



Alternatives Analysis Executive Summary

Durham-Orange County Corridor

Triangle Regional Transit Program
our transit future



APRIL 2012

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Executive Summary

Introduction

The 2035 Long Range Transportation Plan, jointly adopted by the Durham-Chapel Hill-Carrboro and Capital Area Metropolitan Planning Organization in April 2009, identified corridors for major investments in fixed guideway transit over 30 years. The Transitional Analysis (Triangle Transit, 2010) was a system-level study that analyzed and prioritized fixed guideway transit corridors from the adopted 2035 Joint LRTP to be studied in further detail in an alternatives analysis (AA) process. One corridor within each of the MPO areas is recommended for more detailed study. The Durham-Orange Corridor, which is the subject of this AA report, is identified as a high-priority corridor for high-capacity transit improvements.

The AA is a component of the Triangle Regional Transit Program, a comprehensive effort to study expanded bus and rail networks across Durham, Orange and Wake Counties. This AA evaluates and screens alternative alignments, modes, and station locations within the Durham-Orange Corridor and concludes with the selection of a recommended Locally Preferred Alternative (LPA). The AA process is consistent with the Federal Transit Administration's (FTA) New Starts guidelines that enable fixed guideway projects to be eligible for federal funds.

AA Study Area

The Durham-Orange Corridor Study Area extends 17 miles, beginning in southwest Chapel Hill and encompassing the University of North Carolina (UNC) campus, downtown Chapel Hill, suburban areas along NC 54, US 15-501, NC 147 (Durham Freeway), I-40, Duke University, and downtown and east Durham.

AA Process

The AA commenced with a review of previous studies and plans; analysis of the existing and forecast socioeconomic, land use, and transportation conditions; and development of the draft Purpose and Need and corresponding goals and objectives for the project.

The project team developed a two-tiered screening and evaluation process to evaluate the suitability of transit alternatives in meeting the identified needs for the project. The two screening levels were Conceptual and Detailed. The evaluation criteria at both levels directly related to the project's goals and objectives. The criteria evolved through each level, starting with broad, qualitative measures for the conceptual screening and becoming more focused at the detailed level by using both qualitative and quantitative measures.

AA Purpose and Need

Triangle community residents and their elected officials have identified four core issues that a transportation project should address to support and advance a sustainable economy and the region's quality of life. Therefore, the purpose of a proposed high-capacity transit investment in the Durham-Orange Corridor is to provide a transit solution that addresses the following mobility and development needs:

- **Need to enhance mobility:** The Durham-Orange Corridor is forecast to absorb tremendous population and employment growth that will translate into increased travel demand. By 2035, the corridor is projected to add about 56,000 people and 81,000 jobs, which is expected to

generate 255,000 additional daily trips, many of which will be made on local roadways. These trips will increase congestion during the highest AM and PM travel periods. Alternatives to the auto are needed to address the limited capacity of the corridor's roadway system to accommodate increased travel demand. Conventional buses tend to make frequent stops and operate in mixed traffic conditions, thereby slowing travel times and offering no travel time savings over the automobile. Sample trips (Table 3.3 in Section 3.2.2) illustrate what is problematic with much of the area's transit service: not only does transit fail to provide a travel time savings, but bus travel generally takes longer than auto travel due to less direct routing between key destinations, bus stops, and, in some cases, transfers. The sample trip between Chapel Hill and Durham, which has a total travel time of approximately one-half hour by car, has a nearly 1 hour and 10 minute total travel time by bus on a typical weekday. On a weekend, that same trip by transit will take just over one and one-half hours because of a longer walk to access to the bus due to the reduced frequency in CHT transit service.

- **Need to expand transit options between Durham and Chapel Hill:** Most bus service in the Durham-Orange Corridor is concentrated in downtown Durham and downtown Chapel Hill. Transit connecting these urban centers and serving the residential areas and suburban-style retail developments ES-3 between them is limited to two Triangle Transit routes and the Duke University Robertson Scholars Express Bus. Currently, these buses operate in mixed traffic along increasingly congested roadways, have limited capacity, and are not competitive with the auto for most trips. Furthermore, the Study Area does not currently offer a high premium service for choice riders.
- **Need to serve populations with high propensity for transit use:** University students and employees, as well as transit-dependent populations, are a significant percentage of the population in the D-O Corridor. Expanding transit services and increasing access to each of the university campuses and medical centers, which offer pedestrian-friendly environments, limited parking, and free transit passes, will support increased mobility options for university students, employees and other patrons. Also, expanding reliable mobility options for lower income populations and transit users who may not be able to drive will enhance economic opportunities through improved access to major jobs centers along the corridor. Providing a transit option that supports the mobility of these groups satisfies an important need within the corridor serving these communities.
- **Need to foster compact development:** Local governments recognize the need to manage growth and focus development within the Study Area. Durham City/County, Chapel Hill and Orange County have developed plans and implementation strategies that call for more compact, walkable, higher density, mixed-use development within the D-O Corridor. However, the existing transit infrastructure throughout the corridor is not fully supportive of these land use plans and implementation strategies and cannot facilitate long-term economic development. A proposed fixed guideway transit investment can channel future growth, provide a superior transit option appropriate for high density development, and help local communities realize their goals and objectives for the future.

