ES Executive Summary

The Research Triangle Regional Public Transportation Authority d/b/a Triangle Transit d/b/a GoTriangle (Triangle Transit), in cooperation with the Federal Transit Administration (FTA), has prepared a Draft Environmental Impact Statement (DEIS) pursuant to the National Environmental Policy Act (NEPA) to evaluate the proposed Durham-Orange Light Rail Transit (D-O LRT) Project, a potential high-capacity transit improvement in the Research Triangle region within the Durham-Orange (D-O) Corridor between Chapel Hill and Durham.

Who is Triangle Transit?

Triangle Transit operates the regional public transportation system (bus and shuttle service, paratransit services, ride matching, vanpools) and provides commuter resources and an emergency ride home program in the Raleigh-Durham-Chapel Hill area of North Carolina. Triangle Transit manages Durham's bus and paratransit services (Go Durham) and is also home to the GoTransit Regional Information Call Center.

GO Triangle

Triangle Transit's mission is to improve the region's quality of life by connecting people and places with reliable, safe, and easy-to-use travel choices that reduce congestion and energy use, save money, and promote sustainability, healthier lifestyles, and a more environmentally responsible community.

What is Light Rail Transit?

Light rail transit is used to provide high frequency rail transit service in more than 20 urban areas in the United States and Canada including Charlotte, Norfolk, Baltimore, Dallas, St. Louis, Minneapolis, Pittsburgh, Denver, Salt Lake City, San Diego, San Jose, Portland, and Ottawa.

Typical service characteristics of a light rail system include:

- Corridor Length: 5 – 20 miles
- Station Spacing: 0.25 – 2 miles
- Service Frequency:
  - 5 – 15 minutes during peak periods
  - 10 – 20 minutes during off-peak periods
- Typical Maximum Operating Speed: 55 mph
- Average Capacity: 125 (40-60 seated) per car

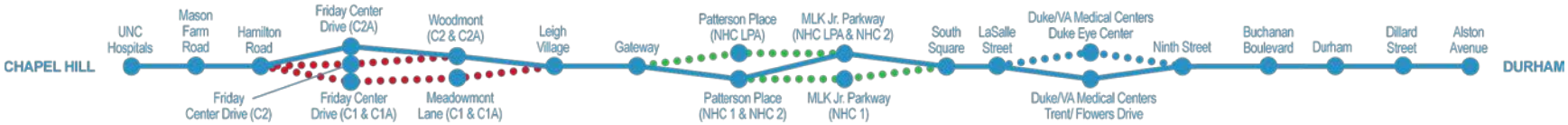
Light rail service can operate adjacent to regular vehicular traffic and can accommodate increases in ridership by adding more train cars, referred to as light rail vehicles (LRV). LRVs are electrically-powered vehicles and operate on their own tracks, in a dedicated right-of-way. They can navigate tight turns and accelerate and decelerate more quickly than vehicles such as Diesel Multiple Units and Amtrak trains, and are designed to serve corridors with narrow rights-of-way and frequent stops. LRVs are American with Disabilities Act (ADA)-compliant and can accommodate wheelchairs as well as bicycles and strollers.

Furthermore, a light rail system provides communities with:

- Consistent, reliable transportation, often accompanied with other service and capital improvements
- Increased development activity
- Access to economic opportunities for riders and communities
- Increased property values around stations
- Investments made in infrastructure around stations
- Jobs during construction and when operating and maintaining the light rail system

Why the D-O Corridor?

The D-O Corridor was identified as a high priority transit corridor as early as the 1990s due to the rapid growth in the corridor. The D-O Corridor includes the University of North Carolina at Chapel Hill (UNC), Duke University, downtown Durham, and North Carolina Central University. In 2006, the DCHC MPO and Capital Area Metropolitan Planning Organization (CAMPO) appointed stakeholders throughout the Triangle region to collaborate on restructuring the vision for a regional transit system. Public comments were accepted throughout the process and light rail transit was recommended from UNC to downtown Durham via Duke University Medical Center. The Town of Chapel Hill and City Durham identified the corridor for intense development, and they have been targeting development in the corridor for the past two decades.



Why a Light Rail System for the D-O Corridor?

Light rail was chosen for the D-O Corridor because this technology will:

- Connect residential, educational, and major employment centers throughout the corridor
- Serve the people in the D-O Corridor more cost-effectively in the long term than other transportation options
- Efficiently serve a corridor with some of the highest projected trips per acre in the Triangle region
- Support land use patterns that require closely spaced stops, best served by vehicles that are able to accelerate quickly
- Provide solid anchors needed to shape land use along this critical corridor
- Provide high-frequency rail service shown to support transit-oriented development (TOD)

What is the D-O LRT Project?

The proposed D-O LRT Project is a new light rail line roughly extending from southwest Chapel Hill to east Durham (**Figure ES-1**) and connecting educational, medical, employment, and other important activity centers, park-and-ride lots, transfer centers, the Durham Amtrak Station, and the Durham Station. Key elements of the proposed D-O LRT Project include:

- Approximately 17 miles of light rail service including 17 stations
- An electrically powered system that will run in a dedicated guideway
- Travel time between UNC Hospitals and Alston Avenue of approximately 42 minutes
- A 7-day per week operations schedule
  - Every 10 minutes during peak times
  - Every 20 minutes during off-peak times and on weekends

The primary purpose of the DEIS is to assist decision-makers and the public in assessing potential impacts associated with the implementation of the proposed D-O LRT Project. The DEIS documents the “purpose and need” for the project and presents a discussion of the alternatives considered for implementation. It addresses, in detail, the potential social, economic, environmental, and transportation related impacts of each of the project elements, and describes the recommended mitigation measures to offset the unavoidable impacts.

In accordance with federal regulations, full consideration of environmental effects as disclosed during the NEPA process is required before the D-O LRT Project can be advanced to final design, right-of-way (ROW) acquisition, equipment and facilities procurement, and system construction.

The DEIS sets forth the environmental effects, while a Final EIS (FEIS) and Record of Decision (ROD) from the FTA will be required for the proposed D-O LRT Project to advance to the subsequent engineering and construction stages. This DEIS will be made available and circulated for review for 45 days to interested parties, including members of the public, community groups, the business community, elected officials, and public agencies in accordance with federal and state requirements. At the conclusion of the 45-day public comment period, the FTA and Triangle Transit will consider all comments received about the DEIS, and will resolve the outstanding issues. The result of these decisions will be documented in the FEIS, which will also include responses to substantive comments received during the public circulation and review of the DEIS.

This Executive Summary provides an overview of the proposed D-O LRT Project and highlights the key findings from the DEIS.

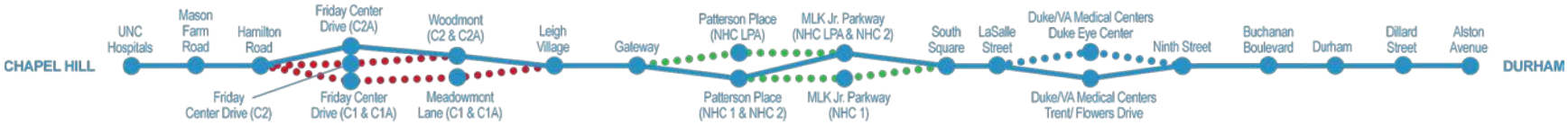
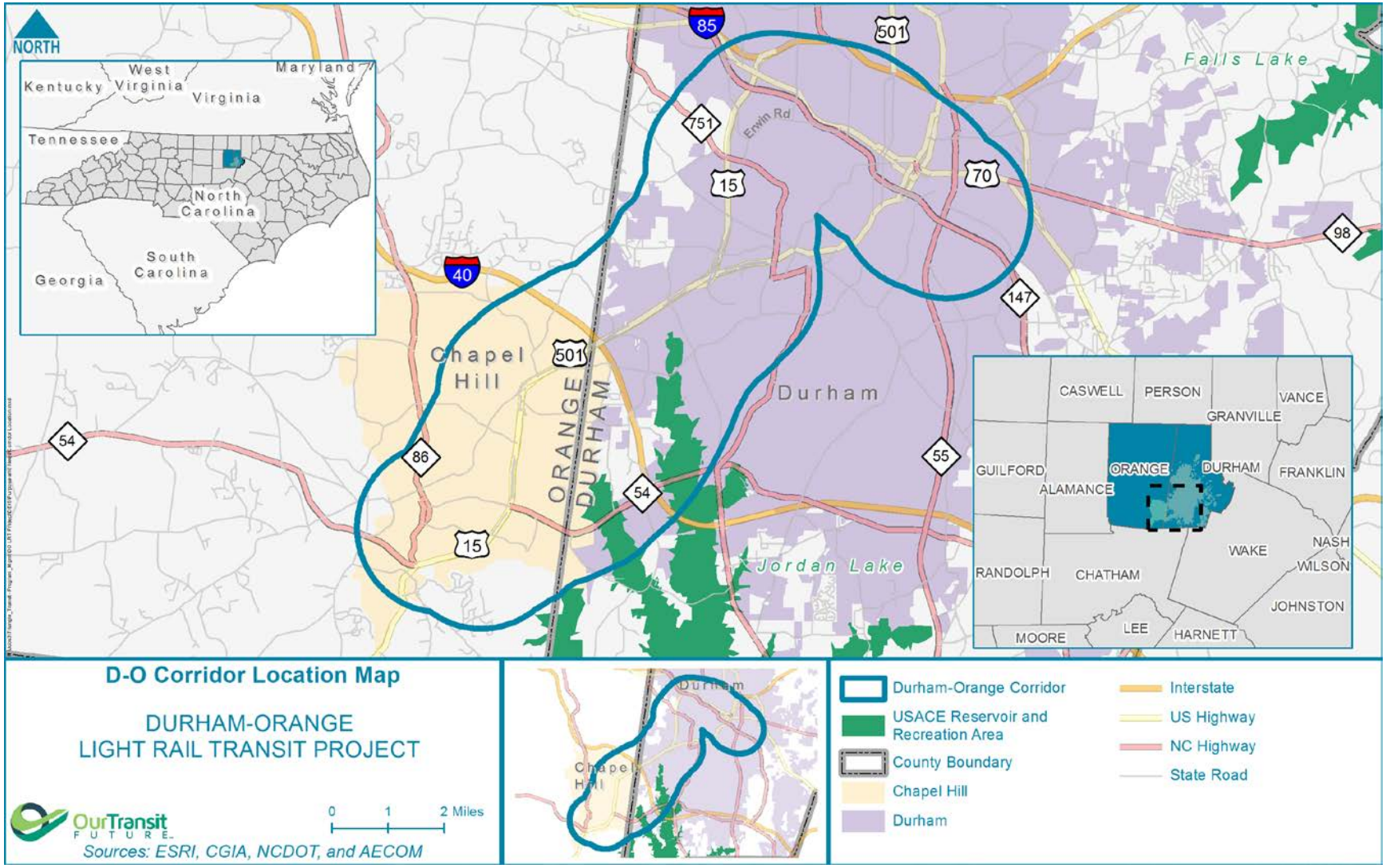
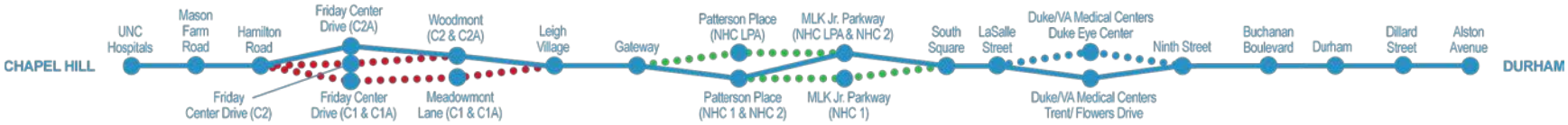


Figure ES-1: D-O Corridor Location Map





Why is the Project Needed?

