average daily traffic (AADT) on various roadways.
- An "operations analysis" is then developed, based on the traffic forecasts. The operations analysis provides congestion levels, which are typically measured in level of service (LOS); other measures, such as volume/capacity (v/c) ratios, also are sometimes used.

The traffic forecasts and operations analyses were prepared for the No-Build Alternative and for the DSAs. In addition, a separate traffic study was prepared for the Improve Existing US 74 Alternative as part of the screening process. All of these studies are described further below.

In general, the traffic studies used 2035 as the horizon year. However, as explained below, the operations analysis for the No-Build Alternative was based on the year 2030.

2.6.1 TRAFFIC FORECASTS FOR THE NO-BUILD ALTERNATIVE

Traffic forecasts and operations analyses were prepared for the No Build Alternative. These forecasts provide a baseline for evaluating the improvements provided by the Build alternatives. The traffic studies used in analyzing the No-Build Alternative included:

- 2030 No-Build Alternative Traffic Forecasts. These forecasts are documented in *Traffic Forecasts for the No-Build Alternatives for the NCDOT State TIP Project No. R-3329 and NCDOT State TIP Project No. R-2559, Monroe Connector/Bypass Study* (Martin/Alexiou/Bryson, June 2007).
- 2035 No-Build Alternative Traffic Forecasts. These forecasts are documented in *Traffic Forecast for TIP Projects R-3329 and R-2559, Monroe Connector/Bypass* (Wilbur Smith Associates, July 25, 2008)
- 2030 No-Build Alternative Traffic Operations Analyses. These analyses are documented in *Existing and Year 2030 No-Build Traffic Operations Technical Memorandum* (PBS&J, March 2008). This report was based on year 2030. Because traffic forecasts for year 2035 for the No-Build Alternative were greater than the year 2030 forecasts, FHWA and NCTA determined that it was not necessary to update the operational analyses for the No-Build alternative from 2030 to 2035. For this Draft EIS, the results of that 2030 analysis were assumed to be representative of conditions in 2035. Actual conditions with the No-Build Alternative in 2035 would likely be similar or worse than in 2030.

2.6.2 TRAFFIC FORECASTS FOR THE BUILD ALTERNATIVES

Traffic forecasts for the DSAs were prepared for the project using the *Metrolina Regional Travel Demand Model* (MRTDM), updated December 15, 2005, which was the same version used for the *Proposed Monroe Connector Preliminary Traffic and Revenue Study* (Wilbur Smith Associates, October 2006). Adjustments were made to reflect local conditions and input from local officials as well as engineering judgment to derive the traffic forecasts for this project. Forecasts assume a tolled facility and were developed for the year 2035. Modeling efforts and forecasts are documented in *Traffic Forecast for the Monroe Connector/Bypass* (Wilbur Smith Associates, September 2008).

In the 2035 traffic forecasts, two scenarios were modeled to represent the DSAs under consideration: Scenario 1A and Scenario 3A. These scenarios differed in their western terminus, where some DSAs included Segment 18A and others included Segment 2:

- Scenario 1A represents all DSAs that include DSA Segment 18A. These are DSAs A, B, A1, B1, A2, B2, A3, and B3.
- Scenario 3A represents all DSAs that include DSA Segment 2. These are DSAs C, D, C1, D1, C2, D2, C3, and D3.

Other DSA Segments and interchange locations were considered similar enough that modeling would not result in discernable differences in traffic forecasts between them. **Table 2-7** shows the forecasted 2035 traffic volumes along the mainline of the Monroe Connector/Bypass for the two traffic scenarios and forecasted 2035 traffic volumes along the existing US 74 corridor. As shown in Section 5 of the *Year 2035 Build Traffic Operations Technical Memorandum* (PBS&J,

February 2009), volumes on existing US 74 are expected to decrease with a new location DSA in place.