Stakeholder and Public Involvement

The project team consisted of Triangle Transit staff and the URS Corporation Consultant Team, with broad input from stakeholders and the general public through a multi-faceted outreach program. The AA process included 19 public workshops, targeted communication with traditionally underserved groups, a public involvement steering committee, coordination with the two local MPOs and elected officials, and convening of working groups as necessary to review project alternatives. Outreach efforts

also included a project Web site (www.ourtransitfuture.com), a project hotline for telephone calls, a postal service mailing address, interior bus ads, news stories, a dedicated e-mail account, and social media outlets.

The comprehensive process yielded more than 1,100 public workshop attendees, several additional meetings with regional stakeholders, and receipt of over 500 comments through the various means of communication available.

Tier 1 Screening: Conceptual Evaluation of Alternatives

Methodology The conceptual evaluation focused on developing and evaluating transit technology alternatives and refining the transit alignment recommended in the US 15-501 Phase I Major Investment Study (1998) and the US 15-501 Phase II Major Investment Study (2001) and subsequently adopted by local governments. Screening criteria included assessment of potential transit ridership through the review of population and employment concentrations and suitability of transit mode; consistency with existing plans and studies; community support; presence of irresolvable environmental impacts; and technical and financial feasibility. Failure to meet at least one or more criterion resulted in elimination of an alternative from further consideration. The No-Build and Transportation System Management (TSM) Alternatives, both required for inclusion by the FTA, were automatically advanced to the Detailed Evaluation of Alternatives.

Transit Technology Evaluation Because a preferred transit technology was not selected through the course of the previous MIS studies, the project team developed four conceptual transit technology alternatives: Bus Rapid Transit (BRT), Streetcar, Light Rail Transit (LRT), and Commuter Rail (CRT). Streetcar was eliminated from further consideration because the mode would not sufficiently enhance mobility, increase transit efficiency, or improve transit connections throughout the project corridor. CRT was not advanced into the detailed evaluation of alternatives because it will not enhance mobility within the corridor as effectively as other transit technologies, is limited in the level of service provided to high need populations, and is cost prohibitive. BRT and LRT were found to be the most reasonable alternatives for the corridor that could address the project's Purpose and Need and were advanced for more detailed study.

Alignment Evaluation The recommended transit alignment from the US 15-501 Phase II Major Investment Study (MIS) was carried forward into the AA as the base alignment for all Build alternatives between UNC Hospitals and Duke Medical Center. Since completion of the US 15-501 Phase II MIS, however, new development, transit technology considerations, and the availability of more detailed environmental information warranted consideration of alternate routes to specific segments of the base alignment. A total of 14 alignment alternatives, as shown in ES-1, were developed across the following five subareas within the Durham-Orange Corridor Study Area:

A. UNC Hospitals The UNC Hospitals area is the western terminus of the project corridor and is generally defined as the southern campus area between the UNC Hospitals, Manning Drive and Fordham Boulevard. Alternatives were conceptualized in this area to accommodate the possible future extension of the proposed transit system to the west through Chapel Hill and into Carrboro.

B. Meadowmont The Meadowmont area is generally defined as the area along NC 54, from the US 15-501 split to Friday Center Drive/Meadowmont Lane intersection. Several alternatives were conceptualized in this area due to several destinations including Meadowmont Subdivision, the Finley Golf Course, and the Friday Center.

C. Leigh Village The Leigh Village area is generally defined as the area around NC 54, George King Road and Farrington Road. Several alternatives were conceptualized in this area due to the future development of the Leigh Village planned community, and potential impacts to wetlands associated with the water supply watershed of Lake Jordan.

D. South Square The South Square area is generally defined as the area bordered by Westgate Drive, University Drive, Shannon Road, and Tower Boulevard. Alternatives were conceptualized in this area due to the complexity of accessing the South Square Shopping Center and crossing Durham-Chapel Hill Boulevard.

E. Downtown Durham The Downtown Durham area is the area between Duke Medical Center and Alston Avenue. An alternative was developed to study an alignment alternative off the existing rail right-of-way through downtown Durham.

The alignment alternatives were narrowed to nine options which were advanced for study in Tier 2 of the screening process. More detailed information on the alignments options is presented in Section 5.2.4.

Tier 2 Screening: Detailed Evaluation of Alternatives

Methodology The Detailed Evaluation of Alternatives focused on identifying the LPA to be advanced for further evaluation in the Preliminary Engineering/Environmental Impact Statement (PE/EIS) process. Alternatives were evaluated based on Ridership, Transportation Operations, Expansion Potential, Economic Development Potential, Public and Agency Support, and Environmental Impacts.

