

LYNX BLUE LINE EXTENSION
NORTHEAST CORRIDOR LIGHT RAIL PROJECT
CHARLOTTE-MECKLENBURG COUNTY, NORTH CAROLINA

DRAFT ENVIRONMENTAL IMPACT STATEMENT

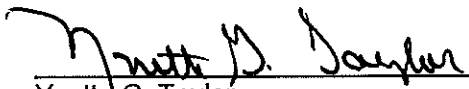
Prepared by:

U.S. Department of Transportation
Federal Transit Administration
and
Charlotte Area Transit System
City of Charlotte
Charlotte, North Carolina

Pursuant to the National Environmental Policy Act (NEPA) of 1969 as amended, 42 U.S.C. §4322(2); the regulations of the Council on Environmental Quality (CEQ), 40 CFR 1500-1508; the Federal Transit Laws, 49 U.S.C. Chapter 53; the National Historic Preservation Act of 1966, 16 U.S.C. §470(f); Section 4(f) of the Department of Transportation Act of 1966, as amended, Title 49 U.S.C. §303; the Federal Clean Air Act Amendments of 1990; the Endangered Species Act of 1973, 16 U.S.C. § 1531; Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 U.S.C. §4601; Section 402 of the Clean Water Act, 33 U.S.C. §1342; Executive Order 12898, Federal Actions to Address Environmental Justice in Minority & Low Income Populations; Executive Order 11990, Protection of Wetlands; Executive Order 11988, Floodplain Management; and, all relevant laws and procedures of the State of North Carolina.

For: Federal Transit Administration, Region IV

AUG 11 2010



Yvette G. Taylor
Regional Administrator

8-11-10

Date

For: Charlotte Area Transit System



Carolyn Flowers
Chief Executive Officer

8/3/10

Date

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A.0 ABSTRACT

The Charlotte Area Transit System (CATS), in cooperation with the Federal Transit Administration (FTA), prepared this Draft Environmental Impact Statement (EIS) to evaluate the extension of the LYNX Blue Line, called the LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) in Mecklenburg County, North Carolina. The Draft EIS will allow decision-makers to evaluate the social, economic, environmental and transportation effects associated with a proposed light rail extension from Center City Charlotte to I-485 near the Mecklenburg-Cabarrus County line, relative to a No-Build Alternative.

Part of the project development process for projects seeking federal funding is preparation of an EIS in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended. NEPA requires that federal decision-making take into account the potential impacts of a proposed project and its alternatives on the natural and human environment. If substantial environmental impacts are anticipated and cannot be avoided, a plan for mitigating these impacts must be proposed. As part of the decision-making process, reasonable alternatives that would avoid or reduce adverse impacts must be considered, analyzed, and documented. In addition, the public must be given adequate opportunity to comment on a proposed project, and the project must be coordinated with appropriate agencies.

The purpose of a Draft EIS is to document the purpose and need for the project; present a discussion of all reasonable alternatives considered; describe in detail the anticipated social, environmental, economic, and transportation-related effects of the proposed project; and identify appropriate mitigation measures to offset unavoidable impacts. This detailed analysis of costs, ridership, and environmental consequences will assist decision-makers and the public in evaluating the relative merits of the proposed project.

The information presented in this Draft EIS is based on numerous technical studies and reflects comments or suggestions from interested and affected parties made during the evaluation of alternatives. Impact information is based on design assumptions as shown in the *30% Preliminary Engineering Design Plans* completed March 2010. Figures are located at the end of each chapter, where applicable. Supporting documentation can be found in Appendices D through H. The document has been circulated to federal, state, and local agencies as well as the general public to solicit comments. Copies of this document have also been made available for public review.

Written comments will be accepted for a period of 45 days from the date of distribution of the Draft EIS and the publication of the formal Notice of Availability in the Federal Register and local newspapers. Comments will also be accepted in writing and verbally at formal public hearings scheduled during the public comment period.

Based on the review of the analysis presented in the Draft EIS and comments received, decision-makers will determine whether to advance the proposed light rail line in the Northeast Corridor and whether to advance the Light Rail Alternative or the Light Rail Alternative – Sugar Creek Design Option. A Final EIS will be prepared to respond to the comments and issues raised during the circulation of the Draft EIS. The document will be circulated for agency review and then FTA, as the lead Federal agency, will render its formal decision on the proposed project in a Record of Decision (ROD).

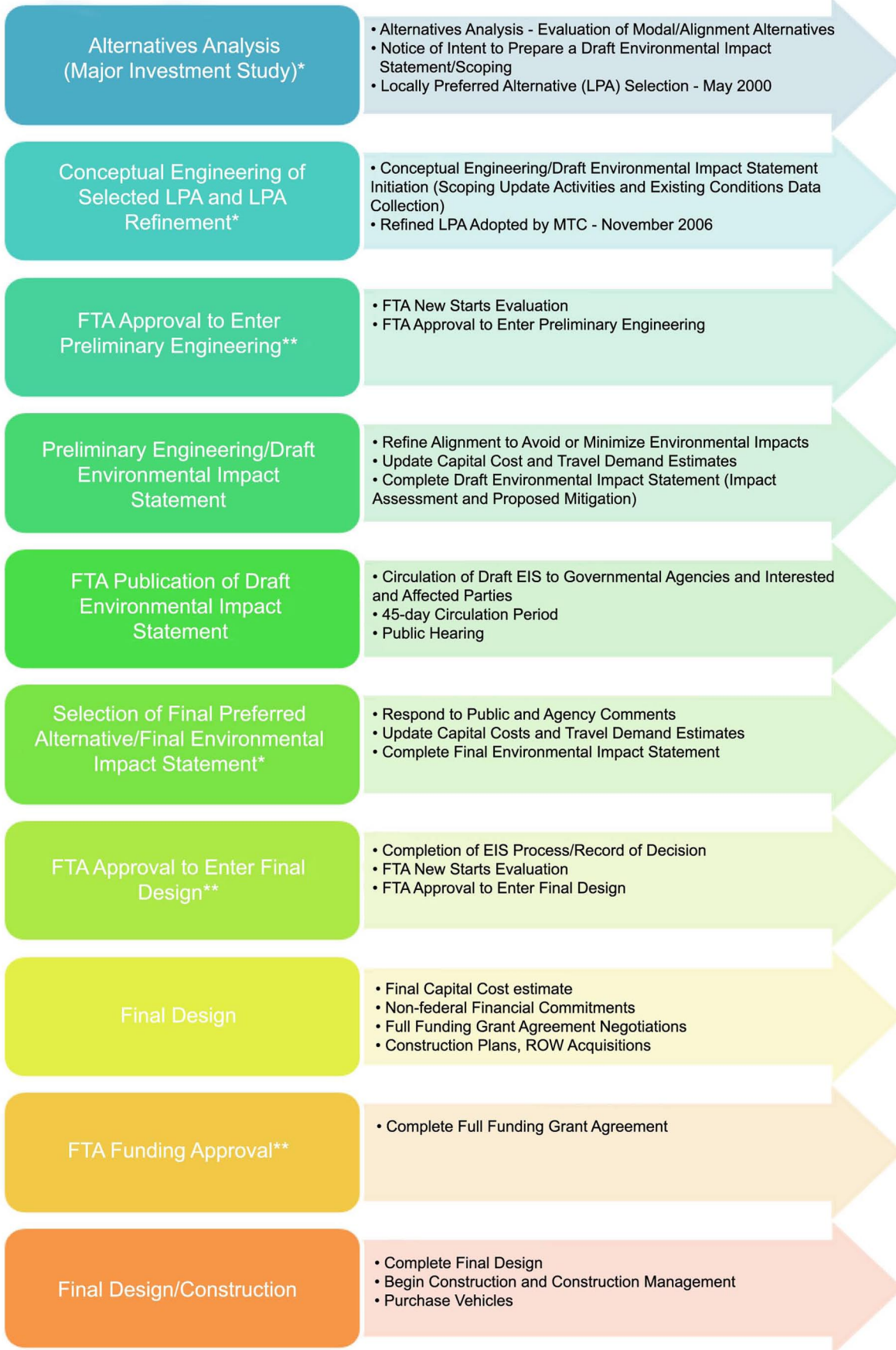
A public hearing will be held on September 22, 2010 to provide the public with opportunities to comment on this Draft EIS and the proposed project. Comments will be accepted until October 12, 2010. More detailed information about public and agency involvement activities is provided in Chapter 22.0.

For further information about this Draft EIS, or to provide formal written comments on this document, please contact:

Mr. Keith Melton, Community Planner
Federal Transit Administration, Region IV
230 Peachtree, NW, Suite 800
Atlanta, GA 30303
(404) 856-5600
Keith.Melton@dot.gov

Judy Dellert-O'Keef, Communications Officer
Charlotte Area Transit System
600 East Fourth Street
Charlotte, NC 28202
(704) 432-0477
bluelineextension@charlottenc.gov

Northeast Corridor Project Development Process



*CATS Decision points

** FTA Decision Points

ES.0 EXECUTIVE SUMMARY

This chapter presents a summary of the LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) Draft Environmental Impact Statement (EIS). It describes purpose and need of the proposed project, the alternatives under study, summarizes the environmental consequences associated with the studied alternatives, provides a summary of proposed mitigation measures and outlines the steps for the selection of a preferred alternative.

ES.1 Project Study Area

The proposed LYNX BLE is located within the Northeast Corridor of the City of Charlotte and Mecklenburg County, North Carolina (Figure ES-1). The study area is bounded by Center City Charlotte to the south, Interstate-85 (I-85) to the west and Cabarrus County to the north. The proposed light rail alignment would primarily utilize existing railroad rights-of-way for the first four miles and would be located in the median of North Tryon Street/US-29 until it enters the University of North Carolina at Charlotte (UNC Charlotte) campus. The line would then return to North Tryon Street/US-29 to a terminus just south of Interstate-485 (I-485). A Locally Preferred Alternative (LPA) was selected at the conclusion of the *Northeast Corridor Major Investment Study* in March 2000. This alignment has been refined with public and stakeholder input and is represented herein as the Light Rail Alternative. A design option, called the Light Rail Alternative – Sugar Creek Design Option, is also presented and provides an alignment option with two different station locations.

ES.2 Purpose and Need for Action

ES.2.1 Need for Transportation Improvements

The need for the LYNX BLE Project is based on an existing overburdened transportation system and the City of Charlotte's and Mecklenburg County's desire to implement long-range plans that integrate land use and transportation policies. This regional vision has been exhibited for the past decade in the *Centers and Corridors Concept Plan*, the *2025 Integrated Transit/Land Use Plan* and the *Centers, Corridor and Wedges Growth Framework*, Draft 2010. Making a transportation investment in the Northeast Corridor is one of many steps planned to realize more integrated transit and land use connections.

As one of the fastest growing metropolitan areas in the United States, Charlotte has seen, and is projected to continue to see, significant increases in both population and employment. The Northeast Corridor is a major employment, shopping and educational destination from all across the region, anchored by Center City Charlotte at the southern end and University City at the northern end. As such, the Northeast Corridor is a major generator of trips from throughout the region, as well as a significant number of intra-corridor trips. Based on adopted land use policies, the travel market between corridors will continue to strengthen; connections between the Center City campus and the main campus of UNC Charlotte will also grow in importance; and, special events and tourism will remain an important travel market in the corridor.

The Northeast Corridor, which has few arterials and minimal cross-town connections, has several major roadways and intersections currently experiencing peak hour volumes that exceed capacity. Approximately 23 percent of the total miles on roadways within the Northeast Corridor operate at or above capacity. Much of the growth in the Charlotte-Mecklenburg region in the 1980s and 1990s occurred quickly in a dispersed pattern of jobs and residences with limited connectivity between uses. These land use patterns have resulted in people driving more and making longer trips, leading to traffic volumes that exceed roadway capacity and result in unacceptable levels of service in many locations throughout the region. Projections show that high growth rates will continue, further burdening the regional transportation system. The regional model indicates that the region is expected to experience a projected 57 percent increase in regional person trips, a 59 percent increase in daily Vehicle Miles Traveled (VMT), and a 70 percent increase in daily Vehicle Hours Traveled (VHT) from 2008 to 2030. Continued population and employment growth are expected to increase travel demand, resulting in deteriorating conditions on area roadways, despite planned roadway widening and intersection improvements. Traffic volumes are expected to increase on nearly all area roadways, especially at the outer end of North Tryon Street/US-29, where volumes are expected to roughly double by 2030.

CATS currently operates 16 routes in the Northeast Corridor study area, including eight local routes, three university shuttle routes, two neighborhood circulator routes, and three express routes. These bus routes currently operate in mixed-traffic on congested roadways. Therefore, the reliability of the service is affected by delays from local street conditions.

ES.2.2 Project Goals

To determine how well the identified transportation alternatives would address the transportation and land use needs in the Northeast Corridor, specific project goals and evaluation measures were developed during the Major Investment Study (MIS). These goals reflect the emphasis the community has placed on the integration of transportation and land use in the alternatives analysis. The five project-specific goals developed are:

- Land Use - Support the region's *Centers, Corridors and Wedges Growth Framework*, Draft 2010;
- Mobility - Improve access and mobility in the corridor and throughout the region; Increase transit ridership; Improve quality of transportation service;
- Environment - Preserve and protect the environment;
- Financial - Develop affordable, cost-effective transportation solutions; and,
- System Integration - Develop transportation improvements that function as part of the larger transportation system.

ES.3 Alternatives Considered

ES.3.1 No-Build Alternative

The No-Build Alternative includes transit services, highway and transit facilities, and railroad improvements that are planned to exist in 2030. The No-Build Alternative provides the underlying foundation for comparing travel benefits and environmental impacts of the other alternatives. The No-Build Alternative includes one new route and improvements to service frequency for six routes in the Northeast Corridor study area.

ES.3.2 Light Rail Alternative

The proposed Light Rail Alternative would be an extension of the LYNX Blue Line (South Corridor Light Rail Project) that opened in November 2007. The proposed project would begin in Center City Charlotte at the terminus of the LYNX Blue Line light rail line at 7th Street and extend 10.7 miles to I-485 near the Mecklenburg-Cabarrus County line.

Alignment

The first ½-mile of the alignment would be within right-of-way owned by the City of Charlotte. The next 1.5 miles are primarily within Norfolk Southern right-of-way. The alignment then transitions into the North Carolina Railroad (NCR) right-of-way north of 30th Street, and remains in the NCR right-of-way for over two miles. The alignment would run parallel to the existing freight tracks on the south side of the NCR right-of-way until Craighead Road, where it would go up and over Craighead Road and the freight tracks and continue on the western side. Near Old Concord Road, the alignment transitions into the median of North Tryon Street/US-29, where it remains for the next four miles. The alignment exits North Tryon Street/US-29 near UNC Charlotte and enters the campus to provide direct service to the university.

After the alignment exits the university, it runs northwest to a terminus along North Tryon Street/US-29, just south of I-485.

Stations

The proposed Light Rail Alternative includes 13 stations, seven with park-and-ride facilities (with over 4,600 total parking spaces) and six walk-up stations. Bus service connections would also be provided at most stations. Following is a summary of each station location:

- **9th Street Station:** The 9th Street Station would be located directly north of 9th Street and directly south of the future 10th Street Connector, along right-of-way owned by the City of Charlotte. The station would be designed as an urban station with walk-up access and eight short-term bicycle

parking spaces. Sidewalks, like those placed next to the LYNX Blue Line light rail tracks within Center City, would extend between 9th and 12th Streets.

- **Parkwood Station:** The Parkwood Station would be located at the intersection of Parkwood Avenue and North Brevard Street. The station would be designed as a neighborhood, walk-up station with eight kiss-and-ride spaces and eight long-term and eight short-term bicycle parking spaces. A small landscaped area would be located in front of the station.
- **25th Street Station:** The 25th Street Station would be located along the northwest side of Brevard Street, northeast of Little Sugar Creek. The station would be a neighborhood, walk-up station with 16 short-term bicycle parking spaces.
- **36th Street Station:** The 36th Street Station would be located along the south side of the railroad right-of-way. The station platform would be located on a bridge structure as 36th Street would be depressed under the existing freight tracks and the proposed light rail tracks. This bridge structure would be at the same elevation as the existing freight tracks, while 36th Street would be lower than the current elevation of 36th Street. The station would be designed as a neighborhood station, with walkup access and eight long-term and eight short-term bicycle parking spaces. Pedestrian access would be via sidewalk along both sides of 36th Street. There would be two bus stops located on-street.
- **Sugar Creek Station Park-and-Ride Option 1:** The Sugar Creek Station would be located along the north side of the existing railroad tracks. The station platform would be located on a bridge structure as Sugar Creek Road would be depressed under the existing freight tracks and the proposed light rail tracks. This bridge structure would be at the same elevation as the freight tracks, or at-grade. The station would be designed as a regional station and would include three separate park-and-ride lots totaling approximately 899 spaces, three bus bays, four kiss-and-ride spaces and 22 long-term and six short-term bicycle parking spaces. Vehicular access to the park-and-ride lot would be available from Raleigh Street and Sugar Creek Road. Stairs and elevators would be provided for pedestrian access, along with pedestrian walkways along both sides of Sugar Creek Road.
- **Sugar Creek Station Park-and-Ride Option 2:** The Sugar Creek Station would be located along the south side of the existing railroad tracks. Like Option 1, the station platform would be located on a bridge structure as Sugar Creek Road would be depressed under the existing freight tracks and the proposed light rail tracks. This bridge structure would be at the same elevation as the freight tracks. The station would be designed as a regional station and would include a five story parking garage totaling approximately 1,010 spaces, three bus bays, 22 long-term and six short-term bicycle parking spaces. Vehicular access to the park-and-ride lot would be available from North Davidson Street. A bus crew comfort area will also be provided in the parking garage. A pedestrian bridge would provide access to the station platform from the parking garage. Stairs and elevators would be provided for pedestrian access to the pedestrian bridge from the garage and the station platform. Separately, pedestrian walkways would also be provided along both sides of Sugar Creek Road.
- **Old Concord Road Station:** The Old Concord Road Station would be located between the existing railroad right-of-way and Old Concord Road in the area of the alignment where it would depart the railroad right-of-way and head north towards the intersection of North Tryon Street/US-29 and Old Concord Road. The station would function as a community station and would include a surface park-and-ride lot with 563 spaces, four bus bays and 16 long-term and eight short-term bicycle parking spaces. Access to the park-and-ride lot would be from Old Concord Road and North Tryon Street/US-29.
- **Tom Hunter Station:** The Tom Hunter Station platform would be located directly north of Tom Hunter Road in the median of North Tryon Street/US-29. The station would be a neighborhood station, with a surface park-and-ride lot with approximately 139 spaces and eight long-term and eight short-term bicycle parking spaces. Access would be available from Tom Hunter Road.
- **University City Blvd. Station:** The University City Blvd. Station is proposed in the median of North Tryon Street/US-29 within the “weave” between the future intersections of I-85 Connector Road, North Tryon Street/US-29 and University City Boulevard/NC-49. This station would be a regional station with a surface park-and-ride lot with 797 spaces on the west side of North Tryon Street/US-29, along with four bus bays and 18 long-term and six short-term bicycle parking spaces.
- **McCullough Station:** The McCullough Station would be located directly north of McCullough Drive within the median of North Tryon Street/US-29. The station would be designed as a community station. The McCullough Station would include a surface park-and-ride lot with 151 spaces and ten

long-term and eight short-term bicycle parking spaces. The park-and-ride lot would be located on the west side of North Tryon Street/US-29 at McCullough Drive.

- **JW Clay Blvd. Station:** The JW Clay Blvd. Station would be located south of JW Clay Boulevard in the median of North Tryon Street/US-29. The station would be designed as a neighborhood station with walk-up access, eight long-term and eight short-term bicycle parking spaces and two bus bays.
- **UNC Charlotte Station:** The UNC Charlotte Station would be located on campus opposite Laurel Hall Dormitory. The station would be designed for walk-up access, with 32 short-term bicycle parking spaces and two bus bays for connections to campus shuttle service.
- **Mallard Creek Church Station:** The Mallard Creek Church Station would be located north of Mallard Creek Church Road, east of Mallard Creek. The station would provide three bus bays, eight long-term and eight short-term bicycle parking spaces and a surface park-and-ride lot with approximately 156 spaces. Vehicle access would be available from Stone Quarry Road.
- **I-485/N. Tryon Station:** The I-485/N. Tryon Station would be a regional station with a five-story parking garage located to the east of North Tryon Street/US-29, just south of the I-485 ramps and Morningstar Drive. The station would consist of a parking garage, four bus bays, seven kiss-and-ride spaces and 24 short-term bicycle parking spaces. Approximately 1,959 spaces would be provided along with a crew comfort station.

Vehicle Light Maintenance Facility (VLMF)

A VLMF and storage yard would be constructed on the existing Norfolk Southern Intermodal Facility that abuts North Brevard Street. The facility would provide vehicle storage and light vehicle maintenance activities, those that could be done in less than 24 hours. Heavy maintenance would take place at the existing South Boulevard Light Rail Facility.

Ancillary Facilities

Substations and signal control houses would be placed along the alignment to provide electricity and operating signals along the alignment.

ES.3.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would divert from the Light Rail Alternative just after Sugar Creek Road and enter the median of North Tryon Street/US-29 near Dorton Street. This design option represents a change in the station platform and park-and-ride locations for the Sugar Creek Station and the Old Concord Road Station. These stations are summarized as follows:

Sugar Creek Station – Sugar Creek Design Option: This station would be located along Dorton Street, near Raleigh Street. The station would include a surface park-and-ride lot with 893 spaces, three bus transfer bays, four kiss-and-ride spaces and 26 bicycle parking spaces. Access to the park-and-ride lot would be available from Dorton Street and Raleigh Street.

Old Concord Road Station – Sugar Creek Design Option: This station platform would be located in the median of North Tryon Street/US-29, directly west of the Old Concord Road intersection. The station would include a surface park-and-ride lot with 458 spaces, three bus transfer bays and 20 bicycle parking spaces. Access to the park-and-ride lot would be available from North Tryon Street/US-29 and Old Concord Road. The park-and-ride lot would be at roughly just west of the same location as the park-and-ride facility for the Light Rail Alternative Old Concord Road Station.

ES.4 Summary of Transportation Impacts

Improve access and mobility

Under the No-Build Alternative, improvements to access and mobility would be limited to additional bus service within the Northeast Corridor. The proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would improve mobility in areas with the highest levels of employment in the Charlotte metropolitan area, including Center City Charlotte and the University City area. The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would also improve access to transit by providing station facilities, more frequent and reliable service, pedestrian and bicycle improvements, and parking facilities. In addition, the Light Rail Alternative and Light Rail Alternative – Sugar Creek

Design Option would provide a seamless and direct connection to destinations along the existing LYNX Blue Line light rail service.

Since the Northeast Corridor is comprised of a large number of residents that are transit-dependent, access to travel is a major concern for area households. Ten percent of the housing units in the corridor have no vehicles available to travel to and from work or for any other purpose. The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would also improve mobility and access in areas with large numbers of residents who are transit-dependent.

Increase transit ridership

The Light Rail Alternative would operate in a dedicated right-of-way, free from traffic congestion; therefore it is projected that the Light Rail Alternative would provide a significant travel time savings over the No-Build Alternative. For this reason, total transit trips would be greater for the Light Rail Alternative than the No-Build Alternative, and dependency on highly congested roadways would be reduced. The Light Rail Alternative would also increase transit ridership. Compared to the No-Build Alternative, approximately 18,300 additional riders would utilize transit under the Light Rail Alternative. Ridership on the light rail system is projected to increase from 23,700 daily riders on the existing LYNX Blue Line under the No-Build Alternative, to a total of 47,500 daily light rail boardings for the entire alignment (South to Northeast) under the Light Rail Alternative; this represents an addition of 23,800 riders per day on the light rail system alone. It is expected that the transit times and trips under the Light Rail Alternative – Sugar Creek Design Option would be comparable to the Light Rail Alternative.

Improve quality of transportation service

As noted, the Light Rail Alternative has the advantage of providing faster service over the No-Build Alternative. For example, when comparing peak hour travel times from the UNC Charlotte to Center City Charlotte, the Light Rail Alternative would take just over 25 minutes for in-vehicle travel times, whereas under the No-Build Alternative, the in-vehicle travel time using bus service would take nearly 58 minutes. Comparable travel by automobile would take nearly 36 minutes to travel from UNC Charlotte to Center City Charlotte.

The proposed project would improve the quality of transportation service by providing a frequent and reliable service in the Northeast Corridor. Congestion on arterial roadways and highways influences the reliability of travel by automobile and bus. Light rail traveling in dedicated right-of-way would not be subject to congested roadway conditions, resulting in dependable and on-time service. The proposed project would travel between major growth and employment centers with six-minute to ten-minute headways during peak periods.

Traffic Operations

An analysis of over 55 intersections was conducted to determine the effects of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option on traffic operations within the corridor. The analysis generally shows minor increases in automobile delay with the Light Rail Alternative, compared to the No-Build Alternative. Additional signalized intersections, turn lanes and grade separations were included in the project design to address potential traffic impacts. A grade separation analysis was conducted to identify locations where the light rail should be grade separated from roadway traffic based on: safety, traffic volumes, transit headways, arterial travel speeds, cost, intersection delays, and traffic spillback to adjacent intersections. All major intersections, railroad crossings, and entry into and exit from North Tryon Street/US-29 would be grade separated.

ES.5 Summary of Environmental Consequences

This section summarizes the potential environmental consequences of the No-Build Alternative, the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. Table ES-1 presents a summary of the potential social, economic, and environmental impacts of the alternatives under study in this Draft EIS.

ES.5.1 No-Build Alternative Consequences

Growth in the corridor would continue to occur in a dispersed manner that does not concentrate development as is envisioned in the *2025 Integrated Transit/Land Use Plan*, the *Centers and Corridors*

Concept Plan and the *Centers, Corridors and Wedges Growth Framework*, Draft 2010. It would not provide the opportunity for transit supportive development. Therefore, the No-Build Alternative would not be consistent with the City's general plans and would likely result in the continuation of urban sprawl as highway improvements would need to be put in place to accommodate the anticipated population and employment growth. More parking in Center City Charlotte would be needed to accommodate more single-occupancy vehicles and therefore, Charlotte and Mecklenburg County would not see the economic advantages associated with highest and best uses of urban land. The vacant and underutilized land within the corridor would not be utilized to the greatest extent under existing zoning ordinances. Vehicle miles traveled throughout the region would continue to increase, following the trend of urban sprawl, exacerbating the region's air quality problem. Urban sprawl would continue to eliminate valuable ecosystems, water resources, and farmlands further diminishing the region's natural environment.

There would be no acquisition of property or resulting displacements under the No-Build Alternative. No physical impacts to existing neighborhoods within the project area would occur. However, benefits obtainable through improved mobility and access to an alternate, reliable means of transportation would not be available for area neighborhoods. The expansion of the CATS bus system under the No-Build Alternative would provide improved bus service for environmental justice populations over the existing conditions; however, the benefits of increased mobility, reliability of transit service, access to jobs, and the opportunity to reduce the number of vehicles per household that may occur as a result of the Light Rail Alternative would not take place.

ES.5.2 Light Rail Alternative Consequences

While the development of the Light Rail Alternative is not anticipated to affect the Northeast Corridor's overall growth rate, it may alter the area's growth patterns by focusing growth along the light rail line as envisioned by the *2025 Integrated Transit/Land Use Plan*. The effectiveness of the proposed light rail will be related to both its function and its ability to promote transit-supportive development in the area surrounding the stations. Station area plans, under development by the Charlotte-Mecklenburg Planning Department, outline a vision for future growth and development, including incentives to encourage development, and guidelines and policies to ensure standards are met for transit supportive development and public investments. Station area plans ensure that development around each station meets minimum standards by guiding zoning modifications, establishing appropriate mixtures of uses, setting development intensities, and identifying basic physical design standards.

Overall, the Light Rail Alternative would have no significant adverse impacts on adjacent neighborhoods or community services. With the exception of a few displacements and land acquisitions and potential noise and vibration impacts, communities and neighborhoods near the proposed stations would be expected to benefit from improved access to many businesses and residential uses in the vicinity. The proposed transit improvements are not expected to isolate or fragment any existing neighborhoods, and in some cases, would be expected to serve as a focal point to reinforce the community character, especially in areas that are currently undergoing rapid development intensity changes, such as the North Charlotte Historic District, locally known as "NoDa."

The Light Rail Alternative would result in nearly 9,000 new jobs as a result of the money infused into the local economy from the capital expenditures of the project. It would also require an addition of 96 CATS rail operations or maintenance jobs. While the Light Rail Alternative would provide economic benefits, it would also reduce annual property tax revenues up to \$146,000 (depending on the design option selected for the Sugar Creek park-and-ride).

The Light Rail Alternative would introduce several new visual elements into the Northeast Corridor that would result in some visual impacts to resources immediately adjacent to the proposed alignment. There would not be any adverse effects to historic or archaeological resources. The alignment would come in close proximity to three park resources that would be potentially affected, including two planned greenways and one wetland viewing area at Kirk Farm Fields. The effects to parks are expected to be minimal. Section 4(f) *de minimis* findings are proposed for potentially affected historic resources and parklands. FTA is seeking public review/input as part of the Draft EIS circulation/public hearing.

The Light Rail Alternative would eliminate approximately 20 acres of mixed pine/hardwood forest community to accommodate the proposed alignment and station park-and-ride facilities. The greatest environmental impact that would result from the Light Rail Alternative would be to water resources. Minimization and avoidance efforts have been made to reduce these impacts; but many are unavoidable.

The Light Rail Alternative would save energy through a reduction in vehicle miles traveled over the No-Build Alternative. These same reductions would also result in an improvement to the region's air quality.

Some noise impacts would result to residences and businesses along the alignment, including: 26 residential properties, two hotels, one medical center, one college dormitory and one park. One vibration impact is likely to result at one residential location. A detailed noise and vibration impact assessment will be conducted before the Final EIS to confirm these impacts would occur and to identify specific mitigation methods. This assessment will also address concerns raised by the UNC Charlotte's Charlotte Research Institute with respect to vibration sensitive equipment contained in their research buildings.

Right-of-way would be acquired from private property owners where the alignment would depart from the existing railroad right-of-way over to the median of North Tryon Street/US-29, along North Tryon Street/US-29 where the light rail would operate in the median, and at station park-and-ride facilities. Property acquisition would potentially result in up to 22 business displacements and one residential displacement, resulting from 25 full property acquisitions and up to 204 partial property acquisitions.

Construction activities of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option could generate a variety of impacts to the existing environment and surrounding features. These potential impacts would be neither permanent nor severe.

ES.5.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would essentially have the same social, economic, and environmental benefits of the Light Rail Alternative. There would be fewer impacts to natural and water resources with this design option, most notably 1,113 linear feet (4,657 ft²) less impacts to streams and 0.08 of an acre less of an impact to wetlands. It would add two more visual impacts, one additional noise impact, eliminate one residential vibration impact, and add six more full and ten to 19 more partial acquisitions along North Tryon Street/US-29. It would also remove up to an additional \$33,000 from annual property tax revenues over the proposed Light Rail Alternative.

ES.6 Mitigation Summary

Mitigation would be required to offset the impacts summarized in Table ES-1 and detailed in this Draft EIS. These mitigation commitments are summarized in Table ES-2.

**Table ES-1
Summary of Environmental Impacts**

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Land Use (Chapter 4.0)			
Changes to corridor land use	No change.	No significant impact. Direct land use impacts to vacant, commercial, and industrial properties, and 1 residential property. This would not change the corridor’s overall land use composition.	Same as the Light Rail Alternative.
Compatible with existing land use	No change.	Yes, the proposed stations are compatible with existing land uses. Employees and residents would benefit from increased transit access and amenities.	Same as the Light Rail Alternative.
Consistent with local land use plans	No, does not support the Centers, Corridor, and Wedges Growth Framework.	Yes, supports Centers, Corridors and Wedges Growth Framework.	Same as the Light Rail Alternative.
Socio-Economic Conditions (Chapter 5.0)			
Population, Housing and Employment	Possible decrease.	Possible increase.	Same as the Light Rail Alternative.
Employment/Job Creation	No change.	8,593 new jobs from construction expenditures (direct and indirect) / 96 rail O&M jobs.	111 more new jobs from construction expenditures / O&M jobs same as the Light Rail Alternative.
Investment along the project corridor	Possible decrease.	Possible increase.	Same as the Light Rail Alternative.
Government Finance and Tax Sources	No change.	<u>Short-term:</u> Loss of up to \$146 thousand of property tax revenue related to acquisitions and displacements. <u>Long-term:</u> Potential increase related to transit-oriented development and redevelopment.	<u>Short-term:</u> Loss of up to an additional \$33 thousand of property tax revenue, compared to Light Rail Alternative. <u>Long-term:</u> Same as the Light Rail Alternative.
Neighborhoods, Community Services and Environmental Justice (Chapter 6.0)			
Impacts to community cohesion	No impact.	No impact.	No impact.
Impacts to neighborhoods	No improved access to transit.	Potential for overflow parking on neighborhood streets adjacent to stations. Potential impacts to 4 neighborhoods: <ul style="list-style-type: none"> • <u>North Charlotte</u> - depression of 36th Street under the existing freight and proposed light rail tracks would improve access to the neighborhood and reduce freight train noise; views of the railroad right-of-way would be altered with the addition of light rail trackway and structures, but the views would not be out of character with the 	Same as the Light Rail Alternative.

**Table ES-1 (continued)
Summary of Environmental Impacts**

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Impacts to neighborhoods (continued)	No improved access to transit.	existing context. <ul style="list-style-type: none"> • <u>Hidden Valley</u> - potential moderate noise impact at residences in Pines Mobile Home Park within this neighborhood; • <u>University City South</u> - residential displacements, partial acquisitions, noise impacts, and potentially significant visual impacts would occur in at the Mallard Creek Apartments within this neighborhood; and, • <u>Harris-Houston</u> - access road changes to the Queen’s Grant Mobile Home Park in this area as well as the alteration of the view from this same mobile home park. The visual impact would not be significant due to the natural vegetative screen that would remain. 	Same as the Light Rail Alternative.
Negative impacts to community services	No impact.	<ul style="list-style-type: none"> • Potential impact to emergency services related to light rail signal pre-emption; • <u>Crossroads Charter School</u> - Potential impact, but not considered significant. Partial acquisition of land and a potential visual impact as a bridge and park-and-ride lot would be introduced to the view from this resource; • <u>Zion Primitive Baptist Church</u> – Potential impact, but not considered significant. Partial acquisition of land; and, • <u>Carolinas Medical Center-University</u> - Potentially significant visual impact related to reduced visibility of hospital entrances from bridge over W.T. Harris Blvd. Partial acquisition of land. 	Same as the Light Rail Alternative, except less potential impact to Crossroads Charter School since this alternative does not require a bridge over Old Concord Road.
Adverse and disproportionate impacts to minority and low-income populations	Would not improve access to transit.	Noise impacts at the Pines Mobile Home Park (Hidden Valley; low-income and minority) and the Mallard Creek Apartments (University City South, low-income) would be considered adverse due to the intensity of the impacts and disproportionate as no residential noise impacts would occur outside of minority and low-income communities of concern.	No adverse or disproportionate impact.

Table ES-1 (continued)
Summary of Environmental Impacts

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Visual and Aesthetic Resources (Chapter 7.0)			
Introduction of new visual elements not in character with corridor	No impact.	<ul style="list-style-type: none"> • 12 potential impacts. • 2 potentially significant impacts: CMC - University and Mallard Creek Apartments. 	2 additional potential impacts.
Historical and Archaeological Resources (Chapter 8.0)			
Impacts to historical resources	No impact.	No adverse impacts.	Same as the Light Rail Alternative.
Impacts to archaeological resources	No impact.	No impact.	Same as the Light Rail Alternative.
Parklands (Chapter 9.0)			
Impacts to existing or planned parks	No impact.	Would provide enhanced access to parks facilities. 3 potential impacts, expected to be minimal: <ul style="list-style-type: none"> • Kirk Farm Fields (noise, visual) • Toby Creek Greenway (planned) (visual) • Mallard Creek Greenway Extension (planned) (visual) 	Same as the Light Rail Alternative.
Natural Resources (Chapter 10.0)			
Impacts to farmlands and forests	No impact.	19.89 acres of mixed pine/hardwood forest community removed due to clearing for two park-and-ride facilities and for the UNC Charlotte alignment.	Avoids approximately 1.56 acres of mixed pine/hardwood forest community.
Impacts to protected species	No impact.	No impact.	Same as Light Rail Alternative.
Water Resources (Chapter 11.0)			
Impacts to groundwater	No impact.	No impact.	Same as the Light Rail Alternative.
Impacts to surface waters	No impact.	3,262 linear feet (23,256 ft ²) of streams impacted.	1,113 linear feet (4,657 ft ²) less than Light Rail Alternative.
Impacts to floodplains and floodways	No impact.	<ul style="list-style-type: none"> • 0.2 acre (8,902 ft²) in FEMA Floodway; • 0.87 acre (37,746 ft²) in Community Encroachment Area; and, • 8.47 acres (368,812 ft²) in Community Floodplains. 	Same as the Light Rail Alternative.
Impacts to wetlands	No impact.	1.522 acres of wetlands impacted.	0.08 acre less than the Light Rail Alternative.

**Table ES-1 (continued)
Summary of Environmental Impacts**

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Air Quality (Chapter 12.0)			
Conformity with Regional Plan	Not consistent with Long Range Transportation Plans.	Project is included in the current conforming Transportation Improvement Program (TIP) and Long Range Transportation Plan.	Same as Light Rail Alternative.
Reduction in Vehicle Miles Traveled (VMT)	None.	Reduction of 55 million miles / year.	Same as Light Rail Alternative.
Creation of CO hot spots	No impact.	None.	Same as Light Rail Alternative.
Noise and Vibration (Chapter 13.0)			
Noise impacts	No impact.	<p><u>Moderate Impacts:</u></p> <ul style="list-style-type: none"> • 26 single-family residences within the Pines Mobile Home Park • 6 multi-family buildings at the Mallard Creek Apartments • 2 hotels: Intown Suites and Residence Inn by Marriott along North Tryon Street/US-29 • 1 medical center: CMC-University • 1 park: Kirk Farm Fields <p><u>Severe impacts:</u></p> <ul style="list-style-type: none"> • 2 multi-family buildings at the Mallard Creek Apartments <p><u>Wheel squeal:</u></p> <ul style="list-style-type: none"> • 1 college dormitory: Laurel Hall at UNC Charlotte 	1 additional moderate impact to a single-family residence along North Tryon Street /US-29 over those listed for the Light Rail Alternative.
Vibration impacts	No impact.	1 single-family residence (St. Anne's Place in the Hampshire Hills neighborhood).	Avoids impact to residence affected by the Light Rail Alternative.
Energy Use (Chapter 14.0)			
Daily energy consumption	788,212 million BTU ¹ .	762,560 million BTU (net reduction of 530 million BTU).	Same as the Light Rail Alternative.
Hazardous and Contaminated Materials (Chapter 15.0)			
Sites of concern for hazardous and contaminated materials	No impact.	12 properties on the alignment and 7 properties proposed for park-and-ride facilities	1 less property along the alignment, and 4 less properties for park-and-ride facilities.
Safety and Security (Chapter 16.0)			
Safe and secure operations	No impact.	Design includes provisions for the safety of vehicles, bicyclists and pedestrians, as well as for the security of customers in park-and-ride facilities, platforms and vehicles.	Same as the Light Rail Alternative.

**Table ES-1 (continued)
Summary of Environmental Impacts**

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Acquisitions and Displacements (Chapter 17.0)			
Full acquisitions	No impact.	25	6 more parcels than the Light Rail Alternative.
Partial acquisitions	No Impact.	195/204 ²	19/10 ² more parcels than the Light Rail Alternative.
Displacements – Business	No impact.	22/19 ²	10/13 more business displacements than the Light Rail Alternative.
Displacements – Residential	No impact.	1	Same as the Light Rail Alternative.
Construction Impacts (Chapter 18.0)			
Utilities	None.	Relocation of significant numbers of existing utilities, including electrical power, telecommunication, water and sewer, natural gas, and traffic signals and communications.	Same as the Light Rail Alternative.
Transportation and Traffic	None.	Temporary lane and road closures. Coordination with railroads required to maintain freight train operations.	
Land Use, Community Facilities and Businesses	None.	Potential for disruption to businesses due to access restrictions, signage removal, traffic, noise and dust from construction activities.	
Displacements and Relocations	None.	Temporary construction easements would be acquired.	
Visual and Aesthetic Qualities	None.	Temporary visual impacts from construction equipment, removal of vegetation, and lights from night-time construction.	
Neighborhoods, Community Services and EJ	None.	Access through neighborhoods would be maintained. Potential impact to Hampshire Hills neighborhood related to traffic from construction vehicles and equipment to access the railroad right-of-way.	
Air Quality	None.	Temporary localized air quality pollutant emissions related to demolition and construction activities.	
Noise and Vibration	None.	Temporary elevated noise levels due to construction. Potential temporary vibration impacts to residences and historic resources.	

Table ES-1 (continued)
Summary of Environmental Impacts

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Natural Resources	None.	Construction noise and staging may temporarily displace some wildlife species. The majority of the species is typical of urban/disturbed environments and would adapt and recover quickly.	Same as the Light Rail Alternative.
Water Resources	None.	Construction activities could increase sediment levels to stormwater runoff.	
Cultural Resources	None.	Potential vibration impacts from construction activities.	
Parklands	None.	Temporary greenway trail closures. Temporary visual and noise and vibration impacts to Kirk Farm Fields wetland viewing area.	
Energy	None.	1,210 BTUs (30% of total) during construction	
Hazardous and Contaminated Materials	None.	Potential impacts from removal and transportation of material.	
Safety and Security	None.	Construction safety provisions and regulations will be followed, so adverse safety and security impacts are not expected during construction.	
Secondary and Cumulative Effects (Chapter 19.0)			
Secondary Effects	n/a	<ul style="list-style-type: none"> Positive secondary effects related to potential induced development in station areas, consistent with adopted growth management policies that seek to encourage new development to occur in the designated corridors that will have the infrastructure to support growth. Potential negative secondary effects to natural resources, historic properties, neighborhood gentrification, affordable housing, traffic and demand for public services related to development / redevelopment activities. 	Same as the Light Rail Alternative.

**Table ES-1 (continued)
Summary of Environmental Impacts**

Impact Area	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Cumulative Effects	n/a	<ul style="list-style-type: none"> • Minor effects on notable environmental features. • Multiple projects in the Northeast Corridor, including the Sugar Creek Grade Separation, the Charlotte Rail Improvement and Safety Project (CRISP), High Speed Rail, the I-485 loop, I-85 widening, Northeast Corridor Infrastructure Program (NECI), and UNC Charlotte expansion are not likely to result in significant additional direct effects beyond those identified by each project. If construction occurs within the same time frame, temporary negative impacts to surrounding communities could occur. • Implementing the CATS 2030 System Plan includes improved access and mobility, linking communities across the region, and support for the Centers, Corridors, and Wedges Growth Framework. • Potential impacts on the South Corridor Blue Line light rail due to increased ridership demand. Extension of platforms and/or additional substations area required, which could create traffic, noise and natural resource impacts. 	Same as the Light Rail Alternative.

¹ British Thermal Units

² Sugar Creek Station Park-and-Ride Option 1/Sugar Creek Station Park-and-Ride Option 2.

**Table ES-2
Summary of Mitigation**

Impact Areas	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Transportation (Chapter 3.0)	The mitigation to address project impacts have been incorporated into the project design at 30 percent, including grade separations, signalized grade crossings, and turn lanes. No additional mitigation is proposed.	
Land Use (Chapter 4.0)	Station Area Plans will continue to be developed that define a framework for future growth and development.	Same as the Light Rail Alternative.
Socio-Economics (Chapter 5.0)	None.	None.
Neighborhoods/Community Facilities/Environmental Justice (Chapter 6.0)		
Neighborhoods	<ul style="list-style-type: none"> • Overflow parking in neighborhoods near light rail stations will be monitored. Corrective actions to provide additional parking will be made and/or parking enforcement will be instituted, if necessary. • A detailed noise analysis will be undertaken to determine specific noise mitigation measures for each property affected. • Implementation of the Urban Design Framework to minimize visual impacts • Further coordination with the property owners of Mallard Creek Apartments to develop landscape treatments, where practical, near the buildings closest to the trackway. 	Same as the Light Rail Alternative.
Community Facilities	<ul style="list-style-type: none"> • Coordination with emergency service providers to ensure that design allows access for these services and that the efficiency of emergency services is not impeded. • Coordination with CMC-University. 	
Environmental Justice	<ul style="list-style-type: none"> • Noise mitigation for residential properties located within EJ communities of concern will be required. 	

**Table ES-2 (continued)
Summary of Mitigation**

Impact Areas	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Visual And Aesthetics (Chapter 7.0)	<ul style="list-style-type: none"> • Implementation of the design treatments per the project’s Design Criteria, Urban Design Framework, to the extent practical. • Coordination with property owners to discuss the following proposed mitigation: <ul style="list-style-type: none"> ○ For the six affected properties in Hampshire Hills, landscaping is proposed along the project fencing. ○ Additional directional signage to improve way-finding to CMC-University and retain visibility to the hospital. ○ Additional landscaping, where practical, near the rear buildings of the Mallard Creek Apartments that are closest to the light rail alignment. • Continued coordination with stakeholders and potentially affected groups regarding potential visual impacts: Mecklenburg County Park and Recreation Department (MCPR) to coordinate with greenway plans; Charlotte Research Institute to coordinate with expansion plans; UNC Charlotte to ensure consistency with campus design guidelines; and University City Partners to provide information to affected business owners. 	Same as the Light Rail Alternative and: <ul style="list-style-type: none"> • Businesses along North Tryon Street/US-29 between Dorton Street and Old Concord Road to provide information to affected business owners.
Historical and Archaeological Resources (Chapter 8.0)	None.	None.
Parklands (Chapter 9.0)	<ul style="list-style-type: none"> • <u>Kirk Farm Fields</u> - A detailed noise assessment will be conducted during the Final EIS to confirm if a noise impact would occur at this location. Further coordination with MCPR to share the results of this assessment and determine if mitigation is feasible and prudent. • <u>Toby Creek Greenway (planned) and Mallard Creek Greenway Extension (planned)</u> - Vegetative screens will be maintained to the extent practical; CATS will coordinate with MCPR to ensure the light rail bridge over the greenway would not conflict with the greenway, and to minimize impact to trail operations during construction. CATS will notify MCPR 48 hours in advance of temporary closure of greenways due to construction. 	Same as the Light Rail Alternative.
Natural Resources (Chapter 10.0)		
Impacts to farmlands and forests	Trees and landscaping will replace vegetation loss. Park-and ride lots will comply with Charlotte Tree Ordinance, which requires 8 percent coverage. Limited opportunities for urban forestry.	Same as the Light Rail Alternative.
Impacts to protected species	None.	None.

**Table ES-2 (continued)
Summary of Mitigation**

Impact Areas	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Water Resources (Chapter 11.0)		
Impacts to groundwater	Although no groundwater impacts are anticipated, a well located on the UNC Charlotte campus within the proposed project alignment is no longer in use. CATS and/or UNC Charlotte will complete the abandonment/closure process to seal the well.	Same as the Light Rail Alternative
Impacts to surface waters	Design will continue to minimize impacts to streams through the limited use of riprap at pipe inlets and outfalls; the relocation of channels using natural channel design techniques where practicable; and preservation of streambanks at proposed bridge crossings. Compensatory mitigation would be made through the Charlotte Umbrella Stream and Wetland Mitigation bank when impacts are unavoidable and as required by the Clean Water Act and as determined in coordination with the U.S. Corps of Engineers and the North Carolina Division of Water Quality.	Same as the Light Rail Alternative.
Impacts to floodplains and floodways	Bridge design will continue to minimize impacts to floodplains and floodways. Continued coordination with Charlotte and Mecklenburg County Stormwater Services will be made for continued input into the project design.	Same as the Light Rail Alternative.
Impacts to wetlands	Additional efforts to avoid and minimize impacts to wetlands will continue to be made during preliminary engineering design, including: steepening fill slopes where practicable; use of retaining walls or similar structures; locating construction staging and access areas away from wetlands; and demarcating preserved wetland areas prior to construction. Compensatory mitigation would be made through the Charlotte Umbrella Stream and Wetland Mitigation bank, when impacts are unavoidable, and as required by the Clean Water Act and as determined in coordination with the U.S. Corps of Engineers and the North Carolina Division of Water Quality.	Same as the Light Rail Alternative.
Air Quality (Chapter 12.0)	Coordination with Mecklenburg County Land Use & Environmental Services Agency to comply with air quality modeling requirements for Transportation Facilities Construction Permits for the proposed parking garages.	Same as the Light Rail Alternative.
Noise and Vibration (Chapter 13.0)	A detailed noise and vibration assessment for the potential moderate and severely impacted properties will be completed. Potential noise mitigation measures include rail vehicle skirts, sound barriers, resilient or damped wheels, and building sound insulation. Specific mitigation recommendations will be coordinated with affected property owners.	Same as the Light Rail Alternative, except that a detailed study at St. Anne's Place would not be needed as this design option avoids that impact.
Energy (Chapter 14.0)	None.	None.
Hazardous and Contaminated Materials (Chapter 15.0)	Phase II Environmental Site Assessments will be performed for all full or partial acquisitions determined to be a risk for hazardous material contamination. Remediation in accordance with local and state regulations. For sites of low concern, a special provision will be included in the construction contract for the excavation and disposal of non-hazardous contaminated sites.	Same as the Light Rail Alternative.

**Table ES-2 (continued)
Summary of Mitigation**

Impact Areas	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Safety and Security (Chapter 16.0)	Design review by CATS Safety and Security/CMPD, NCDOT Safety Oversight, and Charlotte Department of Transportation to ensure design meets safety and security requirements. Continued public outreach regarding railroad safety.	None.
Acquisitions and Displacements (Chapter 17.0)	Uniform Relocation Assistance and Real Property Acquisition Policies Act would be followed.	Same as the Light Rail Alternative.
Construction Impacts (Chapter 18.0)		
Utility	<ul style="list-style-type: none"> • Coordinate with utility owners to ensure maintenance of utility services and timely relocation • Relocate, remove and protect existing utilities. 	Same as the Light Rail Alternative but applied to a greater degree due to the street and business impacts that would also occur between Dorton Street and Old Concord Road.
Transportation, Traffic and Parking	<ul style="list-style-type: none"> • Schedule construction activities during off-peak hours, where practical. • Develop Maintenance of Traffic Plan. • Coordinate freight schedule and construction activities with the railroads. 	
Land Use, Community Facilities and Businesses	<ul style="list-style-type: none"> • Coordinate with local business owners and provide advance notification of roadway disruptions and descriptions of alternative routes. • Provide temporary entrance signs during construction. 	
Visual and Aesthetic	<ul style="list-style-type: none"> • Shield and aim night work lights directly at the work zone. • Stage construction activities to limit the duration of impacts at individual locations. 	
Neighborhoods, Community Services and Environmental Justice	<ul style="list-style-type: none"> • Inform local property owners, through the Construction Education and Outreach Plan, of roadway disruptions. • Provide continuous coordination with community service providers to maintain access for emergency vehicles. • Restrict contractors from accessing the railroad right-of-way through the Hampshire Hills neighborhood. 	
Air Quality	<ul style="list-style-type: none"> • Shut off construction equipment not in direct use. • Water areas of exposed soil to control dust. • Cover open body trucks transporting materials to and from construction sites. • Reroute truck traffic away from schools and residential communities when possible. • Repave and/or replant exposed areas as soon as possible following construction. • Adequately secure tarps, plastic or other material over debris piles. • Prohibit idling of delivery trucks or other equipment during periods of extended unloading or inactivity. 	
Noise and Vibration	Conduct detailed noise and vibration assessment during final design and employ recommended mitigation techniques identified within the assessment.	

**Table ES-2 (continued)
Summary of Mitigation**

Impact Areas	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Natural Resources	Best management practices (BMP) would be followed by the contractor during construction. BMP would include the demarcation of the construction limits and staging areas prior to the initiation of construction, to limit the disturbances to the vegetative community.	Same as the Light Rail Alternative but applied to a greater degree due to the street and business impacts that would occur between Dorton Street and Old Concord Road.
Water Resources	<ul style="list-style-type: none"> • Minimize disturbed areas. • Apply prompt stabilization. • Employ an erosion and sediment control plan to treat stormwater runoff. • Prevent the storage of fill or other materials in floodplains, to the extent practicable. • Stage construction of proposed stormwater systems to reduce the duration of construction disturbances to a given area. • Recycle topsoil removed during construction by using it to reclaim disturbed areas and enhance regrowth. • Avoid excessive slopes during excavation and blasting operations to reduce erosion. • Use isolation techniques, such as berming or diversion, for in-stream construction near wetlands. 	
Cultural Resources	<ul style="list-style-type: none"> • Stop construction activities immediately upon the discovery of any new cultural resources. • Maintain minimum allowable distances from historic resources, to the extent practicable. 	
Parklands	<ul style="list-style-type: none"> • Restrict construction to areas adjacent to the Kirk Farm Fields park boundary. • Notify MCPR 48 hours in advance of temporary closures of greenways due to construction. 	
Energy	Measures to minimize energy consumption during construction could include limiting the idling of construction equipment and employee vehicles, as well as locating staging areas and material processing facilities as close as possible to work sites.	
Hazardous and Contaminated Materials	<ul style="list-style-type: none"> • Dispose of hazardous materials according to applicable federal, state and local guidelines. • Clean construction vehicles to prevent off-site contamination. 	
Safety and Security	Provide construction barriers and fencing to secure construction sites and staging areas.	

**Table ES-2 (continued)
Summary of Mitigation**

Impact Areas	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Secondary and Cumulative Effects (Chapter 19.0)		
Secondary Effects	Implement Station Area Plan recommendations to minimize potential secondary impacts. Other measures include: <ul style="list-style-type: none"> • Affordable housing strategies to be developed with station area plans; • Notification to the Landmarks Commission of National Register Eligible properties that could be designated as Local Landmarks to afford them protection; • Provide Convenient access to light rail and bus services; • Public outreach/education regarding the benefits of transit supportive development; public involvement in station area plan development; and, • Coordination with City of Charlotte's Stormwater Services to minimize impacts to water resources and water quality during the station area planning process. 	Same as the Light Rail Alternative.
Cumulative Effects	<ul style="list-style-type: none"> • A detailed traffic analysis and re-evaluation of the South Corridor Light Rail Project Final EIS will be undertaken to identify specific measures to mitigate potential impacts to the South Corridor and existing LYNX Blue Line. • Continued coordination with NCDOT's Rail Division regarding project schedule of the Sugar Creek Grade Separation Project. 	Same as the Light Rail Alternative.

ES.7 Financial Analysis and Investment Impacts

ES.7.1 Capital Costs

For the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option, the estimated capital cost is \$948.6 million for the Light Rail Alternative and an additional \$57.9 million for the Light Rail Alternative – Sugar Creek Design Option, expressed in 2009 dollars. This cost estimate includes trackwork, bridges, systems, stations, parking facilities, a vehicle light maintenance facility and storage yard, light rail vehicles, real estate, professional services and contingencies. Year of expenditure capital costs are projected to be \$1.21 billion and \$1.28 billion for the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option, respectively.

ES.7.2 Operating and Maintenance Costs

The estimated system-wide annual light rail and bus operating costs is \$112.73 million for the Light Rail Alternative or the Light Rail Alternative – Sugar Creek Design Option, approximately \$17.01 million more per year than the No-Build Alternative.

ES.7.3 Funding and Financing Strategies

Funding for corridor capital investments is planned to be funded 50 percent by federal grants, 25 percent by state grants and 25 percent by CATS from sales tax revenues:

U.S. Department of Transportation Discretionary Funds: Federal Section 5309 New Start grants are expected to fund 50 percent of the corridor capital investments. These funds are allocated by Congress and the Federal Transit Administration (FTA).

North Carolina Department of Transportation (NCDOT) Transit Trust Fund: The North Carolina Department of Transportation is the other major funding partner for the LYNX BLE. The funding source to fulfill this commitment is a Transit Trust Fund created by the North Carolina Legislature in its 2001 Budget.

Charlotte Area Transit System (CATS): Twenty-five percent of the project's total capital cost will be funded using revenues from the CATS ½-percent sales and use tax dedicated to funding transit. Voters in Mecklenburg County approved the sales tax in November 1998 and it has been collected since April 1999. By statute, revenues from the sales and use tax can only be applied to expenditures for planning, construction, and operation of a county-wide public transportation system.

ES.8 Evaluation of Alternatives

The information in the Draft EIS provides the basis for decision-makers and the public to assess the benefits, costs and environmental consequences of each alternative against the goals of the proposed project. The goals of the proposed project are as follows:

Goal 1 – Land use: Support the region's Centers, Corridors and Wedges vision

Goal 2 – Mobility: Improve access and mobility in the corridor and throughout the region; Increase transit ridership; Improve quality of transportation service

Goal 3 – Environment: Preserve and protect the environment

Goal 4 – Financial: Develop affordable, cost-effective transportation solutions

Goal 5 – System Integration: Develop transportation improvements that function as part of the larger transportation system

This Draft EIS compares the No-Build Alternative to the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option and illustrates that the two Build Alternatives address the goals and objectives of the proposed project. The Light Rail Alternative and Light Rail Alternative – Sugar Creek

Design Option would enhance accessibility, improve mobility, and support land use goals that would not be possible under the No-Build Alternative. The following summarizes the evaluation of the alternatives against the adopted goals and the assessment of impacts documented in this Draft EIS.

ES.8.1 No-Build Alternative

The No-Build Alternative would not fulfill Goal 1, to support the region's Centers, Corridors and Wedges vision as no improvements would be made that are consistent with land use plans and policies. Likewise, the No-Build Alternative would not fulfill Goal 2 to improve access and mobility within the corridor and throughout the region. The No-Build Alternative would not encourage the use of transit. Travel time savings would not be realized and service improvements for transit-dependent populations would not be provided or would be limited. Similarly, Goal 5, which encourages system integration, would not be realized under the No-Build Alternative. The No-Build Alternative would not fulfill Goal 3 to preserve and protect the environment. Under the No-Build Alternative, population growth and land use would not be concentrated to the City's centers and corridors, and urban sprawl could continue. This could result in continued impacts to natural resources as development trends could continue in outlying areas of the metropolitan region. Additionally, an alternative to the automobile and bus would be not available, resulting in no improvements to air quality. The No-Build Alternative would fulfill Goal 4 by providing a cost effective alternative that ensures capital and O&M costs are consistent with funding levels.

ES.8.2 Light Rail Alternative

The Light Rail Alternative would fulfill each of the project goals. Goal 1, to focus growth in the Northeast Corridor directing new development and redevelopment around transit stations, would be attained as the Station Area Plans would employ the City's Zoning Ordinance to implement land uses that are transit supportive. The Light Rail Alternative would also fulfill Goal 2, to improve access and mobility within the Northeast Corridor and the region. The Light Rail Alternative would increase transit ridership, improve transit travel times, and improve mobility for transit-dependent populations. The Light Rail Alternative would fulfill Goal 3, to protect the environment, by supporting sustainable growth through transit-supportive development plans. Increased transit use would reduce vehicle miles of travel by automobiles, thereby resulting in a reduction in automobile emissions. This reduction in automobile emissions would result in improvements to local air quality. However, the Light Rail Alternative would result in impacts to other natural resources such as wetlands and streams. These impacts would be minimized or mitigated as described in this Draft EIS. Goal 4, to develop affordable, cost-effective transportation solutions, can be attained under the Light Rail Alternative as projected capital and operating and maintenance costs are consistent with anticipated funding levels. However, though the Light Rail Alternative is only slightly higher to the No-Build Alternative in terms of system-wide annual operating and maintenance cost, the capital costs are significantly greater. The Light Rail Alternative provides a significant level of benefits for its proposed cost. Goal 5, which encourages system integration, would be realized under the Light Rail Alternative as it would provide through service to the existing light rail line, and implement part of the *2030 Transit Corridor System Plan*.

ES.8.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would fulfill each of the project goals in the same way as the Light Rail Alternative. However, capital costs associated with the Light Rail Alternative – Sugar Creek Design Option would be higher than under the Light Rail Alternative. Additionally, impacts to natural and human resources would differ slightly under the Light Rail Alternative – Sugar Creek Design Option as compared to the Light Rail Alternative. This comparison confirms the previous findings that this option does not provide sufficient additional benefits to justify the increased costs.

ES.9 Public and Agency Coordination

ES.9.1 Public Involvement

The coordination of the public, interested and affected parties, and federal, state, and local agencies is necessary to help the project team define the transit and land use issues that characterize the Northeast Corridor. The Public Involvement Plan (PIP) included scoping and focus group meetings, project mailings, individual/group contacts, public hearings, a newsletter, website, and countywide mailing list.

Scoping Meetings. A Notice of Intent to conduct an Alternatives Analysis and prepare an EIS was published in the Federal Register on September 29, 2000. Public scoping meetings were held September 26th and 28th, 2000 for the purpose of gathering input on the alternatives being studied in the Major Investment Study and the potential impacts to be included in the scope of the EIS. Interagency scoping letters were mailed to all agencies with jurisdiction to obtain input from the environmental resource and regulatory agencies on the appropriate assessment methodologies to be used in the project. CATS conducted a Scoping Update process in 2005 and 2006 to conduct additional scoping outreach activities.

Public Workshops and Individual Meetings. Over the course of project development, CATS held 34 public meetings, with approximately 1,438 attendees, and 86 individual meetings, with approximately 3,613 attendees, to gather input on the project definition and station locations.

Newsletter and Website. A project-specific newsletter entitled *Blue Line Extension Transitions* was published by CATS in order to inform interested citizens of project updates, upcoming meetings, and website enhancements. It was mailed to those on the mailing list, made available at meetings and presentations, on the project website, and at CATS offices. CATS also maintains a project specific page on its website, www.ridetransit.org, that provides information relevant to the LYNX BLE project.

Mailing Lists. CATS maintains two mailing lists, a countywide project mailing list and a mailing list for those specifically interested in the LYNX BLE. The countywide list contains 6,800 contacts and includes property owners, occupants, and other stakeholders. The LYNX BLE mailing list includes 870 persons located in and around the LYNX BLE study area and/or those who have expressed specific interest in the project. Persons on the mailing lists received the CATS' *Blue Line Extension Transitions* Newsletter.

ES.9.2 Agency Coordination

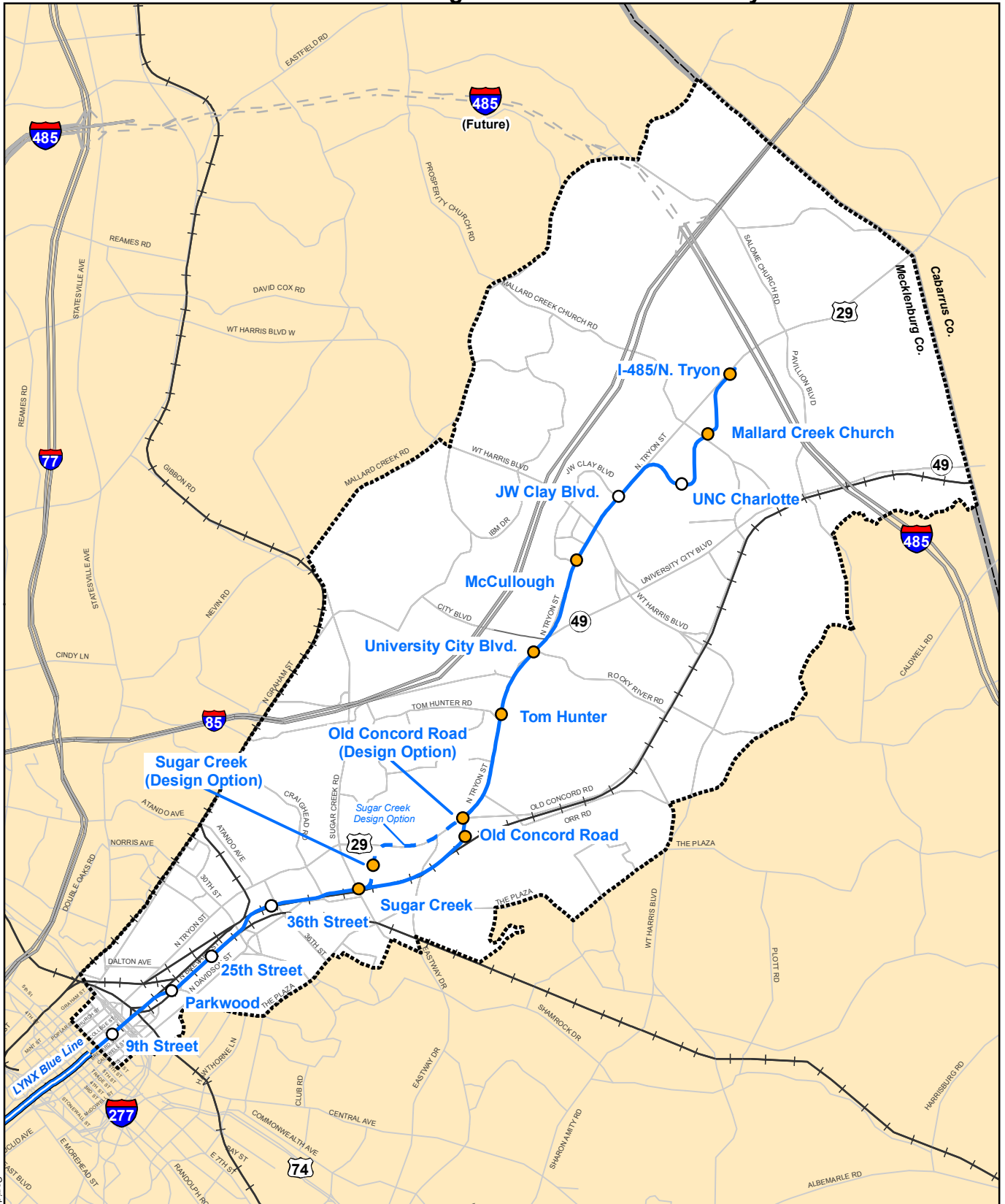
Quarterly meetings are held between CATS and the FTA to review the status of CATS projects, including the LYNX BLE project, and for FTA to provide federal oversight and guidance. In addition, CATS has formed three teams with representatives from City and County departments to provide project management and oversight.

Throughout the project development process, CATS has coordinated with state and federal agencies, including the State Historic Preservation Office (SHPO), the US Army Corps of Engineers, UNC Charlotte and NCDOT. In addition, CATS has coordinated closely with project stakeholders, including railroads and utilities, to development agreements related to construction, operation, and funding.

ES.10 Next Steps

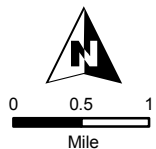
Following the close of the public circulation period on this Draft EIS, the Metropolitan Transit Commission (MTC) will consider public comments to select a Preferred Alternative amongst the alternatives under study in this Draft EIS.

Light Rail Alternative - Locally Preferred Alternative



Legend

- Northeast Corridor Limits
- LYNX Blue Line
- Proposed Light Rail Alternative
- Design Option
- Proposed Stations
- Proposed Stations with Park-and-Ride
- Railroads
- Highway
- Major Roads
- Highway (Future)
- County Line



Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Corridor_Base_Map_Figure_1-2_CB_120909.mxd

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1.0 PURPOSE AND NEED

The Charlotte Area Transit System (CATS), in cooperation with the Federal Transit Administration (FTA), is preparing this Draft Environmental Impact Statement (EIS) to evaluate potential transit improvements in the Northeast Corridor of the Charlotte-Mecklenburg region. This chapter focuses on the purpose of the LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) and the need for transportation improvements in the Northeast Corridor. In addition, this chapter explains the goals and objectives of the corridor improvements.

1.1 Introduction

1.1.1 Project Description

The Northeast Corridor is located within the City of Charlotte and Mecklenburg County, North Carolina, as shown in Figure 1-1. The proposed LYNX BLE would be an extension of the LYNX Blue Line (formerly called the South Corridor Light Rail Project) light rail service that opened in November 2007. The proposed project would extend approximately 10.7 miles and provide 13 transit stations, including six walk-up stations and seven stations with park-and-ride facilities, as well as a feeder bus system to support the light rail system. The alignment would travel within existing railroad rights-of-way from Center City Charlotte to the middle of the alignment, near Old Concord Road, where it would then transition to the median of North Tryon Street/US-29. The line would remain in the median until approximately 1,000 feet north of the existing entrance to the University of North Carolina at Charlotte's (UNC Charlotte) Charlotte Research Institute, where it would turn southeast and enter the campus. The line would then return to North Tryon Street/US-29 to a terminus just south of Interstate 485 (I-485). The proposed project would include bus services to connect the light rail service with the CATS regional bus system. Figure 1-2 shows the proposed Light Rail Alternative alignment, station locations and design option under study.

1.1.2 Project Purpose

The purpose of the proposed LYNX BLE is to ensure future mobility by providing a transportation alternative in a highly congested travel corridor and to support the region's land use policies and goals for a sustainable growth and development pattern. The proposed project would provide high-capacity, fixed guideway transit service in the corridor. This new service would offer a convenient, time-competitive travel alternative and reduce dependence on single-occupant automobiles. As an extension of the LYNX Blue Line, the proposed project would enhance the operating effectiveness of CATS' light rail service and leverage the public investment already made in the South Corridor.

The proposed project would also support the *Centers, Corridors and Wedges Growth Framework*, Draft 2010, for the Charlotte-Mecklenburg region, as shown in Figure 1-3. As envisioned in the region's combined transit and land use plans, future development would be focused into areas that can support new development or are in need of redevelopment and away from areas that cannot support new growth. The highest density development would be encouraged around light rail stations. By focusing future growth in corridors with multiple travel alternatives, the region would be able to grow in a manner that promotes continued access and mobility and that enhances the quality of life for residents and employees.

1.1.3 Project Need

The City of Charlotte, North Carolina is at the heart of the rapidly growing Charlotte-Mecklenburg region, which boasts one of the most robust economies in the United States. Charlotte serves as the commercial capital of the Carolinas and has become one of the nation's largest banking centers. With its reputation as an excellent place to live and do business, the region is thriving, and the last several decades have seen record increases in population and employment, both in Center City Charlotte and in outlying activity centers.

A large amount of growth is anticipated for the Charlotte-Mecklenburg region in the next 25 years. Much of the past growth has occurred in a dispersed pattern of jobs and residences with limited connectivity between uses. If future growth follows past development trends, area residents will continue to be

dependent on the automobile for their travel needs, and peak period congestion will worsen. This congestion presents a significant threat to mobility, air quality, public safety, economic vitality and the overall quality of life in the Charlotte-Mecklenburg region.

Several major roadways and intersections in the Northeast Corridor currently experience peak hour volumes that exceed capacity, including North Tryon Street/US-29, W.T. Harris Boulevard, Sugar Creek Road, Mallard Creek Church Road and University City Blvd./NC-49. Despite widening projects and intersection improvements that are planned or programmed for most of these roadways, peak period congestion is projected to increase to significant levels by 2030.

The Northeast Corridor is a heavily traveled transit route, as it provides a vital connection between Center City Charlotte and the University City area. The route along North Tryon Street/US-29 also provides an alternative to travel on Interstate 85 (I-85) between these two activity centers. As of January 2009, there were 14 bus routes operating in the Northeast Corridor, including local bus routes, UNC Charlotte shuttle routes, neighborhood circulator routes and express bus routes. However, existing transit services must operate in mixed traffic on congested roads. This congestion often causes delays to transit service and results in longer transit travel times that cannot provide a time-competitive alternative to auto use. As such, these conditions limit the probability that people with a choice would use transit rather than driving alone.

Recognizing the consequences of uncontrolled growth to the region's attractiveness as a place to live and do business, decision-makers initiated efforts to coordinate land use and transportation planning, and encourage growth in a way that will enhance regional mobility. The City of Charlotte and Mecklenburg County adopted the *Centers and Corridors Concept Plan* and updated *Centers, Corridors and Wedges Growth Framework*, Draft 2010, to build on the region's existing framework of centers and corridors, focusing future development in these areas and preserving lower density development and open space between corridors.

1.2 Corridor Description

The Northeast Corridor extends approximately 14 miles from Center City Charlotte to the Concord Mills Mall area near the Mecklenburg-Cabarrus County line. The corridor runs in a northeasterly direction from Center City Charlotte, generally following I-85, and encompasses the major arterials that parallel I-85, including North Tryon Street/US-29 and University City Blvd./NC-49. The Northeast Corridor begins in Center City Charlotte, the City's central business district, and the region's largest employment concentration. The Northeast Corridor also includes University City, one of the largest suburban edge cities in the region. University City is a major regional employment center that includes the Wells Fargo and IBM complexes at University Research Park, the Teachers Insurance and Annuity Association-College Retirement Equities Fund financial services complex, and Carolinas Medical Center–University. University City also is the location of the main campus of UNC Charlotte. The Northeast Corridor Major Activity Centers are shown in Figure 1-4.

1.2.1 Population and Employment

The Charlotte-Mecklenburg area represents the largest concentration of population and employment in North Carolina. Since 1980, the region has experienced significant growth, resulting in a doubling of population between 1980 and 2000. According to U.S. Census Bureau data, between 1990 and 2000 Mecklenburg County's population increased from 511,400 residents to 695,000 residents (a 36 percent increase). This trend of adding nearly 200,000 persons per decade is projected to continue through 2030.

The latest estimates by the U.S. Census Bureau indicate that the County population has been increasing significantly within this decade. The population was approximately 895,567 in 2008, representing a 75 percent increase from the 1990 population of 511,400. Projected corridor population trends are summarized in Table 1-1. As seen in Table 1-1, the Northeast Corridor in 2008 was home to about 89,300 persons, which is approximately 10 percent of the County's population. By 2030, population in the corridor is projected to increase by 41 percent. Center City Charlotte is projected to have an increase in population of approximately 20,108 persons or about 208 percent between 2008 and 2030. With the

population increase, population densities within Mecklenburg County are expected to increase within the 20-year horizon period for this Draft EIS.

**Table 1-1
Population and Employment, 2008 and 2030**

Category	Population			Employment		
	2008	2030	Percent Change	2008	2030	Percent Change
Mecklenburg County	895,567	1,271,039	42%	647,180	985,769	52%
Persons/Sq. Mile	1,640	2,328		1,185	6,805	
Northeast Corridor (excluding Center City Charlotte)	89,360	126,373	41%	79,736	127,317	60%
Persons/Sq. Mile	2,198	3,108		1,961	3,131	
Center City Charlotte	9,687	29,795	208%	68,630	111,069	62%

Source: Charlotte-Mecklenburg Planning Department Land Use Projections (LUSAM Model), 2009.

The Northeast Corridor is comprised of a large number of residents that are transit-dependent, so access to travel is also a major concern for area households. Ten percent of the housing units in the corridor have no vehicles available to travel to and from work or for any other purpose. Forty-one percent of the population belongs to a minority defined population group and the median-income for most of the area census tracts is below the level defined as low-income (See Chapter 6.0: Neighborhoods, Community Services and Environmental Justice).

Substantial employment growth has also occurred in the County and Northeast Corridor, with additional growth projected to continue through 2030. According to the Employment Commission of North Carolina, employment within Mecklenburg County grew by approximately 57 percent between 1990 and 2008. As seen in Table 1-1, employment growth in the Northeast Corridor (60 percent) is projected to be slightly higher than projected for the County (52 percent) in 2030.

1.2.2 Existing Land Use

The Northeast Corridor has a diverse mix of existing land uses that are anchored between two of the most popular regional travel destinations and activity centers: Center City Charlotte and the University City area. Center City Charlotte is characterized by the City's highest density office and commercial developments, as well as numerous entertainment venues, shops, restaurants, hotels and government facilities. Center City Charlotte has approximately 68,630 employees, 14.4 million square feet of office space (Charlotte Center City Partners, 2008), 2.7 million square feet of office space in construction (Charlotte Center City Partners, 2008), and another 1.1 million square feet of office space proposed. This total square footage of office space represents approximately 34 percent of the total office space in Mecklenburg County, a share that is among the highest of mid-sized cities in the nation (Charlotte Center City Partners, 2008). Major employers include Bank of America, Wells Fargo, Bell South, Duke Energy, Hearst Corporation and City and County governments.

Development within Center City Charlotte has occurred at a rapid pace in the last five years. Numerous development projects are currently proposed or are under construction. With these projects, an additional 1.1 million square feet of office space, representing six billion dollars in construction costs, will be added to the core of Center City Charlotte within the next decade (Charlotte Center City Partners, 2008).

In addition, Center City Charlotte has experienced dramatic growth in housing in the last five years. With more than 4,500 housing units added since 1997 (Charlotte Center City Partners, 2007), Center City Charlotte now has over 6,000 housing units (Charlotte Center City Partners, 2009) and 9,687 residents. Center City Charlotte also has over 1.67 million square feet of retail space and numerous entertainment destinations, including an NFL football stadium, an NBA arena, 48 cultural facilities and the NASCAR Hall of Fame (Charlotte Center City Partners, 2009). Charlotte has a robust tourism industry. Center City Charlotte has approximately 4,214 hotel rooms in 15 hotels, and the Charlotte Convention Center attracts

about 500,000 people annually to its conventions, trade shows, and other events (Charlotte Center City Partners, 2009).