The identification and documentation of the purpose and need for a proposed project are important components of environmental review under NEPA and certain other federal laws and regulations. The purpose and need statement of a project is a key factor in determining the range of alternatives considered in an EIS. The need describes the existing transportation problem and the purpose outlines the goals and objectives to address the need.

*The **purpose** of the proposed D-O LRT Project is to provide a high-capacity transit service within the D-O Corridor that improves mobility, increases connectivity through expanding transit options, and supports future development plans.*

*The **needs** for the proposed D-O LRT Project are:*

- *Improve mobility*
- *Increase connectivity*
- *Promote future development*

The Triangle region has experienced extraordinary growth in recent years. Growth forecasts show population in the region increasing by 80 percent between 2010 and 2040, from 1.6 to 2.9 million. Within the D-O Corridor, the population is projected to double and the highest expected travel intensity (number of trips per acre) in the

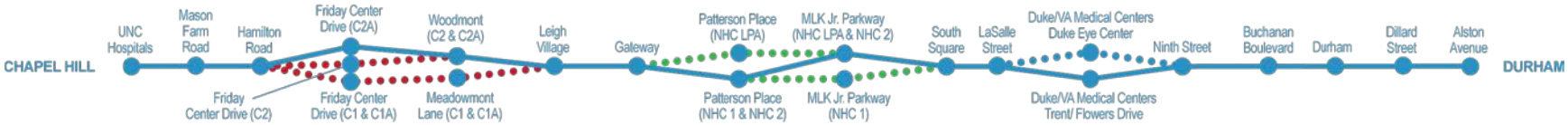
Triangle region is predominately located in this corridor. Even under current demands, the region's transportation system is beginning to strain. Levels of congestion are increasing and are anticipated to worsen, which will lead to increased travel times and

The **Research Triangle** is a region in the Piedmont of North Carolina anchored by the University of North Carolina at Chapel Hill (UNC), Duke University (Duke), North Carolina Central University (NCCU), North Carolina State University, and the municipalities of Chapel Hill, Durham, Cary, and Raleigh (the state capital).

the continuation of automobile-oriented development patterns. The region's explosive growth is also outpacing the ability to repair, replace and expand the existing roadway network. Considering financial and environmental issues, simply increasing highway capacity to meet these demands is no longer a viable option.

Furthermore, the region's existing transit network is currently operating at close to maximum capacity including 84 buses per hour servicing UNC Hospitals and 46 buses per hour servicing Duke University and Durham Veterans Affairs (VA) Medical Centers.

In order to maintain the high quality of life and attract new residents and businesses, the region needs a multi-modal transportation system, including improved high-quality transit service. The D-O Corridor needs a long term solution that provides accessible transit service, and a competitive and reliable alternative to congested roadways; that seamlessly serves many



popular destinations in Durham and Chapel Hill, and that fosters growth, compact development, and economic development along a high-capacity transportation network.

Triangle Region Growth

- D-O Corridor
  - ✓ 175,000 people (2005)
  - ✓ 231,000 people (2035)
- 3 Major Universities
- 3 Major Medical Centers
- Hub of innovation and entrepreneurship
- Abundant parks, cultural, culinary, artistic and historic resources

What Alternatives Were Considered for the D-O LRT Project?

The project alternatives evaluated in detail in the DEIS were derived from a lengthy planning process that began more than 20 years ago. A number of studies helped to advance planning for major transit investments in the area, including extensive coordination with stakeholders and members of the public to develop, evaluate, and refine a range of alternatives that support the project's purpose and need (**Figure ES-2**).

An Alternatives Analysis (AA) summarizes the purpose and need for a proposed fixed-guideway transportation project and communicates a locally preferred alternative (LPA) for three elements:

- Alignment within the corridor (where the project goes)
- Transit technology (e.g., traditional bus, bus rapid transit [BRT], Light rail, commuter rail)
- Station locations

In April 2012, Triangle Transit released the final AA report on the D-O Corridor. The alternatives evaluated included the No Build and several Build Alternatives, as well as a variety of alignments, station locations, and transit technologies, such as BRT and light rail. These alternatives were evaluated based on their ability to meet the project's Purpose and Need.

The AA identified the LPA, the most promising alternative for further analysis. The LPA distinguished light rail as the only technology that satisfied the project's Purpose and Need for premium transit service in the D-O Corridor by enhancing mobility, expanding transit options between Durham and Chapel Hill, serving populations with a high propensity for transit use, and fostering compact development and economic growth.

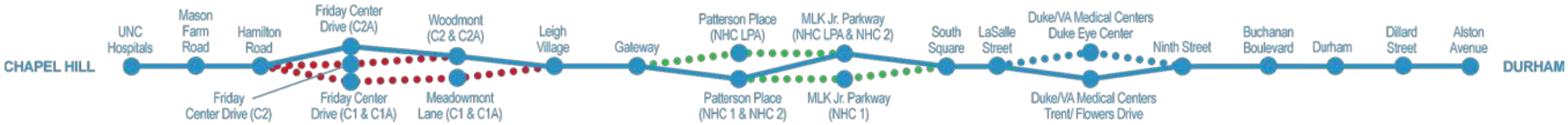
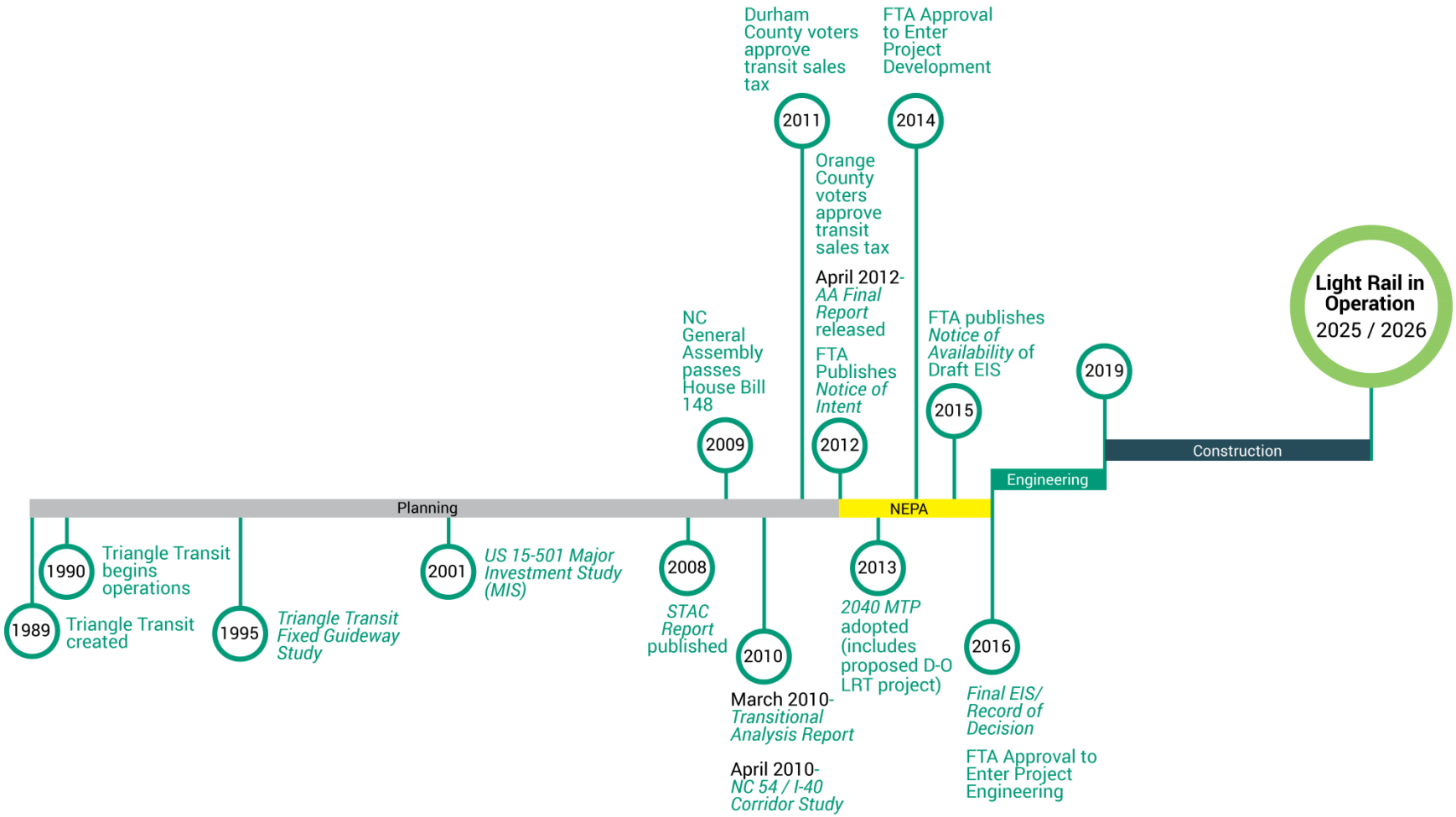
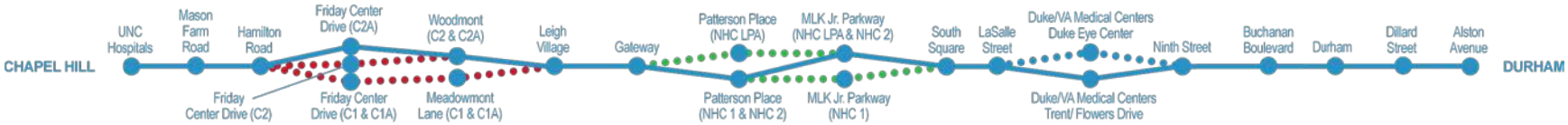


Figure ES-2: D-O Corridor History and Timeline



Source: Triangle Transit 2015.



What is the No Build Alternative?

The No Build Alternative includes the existing and planned transportation programs and projects scheduled to be built and implemented before forecast year 2040 and contained in the 2040 *Metropolitan Transportation Plan* (MTP), as adopted by the Durham-Chapel Hill-Carrboro (DCHC) Metropolitan Planning Organization (MPO), without the proposed rail transit improvements and related bus transit modifications. Stated another way, the No Build Alternative incorporates the roadway and other transportation improvements that are planned to exist in 2040. The No Build Alternative is used as the baseline against which the other alternatives are compared for the extent of environmental and community impacts.

What is Evaluated in the DEIS?

This DEIS for the proposed D-O LRT Project evaluates the No Build Alternative and Build Alternatives. The No Build Alternative serves as the basis of comparison for the Build Alternatives. These Build Alternatives include a NEPA Preferred Alternative and Project Element Alternatives.