TABLE 2-7: Projected 2035 Traffic Volumes Along Mainline

Segment	Monroe Connector/Bypass Mainline Average Daily Traffic Volumes		Existing US 74 Average Daily Traffic Volumes		
	Scenario 1A (DSAs A, B, A1, B1, A2, B2, A3, B3)	Scenario 3A (DSAs C, D, C1, D1, C2, D2, C3, D3)	Scenario 1A (DSAs A, B, A1, B1, A2, B2, A3, B3)	Scenario 3A (DSAs C, D, C1, D1, C2, D2, C3, D3)	No-Build Alternative
I-485 to Stallings Rd (SR 1365)	41,400	95,600	79,600	95,600	140,200
Stallings Rd (SR 1365) to Indian Trail-Fairview Rd (SR 1520)	49,100	48,200	66,300	67,400	134,300
Indian Trail-Fairview Rd (SR 1520) to Unionville-Indian Trail Rd (SR 1367)	50,700	51,200	49,000-50,100	51,300-52,400	123,400
Unionville-Indian Trail Rd (SR 1367) to Rocky River Rd (SR 1514)	51,500	52,300	32,000-35,700	34,500-38,200	112,800-123,500
Rocky River Rd (SR 1514) to US 601	46,200	46,600	26,300-45,900	28,800-48,100	101,800-121,400
US 601 to Morgan Mill Rd (NC 200)	35,000	35,200	54,300-55,200	56,600-57,200	115,300-116,200
Morgan Mill Rd (NC 200) to Austin Chaney Rd (SR 1758)	24,400	24,800	32,200-59,300	33,100-60,000	74,300-101,400
Austin Chaney Rd (SR 1758) to Forest Hills School Rd	19,300	19,600	25,200-26,600	25,200-26,100	48,600-51,700
Forest Hills School Rd to US 74	15,400	16,400	21,700	20,700	44,200

Source: *Traffic Forecast for TIP Projects R-3329 and R-2559, Monroe Connector/Bypass* (WSA, July 25, 2008 and addenda September 2008 for Scenario 3A).

2.6.3 2035 TRAFFIC OPERATIONS ANALYSES FOR THE BUILD ALTERNATIVES

Traffic operations analyses for the Build Alternatives are documented in the *Year 2035 Build Traffic Operations Technical Memorandum* (PBS&J, December 2008). These operations analyses were used to develop functional engineering designs for the DSAs.

For the year 2035 Build scenarios, traffic operations analyses for individual freeway elements, including basic freeway segments, ramp merge/diverge areas, and weave sections, were conducted using Highway Capacity Software 2000 (HCS 2000, version 4.1f). Levels of service (LOS) analyses were performed following the NCDOT Congestion Management Section’s *Capacity Analysis Guidelines for TIP Project Traffic Analyses*. Desirable LOS for this analysis was considered to be LOS D.

In addition to the traffic operations along the Monroe Connector/Bypass, summarized in **Section 2.6.3.1**, traffic operations along existing US 74 with the Build Alternatives in place also were evaluated, as summarized in **Section 2.6.3.2**.