Center City Charlotte is also home to major institutional uses, including City and County government, federal and state offices, a Federal Reserve Bank branch, the Central Post Office, Main Library, and the Mecklenburg County Courthouse. A number of secondary schools, Johnson and Wales University (3,000 students), and the UNC Charlotte Uptown campus are also located in Center City Charlotte. In addition, Center City Charlotte is home to a number of visitor attractions and entertainment venues including the Time Warner Cable Arena, the Levine Museum of the New South and the ImaginOn Children's Learning Center. There are over 2 million annual visits to Center City Charlotte sports venues (Charlotte Center City Partners, 2009). Center City Charlotte also hosts special events throughout the year.

To the north of Center City Charlotte, the character shifts from the rapidly growing Center City to light industrial uses, warehouses, and established urban neighborhoods where Charlotte's historic textile mills and self-contained villages just outside the City were once located. This area, known as North Charlotte neighborhood, is a National Register Historic District (North Charlotte Historic District) and has been undergoing major redevelopment efforts since the early 1980s. This redevelopment has retained the small village character for which the area was originally known and has included the adaptive re-use of the area's historic mills.

In particular, the NoDa Arts District near the intersection of North Davidson and 36th streets has seen new investments in shops, restaurants, small arts and crafts businesses, art galleries and multi-family residences. Given its historic development patterns that pre-date the expansive use of the automobile, NoDa offers nearby residents a pedestrian-oriented atmosphere where shops and entertainment venues are easily accessible by neighborhood residents. The NoDa area is also bordered by the planned Little Sugar Creek Greenway, which will provide a bicycle and pedestrian connection from North Davidson into Center City Charlotte and to the north.

North of the NoDa area, the corridor shifts to the City's first ring of suburbs that date to the mid-1940s. The area is characterized by commercial development along the main arterials with established residential neighborhoods behind the commercial areas, including the Hidden Valley neighborhood. Many of these neighborhoods are low-income transit-dependent populations. Some businesses along North Tryon Street/US-29, which is the main strip commercial artery in this portion of the corridor, have closed and some of the larger shopping centers have lost their major commercial anchor tenants.

North of the convergence of North Tryon Street/US-29 and University City Blvd./NC-49 (locally called "the weave"), land use in the corridor shifts from older development to newer and emerging suburban development on undeveloped (greenfield) land. Improvements to the roadway network in this area have led to the new construction of two major retail sites including an IKEA that opened in February of 2009 (as part of the planned Belgate development) and a Wal-Mart.

To encourage and support the growth and development of University City, a Municipal Service District (MSD) was created in 2003 and shortly thereafter, University City Partners was formed to guide policies and plan development within the MSD. University City Partners, along with the City of Charlotte, completed the *University City Area Plan* in 2007 for the MSD. The MSD is generally bound by North Tryon Street/US-29, I-85, University City Blvd./NC-49 and Mallard Creek Church Road. University City is estimated to contain over 150,000 residents and provides approximate 74,000 jobs (University City Partners, 2009). The central goal of the *University City Area Plan* is to promote the Northeast Corridor and encourage development that would support and benefit from the development of light rail in the Northeast Area, of which the University City area serves as the core. This plan calls for improvements to existing land use patterns and connectivity; identifies opportunities for transit-oriented development; and introduces a boulevard concept for North Tryon Street/US-29. The central goal of the plan is to design and promote the corridor as a premier public space and gateway into the University City area.

The University City area includes the University Research Park, which is home to over 198 companies that employ over 20,000 workers (University City Partners, 2008). University City is also the location of the main campus of UNC Charlotte. UNC Charlotte comprises a 1,000-acre campus, with over 2,200

faculty and staff and over 23,300 students (UNC Charlotte, 2009). UNC Charlotte projects enrollment to be 35,000 by 2030. The area also has a large presence of higher-density, multi-family housing due to the presence of the UNC Charlotte. The University City area “town center” includes major retailers, hotels, and restaurants, including a 500,000 square foot regional retail center, University Place, which is located adjacent to UNC Charlotte.

Land uses on the UNC Charlotte campus include research facilities, administration buildings, classrooms and laboratories, student housing and recreational facilities. Development on the campus has, in the past, been limited by the topography of the campus that is subject to rock-outcrops and steep slopes. The heart of the campus is located between North Tryon Street/US-29 and University City Blvd./NC-49. The University has constructed several new buildings in the last few years, including the Charlotte Research Institute, with a new entrance on North Tryon Street/US-29. The latest *UNC Charlotte Facilities Master Plan* (2000) identifies the need to add 3.1 million square feet of academic building space and 2,400 beds on campus over the next 20 years. The University is currently in the process of updating the master plan.

Beyond University City, the corridor includes large areas of vacant and under-utilized properties with pockets of low-density development, including single and multi-family residential areas. With the completion of I-485 to I-85, the northeast end of the corridor is quickly developing in ways similar to the University City area. Just past the corridor are Verizon Wireless Amphitheatre, Concord Mills Mall (North Carolina’s largest tourist attraction) and Lowe’s Motor Speedway, which holds over 380 events a year.

1.2.3 Travel Patterns and Markets

Travel patterns in the Northeast Corridor are strongly influenced by the presence of Center City Charlotte at the southern end of the corridor and University City at the northern end of the corridor. Both Center City Charlotte and University City are major employment centers for the region and attract trips from within the corridor as well as adjacent areas, such as Concord/Kannapolis (in Cabarrus County), the Southeast Corridor, the South Corridor, the wedge between the Northeast and Southeast corridors called the East Wedge, and the North/Northeast Wedge. The Northeast Corridor also contains major activity centers that attract trips that are not work-related, including UNC Charlotte, Carolinas Medical Center–University, and regional shopping destinations in University City, as well as just north of the Mecklenburg-Cabarrus County line at Concord Mills Mall.

The Northeast Corridor is a major generator of trips from throughout the region, as well as a significant number of intra-corridor trips. The Northeast Corridor is a major employment, shopping and educational destination from all across the region. Based on adopted land use policies, the travel markets between corridors will strengthen. Connections between the center city campus and the main campus of UNC Charlotte will be important. In addition, special events and tourism are another travel market in the corridor. The proposed LYNX BLE project would serve the following travel markets:

- Inbound and reverse commute work trips (Center City Charlotte had 68,630 employees in 2008 and that number is expected to grow to 111,069 by 2030);
- Trips to the UNC Charlotte main campus;
- Trips between the UNC Charlotte main campus and its new downtown campus;
- Trips to University City, including University Place, Carolinas Medical Center–University;
- Trips to the “NoDa” area;
- Trips from the Hidden Valley neighborhood, an existing high transit use and transit-dependent area;
- Trips to the Center City Charlotte entertainment district (theaters, museums, NASCAR Hall of Fame and Convention Center);
- Trips to major sporting venues and other special events (Bank of America Stadium - NFL games; Time Warner Cable Arena - NBA games, hockey games, concerts; and the planned AAA baseball stadium); and
- Trips to and from other transit corridors.

The following section describes the major travel patterns within the Northeast Corridor:

All Trips

The Northeast Corridor is projected to experience increased travel demand for both peak period and daily trips from 2009 to 2030 for trips occurring within the Northeast Corridor and those occurring between the Northeast Corridor and other parts of town. Between 2009 and 2030, the total number of trips that either begin or end in the Northeast Corridor is expected to increase 46 percent from 646,734 trips in 2009 to 944,098 trips in 2030. Similar to 2009, the percent of trips by purpose in 2030 is expected to be 17 percent work trips, 41 percent other home-based trips, 40 percent non-home based trips, and two percent university trips.

Home-based Work Trips

Home based-work trips are typically the largest transit market, since trips to major employment centers are usually well served by transit services, are made on a predictable schedule, and have the potential for attracting non-transit dependent travelers.

Daily home-based work trips to and from the Northeast Corridor are expected to increase 39 percent from 47,642 in 2009 to 66,116 trips in 2030. In 2030, 39 percent of these work trips stay within the Northeast Corridor, while 20 percent of work trips are between the Northeast Corridor and Center City Charlotte.

Home-based work trips to Center City Charlotte are particularly transit-competitive. In 2030, about 6.5 percent of all regional home-based work trips to Center City Charlotte will originate in the Northeast Corridor and would be the strongest market for rapid transit service.

Trips within the Northeast Corridor

Twenty-three percent of all Northeast Corridor trips stay within the Northeast Corridor in 2009 and 25 percent in 2030. Within the Northeast Corridor, most trips are associated with either travel to Center City Charlotte or to the University City area, University Research Park, and the UNC Charlotte campus. The highest number of trips to Center City Charlotte occurs in the southern portions of the alignment closest to Center City Charlotte. Likewise, the trips associated with the outermost portion of the corridor, north of W.T. Harris Boulevard, also occur in the outermost portion of the corridor near the University area.

Given the presence of UNC Charlotte and other employment centers in University City, reverse commuting from inner portions of the corridor to the outer portions is a strong market. In addition to work trips to Center City Charlotte, work trips within the Northeast corridor are a strong market. The University Research Park and the UNC Charlotte / University City areas represent about 12 percent of the work trips projected to stay within the Northeast Corridor in 2030.

Special Events

Another significant travel market for the Northeast Corridor are trips associated with activities that do not occur on a regular basis, such as travel to special events and travel by visitors to the area. Charlotte has a large number of major sporting and special events venues in Center City Charlotte, including, but not limited to: Bank of America Stadium, Time Warner Cable Arena, Discovery Place, Blumenthal Performing Arts Center and various museums. The outer part of the corridor contains several special generators including UNC Charlotte, Charlotte Motor Speedway, Verizon Wireless Amphitheatre and Concord Mills Mall. The existing LYNX Blue Line light rail service has a high volume of special event riders.

1.2.4 Transportation Facilities and Service

The transportation system in the Northeast Corridor consists of the street and highway network; transit services and facilities; freight and passenger railroads; and bicycle and pedestrian facilities. A brief overview of the various components of the transportation network is provided in the following sections. A more detailed discussion of the corridor's transportation facilities is included in Chapter 3.0: Transportation and representative figures.

1.2.4.1 Highway Facilities

The roadway network in the Northeast Corridor ranges from Center City Charlotte's urban street grid to facilities that provide suburban and neighborhood access in the central and northern portions of the corridor. The major roadways in the study corridor form part of the region's dominant radial pattern,

extending northeast from Center City Charlotte to the Mecklenburg-Cabarrus County line. Overall, the network is discontinuous, particularly in the outer suburban portion, as few routes provide access across the corridor or into and out of the corridor.

The Northeast Corridor is centered along two major roadways. I-85 is a 6- to 8-lane limited-access freeway that is the primary carrier of traffic in the project corridor. The recent expansion of the facility to eight lanes at the outer end of the corridor has helped to alleviate heavily congested conditions in this area during peak commuting times. However, the interstate itself remains congested from W.T. Harris Boulevard northward in the evening peak hours due to reduced interstate lanes in Cabarrus County.

North Tryon Street/US-29 is primarily a 4-lane divided arterial where light rail is planned to run within the median and contains numerous traffic signals and turn lanes that provide connectivity to adjacent street networks. North Tryon Street/US-29 is also a heavily-traveled arterial route in the corridor. The facility provides access to most of the major activity centers in the corridor and congestion levels can be high in the northern end of the corridor during peak periods.

Other major radial routes in the Northeast Corridor include Graham Street, Mallard Creek Church Road, and University City Blvd./NC-49. These roadways provide access to activity centers at the edges of the corridor. The Northeast Corridor has limited east-west connections across the corridor, especially in the inner and mid-portions of the corridor. Major cross-corridor routes include Sugar Creek Road, W.T. Harris Boulevard, Mallard Creek Church Road and I-485. Detailed descriptions of these routes are included in Chapter 3.0: Transportation.

1.2.4.2 Transit Services and Facilities

Public transit facilities and services in the Charlotte-Mecklenburg area are provided by CATS. Currently, CATS operates a variety of services, including fixed-route local, express, demand response and circulator bus services; paratransit services for eligible individuals with disabilities; and vanpool services. In November 2007, CATS began operation of its first light rail service, the LYNX Blue Line, in the South Corridor. This line connects Center City Charlotte to activity centers and communities to the south. The line extends 9.6 miles with 15 stations. The light rail service operates with 10-minute peak and 15-minute off-peak headways.

CATS operates a fleet of 403 buses and 20 light rail vehicles. Service is provided for a total of 54 bus routes and one light rail corridor within Mecklenburg County. In addition, 13 express routes serve Mecklenburg County and the surrounding counties. Regular bus stops as well as 45 park-and-ride lots are located throughout the region. The CATS system also includes the Charlotte Transportation Center (CTC), a major bus transfer facility located in Center City Charlotte, as well as three community transit centers.

As of January 2009, 16 bus routes operate within the Northeast Corridor study area, with eight local bus routes, three University of North Carolina at Charlotte (UNC Charlotte) shuttles, two neighborhood circulator routes and three express routes. These routes primarily provide connections between activity centers in the outer suburbs, inner urban neighborhoods and Center City Charlotte. One route provides cross-town service to the southern portion of the region. In the University City area, two park-and-ride lots provide access to the bus system and three shuttle buses circulate in the vicinity. An additional park-and-ride lot is located at Charlotte Motor Speedway, just beyond the Mecklenburg-Cabarrus County line.

1.2.4.3 Railroad Facilities

Four existing rail lines traverse the Northeast Corridor. The North Carolina Railroad (NCR) is the primary railroad in the corridor, extending the full length of the corridor and forming the eastern boundary of the corridor at its northern end. The Norfolk Southern (NS) "O" Line and the CSX Corporation line pass through the southern end of the corridor. The Aberdeen Carolina and Western Railroad (AC&W) diverges east from the NCR in the vicinity of 36th Street in NoDa. All four lines support freight operations. The NCR also supports passenger service. Railroad facilities in the corridor are discussed in more detail in Chapter 3.0: Transportation.

1.2.4.4 Bicycle and Pedestrian Facilities

The Charlotte Department of Transportation (CDOT), the Charlotte-Mecklenburg Planning Department, Mecklenburg County Park and Recreation Department and the Center City and the University City MSDs have committed to providing a more walkable living environment through the development and implementation of various smart growth principles, street design guidelines, and transit-oriented design principles. Many programmed roadway improvement projects include bicycle facilities such as bike lanes and widened outside lanes. Additional detail about programmed bicycle improvements and planned bicycle and pedestrian connections is included in Chapter 3.0: Transportation and shown in Figure 3-4.

1.3 Travel Demand and Transportation Deficiencies

The section summarizes the problems of the corridor and need for transportation improvements. Chapter 3.0: Transportation provides more detailed information on travel demand, roadway capacity and transit performance.

1.3.1 Increasing Travel Demand

The Northeast Corridor, which has few arterials and minimal cross-town connections, has several major roadways and intersections currently experiencing peak hour volumes that exceed capacity. Approximately 23 percent of the total miles on roadways within the Northeast Corridor operate at or above capacity (Level of Service E and F), including portions of several key roadways such as I-85, North Tryon Street/US-29, W.T. Harris Boulevard and University City Blvd./NC-49. Other major area routes, including Sugar Creek Road and Mallard Creek Church Road, are moderately congested. In general, traffic volumes and levels of congestion are worse at the outer ends of the corridor, where levels of activity are higher and fewer route options are available. Although widening projects are planned for these roadways in the future, peak period congestion is still expected to remain at severe to gridlock conditions.

Much of the growth in the Charlotte-Mecklenburg region in the 1980's and 1990's occurred quickly in a dispersed pattern of jobs and residences with limited connectivity between uses. These land use patterns have resulted in people driving more and making longer trips, leading to traffic volumes that exceed roadway capacity and result in unacceptable levels of service (LOS) in many locations throughout the region.

According to the Texas Transportation Institute's Annual *Urban Mobility Report* (2007), between 1982 and 2005, the amount of travel and travel delay in the Charlotte region has grown at a much faster rate than that in comparable urban areas. The amount of daily travel (as measured by vehicle miles traveled (VMT) for freeways and arterial streets combined) over the last 23 years has increased at a rate (325 percent) more than double the population growth rate (145 percent). Growth in freeway travel, in particular, has increased dramatically (679 percent). Currently, the amount of travel delay experienced in Charlotte is one of the highest amounts experienced in medium-sized urban areas.

Charlotte continues to be ranked as one of the most livable cities and projections show that these high growth rates will continue, further burdening the regional transportation system. The regional model indicates that the region is expected to experience a projected 57 percent increase in regional person trips, a 59 percent increase in daily VMT, and a 70 percent increase in daily Vehicle Hours Traveled (VHT) from 2008 to 2030.

Continued population and employment growth are expected to increase travel demand, resulting in deteriorating conditions on area roadways, despite planned roadway widening and intersection improvements. Traffic volumes are expected to increase on nearly all area roadways, especially along Mallard Creek Church Road and at the outer end of North Tryon Street/US-29, where volumes are expected to roughly double by 2030.

1.3.2 Roadway Network Deficiencies

The LOS for North Tryon Street/US-29, W.T. Harris Boulevard and University City Blvd./NC-49 are expected to remain at or above capacity. Conditions on Sugar Creek Road and Mallard Creek Church

Roads are projected to deteriorate to these levels as well. Chapter 3.0: Transportation includes tables that illustrate the LOS conditions for corridor roadways in 2030. By 2030, two-thirds of all corridor routes (66 percent) are projected to be operating at unacceptable levels.

The City of Charlotte identified the most congested intersections in Charlotte as part of their *Transportation Action Plan* in 2005. A total of 65 intersections with “high congestion” were identified in Charlotte with ten of those intersections located within the Northeast Corridor. These include 3rd ranked W.T. Harris Boulevard/Tryon Street (US-29 North) and 8th ranked I-85 Service Road/Sugar Creek Road.

High traffic volumes not only result in increased delay but higher accident occurrences as well. CDOT ranked 203 of the Highest Accident Intersections from across the city. Forty-six of these intersections are located within the Northeast Corridor. Most of these locations occur within Center City Charlotte, along North Tryon Street/US-29 and along W.T. Harris Boulevard.

1.3.3 Transit System Demand and Conditions

CATS fixed route services provided transit service to over 22 million passengers in fiscal year (FY) 2008 (actual 22,615,456) and over 25 million passengers in FY 2009 (actual 25,443,337), a ridership increase of 12.5 percent. The average monthly ridership during FY 2008 was 1,646,723 and during FY 2009 was 1,700,397, an average annual transit ridership increase of 3.3 percent. The success of the LYNX Blue Line light rail (estimated November 26, 2007) contributed to this ridership increase. Between November 26, 2007 and June 30, 2008 the LYNX Blue Line carried 2,851,717 passengers, and during FY 2009 the line carried over 5 million passengers (actual 5,024,055).

At a time when CATS’ system ridership increased with light rail, the Northeast Corridor experienced growth and maintained its share of the total CATS system ridership. In FY 2008, routes in the Northeast Corridor served 4,322,388 passengers, which increased to 4,506,263 passengers in FY 2009. Average monthly ridership also increased, as Northeast Corridor routes carried an average of 360,199 passengers a month in FY 2008 and 375,522 passengers a month in FY 2009. Approximately 25 percent of system-wide average monthly ridership is from routes that provide service in the Northeast Corridor.

The Northeast Corridor additionally maintained its market-share of CATS’ system ridership. In FY 2008, routes in the Northeast Corridor comprised roughly 19 percent (actual 19.11 percent) of the total CATS system fixed route ridership; and the corridor maintained this share in FY 2009, with approximately 18 percent (actual 17.71 percent) of the total 25 million CATS’ fixed route passengers system-wide. When isolated for fixed bus services alone (i.e. excluding fixed route rail ridership), the Northeast Corridor actually experienced a slight increase in the ridership market-share between FY 2008 and FY 2009, with 21.87 percent of the CATS system bus ridership in FY 2008 and 22.08 percent in FY 2009 coming from bus routes in the Northeast Corridor.

Transit ridership in the corridor is relatively strong, with several local, express, and neighborhood routes attracting large numbers of average monthly riders. Presently, the most direct service through the corridor is provided by Routes 11 (North Tryon) and 80x (Concord Express). Route 11 is ranked in the top ten of CATS system-wide route ridership. In addition, Route 23 (Shamrock Drive) is also ranked in the top 10. The 2009 average monthly ridership for Routes 11 and 23 are 119,000 and 50,500, respectively. Other successful corridor routes include Route 3, a local route serving The Plaza Road, and Route 39, that provides service between UNC Charlotte and Center City Charlotte.

Despite the positive ridership performance of routes in the Northeast Corridor, the transit services in the Northeast Corridor currently operate in mixed-traffic on congested roadways. Therefore, the ability for CATS’ bus operators to complete their routes as scheduled, as well as the reliability of the service for the customer, is subject to local street conditions. During FY 2009, Route 11 ranked 64th of 79 fixed bus routes for on-time performance, with 14.65 percent late trips; performing below the system average for schedule adherence of 10.43 percent late trips.

Table 1-2 identifies the estimated travel times through the corridor for automobiles and buses for the a.m. peak hour. Travel times via bus is more than by automobile, particularly for the trips that are Center City Charlotte to/from UNC Charlotte and Center City Charlotte to/from University Research Park, which are

approximately 20 minutes longer than by automobile. These times are also based on the best available route run time and do not account for delays related to congestion or incidents on the roadways.

**Table 1-2
Corridor Travel Times (minutes), AM Peak, 2009**

Trip	Inbound	Outbound
Center City Charlotte to/from Cabarrus County		
Automobile ¹	32.8	18.6
Transit In-Vehicle	90.4	76.7
Center City Charlotte to/from UNC Charlotte		
Automobile	32.3	22.1
Transit In-Vehicle	51.8	49.1
Center City Charlotte to/from University Research Park		
Automobile	27.1	17.9
Transit In-Vehicle	47.9	23.1

Note: ¹ = Auto time to Cabarrus County, travel times only in-vehicle times and do not include wait time, walk time, transfer time, etc.

Source: 2007 and 2030 Metrolina TC5 Calib6 MHYBRID Model Run from 12/2008

An important goal of the *2030 Transit Corridor System Plan* is to provide system linkages that maximize the efficiency of the overall transit system. Over 30 percent of work trips from the Northeast Corridor occur between the transit corridors. The *2025 Integrated Transit/Land Use Plan* calls for concentrating future growth in these corridors. Developing improvements that provide through-service and connections to other corridors is critical to supporting the land use vision.

1.3.4 Land Use and Transportation Integration

Recognizing the environmental and economic consequences of uncontrolled growth, decision-makers in the Charlotte-Mecklenburg region adopted a coordinated growth strategy that combines land use and transportation planning efforts. Joint planning of development activities and transportation improvements is intended to provide future travel choices; improve access and connectivity; reduce auto dependence; and promote regional mobility over time.

The adopted *Centers and Corridors Concept Plan* (1994) presented a vision of how the region should grow over the long-term. The plan concept builds on the region’s existing infrastructure framework, focusing growth along five major transportation corridors and supporting this development with a regional rapid transit system in these five corridors, including the Northeast Corridor. To advance the *Centers and Corridors Concept Plan* vision, the *2025 Integrated Transit/Land Use Plan* (1998) and the subsequent *2030 Transit Corridor System Plan* (Figure 1-5) were developed. The *Centers and Corridors Concept Plan* has been updated and is now called the *Centers, Corridors and Wedges Growth Framework*, Draft 2010. These plans define a regional rapid transit system with specific mode and alignment combinations for each of the five transportation corridors. The primary purpose of the transit system is to support the region’s preferred land use strategy; therefore, the alternatives proposed for each corridor are those that were determined to best encourage future transit-oriented development in the corridor.

The Charlotte-Mecklenburg General Development Policies (GDP) are planning principles that provide direction on development and redevelopment within the City of Charlotte and Mecklenburg County. The GDP also revises previous policies that allow the dispersal of multi-family development and redirects much of the denser development to major activity centers and transit corridors. The GDP also outlines Transit Station Area Principles to encourage transit-supportive development along the transit corridors by focusing on creating high-density, mixed-use development within ½-mile of transit stations. This type of development is intended to create livable communities where people can travel without the use of a car and focuses on land use, mobility and community design to achieve this goal.

Transit-oriented development is occurring in the Charlotte-Mecklenburg region. This development is resulting in a mix of more intense land uses, specifically in station areas for the LYNX Blue Line. Existing development near transit stations illustrates how the local land use policies are successfully redirecting

development into the region’s travel and transit corridors. A blend of residential, office, service-oriented and civic uses encourage walking, biking and transit use. Key features of future station area developments include a variety of housing options, pedestrian-friendly streetscape elements (such as street trees and lighting) and limited surface parking.

The Northeast Corridor is one of the five corridors identified in the *Centers, Corridors and Wedges Growth Framework*, Draft 2010. Future rapid transit development in this corridor is an integral part of the region’s coordinated growth strategy and is needed to support the desired concentrations of development in the corridor and meet the regional integrated transportation and land use strategy.

1.3.5 Quality of Life

In addition to its negative effects on mobility, continued reliance on single-occupant vehicles presents a significant threat to air quality. The region is currently designated as a non-attainment area for ozone levels. Reduced auto dependence is necessary to help decrease pollutant emissions and maintain or reduce ozone levels. Auto dependence also impacts public safety, economic vitality and the overall quality of life in the Charlotte-Mecklenburg region. Additional transportation choices ensure access to jobs and vital services in the community.

Moreover, the costs of congestion can reduce economic opportunities and make a metropolitan area less livable, primarily because travel during the peak period becomes time-consuming and stressful. As Charlotte grows, competitive alternatives to auto travel are needed to sustain the region’s appeal as a place to live, work and do business.

1.4 Goals and Objectives

To determine how well the alternatives under consideration in this Draft EIS address regional and corridor needs, a set of goals, objectives and evaluation measures were developed for the proposed project. The goals and objectives outlined in Table 1-3 reflect the regional and corridor needs and are based on the system plan principles developed for the *Northeast Corridor Major Investment Study (MIS)*. These principles were used to guide the selection of the preferred alternatives for the *2025 Corridor System Plan* and the *revised 2030 Transit Corridor System Plan* adopted by the Metropolitan Transit Commission (MTC) on November 15, 2006. The system plan principles stem from the transit goals established for the earlier *Centers and Corridors Concept Plan (1994)*, updated *Centers, Corridors and Wedges Growth Framework*, Draft 2010 and the *2025 Integrated Transit/Land Use Plan* and demonstrate the community emphasis on integrated land use and transportation planning.

**Table 1-3
Goals and Objectives for the LYNX BLE**

Goals	Objectives
<p>Land Use <i>Support the region’s Centers, Corridors and Wedges Growth Framework</i></p>	<ul style="list-style-type: none"> • Provide improvements that are consistent with land use plans and policies. • Provide improvements that are compatible with existing or desired community character as well as neighborhood preservation. • Provide connections to transit-supportive areas. • Support existing and planned land use patterns. • Promote transit-supportive development within station areas. • Provide a strong link to integrating land use and transportation. • Promote growth in an area that can support new development and away from areas that cannot support new growth.

Table 1-3 (continued)
Goals and Objectives for the LYNX BLE

Goals	Objectives
Mobility <i>Improve access and mobility in the corridor and throughout the region; Increase transit ridership; Improve quality of transportation service</i>	<ul style="list-style-type: none"> • Offer people a choice in meeting mobility needs. • Reduce dependence on grid-locked roadways. • Increase transit ridership. • Increase transit mode share. • Provide travel time savings. • Provide service for transit dependent populations. • Provide connections to activity centers, special event venues, and cultural sites. • Improve convenience and reliability of transit service.
Environment <i>Preserve and protect the environment</i>	<ul style="list-style-type: none"> • Minimize disruptions to communities. • Minimize negative effects on natural resources. • Minimize negative effects on cultural resources. • Support air quality improvements. • Support sustainable growth in the region.
Financial <i>Develop affordable, cost-effective transportation solutions</i>	<ul style="list-style-type: none"> • Ensure capital and operating and maintenance costs are consistent with funding levels. • Minimize operating and maintenance costs. • Optimize cost-effectiveness.
System Integration <i>Develop transportation improvements that function as part of the larger transportation system</i>	<ul style="list-style-type: none"> • Develop improvements that provide through-service and connections to other corridors. • Ensure operating efficiency. • Balance use of system capacity.

1.4.1 Evaluation Criteria

During the MIS phase, a set of evaluation criteria for the transit element of the proposed project was developed based on the system-wide and corridor-specific goals and objectives. The evaluation criteria helped determine the degree to which various transit improvement alternatives would address the purpose and need for the Northeast Corridor. For the Draft EIS study phase, CATS has developed a corridor evaluation framework as part of a set of common technical methods and guidance to be followed in all the corridors. System-wide principles were used in the development of specific measures to evaluate transportation improvement and station area alternatives as part of the corridor environmental evaluations. The corridor evaluation framework defines specific means to measure the performance of the various alternatives in relation to the problems and goals of the corridor. The evaluation criteria include both quantitative measures and qualitative assessments.

The general evaluation framework involves the following:

- Effectiveness - the extent to which an alternative accomplishes both the land use and mobility purposes that the transportation improvements are intended to address.
- Cost Effectiveness - the extent to which an alternative provides a level of benefits that is commensurate with its costs (and relative to other alternatives).
- Financial Feasibility - the extent to which sufficient funding is available or can be developed, to support the construction, operation and maintenance of an alternative.
- Equity - the extent to which each alternative provides fair distribution of benefits, costs and impacts across various sub-groups in the corridor.
- Compatibility - the extent to which an alternative fits within its existing context and promotes development patterns consistent with adopted transit supportive principles.

1.4.2 FTA New Starts Criteria

The proposed project is following the FTA planning and project development process for projects that are considered new start fixed guideway or rail projects, called “New Starts” (see Figure P-1 in Preface). New

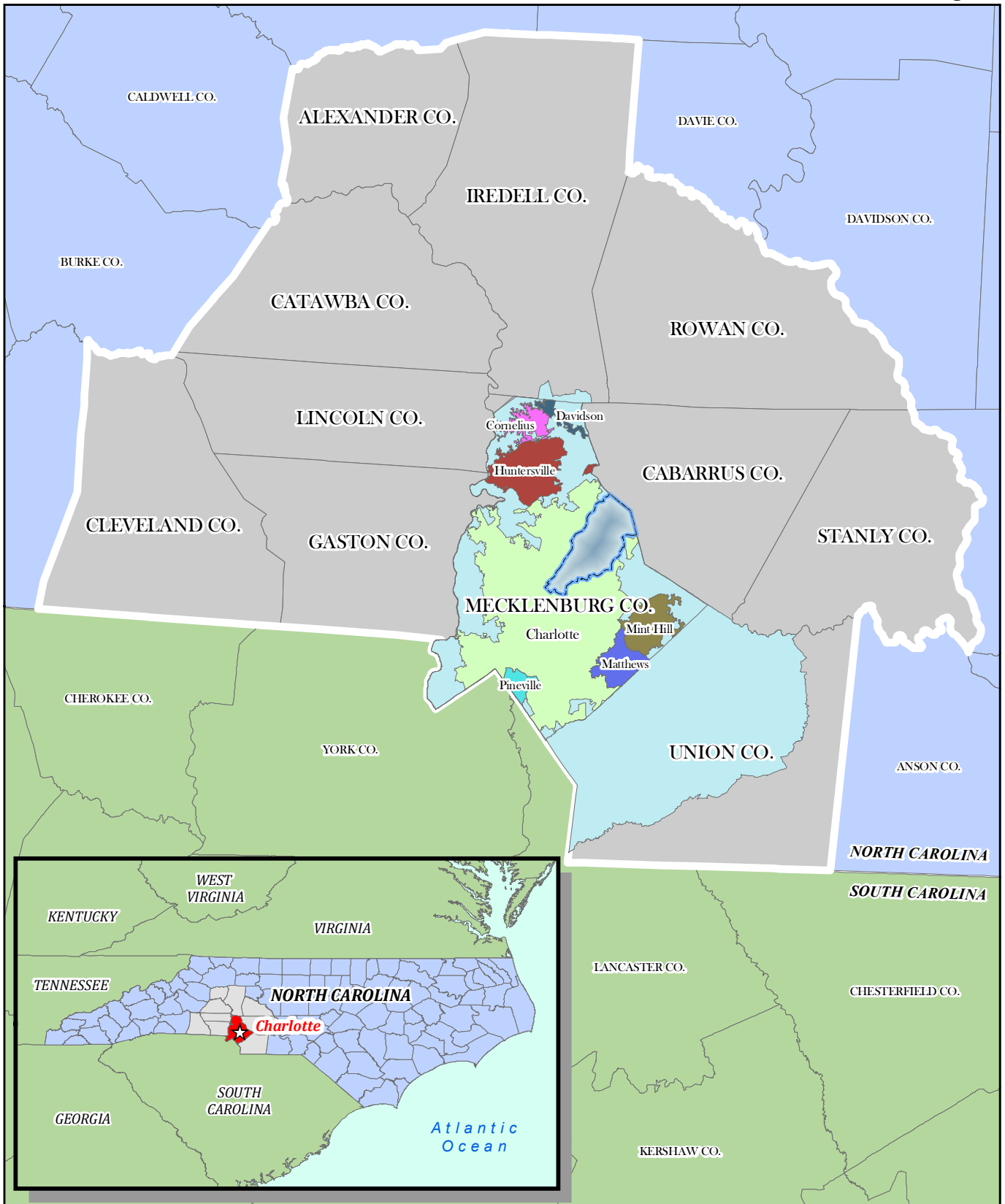
Starts projects, such as the proposed LYNX BLE, are those for which the local transit agency (i.e. CATS) is seeking discretionary federal funding from the Section 5309 New Starts Program. In accordance with federal transportation law, called the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU), FTA has developed and uses the New Starts Criteria to decide whether projects may advance into preliminary engineering or final design, and to evaluate and rate projects in support of funding recommendations.

A project that does not meet the minimum ratings cannot advance into the next phase of FTA’s project development process. Projects must receive a medium, medium-high, or high rating to be eligible to receive Section 5309 funding. The *Annual Report on Funding Recommendations* allows FTA to brief Congress on the proposed New Starts projects and their current status or rating. The New Starts Criteria for evaluating New Starts Projects are shown in Table 1-4. FTA published the final policy guidance on July 29, 2009, that the project justification rating be based on ratings for the following criteria: mobility improvements, cost effectiveness, operating efficiencies, public transportation supportive land use policies and future patterns, environmental benefits and economic development effects.

**Table 1-4
FTA New Starts Criteria**

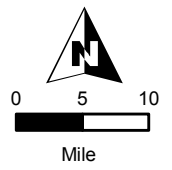
Project Justification Criteria	Measure(s)
<i>Mobility Improvements</i>	Measured by: <ul style="list-style-type: none"> • Number of transit trips using the project. • User benefits per project passenger mile. • Number of transit trips by dependent riders using the proposed New Starts project. • Transit dependent user benefits per passenger mile on the project. • The share of user benefits received by transit dependents compared to the share of transit dependents in the region.
<i>Cost Effectiveness</i>	Two measures of cost effectiveness are required. <ul style="list-style-type: none"> • Incremental cost per hour of user benefits. • Incremental cost per incremental passenger in the forecast year.
<i>Operating Efficiencies</i>	Measured by the difference between the ratios of system-wide operating and maintenance costs and system-wide passenger miles.
<i>Land Use and Economic Development</i>	Measured by existing land use; transit supportive plans and policies, performance and impacts of policies; and future patterns.
<i>Environmental Benefits</i>	Measured by change in regional pollutant emissions, change in regional energy consumption, and EPA Air Quality Designation.
<i>Other Factors</i>	<ul style="list-style-type: none"> • Environmental justice considerations and equity issues. • Opportunities for increased access to employment for low-income persons, and welfare to work initiatives. • Evidence that the proposed project is a principle element of a congestion management strategy. • Any other factor which the New Starts project sponsor believes articulates the benefits of the proposed major transit capital investment, but which is not captured within the other project justification criteria. • Reliability of the data supporting the evaluation criteria.
Local Financial Commitment Criteria	Measure(s)
<i>Local Financial Commitment</i>	Measured by the proposed share of total project costs from sources other than 49 USC Section 5309 New Starts, including federal formula and flexible funds, the local match required by federal law, and any capital funding. <ul style="list-style-type: none"> • Proposed share of total project costs from sources other than Section 5309 New Starts funding. • The strength of the proposed capital funding plan. • The strength of the proposed operating funding plan.

Source: Federal Transit Administration, *Final Policy Guidance on 5309 New Starts Criteria*, July 2009.



Legend

- | | | | | | |
|--|---|--|--------------|--|---|
| | Northeast Corridor Limits | | Charlotte | | Matthews |
| | 11 County Air Quality Monitoring Region | | Cornelius | | Mint Hill |
| | North Carolina County Boundaries | | Davidson | | Pineville |
| | South Carolina County Boundaries | | Huntersville | | Mecklenburg-Union MPO Regional Boundary |

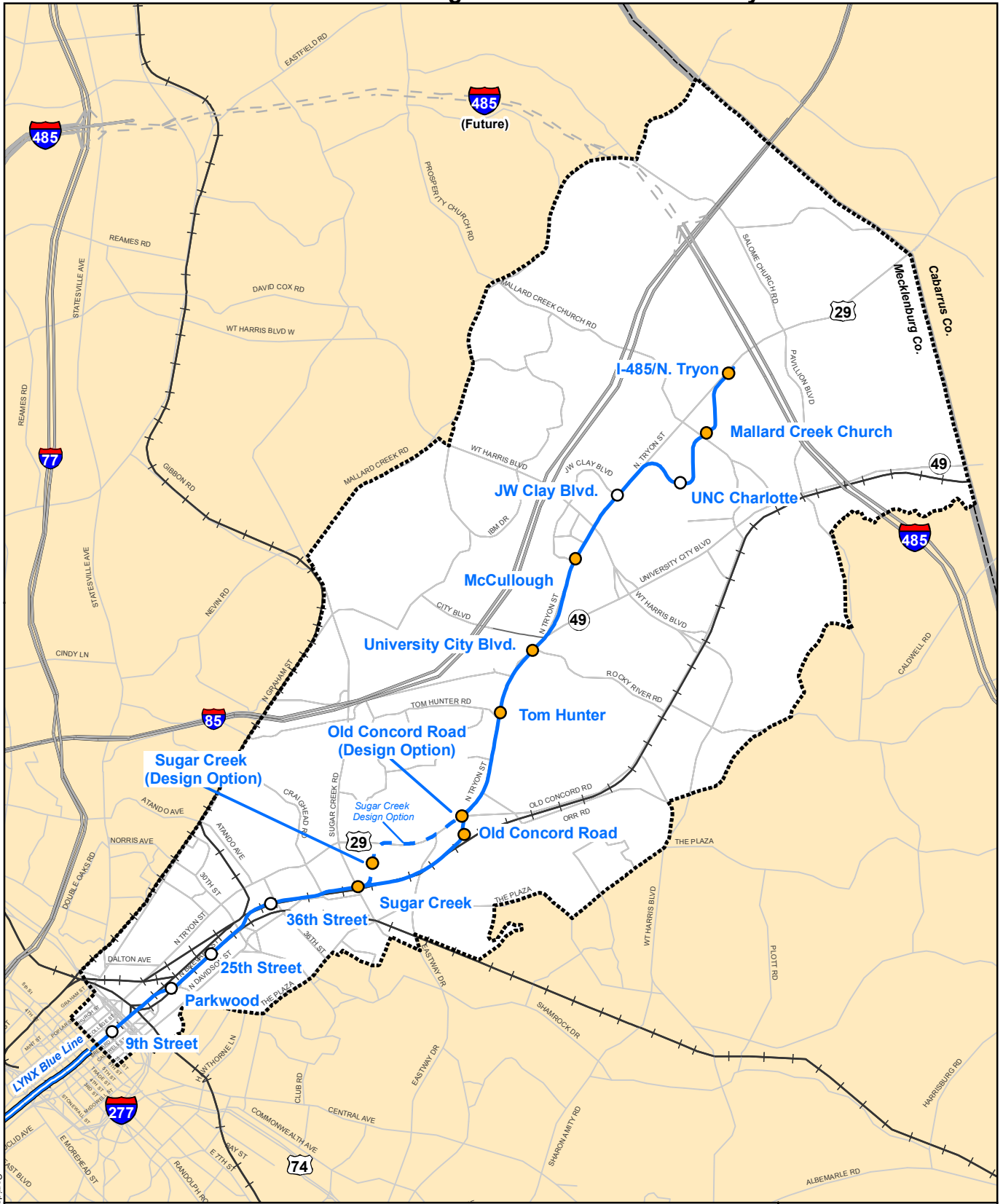


Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

The_Region_Figure1_1_REV/00.pdf

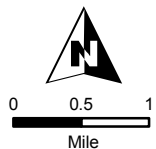
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Light Rail Alternative - Locally Preferred Alternative



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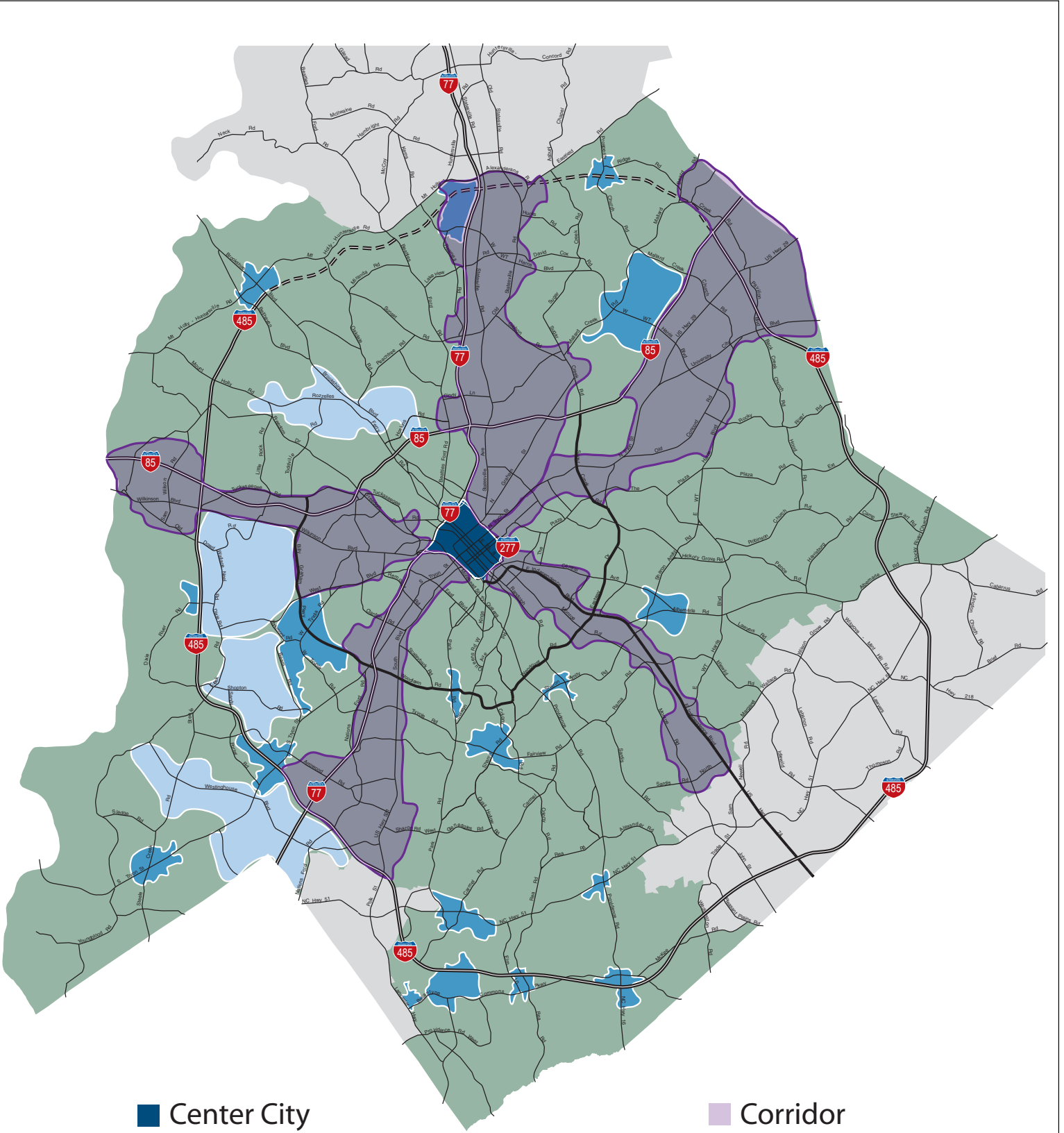
- Northeast Corridor Limits
- LYNX Blue Line
- Proposed Light Rail Alternative
- Design Option
- Proposed Stations
- Proposed Stations with Park-and-Ride
- Highway
- Major Roads
- Highway (Future)
- County Line
- Railroads



Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Corridor_Base_Map_Figure_1-2_CB_120909.mxd

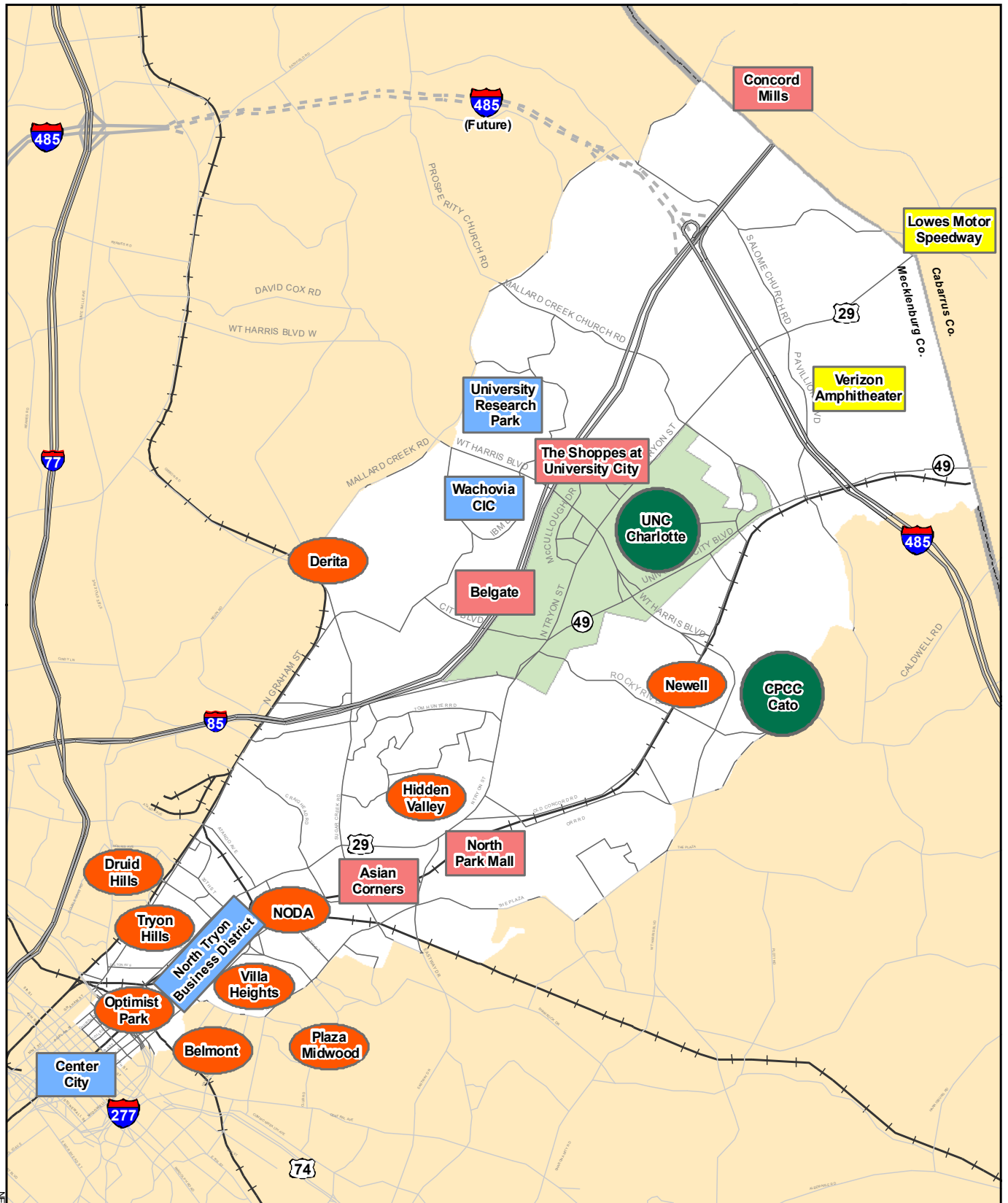
120909



- Center City
- Mixed Use Center
- Industrial Center

- Corridor
- Wedge
- Other Jurisdiction





Legend

- Northeast Corridor Limits
- Highway
- Major Roads
- Highway (Future)
- County Line
- Railroads

Activity Centers

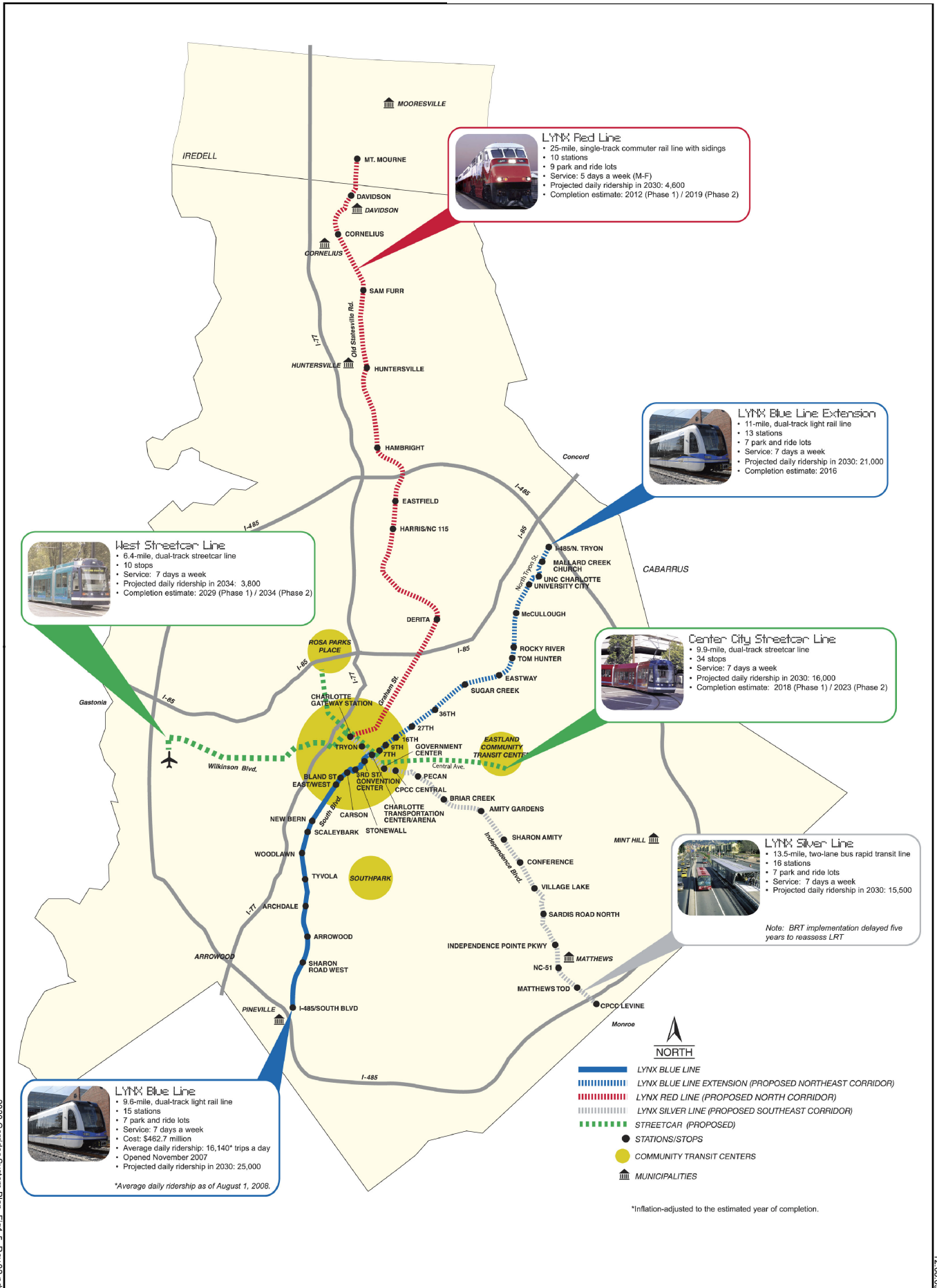
- Employment Center
- Commercial Center
- Neighborhood
- Institutional Center
- University City Municipal Services District
- Entertainment Centers

0 0.5 1
Mile

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County
GIS, RWA/STV

NE_Corridor_Study_Area_Fig-1-4_REV01.pdf

07.02.09



2.0 ALTERNATIVES CONSIDERED

This chapter focuses on the development and evaluation of alternatives considered for a transportation investment in the Northeast Corridor; the definition of the alternatives assessed in this Draft Environmental Impact Statement (EIS); and the capital and operating costs of the alternatives under study.

2.1 Screening, Selection and Refinement Process

In 1994, the Charlotte-Mecklenburg Planning Commission adopted the *Centers and Corridors Concept Plan*, a vision to modify the region's existing growth patterns by concentrating development and redevelopment in five radial corridors extending from Center City Charlotte out to the Mecklenburg County line: South, North, Northeast, Southeast and West Corridors. The overall goal was to make the best use of existing and future infrastructure investments by focusing growth. The plan identified a county-wide rapid transit system that included rapid transit service in each of the identified corridors where existing interstate infrastructure is already present and where growth should be focused. The Northeast Corridor is one of the corridors identified in the *Centers and Corridors Concept Plan*. [This plan was recently updated to the *Centers, Corridors and Wedges Growth Framework, Draft* January 2010.]

In 1998, the *2025 Integrated Transit/Land Use Plan* advanced the *Centers and Corridors Concept Plan* a step further by evaluating specific transit options (alignment/mode) and outlined land use initiatives that were intended to promote the focusing of development in the transit emphasis corridors. The guiding principle for plan implementation was a mutually supportive strategy linking transit and land use decisions. The plan recommended rail in the South and North corridors and Bus Rapid Transit (BRT) in the Northeast, Southeast and West corridors. This plan was the basis for a public referendum for implementing a ½-percent sales tax increase to fund the plan's transit/land use concepts. Although the *2025 Integrated Transit/Land Use Plan* identified a preferred strategy for each of the five corridors, it was recommended that the final alignment and a modal technology be determined through a more detailed Major Investment Study (MIS) process for each corridor. In 1999, Charlotte Area Transit System (CATS) initiated their first MIS on the South Corridor to begin implementation of the *2025 Integrated Transit/Land Use Plan*.

The South Corridor MIS was completed in 2000 resulting in the selection of a light rail transit alignment as the Locally Preferred Alternative (LPA). That project, now called the LYNX Blue Line, began revenue service in November 2007.

Between 2000 and 2002, CATS completed MIS documents for the North, Northeast, Southeast and West corridors to examine a full range of transportation alternatives. The LPA selected for the Northeast Corridor at the conclusion of the MIS was light rail between Center City Charlotte and the University of North Carolina Charlotte (UNC Charlotte) to Interstate 485 (I-485) and BRT between the University Area to Concord. The results of the Northeast Corridor MIS, along with the other corridor MIS documents, were incorporated into the regional long-range transportation planning process and adopted in the *2025 Corridor System Plan*.

In 2004, CATS moved forward with the conceptual engineering of the light rail element of the MIS LPA. This phase allowed for a more detailed analysis of the Light Rail Alternative and resulted in refinements to the proposed alignment and station locations. During this time, CATS, along with the Charlotte Department of Transportation (CDOT), City of Charlotte Engineering & Property Management (E&PM), City of Charlotte Economic Development Office (EDO) and the Charlotte-Mecklenburg Planning Department (Planning), worked to refine the alignment and identify station locations for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE).

A Refined Locally Preferred Alternative (R-LPA) was adopted by CATS' governing board, the Metropolitan Transit Commission (MTC), in June 2006. The R-LPA incorporated alignment refinements that occurred between 2004 and 2006, prior to the adoption of the updated *2030 Transit Corridor System Plan* in November 2006. The updated plan remains consistent with the land use plans and policies set forth in the *Centers and Corridors Concept Plan* as well as the *2025 Integrated Transit/Land Use Plan*.

In November 2007, CATS received Federal Transit Administration (FTA) approval to initiate the next phase of project development, Preliminary Engineering. As part of the Preliminary Engineering phase, further refinements were made to the LPA. The plans continue to be consistent with the recently updated *Centers, Corridors and Wedges Growth Framework Draft*, January 2010. On October 28, 2009, the MTC adopted the proposed LPA as described and evaluated in this Draft EIS. The LPA includes 13 stations and is approximately 10.7 miles long.

The following sections describe the process of identifying, evaluating and refining alternatives for the LYNX BLE in previous studies. The selection of the LPA by the MTC and the refinement of the LPA in subsequent engineering phases are described.

2.1.1 Early Alternatives Considered in the 2025 Integrated Transit/Land Use Plan

The *2025 Integrated Transit/Land Use Plan*, completed in 1998, involved an initial study of rapid transit improvements for all of the corridors identified in the *Centers and Corridors Concept Plan*. Initially, a full range of alternatives was developed for each corridor and these alternatives were based on field work, professional assessments of appropriate technologies and alignments and community input. The number and type of modes and alignments were then narrowed to one rail option and one BRT option for each corridor. The selection of the two options was based on an evaluation of each candidate's potential to shape future growth, capital cost, ease of implementation and potential environmental or social fatal flaws.

For the Northeast Corridor (called the University Corridor in the *2025 Integrated Transit/Land Use Plan*), the following BRT and rail options were selected:

- BRT Alternative: Center City Charlotte to UNC Charlotte via Graham Street, I-85 and Mallard Creek Church Road.
- Rail Alternative: Center City Charlotte to UNC Charlotte via the Norfolk Southern “O” line to Derita, the IBM rail spur to University Research Park and a new alignment extending east to the UNC Charlotte campus.

The initial range of alternatives included: BRT options that used W.T. Harris Boulevard; University City Blvd./NC-49; North Tryon Street/US-29; the IBM rail spur rail options that used the North Carolina Railroad (NCR); and University City Blvd./NC-49. These options were not considered promising for the Northeast Corridor.

The rail and BRT options selected for each corridor were refined and subjected to additional evaluation. Measures included potential job and household growth for each option, capital cost, capital cost-per-mile, ridership, long-term need for congestion relief and long-term land use opportunities. Following the evaluation, a single conceptual alternative was recommended for each corridor based on what would best support focused development in the region.

In the Northeast Corridor, the plan recommended BRT as an efficient and cost effective option for serving existing centers and supporting future development opportunities in the corridor. A more detailed MIS was recommended to study both BRT and rail alternatives for the corridor.

2.1.2 Alternatives Considered in the Northeast Corridor Major Investment Study

The Northeast Corridor Major Investment (MIS) Study was initiated in 2000 to advance the recommendations of the *2025 Integrated Transit/Land Use Plan* and the *Centers and Corridors Concept Plan* and to conduct a more detailed study of rail transit and modal alternatives for the Northeast Corridor. A Notice of Intent to Prepare an EIS was published by the FTA on September 29, 2000. A comprehensive range of rail/transit modes was considered for the study, including BRT, light rail, streetcar and commuter rail.

Alternatives were initially developed based on recommendations from the *2025 Integrated Transit/Land Use Plan* and suggestions made during the scoping process initiated at the beginning of the study. The initial list of alternatives was screened to eliminate those alternatives that were "fatally flawed" from an

engineering or environmental perspective or would be unlikely to meet project goals and objectives. The remaining alternatives were carried forward for more detailed evaluation in the MIS.

The alternatives carried forward for detailed evaluation after the initial screening are listed in Table 2-1. Three modal alternatives – BRT, light rail and streetcar – were included. Some of these modes were considered on different alignments (see Figures 2-1a and 2-1b). The commuter rail alternative was eliminated from further consideration because it was decided the mode could not adequately serve the current and future planned activity centers in the Northeast Corridor. The right-of-way available for commuter rail service is located at the eastern edge of the corridor and is heavily used by existing freight and passenger services. Moreover, commuter rail technology is more appropriate for longer distance trips (25 to 60 miles and beyond) with infrequent stops than for the kind of service needed in the Northeast Corridor.

**Table 2-1
Alternatives Studied in Detail in MIS**

Name	Transit Type	To/From	Via
NE-2 ¹	Baseline Alternative		
NE-3 ²	BRT	Center City Charlotte to Concord Mills	Statesville Avenue, Asbury Avenue, North Graham Street, I-85
NE-4	LRT	Center City Charlotte to I-485	NCRR, Brevard Street, North Tryon Street/US-29
NE-5	LRT	Center City Charlotte to I-485	North Tryon Street/US-29
NE-6	Streetcar	Center City Charlotte to US-29/NC-49 “weave”	North Tryon Street/US-29
	BRT (branch 1)	Center City Charlotte to Concord Mills	same as NE-3
	BRT (branch 2)	University Research Park to I-485	North Tryon Street/US-29, Salome Church Road
NE-7	LRT	Center City Charlotte to UNC Charlotte	same as NE-4
	BRT (loop)	University Research Park to Concord Mills	I-85, new Busway, University City Blvd./NC-49, North Tryon Street/US-29, Mallard Creek Church Road

Notes: ¹Alternative numbering begins with NE-2, because the initial list of alternatives included a No-Build Alternative (NE-1) and a Transportation System Management (TSM) Alternative (NE-2). During FTA coordination, it was agreed that the No-Build and TSM alternatives would be replaced by a single Baseline Alternative for the Northeast Corridor MIS. ²This alternative is a modified version of the BRT alternative recommended in the *2025 Integrated Transit/Land Use Plan*. Source: *Northeast Corridor Major Investment Study*, 2002.

Alternatives were evaluated to determine how well each supported regional land use, mobility, environmental, financial and system development goals. Prime considerations included the following:

- Support for existing land use patterns;
- Potential for future transit-oriented development;
- Estimated ridership;
- Travel time savings;
- Connections to activity centers and event sites;
- Support for regional air quality goals;
- Potential for effects on the built and natural environments;
- Capital and operating costs;
- The ability to function as part of an overall regional system; and,
- Engineering feasibility and equity of service.

The detailed evaluation results showed that the key differences between alternatives were a function of support for future development patterns, anticipated ridership and costs. Environmental and system development considerations were not differentiators because all alternatives would have minimal to no affect on the built and natural environments, as well as comparable air quality and system development benefits.

The BRT alternatives would serve existing land use patterns better than the light rail alternatives, but light rail would have more potential to support the desired shape of future development called for in the *2025 Integrated Transit/Land Use Plan*. The BRT alternatives would have more total available land to develop but less transit-oriented development potential. The light rail alternatives, on the other hand, would yield more land use and economic development advantages because they would have better pedestrian access, a better mix of uses and more transit-oriented development potential. The relative costs of alternatives were varied but the multi-modal alternatives were generally more expensive to build and operate. All alternatives were found to have similar order-of-magnitude costs.

2.1.3 Selection of a Locally Preferred Alternative and Adoption of a Transit Corridor System Plan

Guided by the Northeast Corridor MIS findings and the land use, mobility, environment, financial, and system development goals, the MTC selected an LPA for high capacity transit in the Northeast Corridor (Figure 2-1b) on November 20, 2002. The LPA combined light rail and BRT elements studied in the MIS. The light rail portion of the LPA (Alignment NE-4 in the MIS) would extend the LYNX Blue Line light rail from Center City Charlotte to the I-485 vicinity near the county line. The BRT portion was planned to serve the University Research Park and Concord Mills, connecting to the light rail line at UNC Charlotte. To lower capital costs, the BRT portion of the LPA was a reduced version of what was considered in the MIS. Together, the light rail and BRT elements were planned to serve the multiple markets in the Northeast Corridor.

The primary purpose of the LPA and the regional transit system defined in the adopted *2025 Corridor System Plan* was to promote the *Centers and Corridors Concept Plan* vision of corridor-focused development and provide an alternative to driving. The intention of the selected LPA is to enrich key activity centers and leverage investments in the transportation system. Light rail was selected as the primary component of the LPA because it has more potential for transit oriented development in the Northeast Corridor than BRT. Therefore, light rail would better support the region's *Centers and Corridors Concept Plan* vision and implement the *2025 Integrated Transit/Land Use Plan*. A light rail extension would also improve the operational effectiveness of the existing LYNX Blue Line light rail service in the South Corridor and leverage the investment already made by CATS.

2.1.4 Conceptual Engineering LPA Refinements

In the summer of 2004, the light rail component of the LPA was advanced to a conceptual engineering phase, based on a Memorandum of Understanding between CATS and FTA. This advancement of the proposed project allowed CATS to achieve the following:

- Obtain more detail-oriented level engineering mapping;
- Identify specific station locations and provide for greater transit-oriented station area development;
- Continue public involvement efforts and refine the alignment based on further public and agency comment; and,
- Minimize or avoid environmental impacts along the corridor.

As more planning, environmental and engineering data was developed, it was necessary to make refinements to the alignment to reflect updated conditions and to identify the best project alignment to advance into future phases of project development. Representatives from CATS, their engineering consultants, City Departments, and the City's station area planning consultants worked collaboratively to identify the best station locations and refine the alignment. The refinements included the addition of a light rail station that would directly serve the UNC Charlotte campus and terminating the line south of I-485. Details of alignment refinements can be found in the *Refined LPA Report* (August 2007).

In addition to the internal coordination that occurred within the City Departments, CATS continuously solicited public input on each station location and alignment refinement as the design progressed. See Chapter 22.0: Public Involvement and Agency Coordination for additional detail.

2.1.5 Adoption of a R-LPA and an Updated Transit Corridor System Plan

On June 28, 2006, the MTC adopted the R-LPA for the Northeast Corridor as identified in Figure 2-1b. This R-LPA, along with the refined LPA's for the other corridors being studied by CATS, was incorporated into the agency's *2030 Transit Corridor System Plan* that was adopted by the MTC on November 15, 2006. The *2030 Transit Corridor System Plan* includes the prioritization of the region's transit projects, a plan for implementation based on updated capital cost estimates and the source of funding for each transit corridor.

2.1.6 Preliminary Engineering LPA Refinements

In November 2007, the FTA approved CATS' application to enter into the Preliminary Engineering phase of project development and these activities started immediately thereafter. Due to the overwhelming success of the LYNX Blue Line light rail, it was apparent that the proposed LYNX BLE project needed to re-examine some key design decisions in order to accommodate higher projected ridership, and to reflect new projects in the area. These considerations, as well as input received during public meetings and in coordination with North Carolina Department of Transportation (NCDOT), NCRR, Carolinas Medical Center–University, UNC Charlotte and Norfolk Southern (NS), led to additional refinements of the alignment and station locations during preliminary engineering. These refinements are described in the supporting *Refinement of Alternatives Report* (July 2010), and were adopted by the MTC on April 22, 2009 and October 28, 2009. Following public input, refinements to the LPA remained consistent with CATS' adopted *2030 Transit Corridor System Plan*. The LPA is represented in this document as the Light Rail Alternative and is based on *30% Preliminary Engineering Design Plans*, completed in March 2010.

As part of its adoption of the R-LPA in 2006, the MTC determined that a design option for the Sugar Creek area should be studied further. In 2008, CATS, in partnership with the Charlotte-Mecklenburg Planning Department and the City of Charlotte's Economic Development Office, conducted an Alternatives Analysis on the Light Rail Alternative – Sugar Creek Design Option. This study is available under separate cover as the *CATS Blue Line Extension Sugar Creek and North Carolina Railroad Alignment Alternatives Study* (February 2009). In late 2008, CATS presented the study findings to public and the MTC. The results of this Alternative Analysis and additional detail on the potential environmental impacts, including costs, are provided throughout this Draft EIS. This information will document the examination of the design option and allow additional public comment.

The Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option are fully described in Section 2.2.3.

2.2 Definition of Alternatives

The following alternatives are described in this section:

- The No-Build Alternative, in which no changes to transportation service or facilities would be implemented in the corridor beyond already committed projects;
- The TSM Alternative, in which low to medium cost improvements to the operations of the CATS local bus service would be implemented, in addition to the currently planned transportation improvements in the corridor;
- The Light Rail Alternative, in which light rail would be constructed between Center City Charlotte and I-485 near the Mecklenburg-Cabarrus County line, primarily using existing railroad rights-of-way and North Tryon Street/US-29. The light rail line would be constructed as an extension of the existing LYNX Blue Line light rail line; and
- The Light Rail Alternative – Sugar Creek Design Option, a design option for the light rail alignment between Sugar Creek Road and Old Concord Road and the two stations located in this segment.

It was determined that the TSM Alternative does not meet the Purpose and Need of the proposed project. Therefore, only the No-Build and Light Rail Alternatives are evaluated in this LYNX BLE Draft EIS. The TSM Alternative is used as a baseline alternative for comparison in Chapter 21.0 Evaluation of Alternatives, as required under the FTA's New Starts program.

2.2.1 No-Build Alternative

The No-Build Alternative includes: transit services; highway and transit facilities; and railroad improvements that are planned to exist in 2030. The No-Build Alternative provides the underlying foundation for comparing the travel benefits and environmental impacts of the other alternatives. The No-Build Alternative includes:

- The existing highway network;
- Highway improvements that NCDOT has scheduled in the State Transportation Improvement Program (STIP);
- Highway improvements from the financially constrained *2030 Long Range Transportation Plan*;
- Roadway improvements in the *City of Charlotte’s 25-year Transportation Action Plan*;
- Existing transit routes and schedules as of January 2009;
- Other new bus services to which CATS has committed, including expansion of bus services in the other rapid transit corridors;
- New bus services to serve areas that would be developed by 2030; and
- Routine replacement of existing transit facilities and equipment at the end of their useful life.

The transit component of the No-Build Alternative includes light rail and bus service expansion. Transit services under the No-Build Alternative represent the existing transit services, planned expansion of existing bus services, plus more frequent light rail service in the South Corridor. For the No-Build Alternative, one new route would add service in the Northeast Corridor. Several other existing routes in the corridor would have more frequent service. Table 2-2 and Figure 2-2 show the bus service operating in the Northeast Corridor for the No-Build Alternative.

**Table 2-2
Bus Service in Northeast Corridor for No-Build Alternative**

Routes	Frequency			Type	Change from Existing
	Peak	Midday	Night		
3-The Plaza	30	30	45	Local	Increase peak frequency.
4-Country Club	20	30	45	Local	Increase peak and night frequency.
11-North Tryon	10	20	30	Local	No Change.
22-North Graham	35	35	45	Local	Increase peak and night frequency.
23-Shamrock	20	35	40	Local	Increase peak and night frequency.
29-UNC Charlotte*	60	60	60	Local	No change.
39-Eastway/UNC Charlotte	35	45	45	Local	Increase all frequency.
54x-URP Express	15	---	---	Express	No change.
80x-Concord	30	---	---	Express	Decrease peak frequency.
81x-Wachovia	60	60	---	Express	No change.
211-Hidden Valley	20	20	30	Local	Increase peak frequency.
360-City Boulevard/NC-49	30	40	60	Local	New route to provide service from UNC Charlotte to Cabarrus County along University City Blvd./NC-49.

Note: “---” refers to no service being operated during those frequencies.

* Existing UNC Charlotte shuttle routes would also be operated, but are not modeled in the travel demand model.

2.2.2 TSM Alternative

The TSM Alternative is a low capital cost approach for addressing the need for transit improvements in the Northeast Corridor. Under federal guidelines, it provides the baseline for evaluating the cost-effectiveness of the build alternatives. The TSM Alternative includes the highway and transit improvements associated with the No-Build Alternative in the Northeast Corridor, along with additional service and facilities to improve service along the Northeast Corridor to Center City Charlotte and University City. These improvements include two skip-stop bus routes. Skip-stop services operate with fewer stops than local routes to minimize travel times. One skip-stop service route would deviate from North Tryon Street/US-29 and follow I-85 into Center City Charlotte. The second skip-stop service route would begin at the I-485/N. Tryon Station and travel along North Tryon Street/US-29 into Center City Charlotte. Skip-stop bus service improvements include revisions or additions to the existing bus service,

upgraded stops with ticket vending machines and closed circuit televisions, bus queue jumpers at select intersections (including signal prioritization), and the construction of seven new park-and-ride lots with pedestrian and bicycle facilities. Additionally, two signals would be installed at the University City Blvd. and I-485/N. Tryon Street park-and-ride lots. This alternative also assumes the procurement of hybrid buses to reduce air quality emissions, as well as upgrades to the existing CATS South Tryon Street Bus Maintenance Facility to provide space for the additional bus fleet. No changes to transit service outside the corridor would be made. Table 2-3 and Figure 2-3 show the proposed bus service improvements and park-and-ride locations for the TSM Alternative.

**Table 2-3
Bus Service in Northeast Corridor for TSM Alternative**

Routes	Frequency			Type	Change from No-Build
	Peak	Midday	Night		
3–The Plaza	15	30	45	Local	No change.
4–Country Club	15	30	45	Local	Rerouted to serve areas near North Graham Street, as well provide transfer options to Skip Stop service on North Tryon Street.
11–North Tryon	15	20	30	Local	Decrease peak frequency.
22–North Graham	30	35	40	Local	Streamline route along North Graham Street.
23–Shamrock	15	30	40	Local	No change.
29–UNC Charlotte*	15	30	60	Local	Improve peak and midday frequency.
39–Eastway/UNC Charlotte	30	30	30	Local	No change.
54x–URP Express	15	---	---	Express	No change.
80x–Concord	30	---	---	Express	No change.
81x–Wachovia	60	60	---	Express	No change.
110–Concord Mills Mall	30	30	60	Local	Improve midday frequency.
211–Hidden Valley	15	20	30	Local	No change.
360–City Boulevard/NC-49	30	40	60	Local	No change.
604–NE Skip Stop 1	6	15	20	Local	New route to provide skip-stop service along North Tryon Street/US-29 from City Boulevard to Center City Charlotte.
613–NE Skip Stop 2	6	15	20	Local	New route to provide skip-stop service along North Tryon Street/US-29 from I-485 to University City Blvd./NC-49, then non-stop on I-85 to Center City Charlotte.
807–Old Concord Route	30	30	30	Local	New route along Old Concord Road to UNC Charlotte and skip-stop service.

Note: “---” refers to no service being operated during those frequencies.
 * Existing UNC Charlotte shuttle routes would also be operated, but are not modeled in the travel demand model.
 Source: AECOM and the Metrolina Travel Demand Model

**Table 2-4
Park-and-Rides in Northeast Corridor for TSM Alternative**

Park-and-Ride	Location
Sugar Creek	Sugar Creek Road and North Tryon Street/US-29
Old Concord Road	Old Concord Road and North Tryon Street/US-29
Tom Hunter	Tom Hunter Road and North Tryon Street/US-29
University City Blvd.	Rocky River Road and North Tryon Street/US-29
McCullough	McCullough Drive and North Tryon Street/US-29
Mallard Creek Church	Mallard Creek Church Road and North Tryon Street/US-29
I-485/N. Tryon	I-485 and North Tryon Street/US-29

As noted, the TSM Alternative does not meet the Purpose and Need of the proposed project. Therefore, only the No-Build and Light Rail Alternatives are further evaluated in this LYNX BLE Draft EIS. The TSM Alternative serves as a baseline alternative in Chapter 21.0 Evaluation of Alternatives, as required by the FTA New Starts program.

2.2.3 Light Rail Alternative

The proposed Light Rail Alternative would begin in Center City Charlotte at the terminus of the CATS' LYNX Blue Line light rail line near 7th Street and extend 10.7 miles northeast towards UNC Charlotte to I-485 near the Mecklenburg-Cabarrus County line (see Figure 1-2 in Chapter 1.0: Purpose and Need). The proposed Light Rail Alternative would include bus services to support and supplement the light rail system. The trackway would be configured with two tracks, one for northbound service and one for southbound service. The proposed project would generally exist within either existing railroad or roadway right-of-way. Some portions would be elevated up and over existing freight tracks, roads or other geographic constraints. In one location, the tracks would be depressed under an existing road. The Light Rail Alternative and a design option called the Light Rail Alternative – Sugar Creek Design Option, are described in more detail in the following sections.

2.2.3.1 Alignment

The Light Rail Alternative alignment was identified by the MTC as the LPA, or preferred route, for the proposed project. One design option presented in this Draft EIS that deviates from the base alignment of the Light Rail Alternative is known as the Light Rail Alternative – Sugar Creek Design Option. This design option is described in more detail in Section 2.2.3.5. Figure 2-4 shows typical cross-sections for the alignment.

The proposed Light Rail Alternative would begin at the northern terminus of the existing LYNX Blue Line light rail at 7th Street in Center City Charlotte and would follow the former railroad right-of-way north through Center City Charlotte. The right-of-way is owned by the City of Charlotte up to 12th Street and was purchased for transit use in 1998. The proposed Light Rail Alternative would then travel at the existing street level and gated light rail crossings would be used at 7th Street, 8th Street, 9th Street, the proposed 10th Street, and 12th Street.

A single track is located between 7th and 9th Street, and a Trolley station is located at 9th Street. The LYNX Blue Line provides light rail service to the 7th Street Station but utilizes the track between 7th and 9th Street to stage extra vehicles for special events. The proposed Light Rail Alternative would eliminate the Trolley station at 9th Street.