Alternatives Considered In addition to the No-Build and TSM Alternatives automatically advanced from the conceptual alternatives screening, the transit technologies and alignment options remaining after the conceptual alternatives were combined into three fixed guideway alternatives for detailed evaluation (Figure ES-1):

LRT Alternative This alternative would operate light rail vehicles between University of North Carolina (UNC) Hospitals and east Durham and includes alignment options in UNC Chapel Hill (A1 – UNC Hibbard Drive and A3 – UNC Southern), Meadowmont/Woodmont (C1 – Meadowmont Lane and C2 – George King Road), and South Square (D1 – Westgate Drive and D3 – Shannon Road). A total of 17 station locations are proposed.

BRT-High Alternative This alternative would operate BRT between UNC Hospitals and east Durham, generally following the same alignment as LRT and including the same station locations. The only deviation would occur through downtown Durham to the end-of-line at Alston Avenue in east Durham where the BRT-High option would utilize Pettigrew Street, while the LRT would run in the rail corridor. The BRT-High would operate similar to conventional bus in mixed traffic along Pettigrew Street, but would transition to exclusive running along a new Pettigrew Street connection to be constructed as part of this project between Campus Drive and Duke Street. The new guideway connection between these intersections would require coordination with the operating railroads, NCDOT, Durham, and other stakeholders and, potentially require further engineering and design analysis.

FIGURE ES-1
DURHAM-ORANGE
CORRIDOR
ALTERNATIVES

LEGEND

- Aerial Segment (LRT/BRT)
- At-Grade (LRT/BRT)
- TSM Alternative
- BRT Alternatives
- Interstate
- US Route
- NC Route
- Railroad
- County Boundary
- Town of Chapel Hill
- Chapel Hill ETJ
- City of Durham
- Expanded Study Area
- Conceptual LRT/BRT Station
- TSM Station