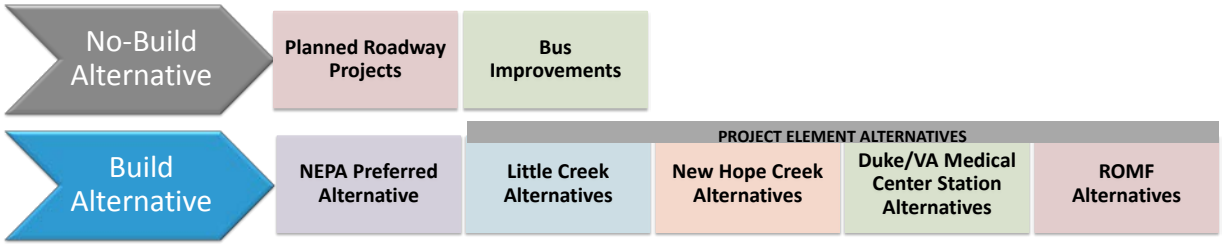
The majority of the proposed D-O LRT alignment and the alignment alternatives crossing New Hope Creek and Little Creek were identified during the AA process and subsequently refined during NEPA scoping in response to public and agency comments. As a result, the following alignments crossing Little Creek and New Hope Creek are evaluated in this DEIS one of each creek crossing is included in the NEPA Preferred Alternative.

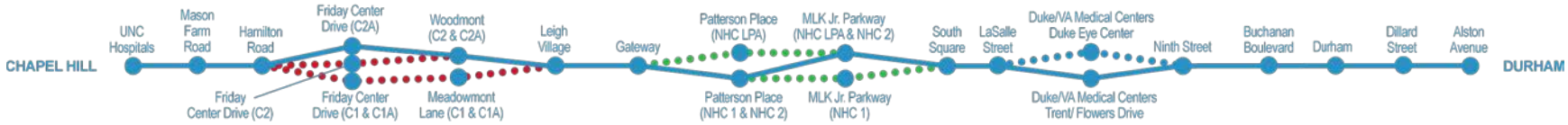
- Four potential crossings of Little Creek between Hamilton Road and the proposed Leigh Village Station (Alternatives C1, C1A, C2, and C2A)
- Three potential crossings of New Hope Creek and Sandy Creek between Patterson Place and South Square (Alternatives NHC LPA, NHC 1, and NHC 2)

In addition, station alternative locations are being studied for the Duke/VA Medical Centers Station: Duke Eye Center and Trent/Flowers Drive. One station alternative location is included in the NEPA Preferred Alternative.

Also, to serve the proposed project, five alternative locations are under study for the ROMF. One ROMF alternative location is included in the NEPA Preferred Alternative.

Alternative	Description
No Build Alternative	Basis of comparison for the Build Alternatives
Build Alternatives:	
NEPA Preferred Alternative	Alternative recommended by the DEIS
Project Element Alternatives	Alternatives studied in detail but not recommended





What is the NEPA Preferred Alternative?

In accordance with recent federal laws and regulations, the DEIS for the proposed D-O LRT Project identifies the NEPA Preferred Alternative.

The NEPA Preferred Alternative would generally follow NC 54, I-40, US 15-501, and the North Carolina Railroad (NCRR) Corridor into downtown Durham and east Durham, as shown on **Figure ES-3**. The alignment would begin at UNC Hospitals, parallel Fordham Boulevard, proceed east along NC 54, travel north along I-40, parallel US 15-501 before turning east toward the Duke University campus along Erwin Road, and then follow the NCRR Corridor parallel to NC 147 through downtown Durham, before reaching its eastern terminus near Alston Avenue. The alignment would consist of at-grade alignment, fill and cut sections, and elevated structures.

In two sections of the proposed D-O LRT Project alignment – the crossing of Little Creek and New Hope Creek – multiple alignments were evaluated in this DEIS. These Project Element Alternatives are discussed in chapter 2.

The **NEPA Preferred Alternative** includes:

- the **C2A Alternative** in the Little Creek section of the alignment
- the **NHC 2 Alternative** in the New Hope Creek section of the alignment
- the **Trent/Flowers Station Alternative** location for the Duke/VA Medical Centers Station
- the **Farrington Road ROMF Alternative** site

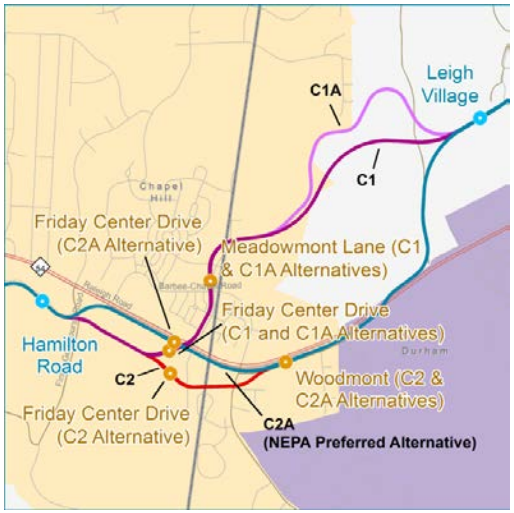
Further details of the NEPA Preferred Alternative are provided by alignment segment in the sections that follow.

UNC Hospitals to Hamilton Road

The alignment would begin in Chapel Hill at the proposed UNC Hospitals Station on the southern portion of the UNC campus, near the UNC Dogwood Parking Deck, southwest of the intersection of East Drive/Jackson Circle and Mason Farm Road. The alignment would continue through Odum Village to Mason Farm Road, where a station is proposed. It would parallel Mason Farm Road and the west side of Fordham Boulevard (US 15-501) on aerial structure and cross to the east side of Fordham Boulevard near Old Mason Farm Road. The alignment would turn east and stay on the south side of Raleigh Road (NC 54), and follow the edge of the Finley Golf Course to Prestwick Road, where the Hamilton Road Station is proposed.

Hamilton Road to Leigh Village

The NEPA Preferred Alternative includes C2A Alternative for this segment.



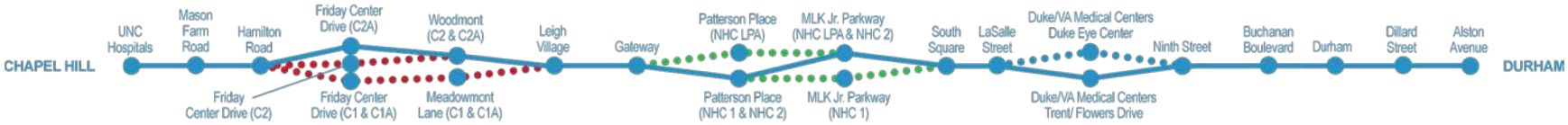
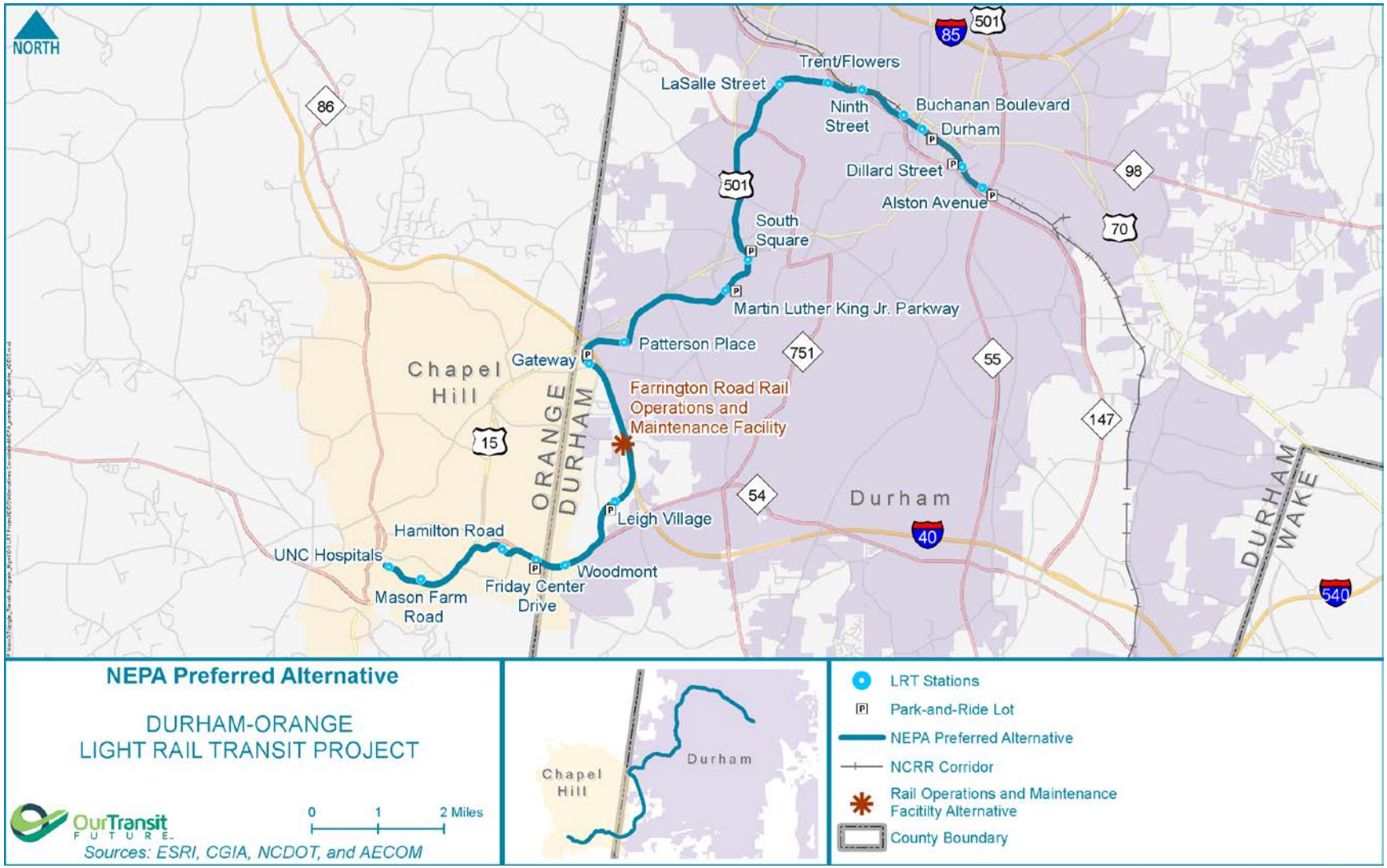
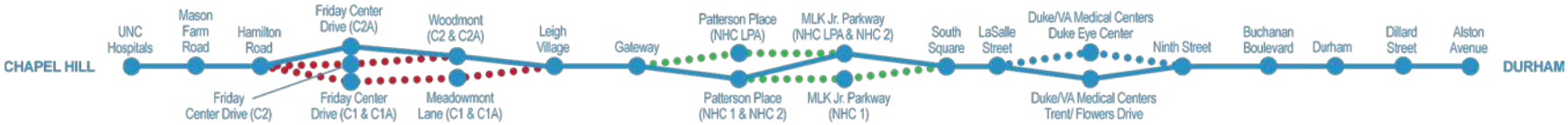


Figure ES-3: NEPA Preferred Alternative





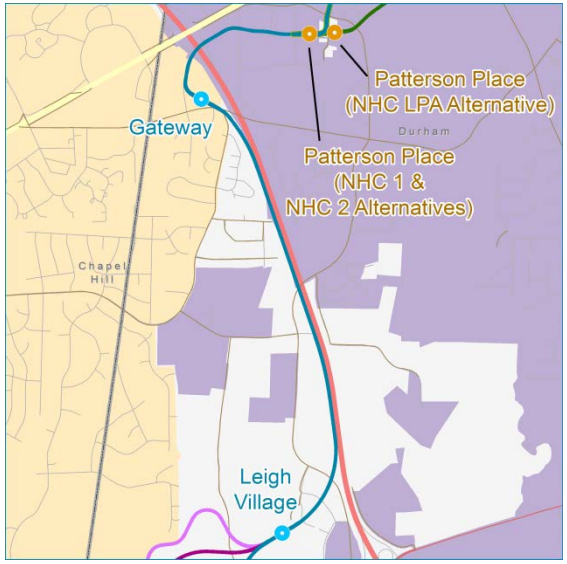
Little Creek Alternative C2A

The alignment would follow Prestwick Road until crossing Finley Golf Course Road. It then would turn slightly north and continue along the south side of NC 54 in NCDOT right-of-way (ROW) to the proposed Friday Center Drive Station, west of Friday Center Drive. It then would continue in the NC 54 ROW to the proposed Woodmont Station east of Barbee Chapel Road.