North of 12th Street, the proposed alignment would transition up a retaining wall and onto a bridge in order to pass over the existing CSX Corporation (CSX) rail line, and then return to ground level just before 16th Street. The proposed Light Rail Alternative would cross 16th Street at the existing street level with a gated light rail crossing. The alignment would then shift south and run between the southern edge of the Norfolk Southern Intermodal Facility and the northern side of North Brevard Street. A proposed Vehicle Light Maintenance Facility (VLMF) would be located on the site of the Norfolk Southern Intermodal Facility, which NS plans to relocate to the Charlotte-Douglas International Airport as a separate project. The VLMF is described in more detail in Section 2.2.3.6.

The Light Rail Alternative would continue along the northern edge of North Brevard Street and cross over Little Sugar Creek on a bridge and then under the 30th Street Bridge. No changes to Brevard Street would occur. Just beyond 30th Street, the alignment would ascend up a retaining wall and over a bridge to pass over the existing Aberdeen, Carolina & Western Railway Company (AC&W) rail line. The proposed alignment would return to ground level and run parallel to the existing freight tracks on the south side of the NCCR right-of-way until Craighead Road.

A new access road for the Duke Energy Substation would be constructed off of North Brevard Street, north of the existing driveway, since the proposed light rail alignment would be located where the existing entrance is located. The new access road would go under the light rail bridge to provide an entrance to the electrical substation from the west side, as well as to provide access to a proposed signal house for the light rail, and potentially provide additional access to an adjacent parcel. Between 30th Street and Old Concord Road, the light rail would operate in the NCRR right-of-way.



Proposed Duke Energy Substation access road.

NS operates the existing freight service that is active in this segment of the corridor. The proposed Light Rail Alternative would include a separation of approximately 54 feet between the freight tracks and the proposed light rail track.

At 36th Street, the proposed light rail would travel within the NCRR right-of-way on the southeast side of the existing freight tracks. Existing 36th Street would be depressed under the existing freight and proposed light rail tracks to alleviate traffic and pedestrian safety and traffic delay concerns and to improve freight operations. The existing freight tracks would be shifted to the north, and the freight tracks and the proposed light rail tracks would be placed on a bridge structure to allow the road to be constructed as an underpass. Just south of Craighead Road, the proposed alignment would go up and over Craighead Road, crossing over the existing freight tracks on a bridge and then return back to ground level on the western side and continue to the northeast.

NCRR and the NCDOT Rail Division plan to depress Sugar Creek Road under the existing freight tracks that are at street level due to safety concerns. CATS has worked with NCRR and NCDOT Rail to develop plans that also allow the light rail tracks to pass alongside the freight tracks on an adjacent bridge over Sugar Creek Road. The alignment would continue along the northwest side of the existing NS tracks within the NCRR right-of-way. At Eastway Drive, the proposed alignment would go under the existing roadway bridge that carries vehicular traffic as the existing freight tracks do today. The Eastway Drive roadway bridge would be lengthened to accommodate the proposed light rail tracks.



Rendering of the proposed depression of Sugar Creek Road under the existing freight tracks and proposed Light Rail Alternative.

Approximately 2,600 feet north of Eastway Drive, the alignment would depart from the NCRR right-of-way and turn northwest towards the intersection of Old Concord Road and North Tryon Street/US-29 through private property. Due to high traffic volumes, vehicular safety concerns (for motorists and light rail vehicles), and traffic operations at this location, a bridge would be constructed to take the light rail up and over Old Concord Road and the outbound travel lanes of North Tryon Street/US-29. The proposed light rail would return to street level approximately 1,000 feet north of the North Tryon Street/US-29 - Old Concord Road intersection and continue in the median to just north of JW Clay Boulevard and the entrance to the Charlotte Research Institute.

Where North Tryon Street/US-29 meets University City Blvd./NC-49, commonly referred to as the “weave”, NCDOT and CDOT have designed safety improvements that convert the weave configuration

into two at-grade, signalized intersections. Construction of the improved intersections will begin in 2010.

To pass through the reconfigured intersections, the proposed light rail alignment would begin to ascend onto a bridge structure to pass over the realigned I-85 Connector Road - North Tryon Street/US-29 intersection. The alignment would return to street level south of the University City Blvd. Station park-and-ride entrance, where there would be a signalized intersection provided to access the park-and-ride lot. Beyond Stetson Drive, the alignment would again ascend to an aerial structure and pass over the realigned University City Blvd./NC-49 and City Boulevard intersection and return to street level just north of Brookside Lane.

The proposed alignment would continue at street level in the median of North Tryon Street/US-29, past McCullough Drive. Just north of Ken Hoffman Drive, the alignment would transition to an aerial structure, crossing over W.T. Harris Boulevard and returning to street level just south of JM Keynes Drive/Hospital Drive.

After the proposed light rail alignment passes through the intersection of North Tryon Street/US-29 and UNC Charlotte Research Drive, the alignment would begin to descend below the existing street elevation of North Tryon Street/US-29. The alignment would then turn to the southeast towards the UNC Charlotte campus, crossing under the northbound travel lanes of North Tryon Street/US29, continuing to turn southeast, bringing the light rail alignment onto the campus of UNC Charlotte. The alignment would continue towards the northeastern edge of the existing Charlotte Research Institute buildings. The alignment would cross over Toby Creek and the planned Toby Creek Greenway on a bridge and then travel along the northern side of Cameron Boulevard, across from the Laurel Hall dormitory.

The proposed alignment would then turn north and west to leave the campus and head towards Mallard Creek Church Road. The proposed alignment would cross an unnamed tributary to Mallard Creek on a bridge and head northeast towards Mallard Creek Church Road, crossing over Mallard Creek Church Road at-grade just east of a bridge crossing of Mallard Creek and just south of the Kirk Farm Fields Wetland Viewing area. The proposed alignment would turn north after the Mallard Creek Church Road Station and cross over Mallard Creek on a bridge and then turn northeast to parallel North Tryon Street/US-29 and continue along the eastern side of the roadway. The terminal station would be located approximately 1,400 feet south of the existing I-485 ramps.

2.2.3.2 Stations

The Light Rail Alternative would include 13 stations, as well as a feeder bus system to support the light rail system. Passengers would board or alight the light rail vehicles at stations. Stations would be configured with center or side platforms, depending on the available site conditions, and most stations would be located at existing ground or street level. All stations would have level boarding to be ADA accessible. The 36th Street and Sugar Creek Stations would be located on a bridge structure that would support the station and light rail tracks while the respective roadways would be depressed underneath. In addition, the Sugar Creek Station Park-and-Ride (Option 2) and the I-485/N. Tryon Station would also be located on a bridge structure connected to the respective parking garage with direct access to the garage.

Platforms are planned to be 300 feet long to accommodate a three-car train consist. Typical center and side platform station layouts are shown in Figure 2-5. Along North Tryon Street/US-29, stations would be located in the median with pedestrian access via crosswalks. All stations would include facilities for bicyclists, such as bike racks or bike lockers. All stations would include:

- Shelters, garbage cans and benches;
- Lighting;
- Self-serve ticket-vending machines (TVM);
- Closed Circuit Television cameras (CCTV);
- Passenger Assistance Telephones (PAT);
- Variable Message Signs (VMS);
- Public Address System (PA);
- Blue light emergency phones; and,

- Customer information, such as maps and schedules for the light rail line and connecting bus routes.

In the more urban areas of the corridor, access to stations would primarily consist of pedestrians, bicyclists, or passengers transferring from bus services; otherwise known as “walk-up” customers. Walk-up stations are more conducive to urban environments where higher land densities exist. Automobile parking would not be provided at walk-up stations; therefore less land acquisition would be required for walk-up stations. On-street bus transfers would take place in proximity to the station locations to facilitate mobility between bus service and the light rail.

Seven stations would have park-and-ride facilities with accessible parking for handicapped passengers. The park-and-ride facilities would vary in size based on projected ridership and available land. Park-and-ride facilities have been designed to accommodate access by bus, automobile, bicyclists and pedestrians. Additionally, “kiss-and-ride” areas for passenger pick-up and drop-off, as well as bus bays and bus stops, would be accommodated at select stations based on available land and projected demand. Parking garages are planned at Sugar Creek Station Park-and-Ride (Option 2) and the I-485/N. Tryon Station. All other parking would be provided at surface parking lots.

Table 2-5 summarizes the basic characteristics of the proposed stations for the Light Rail Alternative. Station site plans are included in Figures 2-6 through 2-19.

**Table 2-5
Proposed Stations for the Light Rail Alternative**

Station	Access	Platform Type	Parking Spaces*	Bus Bays/stops*
9th Street Station (Figure 2-6)	Walk-up	Side	0	None
Parkwood Street Station (Figure 2-7)	Walk-up	Side	0	None
25th Street Station (Figure 2-8)	Walk-up	Center	0	None
36th Street Station (Figure 2-9)	Walk-up	Center	0	2 Stops
Sugar Creek Station Park-and-Ride Option 1 (Figure 2-10)	Park-and-ride	Center	899	3 Bays
Sugar Creek Station Park-and-Ride Option 2 (Figure 2-11)	Park-and-ride	Center	1,010	3 Bays
Old Concord Road Station (Figure 2-12)	Park-and-ride	Side	563	4 Bays
Tom Hunter Station (Figure 2-13)	Park-and-ride	Center	139	2 Stops
University City Blvd. Station (Figure 2-14)	Park-and-ride	Center	797	4 Bays
McCullough Station (Figure 2-15)	Park-and-ride	Center	151	2 Stops
JW Clay Blvd. Station (Figure 2-16)	Walk-up	Center	0	2 Bays
UNC Charlotte Station (Figure 2-17)	Walk-up	Side	0	2 Bays
Mallard Creek Church Station (Figure 2-18)	Park-and-ride	Side	156	3 Bays
I-485/N. Tryon Station (Figure 2-19)	Park-and-ride	Center	1,959	4 Bays

* Reflects the 30% Preliminary Engineering Design Plans (March 8, 2010).

2.2.3.3 Grade Separations

Based on an evaluation of safety and projected traffic volumes and delays, grade separations are proposed as part of the project to provide safe operations reduce delay to vehicles at intersections through the corridor. The locations of the proposed grade separations are:

- 11th Street (existing)
- I-277 (existing)
- CSX Railroad tracks between I-277 and 16th Street
- AC&W railroad tracks just north of 30th Street/Duke Energy access road

- 36th Street
- E. Craighead Road
- Sugar Creek Road
- Eastway Drive (existing)
- North Tryon Street/US-29 northbound lanes (entrance to median)
- I-85 Connector Road
- University City Blvd./NC-49
- W.T. Harris Boulevard
- Northbound lanes of North Tryon Street/US-29 just north of Grove Lake Dr. (underpass/median exit)
- Morningstar Place Drive at the proposed I-485/N. Tryon Street Station Park-and-Ride

2.2.3.4 Rail and Street Modifications

Modifications that would need to occur to existing infrastructure that would result directly from the Light Rail Alternative include:

- Construction of a new access driveway off of North Brevard Street for access to the existing Duke Energy substation;
- Grade separation of 36th Street and the NCRRL, including construction of a sidewalk along 36th Street under the future freight and light rail bridges;
- A new signal is also proposed at Sugar Creek Road and North Davidson Street for traffic accessing the proposed Sugar Creek Station Park-and-Ride Option 2.
- Modifications to North Tryon Street to accommodate light rail in the median, described below.

North Tryon Street Modifications

The existing right-of-way along most of North Tryon Street/US-29 where the proposed light rail would be located is 120 feet. The required right-of-way width for incorporating light rail into the median is 147 feet plus additional width at intersections to accommodate turn lanes and in station locations. The typical section would include: two 11-foot through travel lanes for northbound and southbound directions; 11-foot turn lanes at intersections; two light rail tracks within the median; five foot bicycle lanes; two foot – six inch curb and gutters on both sides; eight foot planting strips; and six to eight foot sidewalks on both sides (see Figure 2-4).

- Along North Tryon Street/US-29 between Old Concord Road and “the weave,” asymmetrical widening is proposed. Along this section of North Tryon Street/US-29, the intent would be to acquire additional right-of-way primarily on the west side of North Tryon Street/US-29. To accommodate light rail in the median, North Tryon Street/US-29 would be re-built so that the proposed edge of pavement on the east side would be located approximately 10 feet to the east of existing edge of pavement for the north-bound lanes of North Tryon Street/US-29, and the proposed edge of pavement on the west side would be approximately 30 feet to the west of the existing edge of pavement of the south-bound lanes of North Tryon Street/US-29.
- North of the “the weave” to UNC Charlotte Research Drive (also known as Institute Circle), symmetrical widening of North Tryon Street/US-29 is proposed. This would require approximately the same amount of additional right-of-way on both sides. Along both sides of North Tryon Street/US-29, the proposed edge of pavement would be located approximately 30 feet from the existing edge of pavement.
- Additional widening, along the entire stretch of North Tryon Street/US-29 for both the asymmetrical and symmetrical widening, of approximately ten to 20 feet would be required to accommodate the left/right turn lanes at signalized intersections. The proposed number of turn lanes at each intersection is based on the traffic analysis documented in Chapter 3.0: Transportation. Additional widening would likely be required at the signalized intersections to provide sufficient pedestrian refuge in the median.
- The existing intersection of North Tryon Street/US-29 and Old Concord Road would be modified. The existing skewed intersection would be realigned to a 90-degree intersection by eliminating the free-flow right turn movement from north-bound North Tryon Street/US-29 onto Old Concord Road.
- Signalized intersections would provide vehicular and pedestrian crossings across the light rail tracks.

- The southern portion of US-29 Service Road/Morningstar Place Drive would be modified and a new signalized intersection would be added at North Tryon Street/US-29 as the primary entrance/exit for the I-485/N. Tryon Station park-and-ride. The current configuration is an unsignalized intersection with North Tryon Street/US-29. The road would continue through the park-and-ride and would turn to the north to reconnect with its current location just before Carnival Street. An additional un-signalized intersection (right-in/right-out with left-over) for the I-485/N. Tryon Station park-and-ride would be provided north of the proposed signalized intersection.
- All existing signalized intersections would remain and the proposed project would add six new signalized intersections along North Tryon Street/US-29 at Orr Road, Arrowhead Drive, Owen Boulevard, Orchard Trace Lane, University City Blvd. Station park-and-ride entrance, and Morningstar Place Drive.
- Existing median openings along North Tryon Street where vehicles can currently make a left turn would be closed at: Austin Drive, Heathway Drive, Kemp Street, Stetson Drive, and Clark Boulevard. Side streets and driveways between signalized intersections would be right-in/right-out only and would require vehicles to make left or u-turns at signalized intersections.

Other Projects

Two projects being undertaken by others have influenced the design of the Light Rail Alternative:

- The City's reconfiguration of the North Tryon Street/US-29 and University City Blvd./NC-49 intersections which will result in two at-grade intersections to improve the existing safety conditions of the area referred to as "the weave;" and,
- The NCR and NCDOT Rail Division's plan to grade separate Sugar Creek Road by depressing Sugar Creek Road under the existing freight tracks and proposed light rail tracks.

2.2.3.5 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option (Figure 2-20) represents a change from the proposed Light Rail Alternative alignment described in Section 2.2.3.1 and a change in the locations for the station platforms and park-and-ride locations for the Sugar Creek and Old Concord Road Stations. The proposed Light Rail Alternative alignment and stations leading up to and departing from the area of the Light Rail Alternative – Sugar Creek Design Option would not change under this design option.

The alignment would divert from the Light Rail Alternative just after it passes Sugar Creek Road. Like the Light Rail Alternative, the alignment for the proposed Light Rail Alternative – Sugar Creek Design Option would pass over Sugar Creek Road on a bridge. This bridge structure would be at the same elevation (at-grade) as the freight tracks and the existing roadway. Sugar Creek Road would also be depressed under the existing freight and the future proposed light rail tracks.

The Light Rail Alternative – Sugar Creek Design Option light rail alignment would turn north towards North Tryon Street/US-29 approximately 200 feet north and east of Sugar Creek Road, rather than continuing along the NCR right-of-way to north of Eastway Drive, like is proposed under the Light Rail Alternative. This design option alignment would then go up and over the northbound travel lanes of North Tryon Street/US-29 approximately 800 feet north of Dorton Street and then return to street level in the median of North Tryon Street/US-29 approximately 160 feet north of Bennett Street.

Asymmetrical widening to the west side of North Tryon Street/US-29 from Dorton Street to Old Concord Road is proposed. The existing right-of-way along this portion of North Tryon Street/US-29 is 100 feet. The required right-of-way width for incorporating light rail into the median is 147 feet plus additional width at intersections to accommodate turn lanes. The proposed typical section along North Tryon Street would be the same as in the Light Rail Alternative. In addition, Dorton Street would be extended east to Raleigh Street to provide access to the park-and-ride lot. An at-grade crossing would also be provided where the light rail would cross Raleigh Street.

The Light Rail Alternative – Sugar Creek Design Option would continue north and east in the median of North Tryon Street/US-29. A retaining wall would begin 712 feet south of Eastway Drive and continue to a bridge to cross over Eastway Drive. The light rail would descend on a retaining wall for another 750 feet

to Northchase Drive. The design option would continue at street level through the intersection at Old Concord Road, to the point where the alignment merges with the Light Rail Alternative alignment at Austin Drive. Table 2-6 summarizes the basic characteristics of the proposed stations for the Light Rail Alternative – Sugar Creek Design Option. Station site plans for the Sugar Creek Station Light Rail Alternative – Sugar Creek Design Option and the Old Concord Road Station Light Rail Alternative – Sugar Creek Design Option are included in Figures 2-21 and 2-22.

**Table 2-6
Proposed Stations for the Light Rail Alternative – Sugar Creek Design Option**

Station	Access	Platform Type	Parking Spaces	Bus Bays
Sugar Creek Station, Sugar Creek Design Option (Figure 2-21)	Park-and-ride	Side	893	3
Old Concord Road Station, Sugar Creek Design Option (Figure 2-22)	Park-and-ride	Center	458	3

2.2.3.6 Vehicle Light Maintenance Facility (VLMF)

A VLMF and storage yard would be constructed on the existing Norfolk Southern Intermodal Facility that abuts North Brevard Street as part of the Light Rail Alternative as shown in Figure 2-23. The VLMF would include a maintenance building and a storage yard. The existing CATS Vehicle Maintenance Facility would need minor modifications to the Rail Operations Control Center. Light maintenance activities, those that could be done in less than 24 hours, would take place at this new facility; whereas heavy maintenance would take place at the existing South Boulevard Light Rail Facility. As noted in Section 2.2.3.1, Norfolk Southern plans to relocate the existing intermodal facility to the Charlotte-Douglas International Airport. In the unlikely event that the relocation project will not be complete prior to opening service of the proposed LYNX BLE, CATS has identified three alternate sites that could potentially accommodate the VLMF, if necessary. These sites are shown in Figure 2-24 and include, Option A, a location near to the South Boulevard Light Rail Facility; Option B, a location near to the North Tryon Street/US-29 and Eastway Drive intersection; and Option C, a location near to the proposed I-485/N. Tryon Station. As the existing NS Intermodal Facility is the preferred location of the proposed VLMF, potential environmental impacts associated with development of the alternate sites have not been evaluated and are not included in this Draft EIS. However, if it becomes apparent that the NS Intermodal Facility relocation will be delayed, detailed environmental analysis will be performed on the alternate sites to determine potential social, environmental and economic effects.

2.2.3.7 Ancillary Facilities

The Light Rail Alternative would also include ancillary facilities, such as electric substations and signal control houses. To provide electricity along the line for the light rail vehicles, eight traction power substations would be located along the alignment. Substations require approximately 40 feet-by-60 feet sites with access driveways. A typical substation would be constructed of steel housing and depending on the location, could be surrounded by fencing, a brick wall, landscaping or other forms of aesthetic barriers. Substations would be spaced along the alignment, approximately one-mile apart. Final substation locations would be determined during 65 percent engineering for the proposed project.

The signal control house contains the signaling control system, circuits and equipment required for safe vehicle operation. Eight signal houses are planned along the alignment. The distances between the signal houses vary and are related to the location of the crossover tracks where light rail vehicles can cross between one track and another. The minimum distance between



Typical LYNX Blue Line substation.



Typical LYNX Blue Line signal house.

signal houses is 800 feet, while the maximum distance between signal houses is 16,000 feet.

2.2.3.8 Technology Characteristics

Light rail is a transit technology that operates on fixed steel rails and is typically powered by an overhead electrical system, although diesel-powered systems also exist. The proposed Light Rail Alternative vehicles would be electrically powered by an Overhead Catenary System (OCS) of wires supported by poles. The design of the light rail OCS would utilize either a center pole configuration or side pole configuration along the corridor.

For the proposed Light Rail Alternative light rail would operate in dedicated right-of-way; although autos would be able to cross the tracks at select intersections. Grade crossing gates and lights would be placed at these intersections for safety.



Typical Light Rail Vehicle

The proposed Light Rail Alternative would utilize similar vehicles to the vehicles used for the existing LYNX Blue Line light rail. The light rail vehicles would have a partial low floor (75 percent) and articulation. The cars would be capable of multiple unit bi-directional operation and consist of 1, 2 or 3-car sets with a minimum of 68 seats per car. Each vehicle would be fully compliant with the American with Disabilities Act (ADA), with sufficient space to accommodate a minimum of four wheelchairs. The vehicles would also include racks to carry up to four bicycles, radios and Automatic Passenger Counters (APC). Each vehicle would be manually operated and would generally operate at a maximum speed of 55 miles per hour.

2.2.3.9 Operating Characteristics

The operations plan for the proposed Light Rail Alternative includes light rail service and feeder bus service. Since the proposed Light Rail Alternative would be an extension of the existing LYNX Blue Line, service frequency in the Northeast Corridor would be the same as that for the existing LYNX Blue Line.

Light Rail Service

Light rail service would operate between the I-485/South Boulevard Station at the southern terminus of the South Corridor line and the I-485/N. Tryon Station near the Mecklenburg-Cabarrus County line. Trains would operate in 1, 2 or 3-car sets, seven days a week from 5:00 a.m. to 1:00 a.m. The service would generally operate on the following frequencies:

- Weekday peak-period service (i.e. 6:00 a.m. to 9:30 a.m. and 4:00 p.m. to 7:00 p.m.) would be every 7.5 minutes for initial operations and every six minutes by the year 2030.
- Weekday off-peak service would be 15 minutes during the early morning, mid-day, and evening periods (i.e. 5:00 a.m. to 6:30 a.m. and 9:30 a.m. to 4:00 p.m.) and 20 minutes during the evening/night period (i.e. 7:00 p.m. to 1:00 a.m.).
- Saturday service would be every 15 minutes from 10:00 a.m. to 5:00 p.m.; every 20 minutes from 7:00 a.m. to 10 a.m. and 5:00 p.m. to 10:00 p.m.; and, every 30 minutes from 6:00 a.m. to 7:00 a.m. and 10:00 p.m. to 1:00 a.m.
- Sunday service would be every 15 minutes from 11:00 a.m. to 5:00 p.m.; every 20 minutes from 9:00 a.m. to 11:00 a.m. and 5 p.m. to 10:00 p.m.; and every 30 minutes from 6:00 a.m. to 9:00 a.m. and 10:00 p.m. to 1:00 a.m.

The operating analysis indicated that to meet the projected peak period demand in 2030, two operating scenarios would provide sufficient capacity. The first operating scenario is two car trains with 6-minute headways. The second operating scenario is 3-car trains with 10-minute headways. Six-minute headways were analyzed in this Draft EIS to represent a worst case traffic and noise scenario. As ridership projections are refined, a final operating plan will be determined and presented in the Final EIS.

Additional light rail service would be provided to meet the demand produced by special events. The service plan would vary depending on the size and type of special event. The plan may include more frequent service, additional hours of service, or additional vehicles added to the light rail service and supporting bus services for special events such as sporting events, concerts, shows, or festivals. Venues in Center City Charlotte that may require special event service include: Bank of America Stadium, Time Warner Cable Arena, the Blumenthal Performing Arts Center, the NASCAR Hall of Fame and a future baseball stadium. Outside of Center City Charlotte, events at Memorial Stadium, Central Piedmont Community College, UNC Charlotte, Verizon Wireless Amphitheatre and Charlotte Motor Speedway may also require special event service.

Feeder Bus Service

The light rail service would be augmented by feeder bus service that would include local and express bus service. Bus-to-rail transfers would occur at most station locations. To provide feeder bus service for the proposed Light Rail Alternative, the existing CATS corridor bus service would be modified to move passengers to and from proposed light rail stations. In total, fourteen routes are planned for the corridor and three of these routes would be new services. Several existing routes would be re-aligned and some route frequencies would be modified to minimize waiting time for transfers to or from light rail. Specific route changes are described in detail in the *CATS Bus/Rail Operating Plan* and summarized in Table 2-7. Figure 2-25 shows bus service in the Northeast Corridor under the Light Rail Alternative.

**Table 2-7
Bus Service in Northeast Corridor for Light Rail Alternative**

Routes	Frequency			Type	Light Rail Station Served
	Peak	Midday	Night		
3-The Plaza	15	30	45	Local	36th Street
4-Country Club	15	30	45	Local	Sugar Creek Station Park-and-Ride Options 1 and 2
11-North Tryon	15	30	30	Local	Old Concord Road, Tom Hunter, University City Blvd.
22-North Graham	30	35	40	Local	Not applicable
23-Shamrock	15	30	40	Local	Parkwood, 36th Street
29-UNC Charlotte*	15	30	60	Local	Mallard Creek Church
39-Eastway /UNC Charlotte	30	30	30	Local	Sugar Creek Station Park-and-Ride Options 1 and 2
54x-URP	15	---	---	Express	University City Blvd., JW Clay Blvd
80x-Concord	30	---	---	Express	I-485/N. Tryon
81x-Wachovia	15	30	---	Express	University City Blvd., JW Clay Blvd.
110-Concord Mills Mall	30	30	60	Local	Mallard Creek Church
211-Hidden Valley	15	20	30	Local	Sugar Creek Station Park-and-Ride Options 1 and 2, Tom Hunter
360-City Boulevard/NC-49	30	40	60	Local	Mallard Creek Church
807-Old Concord Route	30	30	30	Local	Old Concord Road, Mallard Creek Church

Note: “---” refers to no service being operated during those frequencies.

* Existing UNC Charlotte shuttle routes would also be operated, but are not modeled in the travel demand model.

Fare Collection

Fare collection for the Light Rail Alternative would be the same as the existing LYNX Blue Line; a barrier-free, proof-of-payment method of fare collection, otherwise known as the “honor” system. CATS would utilize fare inspectors and police officers to check tickets and passes aboard the light rail vehicles. This is the same method of fare collection and enforcement that CATS currently performs on the existing LYNX Blue Line.

Light rail patrons would buy tickets and passes from the self-serve ticket vending machines (TVMs) located at the stations, or otherwise in advance at an authorized CATS pass outlet or through the CATS website. The TVMs located at the stations would have the capability to dispense one-way, round-trip, weekly and day pass tickets, reduced-fare tickets for qualified persons (seniors, handicapped, etc.) and

print receipts for credit/debit transactions. The fare media would be paper-based, magnetically encoded, and compatible with the existing bus magnetic ticketing system.

2.2.4 LYNX Blue Line Light Rail (South Corridor) Improvements

The LYNX BLE creates projected ridership loads that require either the operation of ten-minute headways with 3 car trains or six-minute headways with 2 car trains. Both these scenarios require improvements to the existing Blue Line light rail (*South Corridor Improvements*, STV Inc., 2009). The LYNX Blue Line (South Corridor Light Rail Project) was originally designed with 3 car platforms and additional substations, but these improvements were cut during Final Design. To operate 3 car train sets in the future, CATS would need to extend the length of the existing 2-car platforms at each of the 15 LYNX Blue Line stations in the South Corridor and add four additional substations to meet the traction power requirements. To operate 2 car train sets at 6-minute headways, three additional substations are needed. These improvements are not included in the proposed project at this time. The potential impacts of the improvements are described in 19.0 Secondary and Cumulative Effects.

2.2.5 Capital Costs

The estimated capital costs for the proposed Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option are shown in Table 2-8.

**Table 2-8
Capital Costs for the Light Rail Alternative
and the Light Rail Alternative – Sugar Creek Design Option, 2009**

Cost Category ¹	Light Rail Alternative (\$ millions, 2009)	Change in Cost for Sugar Creek Design Option (\$ millions, 2009)
Guideway and Track Elements	\$167.06	+\$1.35
Stations	\$42.40	-\$0.08
Support Facilities: Yards, Shops, Admin. Bldgs	\$43.11 ²	No change
Site work and Special Conditions	\$120.29	+\$6.06
Systems	\$93.46	No Change
Right-of-way, Land, Existing Improvements	\$111.99	+\$42.81
Vehicles	\$122.88	No Change
Professional Services	\$161.1 ²	+\$2.49
Unallocated Contingency	\$86.23 ²	+\$5.26
Grand Total	\$948.56³	+\$57.89

Notes: ¹List of Cost Categories based on FTA's "Standard Cost Categories for Major Capital Projects." ²Includes the addition of the VLMF order-of-magnitude cost estimate. ³ Does not include Finance Charges.
Source: *Revised 15 Percent Cost Estimate*, July 2009, STV Incorporated.

2.2.6 Operating and Maintenance Costs

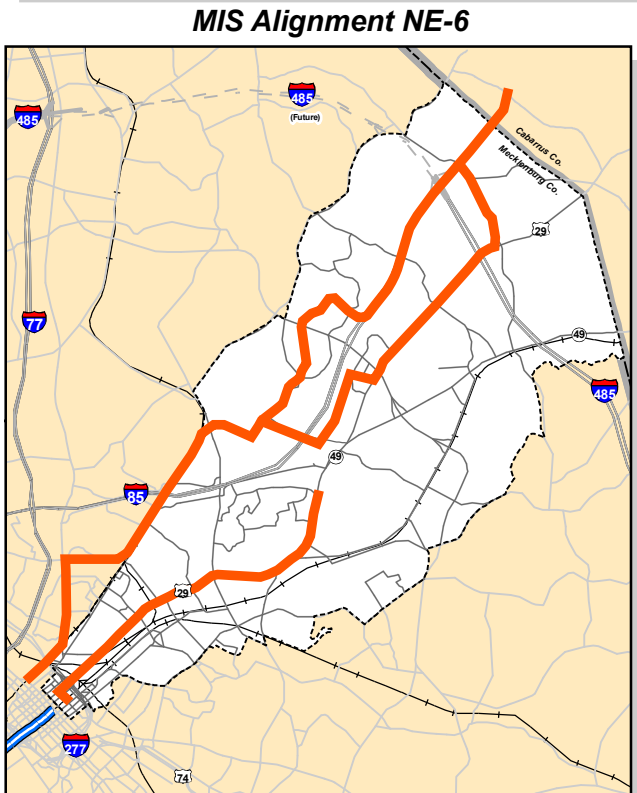
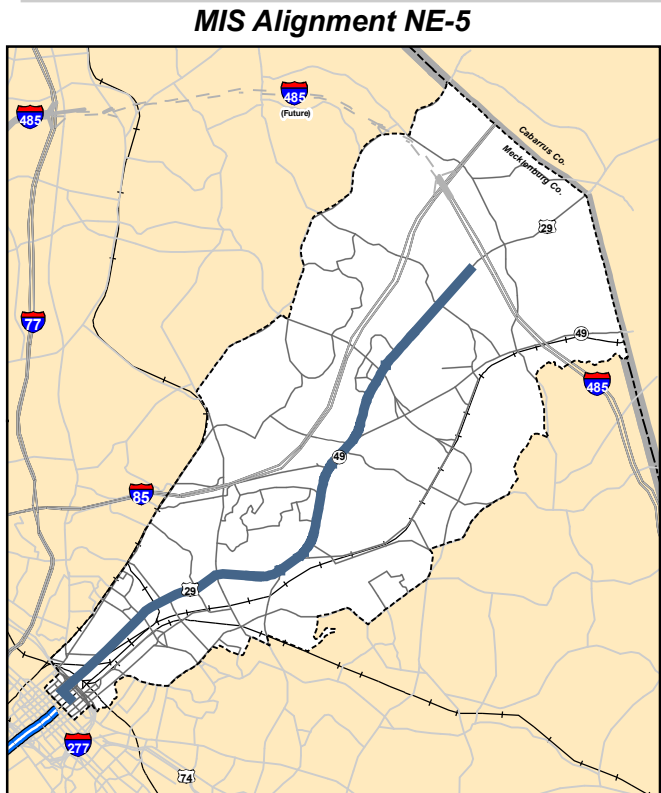
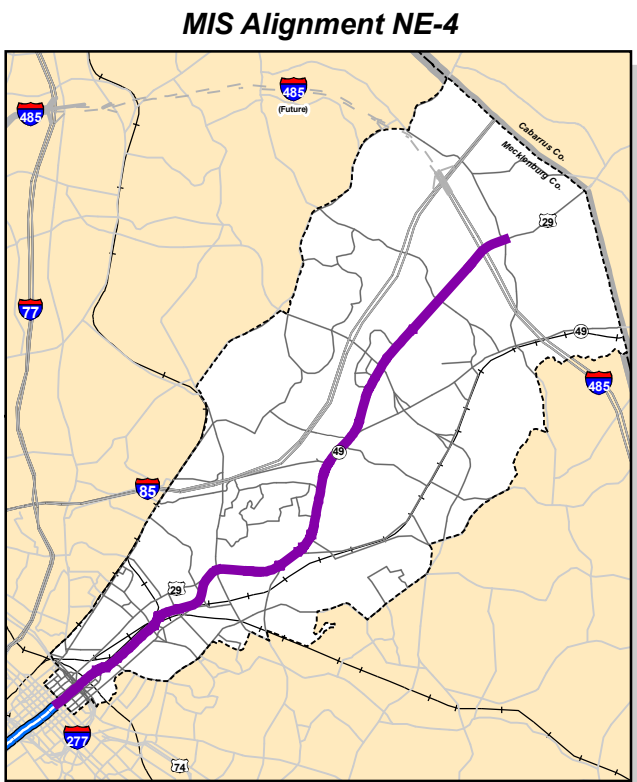
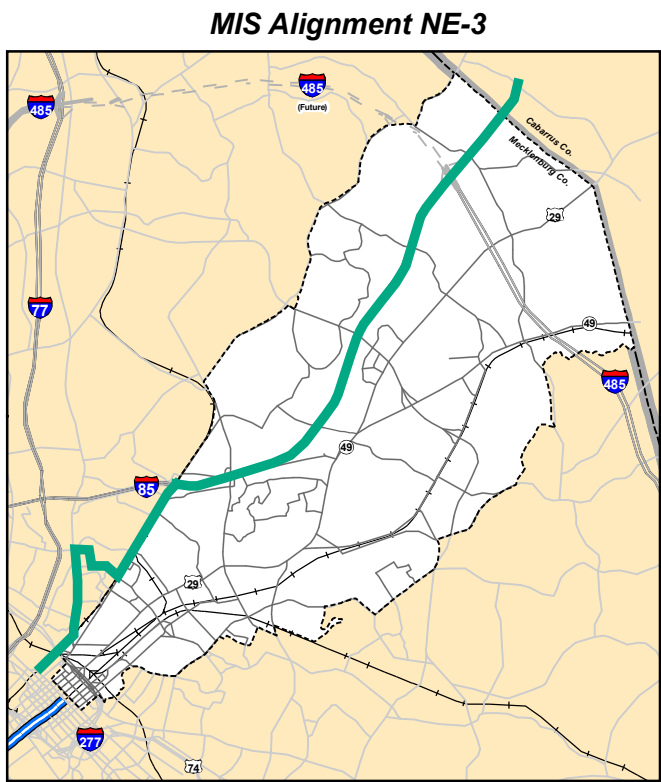
System-wide operating and maintenance costs (O&M) for the No-Build Alternative and the Light Rail Alternative are included in Table 2-9. These numbers reflect system-wide bus and light rail O&M costs for CATS. There would be no difference in O&M costs between the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option.

**Table 2-9
Summary of System-wide Operating and Maintenance Costs**

Alternative	Annual O&M Costs (\$ millions)	Incremental O&M Cost over the No-Build Alternative (\$ millions)
No-Build Alternative	\$95.72	--
Light Rail Alternative	\$112.73	+\$17.01










Note: "--" Not applicable; 2009 Dollars

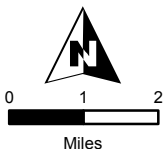
Previously Considered Alignment Alternatives



Project_Alternatives_Figure_2-1a_CB_033010.pdf

Legend

 MIS Alignment NE-3	 Northeast Corridor Limits	 Railroads
 MIS Alignment NE-4	 Highway	
 MIS Alignment NE-5	 Major Roads	
 MIS Alignment NE-6	 Highway (Future)	
 LYNX Existing Light Rail Transit	 County Line	



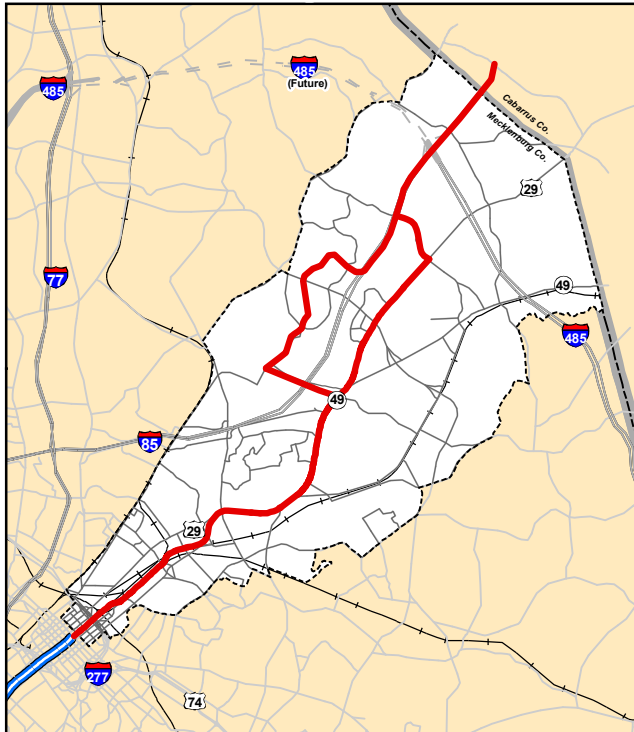
0 1 2
Miles

Data Source:
CATS, RWA/STV/City of Charlotte GIS, and
Mecklenburg County GIS

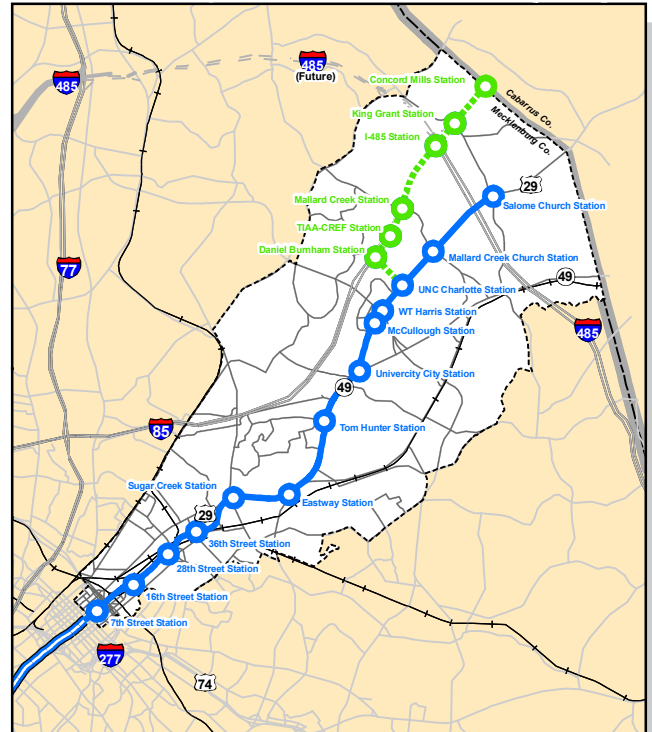
03/30/10

Previously Considered Alignment Alternatives

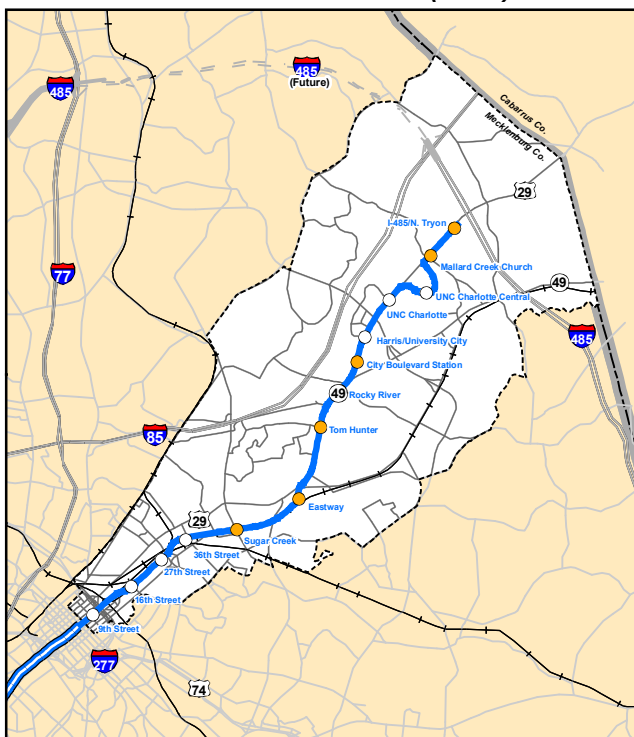
MIS Alignment NE-7



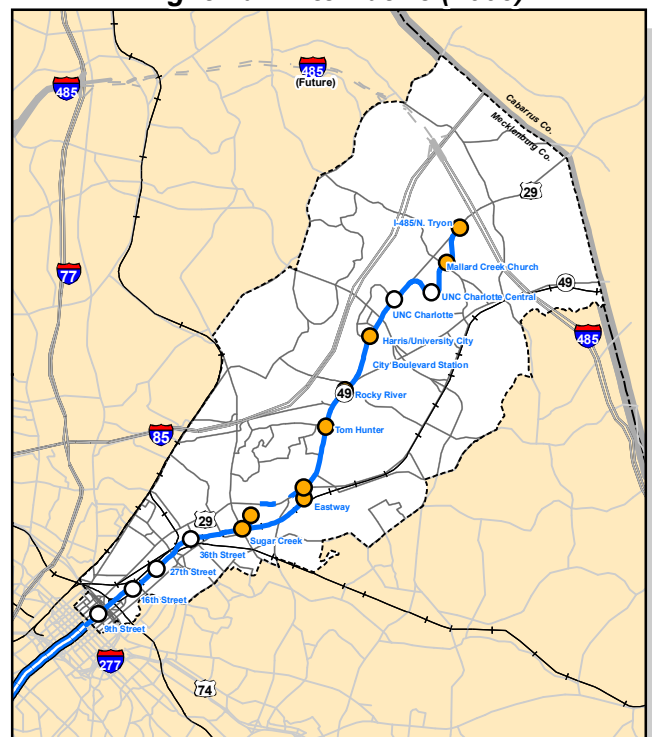
MIS Locally Preferred Alternative (2002)



Conceptual Engineering - Refined Locally Preferred Alternative (2006)

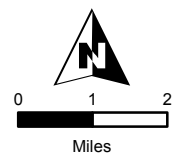


Locally Preferred Alternative / Light Rail Alternative (2009)

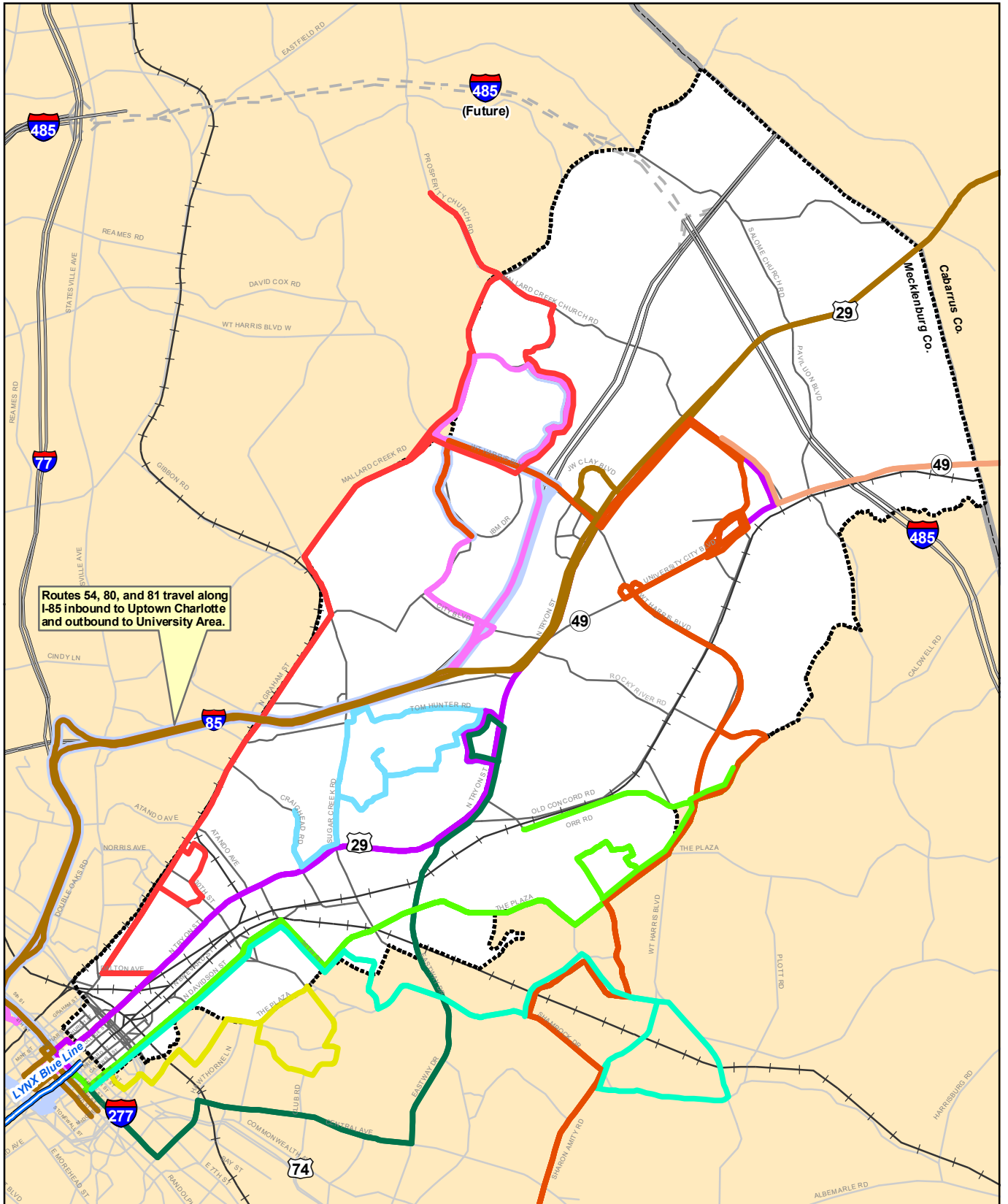


Legend

- MIS Alignment NE-7
- Light Rail Transit
- Light Rail Stations
- - - Bus Rapid Transit
- Bus Rapid Transit Station
- Proposed Stations
- Proposed Stations with Park-and-Ride
- LYNX Existing Light Rail Transit
- Northeast Corridor Limits
- Major Roads
- County Line
- Railroads
- Highway
- Highway (Future)

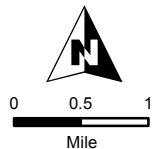


Data Source:
CATS, RWA/STV/City of Charlotte GIS, and
Mecklenburg County GIS



Routes 54, 80, and 81 travel along I-85 inbound to Uptown Charlotte and outbound to University Area.

Legend	
	Northeast Corridor Limits
	LYNX Existing Light Rail Transit
	Railroads
	Highway
	Major Roads
	Highway (Future)
	County Line
	The Plaza
	Country Club
	North Tryon
	Graham St
	Shamrock
	UNCC / SouthPark
	Eastway
	54x URP Express
	80x Concord Express
	81x Wachovia CIC Express
	Hidden Valley
	NC49 / City Blvd

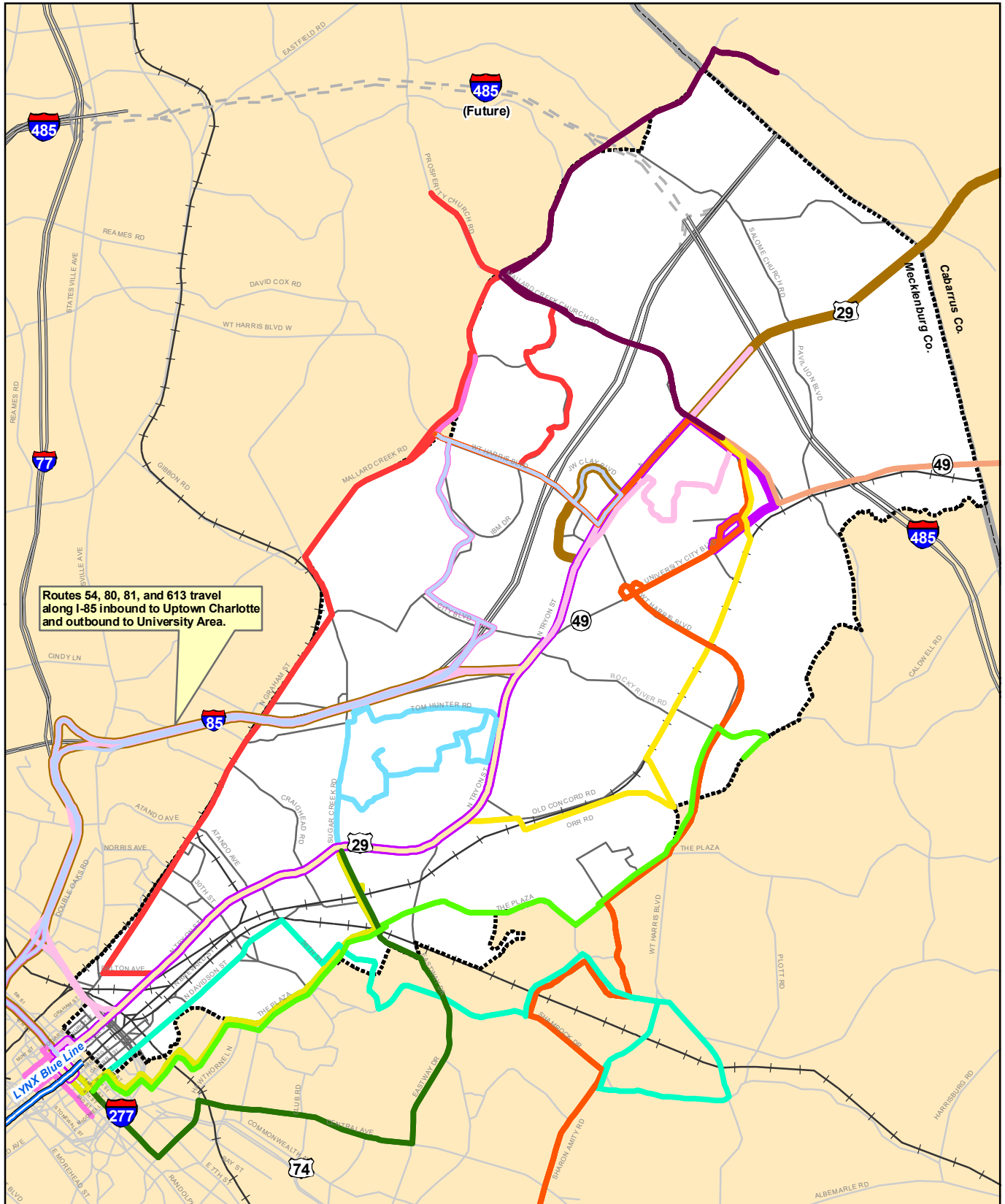


Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

BLE_NoBuildBus3-10.pdf

03_16_10

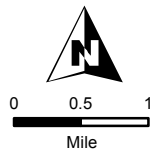
Northeast Corridor - 2030 TSM Bus Network



Routes 54, 80, 81, and 613 travel along I-85 inbound to Uptown Charlotte and outbound to University Area.

Legend

- | | | | |
|---------------------------|----------------------------------|--------------------------|------------------|
| Northeast Corridor Limits | LYNX Existing Light Rail Transit | UNCC / SouthPark | Hidden Valley |
| Railroads | The Plaza | Eastway | NC49 / City Blvd |
| Highway | Country Club | 54x URP Express | NE Skip Stop 2 |
| Major Roads | North Tryon | 80x Concord Express | NE Skip Stop 1 |
| Highway (Future) | Graham St | 81x Wachovia CIC Express | Old Concord Rd |
| County Line | Shamrock | Concord Mills Mall | |

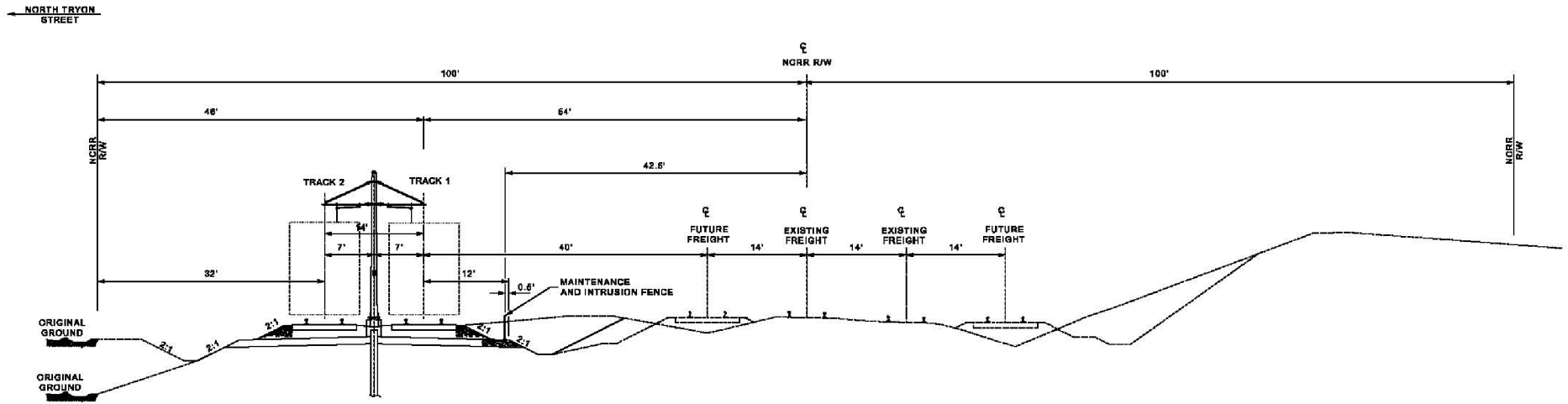


Data Source: CATS, City of Charlotte GIS, and Mecklenburg County GIS

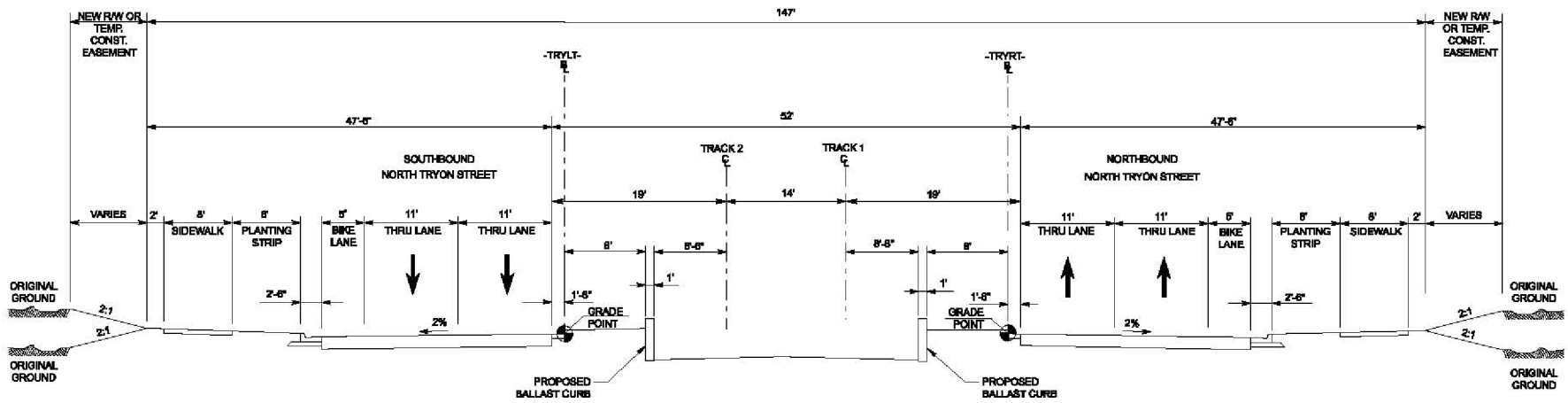
BLE_TSM_Bus3-10.pdf

03/16/10

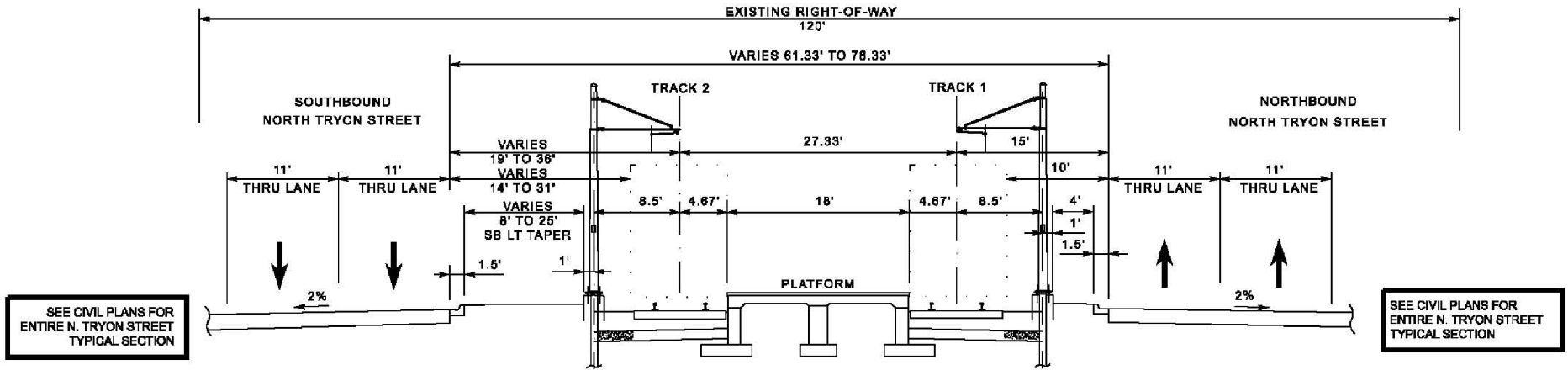
Figure 2-4
Typical Cross Sections with NCRROW & median of North Tryon Street/US-29



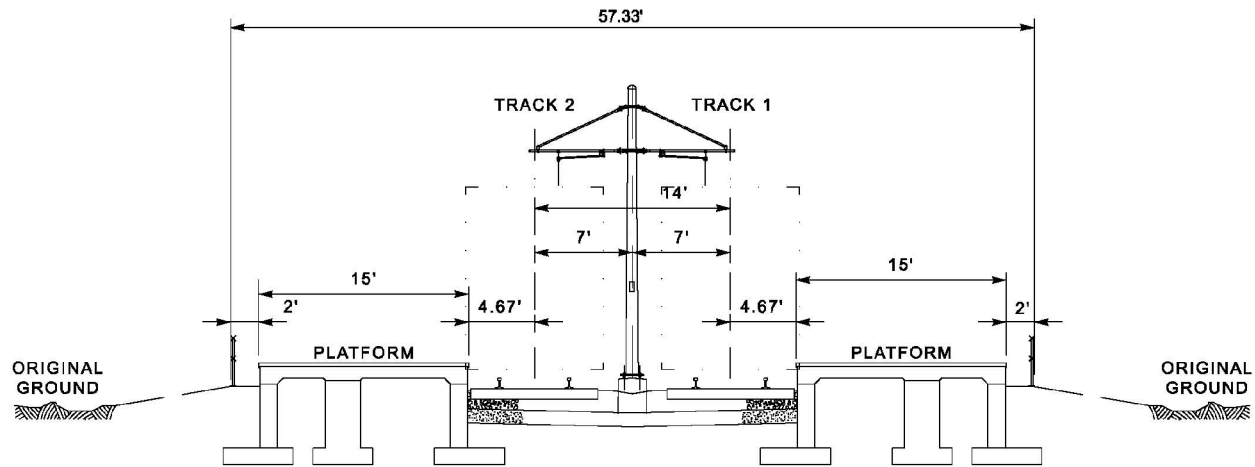
NCRROW TYPICAL SECTION



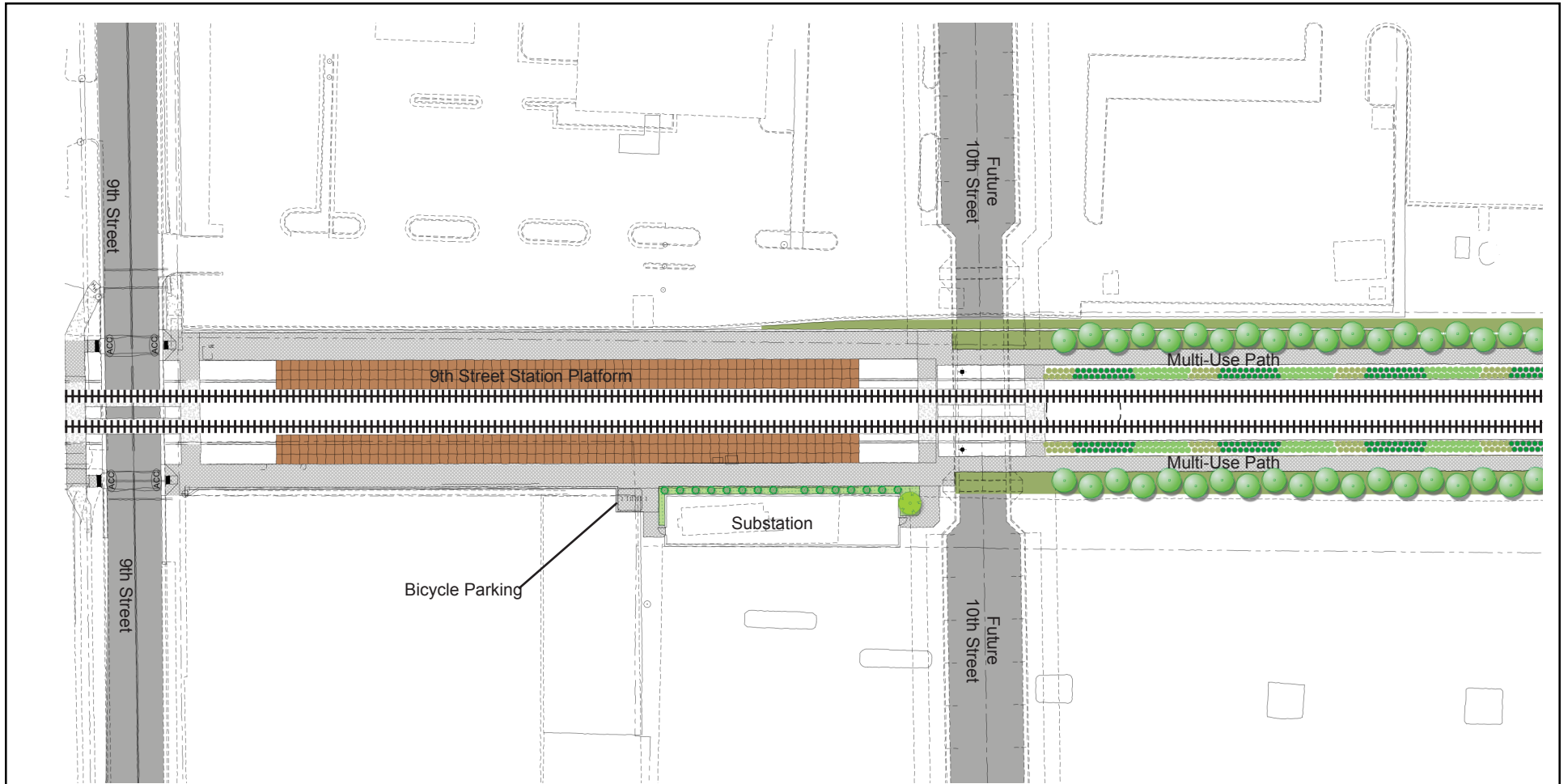
TYPICAL SECTION NORTH TRYON STREET/US 29



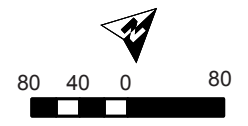
TYPICAL SECTION CENTER PLATFORM



TYPICAL SECTION SIDE PLATFORM

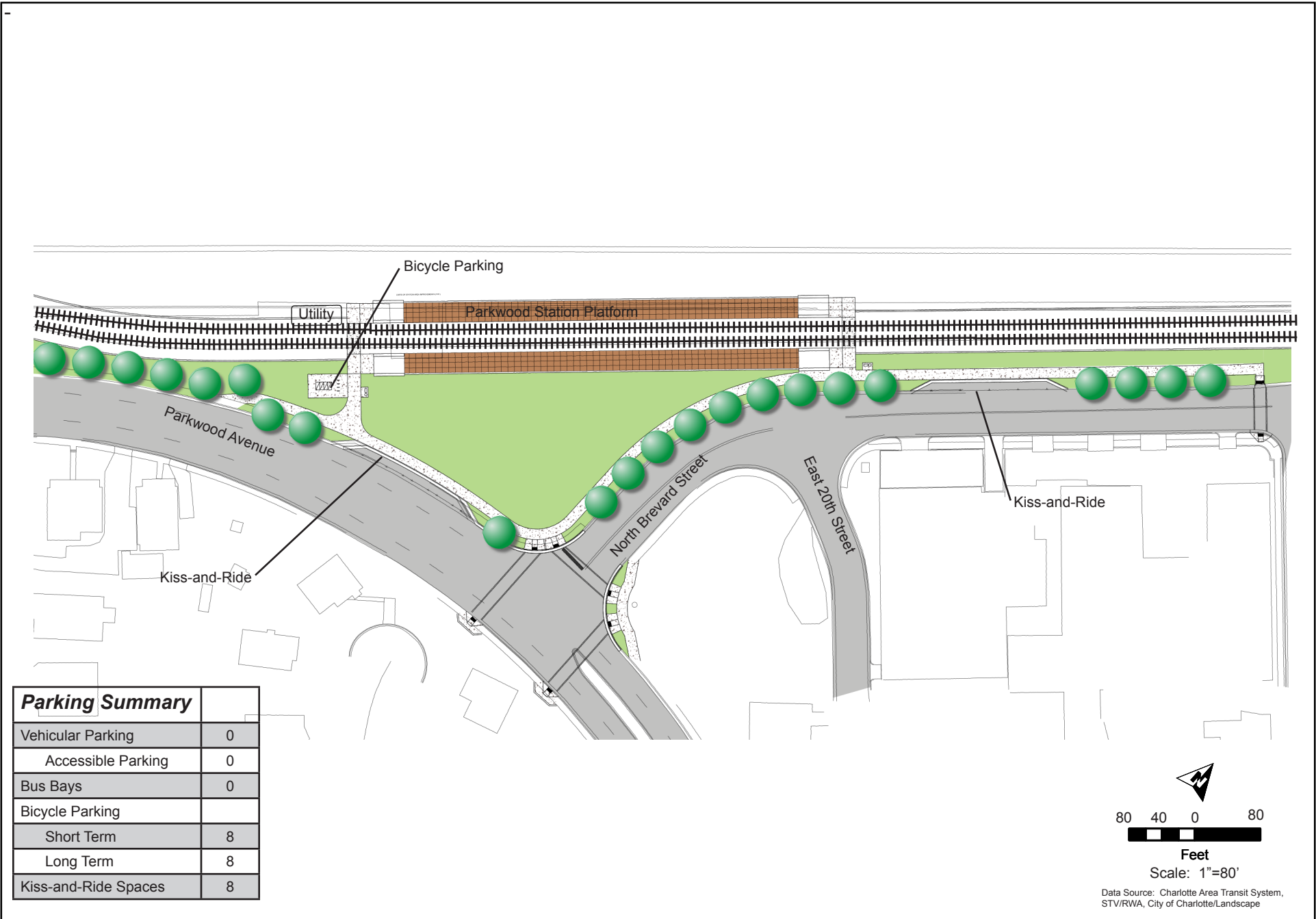


Parking Summary	
Vehicular Parking	0
Accessible Parking	0
Bus Bays	0
Bicycle Parking	
Short Term	8
Long Term	0
Kiss-and-Ride Spaces	0

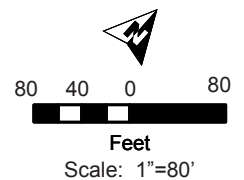


Feet
 Scale: 1"=80'

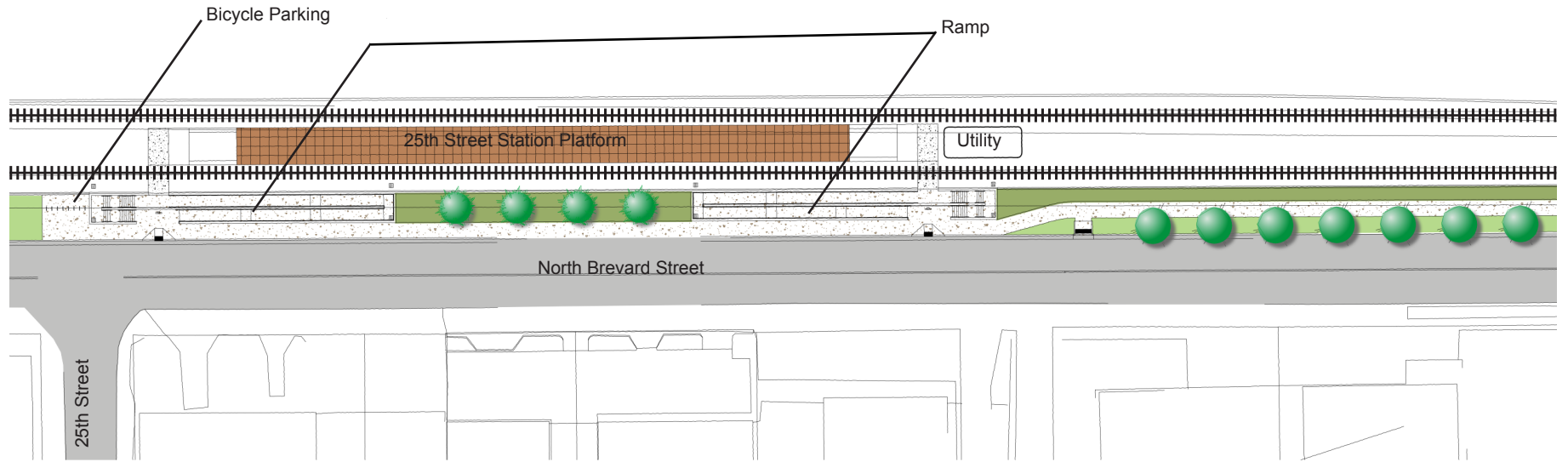
Data Source: Charlotte Area Transit System, STV/RWA,
 City of Charlotte/Landscape Management



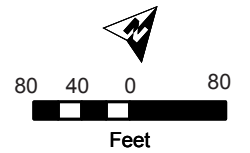
Parking Summary	
Vehicular Parking	0
Accessible Parking	0
Bus Bays	0
Bicycle Parking	
Short Term	8
Long Term	8
Kiss-and-Ride Spaces	8



Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape

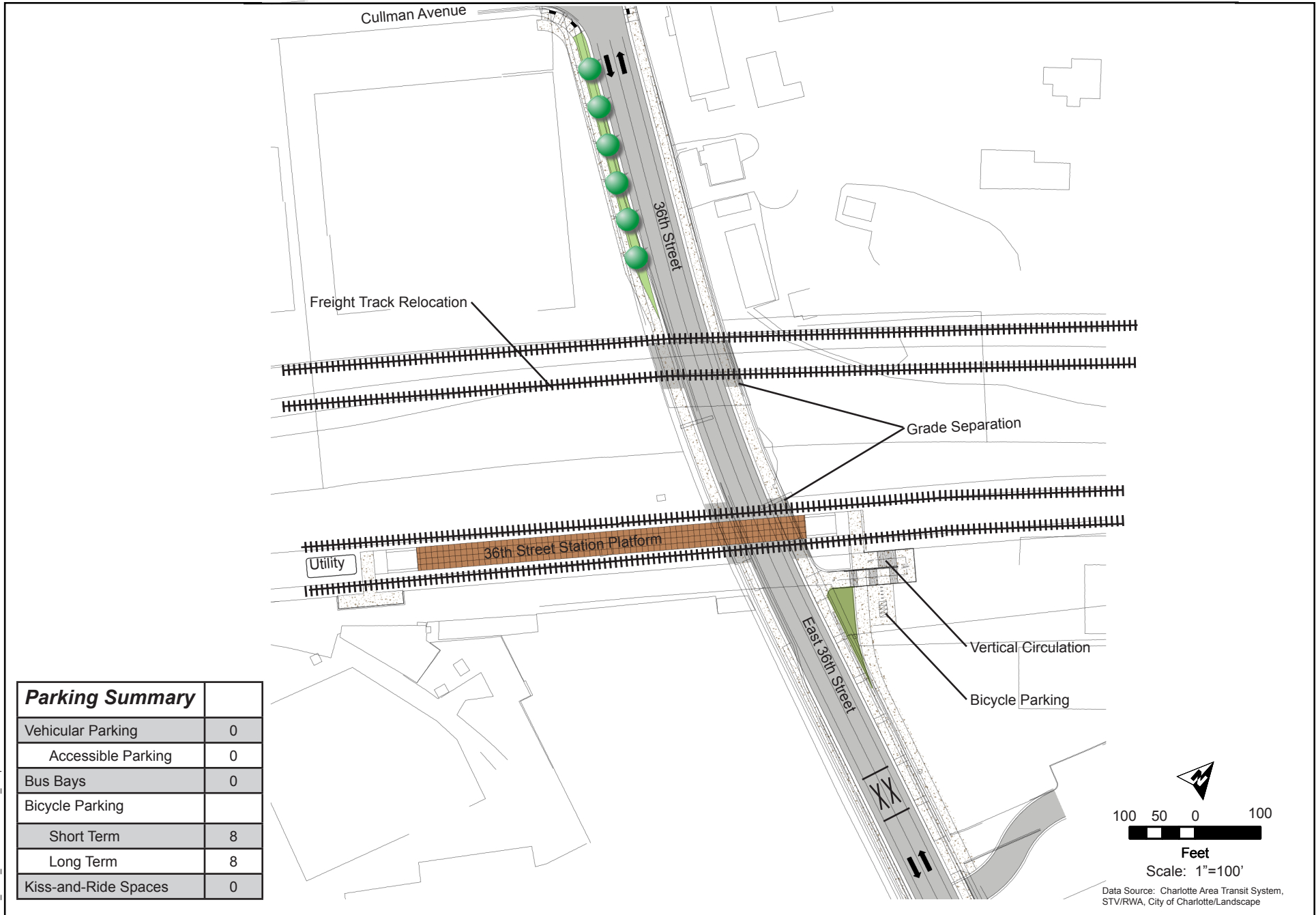


Parking Summary	
Vehicular Parking	0
Accessible Parking	0
Bus Bays	0
Bicycle Parking	
Short Term	16
Long Term	0
Kiss-and-Ride Spaces	0



Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape

Figure 2-9
36th Street Station Site Plan

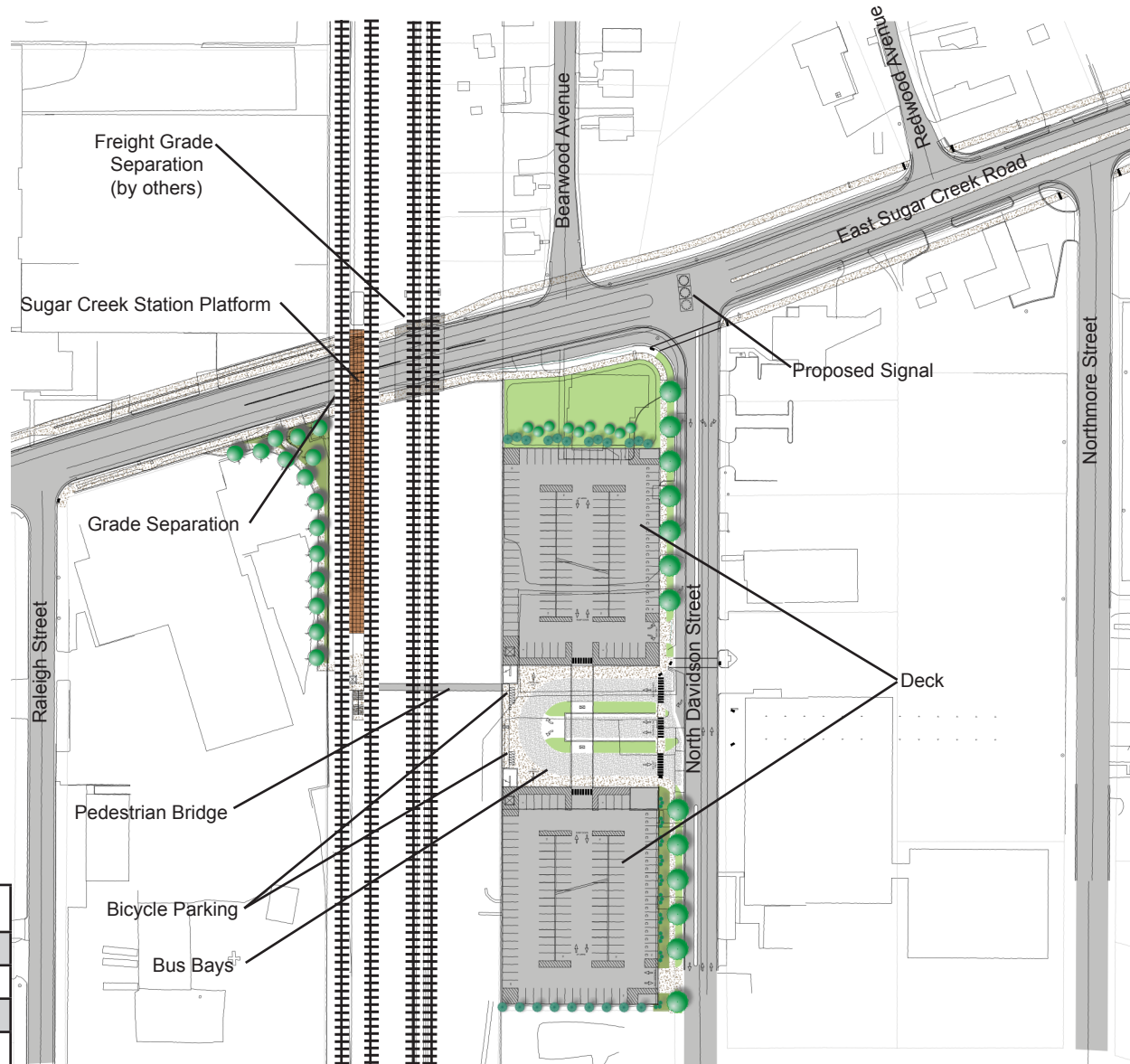


Parking Summary	
Vehicular Parking	0
Accessible Parking	0
Bus Bays	0
Bicycle Parking	
Short Term	8
Long Term	8
Kiss-and-Ride Spaces	0

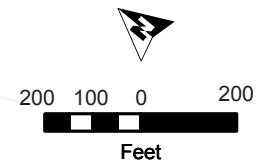
Figure 2-10
Sugar Creek Station Park-and-Ride Option 1 Site Plan



Sugar Creek Station Park-and-Ride Option 2 Site Plan



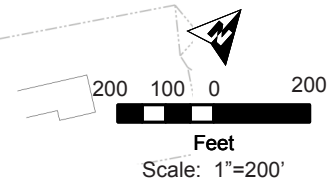
Parking Summary	
Vehicular Parking	1010
Accessible Parking	21
Bus Bays	3
Bicycle Parking	
Short Term	6
Long Term	22
Kiss-and-Ride Spaces	0



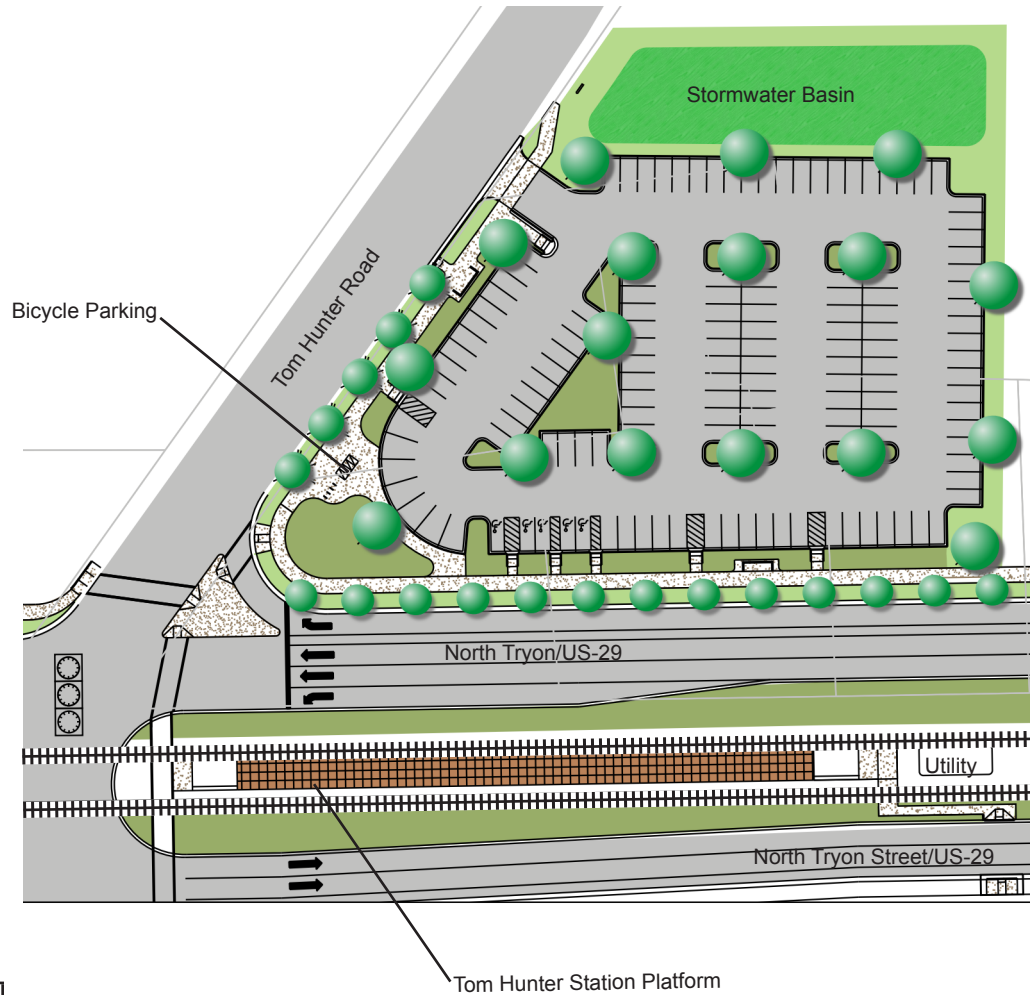
Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape



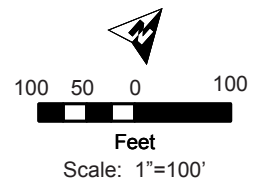
Parking Summary	
Vehicular Parking	563
Accessible Parking	11
Bus Bays	4
Bicycle Parking	
Short Term	8
Long Term	16
Kiss-and-Ride Spaces	0



Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape



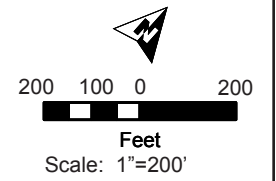
Parking Summary	
Vehicular Parking	139
Accessible Parking	5
Bus Bays	0
Bicycle Parking	
Short Term	8
Long Term	8
Kiss-and-Ride Spaces	0



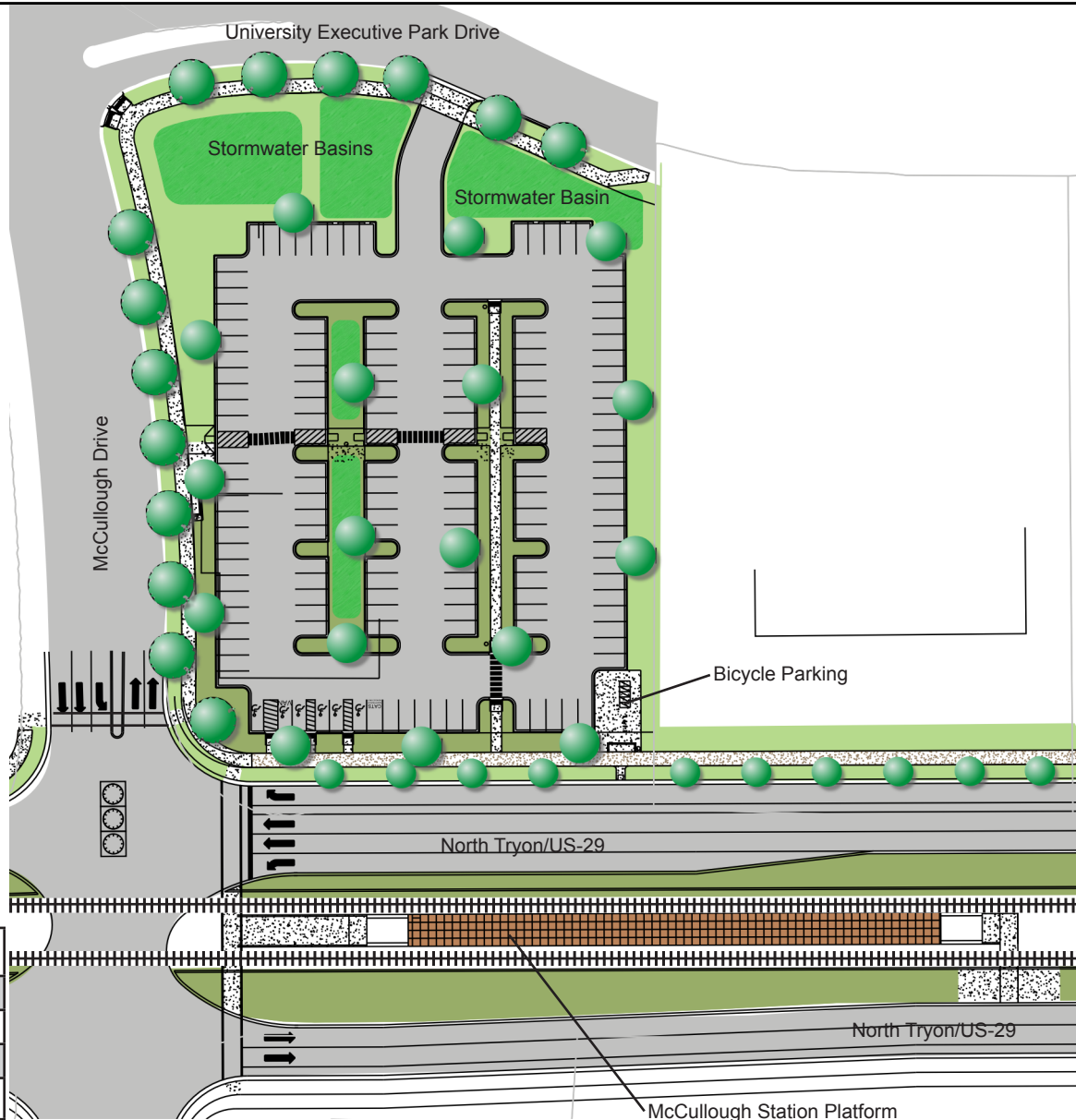
Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape



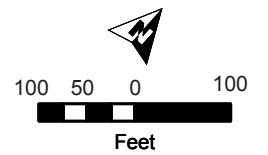
Parking Summary	
Vehicular Parking	797
Accessible Parking	16
Bus Bays	4
Bicycle Parking	
Short Term	6
Long Term	18
Kiss-and-Ride Spaces	0



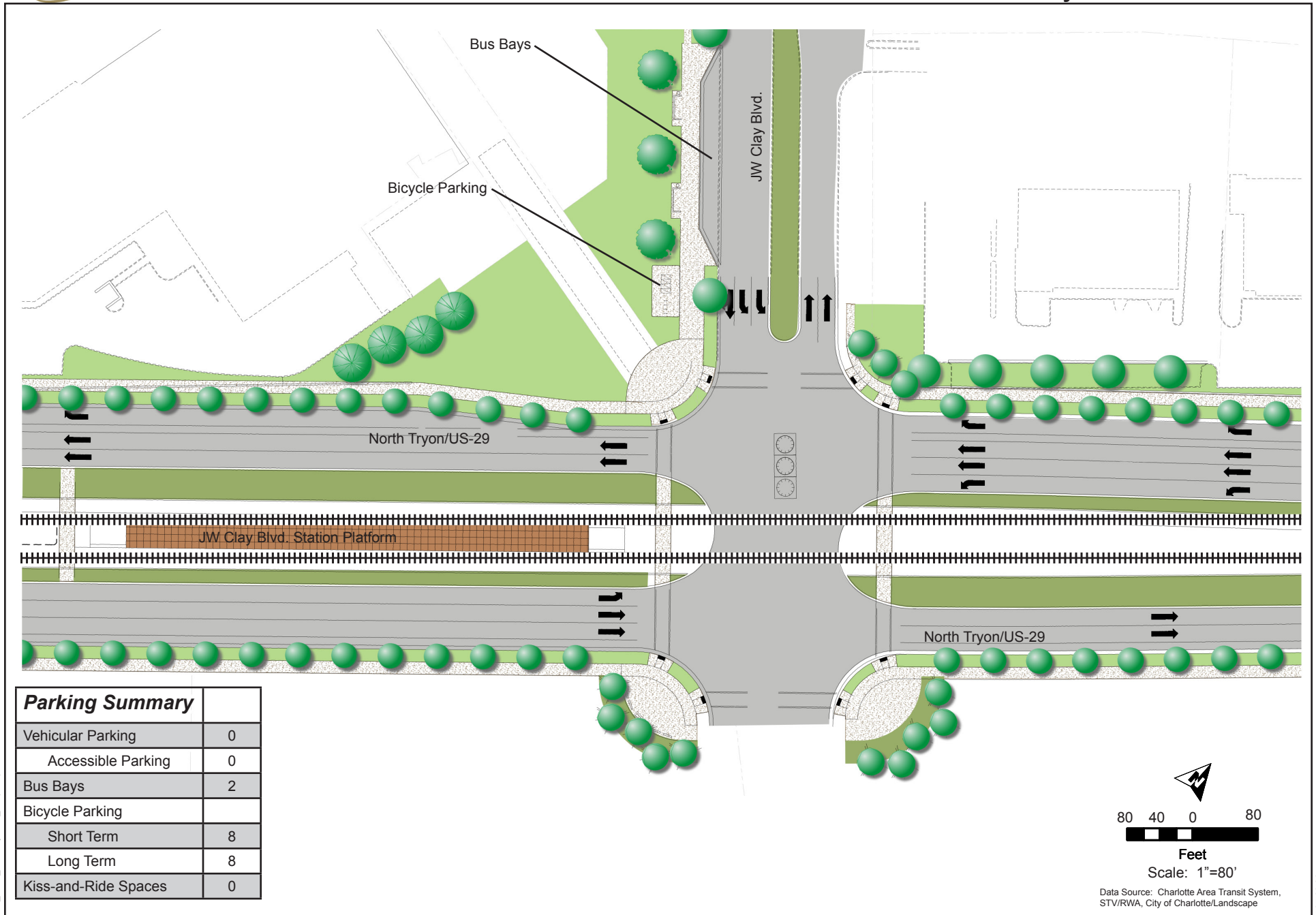
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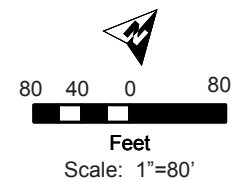
Parking Summary	
Vehicular Parking	151
Accessible Parking	6
Bus Bays	0
Bicycle Parking	
Short Term	8
Long Term	10
Kiss-and-Ride Spaces	0



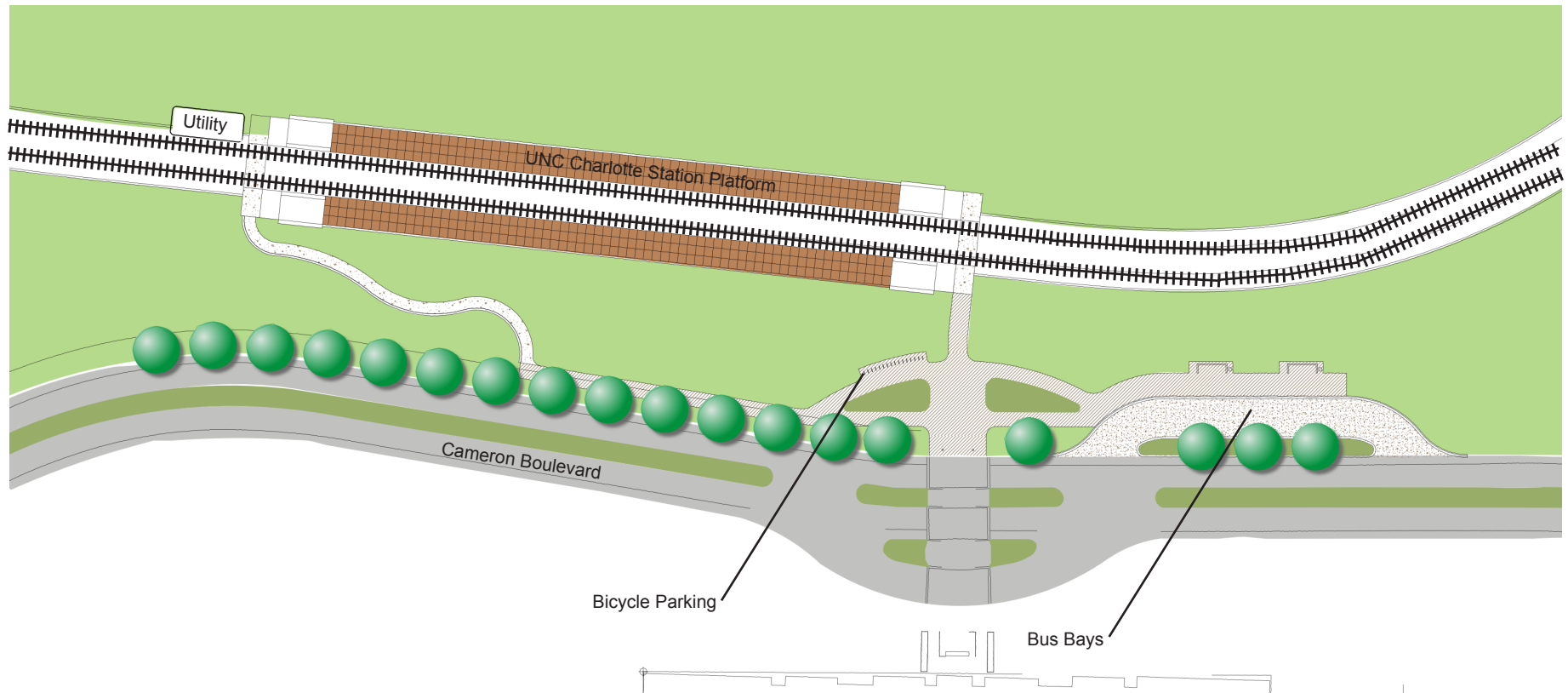
Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape



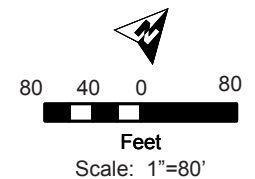
Parking Summary	
Vehicular Parking	0
Accessible Parking	0
Bus Bays	2
Bicycle Parking	
Short Term	8
Long Term	8
Kiss-and-Ride Spaces	0



Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape

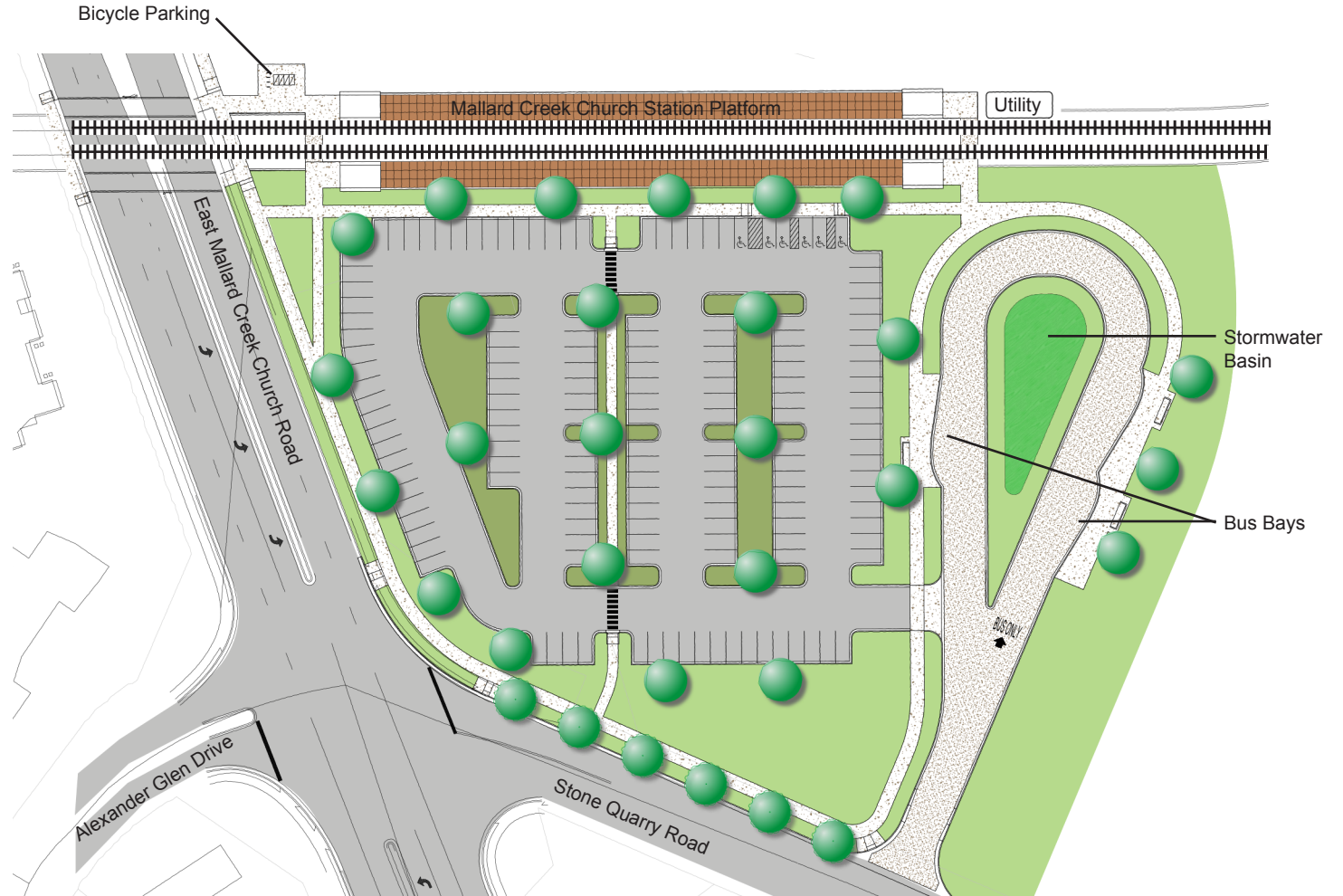


Parking Summary	
Vehicular Parking	0
Accessible Parking	0
Bus Bays	2
Bicycle Parking	
Short Term	32
Long Term	0
Kiss-and-Ride Spaces	0

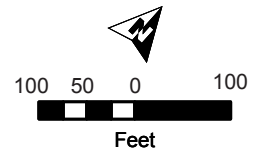


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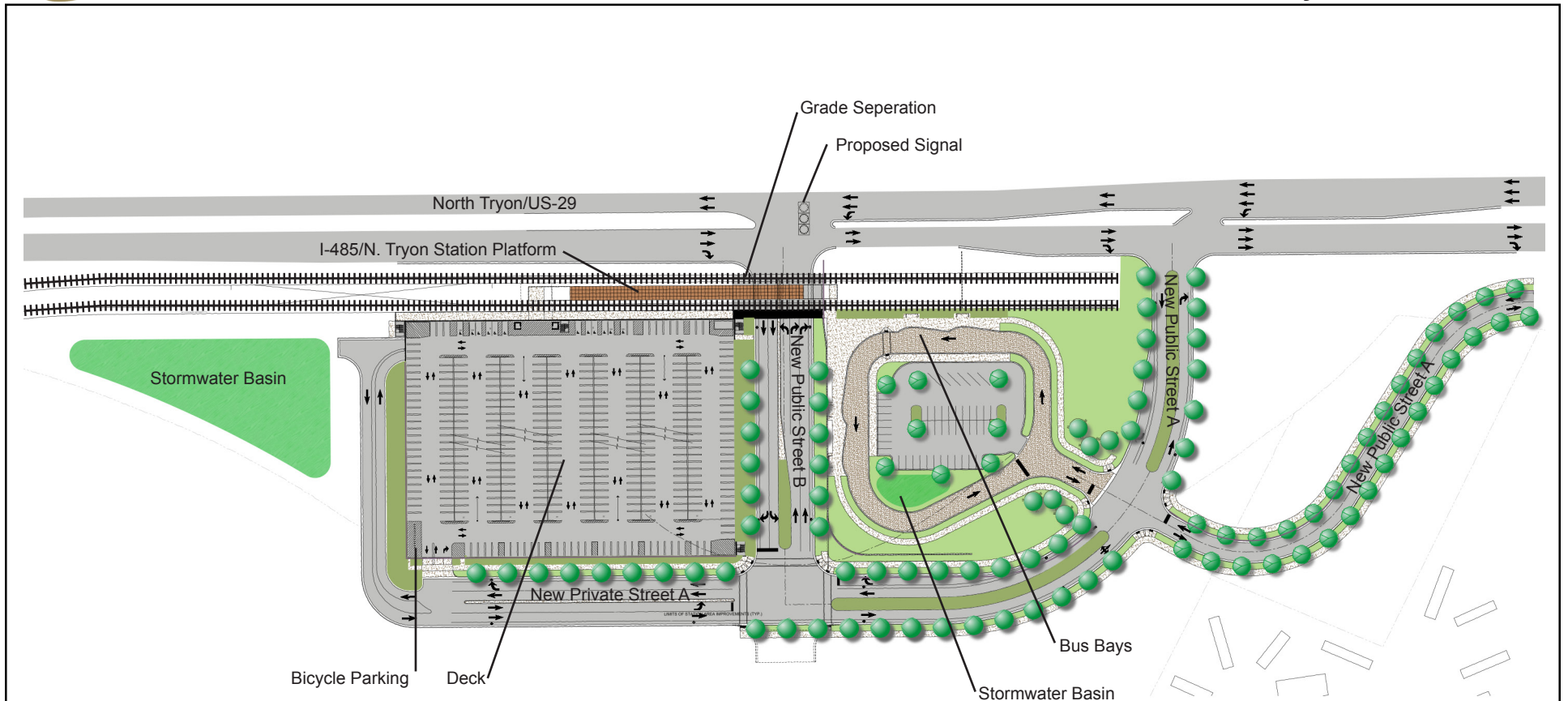
Figure 2-18
Mallard Creek Church Station Site Plan



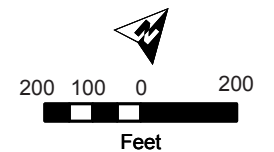
Parking Summary	
Vehicular Parking	156
Accessible Parking	6
Bus Bays	3
Bicycle Parking	
Short Term	8
Long Term	8
Kiss-and-Ride Spaces	0



Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape



Parking Summary	
Vehicular Parking	1959
Accessible Parking	30
Bus Bays	4
Bicycle Parking	
Short Term	24
Long Term	0
Kiss-and-Ride Spaces	7



Data Source: Charlotte Area Transit System, STV/RWA, City of Charlotte/Landscape Management

Figure 2-21
Sugar Creek Station - Sugar Creek Design Option Station Site Plan

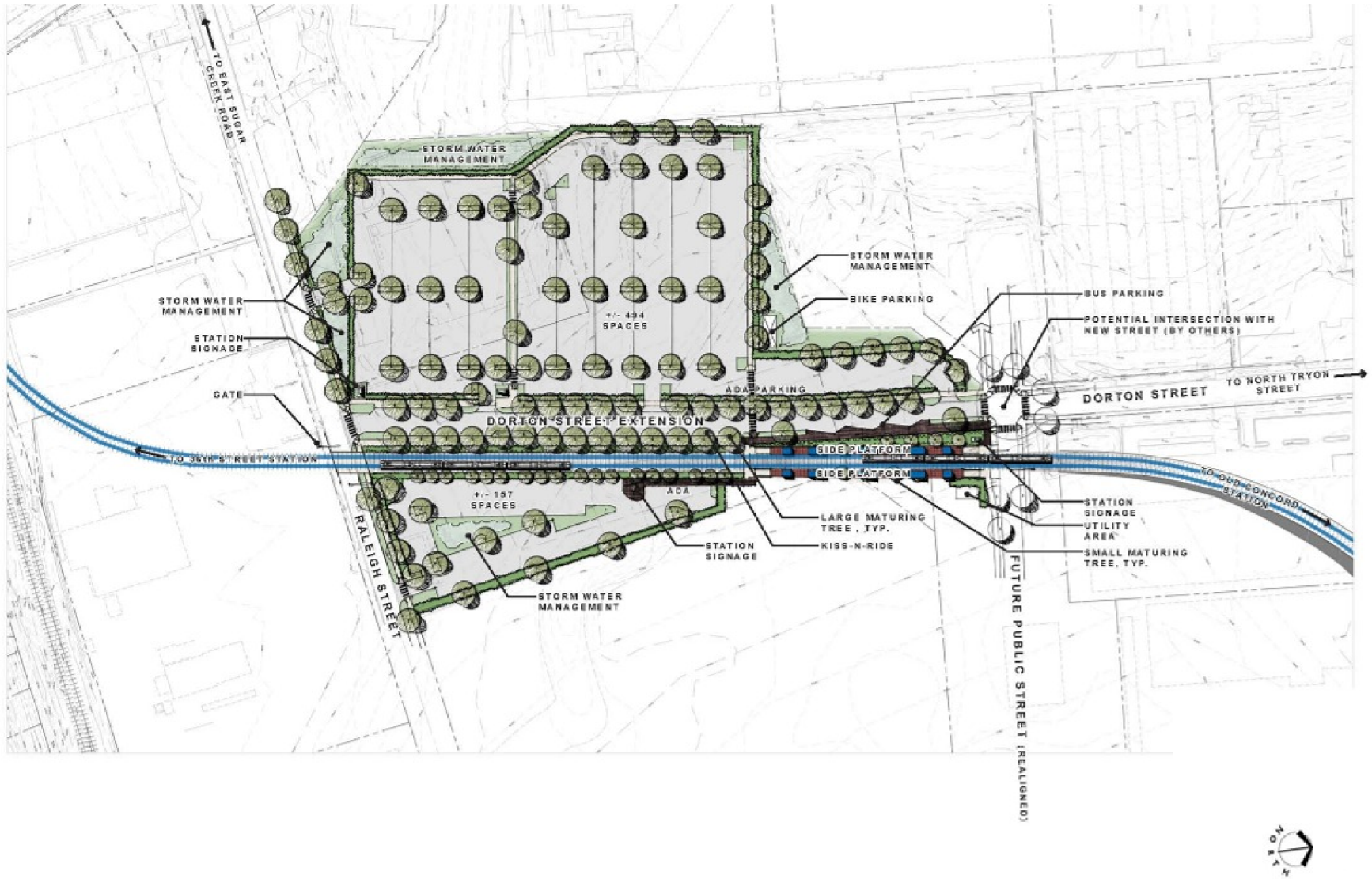
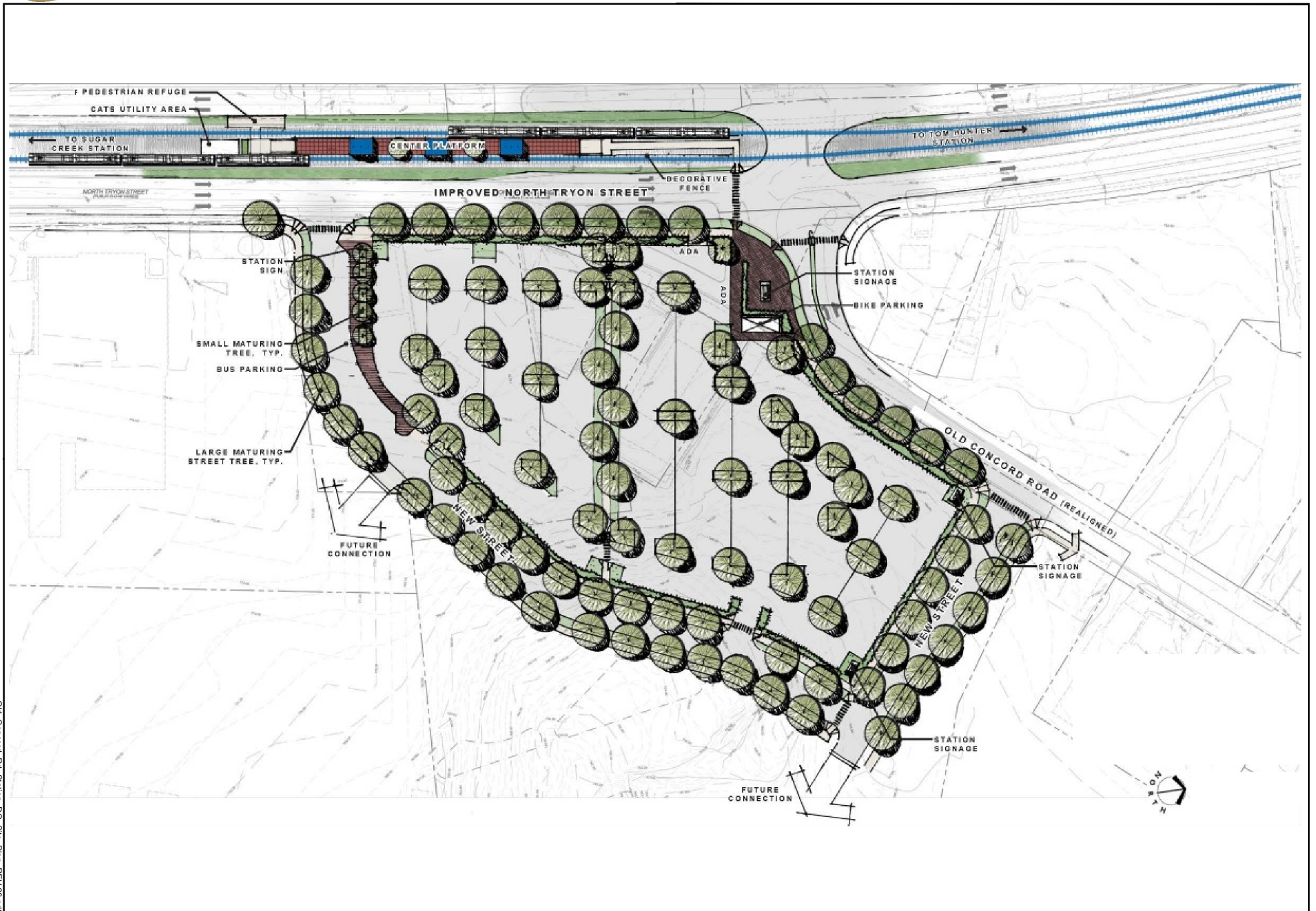
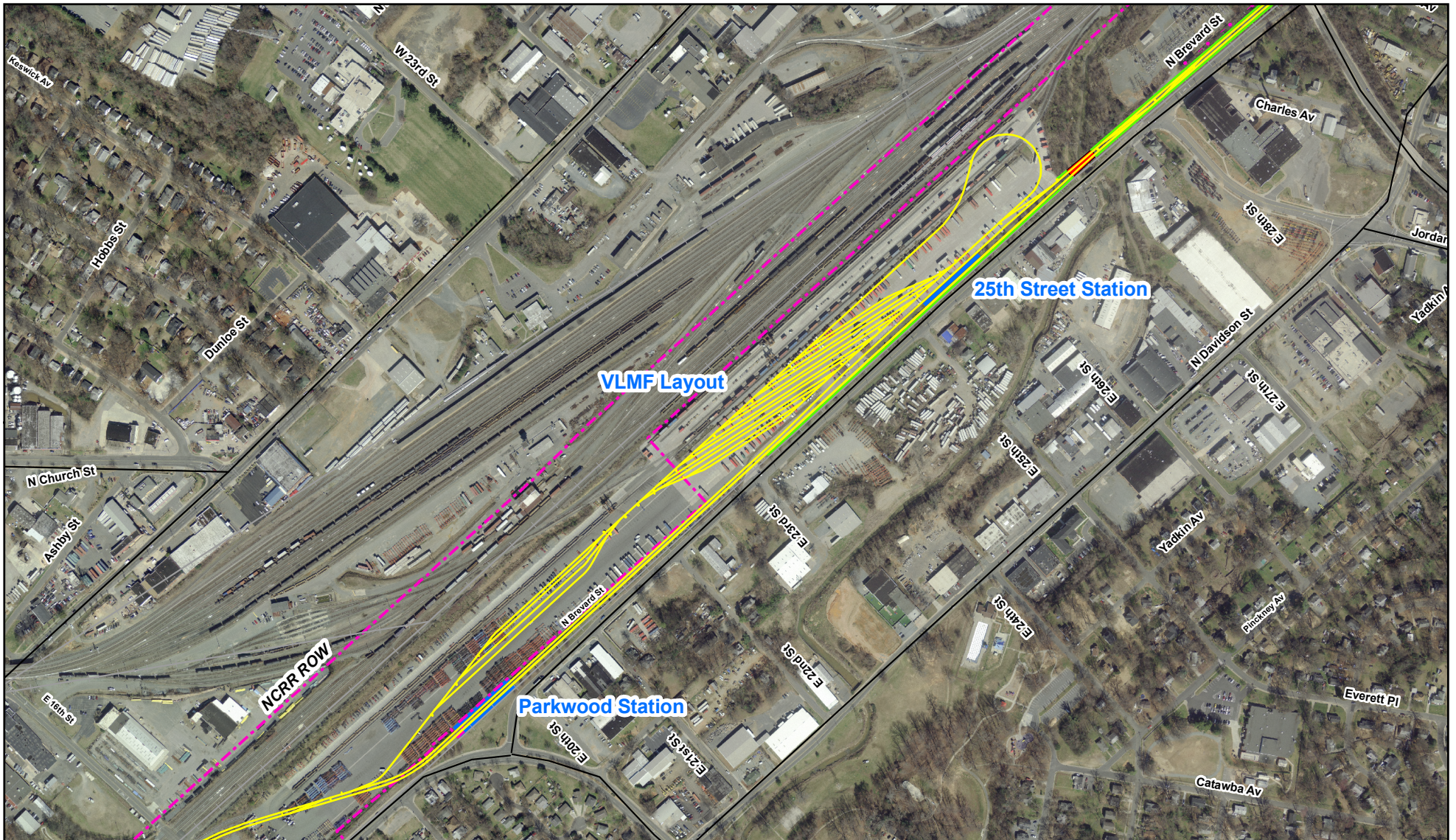
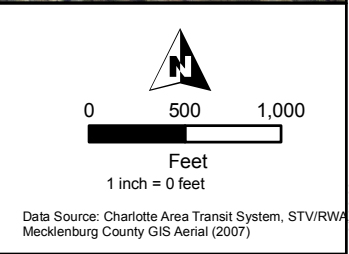
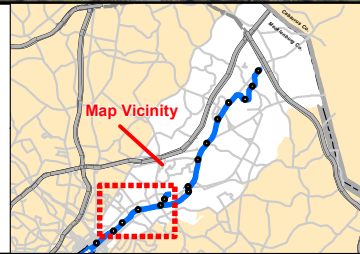


Figure 2-22
Old Concord Road Station - Sugar Creek Design Option Station Site Plan





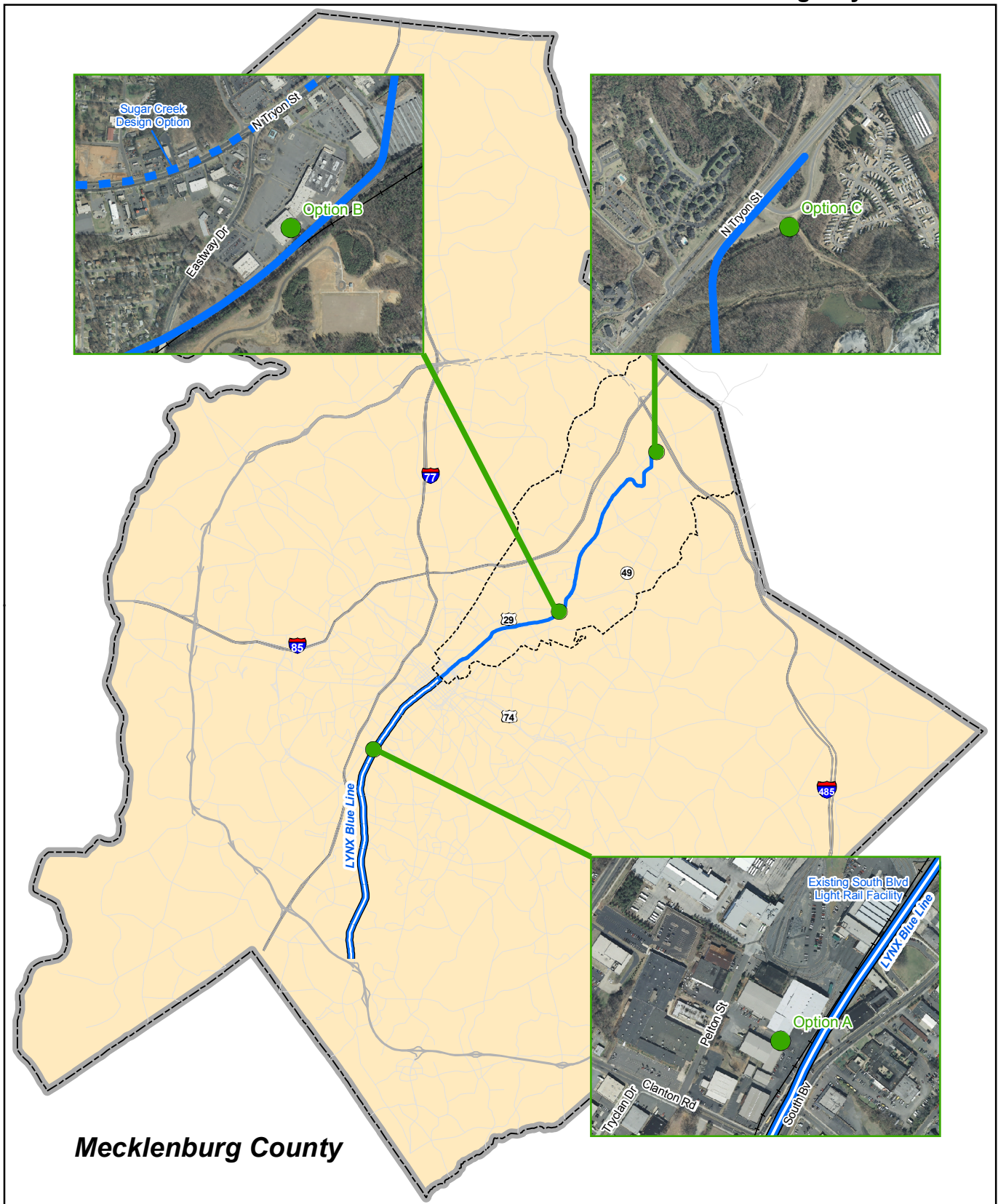
- Legend**
- Proposed Station Platform
 - Proposed Structures
 - Light Rail Transit
 - Proposed Park-and-Ride Facilities
 - Proposed Right-of-Way
 - Proposed Retaining Walls
 - NCCR Right-of-Way
 - Roads
 - Railroad



Data Source: Charlotte Area Transit System, STV/RWA
 Mecklenburg County GIS Aerial (2007)

VLMF_Site_Plan_REV1000.pdf

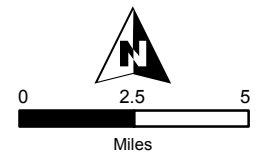
03/08/10



Mecklenburg County

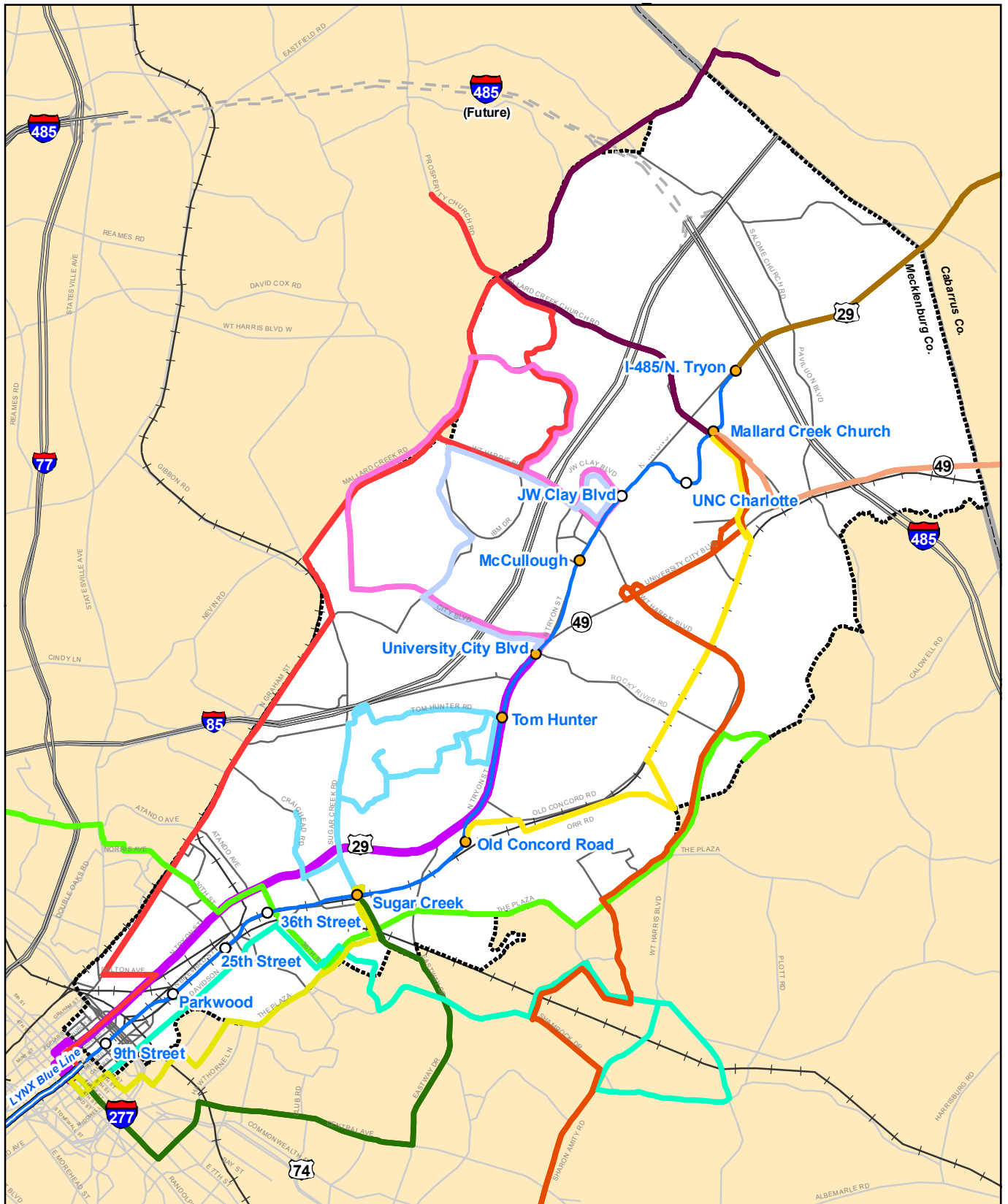
Legend

-  LYNX Blue Line
-  Proposed Light Rail Alternative
-  Contingency VLMF Sites
-  Northeast Corridor Limits
-  Interstates
-  County Line



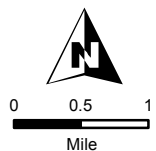
Data Source:
CATS, RWA/STV, City of Charlotte GIS, and
Mecklenburg County Aerials (2010)

Contingency_VLMF_CB_072910.pdf



Legend

- | | | | |
|---------------------------|--------------------------------------|------------------------|--------------------------|
| Northeast Corridor Limits | LYNX Existing Light Rail Transit | 22 Graham St | 81x Wachovia CIC Express |
| Railroads | Light Rail Transit | 23 Shamrock | 110 Concord Mills Mall |
| Highway | Proposed Stations | 29 UNCC / SouthPark | 211 Hidden Valley |
| Major Roads | Proposed Stations with Park-and-Ride | 39 Eastway | 360 NC49 / City Blvd |
| Highway (Future) | 3 The Plaza | 54 5x URP Express | 807 Old Concord Rd |
| County Line | 4 Country Club | 80 80x Concord Express | |
| | 11 North Tryon | | |



Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

3.0 TRANSPORTATION

This chapter describes the existing transportation services and facilities within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE), outlines the programmed and planned improvements, and assesses future travel growth and its impact on the corridor. The transportation and traffic impacts of alternatives that were evaluated are summarized.

3.1 Affected Environment

Affected Environment describes the existing (2008/2009) and projected (2030) transportation conditions in the Northeast Corridor, without implementation of a major transit investment. These transportation conditions are described in terms of travel patterns, public transit service, street and highway facilities, freight and passenger rail service and bike and pedestrian facilities.

3.1.1 Travel Patterns

Travel patterns refer to the number and type of trips made between different portions of the region as a result of the distribution of population and employment. These travel patterns are grouped by the trip interactions between “centers,” “corridors” or “wedges,” as defined in the *Centers, Corridors and Wedges Growth Framework*, Draft 2010. Corridors are the five primary travel and growth areas that extend from Center City Charlotte (central business district or CBD) outward to the edge of its jurisdiction. There are five corridors: North, Northeast, South, Southeast and West. Wedges are those areas situated between the five principal transportation corridors. Travel patterns are described in two ways: by purpose and orientation and by mode.

3.1.1.1 Travel by Purpose and Orientation

Travel by purpose identifies the intent behind an individual’s trip. Orientation identifies the origin and destinations of that trip. For this study, trip purpose is classified as trips from home to work, from home to university, from home to other locations, and non-home based. Travel orientations have been defined to include trips from different parts of the study area to Center City Charlotte, between transit corridors, within the Northeast corridor and to the Concord/Kannapolis area. All remaining trips are those between other parts of the Charlotte area traveling through the study area and are defined as other trips.

Based on regional travel demand forecasts, all purpose travel in the Charlotte region is projected to increase approximately 58 percent for both peak period trips (morning and afternoon rush hours) and total daily trips from 2009 to 2030. Similarly, the Northeast Corridor is projected to increase approximately 53 percent for both peak period trips and total daily trips. The percent of trips by purpose in 2030 is expected to be 16 percent work trips, 45 percent home-based other trips, 38 percent non-home based and one percent home-based university trips. Table 3-1 summarizes the travel patterns within the Northeast Corridor in 2009 and 2030.

**Table 3-1
Study Area Daily Trips by Purpose and Orientation, 2009 and 2030**

Travel Orientation	2009 Person-trips					2030 Person-trips				
	Total HBW ¹	Total HBO ²	Total NHB ³	Total HBU ⁴	Total	Total HBW ¹	Total HBO ²	Total NHB ³	Total HBU ⁴	Total
Travel to CBD										
NE to CBD	11,231	15,007	10,379	169	36,786	13,436	20,615	16,029	419	50,499
East wedge to CBD	18,650	15,285	7,631	346	41,912	22,193	18,482	10,151	713	51,539
North/NE wedge to CBD	9,270	11,759	5,311	152	26,492	10,319	13,083	8,005	329	31,736
Concord/ Kannapolis to CBD	5,833	705	717	2	7,257	5,323	1,008	841	7	7,179
Subtotal	44,984	42,756	24,038	669	112,447	51,271	53,188	35,026	1,468	140,953
Travel to/from Corridors										
NE to/from South Corridor (SC)	3,920	3,758	3,508	16	11,202	3,985	5,039	4,731	25	13,780
NE to/from North Corridor	884	1,858	2,876	0	5,618	1,453	5,148	5,929		12,532
NE to/from SE Corridor	4,148	17,607	10,353	10	32,118	4,531	19,649	13,476	15	37,671
NE to/from West Corridor	2,251	2,667	3,313	6	8,237	3,242	3,666	4,904	10	11,822
North/NE wedge to/from South Corridor	3,787	3,623	2,398	12	9,820	3,569	3,919	3,203	15	10,706
NE to/from East Wedge	2,873	20,061	16,977	21	39,932	4,055	24,330	24,433	27	52,845
NE to/from South Wedge	1,993	4,151	2,642	2	8,788	1,601	4,497	3,089	2	9,189
NE to/from Concord/ Kannapolis	2,527	10,874	13,078	2	26,481	4,467	21,251	23,320	6	49,044
Subtotal	22,383	64,599	55,145	69	142,196	26,905	87,499	83,085	100	197,589
Within NE Corridor	14,028	63,482	67,947	5,477	150,934	25,775	91,324	108,074	7,248	231,921
NE Corridor Related Trips (excluding CBD)	111,478	272,153	247,207	15,858	646,734	161,533	382,769	377,598	22,197	944,098
All other Travel, Region	1,241,749	3,560,255	2,973,991	54,275	7,830,269	1,995,892	5,556,000	4,704,629	83,621	12,340,142
Region Total	1,255,777	3,623,737	3,041,938	59,752	7,981,204	2,021,167	5,647,324	4,812,703	90,369	12,571,563

¹ Home Based Work, ² Home Based Other, ³ Non Home Based, ⁴ Home Based University
Source: AECOM and Metrolina Regional Travel Demand Model

3.1.1.2 Regional Travel by Mode

Daily person-trips forecast by mode for 2009 and the 2030 No-Build Alternative are shown in Table 3-2. The table presents the number and percentages of work and non-work trips predicted to be made in 2030 on transit and highways, categorized by mode of access.

**Table 3-2
Regional Daily Person-Trips by Mode, 2009 and 2030**

Purpose and Mode	2009 Person-Trips		2030 Person-Trips No-Build Alternative	
	Person-Trips	Percent of Total	Person-Trips	Percent of Total
Transit Person-Trips				
Walk to Transit	37,196	74.0%	65,526	78.9%
Drive to Transit	10,344	20.6%	13,989	16.9%
Drop-off to Transit	2,685	5.4%	3,525	4.2%
Highway Person-Trips				
<i>Work Trips</i>				
Drive Alone	1,122,240	14.4%	1,804,043	14.7%
Carpool 2	75,931	1.0%	121,013	1.0%
Carpool 3+	22,998	0.3%	36,275	0.3%
<i>Non-Work Trips</i>				
Drive Alone	3,665,796	47.0%	5,753,523	46.9%
Carpool 2	1,789,707	22.9%	2,803,417	22.8%
Carpool 3+	1,124,959	14.4%	1,759,426	14.3%
Total Transit Person-Trips	50,255	0.6%	83,041	0.7%
Total Highway Person-Trips	7,801,630	97.8%	12,277,696	99.3%
Total Non-Motorized Person-Trips (Walk/Bike)	129,319	1.6%	210,826	1.7%
Total Person-Trips	7,981,204		12,571,563	

Source: AECOM and Metrolina Regional Travel Demand Model

3.1.2 Public Transit Service

Charlotte Area Transit System (CATS) is currently the only public transit service provider that operates within the Northeast Corridor. CATS operates a total of 77 fixed routes, including the LYNX Blue Line light rail transit service, the Charlotte Trolley, local and express fixed bus routes, and community and neighborhood shuttle service to neighborhoods and business parks. CATS also operates vanpool and paratransit service. Collectively, CATS transports more than 18 million passengers annually.

The existing LYNX Blue Line light rail operates service from 7th Street in Center City Charlotte to the I-485/South Boulevard Station near the town of Pineville. The light rail serves 15 stations, including six walk-up stations and seven stations with park-and-ride facilities. The light rail currently operates between the hours of 5:25 a.m. and 1:12 a.m.

The Charlotte Trolley is currently operated by CATS. This service traverses a portion of the existing LYNX Blue Line tracks from Tremont Avenue to 9th Street with 11 stops from Atherton Mill to 9th Street. Due to budgetary constraints, CATS discontinued regularly scheduled trolley service, effective July 1, 2010.

CATS fixed route bus service includes: 54 local and crosstown bus, neighborhood and community shuttles; 13 express routes that serve Mecklenburg County; and 8 regional express bus routes that provide service from Mecklenburg County to surrounding counties. These services primarily originate from the main transit hub known as the Charlotte Transportation Center.

The Charlotte Transportation Center is located in Center City Charlotte between Trade Street and East 4th Street next to the existing LYNX Blue Line light rail. The Charlotte Transportation Center provides a location for transfer opportunities between bus routes, as well as a direct connection to the light rail.

CATS provides additional transfer opportunities at three community transit centers, located outside of Center City Charlotte: Rosa Parks Place Community Transit Center, Eastland Community Transit Center and South Park Community Transit Center.

3.1.2.1 Fleet Characteristics

CATS currently operates a fleet of 403 buses (*CATS Bus Fleet Management Plan*, May 2009) and 20 light rail vehicles. The bus fleet consists of 173 forty-foot Local Buses (low and high floor), 91 forty-foot Suburban Style Express Buses, 40 thirty-foot Shuttle buses, 20 rubber-wheeled Trolley Buses and 85 Special Transportation Cutaway Vans for paratransit service.

The CATS fleet is currently maintained in three separate maintenance facilities. The South Tryon Bus Facility is the principal bus operations and maintenance facility with the capacity to store and maintain 250 buses. The Davidson Street Bus Facility is CATS' secondary bus facility with a capacity of 200 buses. The South Boulevard Light Rail Facility is the principal light rail storage facility and provides heavy and light maintenance services for up to 20 light rail vehicles.

3.1.2.2 Service Area Coverage

As of January 2009, 16 bus routes operate within the Northeast Corridor study area, with eight local bus routes, three University of North Carolina Charlotte shuttle routes, two neighborhood circulator routes and three express routes. The routes are described in the following and illustrated graphically in Figure 3-1.

- **Route 3** – Plaza Road. This route provides service along North Davidson Street and The Plaza from Center City Charlotte to Central Piedmont Community College (CPCC) – CATO Campus. The route serves NoDa and Hampshire Hills neighborhoods, and the University Commercial Place.
- **Route 4** – Country Club. This route serves the Villa Heights, Plaza Hills, Plaza Midwood, and Country Club neighborhoods from Center City Charlotte. The route utilizes 7th Street, Parkwood Avenue and Matheson Avenue.
- **Route 11** – North Tryon. This route provides service along North Tryon Street/US-29 from Center City Charlotte to the UNC Charlotte main campus. The route serves neighborhoods, commercial and business complexes, the Sugar Creek Service Center and the University City Municipal Service District along North Tryon Street/US-29.
- **Route 13** – Nevin Road. This route provides service from Center City Charlotte to Nevin Road, primarily operating along North Tryon Street/US-29, Statesville Avenue, and Nevin Road. The route serves various neighborhoods and businesses, as well as the Nevins Center.
- **Route 22** – Graham Street. This route provides service along North Graham Street and Mallard Creek Road from Center City Charlotte to W.T. Harris Boulevard and the University Research Park. The route serves various neighborhoods along North Graham Street, as well as apartment complexes like the Prosperity Creek Apartments. The route also serves employment destinations within the University Research Park, including the Mecklenburg County 311 Call Center.
- **Route 23** – Shamrock Drive. This route provides service between the NoDa neighborhood and East Towne Market. The route operates from Center City Charlotte via North Davidson Street, Shamrock Drive, W.T. Harris Boulevard and Hickory Grove Road.
- **Route 29** – UNC Charlotte/South Park. This route provides local crosstown service between the South Park Community Transit Center and the UNC Charlotte main campus. The route serves destinations such as South Park Mall, Cotswold Shopping Center, Eastland Community Transit Center, the CPCC CATO Campus, before terminating at the UNC Charlotte Main Campus. The route utilizes North Sharon Amity Road, The Plaza, W.T. Harris Boulevard and University City Blvd./NC-49.
- **Route 39** – Eastway Drive. This route provides service from Center City Charlotte to the Northpark Mall and Eastway Shopping Center, via Central Avenue, Eastway Drive and North Tryon Street/US-29. The route also serves the Presbyterian Hospital and CPCC Main Campus.
- **Route 47** – UNC Charlotte Nugget Shuttle. This shuttle route operates within the UNC Charlotte campus, providing students a mode to travel between dormitories and classrooms.
- **Route 49** – UNC Charlotte Niner Shuttle. This shuttle route operates within the UNC Charlotte campus, providing students a mode to travel between dormitories and classrooms.

- **Route 50** – UNC Charlotte - Charlotte Research Institute (CRI) Shuttle. This shuttle route operates within the UNC Charlotte campus, providing students a mode to travel between dormitories, classrooms and the UNC Charlotte CRI Campus.
- **Route 54x** – University Research Park. This is an express bus route serving Center City Charlotte and the University Research Park. The route utilizes Trade Street, Interstate 77 (I-77), Interstate 85 (I-85), City Boulevard, serving the CATS JN Pease Place Park-and-Ride, University Research Park and the Wachovia Customer Information Center (CIC) campus. The route operates express between Trade/Cedar Streets and I-85/City Boulevard.
- **Route 80x** – Concord Express. This is an express plus bus route serving the Center City Charlotte, various park-and-ride lots along North Tryon Street/US-29 and the City of Concord. There are four park-and-ride lots along the route: University Place Park-and-Ride in Charlotte, and the Lowe’s Motor Speedway, Big Lots Shopping Center, and the Target/Home Depot Shopping Center Park-and-Rides in the City of Concord. The route operates express and does not stop between Center City Charlotte and University Place Park-and-Ride.
- **Route 81x** – Wachovia CIC Express Shuttle. This is an express bus route serving Center City Charlotte and the Wachovia CIC Campus in the University Research Park area. The route utilizes I-77 and I-85, operating express with no stops between Center City Charlotte and the Wachovia CIC Campus.
- **Route 204** – LaSalle. This route is a neighborhood circular route serving Oakview Terrace, the Rosa Parks Place Community Transit Center, the Lincoln Heights and Druid Hills neighborhoods, and the Sugar Creek Service Center. The route utilizes local neighborhood streets, LaSalle Street, Statesville Avenue, Norris Avenue, 30th Street, North Tryon Street/US-29, Craighead Road, Glory Street and West Sugar Creek Road before terminating at the Sugar Creek Service Center.
- **Route 211** – Hidden Valley. This route is a neighborhood circular route serving the Hidden Valley neighborhood and the Sugar Creek Service Center. The route utilizes North Tryon Street/US-29, West Sugar Creek Road, Tom Hunter Road and local neighborhood streets.

3.1.2.3 Operating Characteristics

CATS operates more frequent headways during the weekday peak periods and less frequent headways during off-peak hours and the weekends. Headways for all 16 routes operating within the Northeast Corridor vary in both the peak and off-peak periods. To determine a standard headway for these periods, the average of the individual headway for a particular route within these periods was rounded to the nearest five-minute interval time. The standard headways for each route are presented in Table 3-3.

**Table 3-3
Operating Characteristics for Routes Serving the Northeast Corridor, 2008**

Route Number	Route Name	Type of Route	Peak Headway (minutes)	Off-Peak Headway (minutes)
3	Plaza Road	Local	20	40
4	Country Club	Local	20	35
11	North Tryon/Sugar Creek	Local	10	25
13	Nevin Road	Local	30	30
22	Graham Street	Local	35	40
23	Shamrock Drive	Local	20	40
29	UNC Charlotte/South Park	Local	60	60
39	Eastway Drive	Local	35	45
47	UNC Charlotte Nugget Shuttle	Shuttle	10	15
49	UNC Charlotte Niner Shuttle	Shuttle	10	15
50	UNC Charlotte CRI Shuttle	Shuttle	15	25
54x	University Research Park	Express	10	n/a
80x	Concord Express	Express	15	n/a
81x	Wachovia CIC Shuttle	Express	60	n/a
204	LaSalle	Neighborhood	30	60
211	Hidden Valley	Neighborhood	20	25

n/a – Not Applicable; route operates only in peak period

3.1.2.4 Fare Structure

CATS offers a variety of fares for services structured by rider characteristic and the service provided. One-way fares (based on October 2008 rates) for local bus trips and on the LYNX Blue Line are \$1.50; \$.60 for neighborhood and community shuttles; \$2.00 for Express routes within Mecklenburg County and \$3.00 for Express Plus routes to neighboring counties. CATS also offers round-trip, one-day, weekly, monthly and 10-ride passes. Discounted fares are available for Youth/Students (grades K-12), persons with disabilities and seniors (age 62+).

3.1.2.5 Ridership

CATS fixed route transit services provided transit service to over 22 million passengers in FY 2008 and over 25 million passengers in FY 2009 a ridership increase of 12.5 percent. The success of the LYNX Blue Line light rail (established November 26, 2007) contributed to this ridership increase. Between November 26, 2007 and June 30, 2008 the LYNX Blue Line carried 2.9 million passengers and during FY 2009 the line carried over 5 million passengers.

Two of the Northeast Corridor routes are ranked in the top ten of CATS system-wide routes with respect to average ridership, Route 11 – North Tryon/Sugar Creek and Route 23 – Shamrock Drive. In FY 2008, routes in the northeast corridor served a total of 4.9 million passengers, which increased to 5.2 million passengers in FY 2009; overall ridership in the corridor increased by 5.2 percent between FY 2008 and 2009. The Northeast Corridor also experienced a slightly higher rate of growth compared to the total CATS bus system ridership. Ridership numbers for FY 2008 and FY 2009 as well as the system-wide rank for the 16 bus routes in the corridor are shown in Table 3-4.

**Table 3-4
Annual Ridership for Routes Serving the Northeast Corridor**

Route Number	Route Name	Type of Route	FY 08	FY 09	Percent Change	System-wide Rank FY 09
3	Plaza Road	Local	489,306	522,933	6.9%	13
4	Country Club	Local	296,778	313,819	5.7%	22
11	North Tryon	Local	1,393,864	1,431,834	2.7%	2
13	Nevin Road	Local	280,012	342,952	22.5%	20
22	Graham Street	Local	406,921	415,418	2.1%	16
23	Shamrock Drive	Local	572,559	607,503	6.1%	8
29	UNCC/SouthPark	Local	121,332	127,928	5.4%	40
39	Eastway Drive	Local	432,386	433,927	0.4%	15
47	UNCC Nugget Shuttle	Shuttle	83,808	56,401	-32.7%	73
49	UNCC Niner Shuttle	Shuttle	92,107	88,874	-3.5%	59
50	UNCC CRI Shuttle	Shuttle	38,320	52,967	38.2%	49
54x	University Research Park	Express	235,707	235,747	0.0%	27
80x	Concord Express	Express Plus	89,055	101,544	14.0%	47
81x	Wachovia CIC Shuttle	Express	34,854	45,054	29.3%	66
204	LaSalle	Neighborhood	100,415	124,649	24.1%	89
211	Hidden Valley	Neighborhood	249,626	270,556	8.4%	41
Corridor Total			4,917,050	5,172,106	5.2%	
Bus System Total			19,760,670	20,404,761	3.3%	
Light Rail			2,851,717	5,024,055	76.2%	
Total Bus & Light Rail			22,612,387	25,428,816	12.5%	

Note: Light Rail Ridership service began in the second quarter of FY 2008.
Source: *Schedule Adherence by Route FY 2009 (July 1, 2008 - June 30, 2009)*

3.1.2.6 System Performance

The existing bus routes within the Northeast Corridor currently operate in mixed-traffic on congested roadways. Therefore, the ability for CATS' bus operators to complete their routes as scheduled as well as the reliability of the service for the customer is subject to local street conditions. Presently, the most direct

service operating through the corridor is provided by Routes 11 North Tryon and 80x Concord Express. During FY2009, Route 11 ranked 64th of 79 fixed bus routes for on-time performance, with 14.7 percent late trips; performing below the system average for schedule adherence of 10.4 percent late trips.

As a result of operating in mixed traffic on congested roadways, several of the Northeast Corridor routes consistently experience delays above the system-wide average. Table 3-5 presents the Northeast Corridor routes ranked by schedule adherence as compared to the system average.

**Table 3-5
Northeast Corridor Routes Ranked by Schedule Adherence as Compared to System Average**

Route Number	Route Name	Type of Route	Percent Late	Rank by Schedule Adherence
Perform at or Above System Average				
4	Country Club	Local	3.8%	3
204	LaSalle	Circulator	6.0%	10
3	The Plaza	Local	6.9%	19
23	Shamrock Drive	Local	7.6%	24
13	Nevin Road	Local	8.1%	28
System Average FY 2009			10.4%	
Perform Below System average				
80x	Concord	Regional Express	11.9%	52
22	Graham Street	Local	12.2%	54
211	Hidden Valley	Circulator	12.4%	55
81x	Wachovia CIC	Express	12.7%	56
29	UNCC/SouthPark	Local	14.3%	63
11	North Tryon	Local	14.7%	64
39	Eastway	Local	19.6%	76
54x	University Research Park	Express	19.7%	77

Source: CATS Schedule Adherence by Route FY 2009 (July 1, 2008 - June 30, 2009)

3.1.2.7 Planned Transit Improvements

Over the next 25 years, numerous transit improvements have been identified and are included in the *2030 Transit Corridor System Plan*. Planned improvements range from improving the existing bus service, constructing transit corridors and facility improvements. Three other transit corridors, Southeast, West and Streetcar are in the planning process, while the North Corridor is in the design phase.

Long-term transit service improvements would require expansion of the bus fleet. The *CATS Bus Fleet Management Plan* (May 2009) recommends expanding the bus fleet by an additional 33 buses by 2025. In addition, it is estimated that approximately 372 buses would need to be replaced over the same time frame.

Specific improvements outlined in the current *CATS Bus Fleet Management Plan* and the *North Carolina Department of Transportation (NCDOT) 2009-2015 Transportation Improvement Program (TIP)* include:

- Bus Facility Improvements (TIP project TM-4701): planning, design and construction of various bus facility improvements, including shelters, signs and associated amenities.
- Transit Right-of-Way Protection – TIP project TE-4704: purchase or lease existing rail right-of-way outside of the transit corridors as funding opportunities become available through abandonment or joint use agreements.
- North Corridor Transitway (TIP project TE-4902): design, land acquisition and construction.
- Intelligent Transit Systems (TIP project TT-4906): installation of various Intelligent Transit System components such as, automated interactive voice response systems, customer information technology at transit hubs, trip planning software and other software licenses to improve the operating efficiency of the system.
- Charlotte Gateway Station (TIP project TD-4911): final design and construction of a new multi-modal transit center in Center City Charlotte near Trade Street and Graham Street.

- Park-and-Ride lots (TIP project TD-4704): planning, design and construction of park-and-ride lots throughout the transit service area.
- Replacement and expansion of Vanpool Vans, Buses and Paratransit Buses (TIP projects TA-4960, TA-4716, TA-4710 and TA-4711): replacement and expansion of these vehicles types.

3.1.3 Streets and Highways

This section describes the existing roadway network within the Northeast Corridor (including pedestrian and bicycle facilities), the planned improvements that are identified in the Mecklenburg-Union Metropolitan Planning Organization's (MUMPO) *Long Range Transportation Plan* (LRTP), major roadway traffic volumes and travel speeds, and existing parking.

3.1.3.1 Existing Roadway Network

The existing roadway network within the Northeast Corridor consists of North Tryon Street/US-29, University City Blvd./NC-49 and other interstates, arterials, collector streets and local streets. Major roadways and railroads within the corridor are shown graphically in Figure 3-2.

Major north/south and east/west roadways in the corridor include:

- Interstate 85 - an eight-lane controlled access freeway which functions as the primary commuter travel route in the Northeast Corridor. I-85 parallels North Tryon Street/US-29 for most of the corridor.
- North Tryon Street/US-29 - a major thoroughfare varying between four and six lanes with center turn lanes and median divided sections throughout.
- Old Concord Road - a two-lane thoroughfare mostly running parallel with North Tryon Street/US-29 and University City Blvd./NC-49.
- University City Blvd./NC-49 - a four-lane thoroughfare running parallel with North Tryon Street/US-29 between the I-85 Connector Road and Interstate 485 (I-485).
- Sugar Creek Road - a four-lane thoroughfare providing cross-town access and direct access to I-85 and Eastway Drive.
- Eastway Drive - a four-lane thoroughfare connecting North Tryon Street/US-29 with Sugar Creek Road and southeast Charlotte.
- I-85 Connector Road - a four-lane road providing direct access from North Tryon Street/US-29 to I-85.
- W.T. Harris Boulevard - a four and six-lane thoroughfare providing east/west access and direct access to I-85 and University City Blvd./NC-49.
- Mallard Creek Church Road - a three and four-lane thoroughfare providing access and direct access to I-85 and University City Blvd./NC-49.
- Interstate 485 - a six-lane controlled access freeway which functions as Charlotte's outer beltline.

3.1.3.2 Planned Roadway Improvements

Future roadway improvements are identified in the region's financially constrained LRTP. Projects that are listed as programmed are scheduled to be undertaken within the next five to seven years, and are included in the NCDOT's TIP or the City of Charlotte's CIP. Planned roadway improvements are those that have been identified in the *Long Range Transportation Plan*, but have not yet been programmed and funded in the current TIP or CIP. The most recent adopted transportation plans and programs at the time of this analysis were used as the basis for this Draft Environmental Impact Statement (EIS): the *2030 LRTP*, the *NCDOT 2009-2015 TIP*, and the *City of Charlotte's FY 2010 – 2014 Capital Investment Plan* (CIP). On April 28, 2010, the Federal Highway Administration approved the *2035 LRTP*.

Programmed projects within the Northeast Corridor are presented in Tables 3-6 and 3-7. The LRTP planned improvements within the Northeast Corridor and the horizon year for which the proposed projects are anticipated to be in place are summarized in Table 3-8. Differences in the planned roadway improvements between the 2030 LRTP and the newly adopted 2035 LRTP are also noted. Figure 3-3 displays the planned and programmed transportation projects from the *2009-2015 TIP* and *2030 LRTP* within the Northeast Corridor.

Table 3-6
2009-2015 NCDOT TIP Programmed Transportation Projects within the Northeast Corridor

Facility	Project Description	TIP #	Project Cost
North Tryon Street/US-29	Replace Southbound Bridge #147 over Mallard Creek	B-4779	\$3,300,000
Amtrak	Train operations between Charlotte & Rocky Mount	P-2908	\$16,619,000
Amtrak	Train operations between Charlotte & Raleigh	P-2918	\$23,928,000
Sugar Creek Road	Depress Sugar Creek Road under the existing freight tracks	U-5008	\$2,580,000 (no construction \$)
Mallard Creek Road (Sugar Creek Road to W.T. Harris Boulevard)	Widen and Relocate to four-lanes with median and bike lanes	U-2507A	\$18,300,000
I-485	New Freeway (8 lanes), from NC 115 to I-85	R-2248E	\$167,500,000
I-85 / I-485	Construct new interchange	R-2123CE	80,000,000

Source: North Carolina Department of Transportation

Table 3-7
City of Charlotte CIP Programmed Improvements within the Northeast Corridor

Facility	City of Charlotte Department	Project Status	Anticipated Construction Year	Project Cost
Davidson Street at Craighead Street	Transportation	On-Hold	n/a	\$300,000
Belmont-Gateway	Transportation	On-Hold	n/a	\$600,000
Newell-South Neighborhood Improvement Project (NIP)	Neighborhoods	Design	2012	\$3,400,000
Sugaw Creek/Ritch NIP	Neighborhoods	Real Estate	2011	\$3,000,000
John Kirk Drive/University Boulevard Intersection Improvements	Planning	Construction	2010	\$2,100,000
Countryside Sidewalk	Transportation	Construction	2010	\$350,000
Hidden Valley NIP, Phase 6	Neighborhoods	Real Estate	2010	\$950,000
Tryon Hills NIP	Neighborhoods	On-Hold	2012	\$4,000,000
Howie Acres Phase 2	Neighborhoods	Design	2011	\$1,500,000
North Tryon Street/US-29 & University City Blvd./NC-49 Interchange (the weave)	Transportation	Bid	2010	\$25,500,000
City Blvd. Extension	Transportation	Planning	2012	\$10,800,000
Craighead Road Drainage Improvements	Storm Water	Real Estate	2011	\$5,300,000
Louise Avenue CIP	Storm Water	Real Estate	2011	\$11,300,000
Shopping Center Drive Extension	Transportation	Planning	TBD	TBD
University City Blvd./NC-49 Sidewalk	Transportation	Design	2011	\$1,200,000
University City Blvd./NC-49 / WT Harris Boulevard intersection improvements	Transportation	Bid	2010	\$300,000
Atando Avenue Sidewalk	Transportation	Design	2012	\$600,000
Back Creek Church Road FTM Improvements	Transportation	Planning	n/a	n/a
Brevard-Caldwell Two-Way Conversion	Transportation	Planning	n/a	n/a
Galloway Road Sidewalk	Transportation	Construction	2010	\$250,000
Graham Street Sidewalk at I-85	Transportation	Design	2012	\$600,000
Grier Road Sidewalk	Transportation	Real Estate	2010	\$900,000
Mallard Creek Road Sidewalk	Transportation	Real Estate	2010	\$600,000
Mineral Springs Road Sidewalk	Transportation	Design	n/a	n/a
North Tryon Business Corridor	Planning	Planning	n/a	n/a
Northeast Corridor Improvements (NECI)	Multiple	Planning	n/a	n/a
Salome Church Road at Mallard Creek Road Intersection	Transportation	Design	2011	\$950,000
Sugar Creek Road / Rumble Road Left Turn Lane	Transportation	Bid	2010	\$1,000,000

Source: City of Charlotte FY 2010-2014 CIP

**Table 3-8
Planned Future Roadway Improvements within the Northeast Corridor, 2030 and 2035 LRTP**

Facility	Project Limits	Type	2030 LRTP Horizon Year	2035 LRTP Horizon Year
Brevard Street	11th Street to 7th Street	Widen to three lanes.	2030	Not included
36th Street	Atando Avenue to North Tryon Street/US-29	New two-lane road with median and bike lanes.	2020	Not included
North Tryon Street/US-29	Dalton Avenue to 32nd Street	Widen to five lanes.	2030	Not included
City Boulevard	Neal Road to Mallard Creek Road Extension	New four-lane road with median and bike lanes.	2020	2035
University City Blvd./NC-49	North Tryon Street/US-29 to I-485	Widen to six lanes. Includes median and bike lanes.	2030	Not included
Old Concord Road	W.T. Harris Boulevard to University City Blvd./NC-49	Widen to four lanes. Includes bike lanes.	2030	Not included
Nevin Road Extension	Black Walnut Lane to IBM Drive	New two-lane road with median and bike lanes.	2030	Not included
W.T. Harris Boulevard	North Tryon Street/US-29 to University City Blvd./NC-49	Widen to six lanes. Includes multi-use path.	2020	Not included
Mallard Creek Road	Prosperity Church Road to I-485	Widen to four lanes. Includes median and bike lanes.	2020	2015
East W.T. Harris Boulevard	University City Blvd./NC-49 to The Plaza	Widen to six lanes. Includes bike lanes.	2030	Not included
Eastern Circumferential	University City Blvd./NC-49 to Rocky River Road	New four-lane road with median and bike lanes.	2020	2035
North Tryon Street/US-29	University City Blvd./NC-49 to I-485	Widen to six lanes. Includes median, curb and gutter, and bike lanes.	2030	Not included
I-485	NC-115 to I-85 North	New eight-lane freeway.	2020	2015
I-485/I-85 North	Interchange	Revise interchange.	2020	2015
Odell School Road	I-485 to Cabarrus County Line	Widen to six lanes. Includes concrete median and bike lanes.	2030	Not included
Pavilion Boulevard Extension	Salome Church Road to N. Tryon St. (US-29)	New two-lane road	Not included	2025
Private Construction of Roadways				
10th Street Connector	North College Street to North Brevard Street	Construct a two lane road.	2010	Not included
JW Clay Boulevard Extension	Intersection of North Tryon Street/US-29 and JW Clay Boulevard	Construct fourth leg of existing intersection to the east.	2010	Not included

Source: 2030 LRTP and 2035 LRTP, MUMPO; Charlotte Department of Transportation.