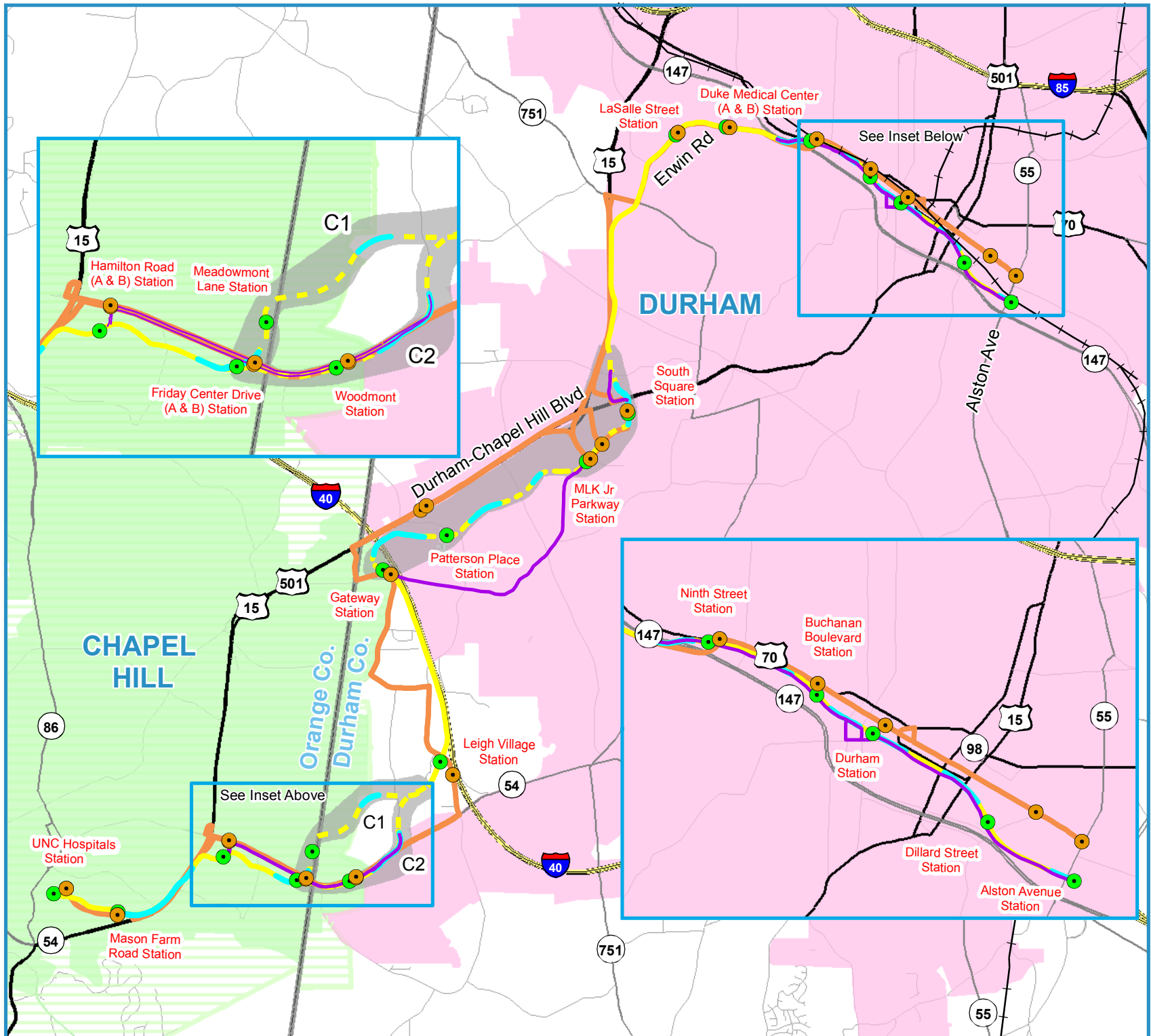


0 0.3 0.6 1.2 Miles

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Durham-Orange County Corridor
 Alternatives Analysis



BRT-Low Alternative A second BRT alternative was developed to take advantage of the greater flexibility offered by BRT operations. The BRT-Low Alternative alignment more closely follows existing roadways with less aerial structures and more mixed-traffic segments. The BRT-Low alignment is similar to the BRT-High alignment but would deviate from the BRT-High alignment in the following three segments: Hamilton Road Station to Leigh Village Station (BRT-Low Alternative 1), Gateway Station to MLK Jr. Parkway Station (BRT-Low Alternative 2), and Shannon Drive to Pickett Road (BRT-Low Alternative 3). A total of 18 station locations are proposed.

The summary of evaluation results focused first on narrowing down the alignment options under consideration and second on comparing and screening the Build Alternatives to arrive at a LPA recommendation.

Alignment Evaluation. An evaluation of primary opportunities and constraints of the alignment options under consideration in the UNC Chapel Hill, Meadowmont/Woodmont, and South Square subareas resulted in the following preliminary alignment recommendations for each subarea:

UNC Chapel Hill Alignment Option Recommendation: The project team recommended that alignment option A3 be carried forward as the preferred alignment option. Both the UNC and Town of Chapel Hill staff support this option.

Meadowmont/Woodmont Alignment Option Recommendation: The project team recommended alignment option C1 be advanced as the preferred alignment option and also recommended advancing alignment option C2 through to the PE/NEPA phase in order to provide an opportunity for continued study of wetlands issues in the area.

South Square Alignment Option Recommendation: The project team recommended alignment option D3 be advanced as the preferred alignment option. The potential for development for alignment option D3 and the surrounding land uses is, in the opinion of the project team, a very significant factor for the recommendation of D3 above and beyond the constraints cited.

Build Alternatives Evaluation Results Incorporating the alignment recommendations into the Build Alternatives, the project team then evaluated each alternative against a set of detailed criteria. Table ES-1 summarizes the evaluation results.¹ A discussion of how well the alternatives performed relative to the project goals follows the table.

Based on the information presented in Table ES-1, The BRT-High and BRT-Low Alternatives clearly rate well in their ability to meet the first three project goals. Both BRT Alternatives outperform the LRT Alternative in their ability to meet Goal 1: Improve mobility through and within the study corridor, Goal 2: Increase transit efficiency and quality of service, and Goal 3: Improve transit connections. The end-to-end travel time for the BRT Alternatives is slightly longer than the LRT Alternative; however, travel time does not seem to be a major differentiator with regard to passenger preference, as ridership on the BRT-High and BRT-Low Alternatives exceeds that of the LRT Alternative, even with a longer travel time. Additionally, while BRT-Low would result in marginally worse traffic impacts than LRT and BRT-High, traffic impacts is also not a major differentiator among the Build Alternatives.

¹ Public and agency support is excluded from the summary table because of the limited amount of data available for evaluation. See Public and Agency Support under Section 5.3.3 of this report for more information.

Table ES-1 Summary of Evaluation Results for LRT, BRT-High, and BRT-Low Alternatives

Goals	Evaluation Criteria*	LRT	BRT-High	BRT-Low
Goal 1: Improve mobility through and within the study corridor. Goal 2: Increase transit efficiency and quality of service. Goal 3: Improve transit connections.	Ridership: Daily Project Boardings	12,000	BRT route: 5,700** Interlined Buses: 11,900 Total: 17,600	BRT route: 4,600** Interlined Buses: 11,700 Total: 16,300
	Ridership: System-wide Trips***	140,500-141,600	142,800	141,100
	Transportation Operations: Traffic Impacts	Low	Low	Moderate
	Transportation Operations: Travel Time	35 minutes	39 minutes	44 minutes
	Expansion Potential	No engineering constraints & consistent with regional plans	Could be inconsistent with regional connectivity goals	Could be inconsistent with regional connectivity goals
Goal 4: Support local and regional economic development and planned growth management initiatives	Public and Agency Support	High	Moderate	Moderate
	Economic Development Potential	Demonstrated ability to influence development	Unproven ability to influence development	Unproven ability to influence development
Goal 5: Foster environmental stewardship	Environmental Impacts	Moderate property acquisitions, high visual impacts, moderate stream/wetland & construction impacts, no air quality impacts	Moderate property acquisitions, visual impacts, stream/wetland & construction impacts, low air quality impacts	High property acquisitions, low visual impacts, low stream/wetland impacts, moderate construction & low air quality impacts
Goal 6: Provide a cost-effective transit investment.	Estimated Cost (2011 \$) – Capital	\$1.37B	\$960M	\$810M
	Estimated Cost (2011 \$) – O&M Cost (based on offered peak hour capacity of 800 and 1500 pax/hr [‡])	800 pax/hr: \$14M 1500 pax/hr: \$15M	800 pax/hr: \$11M 1500 pax/hr: \$13M	800 pax/hr: \$11M 1500 pax/hr: \$13M