The alignment would cross Littlejohn Road and Downing Creek Parkway, and then cross over to the north side of NC 54 on an elevated structure to George King Road.

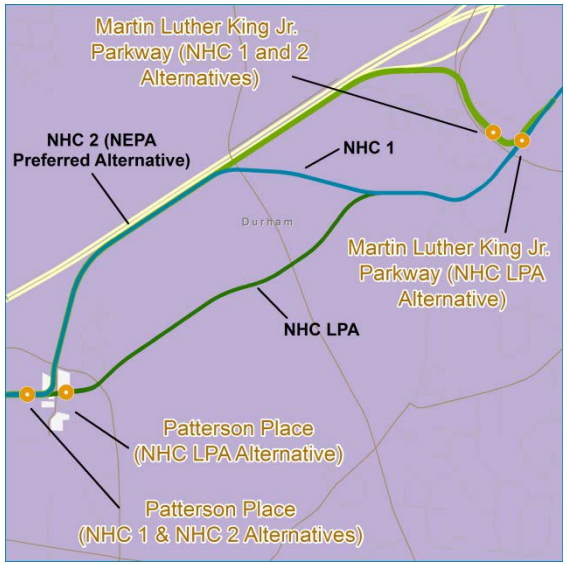
The alignment would travel through USACE property and a low density residential development to the proposed Leigh Village Station.

Leigh Village to Patterson Place



From the proposed Leigh Village Station, the alignment would travel north along the west side of I-40 within the Interstate ROW to the proposed Gateway Station near Old Chapel Hill Road and Pope Road. The alignment would turn east to cross over I-40 on an elevated structure and follow McFarland Drive through the Patterson Place development. The location of the Patterson Place Station would depend on the alignment in the next segment.

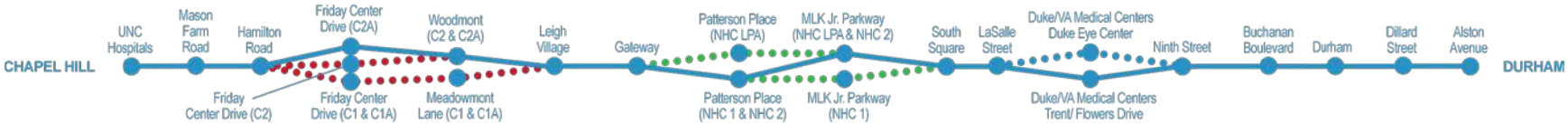
Patterson Place to Martin Luther King Jr. Parkway



Between Patterson Place and Martin Luther King Jr. Parkway, the NEPA Preferred Alternative includes NHC 2.

New Hope Creek Alternative NHC 2

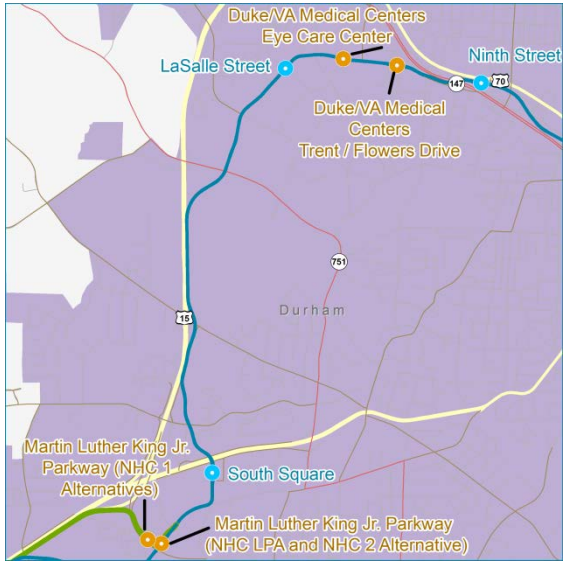
A station is proposed at Patterson Place east of Witherspoon Boulevard. East of the proposed station, the alignment would turn north toward Southwest Durham Drive at Sayward Drive and continue adjacent to US 15-501 on aerial structure across New Hope Creek. At Garrett Road, the elevated alignment would turn east and continue on



an elevated structure to a commercial area and over Sandy Creek before returning to ground level. The alignment would then follow the property line between Springfield Apartments and Laurel Trace Apartments, and then transition to the median of University Drive at Ivy Creek Boulevard. A station is proposed in the median of University Drive east of Martin Luther King Jr. Parkway.

Martin Luther King Jr. Parkway to Ninth Street

The alignment continues in the median of University Drive before crossing through its intersection with Shannon Road. As the ground drops off, the alignment transitions to a bridge over US 15-501 Business with a proposed aerial station, South Square. The alignment comes back to grade south of Pickett Road. The alignment follows US 15-501 at-grade until crossing over Cornwallis Road and returning to ground level. The alignment would continue to follow US 15-501 and Duke Forest until turning east at Cameron Boulevard and transitioning into the median of Erwin Road. A station is proposed at LaSalle Street. The alignment would continue along the median of Erwin Road to Anderson Street where it would transition to the north side of Erwin Road before crossing over NC 147.

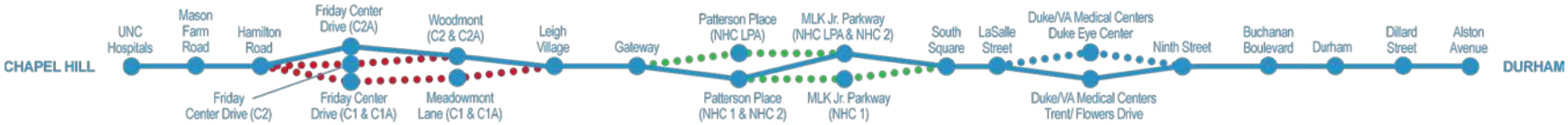


Trent/Flowers Drive

The proposed Duke/VA Medical Centers Station included in the NEPA Preferred Alternative is located in the median of Erwin Road between Trent Drive and Flowers Drive.

Ninth Street to Alston Avenue

After crossing over NC 147, the alignment parallels the NCRR Corridor on the south side of the railroad corridor, west of Ninth Street where an elevated station on retained fill is proposed. The alignment would continue east in a combination of aerial and at-grade conditions, diverting away from the NCRR Corridor where practicable and remaining at least 40 feet away from the nearest future railroad track and 55 feet south of the existing railroad track as identified by NCRR. The end-of-the-line station would be located just west of Alston Avenue. Additional stations in this segment are proposed east of Buchanan Boulevard, east of Chapel Hill Street (Durham Station), and east of Dillard Street.



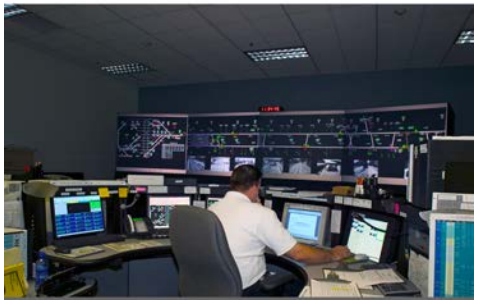
ROMF Alternative Sites

Only one ROMF would be built for the proposed project, selected from the NEPA Preferred and Project Element Alternatives. The ROMF is an integral part of the proposed D-O LRT Project and would include office space, conference rooms, and areas to store, service, and maintain 17 LRVs with the capacity for up to 26 LRVs without needing to expand the facility. The ROMF would also hold equipment needed to maintain the stations and trackway. The facility would operate 24 hours per day, 7 days per week and accommodate staff that report for work at the facility, such as train operators and mechanics.

The ROMF site included with the NEPA Preferred Alternative is the Farrington Road ROMF.

Project Element Alternative ROMF site locations include:

- Leigh Village ROMF Alternative
- Patterson Place ROMF Alternative
- Alston Avenue ROMF Alternative
- Cornwallis Road ROMF Alternative



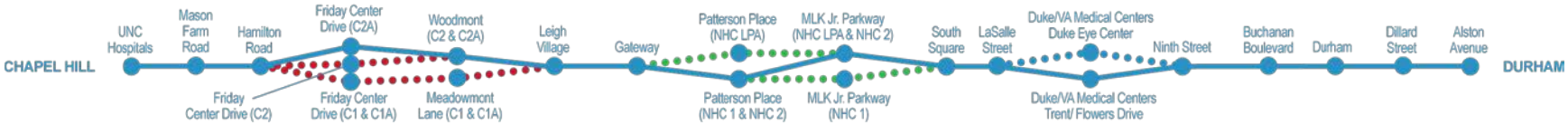
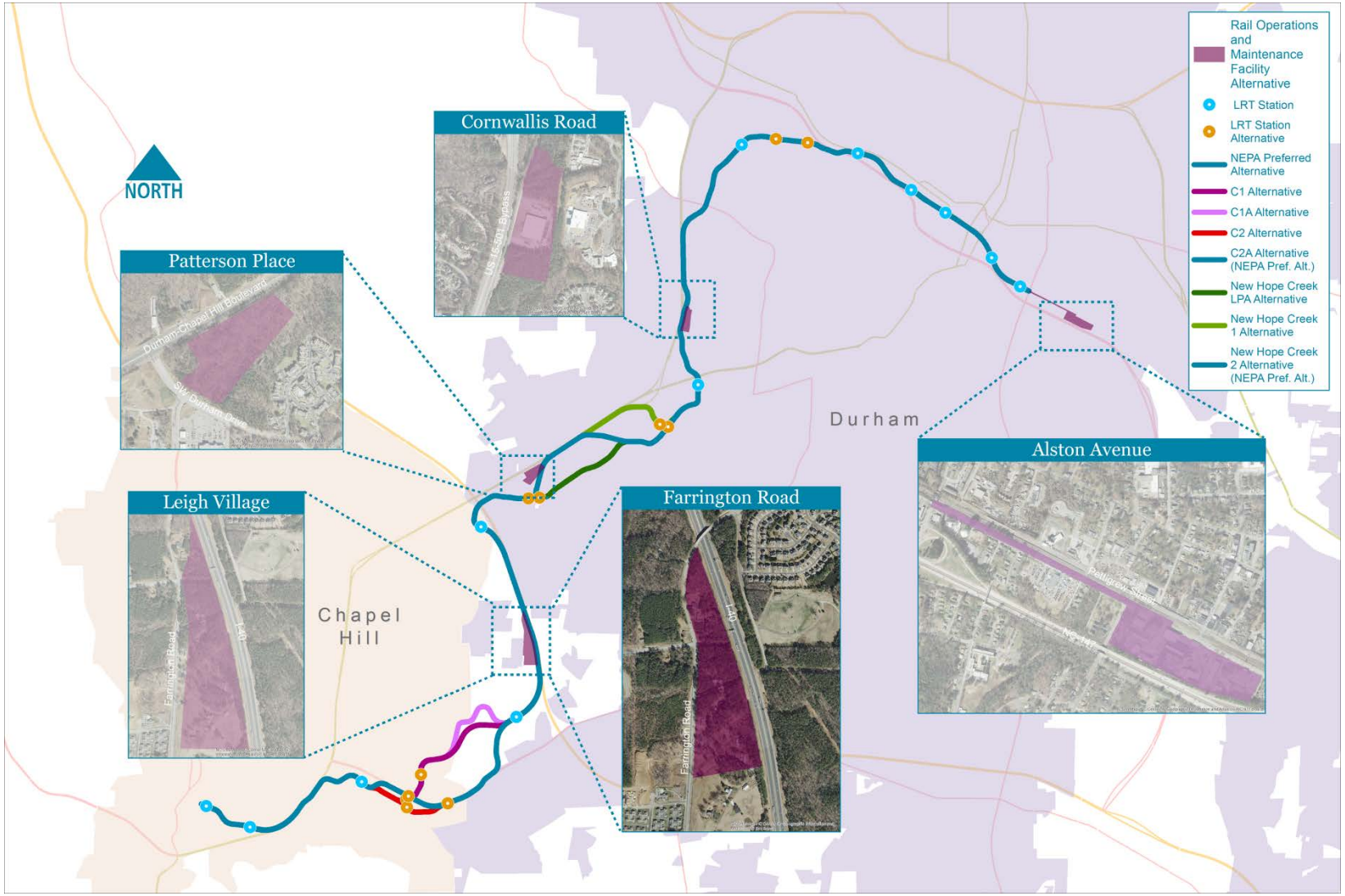
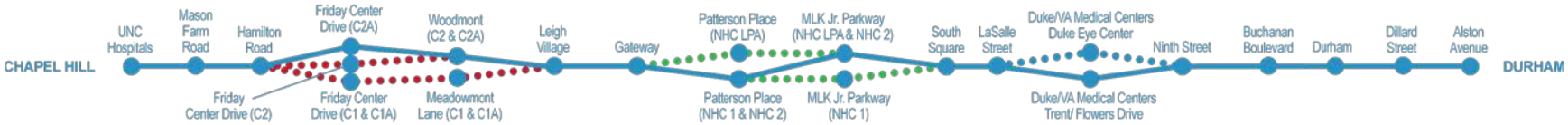