3.1.3.3 Daily Traffic Volumes

Daily traffic volumes along the significant roadway segments in the Northeast Corridor were obtained from the Charlotte Department of Transportation (CDOT) and NCDOT. These volumes, presented in Table 3-9 as Annual Average Daily Traffic (AADT), represent traffic for a 24-hour period and include both directions of travel along each roadway segment.

**Table 3-9
Existing Daily Traffic Volumes, 2008**

Through Street	From	To	AADT	# of Through Lanes	Source
North Tryon Street/US-29	32nd Street	Sugar Creek Road	25,000	5 (U)	NCDOT
North Tryon Street/US-29	Sugar Creek Road	Eastway Drive	30,000	5 (U)	NCDOT
North Tryon Street/US-29	Eastway Drive	Old Concord Road	43,600	5 (D)	CDOT
North Tryon Street/US-29	Old Concord Road	Orr Road	33,000	4 (U)	NCDOT
North Tryon Street/US-29	Orr Road	Orchard Trace Lane	33,000	4 (D)	NCDOT
North Tryon Street/US-29	Orchard Trace Lane	I-85 Connector	29,000	4 (D)	NCDOT
North Tryon Street/US-29	I-85 Connector	University City Blvd./NC-49	62,000	4 (D)	NCDOT
North Tryon Street/US-29	University City Blvd./NC-49	W.T. Harris Boulevard	27,000	4 (D)	NCDOT
North Tryon Street/US-29	W.T. Harris Boulevard	Mallard Creek Church Road	32,000	4 (D)	NCDOT
North Tryon Street/US-29	Mallard Creek Church Road	I-485	25,000	4 (D)	NCDOT
12th Street	North Davidson Street	North Tryon Street/US-29	13,000	3 (O)	NCDOT
36th Street	North Davidson Street	North Tryon Street/US-29	4,900	2 (U)	CDOT
North Davidson Street	28th Street	Sugar Creek Road	9,100	2 (U)	NCDOT
Craighead Road	Philemon Avenue	North Davidson Street	6,500	2 (U)	NCDOT
Sugar Creek Road	North Davidson Street	North Tryon Street/US-29	21,000	4 (U)	NCDOT
Sugar Creek Road	North Tryon Street/US-29	I-85	29,500	4 (U)	NCDOT
Eastway Drive	Curtiswood Drive	North Tryon Street/US-29	25,000	4 (D)	NCDOT
Old Concord Road	Orr Road	North Tryon Street/US-29	14,000	2 (U)	NCDOT
Orr Road	North Tryon Street/US-29	Old Concord Road	6,600	2 (U)	NCDOT
University City Blvd./NC-49	North Tryon Street/US-29	Shopping Center Drive	36,000	4 (D)	NCDOT
W.T. Harris Boulevard	I-85	North Tryon Street/US-29	78,000	6 (D)	NCDOT
W.T. Harris Boulevard	North Tryon Street/US-29	University City Blvd./NC-49	57,000	6 (D)	NCDOT
Mallard Creek Church Road	I-85	North Tryon Street/US-29	31,000	4 (D)	NCDOT
Mallard Creek Church Road	North Tryon Street/US-29	University City Blvd./NC-49	14,600	4 (D)	CDOT

Note: (U) Undivided roadway, (D) Divided roadway, (O) One way street

3.1.3.4 Parking

Parking facilities within a ¼-mile radius of the proposed station locations were assessed along the corridor. With Center City Charlotte being the heart of the CBD, parking facilities are located throughout the area. There are over 45,000 parking spaces (public or private off-street facilities and on-street parking) available. Parking rates vary. Hourly rates range from \$2 to \$4 an hour, with a maximum daily charge of \$20, while monthly rates range from \$40 to \$160 (<http://www.aboutparking.com/charlotte-map.asp>, accessed September 2009).

Parking facilities outside of the CBD mainly consist of on-street parking or commercial shopping center parking lots. On-street parking varies depending on the surrounding land uses, traffic volumes, speeds and safety perspective. Numerous commercial shopping centers are located along the corridor providing public parking opportunities. Two other private locations contain large parking facilities, Carolinas Medical Center–University (CMC-University) and the UNC Charlotte campus.

For UNC Charlotte, the existing parking and future parking demands are near or over capacity. UNC Charlotte maintains 11,766 parking spaces on campus, divided between five parking structures and numerous surface parking lots; a sixth parking structure on the north side of campus was under construction during this report. Parking structures are located close to the academic core of the main campus and available to visitors, commuters, faculty and staff. Surface lots tend to be adjacent to university-owned residence halls, providing parking for resident students. However, there are surface parking lots for commuter students along John Kirk Drive (Lot 5, Lot 6), High-Rise Road (Lot 8), Cameron Boulevard (Lot 26,) and University Road (Lot 7). Parking fees at UNC Charlotte are \$310 for full-year students, \$190 for partial year students and \$210 for remote parking for commuters. The *2009 Draft UNC Charlotte Campus Master Plan* notes that expansion of parking facilities is essential, as well as coordination with CATS on future bus and transit service in order to assist in reducing the need for campus parking.

3.1.4 Railroads

Charlotte is served by four existing rail lines which traverse the Northeast Corridor: the North Carolina Railroad (NCR), Norfolk Southern Corporation (NS) and CSX Corporation (CSX), and one short haul line, the Aberdeen Carolina and Western Railroad (AC&W). Amtrak also operates passenger service through Charlotte.

Several improvements to both freight and passenger rail are planned for the near future. NCDOT Rail Division is working with NCR and NS to improve the Raleigh-to-Charlotte rail corridor, and assist in reducing travel times for both freight and passenger rail. According to the NCDOT Rail Division (NCDOT Rail Division website, <http://www.bytrain.org>, accessed March 2010) plans are being designed for improvements between Raleigh and Charlotte, including double tracking from North Charlotte to Concord. A separate specific project that is located within the corridor addressing the improvements to rail service is the Charlotte Rail Improvement and Safety Project (CRISP). This project is intended to improve various rail operations in Charlotte by creating and/or maintaining accommodations for the proposed Southeast High Speed Rail corridor.

3.1.4.1 Freight Railroads

Two NS freight rail lines pass through Charlotte. One line approaches from the direction of Roanoke, Virginia and the second approaches from the direction of Washington, D.C. Just northeast of Center City Charlotte, the rail lines travel parallel to the NS intermodal yard then west towards Center City Charlotte, paralleling Graham Street; the rail lines head west towards Atlanta, Georgia or south towards Columbia, South Carolina. This NS line parallels North Brevard Street within the North Charlotte Historic District and operates the NS intermodal yard just northeast of Center City Charlotte between 16th Street and 30th Street. Section 3.1.6 describes the future plans for the NS intermodal yard. There is also an existing siding located near 27th Street.

The NCR is the primary railroad leaser in the corridor, extending the full length of the corridor and forming the eastern boundary of the corridor at its northern end. The NS “O” Line and the CSX Corporation line pass through the southern end of the corridor. The AC&W diverges east from the NCR in the vicinity of 36th Street in NoDa. All four lines support freight operations. The NCR also supports the Amtrak passenger rail service.

The state-owned NCR stretches more than 300 miles from Charlotte to Morehead City, North Carolina. The section between Charlotte and Raleigh is the most active rail corridor in the state, supporting both freight and passenger services. Under a lease agreement with the state, Norfolk Southern operates main line freight service on the NCR with an average of 30 to 35 train movements per day. These train movements are expected to increase to approximately 50 to 70 trains per day by the year 2030.

NCDOT’s *North Carolina Rail Plan 2000* (January 2001) reports that 47 percent of the total freight rail traffic shipped on the North Carolina rail system in 1999 originated or terminated in North Carolina and 53 percent was pass-through freight. Since 1990, freight traffic on the mainline has substantially increased. The NCRR corridor recently completed \$10 million worth of projects to improve the eastern portion of the corridor, which included curve improvements between Raleigh and Charlotte. Within Center City Charlotte, the City of Charlotte purchased the former NCRR right-of-way up to 12th Street for future transit use.

3.1.4.2 Passenger Railroads

Amtrak passenger rail operates on the NCRR through an agreement with NS. Currently, three different routes use the line: the Crescent (New York, Atlanta, and New Orleans); the Carolinian (New York, Charlotte) and the Piedmont (Charlotte, Raleigh). Each route operates to and from Charlotte daily, resulting in a combined six trains per day. The Charlotte Amtrak passenger station is currently located within the corridor along North Tryon Street/US-29, approximately two miles north of Center City Charlotte. A future separate project would relocate the passenger station to a new multi-modal transportation facility in Center City Charlotte, called the Charlotte Gateway Station, to be located along the NS main line in the vicinity of West Trade Street.

3.1.4.3 Grade Crossing Inventory

There are seven existing at-grade street crossings within the Northeast Corridor, as identified in Table 3-10. The crossings at 8th Street, 9th Street and 12th Street are along existing City of Charlotte owned right-of-way. The remaining at-grade crossings are located within the active rail corridor. All of these crossings are located on roadways that provide access to existing businesses and residential neighborhoods, and provide connectivity between neighborhoods, business parks, industrial parks and Center City Charlotte.

**Table 3-10
Existing Grade Crossings within the Northeast Corridor**

Grade Crossings	Number of Tracks	Number of Travel Lanes
8th Street	1	2
9th Street	1	2
12th Street	1	4
16th Street	6	2
36th Street	2	2
Craighead Road	2	2
Sugar Creek Road	2	4

3.1.5 Bikeways and Major Pedestrian Ways

3.1.5.1 Bicycle Facilities

Over the past decade, the City has improved the local environment for cyclists through a variety of measures, including:

- The construction of approximately 56 miles of bike lanes throughout the city.
- The incorporation of bicycle lanes into projects that are currently in the design phase.
- The adoption of a standard practice to provide bicycle lanes or additional space in the outside lanes, as streets are resurfaced.
- The addition of newly signed bicycle routes to the 39 mile inventory of signed bicycle routes.
- The construction of bicycle facilities in conjunction with the LYNX Blue Line, including a two-mile off-street pathway parallel to the rail line and over three miles of bicycle lanes on Old Pineville Road.
- The installation of bicycle parking facilities in Center City Charlotte and at most light rail stations.
- The construction of over 30 miles of Mecklenburg County Greenway off-street pathways, including the Mallard Creek Greenway (~6 miles), upper McAlpine Creek Greenway (~9 miles), lower McAlpine Creek/McMullen Creek Greenway (~5 miles), Torrence Creek Greenway (~1 mile), Irwin Creek

Greenway (~2 miles) and Little Sugar Creek Greenway (~3 miles). As well as the construction of the Toby Creek Greenway on the campus of the UNC Charlotte (within the northeast corridor), which is currently underway.

- The development of the *Charlotte Cycling Guide*, which includes a map of existing bikeways, recommended routes and information related to bicycle safety and awareness. The adoption of bicycle parking requirements, requiring new and to construct bicycle parking for new and significantly modified land developments.
- The adoption of the *Urban Street Design Guidelines*. This policy document defines the street design for the various classifications of roadways within Charlotte. Bicycle accommodations are included for street classifications considered suitable for bicycling, including bicycle lanes, shared lanes and adjacent pathways.
- The adoption of the *2008 City of Charlotte Bicycle Plan*, a citywide bicycle planning document that identifies policies and strategies to expand the City’s bicycle network and make cycling a safer and more efficient means of transportation. Most notable is Policy Strategy 3.1, which recommends that “the City will consider bicycle accommodations in the planning, design and development of all rapid transit corridors, station areas and transit hubs. On-going rapid transit planning should take bicycle accommodations into account in the station areas, along roadways leading to the stations, along the transit corridors and on the vehicles.”

Table 3-11 lists key bicycle facilities planned in the Northeast Corridor. Additionally, Figure 3-4 depicts the planned bicycle facility improvements.

**Table 3-11
Proposed Projects with Bikeways within the Northeast Corridor**

Location	Type of Facility
North Tryon Street/US-29	Bicycle lanes
Matheson Avenue	Bicycle lanes
Old Concord Road	Bicycle lanes
West Rocky River Road	Bicycle lanes
Mallard Creek Church Road	Bicycle lanes
West Mallard Creek Church Road	Bicycle lanes
Salome Church Road	Bicycle lanes
Pavilion Boulevard	Bicycle lanes
Mallard Creek Greenway	Off-road trail
Toby Creek Greenway	Off-road trail

Source: *City of Charlotte Bicycle Plan, 2008*

3.1.5.2 Pedestrian Ways

According to the 2030 LRTP, the total existing length of sidewalks in the City is 1,450 miles. Currently, in the Northeast Corridor, sidewalks are not consistently provided along the roadways. The continuity of the sidewalk network is minimal or non-existent in many areas; and gaps primarily exist along North Tryon Street/US-29 within the “weave” area and north of W.T. Harris Boulevard. However, the network is more prevalent within Center City and in the NoDa area.

MUMPO works with NCDOT to incorporate sidewalk construction as a matter of standard practice on state roadway projects within the urban area. MUMPO takes a strong stance to ensure that new roadway construction projects provide room for future sidewalk improvements and do not create pedestrian barriers to the provision of pedestrian ways.

Additionally, the City establishes initiatives to provide multi-use paths through the CIP. The City funds both thoroughfare and non-thoroughfare multi-use path construction. It is the current policy to construct multi-use paths on both sides of all thoroughfares; on one side of all collectors; and, after assessing requests, on local streets. As such, CDOT identified the following needs:

- 685 miles of new multi-use path needs on both sides of Charlotte’s thoroughfares; and,
- 1,400 miles of new multi-use path needs on one side of Charlotte’s local and collector streets.

The current funding level allows for the construction of approximately ten miles of new sidewalks each year. In order to target the funds where they are most needed, CDOT utilizes a ranking system to evaluate each section of potential sidewalk and to prioritize the segment based upon traffic counts, connectivity to a variety of land uses, roadway safety, network completion and transit access.

3.1.6 Trucks and Intermodal

According to the 2030 LRTP, Charlotte's second largest economic activity is warehousing and freight distribution, for which Charlotte ranks sixth in the United States. One of the region's major intermodal sites is currently located within the Northeast Corridor, the Norfolk Southern Intermodal Freight Terminal paralleling North Brevard Street. Norfolk Southern, however, is planning to construct a new intermodal terminal near the Charlotte-Douglas International Airport and relocate operations there.

3.2 Environmental Consequences

The following sections describe the potential impacts to the transportation system (transit, streets and highways, rail and non-motorized forms) of the No-Build, the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option. The impacts are a comparison amongst the alternatives under study.

3.2.1 Transit

Impacts to the public transportation service under the No-Build, the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option are measured in terms of their effectiveness in providing improved transit service to potential users in the corridor. Measures of transit service levels include the geographic coverage, operating characteristics, transfers, travel time, service reliability and safety of the transit system, as well as passenger comfort. The improved service levels should result in higher transit ridership. Therefore, the effectiveness of the alternatives are measured by ridership and system performance measures.

Since the proposed Light Rail Alternative station locations are in proximity to the stations for the Light Rail Alternative – Sugar Creek Design Option; and since the operating characteristics, transfer opportunities, transit travel times, reliability safety, comfort and ridership for the would be the same as the proposed Light Rail Alternative, the impacts to public transportation service for the Light Rail Alternative – Sugar Creek Design Option would be the same as the proposed Light Rail Alternative.

3.2.1.1 Geographic Coverage within Service Area

All alternatives would improve service frequencies and facilities in the Northeast corridor. Under the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, the type and quality of service would be improved. Fixed guideway transit service with a dedicated right-of-way would provide faster and more reliable service than bus service. The proposed Light Rail Alternative would provide park-and-ride facilities and feeder bus service that would expand the area that would have access to rail transit service.

3.2.1.2 Operating Characteristics

Operating plans for the proposed Light Rail Alternative are described in further detail in the *2009 Draft Rail Operations and Maintenance Plan* (ROMP). The ROMP describes the operations strategies, maintenance requirements, LRT operations and system elements. In general, the hours of operation would be the same for all alternatives. The differences would be in the transit route coverage and headways.

Light Rail Service Headways and Fleet Requirements

Under the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, the light rail service for the opening year and the 2030 horizon year would operate at the frequencies shown in Table 3-12. The operating analysis indicated that two different operating scenarios would provide sufficient capacity and meet the proposed projected peak period demand for the 2030 forecast year. The

first operating scenario would be two-car trains with six-minute headways. The second operating scenario would be three-car trains with 10-minute headways. Six-minute headways are analyzed and presented in the Draft EIS to represent a worst case traffic and noise scenario. As ridership projections are refined, a final operating plan will be determined and presented in the Final EIS.

The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would require 26 vehicles to be added to the existing fleet of 20. This would bring the total light rail vehicle fleet for CATS to 46 vehicles.

**Table 3-12
Proposed Light Rail Headways by Service Period**

	Existing 2009	Opening Year	Forecast Year 2030
Peak Periods	10 minute	7.5 minute	6 minute
Base Periods	15 minute	15 minute	15 minute
Early/Late Periods	30 minute	20 minute	20 minute
Weekend Base	20 minute	15 minute	15 minute
Weekend Early/Late	30 minute	30 minute	30 minute

Source: *Draft Rail Operations and Maintenance Plan, 2009*

Bus Routes and Service Headways

As described in Chapter 2.0: Alternatives Considered, the No-Build Alternative would include improvements to service frequencies for routes operating within the Northeast Corridor. Under the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, bus route alignments would be modified to feed into the light rail stations. Route headways would be adjusted to provide more frequent service and minimize transfer waiting time. Route 11 would be the only bus route that would operate with less frequent service under the proposed Light Rail Alternative; since Route 11 operates along the same alignment as the rail line, the reduced service on this line is justified. Table 3-13 compares the future headways by alternative.

**Table 3-13
Comparison of Headways for Bus Routes by Alternative, 2030**

Route Number	Peak Headway (minutes)		Mid-Day Headway (minutes)		Night Headway (minutes)	
	No-Build	Light Rail Alternative ¹	No-Build	Light Rail Alternative ¹	No-Build	Light Rail Alternative ¹
3	30	15	30	30	45	45
4	20	15	30	30	45	45
11	10	15	20	30	30	30
22	35	30	35	35	45	40
23	20	15	35	30	40	40
29	60	15	60	30	60	60
39	35	30	45	30	45	30
54x	15	15	0	0	0	0
80x	30	30	0	0	0	0
81	60	15	60	30	0	0
110	n/a	30	n/a	30	n/a	60
211	20	15	20	20	30	30
360	30	30	40	40	60	60
807	n/a	30	n/a	30	n/a	30

n/a – Not Applicable

¹Represents both the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option.

Source: AECOM and the Metrolina Regional Travel Demand Model, 2009

3.2.1.3 Transfers

Under the No-Build Alternative, transit riders would continue to transfer to/from other bus routes at transit centers. With the proposed Light Rail Alternative and Light Rail Alternative - Sugar Creek Design Option bus service would be modified to service the light rail stations along the Northeast Corridor. Route schedules would be timed to minimize waiting time in transferring to and from light rail. In addition, the

proposed Light Rail Alternative would provide a continuous light rail line from the South Corridor to the Northeast Corridor, without requiring a transfer.

3.2.1.4 Transit Travel Times

Under the No-Build Alternative, transit services would continue to travel with general traffic along congested roadways in the Northeast Corridor and would be subject to traffic conditions. Compared to the No-Build Alternative, the proposed Light Rail Alternative would demonstrate an advantage in travel time, providing faster service because light rail would operate within a dedicated transit corridor. Table 3-14 provides a comparison of existing (2009) and future (2030) transit travel times.

**Table 3-14
Transit Travel Times (minutes) for Selected Trips, AM Peak**

Travel Market	2009	2030	
	Existing Condition	No-Build Alternative	Light Rail Alternative
Inbound	In-Vehicle Time (Weighted Time¹)		
NoDa to Center City Charlotte	15.7 (41.8)	18.7 (40.3)	9.0 (22.9)
University City to Center City Charlotte	34.1 (60.6)	38.4 (64.9)	18.6 (33.5)
UNC Charlotte to Center City Charlotte	51.8 (84.2)	57.9 (90.2)	25.2 (46.3)
University Research Park to Center City Charlotte	47.9 (102.6)	52.2 (106.9)	32.8 (81.9)
Cabarrus County to Center City Charlotte	90.4 (123.2)	101.9 (134.8)	76.1 (120.7)
UNC Charlotte to NoDa	35.0 (76.7)	39.5 (78.2)	16.3 (41.0)
Outbound	In-Vehicle Time (Weighted Time¹)		
Center City Charlotte to NoDa	13.0 (45.2)	14.4 (33.3)	9.0 (22.9)
Center City Charlotte to University City	29.9 (54.1)	32.2 (56.4)	18.6 (33.5)
Center City Charlotte to UNC Charlotte	49.1 (79.1)	54.9 (84.9)	25.3 (46.4)
Center City Charlotte to University Research Park	23.1 (97.2)	28.0 (102.0)	31.7 (85.6)
Center City Charlotte to Cabarrus County	76.7 (135.8)	84.6 (143.7)	73.0 (173.0)
NoDa to UNC Charlotte	35.5 (74.1)	40.6 (79.2)	16.3 (41.1)

Note: ¹Weighted Time = In-Vehicle Time + 1.50*Initial Wait Time + 2.58*Transfer Wait Time + Transfer Penalty + Wtd (Access + Egress + Transfer) Walk
Source: AECOM and Metrolina Regional Travel Demand Model, 2009

Table 3-15 shows the comparative auto travel times for selected trips. In 2030, an automobile would take over 28 minutes from Center City Charlotte to UNC Charlotte and over 35 minutes in the reverse direction. Compared to automobile travel times, the proposed Light Rail Alternative would result in approximately seven minutes of travel time savings from Center City Charlotte to UNC Charlotte.

**Table 3-15
Auto Travel Times (minutes) for Selected Trips, AM Peak**

Selected Trip	2009	2009	2030	2030
	Outbound	Inbound	Outbound	Inbound
Center City Charlotte to/from University Research Park	17.9	27.1	21.1	30.4
Center City Charlotte to/from UNC Charlotte	22.1	32.3	28.8	35.8
Center City Charlotte to/from I-485	18.6	32.8	23.1	37.3

Source: AECOM and Metrolina Regional Travel Demand Model, 2009

3.2.1.5 Reliability and Safety

Reliability and safety are related to the extent to which transit vehicles operate on an exclusive alignment. The No-Build Alternative would continue to operate in general traffic along existing roadways, subject to congestion and delays associated with traffic conditions, traffic signal delay, accidents and pedestrian crossings. Since the No-Build Alternative would limit transit service to existing roadways, transit service would be less reliable, as service would continue to be interrupted or delayed due to traffic congestion.

The proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would operate on exclusive right-of-way within an existing railroad corridor, within the NCDOT right-of-way along North Tryon Street/US-29, and in a new dedicated right-of-way within the UNC Charlotte campus area. Along the proposed alignment in North Tryon Street/US-29, existing roadway left turn median openings would be eliminated or signalized. A number of grade separations would be constructed to eliminate at-grade conflicts with vehicular traffic. In addition, vehicular traffic crossing the alignment would utilize signalized intersections, with signal pre-emption for light rail movements. Since the proposed Light Rail Alternative would operate in a dedicated corridor, transit service would increase in respect to both reliability and safety.

3.2.1.6 Comfort

Industry guidelines for evaluating passenger comfort are documented in the *Transit Capacity and Quality of Service Manual* (TCQSM, 2nd Edition, 2003). The manual recommends using a level of service (LOS) to evaluate passenger comfort using the predicted transit vehicle passenger loads. For this purpose, a LOS is defined based on the area available to each standing passenger in the maximum load section; the location on the line where the most passengers will be on-board the train. The manual recommends a LOS of “D” or better is recommended for achieving a comfortable passenger loading level.

For the No-Build Alternative, projected peak loads in the forecast year 2030 were identified for the existing portion of the LYNX Blue Line. For the existing LYNX Blue Line, the highest projected hourly passenger volume during the peak period in 2030 would occur northbound between Bland and Carson Stations, with approximately 2,020 passengers traveling on that segment during the peak hour. As described previously in Section 3.2.1.2, peak service on the existing line in 2030 would consist of 2-car trains operating at six-minute headways. Based on this service level and projected demand, the typical standee space over the peak hour will be 0.75 meters squared (m²) per passenger, which is equivalent to a LOS of “C”.

For the proposed Light Rail Alternative, peak loads were identified in both directions of the LYNX Blue Line during the peak hour. The highest hourly passenger volume northbound during the peak period in 2030 would occur between Carson and Stonewall Stations, with 2,060 passengers traveling on that segment. The highest hourly volume southbound during that same period would occur between Parkwood and 9th Street Stations, with 2,422 passengers traveling on that segment. As described in Section 3.2.1.2, the proposed Light Rail Alternative would operate every six-minutes during the peak period with 2-car trains. Based on this service level and projected demand, the typical standee space over the peak hour will be 0.47 m² per passenger, which is equivalent to a LOS of “D”.

3.2.1.7 Transit Ridership

The measures used to indicate the impact of the alternatives on transit ridership include:

- Total number transit trips by trip purpose;
- Change in transit trips;
- Peak hour riders on light rail;
- Daily number of boardings by station; and,
- Special event ridership.

As noted previously, the two station locations that vary between the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option are not significantly different; and the operating characteristics, transfers, transit travel times, would be the same. Therefore, travel forecast model runs were not performed separately for the Light Rail Alternative – Sugar Creek Design Option, and the results presented below for the Light Rail Alternative represent both the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option.

Total and New Transit Trips

The proposed Light Rail Alternative is intended to provide additional transit opportunities to the residents of Charlotte and the surrounding area. The trips shown in Table 3-16 represent the number of linked trips in the region. A linked trip is a trip from an origin to a destination, regardless of the number of transfers.

The No-Build Alternative is projected to attract 83,041 transit linked trips in 2030. The proposed Light Rail Alternative would increase transit ridership substantially attracting 101,302 transit linked trips. As compared to the No-Build Alternative, 18,261 additional riders would utilize transit under the proposed Light Rail Alternative. Approximately 49 percent of the projected transit trips for the proposed Light Rail Alternative would be home-based work trips and 57 percent of all transit trips would occur during the peak time period.

**Table 3-16
Daily Transit Trips by Purpose, 2030**

Trip Purpose	No-Build Alternative	Light Rail Alternative ¹
HBW Peak	28,787	35,169
HBW Off-Peak	12,361	14,748
HBO Peak	11,411	13,484
HBO Off-Peak	15,514	18,239
NHB Peak	4,697	5,728
NHB Off-Peak	6,241	8,011
HBU Peak	2,069	3,001
HBU Off-Peak	1,962	2,922
Total Transit Linked Trips	83,041	101,302

¹Represents both the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option.
Source: AECOM and the Metrolina Regional Travel Demand Model, 2009

Transit Mode Share

Determining the share of transit trips provides insight on the shift from automobiles to transit. Compared to the No-Build Alternative, the proposed Light Rail Alternative results in an increase in transit person-trips and a decrease in overall highway persons-trips for the region as shown in Table 3-17.

**Table 3-17
Comparison of Total Trips by Mode, 2030**

	Daily Person-Trips	
	No-Build Alternative	Light Rail Alternative
Total Transit Person-Trips	83,041	101,302
Total Highway Person-Trips	12,277,696	12,259,688
Total Non-Motorized Person Trips (Walk/Bike)	210,826	210,573
Total Person-Trips	12,571,563	12,571,563

Source: AECOM and the Metrolina Regional Travel Demand Model

Bus Ridership

Under the No-Build Alternative, bus routes in the Northeast Corridor are projected to carry 14,623 weekday riders. The proposed Light Rail Alternative would result in an increase of 3,954 additional weekday riders over the No-Build Alternative. This increase is a result of riders using buses to access the light rail stations. Table 3-18 shows the 2030 projected bus riders (unlinked trips) for each alternative. Unlinked passenger trips count each boarding as a separate trip regardless of transfers.

**Table 3-18
Northeast Corridor Bus Ridership Summary by Alternative, 2030**

Route Name	2030 Average Weekday Ridership	
	No-Build	Light Rail Alternative ¹
Route 3 - Plaza Road	2,207	2,014
Route 4 - Country Club	678	896
Route 11 - North Tryon/Sugar Creek	4,064	1,446
Route 22 - Graham Street	1,309	1,163
Route 23 - Shamrock Drive	2,294	2,134
Route 29 - UNC Charlotte/South Park	1,281	4,462
Route 39 - Eastway Drive	805	939
Route 54x - University Research Park	647	585
Route 80x - Concord Express	221	261
Route 81 - Wachovia CIC Shuttle	94	961
Rout 110 - Concord Mills Mall	n/a	1,201
Route 211 - Hidden Valley	751	1,632
Route 360 - City Boulevard/NC-49	272	495
Route 807 - Old Concord Road	n/a	368
Total Average Weekday Bus Ridership	14,623	18,577

¹Represents both the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option.
Source: AECOM and the Metrolina Regional Travel Demand Model, 2009

Fixed Guideway Ridership

Fixed guideway ridership refers to boardings specifically on the light rail system. The passengers boarding the trains would arrive at stations either by walking, driving or by taking a bus. For the No-Build Alternative, approximately 23,700 riders would use the existing LYNX Blue Line light rail service in 2030. Under the proposed Light Rail Alternative, approximately 23,800 additional riders would use light rail, resulting in a total of 47,500 daily light rail boardings for the entire alignment (South to Northeast).

Daily Station Boardings

Light rail ridership was analyzed for each station's peak and off-peak ridership (six-minute headways), as shown in Table 3-19. Under the proposed Light Rail Alternative, five stations in the Northeast Corridor would have daily boardings well over 1,500. Two of those five stations would be major trip destinations: Center City Charlotte and the UNC Charlotte campus. The other three stations would be major park-and-ride locations, with the highest projected boardings at the I-485/N. Tryon Station with just under 2,000 daily boardings.

**Table 3-19
Light Rail Boarding Projections, 2030**

Station	No-Build Alternative			Light Rail Alternative		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
I-485/South Blvd	1,771	664	2,435	1,783	671	2,455
Sharon Rd West	934	470	1,405	944	477	1,422
Arrowood	799	643	1,442	808	654	1,462
Archdale	622	459	1,080	620	464	1,084
Tyvola	1,001	929	1,930	1,028	957	1,985
Woodlawn	839	845	1,684	861	866	1,727
Scaleybark	802	700	1,502	817	716	1,533
New Bern	450	438	888	471	461	932
East-West Blvd.	791	672	1,463	863	742	1,605
Bland	383	370	753	431	422	852
Carson	309	252	560	414	331	745
Stonewall	975	404	1,379	1,555	598	2,153
CTC/Arena	1,102	585	1,687	1,502	712	2,214
3rd St. / Convention Center	2,053	1,187	3,240	4,147	2,268	6,416
7th Street	1,485	748	2,233	2,460	1,369	3,829
9th Street	n/a	n/a	n/a	1,051	550	1,600
Parkwood	n/a	n/a	n/a	271	371	642
25th Street	n/a	n/a	n/a	183	174	357
36th Street	n/a	n/a	n/a	896	604	1,499
Sugar Creek	n/a	n/a	n/a	1,291	1,013	2,304
Old Concord Road	n/a	n/a	n/a	564	455	1,019
Tom Hunter	n/a	n/a	n/a	491	418	909
University City Blvd.	n/a	n/a	n/a	1,021	561	1,582
McCullough	n/a	n/a	n/a	526	497	1,024
JW Clay Blvd.	n/a	n/a	n/a	424	461	884
UNC Charlotte	n/a	n/a	n/a	995	1,124	2,119
Mallard Creek Church	n/a	n/a	n/a	695	477	1,172
I-485/North Tryon	n/a	n/a	n/a	1,449	497	1,946
Total	14,317	9,365	23,682	28,562	18,908	47,470

Source: AECOM and the Metrolina Regional Travel Demand Model, 2009

Peak Hour Line Volumes

Table 3-20 shows the projected peak hourly passenger loads for light rail. The peak hourly passenger load is the maximum number of passengers that travel past a single point on a route during the peak hour. As shown in Table 3-21, the highest line volume in the southbound direction would occur between Parkwood and 9th Street Stations, where trains would carry 2,422 annual passengers during the a.m. peak hour. During the same time in the northbound direction, the maximum loading would occur between Carson and Stonewall Stations. A total of 2,060 riders would ride the northbound trains on this section of the line. As noted earlier, the light rail operating plan calls for running two-car trains on six-minute headways during the peak hours. This would provide one-way hourly carrying capacity of 2,520 passengers per hour per direction, which should provide adequate capacity to handle the projected peak hourly demand.

Table 3-20
Light Rail AM Peak Hour Directional Loads, 2030

Station	No-Build Alternative		Light Rail Alternative	
	Northbound	Southbound	Northbound	Southbound
I-485/South Blvd	753	0	758	0
Sharon Rd West	1,028	97	1,035	98
Arrowood	1,172	195	1,178	199
Archdale	1,311	257	1,317	266
Tyvola	1,476	295	1,485	303
Woodlawn	1,656	388	1,668	407
Scaleybark	1,920	451	1,935	476
New Bern	1,976	457	1,994	487
East-West Blvd.	1,982	465	2,012	501
Bland	2,023	481	2,056	542
Carson	2,020	520	2,060	600
Stonewall	1,648	546	1,700	669
CTC/Arena	1,143	532	1,233	928
3rd Street / Convention Center	627	514	943	1,070
7th Street	0	86	466	1,718
9th Street	n/a	n/a	298	2,301
Parkwood	n/a	n/a	284	2,422
25th Street	n/a	n/a	284	2,346
36th Street	n/a	n/a	316	2,293
Sugar Creek	n/a	n/a	339	2,064
Old Concord Road	n/a	n/a	339	1,590
Tom Hunter	n/a	n/a	367	1,397
University City Blvd.	n/a	n/a	339	1,278
McCullough	n/a	n/a	299	993
JW Clay Blvd.	n/a	n/a	273	922
UNC Charlotte	n/a	n/a	94	926
Mallard Creek Church	n/a	n/a	23	901
I-485/North Tryon	n/a	n/a	0	673

Source: AECOM and the Metrolina Regional Travel Demand Model, 2009

Light Rail Passenger Mode of Access

For the proposed Light Rail Alternative, approximately 20 percent would drive to a park-and-ride, 22 percent of riders would take a bus to a station, 54 percent would walk to a station and four percent would be dropped off (kiss-and-ride). The high percentages of riders who would walk to a station reflect destination stations, such as Center City Charlotte and UNC Charlotte, as well as stations where park-and-ride facilities are not available.

In the Northeast Corridor, the I-485/N. Tryon Station would serve the largest number of patrons driving to a station due to the proximity of I-485, with just over 1,600 drive access riders. The Sugar Creek Station would have the second highest demand for park-and-ride access with a projected drive access demand of 1,400 riders.

Special Event Ridership

In addition to the trip purposes discussed above, the light rail service is expected to serve a number of special events in the Center City Charlotte and at UNC Charlotte, which are not captured in the ridership projections presented above. The proposed Light Rail Alternative is expected to carry an additional 855,237 riders for special events by 2030, including events at the Bank of America stadium (NFL Carolina Panthers), Time Warner Cable Area (NBA Charlotte Bobcats and AHL Charlotte Checkers hockey), the future baseball stadium in Center City Charlotte, Charlotte Convention Center events and UNC Charlotte football. This projected ridership also includes students traveling between the UNC Charlotte Center City campus and its main campus.

3.2.2 Impacts to Streets and Highways

All three alternatives considered would have some level of impact to the local and regional roadway network within the Northeast Corridor. The No-Build Alternative relies primarily on street improvements to address projected travel demand, while the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option encourage shifts from automobile to transit. This modal shift may be effective at reducing the growth of congestion on a regional scale. However, because light rail encourages concentrations of higher density development near its stations, local traffic impacts adjacent to stations may result. This section details the regional and local impacts of these alternatives on the transportation system.

3.2.2.1 Systems Performance

Table 3-21 provides a comparison of 2030 projected regional automobile travel, summarized by Vehicles Miles Traveled (VMT) and Vehicles Hour Traveled (VHT), for each alternative. The proposed Light Rail Alternative would result in 141,259 fewer daily miles traveled and 5,490 fewer vehicle hours on the region’s roadways than the No-Build Alternative. On a regional basis this represents a reduction of approximately 0.1 percent.

**Table 3-21
Comparison of VMT and VHT, 2030**

	2030	
	No-Build Alternative	Light Rail Alternative ¹
Vehicles Miles Traveled		
VMT Peak	30,964,446	30,870,685
VMT Off-Peak	32,511,031	32,463,532
VMT Daily	63,475,476	63,334,217
Vehicles Hour Traveled		
VHT Peak	1,288,456	1,284,107
VHT Off-Peak	778,818	777,676
VHT Daily	2,067,274	2,061,784
Change from No-Build		
VMT Daily	n/a	(141,259)
VHT Daily	n/a	(5,490)

Source: AECOM and Metrolina Regional Travel Demand Model, 2009

3.2.2.2 Local Traffic Operations

This section describes existing and projected traffic conditions for local roadways and intersections, and identifies potential traffic impacts resulting from the proposed Light Rail Alternative. These impacts include changes in traffic operations, such as delay, travel time and speed and are based on analysis of the morning and afternoon peak hours. The analysis focused on road/rail crossings and intersections in proximity to the light rail alignment and transit stations. Detailed information, beyond that provided in this chapter, can be found in the *Traffic Analysis Report, November 2009*.

Traffic Forecasting Methodology

The analysis of future roadway and intersection traffic conditions was based on growth factors derived from the Metrolina 2030 Regional Travel Demand model. These growth factors are the result of comparing future 2030 model traffic volumes to the base year model traffic volumes and were developed by dividing the future year volumes by the base year volumes. Because growth factors and land uses vary significantly over the length of the corridor, the corridor was divided into three distinct segments. A map illustrating the location of each segment can be found in Figure 3-5. Segment 1 includes rail crossings and intersections from Center City Charlotte north to Owen Boulevard along North Tryon Street/US-29. This segment also includes all intersections analyzed on Sugar Creek Road and Eastway Drive. Segment 2 begins with Tom Hunter Road and runs along North Tryon Street/US-29 through Barton Creek Drive. Segment 3 includes Mallard Creek Church Road up to the I-485 Ramps along North Tryon Street/US-29.

**Table 3-22
Growth Factors**

Corridor Segment	Growth Factor
Segment 1 (Center City Charlotte to Owen Boulevard)	1.30
Segment 2 (Tom Hunter Road to Barton Creek Drive)	1.25
Segment 3 (Mallard Creek Church Road to I-485 Outer Ramp)	1.55

Source: Charlotte Department of Transportation and Metrolina Regional Travel Demand Model, 2009

Traffic volumes used in the analysis of 2030 conditions resulted from taking 2008 base year counted traffic and multiplying that by the growth factors shown in Table 3-22. The base year volumes were obtained from routine counts made by CDOT and by counts made specifically for this project in 2008 and 2009. The 2030 No-Build volumes simply reflect the application of these growth factors to 2008 base year traffic counts. The 2030 Light Rail Alternative volumes reflect a similar application of growth factors, but also include the addition of traffic generated by park-and-ride stations. Build year volumes were also adjusted to account for the redistribution of traffic expected as a result of project-related roadway and access changes.

Roadway Modifications

The proposed Light Rail Alternative would include the roadway modifications as described in Section 2.2.3.4 in Chapter 2.0: Alternatives Considered. For the Light Rail Alternative, the proposed light rail alignment travels within an existing railroad right-of-way and the median of North Tryon Street/US-29. Roadway modifications inside the railroad right-of-way as a result of the proposed project include a bridge extension of the Eastway Drive overpass, the depression of 36th Street under the existing and future railroad tracks and the proposed light rail tracks and crossing improvements at street/rail crossings. The Sugar Creek Road grade separation project is a separate future project, which will depress Sugar Creek Road under the existing freight tracks and the proposed light rail tracks.

The majority of the roadway modifications would occur where the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option are situated in the median of North Tryon Street/US-29. North Tryon Street/US-29 would be rebuilt to a complete urban street that accommodates light rail, buses, automobiles, pedestrians and bicyclists. The number of through lanes available to traffic would remain unchanged for the length of North Tryon Street/US-29 (four through lanes), turn lanes would vary. Street features would include median refuge areas, pedestrian crossing signals, multi-use paths, planting strips and bicycle lanes in station areas.

In addition to upgrading the street features of North Tryon Street/US-29, there would also be several changes to roadway access and traffic control. For safety reasons, traffic and pedestrian movements across the light rail tracks must be controlled by traffic signals and railroad crossing signals/gates. This necessitates closing median openings at midblock locations and at some local side-streets. Where medians are closed, access would be limited to right-in/right-out traffic movements and pedestrian crossings of North Tryon Street/US-29 would be restricted. Median openings would remain at all existing signalized intersections. Since cross-access and street connectivity are vital transportation components to sustaining neighborhoods and businesses adjacent to North Tryon Street/US-29, the proposed Light Rail Alternative would include five new signalized intersections. Four median openings would be closed along North Tryon Street/US-29. Where the Light Rail Alternative – Sugar Creek Design Option enters and leaves North Tryon Street/US-29, two intersections would be signalized as well. Design and construction of the proposed Light Rail Alternative and its design option and their physical components would not preclude the subsequent opening of a median at Hampton Church Road and a median at a future street located in the vicinity of Stetson Drive. Tables 3-23 and 3-24 summarize existing and proposed median openings along North Tryon Street/US-29.

**Table 3-23
North Tryon Street/US-29 Summary of Median Openings**

	Old Concord Road to UNC Charlotte Research Drive	
	Existing	Light Rail Alternative
Signalized	11	16
Unsignalized	9	0

**Table 3-24
North Tryon Street/US-29 Median Opening Locations**

Intersection	Existing	No-Build	Light Rail Alternative
Old Concord Road	Signalized	Signalized	Signalized
Orr Road	Unsignalized	Signalized	Signalized
Austin Drive	Unsignalized	Unsignalized	Closed
Arrowhead Road	Unsignalized	Signalized	Signalized
Heathway Drive	Unsignalized	Unsignalized	Closed
Owen Boulevard	Unsignalized	Unsignalized	Signalized
Tom Hunter Road	Signalized	Signalized	Signalized
Midblock (Post Office Driveway)	Unsignalized	Unsignalized	Closed
Orchard Trace Lane	Unsignalized	Unsignalized	Signalized
Reagan Drive/Kemp Street*	Unsignalized	Closed	Closed
I-85 Connector	Signalized	Signalized	Signalized
University City Blvd. Station Access	n/a	n/a	Signalized
Stetson Drive*	Unsignalized	Closed	Closed
University City Blvd.	Signalized	Signalized	Signalized
Shopping Center Drive	Signalized	Signalized	Signalized
Clark Boulevard	Unsignalized	Unsignalized	Closed
McCullough Drive	Signalized	Signalized	Signalized
Midblock (NC Highway Patrol Driveway)	Unsignalized	Unsignalized	Closed
Ken Hoffman Drive	Signalized	Signalized	Signalized
WT Harris Boulevard	Signalized	Signalized	Signalized
JM Keynes Drive	Signalized	Signalized	Signalized
JW Clay Boulevard	Signalized	Signalized	Signalized
UNC Charlotte Research Drive	Signalized	Signalized	Signalized

* Median opening is eliminated with Weave reconstruction project

n/a – Not Applicable; Intersection does not exist under Existing Conditions or No Build Alternative.

Roadway and traffic control changes would also be proposed in areas where light rail would not operate within North Tryon Street/US-29. These changes include a new traffic signal at the primary entrance to the I-485/N. Tryon Station (North Tryon Street/US-29 and Morningstar Place Drive) and a limited access median opening to a proposed new street just north of the I-485/N. Tryon Station.

Other roadway and rail improvements that would change traffic patterns in the corridor include:

- For Sugar Creek Station Park-and-Ride Option 1, Raleigh Street would be realigned to eliminate the offset intersection at Sugar Creek Road. Raleigh Street would serve as an access point to the Sugar Creek Station Park-and-Ride facility. In addition, a new traffic signal would be added to the North Davidson Street and Sugar Creek Road intersection. Analysis results for Option 1 are presented in Table 3-26.
- For Sugar Creek Park-and-Ride Option 2, the Sugar Creek Road & North Davidson Street intersection would be signalized and two lanes (one in each direction) would be added to North Davidson Street. The additional southbound lane would become a drop right turn lane into the proposed parking garage entrance. The additional northbound lane would accommodate a left and right turn lane onto Sugar Creek Road. An eastbound right turn lane and a westbound left turn lane would also be added to Sugar Creek Road at the intersection with North Davidson Street. Analysis results for Option 2 are presented in Table 3-27.
- The Old Concord Road and North Tryon Street/US-29 intersection would be re-configured from a high speed design to a more urban intersection design, and would include a grade separated bridge for the light rail alignment to access the median of North Tryon Street/US-29.
- North Tryon Street/US-29 & Orr Road – A fourth leg would be added to the intersection under the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option. The additional eastbound Orr Road approach intends to restore connectivity for residents on the west side of North Tryon Street/US-29 that will be lost due to the proposed turning restrictions at Austin Drive.

- Entrances to station park-and-ride facilities would be constructed along Sugar Creek Road, North Tryon Street/US-29 and Old Concord Road.
- The light rail alignment would be constructed to cross under the northbound travel lanes of North Tryon Street/US-29 just north of the UNC Charlotte Research Drive intersection in order to access the campus and the UNC Charlotte station.

Intersection Level of Service

An analysis of over 55 intersections was conducted to determine the effects that the proposed Light Rail Alternative and the design option would have on traffic operations within the corridor. This analysis consisted of estimating intersection capacity usage for all intersections and alternatives under study, as well as determining vehicular level of service (LOS) at those intersections. Capacity usage is reported in terms of a volume to capacity ratio (V/C), and level of service is reported based on the average vehicle delay experienced at an intersection. Volume to capacity ratios that are close to or that exceed 1.0 are indicative of congested traffic conditions. Level of service is a qualitative measure of traffic flow intended to reflect driver discomfort and frustration, with a criteria range of A to F. LOS A through D represent what is generally considered to be acceptable motorist delays, with LOS D approaching unstable traffic flows that might result in motorists waiting through more than one signal cycle. LOS E and F reflect congested to extremely congested traffic conditions.

Synchro 7.0 was used to estimate capacity conditions at all intersections within the study area and was also used to determine LOS for locations where light rail operations would not directly affect traffic flow. Where light rail and vehicular traffic would interact, VISSIM 5.10 (a traffic simulation program capable of modeling light rail and vehicular traffic) was used instead. VISSIM provided estimates of vehicle delay, vehicle queuing and spillback, as well as travel times and speeds; and was used to quantify the benefits and impacts to traffic flow if light rail crossings were made at-grade or were grade separated. VISSIM results for intersections inside the North Tryon Street/US-29 corridor, between Sugar Creek Road and the I-485 Outer Ramp can be found in the *Traffic Analysis Report, November 2009*.

Figures 3-6a through 3-6c depict vehicular movements at intersections and at-grade crossings. Table 3-25 summarizes the intersection operations for the No-Build Alternative and proposed Light Rail Alternative. Additionally, Table 3-26 summarizes the intersection operations for the Light Rail Alternative – Sugar Creek Design Option.

**Table 3-25
No-Build and Light Rail Alternatives, Delay and Level of Service by Intersection, 2030**

Intersection	No-Build Alternative					Light Rail Alternative				
	Signalized (S) Unsignalized (U)	Delay (sec.)		LOS		Signalized (S) Unsignalized (U)	Delay (sec.)		LOS	
		a.m.	p.m.	a.m.	p.m.		a.m.	p.m.	a.m.	p.m.
12th Street & College Street	S	9.7	14.7	A	B	S	9.8	14.7	A	B
16th Street & Parkwood Avenue	U	41.9	25.9	E	D	U	41.9	25.9	E	D
Brevard Street & Parkwood Avenue	U	26.6	13.4	D	B	U	26.6	13.4	D	B
28th Street & Brevard Street	U	10.9	10.3	B	B	U	10.9	10.3	B	B
36th Street & North Davidson Street	S	8.8	11.1	A	B	S	9.0	11.0	A	B
Craighead Road & Raleigh Street	U	14.5	13.5	B	B	U	14.5	13.5	B	B
Craighead Road & North Davidson Street	U	20.5	30.1	C	D	U	21.1	37.2	C	E
Sugar Creek Road & North Davidson Street	U	85.6	Note 2	F	F	S	11.9	23.4	B	C
Sugar Creek Road & Raleigh Street (southern intersection)	U	26.2	37.3	D	E	U	69.1	116.9	E	F
Sugar Creek Road & Raleigh Street (northern intersection)	U	20.4	32.1	C	D	U	1.0	91.1	A	F
Sugar Creek Road & Greensboro	S	7.9	9.5	A	A	S	3.4	13.9	A	B
North Tryon Street/US-29 & Sugar Creek Road	S	78.0	122.6	E	F	S	93.1	138.6	F	F
North Tryon Street/US-29 & Beechway Circle	U	7.0	110.2	A	F	U	6.1	117.8	A	F
North Tryon Street/US-29 & Wellingford Street	U	21.5	37.5	C	E	U	19.2	192.7	C	F
North Tryon Street/US-29 & Dorton Street	U	15.2	62.8	C	F	U	18.4	40.6	C	E
North Tryon Street/US-29 & Mellow Drive	U	16.9	55.5	C	F	U	14.4	43.8	B	E
North Tryon Street/US-29 & Bennett Street	U	182.5	63.4	F	F	U	35.1	48.9	E	E
North Tryon Street/US-29 & Bingham Drive	U	32.5	80.8	D	F	U	20.5	155.1	C	F
North Tryon Street/US-29 & Lambeth Drive	U	30.8	67.8	D	F	U	35.8	151.5	E	F
North Tryon Street/US-29 & Eastway Drive	S	37.7	95.7	D	F	S	25.7	116.5	C	F
Eastway Drive & Northpark Mall Driveway #1	U	11.3	10.7	B	B	U	11.7	11.2	B	B

Table 3-25 (continued)
No-Build and Light Rail Alternatives, Delay and Level of Service by Intersection, 2030

Intersection	No-Build Alternative					Light Rail Alternative				
	Signalized (S) Unsignalized (U)	Delay (seconds)		LOS		Signalized (S) Unsignalized (U)	Delay (seconds)		LOS	
		a.m.	p.m.	a.m.	p.m.		a.m.	p.m.	a.m.	p.m.
Eastway Drive & Northpark Mall Driveway #2	S	3.3	7.4	A	A	S	2.8	7.6	A	A
Eastway Drive & Curtiswood Drive	U	15.0	27.1	B	D	U	15.2	28.8	C	D
North Tryon Street/US-29 & Northchase Drive	U	23.8	14.2	C	B	U	14.5	58.0	B	F
North Tryon Street/US-29 & Old Concord Road Station Access	-	-	-	-	-	U	Note 1	10.8	A	B
North Tryon Street/US-29 & Old Concord Road	S	54.4	22.8	D	C	S ^{##}	64.2	45.1	E	D
Old Concord Road & Old Concord Road Station Access	-	-	-	-	-	U	9.2	41.6	A	E
Old Concord Road & Orr Road	S	62.0	37.5	E	D	S	50.0	30.7	D	C
North Tryon Street/US-29 & Orr Road	S [@]	57.5	27.2	E	C	S	75.1	41.1	E	D
North Tryon Street/US-29 & Austin Drive	U	65.3	64.0	F	F	U	26.2	34.3	D	D
North Tryon Street/US-29 & Arrowhead Drive	S [@]	27.1	17.3	C	B	S	40.0	32.6	D	C
North Tryon Street/US-29 & Heathway Drive	U	22.3	41.5	C	E	U	9.4	48.7	A	E
North Tryon Street/US-29 & Owen Boulevard	U	10.0	38.0	B	E	S	20.7	17.6	C	B
North Tryon Street/US-29 & Tom Hunter Road	S	18.6	128.0	B	F	S	33.6	140.9	C	F
North Tryon Street/US-29 & Gloryland Avenue	U	Note 1	238.2	A	F	U	Note 1	560.5	A	F
North Tryon Street/US-29 & Orchard Trace Lane	U	25.4	134.7	D	F	S	14.7	95.4	B	F
North Tryon Street/US-29 & Kemp Street	U	31.7	46.0	D	E	U	25.8	1295.7	D	F
North Tryon Street/US-29 & I-85 Connector	S	40.8	189.1	D	F	S ^{##}	58.5	216.3	E	F
North Tryon Street/US-29 & I-85 Service Road	U	Note 1	19.3	A	C	U	Note 1	9.4	A	A
North Tryon Street/US-29 & University City Blvd. Station Access [#]	-	-	-	-	-	S	24.3	39.1	C	D

Table 3-25 (continued)
No-Build and Light Rail Alternatives, Delay and Level of Service by Intersection, 2030

Intersection	No-Build Alternative					Light Rail Alternative				
	Signalized (S) Unsignalized (U)	Delay (seconds)		LOS		Signalized (S) Unsignalized (U)	Delay (seconds)		LOS	
		a.m.	p.m.	a.m.	p.m.		a.m.	p.m.	a.m.	p.m.
North Tryon Street/US-29 & Stetson Drive	U	47.8	20.0	E	C	U	8.2	4.1	A	A
North Tryon Street/US-29 & Rocky River Road	U	16.1	16.8	C	C	U	11.7	11.4	B	B
North Tryon Street/US-29 & University City Blvd./NC-49	S	125.3	160.4	F	F	S [#]	119.9	160.4	F	F
North Tryon Street/US-29 & Brookside Lane	U	47.3	59.7	E	F	U	34.8	314.6	D	F
North Tryon Street/US-29 & Shopping Center Drive	S	39.0	53.0	D	D	S	87.0	84.1	F	F
North Tryon Street/US-29 & Clark Boulevard	U	22.5	19.3	C	C	U	68.3	34.4	F	D
North Tryon Street/US-29 & Hampton Church Road	U	11.9	16.8	B	C	U	7.9	8.8	A	A
North Tryon Street/US-29 & McCullough Drive	S	17.3	37.0	B	D	S	24.9	34.8	C	C
North Tryon Street/US-29 & Ken Hoffman Drive	S	16.4	12.3	B	B	S	20.9	22.3	C	C
North Tryon Street/US-29 & W.T. Harris Boulevard	S	51.9	136.2	D	F	S [#]	66.1	148.0	E	F
North Tryon Street/US-29 & JM Keynes Drive	S	12.5	39.7	B	D	S	28.3	52.5	C	D
North Tryon Street/US-29 & JW Clay Boulevard	S	16.8	52.1	B	D	S	23.0	79.7	C	E
North Tryon Street/US-29 & UNC Charlotte Research Drive	S	14.4	26.5	B	C	S	24.3	33.0	C	C
North Tryon Street/US-29 & Grove Lake Drive	U	9.0	12.0	A	B	U	7.0	10.5	A	B
North Tryon Street/US-29 & Barton Creek Drive	U	28.8	8.9	D	A	U	9.8	8.3	A	A
North Tryon Street/US-29 & Mallard Creek Church Road	S	89.9	136.1	F	F	S	52.4	140.0	D	F
Mallard Creek Church Road & Stone Quarry Road	U	Note 1	Note 1	A	A	U	0.2	1.3	A	A
North Tryon Street/US-29 & US-29 Access	U	42.7	16.8	E	C	U	38.1	25.6	E	D

Table 3-25 (continued)
No-Build and Light Rail Alternatives, Delay and Level of Service by Intersection, 2030

Intersection	No-Build Alternative					Light Rail Alternative				
	Signalized (S) Unsignalized (U)	Delay (seconds)		LOS		Signalized (S) Unsignalized (U)	Delay (seconds)		LOS	
		a.m.	p.m.	a.m.	p.m.		a.m.	p.m.	a.m.	p.m.
North Tryon Street/US-29 & Morning Star Place Dr (I-485 Station Entrance)	U	21.0	26.9	C	D	S ^{##}	11.6	70.1	B	E
North Tryon Street/US-29 & I-485 Station Access (right-in/right-out)	-	-	-	-	-	U	Note 1	16.8	A	C
North Tryon Street/US-29 & I-485 Inner Ramp	S	16.9	17.4	B	B	S	31.6	85.3	C	F
North Tryon Street/US-29 & I-485 Outer Ramp	S	50.7	14.2	D	B	S	123.1	23.6	F	C

Source: LYNX Blue Line Extension Northeast Corridor Light Rail Project; Traffic Analysis Report 2009

[@]Note: Intersection is anticipated to be signalized by 2030

^{*}Note: Intersection becomes signalized in the 2030 Light Rail Alternative

^{##}Note: Assumes the light rail alignment is grade separated over the intersection

Note 1: Nominal amount of traffic on the side street approach

Note 2: The delay is too large for Synchro to provide a value

Table 3-26
Light Rail Alternative – Sugar Creek Design Option
Delay and Level of Service by Intersection, 2030

Intersection	2030 Light Rail Alternative – Sugar Creek Design Option				
	Signalized (S) Unsignalized (U)	Delay (seconds)		LOS	
		a.m.	p.m.	a.m.	p.m.
16th Street & Parkwood Avenue	U	41.9	25.9	E	D
Brevard Street & Parkwood Avenue	U	26.6	13.4	D	B
28th Street & Brevard Street	U	10.9	10.3	B	B
Craighead Road & Raleigh Street	U	14.5	13.5	B	B
Craighead Road & North Davidson Street	U	21.0	37.9	C	E
Sugar Creek Road & North Davidson Street	S	13.1	27.4	B	C
Sugar Creek Road & Raleigh Street (southern intersection)	U	25.8	25.5	D	D
Sugar Creek Road & Raleigh Street (northern intersection)	U	22.0	304.2	C	F
North Tryon Street/US-29 & Beechway Circle	U	6.9	106.5	A	F
North Tryon Street/US-29 & Wellingford Street	U	15.3	44.5	C	E
North Tryon Street/US-29 & Dorton Street	S	5.1	85.5	A	F
North Tryon Street/US-29 & Mellow Drive	U	9.5	8.3	A	A
North Tryon Street/US-29 & Bennett Street	U	10.2	8.7	B	A
North Tryon Street/US-29 & Bingham Drive	U	10.6	22.7	B	C
North Tryon Street/US-29 & Lambeth Drive	S	16.7	79.9	B	E
Eastway Drive & Curtiswood Drive	U	15.0	28.4	B	D
Eastway Drive & Northpark Mall Driveway #1	U	11.5	11.1	B	B
North Tryon Street/US-29 & Northchase Drive	U	15.6	557.5	C	F
North Tryon Street/US-29 & Old Concord Road Station Access	U	Note 1	13.0	A	B
Old Concord Road & Old Concord Road Station Access	U	9.2	40.9	A	E
North Tryon Street/US-29 & Austin Drive	U	69.8	32.9	F	D
North Tryon Street/US-29 & Heathway Drive	U	9.9	8.3	A	A

Note 1: Nominal amount of traffic on the side street approach

Source: LYNX Blue Line Extension Northeast Corridor Light Rail Project; Traffic Analysis Report 2009

Sugar Creek Park-and-Ride Option 2

A parking garage is proposed at the Sugar Creek Station under the Sugar Creek Park-and-Ride Option 2, which includes approximately 1,010 parking spaces. As described previously, a signal would be added at the intersection of N. Davidson Street and Sugar Creek Road. An addendum to the *Traffic Analysis Report* was created to detail the traffic impacts associated with the proposed parking garage. Table 3-27 details the LOS and delay results, utilizing SYNCHRO software, for intersections affected by vehicular trips accessing the parking garage under the Sugar Creek Park-and-Ride Option 2.

**Table 3-27
Light Rail Alternative (Sugar Creek Park-and-Ride Option 2)
Delay and Level of Service by Intersection, 2030**

Intersection	2030 Light Rail Alternative – Sugar Park-and-Ride Option 2				
	Signalized (S) Unsignalized (U)	Delay (seconds)		LOS	
		a.m.	p.m.	a.m.	p.m.
North Davidson & 36th Street	S	8.8	9.7	A	A
Craighead Road & Raleigh Street	U	8.4	8.4	A	A
Craighead Road & North Davidson Street	U	10.6	10.6	B	B
Sugar Creek Road & The Plaza	S	71.8	59.1	E	E
Sugar Creek Road & Atmore Street	U	15.3	11.8	C	B
Sugar Creek Road & North Davidson Street	S	17.7	29.0	B	C
Sugar Creek Road & Raleigh Street (southern intersection)	U	23.3	26.9	C	D
Sugar Creek Road & Raleigh Street (northern intersection)	U	41.5	24.9	E	C
Sugar Creek Road & Greensboro Street	S	3.6	6.8	A	A
North Tryon Street/US-29 & Sugar Creek Road	S	90.2	65.4	F	E

Source: LYNX Blue Line Extension Northeast Corridor Light Rail Project; Traffic Analysis Report Addendum 2010

Intersection Operations

The operations at most unsignalized intersections along North Tryon Street/US-29 would improve as a result of the proposed Light Rail Alternative. Left turn access across the median and light rail tracks would not be permitted and the unsignalized intersections would be right-in/right-out, which would improve the ease of access to North Tryon Street/US-29. There are a few unsignalized intersections that would not improve or would experience a decreased LOS. These intersections are adjacent to congested signalized intersections that produce queues that would back up through the unsignalized intersection, which would limit gaps for the side street traffic to enter North Tryon Street/US-29.

Of the unsignalized intersections beyond the limits of North Tryon Street/US-29, only one would experience a decrease from a LOS D or better to a LOS E or LOS F. This would be at Raleigh Street and Sugar Creek Road where the proposed project would realign Raleigh Street to form a single four-leg intersection under the Sugar Creek Station Park-and-Ride Option 1. Raleigh Street would not be realigned under the Sugar Creek Station Park-and-Ride Option 2. The realigned intersection, along with two new driveways on Sugar Creek Road, would provide vehicular access to the Sugar Creek Station Park-and-Ride. Delays would occur during the p.m. peak hour on the Raleigh Street approaches to the realigned intersection due to vehicles exiting the park-and-ride facilities. The proximity of existing and planned signalized intersections may preclude a traffic signal at the Raleigh Street and Sugar Creek Road intersection. A traffic signal at this location would be investigated further if the Sugar Creek Station Park-and-Ride Option 1 is selected.

There would be decreases in the LOS and increases in delay at several signalized intersections along North Tryon Street/US-29 as the result of the construction of the proposed Light Rail Alternative. Five intersections would operate at a LOS E or LOS F in the No-Build scenario and would experience an increase in delay with the proposed Light Rail Alternative; these would include the Sugar Creek Road, Eastway Drive, Orr Road, Tom Hunter Road and Mallard Creek Church Road intersections.

Eight signalized intersections along North Tryon Street/US-29 would decrease from a LOS D under the No-Build Alternative to a LOS E or LOS F with the proposed Light Rail Alternative as follows:

- The light rail would be grade-separated at four of these intersections; Old Concord Road, I-85 Connector, W.T. Harris Boulevard and Morningstar Place Drive (I-485/N. Tryon Station Access). While congestion would increase at these signalized intersections as a result of the additional traffic going to the nearby park-and-ride facilities, the grade separated light rail operation itself would not affect these signalized intersections.
- The light rail would be at-grade through two of these signalized intersections; Shopping Center Drive and JW Clay Boulevard. These at-grade signalized intersections would experience an increase in delay on the side street approaches because of the light rail preemption. Heavy left turning movements at the North Tryon Street/US-29 and Shopping Center Drive intersection are accommodated by dual left turn lanes which would be retained. The intersection of North Tryon Street/US-29 and JW Clay Boulevard would be located at a light rail station. Vehicular traffic demand would be balanced against the need for safe pedestrian access to the proposed station at this location by replacing the existing northbound dual left turn lane with a single left.
- The two signalized intersections with North Tryon Street/US-29 and the I-485 ramps would see an increase in congestion as a result of the additional traffic going to the I-485/N. Tryon Station. Additional turn lanes would be added to increase the capacity of these signalized intersections.

Subsequent to the development of this analysis, an NCDOT project (STIP I-3803) has been identified to widen approximately 13 miles of I-85 from US-29/NC-49 in Mecklenburg County to NC 73 in Cabarrus County. This analysis does not include the I-85 widening project which could benefit travel along North Tryon Street/US-29 by diverting inter-county traffic from North Tryon Street/US-29 to I-85, thereby relieving some of the congestion at the intersections.

Pedestrian and Bicycle Level of Service

Level of Service was also calculated for the bicycle and pedestrian facilities at signalized intersections using the Bicycle/Pedestrian LOS methodology developed by CDOT. This methodology assesses the important design features at signalized intersections that affect pedestrian and bicyclist comfort and safety when crossing streets. The methodology is used by CDOT as a diagnostic tool and its results are compared with those for traffic LOS in order to select design and operational features that can provide acceptable levels of service for pedestrians and bicyclists. This analysis was used to design intersections for the Light Rail Alternative that are safe for pedestrians and bicyclists, including pedestrian refuges and pedestrian signal timing. The detailed results of the pedestrian and bicycle LOS analysis can be found in the *Traffic Analysis Report, November 2009*.

Light Rail Grade Crossing Analysis

The Light Rail Alternative would operate in two main environments; the railroad right-of-way and the North Tryon Street/US-29 median. The proposed alignment would cross numerous side streets in both areas. Two options exist when the light rail traverses a side street or crosses traffic to enter/exit a highway median. One option is to grade separate the crossing and the other option is to keep the crossing at-grade. An at-grade crossing would position the light rail tracks at the same elevation as the existing roadway and vehicular crossings of the light rail line would be controlled by traffic lights and gates. A grade separated crossing would construct the light rail above or below the existing roadway so that the light rail and vehicular traffic do not impede one another.

The proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option proposes five rail-roadway grade separations along North Tryon Street/US-29: light rail entrance into the North Tryon Street/US-29 median, I-85 Connector, University City Blvd/NC-49, W.T. Harris Boulevard and light rail exit from the North Tryon Street/US-29 median. Delay along the corridor decreases for most signalized intersections with the grade separated configurations. The midblock light rail crossing of Mallard Creek Church Road was evaluated; however, data provided in the *Traffic Analysis Report, November 2009* indicated that this crossing would operate efficiently as an at-grade facility without significantly affecting the performance of the adjacent roadway systems.

Recommendations for grade separated and at-grade crossings were based on safety, traffic volumes, transit headways, arterial travel speeds, cost, intersection delays and traffic spillback to adjacent intersections. As a result of the traffic impacts identified through this analysis, major intersections as well as the light rail entry into and exit from the North Tryon Street/US-29 median would be grade separated.

All other crossings would be at-grade. While the at-grade crossings would experience increased delays on side streets and left turn crossings of the light rail line, the proposed project would use advanced traffic control strategies to manage these impacts. Table 3-28 provides a summary of the rail crossing recommendations for the proposed Light Rail Alternative. Table 3-29 lists the recommendations for the Light Rail Alternative – Sugar Creek Design Option.

**Table 3-28
Light Rail Alternative Rail Crossing Summary**

Street	Crossing	Recommendation	Traffic Control
7th Street	midblock	at-grade	gates and flashers
8th Street	midblock	at-grade	gates and flashers
9th Street	midblock	at-grade	gates and flashers
10th Street (proposed)	midblock	at-grade	gates and flashers
11th Street	midblock	existing grade separation	none
I-277	interstate	existing grade separation	none
12th Street	midblock	at-grade	gates and flashers
CSX Railroad	railroad	grade separate	none
16th Street	midblock	at-grade	gates and flashers
Entrance to Vehicle Light Maintenance Facility/ NCCR property	midblock	at-grade	gates and flashers
30th Street	midblock	existing grade separation	none
Duke Energy Access Road (proposed)	midblock	grade separate	none
AC&W Railroad	railroad	grade separate	none
36th Street	midblock	grade separate	none
East Craighead Road	midblock	grade separate	none
Sugar Creek Road	midblock	grade separate	none
Eastway Drive	midblock	Existing grade separation	none
Old Concord Road Station Park-and-Ride Access Road	midblock	at-grade	gates and flashers
North Tryon Street/US-29 median entrance	intersection/ median entrance	grade separate	signal
Orr Road	intersection	at-grade	signal, gates and flashers
Arrowhead Drive	intersection	at-grade	signal, gates and flashers
Owen Boulevard	intersection	at-grade	signal, gates and flashers
Tom Hunter Road	intersection	at-grade	signal, gates and flashers
Orchard Trace Lane	intersection	at-grade	signal, gates and flashers
I-85 Connector	intersection	grade separate	
University City Blvd. Station Access Road	intersection	at-grade	signal, gates and flashers
University City Blvd./NC-49	intersection	grade separate	signal
Shopping Center Drive	intersection	at-grade	signal, gates and flashers
McCullough Drive	intersection	at-grade	signal, gates and flashers
Ken Hoffman Drive	intersection	at-grade	signal, gates and flashers
W.T. Harris Boulevard	intersection	grade separate	signal
JM Keynes Drive	intersection	at-grade	signal, gates and flashers
JW Clay Boulevard	intersection	at-grade	signal, gates and flashers
UNCC Research Drive	intersection	at-grade	signal, gates and flashers
North Tryon Street/US-29 median exit	midblock/median exit	grade separate	none
UNC Charlotte Parking Lot Entrance	midblock	at-grade	gates and flashers
Mallard Creek Church Road ¹	midblock	at-grade	gates and flashers
Morningstar Place Drive	intersection	grade separate	signal, gates and flashers

Source: *Traffic Analysis Report*, 2009. Based on 2008 counts.

¹Additional analysis needed to confirm this recommendation.

**Table 3-29
Light Rail Alternative – Sugar Creek Design Option Rail Crossing Summary**

Street	Crossing	Recommendation	Traffic Control
Dorton Street	intersection	at-grade	signal, gates and flashers
Lambeth Drive	intersection	at-grade	signal, gates and flashers

Parking

Parking facilities outside of Center City Charlotte under the No-Build Alternative would continue to consist of on-street parking or commercial shopping center parking lots. For the proposed Light Rail Alternative, park-and-ride lots would be constructed at seven station locations. The locations and the total number of provided parking spaces are detailed in Chapter 2.0: Alternatives Considered – Table 2-6: Proposed Stations for the Light Rail Alternative. The Light Rail alignment would traverse through the median of North Tryon Street/US-29 and roadway widening would be required. As a result, potential impacts would occur to existing private parking facilities along North Tryon Street/US-29. The civil design plans depict that approximately 33 parcels would have their existing parking reduced to some degree. Overall, approximately 379 parking spaces would be affected. Many of these parcels have additional space that could be used for relocating the affected parking spaces. Overall, a majority of the existing properties parking supply along the corridor would not be affected due to efforts in constructing retaining walls along the edge of the proposed right-of-way limits.

For the Light Rail Alternative – Sugar Creek Design Option, transit only park-and-ride lots would also be constructed at seven locations. Two of those locations would be different than the proposed Light Rail Alternative, while the remaining five locations would be identical to the proposed Light Rail Alternative. The locations and the total number of provided parking spaces are detailed in Chapter 2.0: Alternatives Considered - Table 2-7: Proposed Stations for the Sugar Creek Design Option.

3.2.2.3 Effects on Other Transportation Facilities and Services

Freight Railroads

Under the No-Build Alternative, existing freight rail service would continue to operate in its current location. Recent trends shows that freight rail service would continue to increase due to the higher costs of vehicular fuel.

Under the proposed Light Rail Alternative, separate tracks would be built for light rail and the light rail would not cross the existing freight rail tracks at-grade. Therefore, freight service operations would not be altered and potential rail conflicts would be minimized. The proposed project does include relocating existing freight tracks from approximately 30th Street to Craighead Road to make room for the proposed light rail alignment. The grade separation will provide both operational and safety benefits for freight railroads by separating railroad movements from auto, bicycle and pedestrian movements. Tracks would be constructed to be used temporarily by the freight/passenger rail operators during the construction of the proposed Light Rail Alternative in order to avoid any construction-related impacts (See Chapter 18.0: Construction). The light rail tracks would cross over existing freight tracks on a grade separated structure near Craighead Street. Whenever the light rail tracks are at-grade with the freight tracks, a 54 foot separation would be maintained between the tracks at all times.

Separate from the proposed project, there are two different freight projects that are in either the planning or design phase. The first one is the relocation of the existing NS Intermodal Yard to the Charlotte-Douglas International Airport. It is anticipated that within the next two years, the intermodal yard will be relocated to the airport to provide quick and easy transfers from air cargo to freight. The second project is being coordinated by NCDOT and NCR, in which Sugar Creek Road would be depressed allowing for a new grade separated crossing. The existing freight tracks would not change in elevation, Sugar Creek Road would go under the existing tracks.

Passenger Railroads

Under the No-Build Alternative, the existing passenger rail service would operate as it currently does. As mentioned in Section 3.1.4, future passenger rail service accommodating higher speeds is planned to

utilize the corridor, which would require additional tracks to be constructed. The proposed high speed rail service would be a separate alignment and would not share tracks with freight service.

Amtrak and NCDOT Rail utilize the existing freight tracks within the corridor for passenger rail service. For the proposed Light Rail Alternative, the same conditions would apply as with the freight rail. There would be no conflicts between passenger rail and the light rail service, as well as with future high speed rail. Tracks would be constructed to be used temporarily by the freight/passenger rail operators during the construction of the proposed Light Rail Alternative in order to avoid any construction-related impacts (See Chapter 18.0: Construction).

Bikeways and Major Pedestrian Ways

No changes to bikeways or major pedestrian ways would occur beyond those described in Section 3.1.5, as a result of the No-Build Alternative. For the proposed Light Rail Alternative, bicycle parking would be provided at each station by use of either bicycle lockers and/or lockable stands. Bicycles would also be allowed to be placed in a bike holder in each light rail vehicle or carried into the vehicle. Each bike holder inside the vehicle would have the capability to hold up to two bikes. Multi-use paths, for pedestrian and wheelchair accessibility, would be constructed leading up to all station areas. Existing pedestrian and bicycle facilities would be enhanced under the proposed Light Rail Alternative. The proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option propose multi-use paths, bicycle lanes, median refuge areas for pedestrians and vehicular speed reductions along North Tryon Street/US-29. These enhancements markedly improve the pedestrian and bicycle environment and LOS.

As part of the station area planning process, specific pedestrian and bicycle improvements will be identified. The City of Charlotte will identify improvements beyond direct station access as part of a separate program called the Northeast Corridor Infrastructure (NECI) Program. NECI is similar to the City of Charlotte's South Corridor Infrastructure Program (SCIP), where pedestrian, bicycle and other infrastructure improvements were identified and constructed after the decision to implement light rail in the corridor was made. These additional improvements would not be funded as part of the proposed Light Rail Alternative.

3.3 Mitigation

3.3.1 No-Build Alternative

Mitigation is not required for the No-Build Alternative.