*Evaluation criteria include references to sections of the report where more information can be found. | **Daily boardings for BRT-High and BRT-Low routes without interlined buses could potentially be higher as the model estimated the ridership assuming interlined buses. Interlining refers to the ability of local bus routes to use of the guideway in addition to the exclusive BRT service. The BRT numbers thus do not account for passengers that would transfer from feeder buses to BRT if the feeder buses were not sharing the BRT guideway | ***System-wide trips refer to total transit trips in the three county Triangle Region (Durham, Orange, and Wake Counties). | [‡]passengers/hour

Each of the three alternatives – LRT, BRT-High, and BRT-Low also meet Goal 5: Foster environmental stewardship; however, the use of fossil fuels by buses makes LRT a more sustainable and desirable technology over the long term. And, while each would result in limited impacts to the natural and built environments, environmental impacts have not proven to be a major differentiator between the alternatives.

From a cost perspective, the BRT-High and BRT-Low Alternatives best meet Goal 6: Provide a cost-effective transit investment by providing a lower capital cost investment and O&M costs within the planning horizon for the proposed project. In terms of capital costs, while LRT presents substantially

higher costs than BRT, the cost of the LRT Alternative is still within the range of affordability as detailed in the separate Financial Plans being prepared for Durham, Orange, and Wake Counties. For O&M costs, decision makers must also consider that in the long-term, the O&M costs of the BRT Alternatives will likely escalate higher than those of the LRT Alternative due to the shorter life span of buses compared to trains, operations (driver) costs, and, potentially, fuel costs. Ultimately the decision of whether BRT or LRT is a cost-effective technology choice will depend largely on ridership. Currently, the BRT Alternatives do have slightly higher forecasted boardings but, as peak hourly volumes reach the range more comparable to existing LRT and BRT systems, LRT can meet the increased demand at a lower capital and O&M investment than BRT.

While the BRT Alternatives are competitive regarding most project goals, the LRT Alternative clearly surpasses the BRT Alternatives under Goal 4: Support local and regional economic development and planned growth management initiatives. The LRT Alternative has demonstrated public support and a proven record of producing local and regional economic development benefits by enhancing and focusing growth within LRT corridors. LRT enhances opportunities for transit-oriented development (TOD), and the resulting TOD can achieve rental rate premiums and higher land values over non-light rail served properties. Impressive levels of development have been constructed along LRT lines in many examples across the nation. As evidenced by the dollars of investment with LRT corridors such as the Charlotte Blue Line, developers are interested in constructing transit oriented development at LRT stations, as they see the value in the transportation advantage afforded by LRT. Further, in support of planned growth management initiatives, LRT's proven ability to focus growth would, in the long run, have a more substantial impact on mobility because the land use impacts will result in more choices that can reduce impacts to the highway system.













Build Alternative/Technology Recommendation: The ultimate choice of technology to carry forward is a major decision and could be considered a business decision beyond and above all else. Local and regional stakeholders place a high level of importance on economic development potential and focusing growth within the proposed transit corridor through TOD. LRT can bolster economic development and focus growth and the potential development dollars are not insignificant. The LRT Alternative alone can fully address the stated Purpose and Need for a fixed-guideway investment in the Durham-Orange Corridor; it can enhance mobility, expand transit options between Durham and Chapel Hill, serve populations with high propensity for transit use, and foster compact development. Therefore, the recommended Build Alternative (and technology) is the LRT Alternative.