Figure ES-4: Rail Operations and Maintenance Facility (ROMF) Alternative Sites

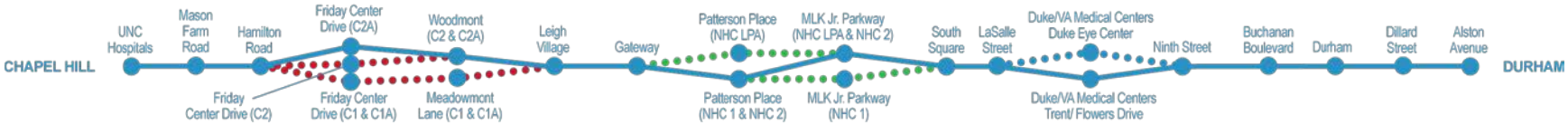




How is the DEIS Organized?

This DEIS has been organized into nine chapters:

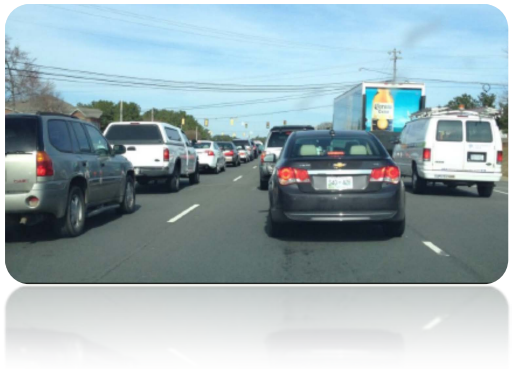
- **Chapter 1: Purpose and Need** describes the background, purpose, and need for transportation improvements within the D-O Corridor. In order to address the transportation challenge faced by the region, and more specifically, within the D-O Corridor, and to cultivate a more sustainable cycle of growth for the future, a high-capacity transportation infrastructure solution is required. This transportation solution must address the needs of the D-O Corridor: enhancing mobility, increasing connectivity through expanding transit options, serving major activity and employment centers, and increasing transit operating efficiency. This solution must also support local land use plans that call for compact development to manage and channel future growth along the transportation corridors that can sustainably support growth, promote economic development, and preserve the region's high quality of life.
- **Chapter 2: Alternatives Considered** describes the alternatives considered during the planning process, including the alternatives considered and evaluated in the DEIS. This DEIS considers a No-Build Alternative, a NEPA Preferred Alternative, and several Project Element Alternatives.
The footer of this DEIS document is a representation of the NEPA Preferred and the Project Element Alternatives considered in the document. The color schema presented in the graphic is carried through the figures presented in this DEIS. The blue line represents the NEPA Preferred Alternative. The Little Creek Project Element Alternatives (C1, C1A, C2) are represented with a red dashed line. The New Hope Creek Project Element Alternatives (NHC LPA, NHC 1) are represented with a green dashed line. In the areas where the alignment alternatives are presented, station locations will differ from the NEPA Preferred Alternative.
- **Chapter 3: Transportation** describes the projected transportation impacts of the No Build and NEPA Preferred and Project Element Alternatives. The evaluation is based upon projected travel demand, transportation capacity, transportation performance measures, and impacts to the roadway network, parking, freight delivery, and pedestrian and bicycle network. The analysis was developed from travel demand forecasts for the project corridor using the Regional Travel Demand Model and reviewing transportation plans.
- **Chapter 4: Affected Environment and Environmental Consequences** summarizes the affected environment and environmental consequences within the D-O LRT study areas. This represents both the existing environmental conditions in the study area prior to construction of the NEPA Preferred Alternative and environmental impacts associated with the construction of the NEPA Preferred and Project Element Alternatives.
- **Chapter 5: Environmental Justice** assesses the potential impacts to minority and low income populations along the proposed D-O LRT Project alignment. The purpose is to ensure that these populations do not incur disproportionately high and adverse impacts as a result of the proposed D-O LRT Project. This analysis is in accordance with E.O. 12898, U.S. Department of Transportation (DOT) Order 5610.2(a), and FTA Circular 4703.1 (effective date August 15, 2012).
- **Chapter 6: Draft Section 4(f) Evaluation** analyzes the proposed D-O LRT Project pursuant to Section 4(f) of the of the Department of Transportation Act of 1966, which protects publicly-owned parks, recreation areas, wildlife or waterfowl refuges, or any historic sites of national, state, or local significance.



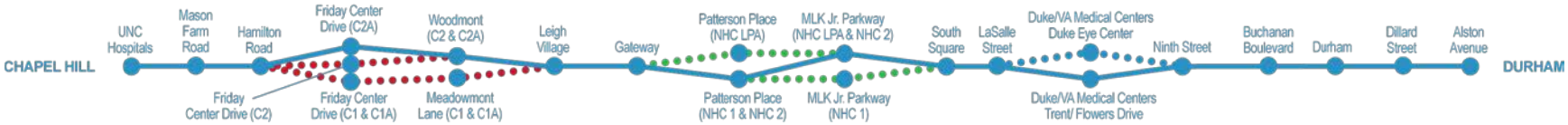
This chapter describes the potential uses of those resources and whether such use is permanent, temporary, or constructive use; if a property is used, the potential impacts are also considered.

- **Chapter 7: Project Costs** describes the costs associated with the D-O LRT Project, including both the capital costs and ongoing operations and maintenance costs.
- **Chapter 8: Evaluation of Alternatives** presents a summary comparison of the alternatives in the D-O LRT Project DEIS/Draft Section 4(f) Evaluation. The intent of this evaluation is to demonstrate the relative effectiveness of the NEPA Preferred Alternative and Project Element Alternatives compared with the No Build Alternative in meeting the project's Purpose and Need statement.
- **Chapter 9: Public Involvement and Agency Coordination** documents the dialogue between Triangle Transit, interested residents, stakeholders, and government agencies regarding issues raised by the proposed D-O LRT Project. It also summarizes public and stakeholder involvement during the Alternatives Analysis, NEPA Scoping, and Project Development phase through the publication of the DEIS.

How will the D-O LRT Project Affect Local Traffic?



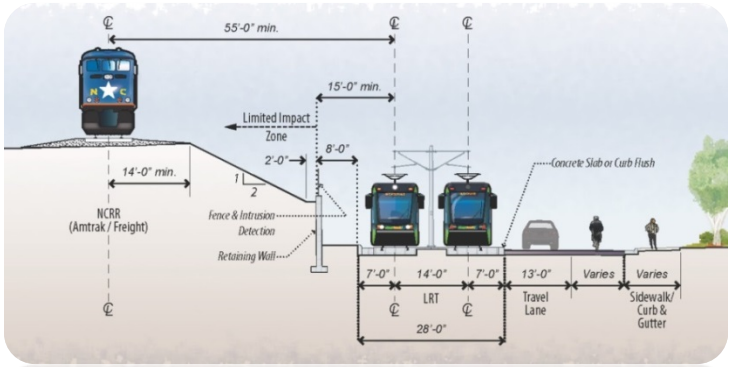
Continued population and employment growth in the region, particularly in the D-O Corridor, is straining the already congested roadway network including I-40, US 15-501, NC 54, NC 147, and Erwin Road. This has resulted in increased travel times and reduced reliability of the transportation system between Chapel Hill and east Durham. These roadways provide access for residents, students, visitors, and the workforce travelling to the major activity and employment centers within the corridor. The existing built and natural environments limit the ability to widen the roadways to accommodate additional travel lanes, which could meet the increasing mobility needs as the population continues to grow. If left unmanaged, this rapid growth would not only continue to constrain corridor mobility, but also result in sprawling development



patterns, leading to the reduction of open space and farmlands. Local land use plans call for focused compact development to manage future growth and reduce the likelihood of sprawl. To support the high quality of life and economic development goals within these plans, an alternative transportation infrastructure solution is necessary.

A summary of the benefits and impacts to each of the transportation resource areas within the D-O Corridor as a result of the proposed D-O LRT Project is included below:

- **Public Transportation**: The proposed D-O LRT Project is projected to serve approximately 20,000 to 25,000 average weekday riders on the system in 2040. Travel time reliability would be improved with the proposed project, as compared to existing bus service.
- **Roadways**: Implementation of the D-O LRT Project would result in minor roadway impacts as the proposed LRT alignment would be built adjacent to or within the roadway right-of-way in some locations. These impacts would generally occur around stations or at-grade crossings, and be mitigated by modifications to the roadway network.
- **Parking**: Approximately 705 parking spaces would be lost due to the proposed D-O LRT Project. Approximately 160 replacement parking spaces would be provided, resulting in a net loss of 545 spaces along the alignment due to the project. Triangle Transit would provide approximately 5,100 additional spaces at park-and-ride locations as part of the project.
- **Freight and Passenger Railroads**: The D-O LRT Project would have no direct impacts to mainline railroad tracks, passenger rail service, and freight service passing through the D-O Corridor.
- **Pedestrian and Bicycle Facilities**: Triangle Transit will work with the Town of Chapel Hill, City of Durham, NCDOT, and local advocates to identify the potential for off-street facilities or on-street facilities on parallel or nearby roadways. Pedestrian crossings of light rail tracks will be designed in accordance with current ADA design requirements to ensure access and mobility for all users. New pedestrian and bicycle infrastructure would be installed in station areas to augment the existing network. Station areas would be designed according to best management practices for bicycle and pedestrian safety. Measures would be taken to discourage pedestrians from crossing the tracks outside of designated track crossings and to enhance safety at permitted crossing locations.