3.3.2 Light Rail Alternative

The following corridor-level design changes, as recommended in the *Traffic Analysis Report*, and *Traffic Analysis Report Addendum* have been made and are included in the *30% Preliminary Engineering Design Plans*. Analysis results of these changes, which address both motorized and non-motorized forms of transportation, are shown in Tables 3-23 through 3-26.

- Sugar Creek Road & North Davidson Street – Install a traffic signal at this intersection. For Sugar Creek Park-and-Ride Option 2, this intersection will still be signalized and two lanes (one in each direction) will be added to North Davidson Street. An additional southbound lane will become a drop right turn lane into the proposed parking garage entrance. The additional northbound lane will accommodate a left and right turn lane onto Sugar Creek Road. An eastbound right turn lane and a westbound left turn lane will also be added to Sugar Creek Road at the intersection with North Davidson Street.
- North Tryon Street/US-29 & Old Concord Road – Provide exclusive dual left turn lanes and a shared through/right lane for the westbound Old Concord Road approach.
- North Tryon Street/US-29 & Orr Road – Provide a second approach lane for Orr Road. This lane can either serve as a through-right lane or as a separate right turn lane. Its use will be determined as the design proceeds. This intersection will be signalized by the proposed project if not installed prior to construction.
- North Tryon Street/US-29 & Arrowhead Drive – Remove the existing northbound and southbound right turn lanes on North Tryon Street/US-29. The right turn volume at this intersection is minimal and

the removal of these turn lanes do not adversely affect the level of service at this location. This intersection will be signalized by the proposed project if not installed prior to construction.

- North Tryon Street/US-29 & Owen Boulevard – Install a traffic signal at this intersection and remove the northbound and southbound right turn lanes on North Tryon Street/US-29. Removal of these two lanes does not adversely affect the level of service at this location based on existing and projected volumes.
- North Tryon Street/US-29 & Orchard Trace Lane – Install a traffic signal at this intersection. A second approach lane on Orchard Trace Lane is also recommended. This lane can either serve as a through-right lane or as a separate right turn lane. Its use will be determined as the design process proceeds.
- North Tryon Street/US-29 & University City Blvd. Station Access – Install a traffic signal at this intersection. Provide a northbound left turn lane to access the park-and-ride facility and a southbound left turn lane to permit U-turns. Provide a southbound right turn lane for vehicles accessing the University City Blvd. Station from North Tryon Street/US-29.
- North Tryon Street/US-29 & Shopping Center Drive – Provide dual left turn lanes for the southbound approach of North Tryon Street/US-29.
- North Tryon Street/US-29 & McCullough Drive – Remove one of the dual left turn lanes on the southbound approach of North Tryon Street/US-29. The removal of this turn lane will not negatively impact the level of service for traffic and will in turn provide a shorter crossing distance for transit patrons accessing the station platform. The proposed Light Rail Alternative will also remove the northbound right turn lane on North Tryon Street/US-29. The right turn volume at this intersection is minimal and the removal of this lane does not adversely affect the level of service at this location.
- North Tryon Street/US-29 & JW Clay Boulevard – Remove one of the dual left turn lanes on the northbound approach of North Tryon Street/US-29. The removal of this lane will not significantly impact the level of service for traffic and will in turn improve pedestrian access to the station platform by providing a shorter crossing of the street.
- North Tryon Street/US-29 & Mallard Creek Church Road – Provide a second westbound left turn lane from Mallard Creek Church Road to prevent the traffic queues from extending over the proposed light rail tracks.
- North Tryon Street/US-29 & Morningstar Place Drive (I-485 Station Entrance) – Install a traffic signal at this intersection. Keep the existing northbound North Tryon Street/US-29 right turn lane.
- North Tryon Street/US-29 & I-485 Inner Ramp – Provide a second right turn lane on the eastbound I-485 off-ramp and place the right turn movement under signal control. The additional right turn lane is needed to mitigate long queues on the ramp.
- North Tryon Street/US-29 & I-485 Outer Ramp – Provide a second left turn lane on the westbound I-485 off-ramp. The additional left turn lane is needed to mitigate long queues on the ramp.

To minimize impacts from light rail operations, the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option proposes that light rail be grade separated with major intersections. These intersections include I-85 Connector, University City Blvd.NC-49 and W.T. Harris Boulevard. Grade separations are also proposed when the light rail alignment enters and exits the North Tryon Street/US-29 median, and at mid-block crossings of 36th Street, Sugar Creek Road and Eastway Drive.

Access management will be facilitated at the seven park-and-ride locations through the addition of new driveways to provide access to the stations. In some situations, these access points will be either right-in/right-outs or full movement signalized intersections. Pedestrian and bicycle access to the stations will be facilitated by improvements in the station vicinity.

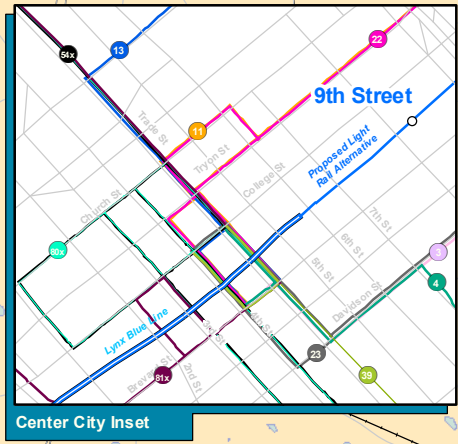
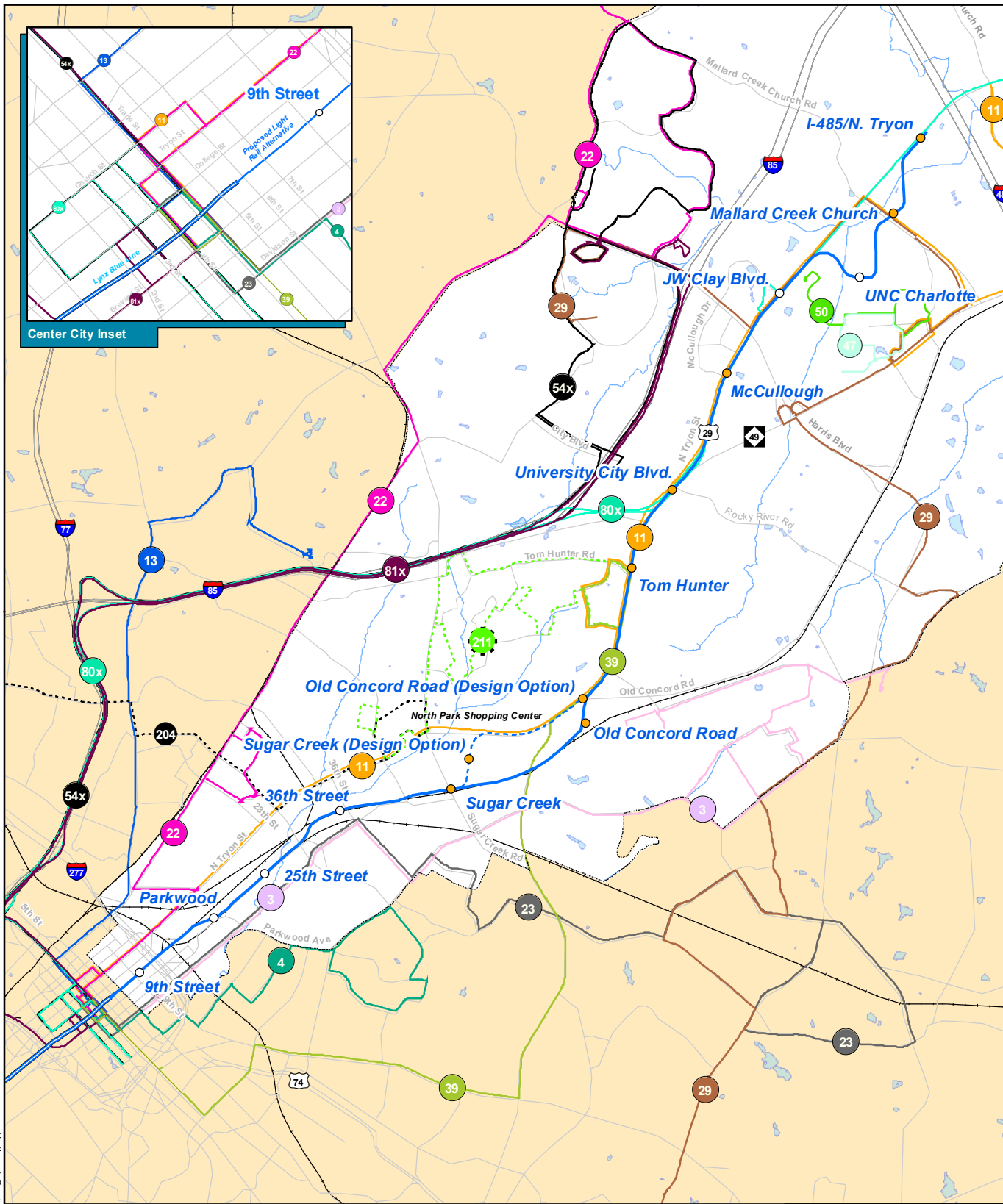
Additional design considerations were included in the *30% Preliminary Engineering Design Plans* to avoid railroad conflicts with the light rail. The proposed Light Rail Alternative includes a grade separated crossing of the CSX Corporation railroad. In the NCR right-of-way, the light rail project includes grade separations over the NS and AC&W railroads, along with relocating the NS mainline freight tracks to provide space for the light rail alignment.

3.3.3 Light Rail Alternative – Sugar Creek Design Option

The following corridor-level design changes, as recommended in the *Traffic Analysis Report*, have been made and are included in the preliminary engineering design plans:

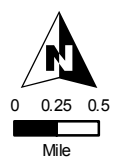
- North Tryon Street/US-29 & Dorton Street – Install a traffic signal at this intersection.
- North Tryon Street/US-29 & Lambeth Drive – Install a traffic signal at this intersection.
- The Light Rail Alternative – Sugar Creek Design Option would include all of the mitigation recommendations for the proposed Light Rail Alternative.

Similar impacts to the proposed Light Rail Alternative would be expected for intersections surrounding light rail stations, under the Light Rail Alternative – Sugar Creek Design Option. Improvements to the existing infrastructure would be required to provide vehicular, bicycle and pedestrian access to the stations, which would include construction of new driveways and turning restrictions for vehicles (i.e. right-in/right-out access).



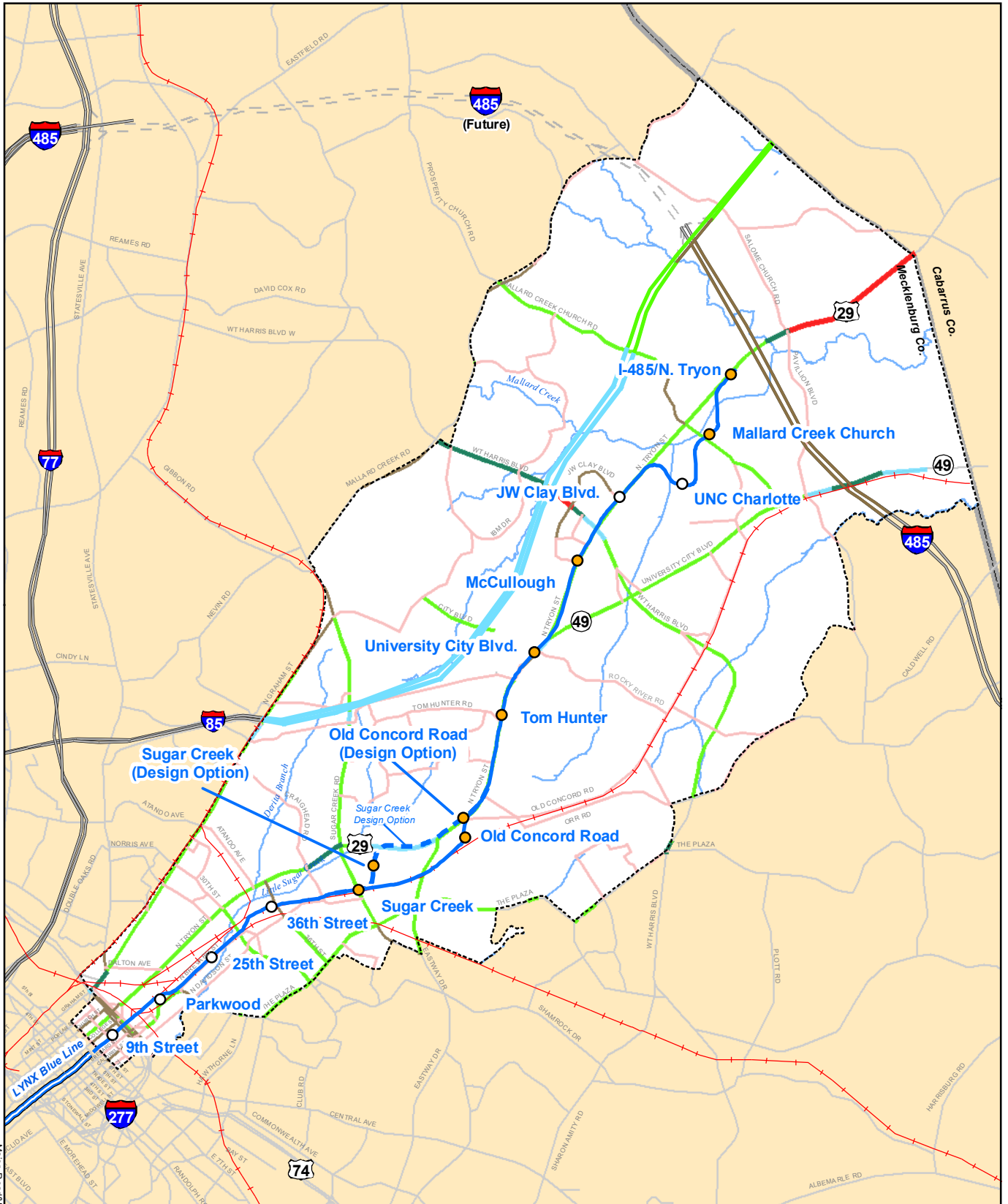
Northeast Corridor_Existing_Bus_Route_Network_Rev000.pdf

<p>Legend</p> <ul style="list-style-type: none"> Northeast Corridor Limits Proposed Light Rail Alternative Design Option Proposed Stations Proposed Stations with Park-and-Ride LYNX Blue Line Railroads Roads Streams Waterbodies 		<p>Northeast Corridor Bus Routes</p> <ul style="list-style-type: none"> The Plaza Country Club North Tryon Nevin Graham St Shamrock UNC Charlotte Eastway Nugget Gold Streak 54x University Research Park 80x Concord 81x Wachovia Express Shuttle 204x Lasalle 211x Hidden Valley
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Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Major Roads and Railroads Serving the Northeast Corridor



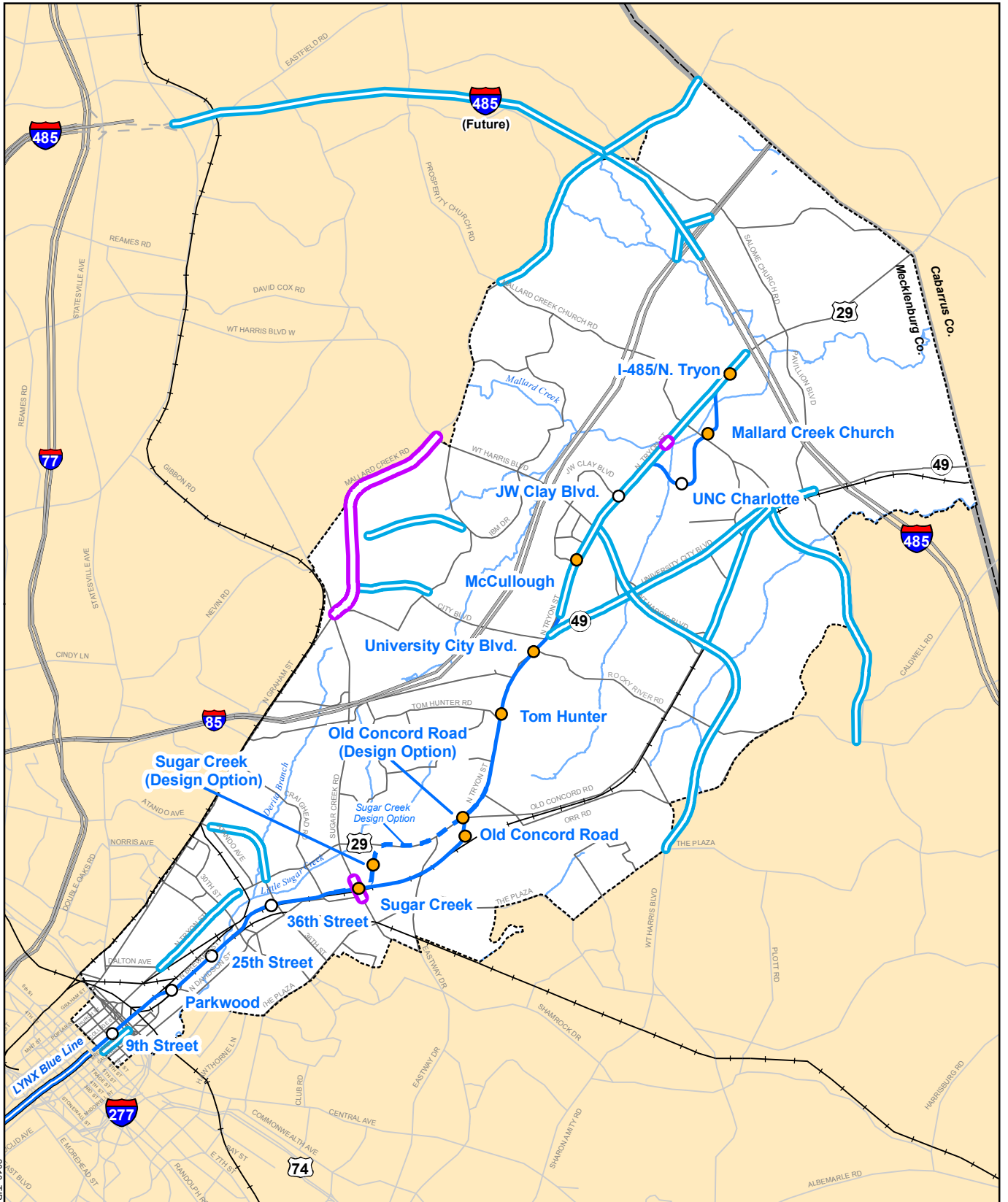
<p>Legend</p> <ul style="list-style-type: none"> Northeast Corridor Limits Proposed Light Rail Alternative Design Option Proposed Stations Proposed Stations with Park-and-Ride Railroads LYNX Blue Line Highway Roads Highway (Future) Streams County Line 		<p>Major Roads # of Lanes</p> <ul style="list-style-type: none"> 2 Lane Road 3 Lane Road 4 Lane Road 5 Lane Road 6 Lane Road 7 Lane Road 8 Lane Road 		<p>Scale</p> <p>0 0.5 1 Mile</p> <p>North Arrow</p>
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Map: Roads&Railroads_Serving_NE_Corridor_Rev000.pdf

Data Source: CATS, City of Charlotte GIS, and Mecklenburg County GIS

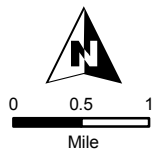
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Planned and Programmed Projects within the Northeast Corridor



Legend

- Northeast Corridor Limits
- Proposed Light Rail Alternative
- Design Option
- Proposed Stations
- Proposed Stations with Park-and-Ride
- Railroads
- LYNX Blue Line
- Highway
- Major Roads
- Highway (Future)
- Streams
- County Line
- Roadway Improvements by 2015 (TIP)
- Roadway Improvements by 2030 (L RTP)

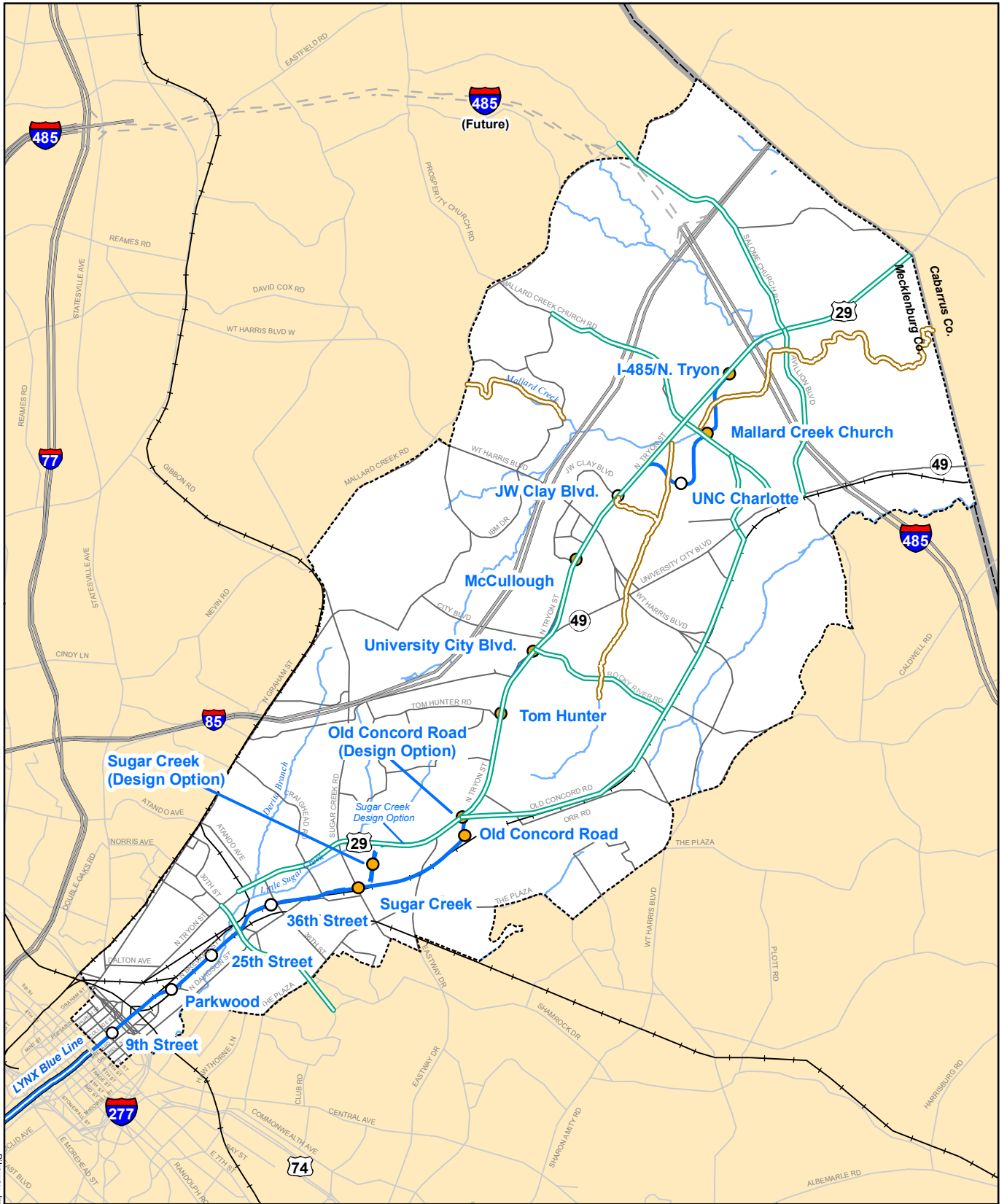


Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

2010_11_TIP_2030_LRTP_NE_Corridor_CB_032210.pdf

03/22/10

Bikeway Improvements within the Northeast Corridor



Legend

Northeast Corridor Limits	LYNX Blue Line	Bikeway Improvements
Proposed Light Rail Alternative	Highway	Off-Road Trail
Design Option	Major Roads	
Proposed Stations	Highway (Future)	
Proposed Stations with Park-and-Ride	Streams	
Railroads	County Line	

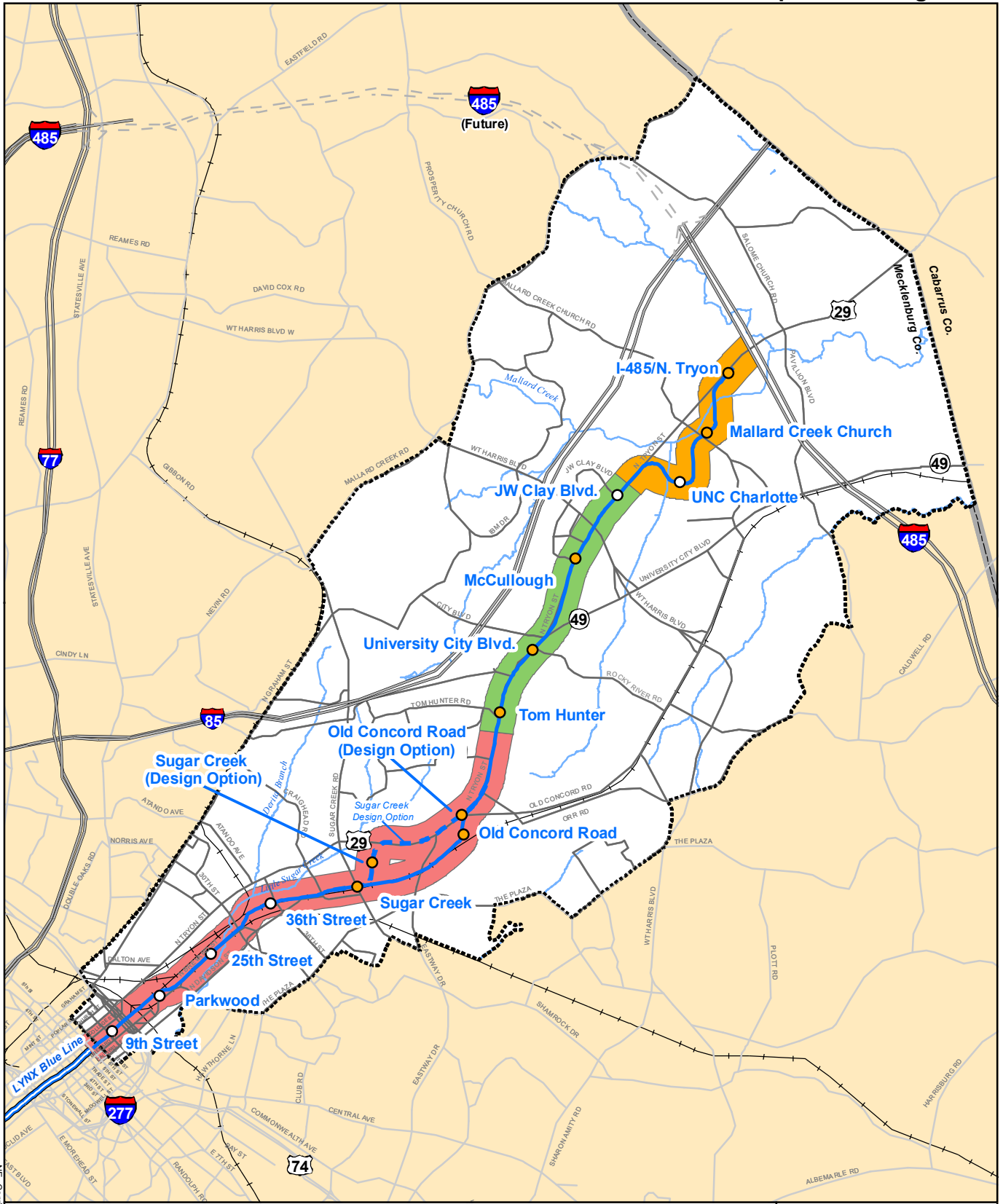
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Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Bikeway_Improvements_NE_Corridor_CB_030410.pdf

030410

Overall Corridor with Transportation Segments

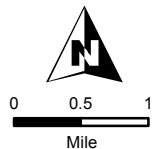


Legend

- Northeast Corridor Limits
- LYNX Blue Line
- Proposed Light Rail Alternative
- Highway
- Design Option
- Major Roads
- Proposed Stations
- Highway (Future)
- Proposed Stations with Park-and-Ride
- Streams
- Railroads
- County Line

Traffic Analysis Segments

- Segment 1 (Center City to Owen Blvd)
- Segment 2 (Owen Blvd to Barton Creek)
- Segment 3 (Barton Creek to I-485)



Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

NE_Corridor_Transportation_Segments_Rev000.pdf

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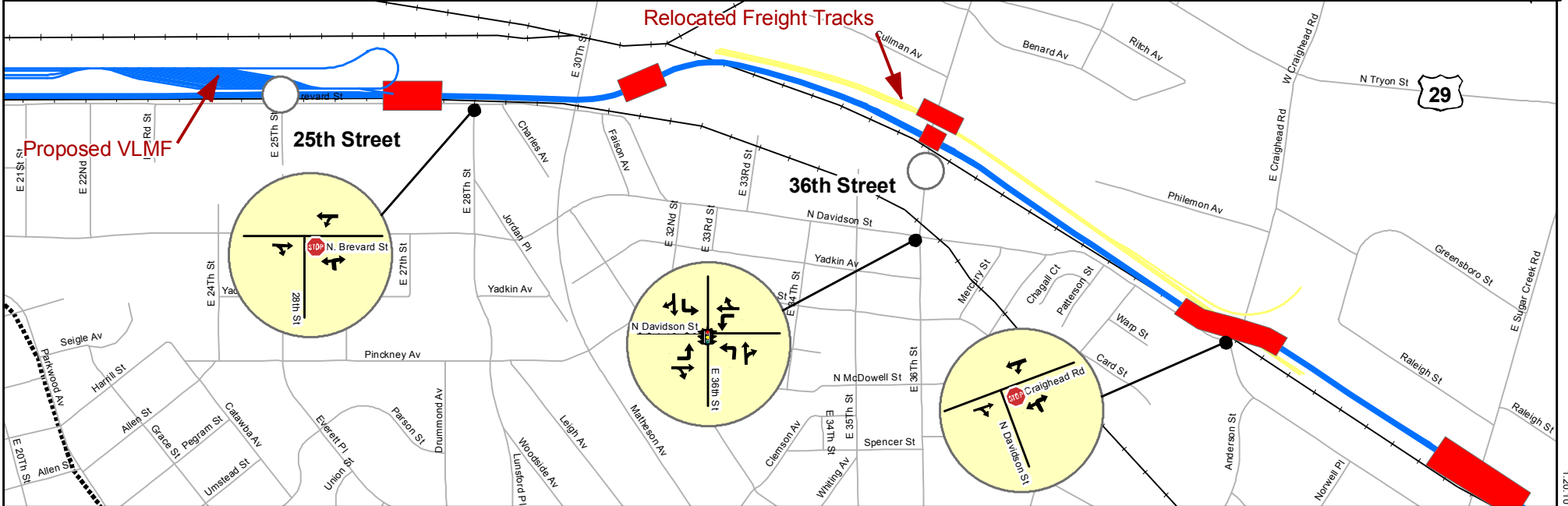
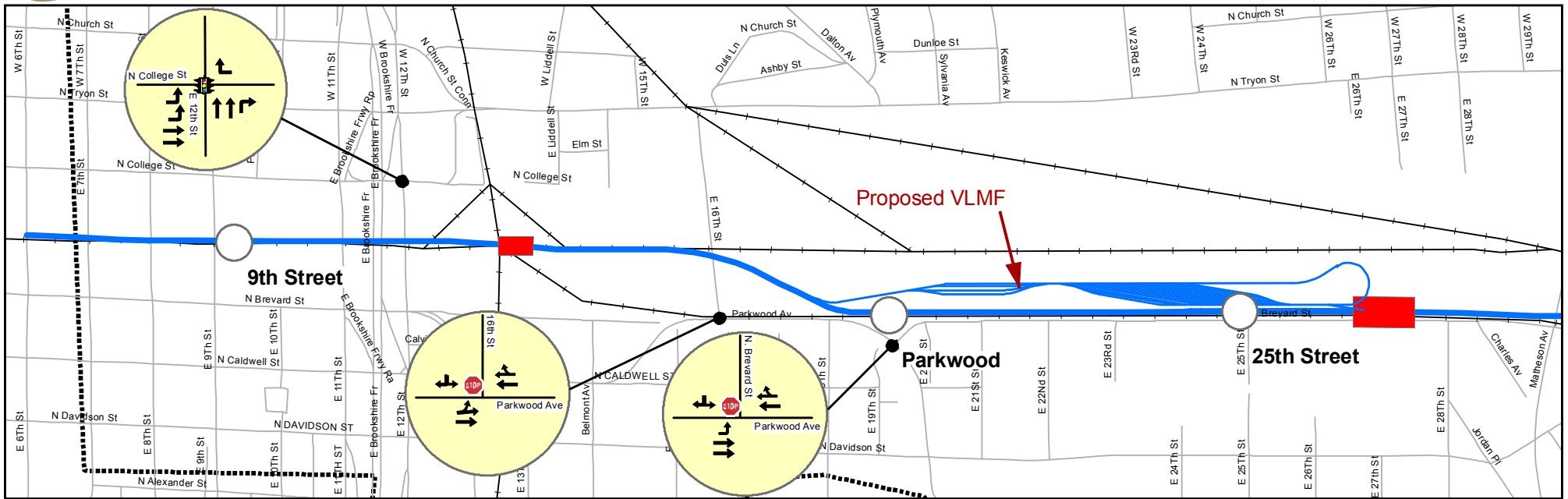
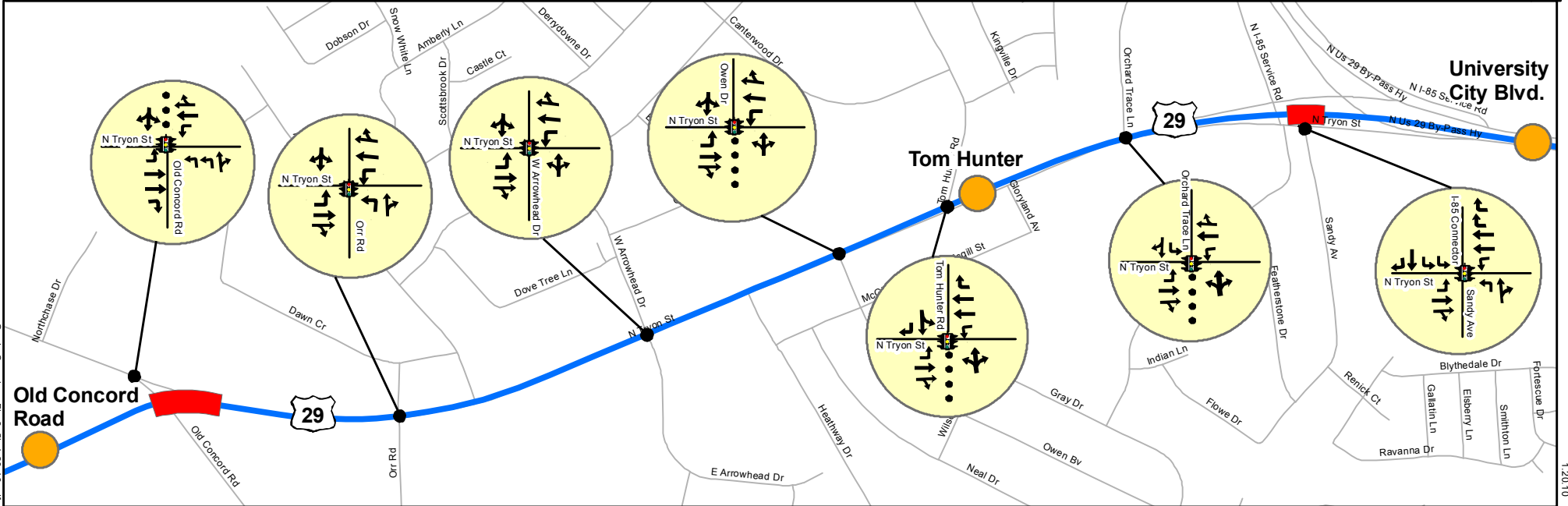
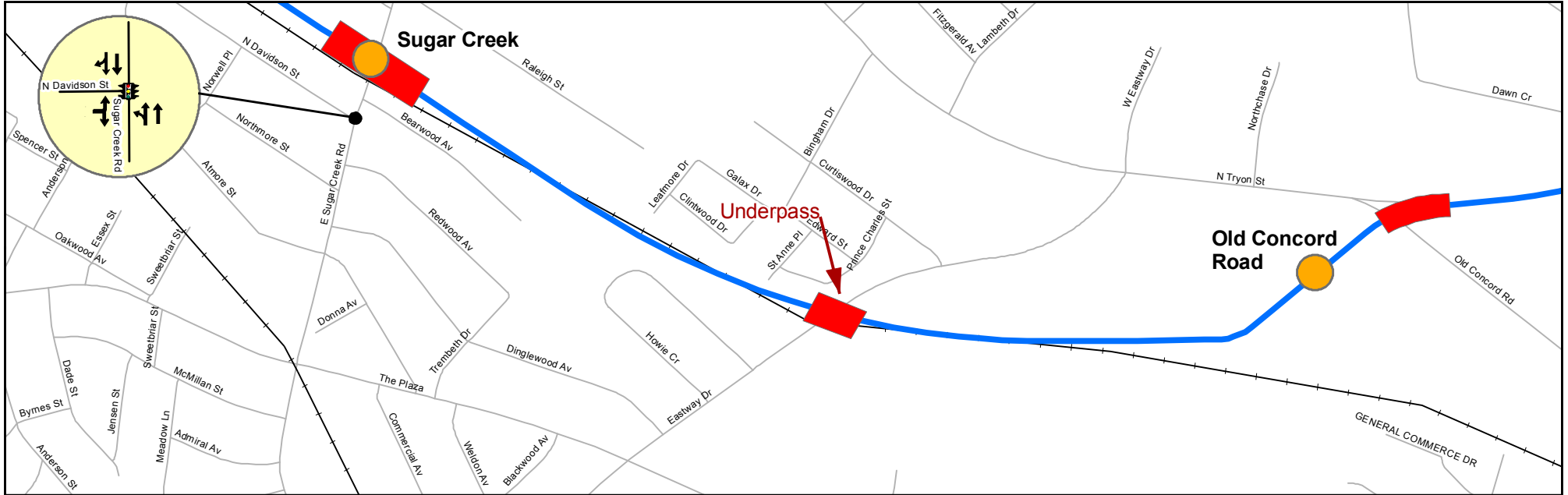
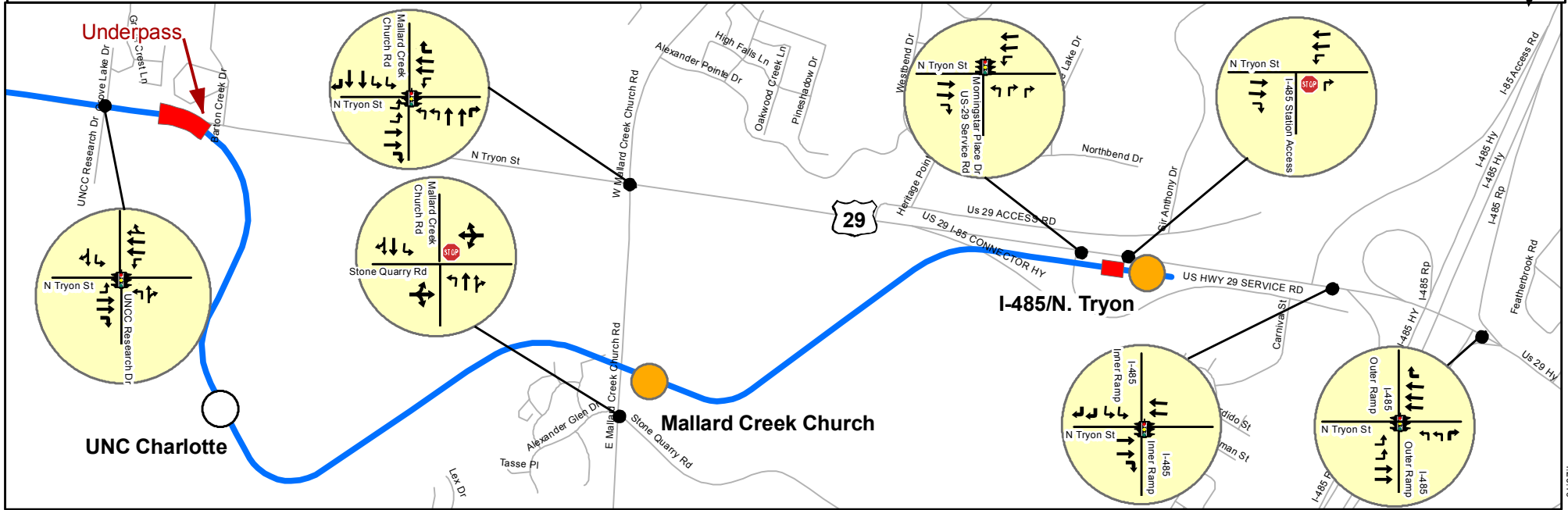
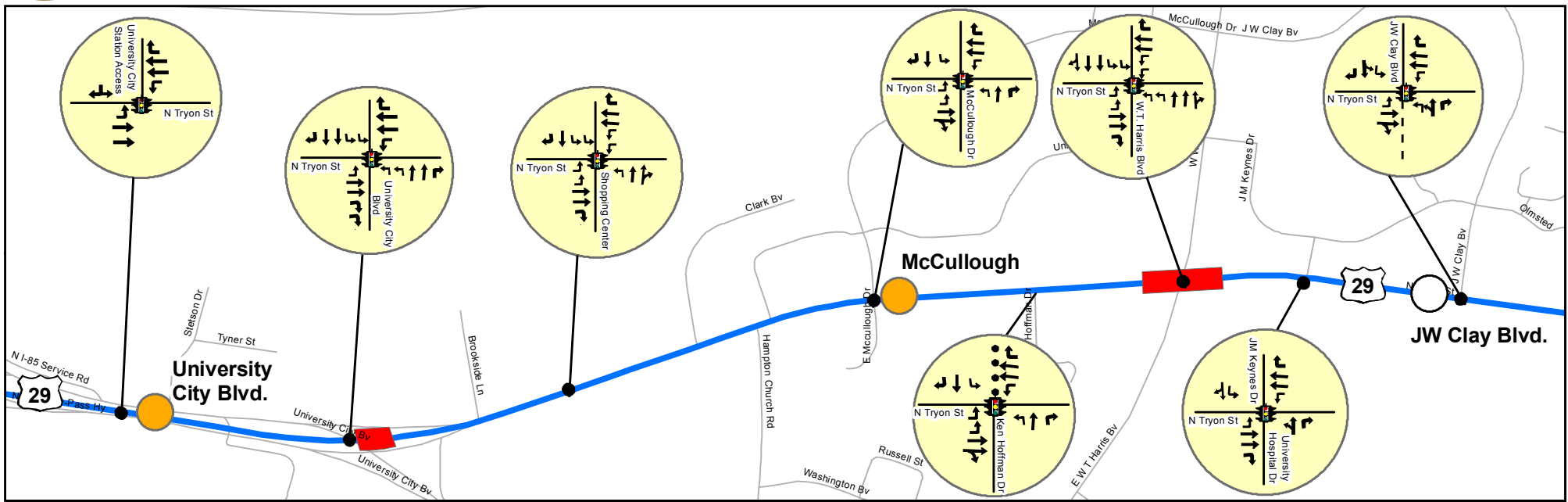


Figure 3-6b
Grade Crossings - 2030 Light Rail Alternative



Grade Crossings - 2030 Light Rail Alternative



4.0 LAND USE, PUBLIC POLICY AND ZONING

This Chapter describes existing land use and proposed future land use within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). The chapter includes an evaluation of transportation and land use policies, as well as the potential direct effects of the alternatives under consideration in this Draft Environmental Impact Statement (EIS) to land use. Mitigation measures are described where potential direct land use impacts are predicted.

4.1 Affected Environment

The proposed project corridor travels through various land uses and development conditions including: high-density land uses in Center City Charlotte; redeveloping industrial areas and commercial areas along North Davidson Street; commercial areas along North Tryon Street/US-29; established suburban communities near North Tryon Street/US-29; and the rapidly developing University and suburban areas near the University of North Carolina at Charlotte (UNC Charlotte). The study area for this land use analysis extends ½-mile from each side of the proposed alignment.

4.1.1 Existing Land Use – Corridor Level

In the *Design Criteria, Chapter 3, Blue Line Extension Urban Design Framework (2009)*, the City has identified six general urban design districts categorized by similarity in terms of natural environment features, land uses, neighborhood character, transportation infrastructure and development patterns along this corridor. The following sections describe the six urban design districts; also illustrated in Figure 4-1.



View of Center City Charlotte from East 9th Street.

High Intensity Urban Core District (East 7th Street to I-277)

The highest density and intensity of development along the proposed project corridor is in the Center City Charlotte area, within the High Intensity Urban Core District. Center City Charlotte is Charlotte’s Central Business District (CBD) and is the major activity and employment center for the Charlotte region; containing office space, government offices, area attractions and venues. This district also includes a mixture of residential, commercial/mixed use, office, civic and institutional uses (See also, Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2).

Over the last ten years, this district has experienced significant office building construction and resurgence in residential construction. All of these projects, in addition to the opening of the LYNX Blue Line in November of 2007, reinforce the attractiveness of Center City Charlotte as the major destination area for the Charlotte region.



New residential construction at East 16th Street.

Industrial Communities (I-277 to East 32nd Street)

Just north of the High Intensity Urban Core District, the development character shifts from urban development to industrial uses along the existing rail corridor. The area developed as a result of the exceptional access to freight rail and highways. Some of these industrial uses are associated with the Norfolk Southern (NS) Intermodal Facility located on the eastern side of the existing rail corridor.

The area also includes residential neighborhoods which once served the mills and industrial areas along the rail corridor. Newer residential and commercial development, including in-fill, high-density residential and mill conversions have occurred in this area due to the proximity and access to Center City

Charlotte. Retail and commercial uses have also emerged to serve the new residential population. This district is well served by a number of civic and institutional land uses including: Cordelia Park; the Little Sugar Creek Greenway; CATS’ Davidson Street Bus Facility; Johnston Branch YMCA; and various

churches, schools and day care facilities (See also, Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2).

Historic Urban Communities (East 32nd Street to Craighead Road)

This district begins at 32nd Street and continues northeast to Craighead Road. The district includes the North Charlotte Historic District, locally known as the North Davidson (NoDa) neighborhood; generally bounded by Matheson Avenue, The Plaza, Sugar Creek Road and the NS right-of-way. North Charlotte was a textile community from the 1900s until the closing of the textile mills in the 1970s and 1980s, which brought temporary disinvestment. However, in the last ten years, this area has experienced significant redevelopment.



New residential construction in NoDa.

NoDa is now a vibrant arts district with commercial shops, restaurants and art galleries, as well as newer high density residences along North Davidson Street and single-family residential development on streets adjacent to the core. Redevelopment has led to conversion of warehouse and mill space to residential uses, offices, live-work units and artist studios. The rest of the Historic Urban District is comprised of active industrial warehousing and trucking facilities along the existing rail corridor and 36th Street, and new construction just north of 36th Street.

Community facilities, churches and day care facilities contribute to the vitality of this district and include: the Johnston Branch YMCA, Highland Park Elementary School, Highland Mill Montessori, the Neighborhood Theater, and various churches and day care facilities. (See Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2). Mecklenburg County Stormwater Services has also acquired land along Cullman Avenue and Little Sugar Creek as part of a floodplain acquisition project and this area has the potential to be developed as a park or community facility in the future.

Established Suburban Communities (Craighead Road to JW Clay Boulevard)

The Established Suburban Communities District is a transition area between the Historic Urban Communities and newer development found in the University District. This district contains a significant number of commercial uses along North Tryon Street/US-29, as this highly developed major arterial connects Center City Charlotte to northeastern Charlotte and Interstate 485 (I-485).



Commercial development along North Tryon Street/US-29.

Most of the commercial development from Sugar Creek Road to Tom Hunter Road is auto-oriented and early suburban (1960s and 1970s) in form and scale (e.g., Asian Corners and North Park malls). Industrial areas are also scattered throughout these commercial developments along North Tryon Street/US-29 and along the existing rail corridor in the southern portion of this design district. Most of the area north of Tom Hunter Road is “big-box” in form and developed over the past 20 years.

Some of the largest tracts of undeveloped properties and new communities in the corridor are located near the University City area. The land surrounding the portion of the district between Rocky River Road and University City Blvd./NC-49 is primarily undeveloped. In the past, development has been constrained by limited access in the “weave” area, where North Tryon Street/US-29 and University City Blvd./NC-49 intersect. A separate transportation project will restructure the “weave” intersection, providing better access to the tracts of undeveloped land. The extension of University City Blvd./NC-49 is under construction and two major retail sites (IKEA and Walmart) have opened in the past year.

Residential neighborhoods in this district are located behind the layer of commercial properties fronting either side of North Tryon Street/US-29. Most neighborhoods developed since the 1950s and contain



New construction on the UNC Charlotte campus.

single family homes, although clusters of multi-family residential clusters can also be found scattered throughout the district.

The residential neighborhoods are established and most have supporting civic and retail uses. Two county parks are located in this district behind the commercial properties lining North Tryon Street/US-29 and fronting the rail right-of-way (Howie Acres Park, a 13-acre neighborhood park; and Eastway Park, a 126-acre district sports park). Also, there are two schools located on along North Tryon Street/US-29 (on the western side, Martin Luther King, Jr. Middle School; and on the eastern side, Crossroads Charter School). (See Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2).

University District (JW Clay Boulevard to Mallard Creek Church Road)

The University District is a mixed-use activity center and includes the area between JW Clay Boulevard and Mallard Creek Church Road. Development around UNC Charlotte emerged in the 1950s and 1960s as a suburban alternative to the housing and office stock in Center City Charlotte. The majority of this district is made up of the University City Area Municipal Service District (MSD). The MSD is represented by the University City Partners (UCP), a non-profit organization comprised of major area stakeholders and land owners.

The University District has the second largest concentration of retail and office space outside of Center City Charlotte, as well as two of the largest employment centers along the corridor - the Carolinas Medical Center-University (CMC-University) and the UNC Charlotte campus. The core of the University District is located at the intersection of W.T. Harris Boulevard and University City Blvd./NC-49 and includes shopping and entertainment uses, hotel and some residential uses.

The UNC Charlotte campus encompasses approximately 950 acres, bounded by North Tryon Street/US-29, W.T. Harris Boulevard and Mallard Creek Church Road. UNC Charlotte includes classrooms, administrative buildings, research facilities, parking decks, residence halls and sports and recreation facilities. The *2009 Draft UNC Charlotte Campus Master Plan* outlines land uses on campus and expansion plans to meet the needs of the projected student population of 35,000 expected by 2020.

New Suburban Communities District (East Mallard Creek Church Road to I-485)

The New Suburban Communities District spans from Mallard Creek Church Road to I-485. Some of the most recent residential and retail developments in the corridor are located along North Tryon Street/US-29 between Mallard Creek Church Road and I-485. A number of multi-family apartment and town home developments supporting UNC Charlotte are located along Mallard Creek Church Road on both sides of North Tryon Street/US-29. The property along the eastern edge of North Tryon Street/US-29 consists of a County park (Kirk Farm Fields) and Mallard Creek. Land east of the park is occupied by a stone quarry. As the corridor approaches I-485, the Queen’s Grant mobile home park is located on the eastern side of North Tryon Street/US-29. Further north along North Tryon Street/US-29 and past I-485 there are retail commercial uses, multi-family developments, and the Verizon Wireless Amphitheatre, Charlotte’s largest outdoor concert venue.



Multi-family development on East Mallard Creek Church Road.

4.1.2 Existing Land Use – Proposed Station Areas

The following provides a summary of existing land uses at each of the 13 proposed Light Rail Alternative stations, as well as two additional stations associated with the proposed Light Rail Alternative – Sugar Creek Design Option. Future land use and zoning designations are also described.

9th Street Station

The proposed 9th Street Station would be the southernmost light rail station and would be located within the High Intensity Urban Core District in Center City Charlotte. The station would serve the First Ward and Fourth Ward neighborhoods.

The proposed 9th Street Station is directly bordered by the First Ward neighborhood, a mixed-income residential area containing both market-rate housing, as well as subsidized housing for low-income residents. This area also contains First Ward Place, a newer affordable housing complex. The First Ward neighborhood has benefited from new infill housing projects that are comprised of both single-family and multi-family residential uses; 11 percent and 8 percent of development within this station area, respectively. A number of community facilities such as schools, churches, libraries and municipal and state buildings are within ½-mile walking distance of this station (See also, Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2).



High-rise office development near East 9th Street.

Limited industrial uses are scattered throughout the area, but are concentrated in the northern portion of the station area on the eastern side of I-277. There are also a number of vacant parcels the 9th Street Station area; comprising approximately 36 percent of the land area. Many of the vacant properties located in this area are currently used for surface parking.

Beyond the immediate station area are some of Center City Charlotte's most active districts, including the East Trade Street and North Tryon Street/US-29 office district, and the entertainment district along North Brevard Street. North Tryon Street/US-29 is Charlotte's premier office address and has the highest concentration of high-rise office buildings in Center City Charlotte. Within the proposed 9th Street Station area, office uses account for 12 percent of the land area, while commercial uses account for 5 percent of the land area.

Much of the ½-mile area surrounding this station has a future land use and zoning designation of mixed-use. The Center City Charlotte area also features an extensive, in-place interconnected street network. The grid-street system and small block sizes of 500 feet or less make the area very accessible for development. There is also an existing pedestrian network with significant streetscape.

Future land use plans are currently underway to redevelop approximately 32 acres of underutilized land between East 7th Street, East 9th Street and North Brevard Street. The "First Ward Urban Village" will be a mixed-use development that will include office and retail space, residential units, a park and an underground parking deck. A new academic building for the UNC Charlotte Uptown Campus will anchor the initial phase of the First Ward Urban Village development. Additionally, 10th Street, which currently terminates at North Tryon Street/US-29 and North Davidson Street, approximately 500 feet west and 900 feet east of the First Ward Urban Village, will be connected through the mixed-used development. Figure 4-2 illustrates the existing land uses within ½-mile of the proposed 9th Street Station.

Parkwood Station

The proposed Parkwood Station would be within a historically industrial area. Approximately 25 percent of the land within the station area for the proposed Parkwood Station is occupied by existing industrial land uses, some of which are associated with the NS railroad and the NS Intermodal Facility. Another 19 percent of this area is comprised of single-family residential uses. Most of the residences within these neighborhoods are bungalows from the 1920s to 1930s. A few infill housing projects can also be found throughout the neighborhoods; and a few industrial parcels in this station area's southern end have also started to transition to residential and mixed uses. A number of institutional and civic land uses are also within ½-mile of the station area (See Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2).

Approximately 42 percent of the land located within this station area is classified as vacant property. The vacant property classification includes the NS Intermodal Facility, totaling over 18 acres. As part of a separate project, NS will be relocating this intermodal facility to property near the Charlotte-Douglas International Airport.

Within the proposed Parkwood Station area, areas designated with a future land use of mixed-use are underutilized, as many are currently developed with industrial and low-density residential uses. Access on the eastern side of North Davidson Street is adequate with a grid street system in the residential areas. However, access in the central portion of the station area is poor, as the area is currently occupied by industrial uses as well as the NS Intermodal Facility. These uses create a physical barrier to redevelopment. Restrictions to some properties also exist due to the railroad track west of North Davidson Street. Figure 4-3 illustrates the existing land uses within ½-mile of the proposed Parkwood Station.



NS Intermodal Facility.

redevelopment. Restrictions to some properties also exist due to the railroad track west of North Davidson Street. Figure 4-3 illustrates the existing land uses within ½-mile of the proposed Parkwood Station.

25th Street Station

The proposed 25th Street Station would be located within the heart of the industrial communities along the proposed alignment of the Light Rail Alternative. This proposed station is surrounded primarily by vacant property, industrial and single-family residential uses. As with the proposed Parkwood Station, the 25th Street Station area contains a high proportion of vacant and industrial use. Approximately 36 percent of the land area is vacant and 30 percent of this station area is

occupied by industrial land uses. Most of these industrial uses are associated with the NS Intermodal Facility (see “Parkwood Station” above for additional information regarding the potential relocation of this facility). Approximately 14 percent of the land uses are single-family residential uses. Most of the single-family residential development consists of the homes in the Belmont and Villa Heights neighborhoods. A Duke Energy utility station and a number of institutional and civic land uses, churches, schools and day care facilities are within ½-mile of the station. (See also, Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2). Little Sugar Creek also runs through this area.

Multi-family uses currently account for approximately 3 percent of the land within this station area. However, plans for additional multi-family development (including the Yards at NoDa condo development on the northwest corner of North Davidson Street and East 30th Street), indicate a strong interest by the private development community for new construction within this station area. Commercial uses are also emerging to support these residential uses (including the NoDa 28 development, with its retail stores and restaurants). Figure 4-4 illustrates the existing land uses within ½-mile of the proposed 25th Street Station.

36th Street Station

The proposed 36th Street Station would be located in core of the NoDa area. The proposed station location is primarily surrounded by vacant and industrial uses, as well as single-family residential development; 19 percent, 37 percent and 25 percent, respectively. Commercial uses are found in the core area of NoDa, along North Davidson Street between East 34th Street and 36th Street. This area has an increasingly urban character with the intensification of the surrounding residential development. Newer high-density residential uses can be found along North Davidson Street in the form of new construction and mill conversions. Single-family construction and rehabilitation can be found along streets adjacent to the commercial core.



New single-family redevelopment in NoDa.

Community facilities, churches and day care facilities, institutional and civic uses contribute to the vitality of this district (See also, Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, Table 6-2).

Within the proposed station area the future land use designation of mixed-use is currently underutilized; however the location of the proposed station in the heart of NoDa makes this station area ideal for redevelopment. The grid street system in this station area provides well connected access to all properties. Due to the location of the Little Sugar Creek Floodplain, some environmental restrictions may create constraints to development. Figure 4-5 illustrates the existing land uses within ½-mile of the proposed 36th Street Station.

Sugar Creek Station

The proposed Sugar Creek Station is on the border of the North Charlotte neighborhood and the Hampshire Hills neighborhood. For the Light Rail Alternative, two park-and-ride options for this station are proposed; resulting in a combination of different parcels for the station park-and-ride. Both of the park-and-ride options for this station are generally located near the intersection of Sugar Creek Road and the existing rail corridor.

The predominant land uses surrounding both park-and-ride options for the proposed Sugar Creek Station are a combination of vacant, commercial, industrial, and single-family residential properties. The majority of the commercial development is located along North Tryon Street/US-29. The industrial and commercial uses combined account for approximately 48 percent of the land within this station area. Around 25 percent of this station area is comprised of single-family residential uses, most located within the North Charlotte neighborhood along Bearwood Avenue and Redwood Avenue. There are properties developed with multi-family residential development located in this area and scattered infill mixed-use development.

Approximately 25 percent of the land surrounding this proposed station is currently vacant and most properties are developed in accordance with their future land use designation. Several of the parcels are large in size and have a great deal of potential for redevelopment. The eastern side of the proposed Light Rail Alternative is developed with connected residential streets that provide ideal access on that side of the station area. The western side of this station area is developed with commercial and industrial uses with few roads. Sugar Creek Road is the main road through this station area and would provide a central connection to properties in the study area. Some environmental restrictions may create constraints to development within the station area due to the presence of jurisdictional streams. In addition, pedestrian improvements would be needed to enhance walkability in the station area. Figure 4-6 illustrates the existing land uses within ½-mile of the Sugar Creek Station.

Sugar Creek Station – Sugar Creek Design Option

The proposed Sugar Creek Station – Sugar Creek Design Option, located along the proposed Light Rail Alternative - Sugar Creek Design Option, is immediately surrounded by industrial and commercial uses. Residential uses are located on the periphery of these industrial and commercial areas. Single-family residential uses within this station area comprise approximately 27 percent of the existing land uses surrounding this proposed station. Industrial uses account for another 28 percent of the uses within this station area. Commercial uses account for approximately 15 percent of the existing land uses, many along North Tryon Street/US-29, and can be found within ½-mile around the northern perimeter of the station area. These commercial uses include the Asian Corners property and smaller strip commercial and highway-oriented uses.

Approximately 23 percent of the land surrounding this proposed station is vacant, and most properties are developed in accordance with their future land use designation. Access issues for this station area are generally consistent with those of the station area plan, and similar environmental constraints to development may also exist due to the jurisdictional streams within the station area. In addition, pedestrian improvements would be needed in the station area. Figure 4-7 illustrates the existing land uses within ½-mile of the proposed station.

Old Concord Road Station

Land use surrounding the proposed Old Concord Road Station consists of parks, industrial, commercial, office and single-family residential uses. Approximately 26 percent of the property is vacant within this station area and another 37 percent consists of industrial land uses. Single-family residential development accounts for approximately 13 percent of the existing land uses. North Park Mall is located on the eastern side of North Tryon Street/US-29 together with a few commercial out-parcels, a self

storage facility, a car dealership, and few single-story professional offices, a charter school and smaller retail malls. In total, commercial properties comprise around 13 percent of the land uses within this station area.

Properties that are designated Multi-Family for future land uses are currently underutilized. Access to the properties within the proposed station area is adequate with Eastway Drive and North Tryon Street/US-29 as the primary roadways serving these properties. Environmental constraints may exist with the presence of Eastway Park on the eastern side of the proposed Light Rail Alignment. Figure 4-8 illustrates the existing land uses within ½-mile of the proposed Old Concord Road Station.

Old Concord Road Station – Sugar Creek Design Option

The existing land uses surrounding the proposed Old Concord Road Station – Sugar Creek Design Option are similar to those surrounding the proposed Old Concord Road Station (located approximately 750 feet to the west). The majority of the existing land uses consist primarily of industrial uses, which comprise approximately 33 percent of the land uses. Approximately 30 percent of the land within this station area is vacant, while single-family residential uses and commercial uses account for approximately 14 percent and 13 of the existing land uses, respectively.

Properties that are designated Multi-Family for future land uses are currently underutilized. Access within this station area is similar to the access issues within the Old Concord Road Station area. Figure 4-9 illustrates the existing land uses within ½-mile of the proposed Old Concord Road Station – Sugar Creek Design Option.

Tom Hunter Station

Stable residential neighborhoods surround the proposed Tom Hunter Station. These neighborhoods are bordered by auto-oriented commercial uses (car rentals and dealerships), hotels, restaurants and vacant or underutilized properties along North Tryon Street/US-29. Residential land uses (single-family and multi-family) represent approximately 52 percent of the land uses in the station area, the largest amount of residential development surrounding any of the proposed stations. Industrial and commercial uses account for approximately 7 percent and 5 percent of the station area, respectively, while 26 percent of land within this station area is vacant.

Access to properties in the study area is adequate as the area is well developed with several roads located throughout. These roadways include Tom Hunter Road, West Arrowhead Drive, Heathway Drive and Gloryland Avenue. Environmental constraints are not anticipated within this station area. Figure 4-10 illustrates the existing land uses within ½-mile of the proposed Tom Hunter Station.

University City Blvd. Station

The land surrounding the proposed University City Blvd. Station is primarily undeveloped and approximately 59 percent of the land in this station area is classified as vacant. Scattered office, industrial and commercial uses can be found along North Tryon Street/US-29. Single-family residential development accounts for approximately 16 percent of the development within this station area. Newer development is emerging with the extension of University City Blvd./NC-49, improvements to “the weave” and the development of IKEA and Walmart stores. Figure 4-11 illustrates the existing land uses within ½-mile of the proposed University City Blvd. Station.



Commercial development near the proposed McCullough Station.

McCullough Station

The majority of the existing land uses surrounding the proposed McCullough Station are commercial and office uses; accounting for 25 percent and 24 percent, respectively. Most of the office development is located on the western side of North Tryon Street/US-29 and include several restaurants and gas stations. A small area of single-family residential development is located along Clark Boulevard, Hampton Church Road and Russell Street. This single-family development only accounts for 3 percent of land uses within this station area.

Many of the properties surrounding this station are already

developed with their future land use designation. However, areas designated for mixed-use are currently underutilized. Access is adequate with several feeder roads connecting to North Tryon Street/US-29. Figure 4-12 illustrates the existing land uses within ½-mile of the proposed McCullough Station.



CMC-University.

JW Clay Blvd. Station

The area surrounding the proposed JW Clay Blvd. Station captures a large portion of University area. The majority of existing land uses are public and institutional uses; UNC Charlotte and the CMC-University. These public and institutional uses account for approximately 38 percent of land uses within this station area. Commercial uses account for approximately 25 percent of the proposed station area land uses, with various restaurants, gas stations, hotels and retail along North Tryon Street/US-29 and W.T. Harris Boulevard.

Pockets of single-family residences and multi-family development are scattered behind the block of commercial parcels that line North Tryon Street/US-29 on the western side. The multi-family development accounts for approximately 9 percent of existing land uses, while single-family residential development accounts for only 3 percent of the existing land uses in this station area.

Approximately 20 percent of the land surrounding this proposed station is currently vacant. Many of the properties in this station area are developed with their designated future land uses. Access to this station area is adequate with most properties having frontage on North Tryon Street/US-29, W.T. Harris Boulevard and JW Clay Boulevard. Figure 4-13 illustrates the existing land uses within ½-mile of the proposed JW Clay Blvd. Station.

UNC Charlotte Station

The UNC Charlotte Station area primarily encompasses public and institutional uses on the UNC Charlotte campus, including research facilities. The public and institutional uses account for approximately 72 percent of property located within the station area. Pockets of single-family residential uses are located within this area and account for approximately 3 percent of the existing land uses. Multi-family development is also included along North Tryon Street/US-29 and East Mallard Creek Church Road and accounts for approximately 6 percent of existing land uses within this station area. Approximately 15 percent of the land area located within this station area is classified as vacant.



New research facilities on the UNC Charlotte campus.

The *2009 Draft UNC Charlotte Campus Master Plan* accommodates the proposed Light Rail Alternative alignment as well as the proposed UNC Charlotte Station. The majority of the property is developed with public and institutional uses, consistent with the future land use designation for this station area. Figure 4-14 illustrates the existing land uses within ½-mile of the proposed UNC Charlotte Station.

Mallard Creek Church Station

The Mallard Creek Church Station area is predominantly occupied by vacant and undeveloped properties as well as a County park and wetland viewing area. Vacant property accounts for approximately 45 percent of existing land uses within this station area. Public and institutional uses on the UNC Charlotte campus comprise approximately 17 percent of existing land uses within this station area. Single-family residential development accounts for approximately 7 percent of existing land uses in this station area. Multi-family residential development, most of it located off Mallard Creek Church Road, accounts for approximately 6 percent of the existing land uses within this station area. The northeastern quadrant of this station area is occupied by Kirk Farm Fields, a County park. East of Kirk Farm Fields Park and south of I-485 is vacant land as well as an active stone quarry.

Much of the vacant and industrial uses have future land use designations of Institutional Use and are currently underutilized. The area is accessed by two roads that transect the area: North Tryon Street/US-29 and Mallard Creek Church Road. Redevelopment of the industrial area and stone quarry in the northeast portion of the station area would require the improvement of Stone Quarry Road and Bonnie Cone Lane. There are environmental constraints that could restrict development with the presence of Kirk Farm Fields and the Toby Creek and Mallard Creek floodplains within this station area. Figure 4-15 illustrates the existing land uses within a ½-mile of the proposed Mallard Creek Church Station.

I-485/N. Tryon Station

The I-485/N. Tryon Station area includes mostly vacant and underutilized properties within the New Suburban Communities District. Vacant properties account for approximately 39 percent of the land within this station area. Industrial uses account for approximately 29 percent of existing land uses within this station area. The residential land uses within the station area include a mobile home park located off of Morningstar Place Drive. A few rural-density residential homes can also be found throughout this station area and multi-family development can be found on the western side of the US 29 Access Road. Single-family residential development accounts for approximately 11 percent of existing land uses within this station area. Multi-family residential development accounts for approximately 6 percent of the existing land uses within this area.

Most of the property located in this station area is developed with the designated future land uses of Park/Open Space and Institutional uses. Figure 4-16 illustrates the existing land uses within a ½-mile of the I-485/N. Tryon Station.

4.1.3 Development Activity

Development activity in the Northeast Corridor is increasing as the corridor provides a vital link between two major activity centers in the area; Center City Charlotte and University City. Center City Charlotte has seen a significant amount of development in the last decade consisting primarily of office and residential uses. University City has likewise seen a considerable amount of development activity in all sectors, including office, retail, commercial and residential (single-family and multi-family) uses. As such, the pace of new development, infill development and redevelopment initiatives has intensified along the Northeast Corridor between these two major activity centers. For example, areas such as NoDa have become vibrant communities, encompassing a mixture of residential (new and rehabilitated/renovated, single-family and multi-family), office and retail establishments.

In addition to by-right development, the Charlotte-Mecklenburg Planning Department (Planning) has received numerous requests for rezonings in the corridor since 2006. A total of 14 rezoning requests within the study area were approved by the Charlotte City Council from 2006-2008. The majority of these rezoning requests were to change industrial and office/commercial designations to allow for mixed-uses and higher density residential uses; most rezoning requests for the Mixed-Use Development District (MUDD) designation, which is a transit-supportive zoning district.

4.1.4 Vacant and Underutilized Land

Vacant properties and underutilized land are located within the corridor. Underutilized land is defined as land where the land value exceeds the value of improvements on the property. The *Charlotte Centers, Corridors and Wedges Growth Framework*, Draft 2010 indicates that in 2007 only 15 percent of the land within Charlotte's "sphere of influence" was vacant; and that much of the projected new development will occur in the form of redevelopment. In addition, access to properties, available infrastructure and environmental restrictions will also influence the development and redevelopment potential of the corridor.

4.1.5 Land Use Controls, Guidelines and Policies

The City of Charlotte and Mecklenburg County are committed to development principles that enhance the community and provide for sustainable growth. As such, the City of Charlotte and Mecklenburg County have developed and adopted several zoning classifications, planning and policy documents to help guide and manage land use; realizing that integrating transportation and land use is the key to fostering sustainable growth.

Zoning

The Northeast Corridor includes properties that fall within a wide range of zoning districts, reflecting varying types and intensities of residential, commercial, and industrial uses. These vary from low-density districts of a more suburban character to high intensity, transit-supportive districts.

Zoning changes may be necessary to permit the desired form of development consistent with transit and supportive activities. As an implementation strategy for the development of property surrounding the proposed stations (within a ½-mile radius), low-density districts may be correctively rezoned with the appropriate transit-supportive zoning districts as part of the Station Area Planning Process.

The three transit-supportive zoning districts in the currently adopted City of Charlotte Zoning Ordinance are described below.

- The Uptown Mixed Use District (UMUD) is the most intense of Charlotte’s zoning districts and is applied to the Center City Charlotte area. The main purpose of this district is “to strengthen the high-density core of the central city” by establishing minimum standards for design and development. This district has no maximum Floor Area Ratio (FAR) or height restrictions and allows a range of transit-supportive uses.
- The Mixed Use Development District (MUDD) is another transit-supportive district that is similar to UMUD. The MUDD district has no FAR limitation and permits a range of transit-oriented uses. Building heights are generally limited to 120 feet, but can be exceeded under certain conditions.
- The Transit Oriented Development District (TOD) is another transit-supportive zoning district that is potentially applicable to the areas surrounding the proposed stations.

In October 2003, the Charlotte City Council approved a new set of TOD Zoning Districts applicable to areas within approved transit station area plans. The purpose of the TOD Zoning Districts is to encourage the transition of future station areas to more compact urban growth centers, with opportunities for increased choice of transportation modes and a safe and pleasant pedestrian environment. This ordinance requires streetscape improvements, a functional mix of complementary uses and the provision of facilities that support transit use, bicycling, and walking. The three main TOD districts and their general requirements are listed below.

- The Residentially Oriented (TOD-R) zoning district requires proposed development to have at least 80 percent residential use, a minimum density of 20 units per acre for parcels within ¼-mile from a transit station, or a minimum density of 15 units per acre for parcels located between ¼-mile and ½-mile from a transit station.
- The Employment Oriented (TOD-E) zoning district requires at least 60 percent office uses, a minimum density of 0.75 FAR within ¼-mile from a transit station or a minimum density of 0.50 FAR between ¼-mile and ½-mile from a transit station.
- The Mixed-Use Oriented (TOD-M) zoning district requires a blend of high-density residential, high-intensity employment/office, civic, entertainment, and institutional uses along with retail uses. This zoning district requires a minimum density of 0.75 FAR within ¼-mile of a transit station, or a minimum density of 0.50 FAR in areas between ¼-mile and ½-mile of a transit station. TOD-M also requires a minimum density of 20 units per acre for parcels within ¼-mile of a transit station, or a minimum density of 15 units per acre for parcels located between ¼-mile and ½-mile of a transit station.

The City has also implemented a number of overlay districts, including the Pedestrian Overlay District (PED) and the Transit Supportive Overlay (TS), to help encourage transit-supportive development. These overlay districts are designed to allow a mixture of transit-supportive uses that are developed in a pedestrian-friendly manner.

Station Area Planning

CATS and the Charlotte-Mecklenburg Planning Department have developed Station Area Concepts for the Northeast Corridor to identify transit-supportive development opportunities and outline the unique characteristics critical to integrating each station with its surrounding area. Building on the Station Area Concepts developed for the proposed project, as well as other plans (such as the University City Area

Plan), CATS and Planning are preparing detailed Station Area Plans to guide the specific land use changes and infrastructure projects necessary to implement transit-supportive development around each station in the Northeast Corridor. These Station Area Plans will be prepared with area stakeholders and citizens; and the plans will continue to evolve as the proposed LYNX BLE moves through the planning process and into the implementation phase.

The Transit Station Area Principles would be applied to each station and current zoning surrounding these stations would be replaced with transit-supportive zoning. Once developed and adopted, the Station Area Plans would serve as a blueprint to guide growth and development surrounding the stations. Public input is encouraged throughout the process of Station Area Plan adoption. Following is a list of the five steps involved in this process.

1. Develop draft versions of the Station Area Plans.
2. Analyze and revise the Station Area Plans.
3. Finalize the Station Area Plans.
4. Review and adoption of the Station Area Plans by the Charlotte-Mecklenburg Planning Commission.
5. Review and adoption of the Station Area Plans by the Charlotte City Council.

Implementation follows the formal adoption of Station Area Plans. Implementation includes zoning changes within the station areas and capital improvements surrounding the stations. Thus far, the University City Area Plan has been adopted (October 2007) and contains Station Area Plans for the stations in the University City area. Station Area Plans have also been completed for the Sugar Creek Station and Old Concord Road Station and were presented to the public in July 2007 and January 2008. Station Area Plans are being refined for these stations and have not yet been adopted. If the proposed Light Rail Alternative is selected for implementation, Station Area Plans for the remaining stations will be developed following public circulation of the Draft EIS.

Centers, Corridors and Wedges Growth Framework

The primary plan to guide growth in the City of Charlotte and Mecklenburg County is a comprehensive strategy based on the radial development of "Centers" (the focal point of activity and mixed-use development) and "Corridors" (the five major transportation arterials that extend from Center City Charlotte). The *Centers and Corridors Vision Plan* (1994) was updated and is now called *Centers, Corridors and Wedges Growth Framework*, Draft 2010. The updated version of the document builds on the scope of the original document, addressing the changing real estate market, demographics, infrastructure needs and environmental concerns. The updated document includes details on the development of areas surrounding proposed transit stations. It also includes recommendations for areas that exist between the corridors known as "Wedges".

The *Centers, Corridors and Wedges Growth Framework* strategy is designed to increase development density in five proposed transit corridors, as well as a number of key nodes or activity centers, as a means of managing growth and reducing sprawl in the City of Charlotte, Mecklenburg County and the greater region. A key element of this plan is the development of a regional transit system that would improve mobility, encourage balanced growth and support the proposed land use initiatives in each of the five growth corridors. The Northeast Corridor is identified as one of the five high-density corridors that is an appropriate location for significant new growth.

2015 Plan: Planning for Our Future

The centers and corridors concept was reinforced in the *2015 Plan: Planning for Our Future* adopted by City and County elected officials in November 1997. This policy document outlines the desired urban future for the City of Charlotte and Mecklenburg County, focusing on mixed-use and pedestrian-oriented development at urban densities. The document highlights the importance of strong community design in the transformation of the City of Charlotte and Mecklenburg County into a more urban community. This document provided planning strategies and set the stage for the development of the *2025 Integrated Transit/Land Use Plan*.

2025 Integrated Transit/Land Use Plan

The *2025 Integrated Transit/Land Use Plan*, adopted in October 1998, provides extensive technical analysis of the transit and land use concepts provided by the *Centers and Corridors* vision and *2015 Plan*. This plan identifies the Northeast Corridor as a high priority for transit based on mobility needs. The *2025 Integrated Transit/Land Use Plan* also details a land use vision that focuses higher density development in station areas and activity centers where it can be best served by rapid transit. The *2025 Plan* includes general station area land use recommendations and proposes modifications to policies and regulatory tools that can be utilized to implement the region's transit and land use vision. The citizens of Mecklenburg County approved a one half-cent sales tax in 1998 to support the vision and goals of this plan. A key recommendation of the *2025 Integrated Transit/Land Use Plan* is to update the *General Development Policies* to accommodate land uses and encourage design that supports transit.