2.6.3.1 Traffic Operations Along the Monroe Connector/Bypass

- **US 74 / I-485 / Monroe Connector/Bypass Interchange Area** – DSAs A, B, A1, B1, A2, B2, A3, and B3 would tie to the existing US 74/I-485 interchange, which would be modified to include the Monroe Connector/Bypass as a fifth leg. The interchange would not accommodate all movements between the Monroe Connector/Bypass and US 74. The movement from westbound US 74 to eastbound Monroe Connector/Bypass and the return movement would not be accommodated at this interchange; instead, a partial interchange at Stallings Road (SR 1365) would be constructed to provide this movement. The LOS, freeway segment, and ramp merge/diverge analysis for this interchange indicated that the interchange would operate at LOS D or better in the design year 2035.
- **Monroe Connector/Bypass / US 74 Frontage Road Area** – DSAs C, D, C1, D1, C2, D2, C3, D, and D3 would include upgrading a portion of existing US 74 to a freeway with frontage roads. In these DSAs, the section of US 74 between the proposed McKee Road and Stallings Road (SR 1365) would be reconfigured to form a split diamond interchange with the US 74 frontage roads. East of this interchange, US 74 would split to provide direct connection between the Monroe Connector/Bypass and the US 74 traffic to and from the west. For the US 74 traffic to and from the east, access to the Monroe Connector/Bypass would be via Indian Trail-Fairview Road (SR 1520), which would lead to an interchange with the Monroe Connector/Bypass. This section of the DSAs and the interchange would operate at LOS D or better in 2035, as would the four ramp terminal intersections of the split diamond interchange at McKee Road, Stallings Road, and the US 74 frontage roads.
- **Monroe Connector/Bypass / Stallings Road (SR 1365) Interchange Area** – DSAs A, B, A1, B1, A2, B2, A3, and B3, would include a half diamond interchange at Stallings Road (SR 1365) with ramps to and from the east of the Monroe Connector/Bypass. Freeway segments in the vicinity of this interchange, as well as the interchange and its ramp terminals, would operate at LOS D or better in 2035.
- **Monroe Connector/Bypass / Indian Trail-Fairview Road (SR 1520) Interchange Area** – All DSAs would include an interchange with Indian Trail-Fairview Road (SR 1520), including loops and ramps in the northwest and southwest quadrants. Freeway segments near this interchange, as well as the interchange and its ramp terminals, would operate at desirable LOS; however, the ramp terminals would likely require signalization.
- **Monroe Connector/Bypass / Unionville-Indian Trail Road (SR 1367) Interchange Area** – All DSAs would include a diamond type interchange with ramps in all quadrants with Unionville-Indian Trail Road (SR 1367). All roadway segments near this interchange would operate at LOS D or better in 2035. The south ramp terminal with Unionville-Indian Trail Road would require signalization to operate at LOS D or better in the design year.
- **Monroe Connector/Bypass / Rocky River Road (SR 1514) Interchange Area** – All DSAs would include an interchange with Rocky River Road (SR 1514) with loops and ramps in the northeast and southeast quadrants. All elements of this interchange area would operate at LOS D or better in 2035. However, the south ramp terminal with Rocky River Road would require signalization by 2035.

- **Monroe Connector/Bypass / US 601 Interchange Area** – All DSAs would include an interchange with US 601 with loops in the northeast and southwest quadrants and ramps in the northeast, northwest, and southwest quadrants. The freeway elements and intersections associated with this interchange area would operate at LOS D or better in 2035, provided the ramp terminals at US 601 are signalized in the design year.
- **Monroe Connector/Bypass / Morgan Mill Road (NC 200) Area** – All DSAs would include a modified diamond type interchange with Morgan Mill Road (NC 200). The interchange would not have a ramp in the northwest quadrant but would have a loop in the northeast quadrant. Freeway segments in this area and the interchange would operate at LOS D or better. The ramp terminals at Morgan Mill Road would require signalization to operate at LOS D or better in the design year.
- **Monroe Connector/Bypass / Austin Chaney Road (SR 1758) Interchange Area** – All DSAs would include an interchange with Austin Chaney Road (SR 1758) that has loops and ramps in the northeast and southwest quadrants. All elements of this interchange area would operate at a LOS D or better in 2035.
- **Monroe Connector/Bypass / Forest Hills School Road Interchange Area** – All DSAs would include a half interchange with a diamond on-ramp in the northwest quadrant and a loop off-ramp in the southeast quadrant at Forest Hills School Road. All elements of this interchange area would operate at LOS D or better in the design year.
- **Monroe Connector/Bypass / US 74 Eastern Terminus Interchange Area** – All DSAs would include a directional interchange with US 74 between the towns of Wingate and Marshville to provide a direct connection between the Monroe Connector/Bypass and US 74 traffic traveling to and from the east. US 74 traffic traveling to and from the west would use Forest Hills School Road to access the proposed Monroe Connector/Bypass. This interchange would operate at LOS D or better in the design year.

2.6.3.2 Traffic Operations Along Existing US 74 With the Build Alternatives

Signalized intersections, unsignalized intersections, and urban interchanges along existing US 74 were evaluated under Scenario 1A (DSAs A, B, A1, B1, A2, B2, A3, B3) and Scenario 3A (DSAs C, D, C1, D1, C2, D2, C3, D3) year 2035 traffic forecasts. There were 27 signalized intersections and 6 unsignalized intersections evaluated, along with two urban interchanges (Concord Avenue and US 601). The unsignalized intersections and urban interchanges were analyzed using HCS 2000 and the signalized intersections were analyzed using the Synchro 7 software package.