What are the Anticipated Environmental Impacts of the D-O LRT Project?

Potential adverse and beneficial environmental impacts associated with the D-O LRT Project are summarized in **Table ES-1**. Specific mitigation measures in response to anticipated impacts are also identified. DEIS chapter 8 provides a detailed comparison of the No Build and NEPA Preferred and Project Element Alternatives.

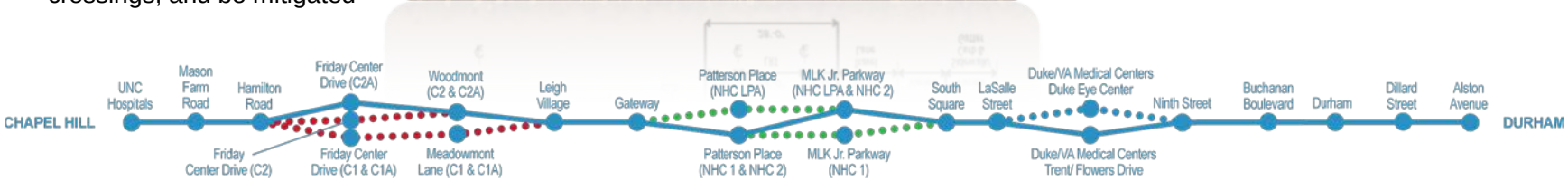


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Public Transportation *Section 3.1*	• 23,020 average weekday light rail boardings in 2040	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • The D-O LRT Project would result in increased access to transit. As a result, mitigation measures are not warranted.
Roadways *Section 3.2*	• Traffic impacts at 5 intersections	• NHC 1 Alternative would result in one less adversely impacted intersection	*NEPA Preferred and Project Element Alternatives Mitigation* • Substantial modifications to the roadway are incorporated into the design including additional turn bays and restriping of intersection approaches to accommodate additional receiving lanes.
Parking *Section 3.3*	• 705 parking spaces removed	• Little Creek Alternatives and NHC 1 Alternative would remove more parking spaces • NHC LPA Alternative would remove fewer parking spaces • Duke Eye Center Station Alternative would remove more parking spaces	*NEPA Preferred Alternative Mitigation* • Replacement parking spaces would be provided *Project Element Alternatives Mitigation* • Replacement parking spaces would be provided for the Little Creek Alternatives and Duke Eye Center Station Alternative
Freight and Passenger Railroads *Section 3.4*	• No direct impacts on the daily rail operations for freight or passenger rail service	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Mitigation would not be warranted for the implementation of the D-O LRT Project; however, coordination with NCRR and NCDOT Rail Division will continue through design and construction for use of the NCRR right-of-way.
Airports *Section 3.5*	• No direct impacts to airport-owned property, portions would be located within the 5 mile protection zone	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • All required mitigation measures will be coordinated with the FAA throughout the design and construction phases of the project.

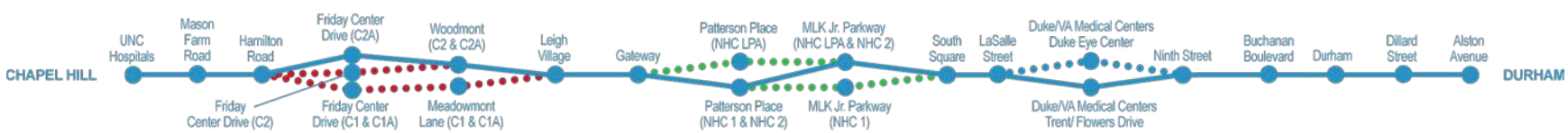


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Pedestrian and Bicycle Facilities *Section 3.6*	• Improvements including bicycle amenities at stations, reconstructed and enhanced sidewalks and crosswalks • Would result in 80 pedestrian and bicycle facility at-grade crossings, bicycle lanes on some roads would not be accommodated	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Impacted sidewalks, crosswalks, curb ramps, and other pedestrian infrastructure would be rebuilt or enhanced • Pedestrian crossings of light rail tracks would be designed in accordance with ADA requirements and standards • Reconstruction options including locating facilities on parallel roadways would be considered for unavoidable impacts • During Engineering, Triangle Transit will work with the City of Durham, Town of Chapel Hill and NCDOT, as well as, the Durham Bicycle and Pedestrian Advisory Commission, and Chapel Hill Transportation and Connectivity Board, and representatives from the Alston Avenue neighborhood to identify ways to improve pedestrian and bicycle connections to stations.
Land Use and Zoning *Section 4.1*	• No impacts anticipated: consistent with Local Planning Efforts. The D-O LRT Project would result in a conversion of lower density land uses to higher density and mixed-use land uses.	• NHC LPA Alternative would be more consistent with transportation plans, but less consistent with plans to protect bottomlands in the area	*NEPA Preferred and Project Element Alternatives Mitigation* • Impacts are considered beneficial and as such, no mitigation would be required.

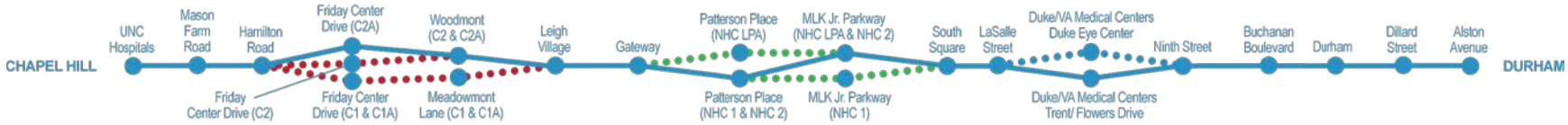


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Socioeconomic and Demographic Conditions *Section 4.2*	• No adverse impacts anticipated: expected to concentrate population, households, and employment around LRT stations • The tax revenue losses due to property acquisitions because of the D-O LRT Project would be minimal in comparison to the overall tax base and anticipated longer-term development would help replenish the tax revenue. • Increased mobility, improved access and mobility for transit-dependent populations	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • These impacts are considered beneficial and as such, no mitigation would be required. • Mitigation efforts would include the identification and promotion of redevelopment, infill, and economic development opportunities by the affected areas.

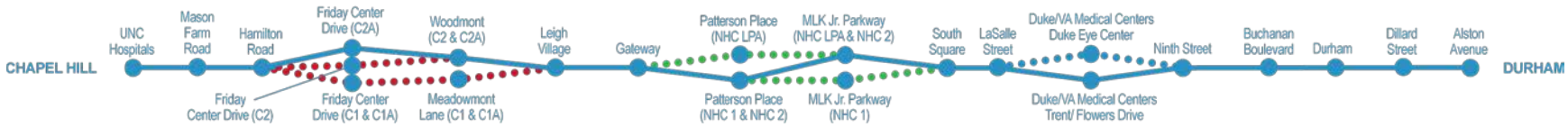


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Neighborhoods and Community Resources *Section 4.3*	• Impacts to access and mobility and community resources in some places • Improves mobility and access for communities and to community facilities	• C2 and New Hope Creek Alternatives would result in no impacts. • The Duke Eye Center Station Alternative would impact community resources • The use of the Levine Jewish Community Center campus facilities and community cohesion may be affected by the presence of the Cornwallis Road ROMF.	*NEPA Preferred Alternative Mitigation* • Protective fencing along the alignment to ensure safety at Glenwood Elementary School • Impacts to the Patterson's Mill Country Store and surrounding residential development by the Farrington Road ROMF will be mitigated through landscaping, vegetative screening, and modifying access to the store. • New roadway constructed between Larchmont Road and Snow Crest Trail to maintain connectivity • Due to the widening of Erwin Road proposed as part of the project, care will be taken to provide safe and convenient pedestrian access across the corridor. • Coordination with Duke University to ensure that services provided at the John Hope Franklin Center are relocated and maintained • At the John Avery Boys and Girls Club, maintain or replace existing fence along the field and playground and improve recreational facilities • Implement and enforce parking management policies at park and ride locations • *Temporary Mitigation*: Coordination with Chapel Hill-Carrboro City Schools and Durham Public Schools to identify detours for impacted school bus routes *Project Element Alternatives Mitigation* • C1 and C1A Alts – pedestrian connectivity to The Cedars maintained including a marked crosswalk, displaced residences relocated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 • Duke Eye Center Station Alternative – same mitigation for the John Hope Franklin Center as the NEPA Preferred Alternative

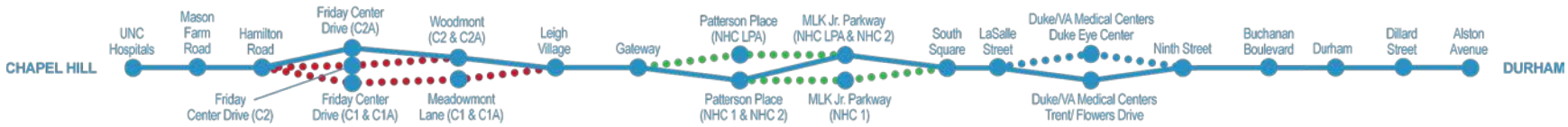


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Visual and Aesthetic Conditions *Section 4.4*	• Visual impacts range from Low to Moderate-High	• C1 and C1A Alternatives would have high visual impacts	*NEPA Preferred and Project Element Alternatives Mitigation* • Using interdisciplinary design teams to create aesthetic guidelines and standards in the design of project elements • Integrating facilities with area redevelopment plans • Planting appropriate vegetation in and adjoining the project right-of-way • Replanting remainder parcels • Using source shielding in exterior lighting at stations and auxiliary facilities • Art-in-Transit opportunities • Providing landscaping and aesthetic treatments when in close proximity to residences with aerial structures
Cultural, Historic, and Archaeological Resources *Section 4.5*	• Preliminary determination of no adverse effects • Indirect impacts to 13 of 25 architectural historic properties within APE • FTA will make a final determination of effects regarding archaeological resources once the alignment has been further defined.	• Little Creek, New Hope Creek, and Duke Eye Center Alternatives would have no effect on architectural historic properties	*NEPA Preferred and Project Element Alternatives Mitigation* • Design commitments for visual screening for properties in rural and residential settings Note: The *Section 106 Assessment of Effects for Historic Properties for Durham-Orange Light Rail Project* will be posted separately for public comment. Triangle Transit will provide notification of the availability of this report for review via the project website, local newspapers, and through the project's email contact list.