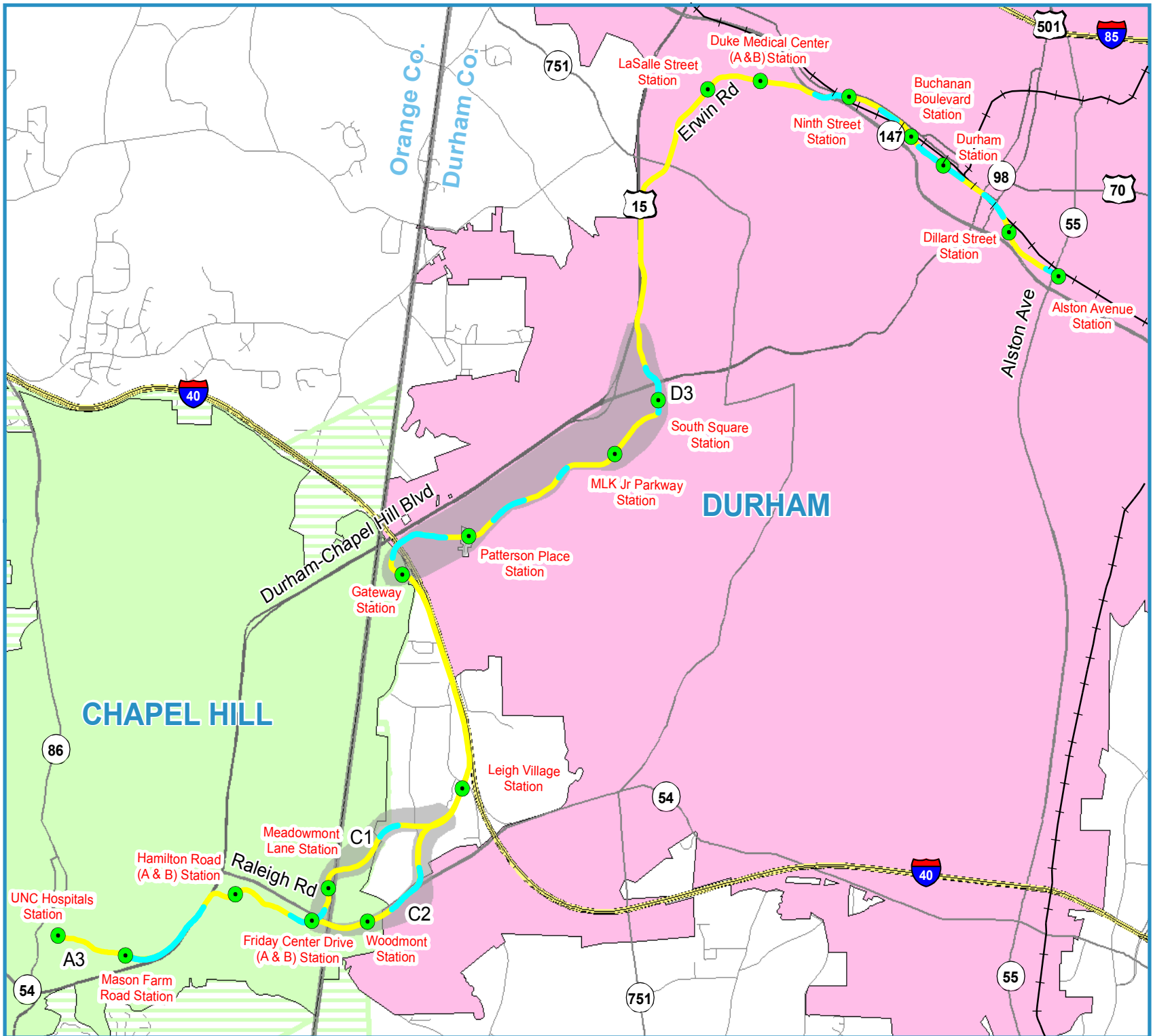
LPA Recommendation

The Durham-Orange Detailed Definition of Alternatives published in July 2011, for reasons presented in the preceding subsections recommended advancing the LRT Alternative as the LPA with alignment options A3, C1, and D3 and the associated station locations. It was also recommended that the alignment option C2 be carried forward for further study in the Preliminary Engineering / Draft Environmental Impact Statement (PE/DEIS) phase based on potential impacts to wetlands and US Army Corps of Engineers (USACE) owned property associated with the C1 Alternative. Figure ES-2 illustrates the LPA.

FIGURE ES-2
DURHAM-ORANGE
RECOMMENDED
LOCALLY PREFERRED
ALTERNATIVE

LEGEND

-  Aerial Segment
-  At-Grade
-  Interstate
-  US Route
-  NC Route
-  Railroad
-  County Boundary
-  Town of Chapel Hill
-  Chapel Hill ETJ
-  City of Durham
-  Expanded Study Area
-  Conceptual Station



0 0.3 0.6 1.2 Miles

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Additional Evaluation and Endorsement of the LPA

Since publication of the Detailed Evaluation of Alternatives and the recommended LPA in July, 2011, the public, Orange and Durham County Commissioners, Chapel Hill Town Council and Durham City Councils and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) have held public hearings, reviewed and considered the recommended LPA. DCHC MPO, in conjunction with Triangle Transit, have held public workshops and received comments on the Detailed Definition of Alternatives which presented the recommended LPA (See Appendix C). Comments received were considered by local officials and the DCHC MPO prior to selection and adoption of the LPA. The events and activities relevant to the selection of the LPA are as follows:

- June 22, 2011: DCHC MPO approves Durham County Bus and Rail Investment Plan
- June 27, 2011: Durham Board of County Commissioners (BOCC) approves Durham County Bus and Rail Investment Plan
- August 29-30, 2011: DCHC Holds Public Workshops on Durham-Orange Corridor AA
- November 8, 2011: Durham County holds successful referendum on ½ cent sales tax for transit
- January 11, 2012: DCHC MPO Conducts Public Hearing
- February 8, 2012: DCHC MPO Selects Locally Preferred Alternative. The recommended LPA was adopted with the modification that both the C1 and C2 alignment options be carried forward for further study in the Meadowmont and Woodmont station areas, with a preference for C2 (Figure ES-3).