The detailed results of the Build analysis for all intersections are shown in Tables 5-2, 5-3, and 5-4 in the *Year 2035 Build Traffic Operations Technical Memorandum* (PBS&J, March 2008), along with the year 2030 LOS results from the No-Build analysis for comparison purposes.

Both urban interchanges (US 74 at Concord Avenue and US 74 at US 601) would operate at LOS D or better under the 2035 Build Alternatives and the 2030 No-Build Alternative.

The unsignalized intersections would operate at undesirable LOS under all Build alternatives and the No-Build Alternative.

For the 27 signalized intersections, 15 would operate at undesirable LOS in 2035 under all Build alternatives, while 20 would operate at undesirable LOS under the 2030 No-Build conditions. Also, it would be expected that more intersections would operate at undesirable LOS under the 2035 No-Build Alternative conditions, since traffic volumes are projected to be higher in 2035 than in 2030. A primary factor contributing to the LOS improvement from No-Build to Build is that the existing US 74 corridor would carry less traffic under the Build alternatives, since a substantial portion of the US 74 traffic would divert to the Monroe Connector / Bypass.

2.7 COST ESTIMATES

Cost estimates are based on functional 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 \$752.5 million for DSA A2 to \$785.3 million for DSA D1. In order from lowest estimated total cost to highest, the DSAs are: DSA A2, A, B2, B, A3, A1, B3, B1, C2, C, D2, D, C3, C1, D3, and D1.

Preliminary cost estimates for each DSA are presented in **Table 2-8**. Additional information about the right-of-way cost estimates is included below.

As noted in **Section 2.3.2.3**, NCDOT purchased right of way for portions of the Monroe Bypass project under a previously approved FONSI for Project R-2599 (June 1997) at an approximate cost of \$19 million incurred by NCDOT. Because many of the previously purchased parcels are large parcels that were purchased in whole, most of the previously purchased parcels (in part or in whole) would be incorporated in one or more of the sixteen DSAs.

All the parcels NCDOT currently owns were reviewed to identify those parcels that would be used for right of way for all DSAs and those that would be used for right of way for only some DSAs. DSAs A, B, C, D, A2, B2, C2, and D2 would use more of the previously purchased right of way than DSAs A1, B1, C1, D1, A3, B3, C3, and D3. If the costs of this previously purchased right of way are considered for DSAs A, B, C, D, A2, B2, C2, and D2, the additional right of way costs would be approximately \$4.2 million in year of expenditure dollars, and would not make a significant difference in comparing the costs presented in **Table 2-8**. Therefore, the costs of previously purchased right of way were not included in the right-of-way costs presented in **Table 2-8**.

TABLE 2-8: Preliminary Cost Estimates for Detailed Study Alternatives

DSA	Approximate Length (miles)	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 \$)*	
A	20.6	525.5 to 610.7	11.6 to 12.5	160.2 to 201.4	697.3 to 824.5	754.6
B	20.5	526.1 to 612.3	10.8 to 11.6	166.7 to 197.5	703.7 to 821.5	755.7
C	19.7	527.1 to 611.5	11.0 to 11.9	176.3 to 221.6	714.5 to 845.0	773.9
D	19.6	527.7 to 614.8	10.2 to 11.0	178.4 to 224.2	716.3 to 850.0	777.4
A1	20.5	516.5 to 601.8	12.3 to 13.3	174.2 to 218.9	703.1 to 834.0	762.5