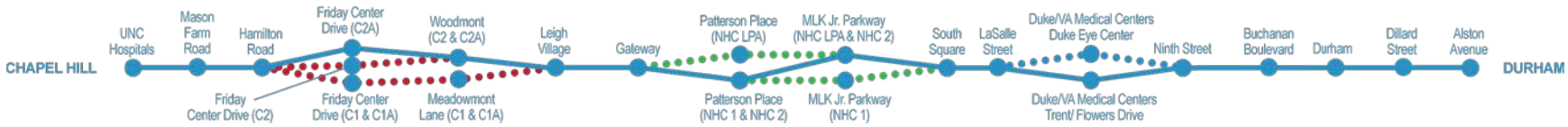


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Parklands and Recreational Areas *Section 4.6*	• Direct impacts to 6 parks (13.4 acres), elevated crossings of an open space resource and trails	• Little Creek Alternatives would result in additional acres of parkland impacts. • The Little Creek and NHC LPA Alternatives would result in additional elevated crossings of trails.	*NEPA Preferred Alternative Mitigation* • Triangle Transit will provide financial compensation for purchase and development of replacement park property of at least equivalent value with the property acquired, or, where appropriate, enhancement of the existing facility to compensate for impacts. • UNC Finley Golf Course: One golf hole will be redesigned • UNC Cross Country Trails: Pedestrian underpass would be installed and the trails realigned to maintain connectivity in a manner consistent with existing conditions • Jordan Game Lands (USACE Property): Replace reservoir water storage, compensate for the loss of marketable timber, relocate roads and signage, and construct a public access parking area *Project Element Alternatives Mitigation* • UNC Finley Golf Course: Two golf holes will be redesigned in the Little Creek Alternatives • New Hope Creek Trail and New Hope Preserve Trail: Elevated track barriers will be incorporated into the project in order to mitigate the moderate noise impacts predicted at these resources for the NHC LPA Project Element Alternative.

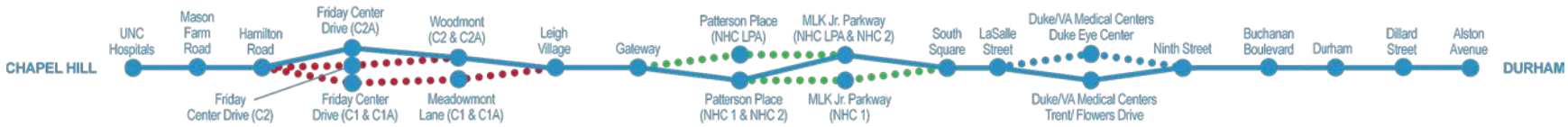


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Natural Resources *Section 4.7*	• Approximately 316 acres of habitat would be impacted • No significant adverse impacts to terrestrial or aquatic wildlife anticipated • No significant impacts to federal or state-listed threatened or endangered species anticipated • No impacts to farmland	• Little Creek and New Hope Creek Alternatives would impact more acres of habitat	*NEPA Preferred and Project Element Alternatives Mitigation* • Avoidance of bisecting floodplain and bottomland habitat degrading the quality and relatively intact character of the natural heritage corridor • Avoidance and minimization of impacts by consideration of alternative alignments, placement of piers outside of wetlands and streams to the greatest extent possible, use of bottomless culverts, and top-down construction techniques • Compensatory mitigation measures will be developed in consultation with the USACE and DWR during the Section 404/401 permitting process • If construction is to take place during nesting season for migratory birds, a nesting survey will be conducted prior to construction • Mitigation measures, if required, will be developed in consultation with the NCWRC and NCDA for wildlife, habitat, and threatened and endangered species pending review of the Natural Resources Technical Report. • Mitigation measures are not required by the USFWS based on a determination of no effect
Water Resources *Section 4.8*	• No groundwater impacts anticipated	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Avoidance and minimization of impacts by consideration of alternative alignments, placement of piers outside of wetlands and streams to the greatest extent possible, use of bottomless culverts, and top-down construction techniques • Compensatory mitigation measures will be developed in consultation with the USACE and DWR during the Section 404/401 permitting process • Each station location and park-and-ride facility would implement BMPs for the collection and treatment of
	• Impacts to 3,413 linear feet (0.438 acre) of streams	• No substantial variation	
	• Impacts to 0.558 acre of wetlands	• C1, C1A, C2, and NHC 1 Alternatives would impact fewer acres of wetlands	
	• Impacts to 216,455 square feet (4.97 acres) of Riparian Buffer Zone 1	• No substantial variation	

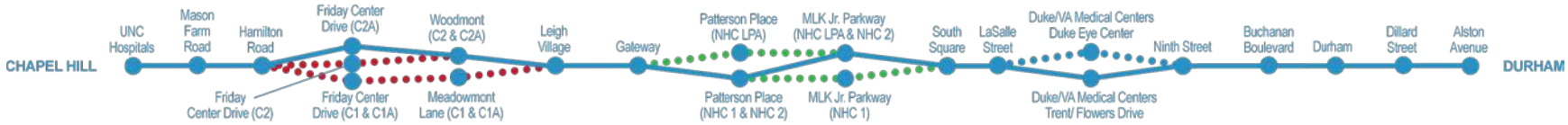


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
	• Impacts to 178,517 square feet (4.10 acres) of Riparian Buffer Zone 2	• C1, C2, and NHC 1 Alternatives would impact fewer acres of Riparian Buffer Zone 2 • C1A and NHC LPA Alternatives would impact more acres	stormwater runoff. Mitigation measures for increases in 100-year flood elevation greater than 0.1 feet would be implemented, pending hydraulic studies *Temporary Mitigation*: The North Carolina *Erosion and Sediment Control Planning and Design Manual* (1988 – updated June 2006) and the NCDOT design specifications will be used to minimize the impacts to land and water resources
	• Impacts to 0.005 acre of open water/ponds	• Little Creek Alternatives would impact more acres of open water/ponds	
	• Impacts to 6.420 acres of 100-Year Floodplain	• C1, NHC LPA, NHC 1 Alternatives would impact more acres of 100-Year Floodplain • C1A Alternative would impact fewer acres	
	• Impacts to 0.378 acre of 500-Year Floodplain	• New Hope Creek Alternatives would impact more acres of 500-Year Floodplain	
	• Impacts to 0.880 acre of Floodway	• NHC LPA Alternative would impact more acres of Floodway • the NHC 1 Alternative would impact fewer acres	
Air Quality *Section 4.9*	• No impacts anticipated: no violations of the 1-hour or 8-hour NAAQS for CO are expected	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Modeled concentrations for the worst intersections are well below the NAAQS requirements; therefore, mitigation measures are not warranted.

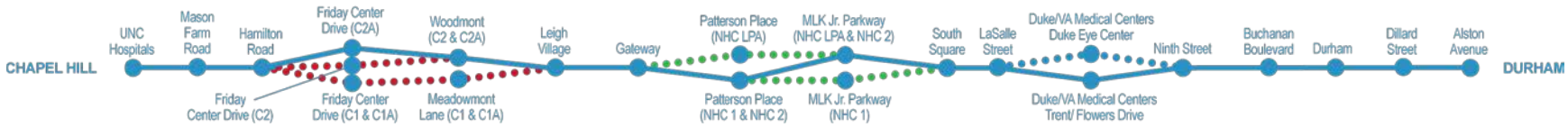


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Noise and Vibration *Section 4.10*	• One severe noise impact, 4 moderate noise impacts, 8 vibration impacts, and 13 ground-borne noise impacts	• Little Creek Alternatives would have more noise, vibration, and ground-borne noise impacts • NHC LPA Alternative would have more noise impacts, but the NHC LPA Alternative and NHC 1 Alternative would have fewer ground-borne noise impacts	*NEPA Preferred and Project Element Alternatives Mitigation* • In accordance with the FTA Guidance Manual, a detailed vibration analysis will be conducted during the Engineering phase to further evaluate geotechnical conditions and more precisely predict the vibration effects of the proposed light rail system on area receptors. • Noise mitigation measures include acquisition and elevated track barriers. Vibration mitigation measures consist of special track support systems, resilient fasteners, ballast mats, resiliently supported ties, and floating slabs.
Hazardous, Contaminated, and Regulated Materials *Section 4.11*	• 41 high risk sites, 83 medium risk sites within 500 feet of alternative	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Triangle Transit will perform a full Phase I or Phase II Environmental Site Assessment for high risk properties following ASTM standards prior to construction • Medium risk properties will have their closure status or current site status reviewed with NCDENR before starting construction *Temporary Mitigation*: • Preventive measures to minimize exposure of the public, community residents, and construction workers to hazardous materials • Construction waste will be disposed of at approved sites • Handling and storage of fuels and other materials will follow Occupational Safety and Health Administration, state, and local standards.

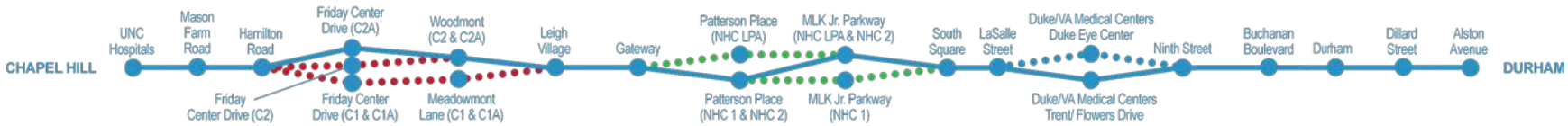


Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Safety and Security *Section 4.12*	• Minimal impacts anticipated: potential safety hazards at stations, light rail vehicles, park-and-ride facilities, impacts to police, security, and emergency service operations	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Strategies such as CPTED and the use of police, private security patrols, proper lighting, and security cameras would be employed as appropriate to make the light rail facilities and operations as safe and secure as possible. • Design considerations such as platform location and length, pedestrian crossings, and alignment design would be used to facilitate the safe operation of the light rail system. • Pedestrian and bicyclist considerations such as building pedestrian bridges and underpasses to prevent the need to traverse the trackway at grade; segregating and delineating the track area using design elements such as fencing, pylons, road surface markings; and developing public education programs to explain how to use the system safely
Energy *Section 4.13*	• No impacts anticipated: annual energy savings of 83 billion BTUs compared to the No Build Alternative	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • The NEPA Preferred and Project Element Alternatives would result in an estimated annual energy savings compared to the No Build Alternative. Mitigation measures are not warranted.
Acquisitions, Relocations, and Displacements *Section 4.14* [c]	• 92 potential full acquisitions, 145 potential partial acquisitions, 65 displacements	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Acquisition and relocation process would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (49 C.F.R 24), as amended.