Final Alternatives Recommended for Study

Based on this evaluation and the LPA adoption by the DCHC MPO on February 8, 2012, the final recommendations for alternatives to carry forward for study in the Draft Environmental Impact Statement are the No Build, Baseline/TSM (required by FTA for comparison to “Build” alternatives), and LRT between UNC Hospitals and Alston Avenue/NCCU, as follows:














No-Build Alternative. The No-Build Alternative is used as a starting point to provide a comparison of all Build Alternatives in terms of costs, benefits, and impacts. The No-Build Alternative includes all highway and transit facilities identified in the fiscally constrained 2035 Long-Range Transportation Plan (LRTP), with the exception of the comprehensive system-wide rail transit network, which includes the D-O LRT Project.

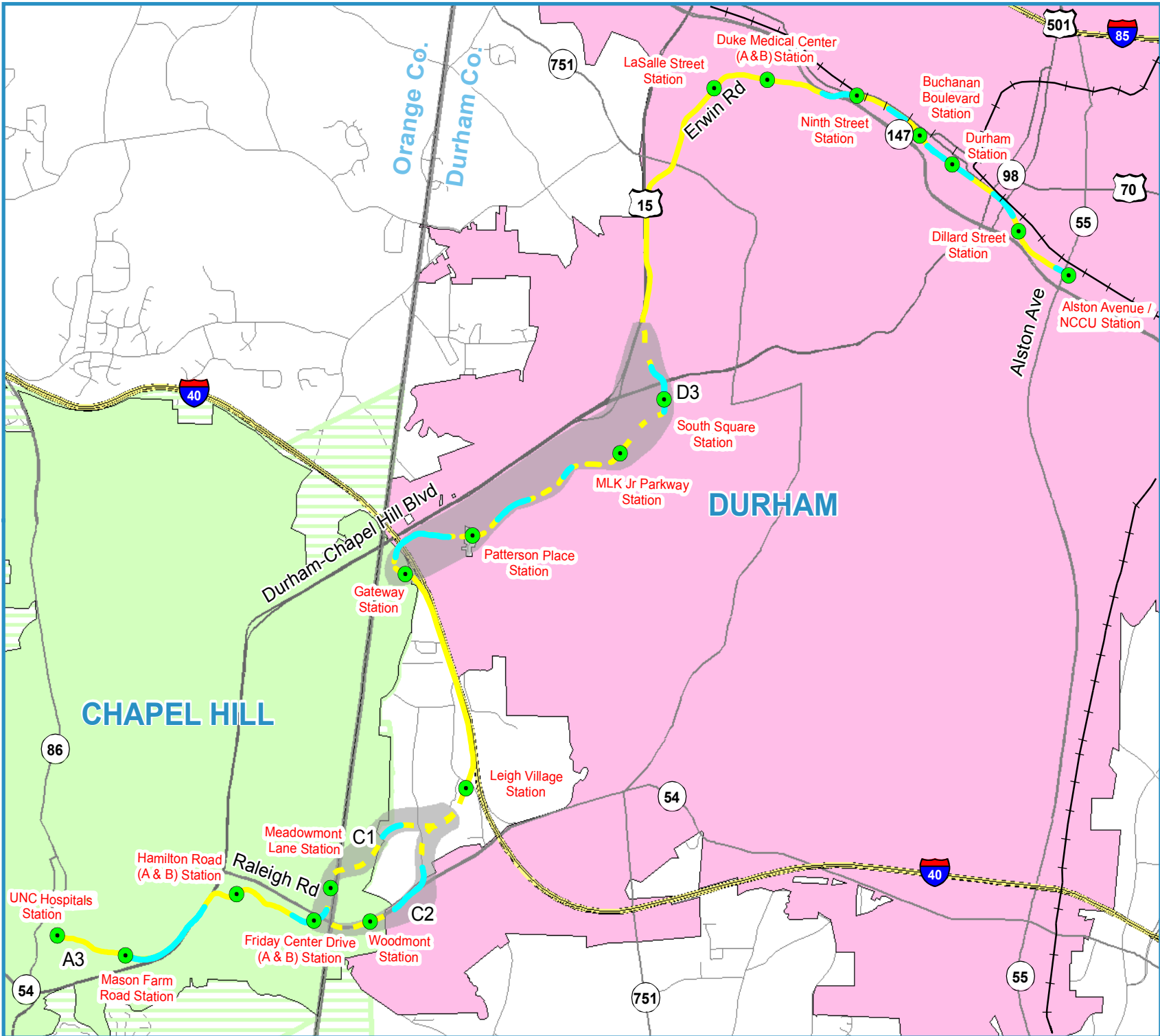
TSM Alternative. The primary purpose of the TSM Alternative is to develop an enhanced and robust bus network in the Durham-Orange Corridor that provides a level of transit service and capacity roughly equivalent to that of a fixed-guideway improvement. The TSM Alternative is required for inclusion in the DEIS by the FTA when federal funds are sought for capital improvements. The intention is to compare the efficiency and cost-effectiveness of a significant bus network in the corridor with fixed-guideway improvements to determine the impact on transit ridership, travel time, and other measures.