TABLE 2-8: Preliminary Cost Estimates for Detailed Study Alternatives

DSA	Approximate Length (miles)	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 \$)*	
B1	20.5	517.3 to 604.3	11.5 to 12.4	176.4 to 221.8	705.3 to 838.5	765.7
C1	19.6	518.0 to 603.2	11.7 to 12.6	190.9 to 239.5	720.7 to 855.2	781.9
D1	19.6	518.9 to 605.7	10.9 to 11.7	192.8 to 242.1	722.6 to 859.5	785.3
A2	20.6	518.5 to 601.8	12.0 to 12.9	164.6 to 206.7	695.0 to 821.3	752.5
B2	20.5	519.1 to 605.6	11.1 to 11.9	166.4 to 209.1	696.5 to 826.6	755.2
C2	19.7	520.2 to 603.8	11.4 to 12.2	180.8 to 227.3	712.4 to 843.4	772.1
D2	19.6	520.7 to 606.0	10.5 to 11.3	182.8 to 229.6	714.1 to 847.0	774.5
A3	20.5	510.0 to 594.2	12.6 to 13.6	178.4 to 224.2	701.0 to 832.0	760.9
B3	20.4	511.6 to 597.2	11.8 to 12.7	180.2 to 226.7	703.7 to 836.7	763.7
C3	19.6	512.0 to 595.6	12.1 to 13.0	194.7 to 244.9	718.8 to 853.6	780.3
D3	19.6	512.7 to 598.2	11.2 to 12.1	196.7 to 247.3	720.7 to 857.6	783.3

Source: *Monroe Draft EIS Cost Estimation Support Memo*, HNTB, March 2009.

Notes: * Assumptions and notes regarding costs:

1. Total cost may not add up exactly due to rounding.
2. Construction costs include construction, utilities, and administrative 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 administrative 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 April 2010 and an opening in December 2013.
9. Environmental mitigation costs are based on NCEEP fee schedule dated July 18, 2008 for estimated impacts to streams and wetlands and assume mitigation for impacts to all wetlands, all perennial streams, and intermittent streams with a NCDENR-DWQ stream rating greater than or equal to 26.
10. Utility relocation costs (included in construction costs) were provided by NCDOT in September 2006.
11. Right-of-way costs were provided by Carolina Land Acquisition in January 2009.

2.8 RECOMMENDED ALTERNATIVE

Based on the information available to date, including this Draft EIS, the FHWA, NCTA and NCDOT have identified DSA D as the Recommended Alternative. This alternative is comprised of DSA Segments 2, 21, 30, 31, 36, 36A, and 40, as shown in **Figure 2-8a-c**.

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. The 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, the 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 received 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 (ROD), which will document the Selected Alternative to be constructed.

DSA D 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 D, just those elements that differentiated DSA D when compared to the other DSAs.

Cost and Design Considerations

- DSA D is one of the shortest alternatives at 19.7 miles (all alternatives range from 19.6 to 20.6 miles).
- DSA D is one of the eight alternatives that would not require the relocation of Rocky River Road and the associated wetland impacts. The relocation of Rocky River Road is required for the eight alternatives that include DSA Segment 22A.
- DSA D is higher in the range of median total project costs with a cost of \$777.4 million (all alternatives range in cost from \$752.5 million for DSA A2 to \$785.3 million for DSA D1). The higher cost of the Recommended Alternative is offset by lower impacts in several other areas as described below.

Human Environment Considerations

- DSA D is one of the four DSAs with the fewest numbers of residential relocations at 107 residential relocations (the range being 94 to 149 residential relocations).
- Although DSA D is higher in the range of business relocations at 45 (the range being 14 to 48 business relocations), this number has been substantially reduced from preliminary estimates through design refinements, and there remains potential for further reduction through continued design innovation. Most of the impacted businesses are located along existing US 74 at the western end of the project. The relocation of these businesses is in exchange for the other positive factors associated with DSA D, including having the roadway located farther away from densely developed residential subdivisions and farther from Stallings Elementary School.
- DSA D would have no direct impacts to schools and would avoid any indirect impacts to Stallings Elementary School. DSA D is one of eight alternatives that would have no impacts to schools. The other eight alternatives would have a direct impact to Central Piedmont Community College and would be adjacent to Stallings Elementary School.
- DSA D is one of the four alternatives that would impact only three church properties (other DSAs impact four or five church properties). There would be no impacts to church buildings.
- DSA D is one of the eight alternatives that would avoid impacts to the proposed Matthews Sportsplex property, a public park to be developed by the Mecklenburg County Park and Recreation Department. Also see Cultural Resources Considerations below.