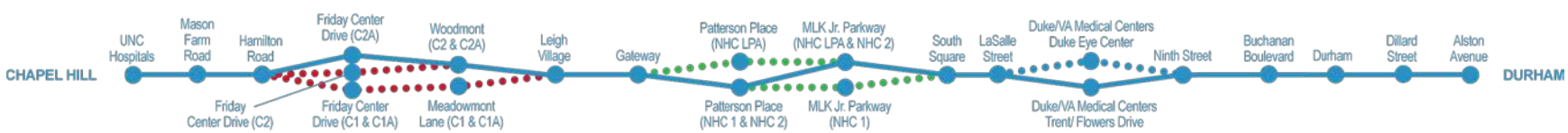


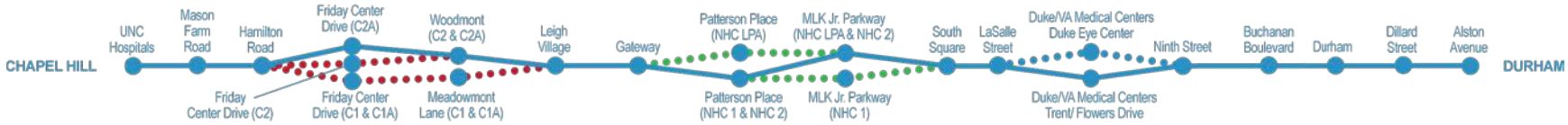
Table ES-1: Anticipated Environmental Impacts by D-O LRT Project Alternative

Factor	Potential Impact and Benefit Summary		Potential Mitigation Measure Summary
	NEPA Preferred Alternative [a]	Project Element Alternatives [b]	
Utility Impacts *Section 4.15*	• Minimal impacts anticipated: potential impacts to 85 miles of utility lines	• C1, C1A, and NHC 1 Alternatives would have 10 percent less utility impacts	*NEPA Preferred and Project Element Alternatives Mitigation* • Existing utilities will be surveyed during the Engineering phase and efforts will be made to avoid or limit impacts to existing utilities when practical. • Where relocation will be required, efforts will be made to consolidate existing utilities where practical. • Measures will be taken to minimize utility service outages and to schedule them with the utility owner and the customer such that they would present the least inconvenience. • Residences and businesses will be notified of utility work.
Construction *Section 4.16*	• Generally temporary impacts to the factors discussed in this table	• No substantial variation	*NEPA Preferred and Project Element Alternatives Mitigation* • Project construction, education, and outreach plan would be developed during the Engineering phase • Construction impacts minimized through selection and implementation of BMPs • Pedestrian and vehicular access to businesses, universities, medical facilities, and residences will be maintained

a C2A, NHC 2, Trent/Flowers Drive Station

b Variation of Alignment and Station Alternatives from the NEPA Preferred Alternative

c There are also 43 full acquisitions of vacant land. Acquisitions of vacant land were not included in chapter 5 Environmental Justice.



How Much Will the D-O LRT Project Cost?

The cost generally expressed for the proposed D-O LRT Project is the "capital cost." Capital costs are considered to be one-time costs for the proposed transit project. The capital cost includes things such as the construction of the stations, station platforms, and station elements like shelters, ticketing machines, lighting, and signage; the light rail tracks and associated structures like bridges; construction and implementation of the systems and technologies that are necessary to support and operate the light rail, including the overhead wires, supporting poles, the train signal systems, the protective safety gates and warning systems at the at-grade crossings with roads, the substations necessary to maintain a constant level of power throughout the wires, as well as the technology systems to communicate with the LRVs. Also included in the capital cost is the cost to purchase the LRVs as well as the cost to construct the ROMF. In addition, professional services like the costs to design, engineer, and inspect the proposed project are also included in capital costs.

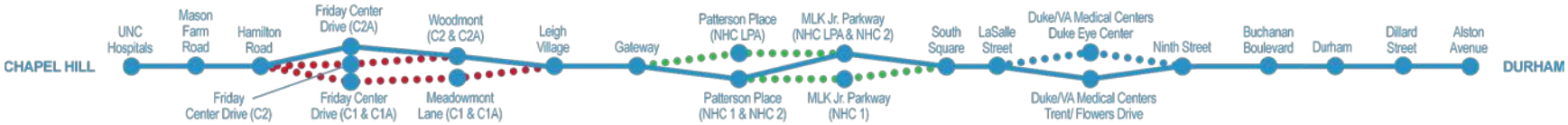
In addition to capital cost, the D-O LRT Project would have annual recurring costs for ongoing operations and maintenance (O&M) of the rail line and the light rail vehicle fleet (e.g., employee salaries, electricity, parts) of $17.9 million in 2015 dollars.

The NEPA Preferred Alternative would cost between approximately…
$1.47 and $1.62 billion
to build and
$17.9 million per year to operate and maintain (2015 $)

How Will the D-O LRT Project Costs be Paid?

If the proposed D-O LRT Project is constructed, it is expected that it would be funded by a combination of federal, state, and local funds. Dedicated local funding for bus and rail transit investment was identified when citizens of both Durham and Orange counties passed referenda to increase sales taxes to support transit improvements. Effective April 1, 2013, Durham and Orange counties adopted resolutions to levy an additional one-half cent local sales tax to be used only for public transportation systems. Other new sources of local funds could also be employed.

The use of established federal and regional sources means no one group in the corridor or the region would receive a disproportionate share of the financial burden of the capital and O&M costs relative to the benefits received. No financial equity considerations would be raised by the project, either in terms of the source of subsidy or the level of fare payments required of passengers.



How Has the Public Been Engaged in the Project?

For Triangle Transit, education, inclusion, transparency, accountability and responsiveness have been key principles of the planning process for transit service in the D-O Corridor from before the AA was completed in 2012 through the ongoing NEPA and project development process.

The public has been engaged through:

- Public meetings and community group meetings
- Project newsletters an email distribution lists
- Project website
- Interaction with community organizations

Informational materials at all public meetings, including presentation materials, handouts, and comment sheets, have been available in Spanish as well as English, and a Spanish-speaking staff member has been present at all meetings.

The goals of Triangle Transit's public involvement and agency coordination include the following:

- To inform the community and appropriate agencies about the proposed D-O LRT Project and its progress
- To actively seek and integrate participation from the public and appropriate agencies in the decision—making process
- To align project goals with the needs of the community
- To inform affected residents, including low income and minority populations
- To ensure that the proposed D-O LRT Project meets federal, state, and local requirements for public involvement.

The project timeline graphic in **Figure ES-2** provides an overview of the project from the 2009 Special Transit Advisory Commission study, the NEPA process, through the projected dates for construction and operation of the D-O LRT Project.

What Are the Roles of Other Agencies?

During project scoping, federal, state, and local agencies that might have an interest in the project were invited to participate. Agencies have been involved through briefings and additional communication focused on specific areas of expertise within each agency's reviewing purview. Agencies, as well as the public, are invited to comment on the DEIS.

Agencies are also involved through concurrent federal processes, including reviews for consistency with:

- Clean Water Act
- National Historic Preservation Act
- U.S. Department of Transportation Act "Section 4(f)" (49 U.S.C. § 303 and 23 U.S.C § 138)

When Are the Public Workshops?

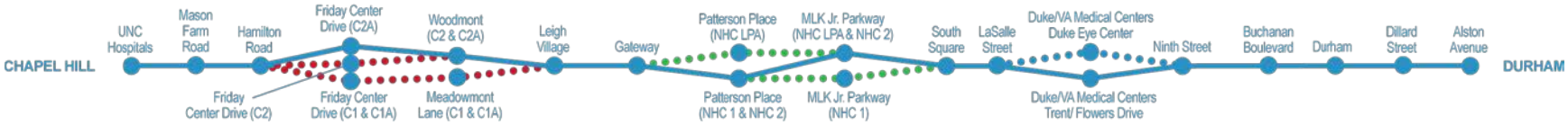
Triangle Transit will be hosting two public workshops in which the public can learn more about specific subject areas. The public workshops will be held in September.

The locations of the workshops are wheelchair accessible. A sign language and Spanish language interpreter will be available at the public workshops.

For more information, see the project website www.ourtransitfuture.com or call 1-800-816-7817.

When Is the Public Comment Period?

The public has the opportunity to comment on the environmental analysis. Comments received during this period can help to identify changes to alternatives that may mitigate adverse effects. Any changes will be incorporated into the FEIS. See www.ourtransitfuture.com for the full copy of



the DEIS and supporting background materials from the study.

Hard copies of the DEIS are available for review at the Triangle Transit offices located at:

4600 Emperor Blvd. Suite 100
Durham, NC 27703

In addition, libraries identified in appendix D: Distribution List will have hard copies. The public comment period on the Draft EIS will be open until October 12, 2015.

When Are the Public Hearings?

Two public hearings on the DEIS will be held as part of the NEPA process. **Verbal comments** may be provided at the public hearings. The two public hearings will be held on:

- **September 29, 2015, from 4:00 p.m. to 7:00 p.m.**
  William and Ida Friday Center for Continuing Education
  100 Friday Center Drive
  Chapel Hill, NC 27599-1020
- **October 1, 2015, from 4:00 p.m. to 7:00 p.m.**
  Durham County Commissioners' Chambers
  200 East Main Street
  Old Courthouse – Second Floor
  Durham, NC 27701

The locations of the hearings are wheelchair accessible and a sign language interpreter will be present at the public hearing**.**

How Do I Comment on the DEIS?

Verbal Comments may be provided at the Public Hearings on September 22 and 30, 2015.

Written Comments may be provided:

Via U.S. Mail:
D-O LRT Project – DEIS
c/o Triangle Transit
Post Office Box 530
Morrisville, NC 27560

Via Email: info@ourtransitfuture.org

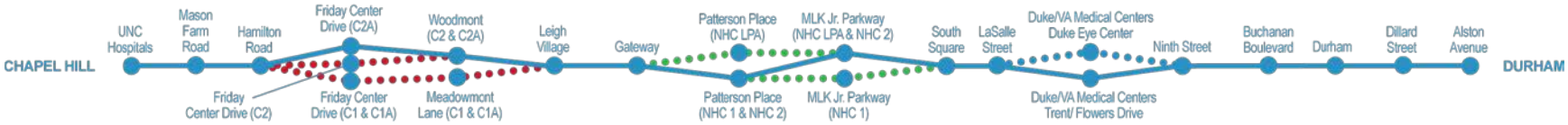
Via the D-O LRT Project's Website:
http://ourtransitfuture.com

Via Comment Card:
Accepted and provided at the Public Hearings and Public Workshops

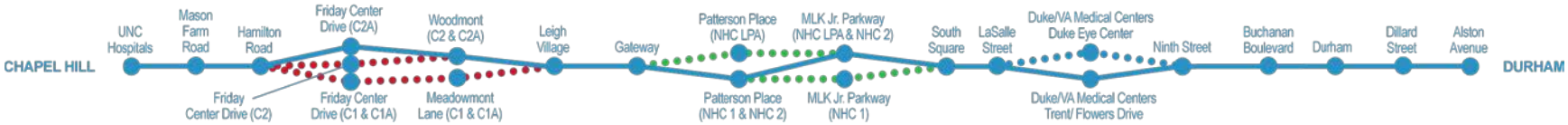
Please note: comments received will NOT receive a reply. Responses to comments will be provided in the FEIS/ROD.

What Happens After the Public Comment Period?

Following the public hearings and comment period, the Triangle Transit Board of Trustees will consider the information provided in this DEIS and the comments received and will make a recommendation to the Durham-Chapel Hill-Carrboro (DCHC) Metropolitan Planning Organization (MPO). Thereafter, the DCHC MPO will consider a resolution to affirm the NEPA Preferred Alternative. Triangle Transit will continue coordination with FTA to ensure compliance with NEPA and other applicable laws and regulation.



Next Steps

Comments on the DEIS will be considered and addressed in the combined Final EIS/ROD. After addressing comments to this document, FTA can determine whether the project would issue a combined FEIS and ROD based on the criteria outlined in the Final Guidance on MAP-21 Section 1319 Accelerated Decision Making in Environmental Reviews (US DOT; November 12, 2014), which reads: “Section 1319(b) directs the lead agency, to the maximum extent practicable, to expeditiously develop a single document that consists of an FEIS and ROD, unless certain conditions exist.

Local elected officials and the public have been, and will continue to be, involved in the project throughout design and construction through public meetings, advisory committee and stakeholder meetings, and individual briefings.