General Development Policies

The *General Development Policies* provide the planning principles for the Charlotte-Mecklenburg Planning Department and are the basis for development of area-specific plans. The *General Development Policies* revise previous policies that allow the dispersal of multi-family development, and redirects much of this denser development to major activity centers and transit corridors, as outlined in the *Centers, Corridors and Wedges Growth Framework*, Draft 2010. The *General Development Policies* also outline a set of Transit Station Area Principles, to encourage transit-supportive development along five transit corridors and focuses on creating compact neighborhoods with housing, jobs, shopping, community services and recreational opportunities all within ½-mile walking distance of transit stations. The intent is to create well-designed, livable communities where people have transportation choices to travel from home to work, as well as to meet other daily travel needs.

The Transit Station Area Principles provide direction for developing and redeveloping property around transit stations in a way that makes it convenient for many people to use transit. Such policies focus on land uses, mobility and community design. The Transit Station Area Principles require the development of land use and urban design plans for the transit stations along each of the five transit corridors and serve as a guide for development of the Station Area Plans. The following principles apply to the areas within ½-mile walking distance of an identified rapid transit station:

- Land Use and Development - Land uses should include a concentrated mixture of complementary, well-integrated land uses within walking distance of the transit station. This mix of uses should offer a range of living, shopping, working, and recreational options within a compact, walkable area with ground floor uses that attract and generate pedestrian activity. Increased land use intensity should be allowed appropriate to transit-supportive communities. The highest densities of new development should be concentrated closest to transit stations with a transition to lower densities adjacent to existing single-family neighborhoods.
- Mobility - The existing transportation network should be enhanced to promote good walking, bicycle and transit connections. Transit-supportive environments require streets that are designed to encourage use by all travel modes. Fast-moving cars are a safety risk to pedestrians and bicyclists; therefore, transit environments should have a system of connected streets that can deal with traffic in a more efficient manner than a system that relies on arterial roadways. Design speeds, facilities and levels of congestion should respond to the increased level of pedestrian and bicycling activity within transit-supportive areas. The traditional network of streets improves the mobility of all modes of travel by providing multiple travel routes for pedestrians, cyclists and motorists. Parking is also a critical element of transit-supportive areas. The proper location and size of parking facilities are essential in creating a transit-supportive setting. The size and location of parking facilities are sensitive to the quality of the pedestrian environment.
- Community and Urban Design – The Transit Station Area Principles call for urban design to be used to enhance the community identity of station areas and make them attractive, safe and convenient places. Streetscapes are a key element of urban design since streets are the most commonly used public spaces in a city. Streets should be auto-accommodating but not auto-dominated, and the design of the sidewalk is as important as the design of the street, potentially enhancing the local business climate and visual conditions. Public spaces (parks, plazas and open space) serve as focal points for development and design elements such as lights, trees, benches and landscaping should

be included to make the pedestrian feel safe and enjoy the space. In transit-supportive environments it is also important to reinforce the important civic role of the transit station. This objective can be achieved with the inclusion of parks and open space near transit stations as well as throughout transit-supportive areas. In transit-supportive environments, primary access points to buildings should be oriented to pedestrians. At the street level, the design of buildings should incorporate elements that reflect a human scale.

Transportation Action Plan and Urban Street Design Guidelines

The *Transportation Action Plan (TAP)* was adopted in 2006 and focuses on the long range development of streets and other facilities to ensure that the transportation goals identified in the *Centers, Corridors and Wedges Growth Framework*, Draft 2010 are being met. The City of Charlotte *Urban Street Design Guidelines (USDG)* were adopted in 2007 to supplement the TAP by providing a comprehensive approach to the planning and design of streets in Charlotte. The USDG offer guidance on streetscape recommendations for planning and design. The USDG also aid in integrating land use and transportation through context-based design. The TAP and USDG plans both adhere to the policies and recommendations of the Centers and Corridors growth strategy.

Transit Station Area Joint Development Principles and Policy Guidelines

In 2002, the City of Charlotte, Mecklenburg County, the MTC, and the towns of Cornelius, Davidson, Huntersville and Matthews adopted the *Transit Station Area Joint Development Principles and Policy Guidelines*. Adoption of the principles provides a framework and subsequent tool for local governments and CATS to encourage and promote transit-supportive development around transit stations. The principles and policy guidelines include:

- Encouraging complementary public facilities around stations;
- Providing basic public infrastructure available through jurisdiction resources in station areas;
- Supporting the development of a variety of housing types near stations;
- Developing public/private partnerships aimed at promoting transit-supportive development;
- Providing incentives, establishing partnerships with the private sector, promoting demonstration projects and removing barriers to encourage transit-supportive development; and,
- Encouraging the location and retention of a healthy mix of private transit-supportive businesses near transit stations.

Center City 2010 Vision Plan

The *Center City 2010 Vision Plan* was adopted by Charlotte City Council and the Mecklenburg County Board of Commissioners in 2000. This plan was developed by citizens to help guide growth within Center City Charlotte. The plan was adopted as a development policy to extend the efforts of the *2025 Integrated Transit/Land Use Plan*. The plan encourages a mixture of uses and high-density development in the Center City Charlotte area. This plan also recommends light rail to improve transit operations within Center City Charlotte and provide an alternative to automobile travel.

Northeast Area Plan

The *Northeast District Plan*, which provides a general land use framework for future growth and development within the entire northeast quadrant of Charlotte, was adopted in 1997. In 2000, the *Northeast Area Plan* was adopted by the Charlotte City Council and the Mecklenburg Board of County Commissioners, which amends the *Northeast District Plan*. The *Northeast Area Plan* provides a framework for future growth and development within a smaller area located generally between North Tryon Street/US-29 and the Mallard Creek Road/I-485 interchange. The *Northeast Area Plan* calls for integrated lands uses that can be served by a variety of transportation choices, including transit. The plan details how transformation of the northeast area can be designed to accommodate development that supports proposed transit improvements, and serves as a guide for elected officials in making land use and zoning decisions.

University City Area Plan

The Charlotte City Council adopted the *University City Area Plan* in 2007. This plan was prepared by University City Partners (UCP), who coordinates planning, marketing and other activities within the University City Municipal Service District (MSD). The *University City Area Plan* was developed and

adopted to amend the *Northeast District Plan* and provides a framework for future growth and development within the University City MSD, generally bound by North Tryon Street/US-29, Interstate 85 (I-85), University City Blvd./NC-49 and Mallard Creek Church Road. The *University City Area Plan* particularly pertains to the planned development of light rail in the northeast Charlotte area. The central goal of the plan is to promote the corridor and encourage development that will support and benefit from the development of light rail in the Northeast District, of which the University City area serves as the core. The plan proposes transit-oriented future land uses around potential transit stations along North Tryon Street/US-29 and details development scenarios and design guidelines for the area.

4.2 Environmental Consequences

The Northeast Corridor is classified as a growth corridor and the City and the County have determined that it is an appropriate location for intense development, as identified in the *Centers, Corridors and Wedges Growth Framework*, Draft 2010. This corridor has grown over the past decade, and it is anticipated that growth and development would continue with selection of the proposed alternatives described in the following sections.

As noted previously, land use impacts of the proposed project are those which are anticipated to result in direct changes to existing land use. In other words, existing land uses such as those used for industrial warehouses or those encompassing vacant land, could be changed to accommodate the proposed Light Rail Alternative or Light Rail Alternative – Sugar Creek Design Option. The study area for this land use analysis extends ½-mile from each side of the proposed alignment and is illustrated in Figure 4-1. Included is an evaluation of the impacts of the No-Build Alternative, the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. Secondary impacts including changes to land use and development patterns and changes in travel patterns, as well as cumulative impacts, were evaluated under a separate study and are discussed in Chapter 19.0: Secondary and Cumulative Effects. Construction-related impacts, along with avoidance, minimization, and mitigation measures, are discussed in Chapter 18.0: Construction Impacts.

4.2.1 No-Build Alternative

The No-Build Alternative would consist of a future scenario with no changes to planned transportation services or facilities in the Northeast Corridor. As a result, project-generated changes to study area land uses would not occur under the No-Build Alternative. With the No-Build Alternative, enhanced access to transit associated with the implementation of the proposed Light Rail Alternative would not occur to support future land use, as called for in adopted plans and policies. Therefore, the No-Build Alternative would not be consistent with adopted land use controls, policies and guidelines.

4.2.2 Light Rail Alternative

The proposed Light Rail Alternative would alter existing land uses at proposed station locations and along the alignment where full and partial acquisitions would be undertaken to accommodate the proposed Light Rail Alternative. Sections 4.2.2.1 and 4.2.2.2 describe these land use changes at both the corridor and station level. In addition, Chapter 17.0: Acquisitions and Displacements, provides more detailed information on the number of displacements/relocations.

Existing land use policies and development regulations support the development of the proposed Light Rail Alternative and have been adopted to accommodate its implementation. The potential positive impacts include enhanced development, access and the integration of transportation and land use, to create sustainable growth within the region. In addition, existing and future development would be served by the improved transportation access and travel options that the proposed Light Rail Alternative would provide. Table 4-1 presents a summary of each alternative's consistency with land use policies described in Section 4.1.5.

**Table 4-1
Summary of Potential Impacts on Land Use Policies**

Measure	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Consistent with existing land uses	Yes	Yes	Yes
Consistent with adopted future land uses	No	Yes	Yes
Consistent with the <i>Centers, Corridors and Wedges Growth Framework, Draft 2010</i>	No	Yes	Yes
Consistent with the <i>2025 Integrated Transit/Land Use Plan</i>	No	Yes	Yes
Consistent with the <i>General Development Policies</i>	No	Yes	Yes
Consistent with the <i>Transportation Action Plan</i>	No	Yes	Yes
Consistent with the <i>Urban Street Design Guidelines</i>	No	Yes	Yes

4.2.2.1 Corridor Level Impacts

The proposed Light Rail Alternative would primarily be constructed along an existing rail corridor and North Tryon Street/US-29. The proposed Light Rail Alternative would first transition through vacant and industrial properties near the northeast intersection of East 16th Street and Parkwood Avenue, just south of the proposed Parkwood Station. The industrial portion of this site is primarily used for storage associated with the NS Intermodal Facility. The alignment would travel north along the western edge of North Brevard Street adjacent to the NS Intermodal Facility.

The proposed Light Rail Alternative would again transition through industrial property between the two existing rail corridors located between East 30th Street and 36th Street. The industrial uses on this site are also used for intermodal and freight storage. In addition, approximately eight properties that are currently located along Cullman Avenue would require partial acquisition in order to shift the freight rail tracks (see Figure 4-5) to accommodate the Charlotte Rail Improvement and Safety Project (CRISP) and to accommodate the proposed light rail alignment. The CRISP project is intended to maintain accommodations for the proposed Southeast High Speed Rail (HSR) corridor, which would utilize the western side of the existing freight tracks. Three of these properties have been acquired by Mecklenburg County as part of a floodplain buy-out program and are now vacant. These properties could potentially be utilized as part of a public park in the future. The remaining properties are currently used as warehouses.

The proposed Light Rail Alternative would leave the existing rail corridor to transition to North Tryon Street/US-29 near Old Concord Road. Direct land use impacts would occur mainly to commercial and warehouse (storage) tracts in this area due to right-of-way needs.

As the proposed Light Rail Alternative travels north along North Tryon Street/US-29 to UNC Charlotte, the alignment would be located in the median. Direct land use impacts would occur along North Tryon Street/US-29 since the existing right-of-way is not wide enough to accommodate the proposed typical section with Light Rail Alternative (See 2.0 Alternatives Considered, Section 2.2.3.4, for a description of the proposed widening). Both sections of North Tryon Street/US-29 encompass primarily commercial properties, which would be subject to partial and full acquisition to meet the needs of the proposed Light Rail Alternative.



Area of potential widening along North Tryon Street/US-29.

When the proposed Light Rail Alternative reaches UNC Charlotte, it would transition east through the campus just north of the Charlotte Research Institute. This alignment is intended to provide service directly to the campus and the proposed UNC Charlotte Station. The alignment would be constructed on vacant land on the campus and a portion of a parking lot.

The proposed alignment would also cross the Toby Creek Greenway, a planned park/recreational trail. The proposed Light Rail

Alternative would bridge over the trail. Land use designations would remain recreational, and the use and enjoyment of the trail would not be affected.

As the proposed alignment exits the UNC Charlotte Campus it would transition across Mallard Creek Church Road and to the south of Kirk Farm Fields Park, requiring the acquisition of one multi-family building and a portion of a second multi-family building. A direct land use change would result.

As the proposed Light Rail Alternative continues north to the I-485/N. Tryon Station, the proposed alignment would cross one planned park/recreational trail, namely the Mallard Creek Greenway Extension. No additional corridor-level impacts would be anticipated to occur.



Area adjacent to Kirk Farm Fields Park where the proposed Light Rail Alternative would be located.

The majority of direct corridor-level land use impacts would affect vacant, commercial, office and industrial properties, with the exception of residential uses at Mallard Creek Apartments. Therefore, the overall land use composition would not change substantially. Some loss of business property and parking facilities would also occur on individual properties, along with direct impacts to a multi-family residential building. No significant adverse land use impacts would be expected from these changes. Land use benefits would also occur through the proposed Light Rail Alternative's support for existing and future development and the anticipated improvements.

4.2.2.2 Station Area Impacts

Most direct land use impacts would occur on parcels around proposed stations, resulting from the conversion of existing land uses needed to accommodate proposed park-and-ride locations. The development of the park-and-ride facilities would be incorporated into the Station Area Plans for each respective station. The proposed stations would also have beneficial land use effects through supporting existing and future development in the station areas and acting as focal points for future growth. Guidelines for this growth will be detailed in the Station Area Plans, which will outline the unique characteristics critical to integrating each station with its surrounding area. Following is a description of anticipated changes to land use within each station area.

9th Street Station

The proposed 9th Street Station platform would be located on East 9th Street between North College Street and North Brevard Street in Center City Charlotte. The proposed station platform would be located within existing rail right-of-way and a park-and-ride facility is not proposed for this station. Direct land use changes would not occur from the implementation of the proposed 9th Street Station, as displacements would not result.

Employees of surrounding offices and residents of the First Ward and Fourth Ward neighborhoods located to the east and west of the proposed station would benefit from increased transit access and mobility. This station would also be compatible with existing surrounding land uses.

Parkwood Station

The proposed Parkwood Station platform would be located near the intersection of Parkwood Avenue and East 20th Street along North Brevard Street, adjacent to the existing rail corridor. In addition, a Vehicle Light Maintenance Facility (VLMF) is also being proposed as part of the Light Rail Alternative, between the proposed Parkwood and 25th Street Stations. The VLMF would be located on the existing NS Intermodal Facility (once NS relocates to the Charlotte Douglas Airport – through a separate project) and would be used for the maintenance, repair, cleaning and inspection of the light rail vehicles. Existing land uses surrounding the proposed station are primarily vacant and industrial properties associated with the intermodal site. Since a park-and-ride facility is not proposed for this station, and no displacements would occur, direct land use changes would not result from the implementation of the proposed Parkwood Station or the VLMF.

The Optimist Park neighborhood is located just south of the proposed Parkwood Station along the eastern side of the alignment. Since the community is adequately buffered by Parkwood Avenue/North Brevard Street, the proposed Parkwood Station and VLMF would be generally compatible with its surrounding land uses. Residents and employees in the area would benefit from increased transit access and mobility, strengthening the area as a residential community and place to do business.

25th Street Station

The proposed 25th Street Station platform would be located adjacent to the existing rail corridor near the North Brevard Street and East 25th Street intersection. A small pocket of residential use is located on the eastern side of North Brevard Street. Other land uses in the area include industrial and vacant properties and public uses (utilities). Since a park-and-ride facility is not proposed for this station and displacements would not occur, direct land use changes would not result from the implementation of the proposed 25th Street Station. A condominium development (Yards at NoDa) is proposed on the northwest corner of North Davidson Street and East 30th Street, approximately three blocks east of the proposed 25th Street Station. Residents and employees in the area would benefit from increased transit access and mobility and the proposed station would be generally compatible with its surrounding land uses.

36th Street Station

The proposed 36th Street Station platform would be located along the southeast side of the existing rail corridor, at 36th Street in the NoDa area. Land uses directly adjacent to the proposed station include industrial and vacant properties. A nearby mill site housing the Johnston and Mecklenburg Mills, located just north of 36th Street, has been converted to apartments and may be rehabilitated/renovated in the future. CATS would continue to coordinate the 36th Street Station design and development, as appropriate.

As part of the proposed Light Rail Alternative, 36th Street would be grade-separated with light rail and freight bridges. Partial parcel acquisitions may be required for the modifications to 36th Street. Residents of the NoDa community and employees in the area would benefit from increased transit access, improved mobility, and reduced freight train horn noise. The proposed station would be compatible with surrounding land uses.

Sugar Creek Station

The proposed Sugar Creek station platform would be located on a bridge structure where Sugar Creek Road would be depressed under the existing freight tracks and proposed light rail tracks. The proposed Sugar Creek Station Park-and-Ride Option 1 would be located along the north side of the existing rail corridor. The proposed park-and-ride would include bus transfer facilities. The parking areas for this park-and-ride option would include three surface parking lots that would be located at the northwest and northeast corners of Sugar Creek Road and Raleigh Street and west of Sugar Creek Road between Raleigh Street and the Light Rail Alternative. Existing land use in the area of the proposed park-and-ride lots consists of industrial, vacant and commercial uses (including large parking lots). Implementation of the proposed station would result in direct conversions from these existing land uses to a park-and-ride lot. The properties that would need to be acquired for development of the park-and-ride lots primarily consist of industrial uses and parking lots. Additional industrial, commercial and vacant properties are available within the general vicinity and no significant change in the overall land use composition of the area would be anticipated.

The proposed Sugar Creek Station Park-and-Ride Option 2 would be located along the south side of the existing rail corridor, just north of North Davidson Street. This proposed station would consist of a five-story parking garage with bus transfer facilities. The platform would remain in the same location as with the proposed Sugar Creek Station Park-and-Ride Option 1. Existing land use in the area of this proposed park-and-ride facility consists of three separate parcels and includes industrial, vacant and commercial uses. These three properties would need to be acquired for development of the proposed garage. Additional industrial, commercial and vacant properties are available within the general vicinity of the proposed station and as with the Sugar Creek Station Park-and-Ride Option 1; no significant change in the overall land use composition of the area would be anticipated.

Single-family residences are located adjacent to the existing rail corridor along Bearwood Avenue and Redwood Avenue to the southeast of both options for proposed Sugar Creek Station. Since the community is already located adjacent to an existing rail corridor and would be well-buffered from the proposed Sugar Creek Station, it is not expected that the proposed station would result in significant adverse land use impacts. Residents and employees in the area would benefit from increased transit access and mobility, and the proposed station would be generally compatible with surrounding land uses.

Old Concord Road Station

The proposed Old Concord Road Station platform would be located just south of the intersection of Old Concord Road and North Tryon Street/US-29. Surrounding land uses are primarily industrial and commercial. The proposed park-and-ride lot with bus transfer facilities would be located just south of Old Concord Road where it intersects with North Tryon Street/US-29. These parcels, which currently consist of commercial, industrial, and vacant land uses, would be converted to station and park-and-ride where acquisitions would occur. Additional industrial, commercial and vacant properties are available within the general vicinity and overall land use composition of the area would not change substantially as a result of implementation of the Old Concord Road Station. The proposed station would be compatible with existing land uses. Employees in the area would benefit from the increased transit access and improved mobility, strengthening the area as a location for business activity.

Tom Hunter Station

The proposed Tom Hunter Station platform would be located within the median of North Tryon Street/US-29 at Tom Hunter Road. Adjacent land uses are industrial and commercial. The proposed park-and-ride would result in direct conversion of commercial properties (vacant gas station, pizza restaurant, hair salon) at the northwest intersection of Tom Hunter Road and North Tryon Street/US-29 to accommodate the parking lot and bus transfer area. Additional commercial and vacant properties are available within the general vicinity.

Single and multi-family residential land uses are directly adjacent to the western side of the proposed park-and-ride lot for this station. The proximity and compatibility of these residential neighborhoods is being considered in the station design provisions, including adequate screening and buffering of these residential properties for the station park-and-ride lot. Residents and employees would benefit from the increased transit access and improved mobility and the proposed station would be compatible with its surrounding land uses.

University City Blvd. Station

The proposed University City Blvd. Station platform would be located within the median of North Tryon Street/US-29, just south of Stetson Drive. The proposed park-and-ride would consist of surface parking area with bus transfer facilities (just north of the platform, southwest of Stetson Drive). The area of development for the proposed University City Blvd. Station is currently vacant; therefore, direct land use conversions would not be required.

As the majority of surrounding property is vacant, the proposed University City Station would be compatible with surrounding land uses. Since the area is mostly undeveloped, significant infrastructure improvements would be required in this station area. It is expected that many of these improvements would occur through new development. The proposed park-and-ride facility includes a road that connects North Tryon Street/US-29 and Ikea Boulevard, and sets up future connections to adjacent properties. Residents and employees would benefit from the increased transit access and improved mobility.

McCullough Station

The proposed McCullough Station platform would be located within the median of North Tryon Street/US-29, just south of McCullough Drive. The proposed station is directly adjacent to commercial and office uses. Residential uses are scattered farther outside of the station area. The existing commercial parcel (vacant restaurant) would be converted for the park-and-ride at this proposed station and additional commercial and vacant properties are available within the vicinity.

Overall, the proposed McCullough Station would be compatible with surrounding land uses. Additional vehicular connections are needed to improve access to all properties in this station area and it is

expected that these improvements would occur through new development. Residents and employees in the area would benefit from the increased transit access and improved mobility.

JW Clay Blvd. Station

The proposed JW Clay Blvd. Station platform would be located within the median of North Tryon Street/US-29, just south of JW Clay Boulevard. The proposed station is directly adjacent to commercial uses, with a greenway on the eastern side of North Tryon Street/US-29. A bus transfer bay that is proposed as part of this station would be located on-street, on the south side of JW Clay Boulevard, adjacent to existing parking lots that serve nearby commercial development

Overall, the proposed station would be compatible with adjacent land uses and would enhance transit access and mobility to and from the University City area. CATS would continue to coordinate the JW Clay Blvd. Station design and development with future development plans, including a potential urban village that may be developed near the JW Clay Boulevard/North Tryon Street/US-29 intersection.

UNC Charlotte Station

The UNC Charlotte Station platform would be located on the campus directly adjacent to Cameron Boulevard and the Laurel Hall Dormitory. No park-and-ride facility is planned for this station. Direct land use changes would not be expected to occur and the station would be compatible with existing and planned future campus uses. UNC Charlotte has incorporated the proposed Light Rail Alternative into its updated Campus Master Plan. Furthermore, employees and students of UNC Charlotte would be better served by the improved transit access and mobility.

Mallard Creek Church Station

The proposed Mallard Creek Church Station platform would be located north of Mallard Creek Church Road and east of Kirk Farm Fields Park. The proposed station location is surrounded primarily by vacant, parkland and industrial uses. Residential uses are located on the southern side of Mallard Creek Church Road. The Mallard Creek Church Station would include a park-and-ride lot with bus facilities located, north of Mallard Creek Church, east of Kirk Farm Fields park, and west of Stone Quarry Road. The station would convert vacant land. This property is owned by UNC Charlotte, and development of this station is being coordinated with the university. This station is included in the Campus Master Plan.

I-485/N. Tryon Station

The proposed I-485/N. Tryon Station platform would be located along the eastern portion of North Tryon Street/US-29. In addition, a five-story parking garage would be located east of North Tryon Street/US-29, just south of the I-485 ramps and Morningstar Place Drive. The area surrounding this station consists of industrial uses, vacant properties and residential development, including the Queens Grant Mobile Home residential properties. Access to this residential area would be redesigned and pedestrian access to the station would be provided with sidewalks as part of the proposed project to allow residents to continue to access their neighborhood. The development of this station is generally consistent with surrounding land uses and would provide residents with increased transit access and mobility.

4.2.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option alignment would transition to North Tryon Street/US-29 approximately one-mile southwest of the proposed transition for the Light Rail Alternative. The proposed Light Rail Alternative – Sugar Creek Design Option would have direct impacts on existing land uses, including vacant land and industrial uses adjacent to the Asian Corners Mall, used primarily as storage facilities related to industrial uses. Partial or full acquisition of parcels would be required.

Corridor-level impacts would also be associated with the required widening on North Tryon Street/US-29 that would be needed to accommodate construction of the proposed Light Rail Alternative and the proposed Light Rail Alternative – Sugar Creek Design Option within the median of North Tryon Street/US-29. The potentially affected properties are primarily comprised of commercial uses, and right-of-way needs would largely affect parking areas, and vacant and landscaped areas. The area would benefit from redevelopment opportunities and access improvements.

Sugar Creek Station – Sugar Creek Design Option

The proposed Sugar Creek Station – Sugar Creek Design Option platform would be located at the terminus of Dorton Street, just south of North Tryon Street/US-29. Existing land use in this area is primarily industrial and commercial, with small pockets of vacant parcels.

The proposed park-and-ride lot for this station would be located to the northeast of Sugar Creek Road and Raleigh Street. The property, which is currently developed with commercial and industrial land uses, would be converted to the proposed station and park-and-ride lot.

The proposed Sugar Creek Station – Sugar Creek Design Option would result in displacement of commercial and industrial uses. However, additional industrial, commercial and vacant properties are available within the general vicinity and no significant changes to the overall land use composition of the area would be expected.



Industrial property in area of where the proposed Light Rail Alternative – Sugar Creek Design Option would transition to North Tryon Street/US-29.

Residential uses would be generally well-buffered from the proposed station and proposed park-and-ride lot. These residents, as well as employees in the area, would benefit from increased transit access and improved mobility. The proposed station would be generally compatible with its surrounding land uses.

Old Concord Road Station – Sugar Creek Design Option

The proposed Old Concord Road Station – Sugar Creek Design Option platform would be located in the median of North Tryon Street/US-29, just south of Old Concord Road. Surrounding land uses just outside of the proposed station area are primarily industrial and commercial, with a small pocket of office use.

The proposed park-and-ride lot would be located at the southern intersection of Old Concord Road and North Tryon Street/US-29. Existing parcels would be converted to accommodate the proposed park-and-ride lot and station. Additional commercial, industrial and vacant properties are available within the general vicinity and no significant changes to the overall land use composition of this area would be anticipated. The proposed station would not be incompatible with these existing land uses. Employees in the area would benefit from the increased transit access and improved mobility, strengthening the area as a location for business activity.

4.3 Mitigation

4.3.1 Light Rail Alternative

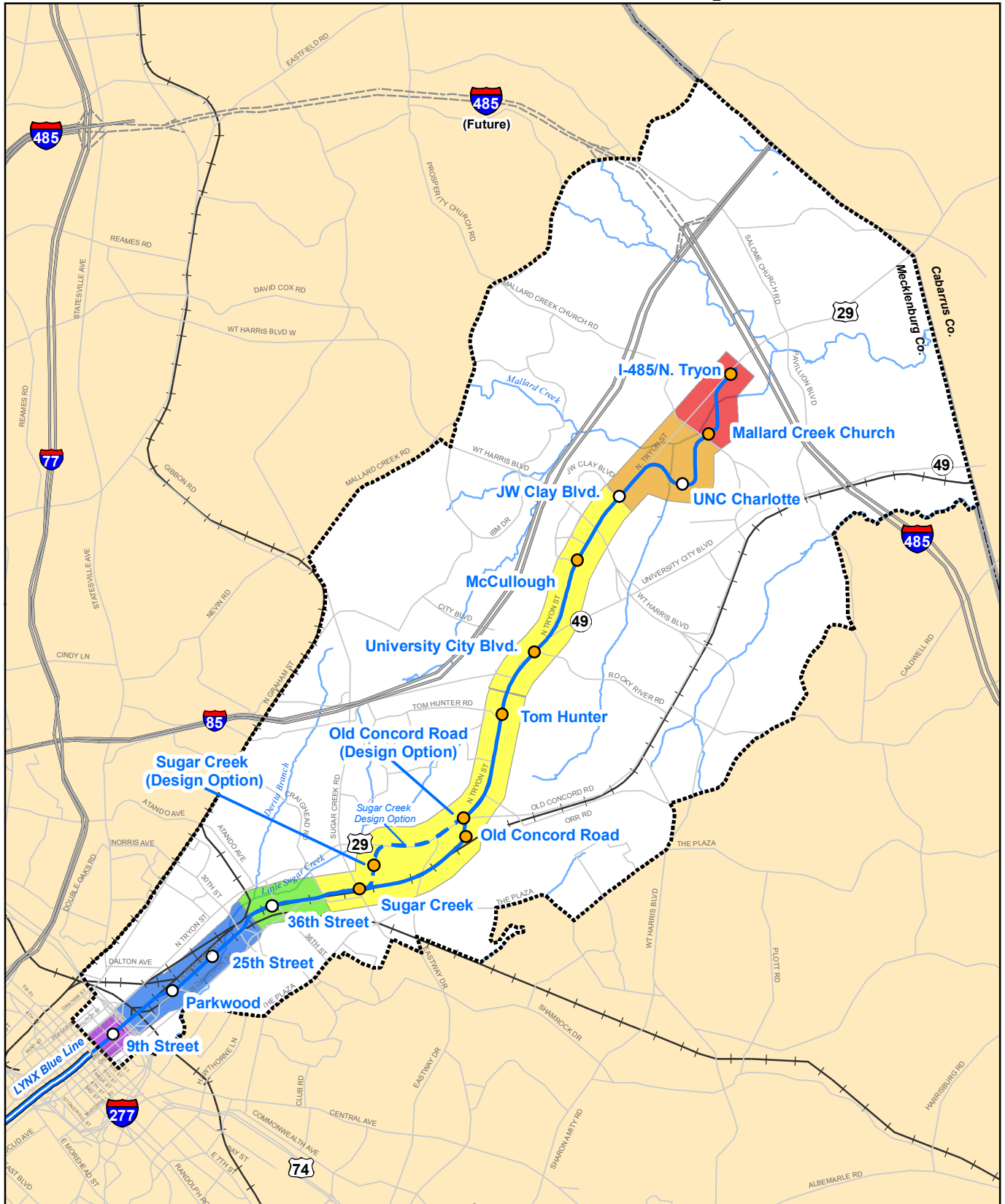
Direct land use changes would result from the proposed Light Rail Alternative. Land use conversions would primarily be required for alignment transitions and the acquisitions associated with the proposed park-and-ride facilities, as well as for widening the North Tryon Street/US-29 right-of-way to accommodate light rail in the median. These changes would not change the overall land use composition of the corridor significantly.

Station Area Plans will be formally adopted and implemented as discussed in Section 4.1.5. In addition, a separate project known as the Northeast Corridor Infrastructure (NECI) program is under development, similar to the South Corridor Infrastructure Program (SCIP). This program would consist of minor infrastructure improvements (e.g., roadway, pedestrian, etc.) to enhance business and residential access at the proposed stations and would be funded through the City’s Capital Improvement Program.

4.3.2 Light Rail Alternative – Sugar Creek Design Option

Direct land use changes would result from the proposed Light Rail Alternative – Sugar Creek Design Option. Impacts resulting from the Light Rail Alternative – Sugar Creek Design Option would be subject to the same mitigation measures described in Section 4.3.1.

Northeast Corridor 1/2 - Mile Land Use Districts

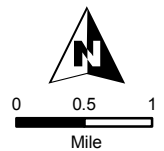


Legend

- Northeast Corridor Limits
- LYNX Blue Line
- Light Rail Transit
- Design Options
- Proposed Stations
- Proposed Stations with Park-and-Ride
- Highway
- Major Roads
- Highway (Future)
- Streams

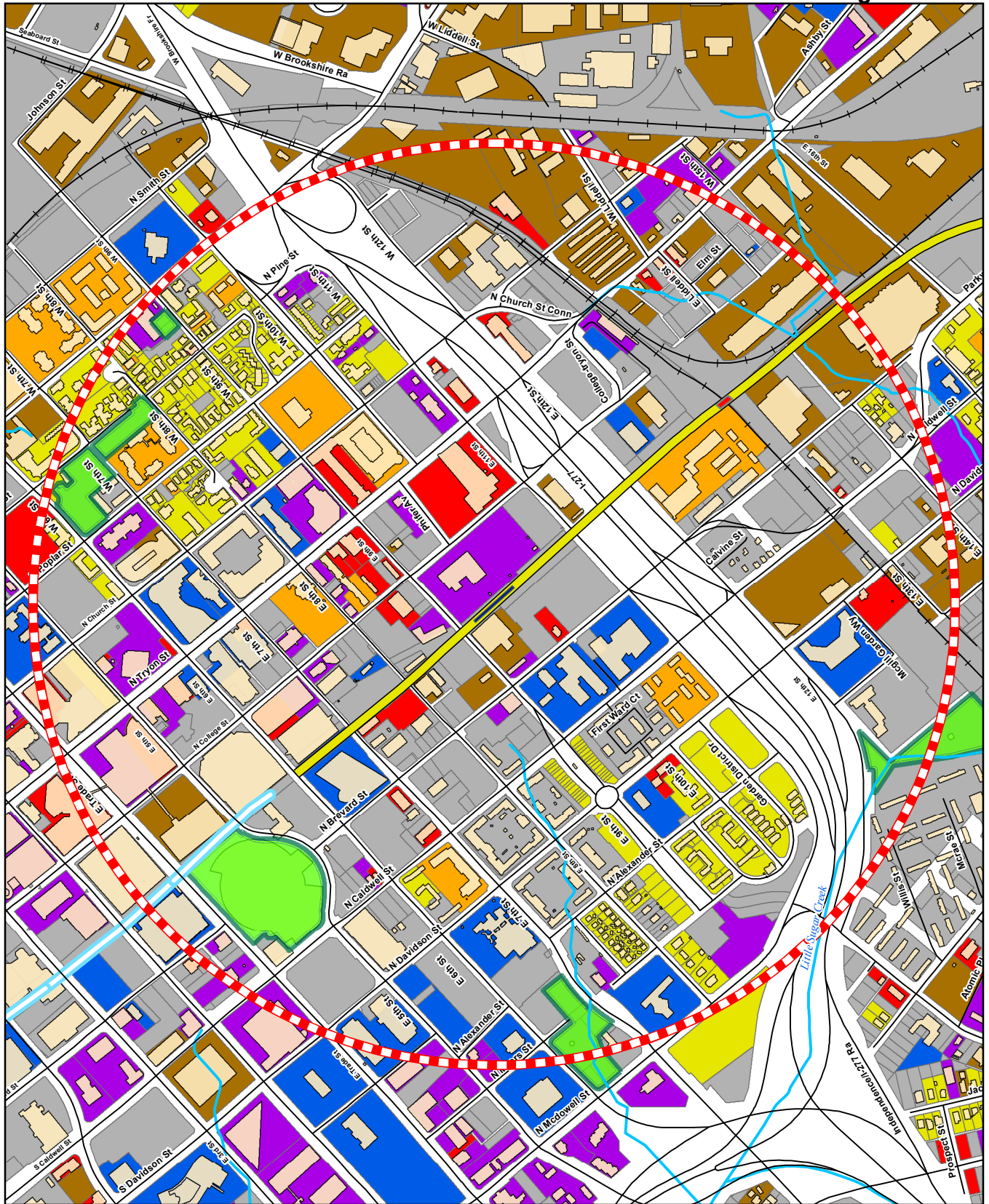
Land Use Districts

- High Intensity Urban Core
- Industrial Communities
- Historic Urban Communities
- Established Suburban Communities
- University
- New Suburban Communities



Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County
GIS, Urban Design Framework, 2009

Figure 4-2
9th Street Station - Existing Land Use



Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2-mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (36%)
	Commercial (5%)
	Single-Family (11%)
	Public/Institution (11%)
	Mobile Home (0%)
	Industrial (17%)
	Multi-Family (8%)
	Office (12%)

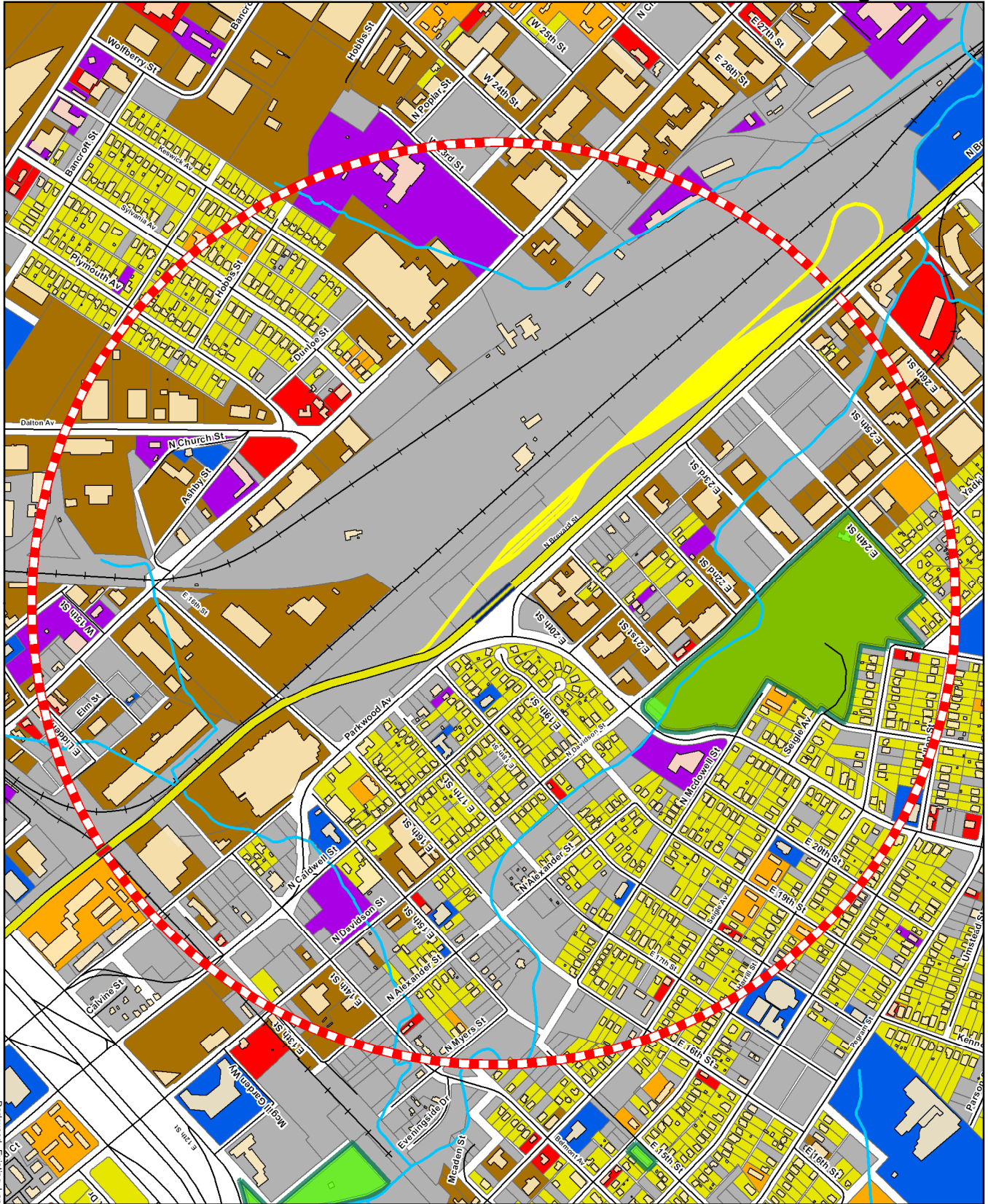
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Feet

Data Source:
 Charlotte Area Transit System, STV/RWA,
 Mecklenburg County GIS

9th_ST_EIU_BufferRev001.pdf

12-11-08

Parkwood Station - Existing Land Use



Legend	
	Proposed Light Rail Alternative
	1/2-mile Station Radius
	Proposed Station Platform
	Parks
	Proposed Structures
	Building Footprints
	Design Option
	Proposed Park-and-Ride Facilities
	Vacant (42%)
	Lynx Blue Line
	Roads
	Railroad
	Streams
	Commercial (7%)
	Single-Family (19%)
	Public/Institution (1%)
	Industrial (25%)
	Multi-Family (1%)
	Office (5%)
	Mobile Home (0%)

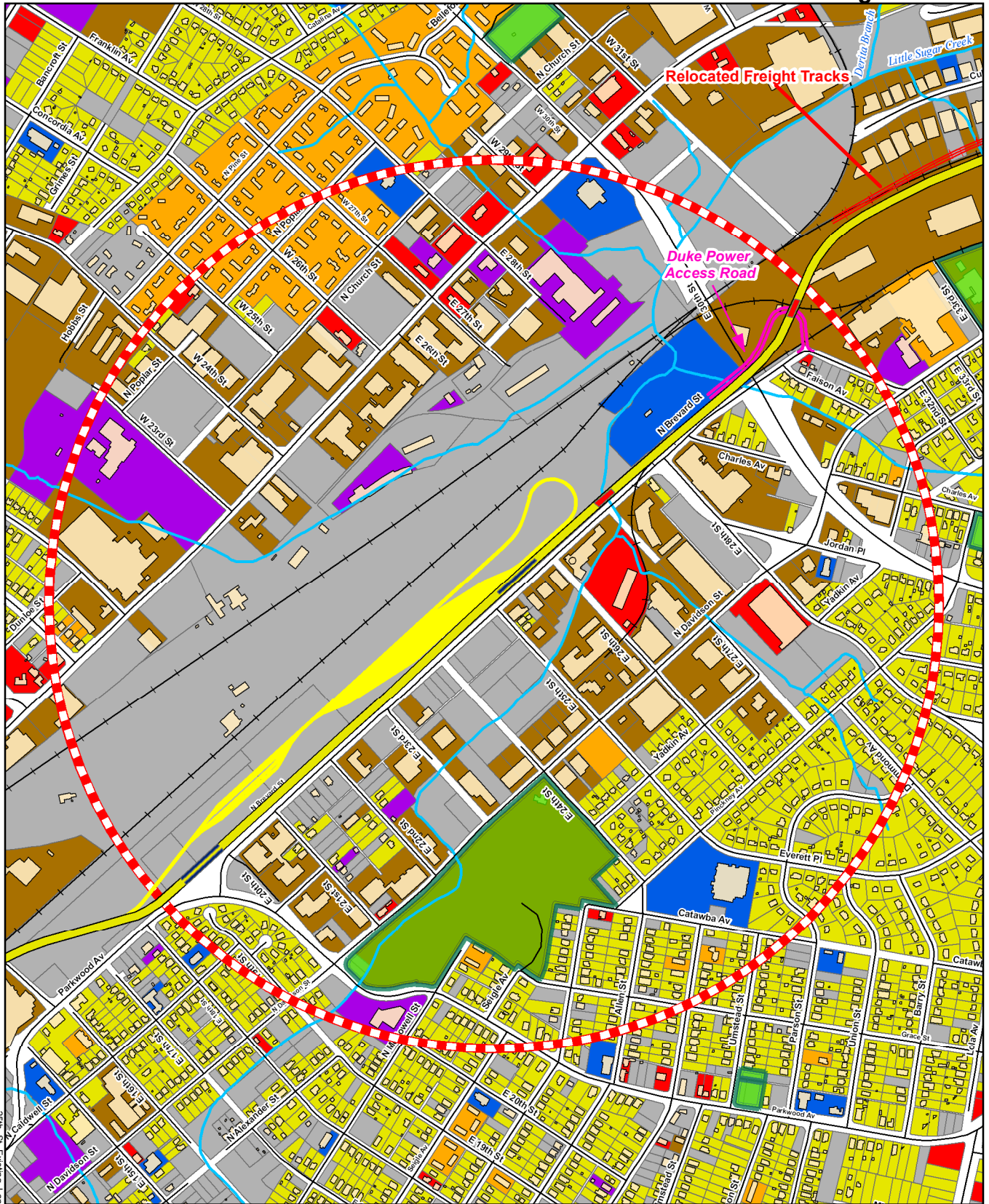
400 200 0 200 400
Feet

Data Source:
Charlotte Area Transit System, STV/RWA,
Mecklenburg County GIS

Parkwood_Existing_Landuse_Buffer_Map_CB_112409.mxd

11/24/09

25th Street Station - Existing Land Use



Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Vacant (36%)
	Commercial (7%)
	Single-Family (14%)
	Public/Institution (4%)
	Industrial (30%)
	Multi-Family (3%)
	Office (6%)
	Roads
	Railroad
	Streams

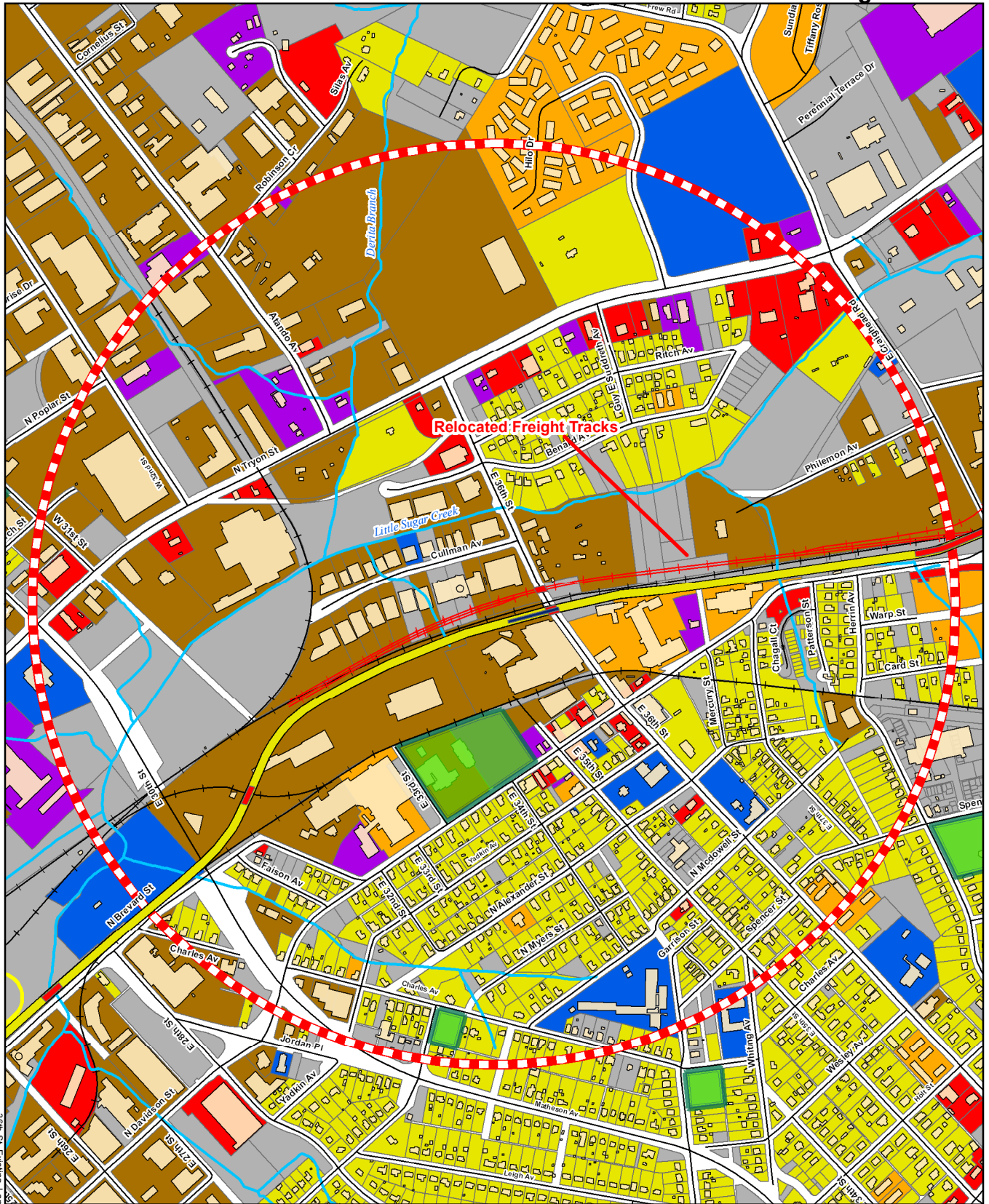
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Feet

Data Source: Charlotte Area Transit System, STV/RWA, Mecklenburg County GIS

25th_ST_Existing_Landuse_Buffer_Map_CB_112409.mxd

11/24/09

36th Street Station - Existing Land Use



Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (19%)
	Commercial (5%)
	Single-Family (25%)
	Public/Institution (5%)
	Mobile Home (0%)
	Industrial (37%)
	Multi-Family (6%)
	Office (3%)

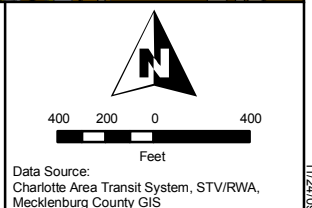
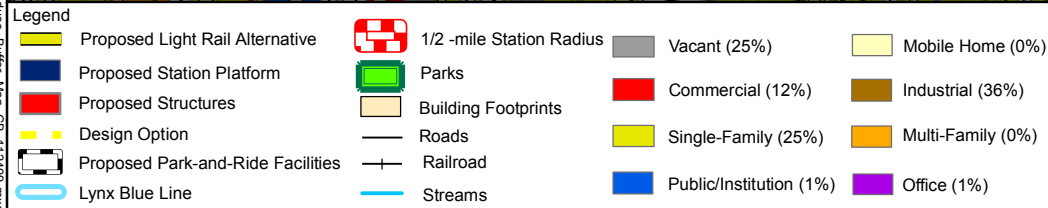
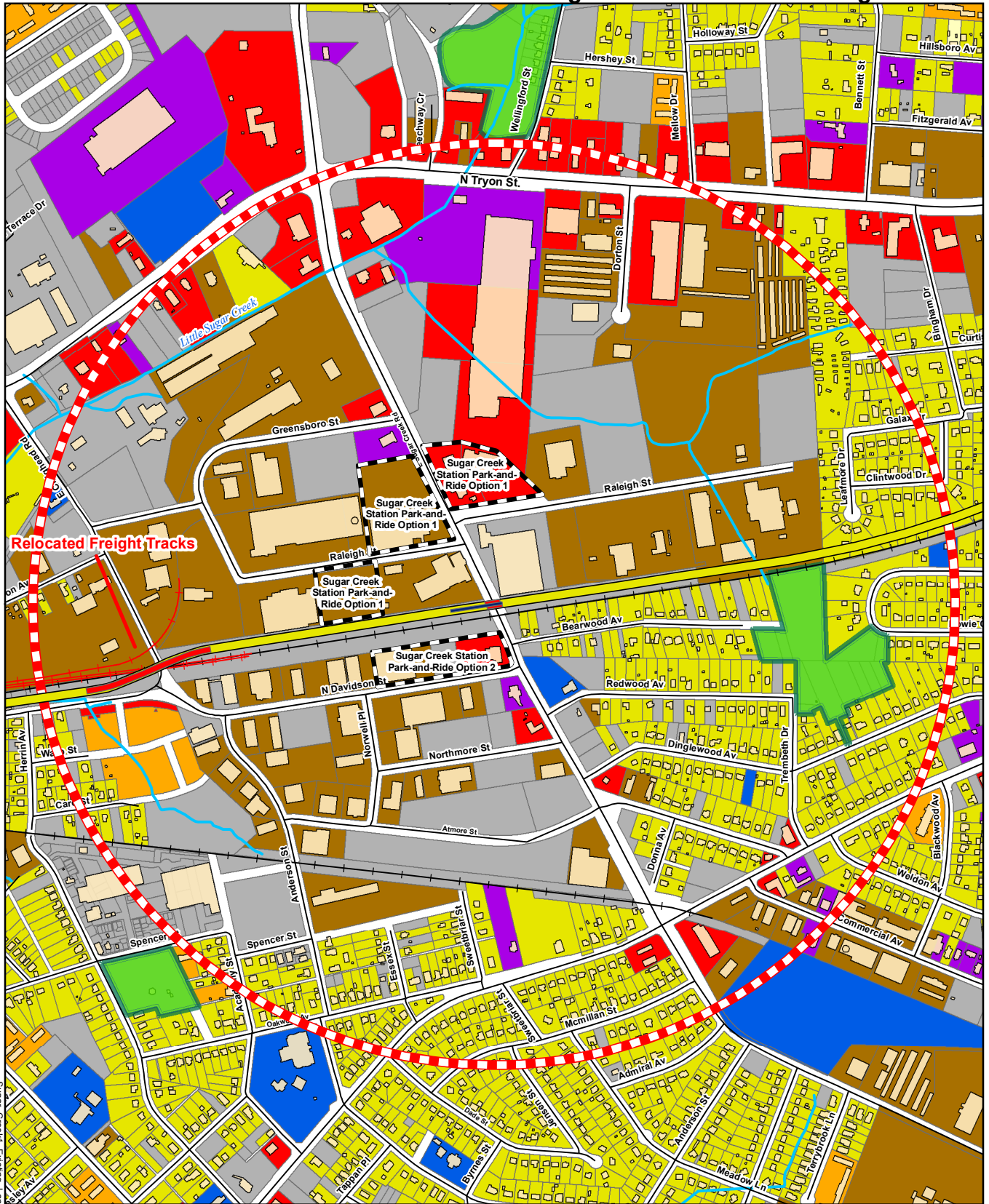
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Data Source:
Charlotte Area Transit System, STV/RWA,
Mecklenburg County GIS

36th St Existing Landuse Buffer_Map_CB_112409.mxd

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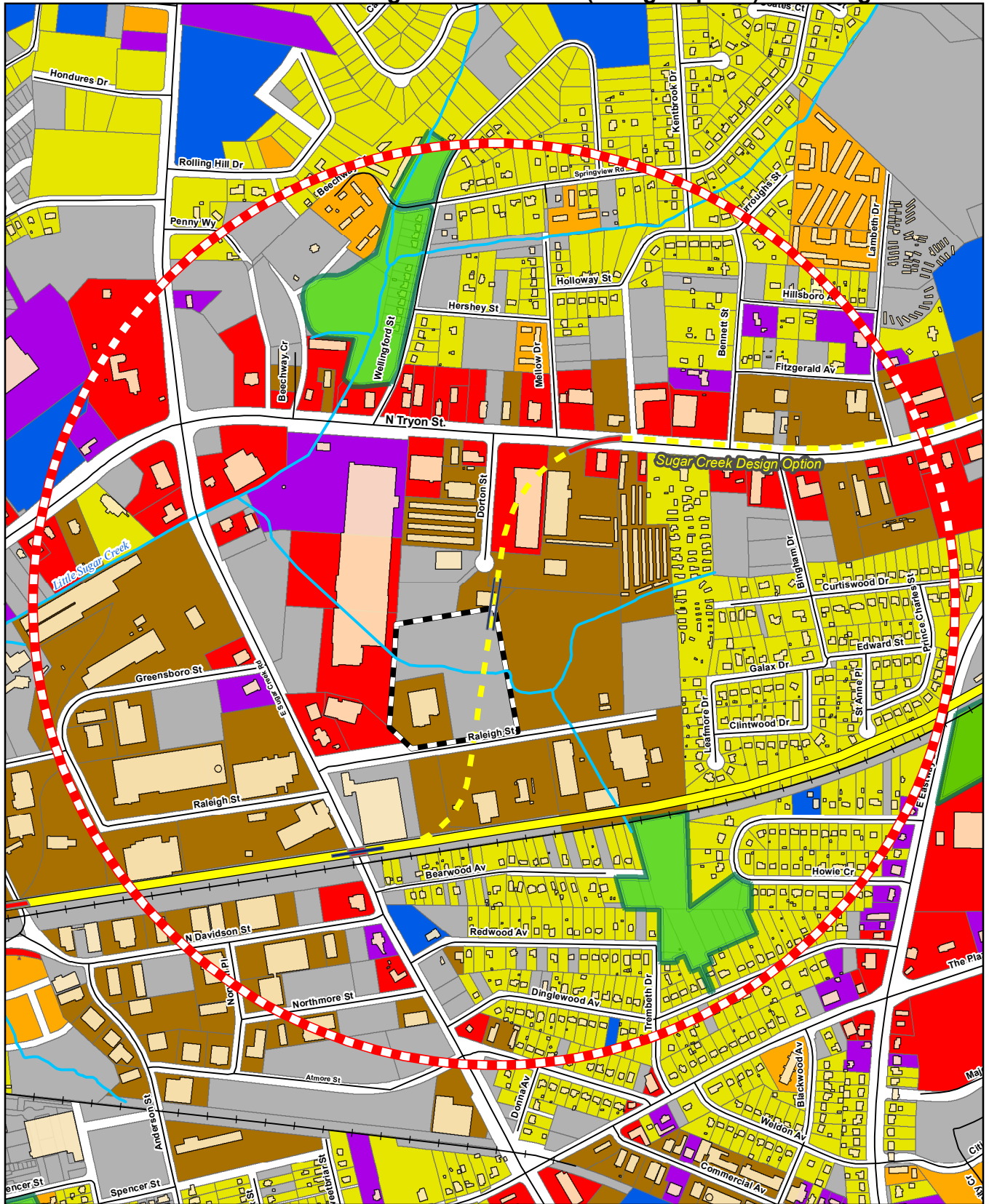
Sugar Creek Station - Existing Land Use



Sugar_Creek_Existing_Landuse_Buffer_Map_CB_112409.mxd

11/24/09

Sugar Creek Station (Design Option) - Existing Land Use

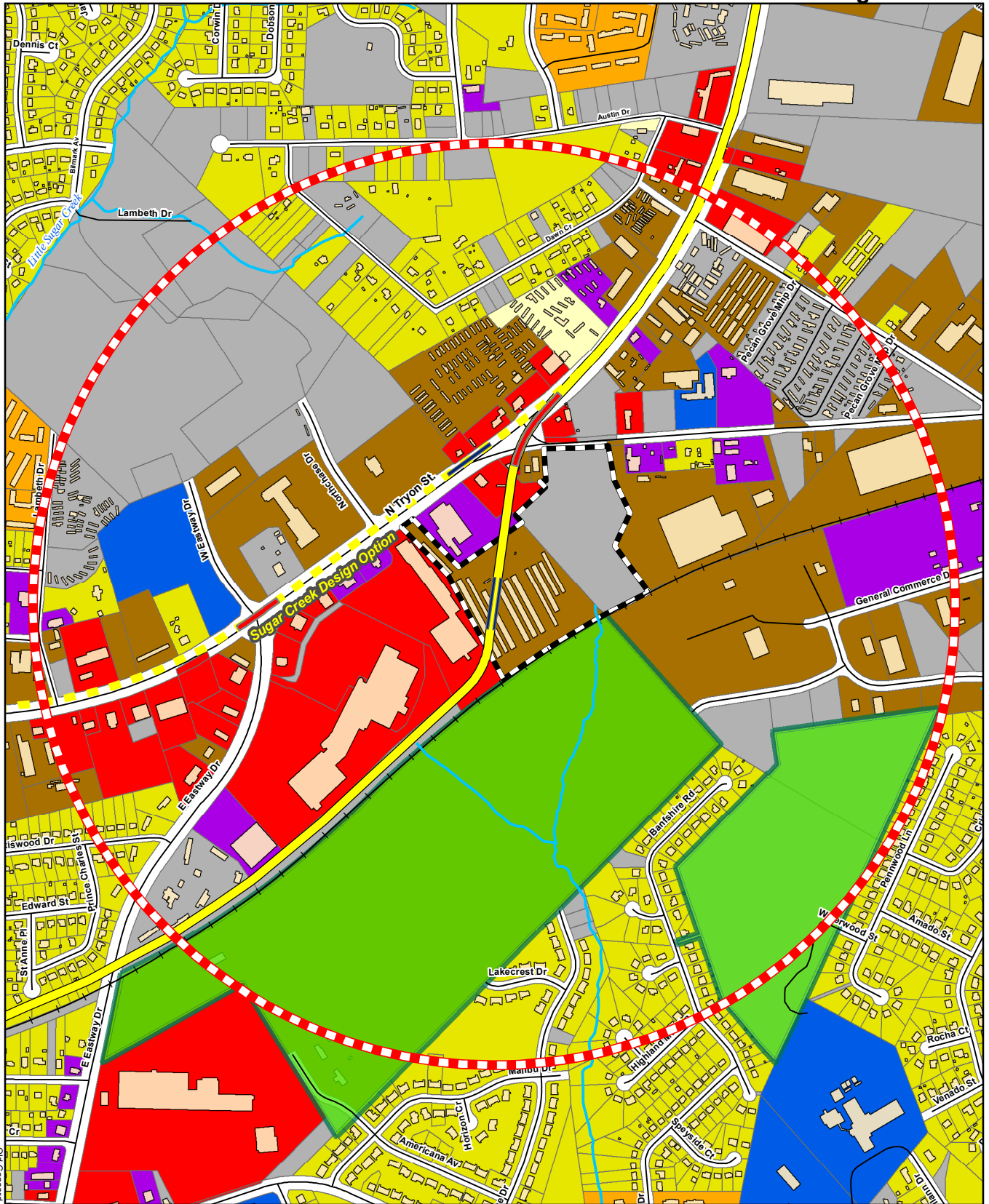


Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (23%)
	Commercial (15%)
	Single-Family (27%)
	Public/Institution (2%)
	Mobile Home (1%)
	Industrial (28%)
	Multi-Family (1%)
	Office (3%)

400 200 0 400
 Feet

Data Source: Charlotte Area Transit System, STV/RWA, Mecklenburg County GIS

Old Concord Road Station - Existing Land Use



Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynch Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (26%)
	Commercial (13%)
	Single-Family (13%)
	Public/Institution (1%)
	Mobile Home (3%)
	Industrial (37%)
	Multi-Family (0%)
	Office (5%)

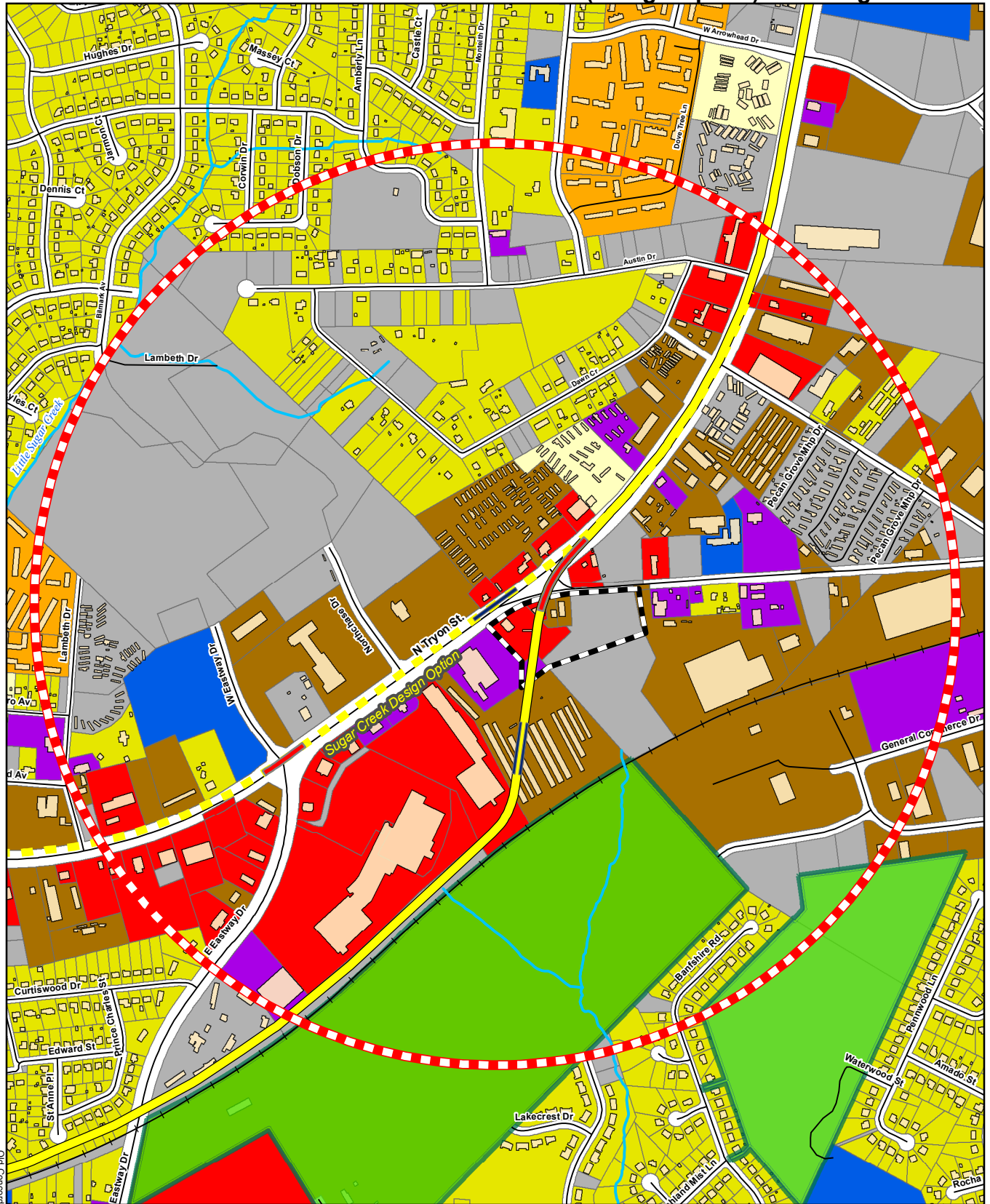
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Feet

Data Source: Charlotte Area Transit System, STV/RWA, Mecklenburg County GIS

Old Concord Road Station_LPA_ELU_Buffer_Rev.00.pdf

12-11-08

Old Concord Road Station (Design Option) - Existing Land Use



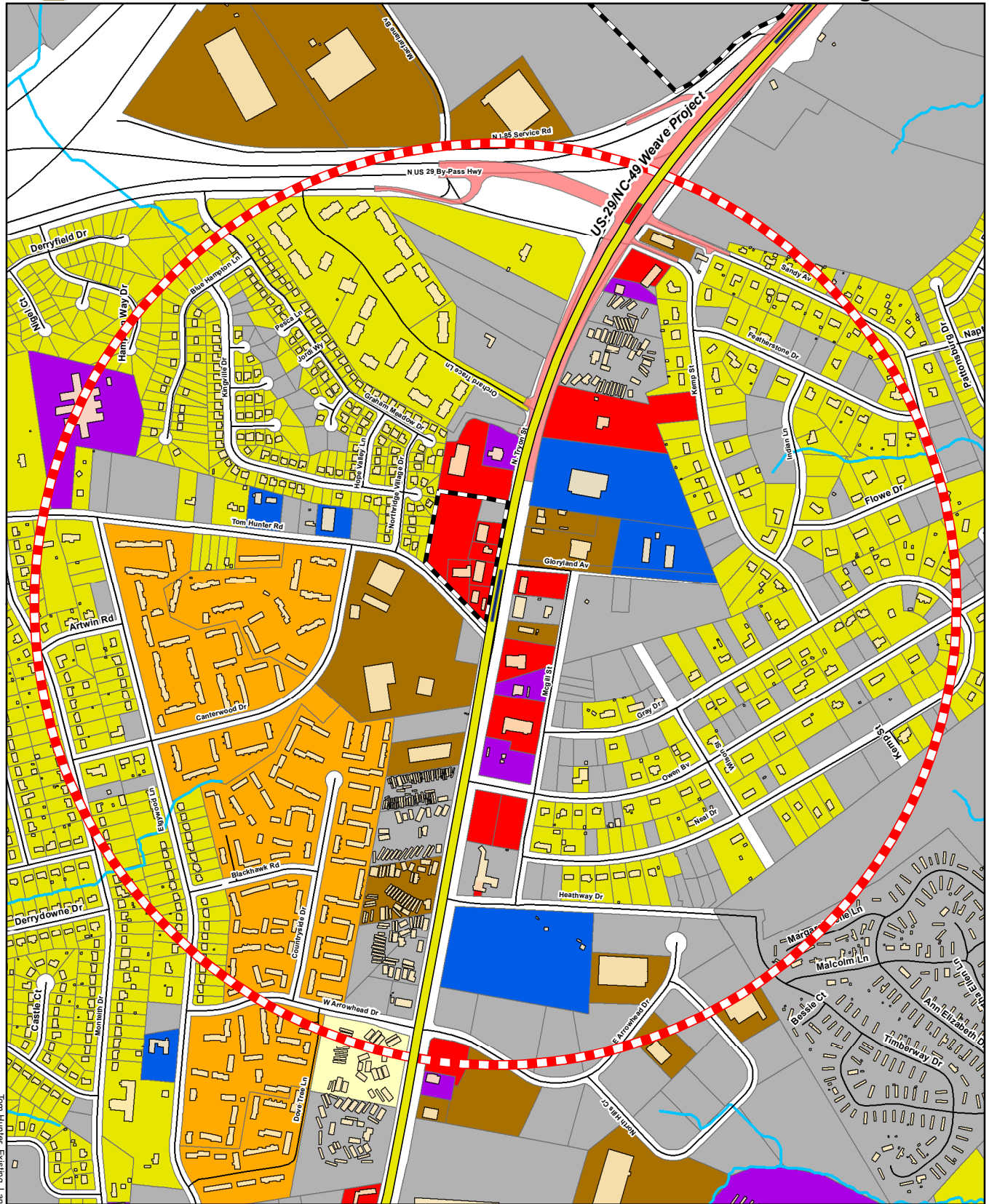
Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (30%)
	Commercial (13%)
	Single-Family (14%)
	Public/Institution (1%)
	Mobile Home (4%)
	Industrial (33%)
	Multi-Family (2%)
	Office (5%)

400 200 0 400
Feet

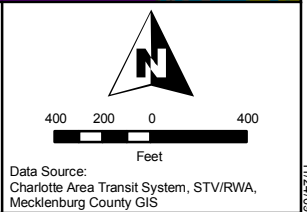
Data Source:
Charlotte Area Transit System, STV/RWA,
Mecklenburg County GIS

Old Concord Station_DG_ELU_BufferRev.00.pdf

12-11-08



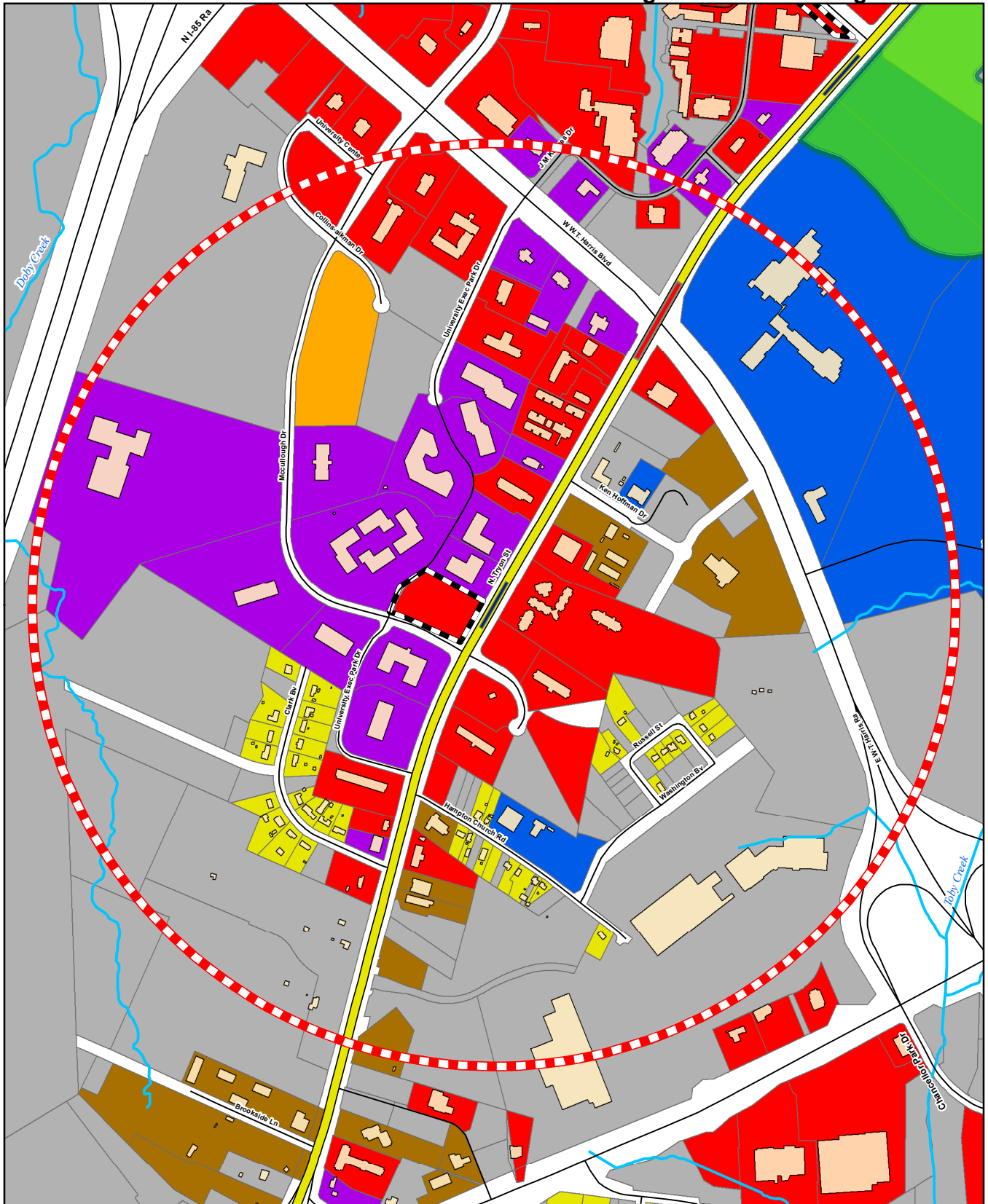
Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (26%)
	Commercial (5%)
	Single-Family (37%)
	Public/Institution (5%)
	Industrial (7%)
	Multi-Family (15%)
	Mobile Home (1%)
	Office (4%)





Tom Hunter_Existing_Landuse_Buffer_Map_CB_112409.mxd

11/24/09

McCullough Station - Existing Land Use



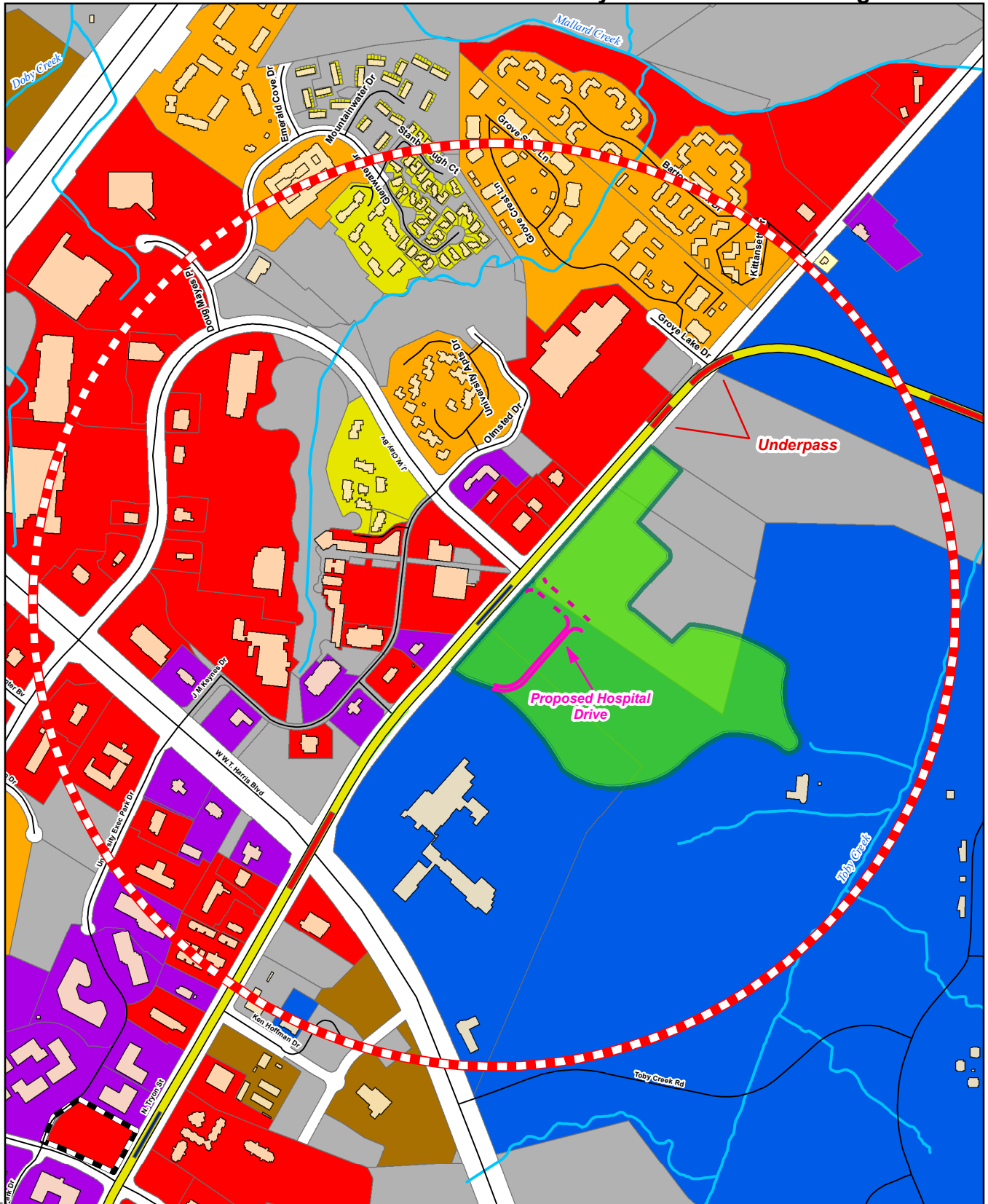
Legend	
Proposed Light Rail Alternative	1/2 -mile Station Radius
Proposed Station Platform	Parks
Proposed Structures	Building Footprints
Design Option	Roads
Proposed Park-and-Ride Facilities	Railroad
Lynx Blue Line	Streams
Vacant (32%)	Mobile Home (0%)
Commercial (25%)	Industrial (4%)
Single-Family (3%)	Multi-Family (2%)
Public/Institution (10%)	Office (24%)