Physical Environment Considerations

- While none of the alternatives are subject to the Farmland Protection Policy Act, DSA D is one of the alternatives that has the least impacts to prime and statewide important

farmland soils. About 27 percent of the acreage within the right of way of DSA D is classified as prime or important farmland soils (all DSAs range from about 27 percent to 39 percent).

- DSA D is one of eight DSAs (DSAs C, D, C1, D1, C2, D2, C3, and D3) that would potentially impact the most hazardous materials sites (11-12 sites impacted, with the lowest impacts being 6-7 sites). However, the anticipated impact severity is “low” for all potentially impacted sites.

Cultural Resources Considerations

- DSA D is one of eight alternatives that would not have impacts on the proposed Matthews Sportsplex property, a future public park and Section 4(f) resource. The other eight alternatives would affect this proposed park, and NCTA would seek a Section 4(f) *de minimis* finding from FHWA if any of these alternatives are selected as the Preferred Alternative.

Natural Resources Considerations

- DSA D is lower in the range of impacts to agricultural land at 499 acres (all alternatives range from 494 to 627 acres).
- DSA D is in the middle range of impacts to upland forest at 450 acres (all alternatives range from 365 to 514 acres).
- DSA D is lower in the range of impacts to ponds at 2.6 acres (all alternatives range from 2.5 to 3.8 acres).
- DSA D is in the middle range of impacts to wetlands at 8.1 acres (all alternatives range from 6.2 to 11.0 acres).
- DSA D would have the least impacts to perennial streams with 9,794 linear feet of impact (all alternatives range from 9,794 to 12,383 linear feet).
- DSA D is lower in the range of impacts to intermittent streams at 11,915 linear feet (all alternatives range from 10,767 to 13,020 linear feet).
- DSA D would have the least linear feet of streams requiring mitigation at 12,550 linear feet (all alternatives range from 12,550 to 16,387 linear feet). While final decisions with respect to mitigation requirements have not been made by the regulatory agencies, for estimation purposes, streams were considered to require mitigation if they were perennial or if they were intermittent and had a stream rating issued by the North Carolina Department of Environment and Natural Resources-Division of Water Quality (NCDENR-DWQ) of greater than or equal to 26. This implies that streams impacted by DSA D are of lower quality than those impacted by other DSAs.
- DSA D is one of eight alternatives that would cross only two 303(d)-listed streams, while the other eight alternatives would cross four.

Public Involvement

- Substantial public input regarding the DSAs, particularly at the western end of the project (DSA Segment 2 versus DSA Segment 18A), was received throughout the alternatives screening process. Much of this public input has been generated by Citizens Against Route Eighteen (C.A.R.E), a community-based group focused on informing and mobilizing residents against DSA Segment 18A of the Monroe Connector/Bypass

(included in DSAs A, B, A1, B1, A2, B2, A3, and B3). To date, C.A.R.E. has submitted more than 2,000 signatures in opposition to DSA Segment 18A. Specifically, the group is concerned about noise, visual, and air quality impacts to the new Stallings Elementary School and adjacent neighborhoods, as well as impacts to North Fork Crooked Creek, which is a 303(d)-listed stream. While this input was a factor in the decision to recommend DSA D, the recommendation was based on a wide range of factors included in the comprehensive review and analysis of the potential impacts of all DSAs, as described above.

The above information will be considered in addition to public and agency comments received on this Draft EIS and at public hearings. In addition, based on public comments received on the functional engineering designs to date, the following areas may be reevaluated during the final design phase:

- The DSA Segment 2 typical section will be evaluated to minimize right of way required along existing US 74 and to explore options to make the design more aesthetically pleasing.
- The entrance to the Forest Park neighborhood and service road to Union West Industrial Park may be revised to allow for separate access points for the Forest Park neighborhood and the industrial park.
- The Beverly Drive grade separation will be reconsidered. NCTA may consider severing Beverly Drive.
- The Bonterra neighborhood entrance at Secret Shortcut Road will be evaluated to address concerns with bridging the Monroe Connector/Bypass over the Bonterra neighborhood entrance, including visual and noise impacts to the neighborhood. NCTA will evaluate other design options for this crossing.
- The Poplin Road realignment will be reevaluated and redesigned.
- The Secret Shortcut Road realignment will be reevaluated and additional design options considered.