LRT Build Alternative –Locally Preferred Alternative. The alignment, which would be double-tracked throughout, (one track for each direction of travel), would operate primarily at-grade in a dedicated right-of-way parallel to existing roadways, with elevated sections throughout to mitigate potential traffic impacts or impacts to environmental features as needed. A total of 17 stations are proposed for the LRT Alternative. Station location refinements for stations such as Hamilton Road and Duke Medical Center will occur during the PE/EIS phase of the project, described in Section 6. During this phase, station layouts and designs will also be prepared.

FIGURE ES-3
DURHAM-ORANGE
ADOPTED
LOCALLY PREFERRED
ALTERNATIVE

LEGEND

-  Aerial Segment
-  At-Grade
-  Routes to be studied further
-  Interstate
-  US Route
-  NC Route
-  Railroad
-  County Boundary
-  Town of Chapel Hill
-  Chapel Hill ETJ
-  City of Durham
-  Expanded Study Area
-  Conceptual Station



0 0.3 0.6 1.2 Miles

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The specific location of the LPA alignment is uncertain in two areas:

1. Crossing of Little Creek between Meadowmont Village and the proposed Leigh Village development: Alternatives C1 and C2
2. Crossing of New Hope Creek and Sandy Creek between Patterson Place and South Square: Alternative alignments generally south of Durham-Chapel Boulevard.

For the purposes of avoiding and minimizing impacts to sensitive environmental resources in these locations, practicable and reasonable alignment options in these locations will be studied in the DEIS.

Next Steps

The following is a description of the work that is currently underway and the next steps needed to advance the LPA through the overall project development and approval/implementation process and the resolution of known issues related to the LPA that will require further analysis and refinement.

FTA Project Development Process. The LRT alternative has been officially selected by the DCHC MPO, and is contained in the region's financially-constrained 2035 LRTP. The project team will prepare an application for entry into the FTA's New Starts process and request approval to begin the PE/EIS phase of the project development process. A decision from FTA regarding the entry of the D-O LRT project into the New Starts funding program and authorization to commence the PE/EIS phase is anticipated to be received by mid-2013.

Concurrent with the preparation of the New Starts application, scoping activities have been initiated for the environmental review process that is required by the National Environmental Policy Act of 1969 (NEPA). After receiving approval to enter New Starts, the project will move into the PE phase of project development. This approval by FTA signals that the project is eligible to be considered for future federal funding support. In the PE/EIS phase, more detailed design and engineering will be conducted to refine project costs and support preparation of an EIS. Following completion of PE and the EIS, Triangle Transit will request FTA permission to conduct Final Design. In Final Design, the engineering is completed, and negotiations, agreements and construction plans are finalized. As that work is being completed, Triangle Transit will work with FTA to negotiate a Full Funding Grant Agreement, which formally commits federal funding for the project.

Issues for Further Analysis and Refinement

Over the course of the AA, selection of the LPA, and leading up to scoping of the PE/EIS process, the following issues were identified for further analysis or coordination:

- Evaluation of project-related environmental impacts and development of mitigation measures for unavoidable impacts.
- Study of alignment options in the US 15/501 Corridor between the proposed Patterson Place and MLK stations to avoid and minimize impacts to wetlands, streams, floodplains, ecologically sensitive resources, public lands and recreation areas associated with New Hope Creek and Sandy Creek.
- Further study of the C1 and C2 alignment options between Friday Center and Leigh Village to evaluate community impacts and to avoid and minimize impacts to wetlands, streams,

floodplains, ecologically sensitive resources, gamelands and federally-owned lands associated with Little Creek.

- Refinement of station locations such as Hamilton Road, Patterson Place, Duke Medical Center.
- Development of station layouts and designs.
- Further evaluation of traffic and transportation impacts, particularly at LRT/street at-grade crossings.
- Evaluation of possible rail operations and maintenance facility locations.
- Coordination and development of agreements with North Carolina Railroad (NCRR) and Norfolk Southern Railroad (NS) and North Carolina Department of Transportation as well as other state and local government agencies.
- Refinement of ridership estimates.
- Development of preliminary engineering drawings.
- Refinement of capital and operating and maintenance costs.
- Continued coordination with interested federal, state, and local government agencies