 Data Source:
 Charlotte Area Transit System, STV/RWA,
 Mecklenburg County GIS

McCullough_ETL_Buffer_Rev.00.pdf

12-11-08

JW Clay Blvd. Station - Existing Land Use



Legend

Proposed Light Rail Alternative	1/2 Mile Station Radius	Vacant (20%)	Mobile Home (0%)
Proposed Station Platform	Parks	Commercial (25%)	Industrial (1%)
Proposed Structures	Building Footprints	Single Family (3%)	Multi-Family (9%)
Design Option	Roads	Public/Institution (38%)	Office (4%)
Proposed Park-and-Ride Facilities	Railroad	Streams	
Lynx Blue Line			

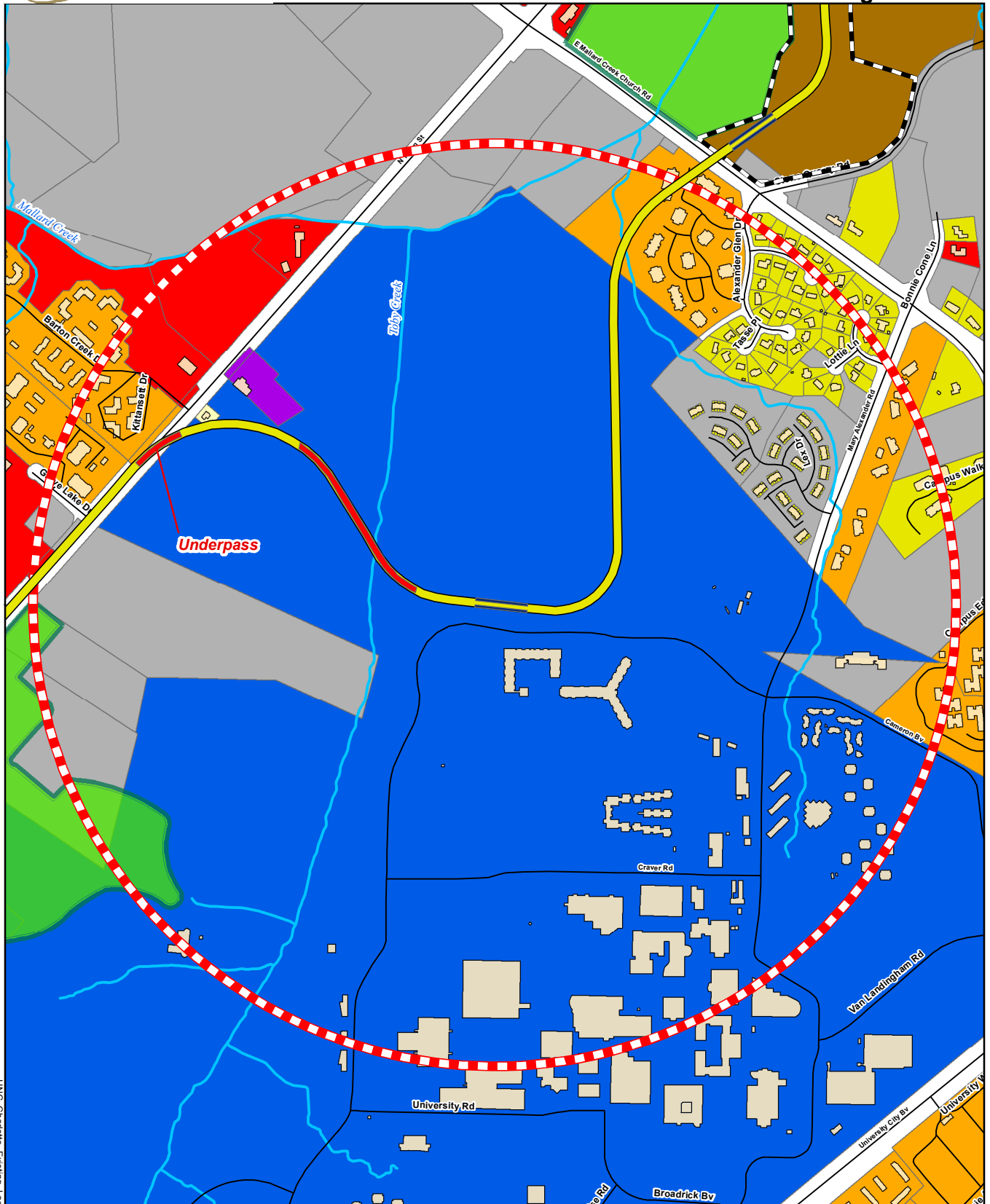
Feet

Data Source:
 Charlotte Area Transit System, STV/RWA,
 Mecklenburg County GIS

JW Clay Blvd. ETLU Buffer Rev. 00.pdf

12-11-08

UNC Charlotte Station - Existing Land Use



Legend	
	Proposed Light Rail Alternative
	Proposed Station Platform
	Proposed Structures
	Design Option
	Proposed Park-and-Ride Facilities
	Lynx Blue Line
	1/2 -mile Station Radius
	Parks
	Building Footprints
	Roads
	Railroad
	Streams
	Vacant (15%)
	Commercial (3%)
	Single-Family (3%)
	Public/Institution (72%)
	Mobile Home (0%)
	Industrial (17%)
	Multi-Family (6%)
	Office (1%)

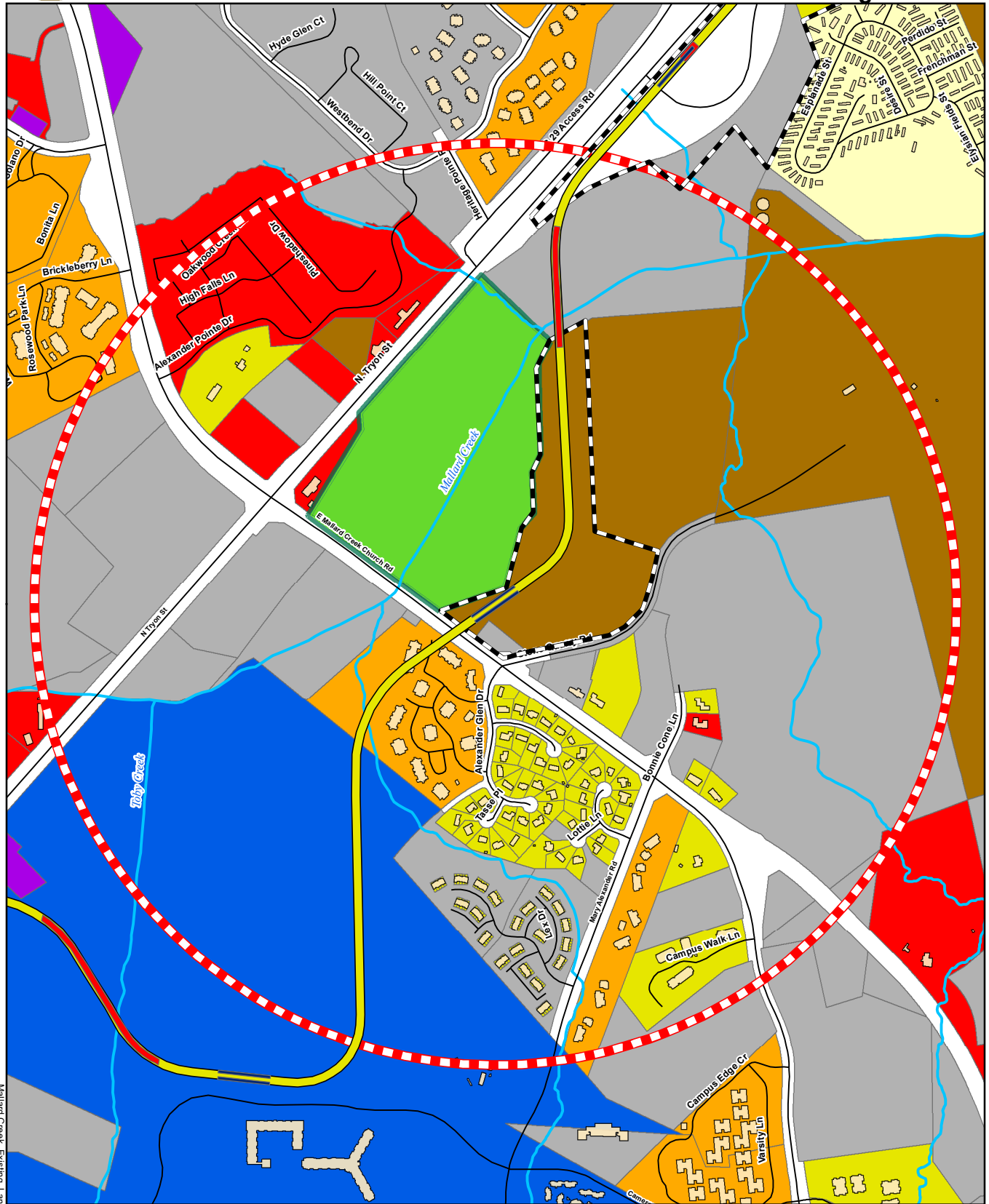
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Feet

Data Source:
Charlotte Area Transit System, STV/RWA,
Mecklenburg County GIS

UNC_Charlotte_Existing_Landuse_Buffer_Map_CB_112409.mxd

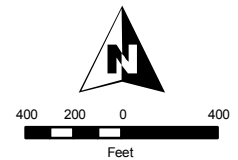
11/24/09

Mallard Creek Church Station - Existing Land Use



Legend

	Proposed Light Rail Alternative		1/2 -mile Station Radius		Vacant (45%)		Mobile Home (0%)
	Proposed Station Platform		Parks		Commercial (7%)		Industrial (18%)
	Proposed Structures		Building Footprints		Single-Family (7%)		Multi-Family (6%)
	Design Option		Roads		Public/Institution (17%)		Office (0%)
	Proposed Park-and-Ride Facilities		Railroad		Streams		
	Lynx Blue Line						

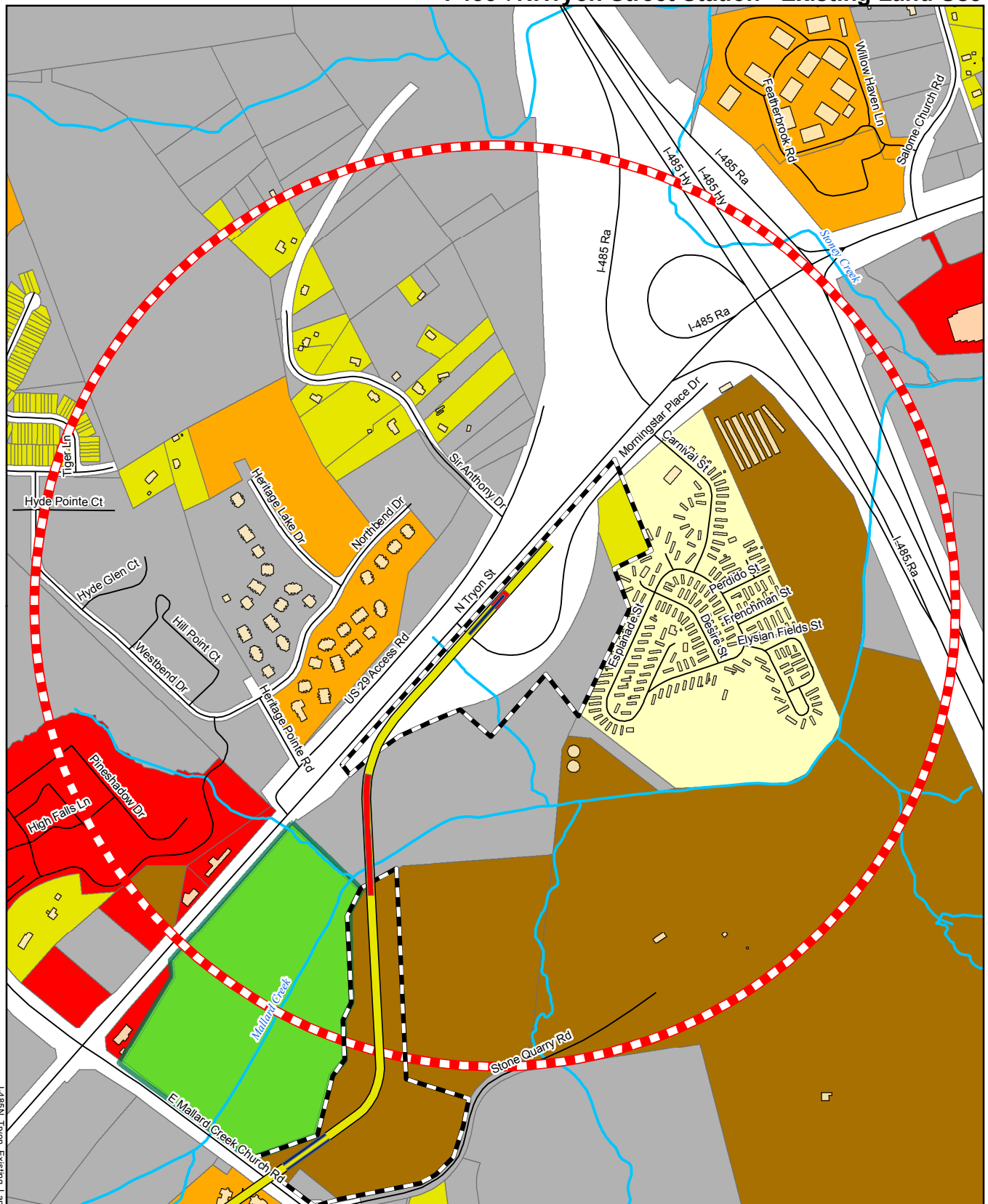


Data Source:
Charlotte Area Transit System, STV/RWA,
Mecklenburg County GIS

Mallard Creek_Existing_Landuse_Buffer_Map_CB_112409.mxd

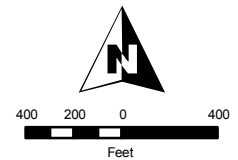
11/24/09

I-85 \ N.Tryon Street Station - Existing Land Use



Legend

- | | | | |
|-----------------------------------|--------------------------|-------------------------|-------------------|
| Proposed Light Rail Alternative | 1/2 -mile Station Radius | Vacant (39%) | Mobile Home (11%) |
| Proposed Station Platform | Parks | Commercial (4%) | Industrial (29%) |
| Proposed Structures | Building Footprints | Single-Family (11%) | Multi-Family (6%) |
| Design Option | Roads | Public/Institution (0%) | Office (0%) |
| Proposed Park-and-Ride Facilities | Railroad | | |
| Lynx Blue Line | Streams | | |



Data Source:
Charlotte Area Transit System, STV/RWA,
Mecklenburg County GIS

I-85\N_Tryon_Existing_Landuse_Buffer_Map_CB_112409.mxd

11/24/09

5.0 SOCIO-ECONOMIC CONDITIONS

This chapter describes existing population, housing and economic conditions such as employment, economic output and government finance located within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). This chapter also includes a discussion of the potential socio-economic effects of the LYNX BLE and its impact on the local economy. Potential mitigation measures are also included, where necessary.

5.1 Affected Environment

The following discussions focus on the existing population, housing and employment within the study area. A description of existing income, special economic activities, as well as finance and tax sources is also included.

5.1.1 Population, Housing and Employment

Population, housing and employment data were reviewed at the regional, county, census tract and station area levels. The following offers a summary of the data.

Population

The six-county Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (further abbreviated to MSA henceforth) has an estimated 2008 population of 1,702,000 and was ranked the 34th largest MSA in the country (U.S. Census, 2008). Mecklenburg County is the most populous county in the Charlotte-Gastonia-Concord, NC-SC MSA with an estimated 895,567 people in 2008, representing approximately 53 percent of the total 2008 MSA population. By 2030, Mecklenburg County’s population is expected to grow by 42 percent. According to the U.S. Census 2000, census tracts in the study area (all census tracts within the corridor) total 151,000 people. This represents approximately 22 percent of the Mecklenburg County population; furthermore, the population represents an approximate 62 percent increase over the population reported in 1990.

Because of the accessibility and walkability, transit stations often become focused development areas that are expected to experience economic effects as a result of a transit project. Table 5-1 shows the estimated existing population, number of housing units and total employment contained by a ½-mile buffer of the proposed light rail station areas.

**Table 5-1
Population, Housing and Employment within ½-Mile of Stations, 2009**

Station Area	Population	Housing Units	Employment
9th Street Station	4,469	2,504	25,176
Parkwood Station	1,682	515	2,163
25th Street Station	1,727	587	1,419
36th Street Station	1,968	844	2,024
Sugar Creek Station	1,477	576	1,848
Old Concord Road Station	1,862	678	1,451
Tom Hunter Station	3,496	1,147	829
University City Blvd. Station	614	233	1,427
McCullough Station	186	83	5,036
JW Clay Blvd. Station	1,372	614	2,571
UNC Charlotte Station	2,346	306	2,059
Mallard Creek Church Station	945	188	671
I-485/N. Tryon Station	1,020	420	71
Totals:	23,164	8,695	46,745

Note: Data derived from Traffic Analysis Zones (TAZs)
Source: CATS LYNX BLE, Northeast Corridor, FY11 New Starts Submittal Land Use (Quantitative) Template, 2009.

Housing

U.S. Census data revealed an approximate 65 percent increase in total households within the census tracts that are located along the proposed project corridor from 1990 to 2000. The number of households

generally increases from south to north (i.e. Center City Charlotte to I-485). The census tracts with the largest number of households include those around the University City area (i.e. Census Tracts 55.05, 55.06 and 55.07). For a more accurate depiction of existing households, TAZ level data was utilized to estimate the existing number of households around each of the proposed station areas. Table 5-1 provides a summary of the estimated existing number of housing units contained by a ½-mile buffer of the proposed station areas.

Employment

An examination of the existing employment within the study area requires a multi-scale evaluation to assess the existing employment market and trends. The total labor force in the MSA totals nearly 1.2 million, with more than 130,000 commuting into Mecklenburg County from surrounding MSA counties (Charlotte Chamber of Commerce, 2009). The workforces within the MSA vary, with the top industries in the MSA being retail trade; professional, scientific and technical services; and construction (U.S. Census, 2007). The Charlotte labor force increased by approximately 16 percent since 2000, and, during that same time, employment grew by approximately 6 percent (Charlotte Chamber of Commerce, 2009).

Within the project corridor, there are approximately 148,366 people employed, including approximately 68,630 within Center City Charlotte. This represents approximately 23 percent of the employment base for the County. Table 5-1 provides a summary of the estimated existing employment numbers using TAZ level data for all TAZs contained by a ½-mile buffer of the proposed station areas.

5.1.2 Economic Output, Jobs Creation and Income

According to the U.S. Census Bureau 2006-2008 American Community Survey, the median household incomes in Mecklenburg, Cabarrus, Union and York counties are higher than the respective state averages. The median household income in Anson and Gaston counties is lower than the North Carolina state average. Mecklenburg County and Union County have the highest median household income in the MSA at approximately \$56,766 and \$62,105, respectively. Additionally, income levels in both Mecklenburg and Union Counties increased at corresponding rates of 12 percent and 23 percent when compared to 2000 U.S. Census. Income levels in the remaining MSA counties have increased between 13 percent and 17 percent.

5.1.3 Special Economic Activities

Development activity in the proposed LYNX BLE Northeast Corridor is increasing, as the corridor provides a vital link between two major activity centers in the area (Center City Charlotte and University City). The proposed project corridor contains several economic activity centers, and for the purposes of this discussion are divided into three geographic areas: Center City Charlotte (generally 9th Street Station to I-277), North Charlotte (generally Parkwood Station to Tom Hunter Station), and the University City area (generally Tom Hunter Station to I-485/N. Tryon Station).

Center City Charlotte

The most southern portion of the project area includes Center City Charlotte and the Central Business District, the major activity and employment center for the region. Center City Charlotte contains much of the area's office space as well as the government offices for the City of Charlotte and Mecklenburg County. Center City Charlotte has seen significant change over the past decade fueled largely by redevelopment and infill development, as well as improvements to transit, including the opening of the LYNX Blue Line light rail service in 2007. Key activities in Center City Charlotte include: First Ward Urban Village; a new academic building for the University of North Carolina at Charlotte (UNC Charlotte); and, 10th Street Connector.

North Charlotte

Just north of Center City Charlotte, the development character shifts from urban development to industrial uses along the existing rail corridor. The area between Parkwood Avenue and 36th Street is dominated by industrial uses that developed because of exceptional access to freight rail and highways. The area is also developed with historic residences in the Optimist Park, Belmont, Villa Heights, and the North Charlotte Historic District neighborhoods that once served the mills and industrial areas along the rail corridor. These neighborhoods experienced disinvestment in the past, but have seen revitalization efforts

in earnest in the past five years. In addition to by-right development, the Charlotte-Mecklenburg Planning Department has received numerous requests for rezonings in the corridor since 2006. Ten properties, totaling approximately 75 acres received rezoning approvals within the North Charlotte segment. Nine of the ten approvals changed zoning designations to Mixed-Use. A number of institutional and civic land uses are also within this area including: Cordelia Park, the Little Sugar Creek Greenway, the CATS Davidson Street Bus Facility and Bus Operations Division Administrative Offices, Johnston Branch YMCA and various churches, schools and day care facilities.

Active industrial warehousing and trucking facilities are located north of 36th Street to Sugar Creek Station. Beyond the Sugar Creek station, land uses transition to residential and commercial uses before the alignment transitions to North Tryon Street/US-29. Additional detail can be found in Chapter 4.0: Land Use, Public Policy and Zoning.

University City

Some of the corridor's largest tracts of undeveloped properties and new communities are located in the University City area, which transitions from the older development along North Tryon Street/US-29 to the more recently developed area. The land surrounding this area is primarily undeveloped (greenfields), with scattered office, industrial and commercial uses found along North Tryon Street/US-29 as the corridor progresses northward. The extension of University City Blvd./US-49 is currently under construction. On the western side of North Tryon Street/US 29 is the Belgate development. This new mixed-use development currently houses two major retail sites, an IKEA and a Wal-Mart. Portions of single-family residential uses are located in the eastern part of the corridor.

As mentioned, in addition to by-right development, the Charlotte-Mecklenburg Planning Department has received numerous requests for rezonings in the corridor since 2006. Four properties, totaling approximately 63 acres received rezoning approvals within the University City area segment. The rezoning approvals largely modified existing zoning to accommodate expanded uses on the existing sites.

The City of Charlotte has established several Municipal Service Tax Districts (MSDs) to provide or maintain services beyond, or in addition to, what is provided for the entire city. The City of Charlotte can establish MSDs outside of the central business district in urban areas, if those areas are considered business centers. As such the University City Area MSD was formed and is one of the City's multi-use activity centers. The University City Area MSD includes the area between the intersection of North Tryon Street/US-29 Street and University City Blvd./NC-49 and East Mallard Creek Church Road. The University City core area has the second largest concentration of retail and office space outside of Center City Charlotte as well as two of the biggest employment centers along the Northeast Corridor - the Carolinas Medical Center (CMC) - University and the UNC Charlotte campus. The University City core is located at the intersection of W.T. Harris Boulevard and North Tryon Street/US-29 and includes shopping and entertainment uses, hotel and some residential uses.

The UNC Charlotte campus was developed on its current site in 1961 and has approximately 950 acres of land between North Tryon Street/US-29, W.T. Harris Boulevard and East Mallard Creek Church Road. The current UNC Charlotte Master Plan outlines additional expansion plans to double the existing academic space from 1.2 million square feet to 2.2 million square feet. UNC Charlotte anticipates a student population of 35,000 students by 2020.

Greenfields and new development comprise the segment of the corridor between East Mallard Creek Church Road and I-485. Some of the corridor's newest residential and retail development supporting UNC Charlotte can be found along North Tryon Street/US-29 between East Mallard Creek Church Road and the I-485/North Tryon Street/US-29 interchange area. Further north along North Tryon Street/US-29 and past I-485 there are retail commercial uses, multi-family developments, and the Starlight Movie Theater. The Verizon Wireless Amphitheatre, Charlotte's largest outdoor concert venue, is located approximately ½-mile east of North Tryon Street/US-29 on the northern side of I-485.

5.1.4 Government Finance and Tax Sources

The cities and counties in the MSA rely on property tax and sales tax revenues to fund general services. Within all of the counties in the MSA, property taxes are the largest revenue source, which fund services

including, but not limited to, fire and police, greenways and parks, local libraries and schools, and road repair. Mecklenburg County is the only county in the MSA that currently has an additional ½-percent sales tax that is dedicated to transit funding. Table 5-2 presents a summary of the revenue sources, derived from the most recent and readily available budget summaries, for entities within the MSA.

Table 5-2
Local Revenue Sources

County/City (Budget Year)	Property Tax	Sales Tax	Other Sources
Mecklenburg County (2010)	60%	9%	31%
City of Charlotte (2010)	63%	13%	24%
Anson County (2009)	45%	9%	46%
Cabarrus County (2008)	56%	7%	22%
Gaston County (2010)	54%	10%	36%
Union County (2010)	68%	13%	19%
York County (2009)	46%	--*	54%

*York County Annual Budget includes sales tax in Other Sources

Source: City of Charlotte, FY2010 Budget Summary; Mecklenburg County Strategic Business Plan 2008-2010 and Recommended Budget Fiscal Year 2010; Cabarrus County Annual Budget Fiscal Year 2009-2010; County of Anson 2008-2009 Fiscal Year Budget Ordinance; Gaston County FY 2009-2010 BOC Adopted Budget; Union County Fiscal Year 2009-2010 Adopted Budget Ordinance; York County Annual Budget FY 2008-2009.

In addition to the revenue sources noted in Table 5-2, the City of Charlotte collects additional ad valorem property tax from property owners and businesses within the defined MSDs. The project corridor crosses two MSDs, namely District 1 – Center City and District 5 – University City. The 2010 revenues for these districts are projected at \$921,385 and \$611,488, respectively. All revenues are spent on programs and services that enhance the quality of the districts.

5.2 Environmental Consequences

The effects of each alternative can be measured to varying degrees in terms of population, housing and employment; economic output, jobs creation and income; special economic activities; and government finance and tax sources. An examination of socio-economic effects requires a multi-scale analysis that considers the relationships among the regional area and the project corridor. Thus socio-economic impacts of the proposed project are evaluated at three scales, namely: at the regional level, at a smaller county/city level, and at a more refined corridor/site specific level. This multi-scale analysis provides a summary of the anticipated socio-economic impacts of the project alternatives with regards to a range of considerations, from regional good and services to changes in the local (i.e., city) tax revenue.

5.2.1 No-Build Alternative

Under the No-Build Alternative, there would be no changes to the existing transportation services or facilities in the Northeast Corridor, beyond those projects already committed. Therefore, the No-Build Alternative would not result in a change to population, housing or employment along the project corridor. However, there would be fewer opportunities for redevelopment and revitalization along the proposed project corridor, particularly around proposed station locations, resulting in a potential negative impact to population, housing and employment and future economic development related to plans and policies for transit-supportive development. This could also indirectly impact future property values and tax revenues.

5.2.2 Light Rail Alternative

5.2.2.1 Population, Housing and Employment

Due to increased connectivity, mobility and reductions in travel time that would result from the proposed Light Rail Alternative, it is anticipated that increased development would likely occur in the project corridor, based on the previously described land use plans. As a result, it is anticipated that the proposed project would result in an increase in population, housing and employment along the proposed project corridor.

Table 5-3 shows the estimated population, number of housing units and total employment in 2030 within ½-mile of the proposed station areas. Most station areas show a drastic increase of greater than 75 percent in all three categories.

**Table 5-3
Projected Population, Housing and Employment within ½-Mile of Stations, 2030**

Station Area	Population	Percent Change from 2008	Housing Units	Percent Change from 2008	Employment	Percent Change from 2008
9th Street Station	10,431	133%	6,040	141%	39,722	58%
Parkwood Station	3,419	103%	1,041	102%	3,516	63%
25th Street Station	3,549	106%	1,170	99%	2,763	95%
36th Street Station	4,101	109%	1,701	102%	3,297	63%
Sugar Creek Station	1,989	37%	777	35%	3,017	63%
Old Concord Road Station	2,358	27%	838	24%	2,509	73%
Tom Hunter Station	4,077	17%	1,318	15%	1,774	114%
University City Blvd. Station	1,902	210%	755	224%	2,490	75%
McCullough Station	2,096	1,029%	866	942%	6,687	33%
JW Clay Blvd. Station	3,283	139%	1,358	121%	3,371	31%
UNC Charlotte Station	3,151	34%	349	14%	3,967	93%
Mallard Creek Church Station	1,751	85%	400	112%	2,360	252%
I-485/N. Tryon Station	2,086	105%	777	85%	1,099	1,457%

Source: Charlotte-Mecklenburg Planning Department Land Use Projections (LUSAM Model), 2009.

Implementation of the proposed LYNX BLE would result in the acquisition and displacement of residential properties. Specifically, where the Light Rail Alternative transitions from UNC Charlotte to the Mallard Creek Church Station, the full acquisition of a multi-family building and the partial acquisition of an adjacent multi-family building would be required. However, the number of units displaced represents a very small percentage of available rental properties.

The Light Rail Alternative would also result in the full acquisition of approximately 25 parcels (approximately 20 non-vacant industrial or commercial properties), discussed in further detail in Chapter 17.0: Acquisitions and Displacements. These acquisitions would result in relocation of the businesses and employees. However, business relocations do not mean that jobs would be lost as the City of Charlotte would provide relocation assistance to displaced businesses. Given the vacancy rate in the local and regional market, it is anticipated that most businesses would find opportunities to relocate. The industrial vacancy rate is estimated at 7.6 percent, with a retail vacancy rate of 11.8 percent and office vacancy rate of 22.7 percent. 14.46 percent in the Northeast Corridor (Charlotte Business Journal, 2010). Therefore, for the purposes of this analysis it is assumed that jobs would be relocated and not eliminated.

5.2.2.2 Economic Output, Jobs Creation and Income

Construction of the Light Rail Alternative would result in increased short-term employment and spending in the project area during construction, as well as long-term benefits resulting from the project operations necessary to operate and maintain the proposed project. Capital costs are broken into six main categories including construction, right-of-way, vehicles, professional services, and contingency and finance charges. General construction includes guideway and track elements; stations, stops, terminals and intermodal elements; support facilities such as yards, shops and administration buildings; sitework and special conditions such as earthwork, utility relocation, etc.; and systems including train control and signals, etc. Right-of-way includes the costs to purchase and/or lease real estate and to relocate existing households and businesses, as applicable. Vehicle costs include those associated with the procurement of light rail vehicles and other non-revenue vehicles that may be necessary. Professional services are those associated with preliminary engineering, final design, construction administration and management, etc.

The estimated capital cost for construction of the Light Rail Alternative is \$1.2 billion in year of expenditure dollars (*Revised 15% Estimate*, Rev. 01, STV, September 11, 2009). The economic impact of

these expenditures depends on the amount of goods and services acquired locally. For example, it is anticipated that construction goods and services would largely be purchased within the MSA, providing a positive economic impact. The purchase of vehicles would not occur locally since light rail vehicles are not manufactured within the MSA. Therefore, there would be little to no economic impact on the local level from this particular expenditure.

Generally, locally funded projects yield smaller economic benefit than state and/or federally funded projects, which bring additional funds to the project area that would not normally be there. As described previously, only the inflow of funds beyond the local level (i.e. those at the state and federal levels, would be considered new expenditures that would contribute to new economic output, jobs creation and income). It is anticipated that approximately 75 percent of the proposed project costs would be provided by non-local sources (e.g. federal capital funding sources such as New Starts and state capital funding sources such as Transit Trust Funds).

Table 5-4 demonstrates the application of the RIMS II multipliers (produced by Bureau of Economic Analysis and widely used for socio-economic impact analyses) for the construction industry to the amount of new capital expenditures to provide an estimate of the net output, earnings and employment generated by the Light Rail Alternative during construction. The resulting effect of construction spending for the Light Rail Alternative would be approximately \$955 million in output. It is estimated that direct construction activities of the Light Rail Alternative would generate \$285 million in net earnings and payroll expansion and would generate 8,593 jobs in the MSA. Employment impacts from construction include direct employment (e.g. construction workers), as well as indirect (e.g. employment by businesses that provide goods and services to construction firms) and induced impacts (e.g. jobs created as a result of additional purchases made by individuals/households due to increased incomes from direct or indirect employment). These impacts are one-time impacts that would last for the duration of project construction.

**Table 5-4
Economic Effects of Construction Activity – Light Rail Alternative**

New Capital Expenditure	Final Demand Multipliers ¹			Output (thousands of dollars)	Earnings (thousands of dollars)	Employment (jobs) ²
	Output (dollars)	Earnings (dollars)	Employment (jobs)			
\$424,365,750 ³	2.2510	0.6707	20.2479	\$955,247	\$284,622	8,593

¹ U.S. Department of Commerce BEA, RIMS II, Final Demand Multipliers (Construction Industry), 2009.

² One job is defined as a job for one person for one year. A job that lasts five years would equate to five person-year jobs.

³ Represents Federal (50 percent) and State (25 percent) share of total construction cost

The Light Rail Alternative would also create jobs and additional earnings from operations and maintenance (O&M) expenditures. O&M expenditures include, but are not limited to, the expenses associated with rail operators, vehicle maintenance, right-of-way maintenance, station maintenance, and safety and security. The Light Rail Alternative would also result in an increase in bus service within the Northeast Corridor to foster connectivity between modes of transportation. These costs are associated with vehicle operating costs, vehicle maintenance costs and administration costs. It is assumed that O&M funding would be procured from local and project-generated funds, and although these expenses would be generated at the local level, O&M expenditures would not happen without the Light Rail Alternative.

Applying the RIMS II multipliers for the transit and ground passenger transportation industry to the amount of new O&M expenditures provides an estimate of net change in local earnings generated by O&M of the Light Rail Alternative. The economic effects of O&M uses direct effect multipliers because output measures are largely contingent on market prices, which are not known for the future (i.e. 2030). Table 5-5 estimates that the socio-economic impact associated with the O&M of the Light Rail Alternative would be approximately \$39 million in net earnings and payroll expansion by 2030. The increased earnings come from direct hiring for light rail and bus-affiliated jobs, as well indirect earnings that result from light rail and bus workers spending their earnings, which creates additional consumer demand and associated jobs.

**Table 5-5
Economic Effects of O&M – Light Rail Alternative, 2030**

Mode	Incremental O&M Expenditure ¹	Direct Effect Earnings Multiplier ²	Earnings (dollars)
Light Rail	\$14,320,449	2.2129	\$31,689,722
Bus	\$3,219,347 ³	2.2129	\$7,124,093
Total			\$38,813,815

¹ Sources: STV, 2009. Operations and Maintenance Quantities and Costs, Light Rail Transit; STV, 2009, Operations and Maintenance Quantities and Costs, Bus.

²Transit and Ground Passenger Transportation, Direct Effect Earnings Multipliers (Transit and Ground Passenger Transportation), U.S. Department of Commerce BEA, RIMS II, 2009.

³ Only CATS bus routes are included in the O&M cost estimate. Rock Hill-Fort Mill Area Transportation Study (RFATS) Gaston and Cabarrus/Rowan buses are excluded. Additionally, for CATS express bus routes that serve areas outside of Mecklenburg County, only 50 percent of the operating costs were included since CATS shares 50 percent of the operating costs with other entities.

The Light Rail Alternative would add approximately 96 new jobs for rail O&M by 2030 (Table 5-6). These jobs would include, but are not limited to, light rail operators and supervisors, rail car mechanics and servicers, rail shop machinists, maintenance supervisors, maintenance-of-way technicians and supervisors, track maintainers and laborers, warranty and parts managers and specialists, stores clerks and receiving clerks.

**Table 5-6
Summary of New O&M Jobs Created – Light Rail Alternative**

Labor Item	2015	2030
Vehicles Operations		
Light Rail Operators and Supervisors	35	38
Vehicle Maintenance		
Rail Car Mechanics	15	19
Rail Car Servicers	5	6
Rail Shop Machinists	2	2
Maintenance Supervisors	2	3
Maintenance-of-Way		
Maintenance-of-Way Technicians	12	12
Maintenance-of-Way Supervisors	5	5
Track Maintainers and Laborers	4	4
Warranty and Parts		
Warranty and Parts Managers/Specialists	2	3
Stores Clerks	2	3
Receiving Clerks	1	1
Total	85	96

Source: STV, 2009. Operations and Maintenance Quantities and Costs, Light Rail Transit.

5.2.2.3 Special Economic Activities

Construction of the proposed Light Rail Alternative would be anticipated to result in increased development and possible increases in property values in the project corridor. The City of Charlotte and Mecklenburg County are committed to ensuring that development principles enhance the community and provide for sustainable growth. For that effort, the City of Charlotte and Mecklenburg County have instituted several regional plans and policies to promote increased development, infill development and/or redevelopment in established urban cores, and to limit development away from primary activity centers. These plans and policies are described in detail in Chapter 4.0: Land Use, Public Policy and Zoning.

The City of Charlotte and Mecklenburg County realize that integrated land use and transit are essential to fostering sustainable growth. Therefore, the City of Charlotte has developed Transit Oriented Development (TOD) and overlay districts along key transit corridors, and has included these districts within the City of Charlotte Zoning Ordinance. The project corridor includes properties that fall within a wide range of zoning districts, reflecting varying types and intensities of residential, commercial, and industrial uses. As an implementation strategy for the development of property within a ½-mile radius of

the proposed stations area, low-density districts may be rezoned with the appropriate transit-supportive zoning districts as part of the Station Area Planning Process. A detailed discussion regarding zoning districts is included in Chapter 4.0: Land Use, Public Policy and Zoning.

CATS and the Charlotte-Mecklenburg Planning Department have developed Station Area Concepts for the proposed LYNX BLE to identify transit-supportive development opportunities and outline the unique characteristics critical to integrating each station with its surrounding area. Building on the Station Area Concepts developed for the proposed LYNX BLE as well as other land use plans such as the University City Area Plan, CATS and Planning are preparing detailed Station Area Plans to guide the specific land use changes and infrastructure projects necessary to implement transit-supportive development around each station. Once developed and adopted, the Station Area Plans would serve as a blueprint to guide growth and development surrounding the stations.

Therefore, it would be anticipated that as a result of the associated land use policies, zoning and plans, the Light Rail Alternative would result in positive effects on development. The Light Rail Alternative would contribute to economic benefits by encouraging and supporting high density land uses, particularly around station locations.

5.2.2.4 Government Finance and Tax Sources

Construction of the Light Rail Alternative would result in the full acquisition of approximately 25 parcels for easements, rights-of-way, stations (including park-and-ride lots or parking garages where applicable), substations and the Vehicle Light Maintenance Facility (VLMF). Full acquisitions would result in removal of the parcels from the local tax base, and the annual tax revenue would subsequently be lost. The subsequent annual tax revenue loss would be between \$135,000 and \$146,000 (based on 2009 property tax bills), depending on which Park-and-Ride Option is considered for the Sugar Creek Station. Given the size of overall tax revenues within the City of Charlotte (i.e. approximately \$282 million), this loss would be minor. Additionally, it is anticipated that the short-term tax revenue loss would be offset by the long-term increase in property values that are expected from economic development that would occur as a result of the proposed Light Rail Alternative.

5.2.3 Light Rail Alternative – Sugar Creek Design Option

5.2.3.1 Population, Housing and Employment

The impacts to population, housing and employment are also expected to be similar to the Light Rail Alternative. The Light Rail Alternative – Sugar Creek Design Option would result in the full acquisition of approximately 31 parcels (26 non-vacant industrial or commercial properties), as well as the acquisition of residential land uses. Acquisition of these properties would result in relocation of residences, businesses and employees. However, these impacts would be offset by the increase in housing and that most business would find opportunities to relocate.

5.2.3.2 Economic Output, Jobs Creation and Income

The capital costs for construction of the Light Rail Alternative – Sugar Creek Design Option based on *15% Preliminary Engineering Design Plans* are estimated at \$1.277 million, approximately \$70 million more than the Light Rail Alternative.

As described previously in Section 5.2.2.2, only the inflow of funds beyond the local level (i.e. those at the state and federal levels, would be considered new expenditures that would contribute to new economic output, jobs creation and income). The same assumptions and multipliers used for the Light Rail Alternative were used to evaluate the effect of construction spending for the Light Rail Alternative – Sugar Creek Design Option, which would be approximately \$977 million in output (Table 5-7). It is estimated that direct construction activities of the Light Rail Alternative – Sugar Creek Design Option would generate \$288 million in net earnings and payroll expansion and would generate 8,704 jobs in the MSA, both slightly greater than what would be generated for the Light Rail Alternative.

**Table 5-7
Economic Effects of Construction Activity
Light Rail Alternative – Sugar Creek Design Option**

New Capital Expenditure	Final Demand Multipliers ¹			Output (thousands of dollars)	Earnings (thousands of dollars)	Employment (jobs) ²
	Output (dollars)	Earnings (dollars)	Employment (jobs)			
\$429,860,250 ³	2.2510	0.6707	20.2479	\$976,615	\$288,307	8,704

¹ U.S. Department of Commerce BEA, RIMS II, Final Demand Multipliers (Construction Industry), 2009.

² One job is defined as a job for one person for one year. A job that lasts five years equates to five person-year jobs.

³ Represents Federal (50 percent) and State (25 percent) share of total construction project cost

The Light Rail Alternative – Sugar Creek Design Option would also create jobs and additional earnings for O&M expenditures, as described in Section 5.2.2.2. The economic effects of O&M of the Light Rail Alternative – Sugar Creek Design Option would be the same as for the Light Rail Alternative (see Section 5.2.2.2).

5.2.3.3 Special Economic Activities

The Light Rail Alternative – Sugar Creek Design Option would transition the alignment to North Tryon Street/US-29 from the NCRR right-of-way just north of the Sugar Creek Road crossing. The *CATS Blue Line Extension Sugar Creek and North Carolina Railroad Alignment Alternatives Study* (February 2009), revealed that the Light Rail Alternative – Sugar Creek Design Option was similar to the Light Rail Alternative with regards to several parameters, including economic development impacts. Therefore, like the Light Rail Alternative, the Light Rail Alternative – Sugar Creek Design Option is expected to have positive effects on development and thus contribute economic benefits by encouraging and supporting high density land uses, particularly around station locations.

5.2.3.4 Government Finance and Tax Sources

Construction of the Light Rail Alternative – Sugar Creek Design Option would result in the full acquisition of approximately 31 parcels for easements, rights-of-way, stations (including park-and-ride lots or parking garages where applicable), substations and the VLMF. Full acquisitions would result in removal of the parcels from the local tax base, and the annual tax revenue would subsequently be lost. The subsequent annual tax revenue loss would be approximately \$168,000. The property tax estimate is based on 2009 property tax bills. The Light Rail Alternative – Sugar Creek Design Option would be located behind the existing Asian Corners shopping center, thereby reducing the potential for economic impact (*Market Potential Analysis* prepared by Warren & Associates, November 2008). However, the area would have the redevelopment potential to offset the short-term loss in tax revenue.

5.3 Mitigation

5.3.1 Light Rail Alternative

Construction of the proposed Light Rail Alternative would likely result in an increase in population, housing supply and employment, particularly around the proposed transit stations. These changes would be consistent with existing plans and policies. Therefore, no mitigation is warranted.

The Light Rail Alternative is not expected to result in negative impacts to economic output, jobs creation or income. Therefore, mitigation measures are not warranted.

The Light Rail Alternative is not expected to result in significant adverse land use impacts or significant adverse impacts to zoning or public policy. Land use changes would be supportive of existing plans and policies, and existing and future growth along the corridor would enhanced transit access and mobility. The Light Rail Alternative would also facilitate future transit-oriented development called for in existing local and regional plans. Station Area Plans will be formally adopted and implemented for the areas discussed in Section 5.2.2.3. No mitigation is warranted.

Tax revenue would be lost as a result of the proposed Light Rail Alternative. However, the overall loss would be small compared to the City and County’s total tax base. Additionally, to mitigate this potential loss, the City of Charlotte and Mecklenburg County have instituted regional plans and policies to promote increased development, infill development and/or redevelopment. These efforts will mitigate tax revenue losses that would result from the proposed Light Rail Alternative by creating positive effects on development and thus contributing economic benefits.

5.3.2 Light Rail Alternative – Sugar Creek Design Option

No additional mitigation would be required for the Light Rail Alternative – Sugar Creek Design Option beyond what is described for the Light Rail Alternative.

6.0 NEIGHBORHOODS, COMMUNITY SERVICES AND ENVIRONMENTAL JUSTICE

This chapter provides an assessment of potential impacts to neighborhoods, community facilities and special populations located within the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). Neighborhoods within the study area are described and community facilities are identified. Potential direct effects to communities and special populations are discussed in terms of the long-term direct effects associated with the alternatives under study in this Draft Environmental Impact Statement (EIS).

6.1 Affected Environment

The following sections describe the existing conditions of corridor neighborhoods; community services and social service providers; and environmental justice communities of concern. The study area for the assessment of neighborhoods includes all neighborhood statistical areas (NSAs) located adjacent to the proposed project corridor. The study area for the assessment of environmental justice populations includes census tracts located within or adjacent to the proposed project corridor. Existing community facilities within ½-mile of the proposed project corridor were identified. The environmental justice study area is defined as any census tract partially or wholly within ½-mile of the proposed alignments. Data was collected at the block group level for the study area and for Mecklenburg County for comparative purposes (including for minority households, transit-dependent populations and low-income households) and was aggregated to the Census Tract level for presentation within this Draft EIS. The entire county was selected as the appropriate comparison tool because of the potential regional influence of this proposed project and because it best represents the regional project area.

6.1.1 Neighborhoods

Descriptions of study area neighborhoods are based on site visits, aerial photography and the *Charlotte Neighborhood Quality of Life Study 2008*, completed for the City of Charlotte Neighborhood Development and the Charlotte-Mecklenburg Planning Commission by the University of North Carolina at Charlotte's (UNC Charlotte's) Metropolitan Studies Group. The *Charlotte Quality of Life Study 2008* is the most recent in a series of studies conducted to evaluate living conditions in Charlotte's neighborhoods. The study report includes a profile for each of the city's 173 NSAs and rates each neighborhood's condition and quality of life relative to those in other NSAs (using the following dimensions to develop neighborhood profiles: social, physical, crime, and economic conditions).

Overall, the Northeast Corridor has relatively healthy neighborhoods and none of the neighborhoods located along the proposed project corridor are identified as "challenged." Table 6-1 presents the results of the *Charlotte Neighborhood Quality of Life Study 2008* for the neighborhoods in the Northeast Corridor study area. The neighborhoods adjacent to the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option are presented generally in geographic order from Center City Charlotte to the Mecklenburg-Cabarrus County line and are also shown in Figure 6-1.

Following Table 6-1 is a brief description of each neighborhood located within the study area. Calculations for the percentage of persons within a specific neighborhood with access to transit are based on the percentage of NSA residents living within walking distance (¼-mile) of a bus-stop. Pedestrian friendliness of each neighborhood was rated by comparing the total length of sidewalks to the total length of streets within each neighborhood. The data and calculations are from the *Charlotte Neighborhood Quality of Life Study 2008*.

**Table 6-1
Summary of Northeast Corridor Neighborhood Demographics and Quality of Life Index**

NSA	Neighborhood	Population	Median Household Income	Average Home Value	Overall Quality of Life	Trend Change 2002-2008
67	First Ward	2,172	\$32,776	\$314,023	Stable	No Change
32	Fourth Ward	3,006	\$47,357	\$316,706	Stable	Trending Up
51	Belmont	2,487	\$26,215	\$97,308	Stable	Trending Up
45	Optimist Park	733	\$24,597	\$109,614	Stable	Trending Up
35	Lockwood	921	\$22,321	\$75,262	Transitioning	Trending Up
46	Villa Heights	2,332	\$31,452	\$87,837	Transitioning	Trending Up
36	Tryon Hills	2,172	\$29,170	\$53,681	Transitioning	Trending Up
48	Plaza-Shamrock	3,513	\$32,806	\$93,462	Transitioning	No Change
44	North Charlotte	3,443	\$29,231	\$201,820	Stable	Trending Up
40	Sugaw Creek/ Ritch Avenue	2,666	\$29,785	\$95,897	Transitioning	Trending Up
142	Shannon Park	7,110	\$39,523	\$87,892	Transitioning	No Change
141	Hampshire Hills	6,055	\$40,389	\$85,318	Transitioning	Trending Down
140	Hidden Valley	12,127	\$34,746	\$70,867	Transitioning	No Change
139	Newell South	2,240	\$47,743	\$140,536	Transitioning	Trending Down
133	Mineral Springs/ Rumple Road	6,938	\$57,205	\$126,555	Transitioning	No Change
138	College Downs	5,779	\$38,828	\$102,230	Stable	Trending Up
134	University City South	5,200	\$35,784	\$83,173	Transitioning	No Change
132	University City North	5,994	\$59,086	\$127,768	Transitioning	Trending Up
135	Harris-Houston	7,610	\$50,776	\$120,998	Transitioning	Trending Down

Ratings are defined as follows:

- Stable – Neighborhoods identified as above average and having few neighborhood and social problems, low rates of crime, few physical needs, sound housing and high levels of economic vitality.
- Transitioning – Neighborhoods characterized as average on most dimensions but may display weakness on one or more dimensions, indicating a possible shift in the overall quality of life. Transitioning status can be of an improving or declining position, relative to other Charlotte NSAs.
- Challenged – Neighborhoods that scored low-to-moderate on all four dimensions and characteristic of a lower quality of life and “at risk” on multiple dimensions. Neighborhoods are characterized by high rates of physical deterioration, crime, social needs and low rates of income change (even declines). Challenged neighborhoods generally have a below average quality of life in comparison to other Charlotte NSAs.

A 6-year analysis (2002-2008) identified changes from the previous ratings and are generally defined as follows:

- Trending Up – Neighborhoods experiencing improvements in performance with a cumulative positive change in variable scores.
- No Change – These neighborhoods experienced slight or modest changes in scores (improving or declining).
- Trending Down – Neighborhoods that experienced declining scores for individual and cumulative variables.

Source: *Charlotte Neighborhood Quality of Life Study 2008*

First Ward (NSA-67)

The First Ward neighborhood is located in Center City Charlotte and is part of the High Intensity Urban Core District. The neighborhood is bound on the north and east by Interstate 277 (I-277) and extends south to East Trade Street and west to North Tryon Street/US-29. First Ward encompasses a mix of uses including offices, institutional and high-density residential. The neighborhood is also home to several community facilities including a fire station and a school. A new park, called First Ward Park, is also proposed for the neighborhood and would be an urban park within a mixed-use development between

East 7th Street, East 9th Street and North Brevard Street. The park would be constructed by a private developer as part of a public-private partnership and would also include construction of the UNC Charlotte Uptown Campus on the site. The neighborhood is well developed with sidewalks and within walking distance to many amenities within Center City Charlotte and approximately 100 percent of residents have access to public transportation.

Fourth Ward (NSA-32)

Fourth Ward is located northwest of First Ward in Center City Charlotte, between I-277 to the north, North Tryon Street/US-29 to the east, East Trade Street to the south and Smith Street to the west. Fourth Ward is part of the High Intensity Urban Core District and includes a mixture of land uses including both single-family and multi-family residential, and some neighborhood retail. The neighborhood also contains community facilities including a police station, a fire station and several religious institutions. The location provides walk-to-work opportunities to most of the high-rise office buildings located in Center City Charlotte and approximately 100 percent of residents have access to public transportation.

Belmont (NSA-51)

Belmont is located east of Center City Charlotte, just outside of I-277, within the Industrial Communities District. The neighborhood is bound by North Davidson Street to the west, Parkwood Avenue to the north, Hawthorne Lane to the east and East 10th Street to the south. The area was historically an industrial and working-class mill neighborhood and much of the historic mill housing is still present. The proximity of the neighborhood to Center City Charlotte has made it a popular area for redevelopment and in-fill housing, including industrial mill conversions throughout. The primary land use in the neighborhood is single-family residential with industrial and neighborhood commercial uses scattered throughout. The neighborhood also includes two middle schools, several parks, a greenway/trail, churches and a library. Approximately 100 percent of residents have access to public transportation.

Optimist Park (NSA-45):

Optimist Park is located along the west side of Belmont, adjacent to the Norfolk Southern Intermodal Facility between I-277 and 30th Street/Matheson Avenue. The neighborhood is within the Industrial Communities District and is dominated by industrial uses (primarily along the existing railway corridor), with a concentration of single-family homes in the southern portion. A few multi-family and commercial uses are scattered throughout, as well as several religious institutions. The Little Sugar Creek Greenway runs along portions of Optimist Park and a future extension of the greenway is proposed through the northern portion of the neighborhood. Approximately 100 percent of residents have access to public transportation.

Lockwood (NSA-35)

Lockwood is located northeast of Center City Charlotte, roughly between Graham Street, West 24th Street, the existing railway and I-277. This neighborhood is part of the Industrial Communities District, and land use in this neighborhood is primarily industrial with a small concentration of single-family residences on the western side of North Tryon Street/US-29. The neighborhood houses several religious institutions and the Charlotte Amtrak Station. The pedestrian friendliness of the neighborhood is rated as medium and approximately 100 percent of residents have access to public transportation.

Villa Heights (NSA-46)

Villa Heights is part of the Industrial Communities District and is located north of Belmont and east of the northern portion of Optimist Park. The neighborhood is bordered by Matheson Avenue to the north, Clemson Avenue and The Plaza to the east, Parkwood Avenue to the south and North Davidson Street to the west. The neighborhood primarily contains single-family residences, with some commercial uses fronting The Plaza and industrial uses along North Davidson Street. Cordelia Park is located in the southwestern portion of the neighborhood. The pedestrian friendliness of the neighborhood is rated as low and approximately 90 percent of residents have access to public transportation.

Tryon Hills (NSA-36)

Tryon Hills is located to the north of the Lockwood neighborhood and is roughly bordered by 24th Street, North Graham Street, an existing railway and North Tryon Street/US-29. Tryon Hills is part of the Industrial Communities District and contains a mixture of multi- and single-family housing bordered by

industrial uses. Tryon Hill Park is located within the neighborhood, but there are relatively few community facilities otherwise. The pedestrian friendliness of the neighborhood is rated as low; however, approximately 100 percent of residents have access to public transportation.

Plaza-Shamrock (NSA-48)

Plaza-Shamrock is located at the eastern edge of the Northeast Corridor and is bordered by The Plaza, Eastway Drive, East Ford Road/Shamrock Drive/Hillard Drive and Matheson Avenue. The neighborhood is not located within a specific design district due to its distance from the proposed project corridor. Land use in the neighborhood is predominantly single-family residential, with a few concentrations of multi-family residential. The neighborhood also includes small areas of commercial and industrial uses and there are two schools and several religious organizations. The pedestrian friendliness of the neighborhood is rated as low; however, approximately 100 percent of residents have access to public transportation.

North Charlotte (NSA-44)

North Charlotte is bordered by an existing railway corridor to the north, Eastway Drive to the east, The Plaza to the south, and Clemson Avenue and Matheson Avenue to the west. The neighborhood encompasses a mix of residential, commercial and industrial uses and is part of the Historic Urban Communities District. Much of the neighborhood is designated as a historic district (North Charlotte Historic District). In recent years, North Charlotte, particularly the NoDa community, has seen redevelopment, infill development and adaptive reuse of former mills, as well as residential renovations. The North Charlotte neighborhood also contains several community facilities including churches, schools, parks and a YMCA. The pedestrian friendliness of the neighborhood is rated as low and approximately 85 percent of residents have access to public transportation.

Sugaw Creek/Ritch Avenue (NSA-40)

Sugaw Creek/Ritch Avenue is located north and east of Tryon Hills and is bordered by North Graham Street, I-85, Sugar Creek Road and the existing rail corridor. The neighborhood is located within both the Historic Urban Communities District and the Established Suburban Communities District. The western portion of the neighborhood is composed of industrial and commercial uses, while the eastern portion includes single-family and multi-family residential uses. Some single-family residential uses can also be found scattered throughout the industrial and commercial uses. A school, police station and a library are also located within this neighborhood. The pedestrian friendliness of the neighborhood is rated as low and approximately 90 percent of residents have access to public transportation.

Shannon Park (NSA-142)

Shannon Park is located at the eastern edge of the Northeast Corridor and is bordered by The Plaza, Eastway Drive, Shamrock Drive and Tipperary Place. The neighborhood is not located within a specific design district due to its distance from the proposed project corridor. Land use in the neighborhood is predominantly single-family residential and there are several religious institutions. The pedestrian friendliness of the neighborhood is rated as low and approximately 75 percent of residents have access to public transportation.

Hampshire Hills (NSA-141)

Hampshire Hills is located north of North Charlotte. The neighborhood is primarily bound by North Tryon Street/US-29, Orr Road, Newell-Hickory Grove Road, The Plaza and Eastway Drive. A small western portion of the neighborhood is bordered by the existing railway, Sugar Creek Road and North Tryon Street/US-29. The neighborhood is located within the Established Suburban Communities District and is composed of residential, industrial and commercial uses. Several religious institutions and a large district park (Eastway Park) are also located within this neighborhood. The pedestrian friendliness of the neighborhood is rated as low and approximately 90 percent of residents have access to public transportation.

Hidden Valley (NSA-140)

Hidden Valley is located east of the Sugaw Creek/Ritch Avenue neighborhood, between Sugar Creek Road, I-85 and North Tryon Street/US-29. The neighborhood is located within the Established Suburban Communities District and consists of a core of single-family homes and multi-family complexes.

Commercial and industrial uses are located along North Tryon Street/US-29 and near the Sugar Creek Road/I-85 interchange. Hidden Valley also includes two schools, several religious institutions and the Hidden Valley Eco Park (stormwater restoration area). The pedestrian friendliness of the neighborhood is rated as low and approximately 96 percent of residents have access to public transportation.

Newell South (NSA-139)

Newell South is located northeast of Hampshire Hills, between Rocky River Road, Old Concord Road, Orr Road and North Tryon Street/US-29. The neighborhood is located within the Established Suburban Communities District, and land use is predominantly single-family residential, with industrial and commercial uses along North Tryon Street/US-29. Several religious institutions are located within the neighborhood and a charter high school is located along North Tryon Street/US-29. The pedestrian friendliness of the neighborhood is rated as low and 20 percent of residents have access to public transportation.

Mineral Springs/Rumple Road (NSA-133)

Mineral Springs/Rumple Road is located west of College Downs and University City North and directly adjacent to “the weave.” The neighborhood is bordered by I-85, North Tryon Street/US-29, W.T. Harris Boulevard, IBM Drive, Mallard Creek Road, Sugar Creek Road and North Graham Street. The neighborhood contains a large portion of the University City core commercial area and is located in an area of transition from the Established Suburban Communities District to the New Suburban Communities District. There are a variety of land uses within the neighborhood including single- and multi-family residential, office, and commercial uses, and vacant land. There is a large concentration of commercial uses at the intersection of W.T. Harris Boulevard and North Tryon Street/US-29. The pedestrian friendliness of the neighborhood is rated as low and approximately 50 percent of residents have access to public transportation.

College Downs (NSA-138)

College Downs is located northeast of Newell South, east of University City Blvd./NC-49 and north of Rocky River Road. A small portion of the neighborhood is located along North Tryon Street/US-29 and the neighborhood is within the New Suburban Communities District. Land uses throughout College Downs include commercial and single- and multi-family residential. However, much of the existing land use is primarily commercial and undeveloped land. There are no community facilities within this neighborhood. The pedestrian friendliness of the neighborhood is rated as low and 30 percent of residents have access to public transportation.

University City South (NSA-134)

University City South is located north and west of College Downs, between North Tryon Street/US-29, Mallard Creek Church Road, and University City Blvd./NC-49 and is part of the University City Core District. Institutional land uses dominate this neighborhood, with UNC Charlotte and Carolinas Medical Center-University (CMC-University) making up the northern two-thirds of the area. The southern tip of the neighborhood includes commercial and office park uses. Many of these uses are located along North Tryon Street/US-29. Residential areas include a small area of single-family residences south of W.T. Harris Boulevard and a mix of single- and multi-family residences north of UNC Charlotte along Mallard Creek Church Road. The pedestrian friendliness of the neighborhood is rated as low; however, approximately 100 percent of residents have access to public transportation.

University City North (NSA-132)

University City North is located north and west of University City South and is part of the University City Core District. The neighborhood is bordered by Interstate I-85, Interstate I-485, North Tryon Street/US-29 and W.T. Harris Boulevard. The area includes a mix of commercial and higher-density residential uses, as well as some undeveloped land. Large commercial development can be found near the intersection of W.T. Harris Boulevard and North Tryon Street/US-29. There are no community facilities located within this neighborhood. The pedestrian friendliness of the neighborhood is rated as low; however, approximately 100 percent of residents have access to public transportation.

Harris-Houston (NSA-135)

Harris-Houston is located northeast of University City South, between North Tryon Street/US-29, the Mecklenburg-Cabarrus County line, University City Blvd./NC-49 and Mallard Creek Church Road. The neighborhood is located within the New Suburban Communities District. South of I-485, the neighborhood includes undeveloped land, industrial uses and some residential uses. However, the majority of residents within this neighborhood live on the northern side of I-485. The neighborhood also includes a large park (Kirk Farm Fields) and a greenway trail (Mallard Creek Greenway). The pedestrian friendliness of the neighborhood is rated as low and only 40 percent of residents have access to public transportation.

6.1.2 Community Services and Social Service Providers

Community services/facilities and social service providers include, educational, religious and healthcare facilities to public libraries, police/fire stations and post offices located within a ½-mile of the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option (Table 6-2). The evaluation of the effect of the proposed alternatives on neighborhoods and communities includes the consideration of the potential direct impacts of the project on these services/facilities, as these services contribute to the overall quality of life and sense of community in these areas.

**Table 6-2
Community Services and Social Service Providers**

Facility Name	Address	Facility Type
Police Station – Headquarters	601 East Trade Street	Police Station
Fire Station #1	221 North Myers Street	Fire Station
Children & Family Services Center	601 East 5th Street	Government Facility
Carole A. Hoefner Community Services Center	610 East 7th Street	Community Center
UNC Charlotte – Uptown Campus (Existing)	220 North Tryon Street	University
Police Station - Central Division	119 East 7th Street	Police Station
First United Presbyterian Church	406 North College Street	Religious Institution
Main Branch Library	310 North Tryon Street	Library
First United Methodist Church	501 North Tryon Street	Religious Institution
Fire Station #4	525 North Church Street	Fire Station
Fire Station – Administrative Division	228 East 9th Street	Government Facility
Hal Marshall Services Center Annex	618 North College Street	Government Facility
Hal Marshall Center	700 North Tryon Street	Government Facility
First Ward Elementary School	715 North Caldwell	School
Mecklenburg County Services Center	624 College Street	Government Facility
United Baptist Association	2313 Vinyard Lane	Religious Institution
First Ward Community Center	1410 North Tryon Street	Community Center
Duncan Memorial Methodist Church	420 East 15th Street	Religious Institution
Good Shepherd Baptist Church	1139 North Alexander Street	Religious Institution
Fifteenth Street Church of God	615 East 15th Street	Religious Institution
Episcopal Diocese of North Carolina	425 East 17th Street	Religious Institution
Corinthian Missionary Baptist Church	1404 North Church Street	Religious Institution
Bethlehem Fire Baptist Church	421 East 18th Street	Religious Institution
Jerusalem Pentecostal	421 East 18th Street	Religious Institution
Belmont Center Branch Library	700 Parkwood Avenue	Library
Seigle Avenue Church of God	1620 Seigle Avenue	Religious Institution
Villa Heights Elementary School	800 Everett Place	School
Greater Myers Pentecostal Church	606 Jordan Place	Religious Institution
First Mount Calvary Baptist	209 West 28th Street	Religious Institution
New Life Theological Seminary	3117 Whiting Avenue	Religious Institution
Highland Mill Montessori School	3201 Clemson Avenue	School
Johnson Branch YMCA	3025 North Davidson Street	YMCA
CMC Health Center	3025 North Davidson Street	Medical Center
Fire Station #7	3210 North Davidson Street	Fire Station
Union Missionary Baptist Church	721 East 35th Street	Religious Institution
Church of Jesus Christ of Latter-Day Saints	600 East 36th Street	Religious Institution
North Charlotte Presbyterian Church	719 East 36th Street	Religious Institution

Table 6-2 (continued)
Community Services and Social Service Providers

Facility Name	Address	Facility Type
Spencer Memorial Methodist Church	1025 East 36th Street	Religious Institution
Plaza Road Pre-K School	1000 Anderson Street	School
Mount Caramel Church of God	3901 The Plaza	Religious Institution
Zion Primitive Baptist	827 Sugar Creek Road	Religious Institution
Highland Renaissance Academy	125 West Craighead Road	School
Joblink Center	4045 North Tryon Street	Government Facility
Sugar Creek Branch Library	4045 North Tryon Street	Library
Police Station - North Tryon Division	4045 North Tryon Street	Police Station
Hispanic Church/Faith Based Facility	4409 North Tryon Street	Religious Institution
The Vietnamese Baptist Church	4301 Howie Circle	Religious Institution
Mount Zion Church of God Holiness	4600 The Plaza	Religious Institution
Faith Christian Methodist Church	457 Wellingford Street	Religious Institution
CMC – Northpark	251 Eastway Drive	Medical Center
Crossroads Charter High School	5500 North Tryon Street	School
Iglesia Pentecostes Church	5714 Old Concord Road	Religious Institution
Harbor Baptist Church	5801 Old Concord Road	Religious Institution
Center for Community Transitions	6000 Old Pineville Road	Government Facility
Greenville Memorial Zion Church	6116 Montith Drive	Religious Institution
Kingdom Purpose Church	6108 North Tryon Street	Religious Institution
New Direction Church	6201 Elgywood Lane	Religious Institution
Christ Gospel Church	312 Tom Hunter Road	Religious Institution
Landmark Baptist Church	400 Tom Hunter Road	Religious Institution
Gloryland Baptist Church	3001 Gloryland Avenue	Religious Institution
U.S. Post Office – North Tryon	6700 North Tryon Street	Post Office
Camino Del Rey Ministries	133 Stetson Drive	Religious Institution
New Hampton Presbyterian	201 Hampton Church Road	Religious Institution
Police Station – University City Division	8401 University Executive Park Drive	Police
Department of Motor Vehicles	8446 North Tryon Street	Government Facility
Fire Station #27	111 Ken Hoffman Road	Fire Station
University City Regional Branch Library	301 East W.T. Harris Boulevard	Library
CMC-University	8800 North Tryon Street	Medical Center
UNC Charlotte	9201 University City Boulevard	University

6.1.3 Environmental Justice

To comply with Executive Order 12898, the presence of minority and low-income persons in the study area was determined. In addition, concentrations of transit-dependent populations, such as the elderly, children, and households without a vehicle, were identified. Concentrations of minorities and other special population groups near the proposed project corridor were identified through analysis of the 2000 U.S. Census data at both the County and census tract level. The individual tract data were compared to the countywide data to determine if any of the tracts would qualify as having large concentrations of one or more special populations. These concentrations are referred to as communities of concern.

Communities of concern were identified as those census tracts with either a large concentration of minority residents or median income levels substantially lower than the county-wide median income. A tract was categorized as having a community of concern if:

- Minority population within that tract was greater than or equal to 49 percent of total tract population; or,
- Median income for that tract was less than \$40,463 (80 percent of the 2000 Mecklenburg County median income).

Table 6-3 lists the 2000 census tracts that are located within the ½-mile study area and indicates whether high concentrations of minority and/or low-income residents were present. This information is also shown in Figure 6-2. In addition, the median household incomes listed in Table 6-3 may not be the same as the ones listed in Table 6-1. The median household incomes in Table 6-1 were based on neighborhood NSA boundaries from the *Charlotte Neighborhood Quality of Life Study 2008*. The median household incomes listed in Table 6-3 are based on census tracts with different boundaries for the defined neighborhoods.

As shown in Table 6-3, 16 of the 19 census tracts in the proposed project corridor include communities of concern. The census tracts in the southern portion of the study area generally meet the threshold for both minority and low-income residents. The communities of concern identified in the northern portion of the study area meet the threshold for low-income.

In addition to communities of concern, special populations of interest include transit-dependent populations. Generally, the elderly, children, zero-car households, and low-income populations are considered to be transit-dependent. These categories are not mutually exclusive and the different types of data are not consistent by one type of population unit (i.e., some information is by individual, some by household, some by housing unit). Therefore, it was not possible to correlate the data to obtain an accurate composite number of transit-dependent individuals for each tract. Instead, Table 6-3 includes the first three indicators for transit dependency by census tract. These transit-dependent neighborhoods are shown in Figure 6-2. The threshold for the transit-dependent categories is if the percentage of the population of a particular group within a tract is at least 10 percent greater than the percentage of that population in the county. These criteria resulted in the following threshold values for transit dependency:

- The elderly population (age 65 and older) within a tract is greater than or equal to 19 percent of total tract population (Note: none of the census tracts were comprised of an elderly population and this category is therefore not included in Table 6-3);
- The youth population (age 0 to 17) within a tract is greater than or equal to 35 percent of total tract population;
- The percentage of zero-car housing units (based on occupied housing units) within a tract is greater than or equal to 17 percent; and,
- Median income for that tract is equal to or less than \$40,463 (80 percent of the 2000 Mecklenburg County median income).

**Table 6-3
Communities of Concern within the Study Area**

Neighborhood	Census Tract	Total Population	Total Minority Population	% Minority Population	Median Household Income	% Elderly	% Youth	% Zero-Car Housing Units	Communities of Concern		Large Concentration of Transit-Dependent	
									Minority	Low-Income	Youth	Zero-Car
First Ward	6	1,711	1,417	83%	\$14,338	5%	17%	26%	●	●		●
	1	1,147	442	39%	\$35,385	12%	2%	28%	●	●		●
Fourth Ward	5	2,388	1,270	53%	\$36,711	11%	13%	25%	●	●		●
Belmont	8	3,099	2,991	97%	\$16,995	5%	40%	44%	●	●	●	●
Optimist Park	7	627	614	98%	\$25,233	6%	24%	19%	●	●		●
Lockwood/ Tryon Hills	52	3,056	2,930	96%	\$26,230	9%	30%	32%	●	●		●
Villa Heights	9	2,172	2,103	97%	\$28,173	9%	30%	22%	●	●		●
Plaza-Shamrock	13	4,288	2,657	62%	\$32,607	13%	25%	17%	●	●		●
Shannon Park	15.04	4,806	3,706	77%	\$36,625	10%	31%	12%	●	●		
North Charlotte	14	2,687	1,771	66%	\$25,762	9%	25%	22%	●	●		●
Sugaw Creek/ Ritch Avenue	53.01	2,649	2,146	81%	\$28,991	6%	23%	16%	●	●		
Hampshire Hills	15.06	6,454	5,552	86%	\$41,358	6%	28%	9%	●			
Hidden Valley	53.03	6,970	6,264	90%	\$35,203	8%	26%	10%	●	●		
	53.04	6,393	6,186	97%	\$31,633	1%	28%	18%	●	●		●
Newell South	15.05	2,875	1,188	41%	\$47,202	8%	28%	4%				
Mineral Springs/ Rumble Road/ University City North	55.07	10,240	4,252	42%	\$50,671	6%	19%	2%				
College Downs	56.05	3,718	1,428	38%	\$39,434					●		
University City South	56.04	4,880	1,779	36%	\$33,723	0%	1%	4%		●		
Harris-Houston	56.03	6,373	2,884	45%	\$52,755	1%	23%	4%				

Source: 2000 U.S. Census Data

6.2 Environmental Consequences

This section discusses the potential impacts of the proposed project alternatives, including the No-Build Alternative, the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option on neighborhoods, community facilities and environmental justice populations. Table 6-4 is a summary of neighborhood impacts.

**Table 6-4
Summary of Potential Impacts on Neighborhoods**

Resource	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
First Ward	No Impact	No Impact	(n/a)
Fourth Ward	No Impact	No Impact	n/a
Belmont	No Impact	No Impact	n/a
Optimist Park	No Impact	No Impact	n/a
Lockwood	No Impact	No Impact	n/a
Villa Heights	No Impact	No Impact	n/a
Tryon Hills	No Impact	No Impact	n/a
Plaza-Shamrock	No Impact	No Impact	n/a
Shannon Park	No Impact	No Impact	n/a
North Charlotte	No Impact	Potential Impact (VA)	n/a
Sugaw Creek/Ritch Avenue	No Impact	No Impact	n/a
Hampshire Hills	No Impact	No Impact	No Impact
Hidden Valley	No Impact	Potential Impact (NV)	Potential Impact (N)
Newell South	No Impact	No Impact	n/a
Mineral Springs/Rumple Road	No Impact	No Impact	n/a
College Downs	No Impact	No Impact	n/a
University City South	No Impact	Potential Impact (AD, NV, VA)	n/a
University City North	No Impact	No Impact	n/a
Harris-Houston	No Impact	Potential Impact (VA)	n/a

n/a Indicates that the Light Rail Alternative – Sugar Creek Design Option is not located within the neighborhood
 AD Indicates impacts from acquisitions and displacements
 NV Indicates impacts from noise and vibration
 VA Indicates impacts to visual and aesthetic environment

6.2.1 No-Build Alternative

The No-Build Alternative would consist of a future scenario with no changes to transportation services or facilities in the Northeast Corridor, beyond the projects that are already committed. As a result, impacts to neighborhoods and community facilities would not occur under the No-Build Alternative. However, with the No-Build Alternative, neighborhoods and community facilities in the Northeast Corridor would not benefit from enhanced access to transit that would be associated with the implementation of the proposed Light Rail Alternative or Light Rail Alternative – Sugar Creek Design Option.

6.2.2 Light Rail Alternative

The following sections describe the direct impacts to neighborhoods, community services and environmental justice populations. The introduction of the physical elements of the proposed Light Rail Alternative, when proximate to neighborhoods and community facilities would have the potential to cause both positive and negative impacts. Impacts to environmental justice population communities of concern and transit-dependent populations within these neighborhoods would also occur and are identified in Section 6.2.2.3. The proposed Light Rail Alternative would include new stations, park-and-ride facilities, substations, a vehicle light maintenance facility, trackwork and an overhead catenary system located along neighborhoods within the corridor and would result in a permanent physical change of the corridor as well as changes to local traffic operations and street patterns.

Physical impacts include residential or business displacements, new access barriers, visual changes, or noise and vibration impacts. While some impacts would have a negative impact resulting from these physical changes, the Light Rail Alternative would provide mobility benefits to neighborhood residents by improving access to transit and destinations along the proposed Northeast Corridor as well as the existing LYNX Blue Line light rail service.

As part of the station area planning process for the proposed project, the *Design Criteria, Chapter 3, Blue Line Extension Urban Design Framework (UDF) (2009)* was developed to reduce potential impacts and integrate the proposed project into the context of the surrounding environment. The UDF specifies design treatments for the light rail trackway, fencing, retaining walls, embankments, bridges, traction power system components and landscaping. The UDF recommendations are an attempt to minimize the impact of the proposed project on its surroundings and to help integrate it with those surroundings. Station Area Plans are being developed for each station.

Citizens within the proposed project corridor have been involved throughout the planning process in an attempt to avoid or minimize potential impacts on surrounding neighborhoods. As part of this involvement, a Public Involvement Plan (PIP) was developed and implemented for the planning and design phases. Details on the PIP are included in Chapter 22.0.

6.2.2.1 Neighborhoods

Neighborhoods were evaluated for the effects of the proposed Light Rail Alternative on travel patterns and accessibility; displacements and relocations; noise and vibration; visual and aesthetics; and cohesion. A general assessment was performed at the corridor level to identify direct effects to individual properties that do not constitute an overall impact to the entire neighborhood. The second portion of the evaluation specifically assesses impacts expected to affect the entire neighborhood. Neighborhoods that would experience no negative impacts are not included in this discussion.

Most of the residential areas for neighborhoods identified along the proposed project corridor are 500 feet or more from the proposed alignment, therefore reducing the potential for negative impacts. Given that the existing rail corridor and North Tryon Street/US-29 currently form the boundaries for several neighborhoods within the Northeast Corridor, the proposed Light Rail Alternative would not physically divide neighborhoods, reduce access to or disrupt the cohesion of existing communities. The alignment would also not be likely to alter neighborhood boundaries or the setting in which these neighborhoods exist. Additionally, access to neighborhoods would not be severed. However, visual, noise and vibration impacts would be expected to occur in some areas.

General Assessment

Travel Patterns and Accessibility: Given the distance of most neighborhoods from the proposed Light Rail Alternative, overall negative impacts to automobile travel patterns and accessibility are not anticipated within these neighborhoods. The proposed project would not sever or divide any streets within the corridor, as the majority of the proposed project would be constructed along existing railway and roadway. However, the portion of the proposed project that would be constructed within the median of North Tryon Street/US-29 would change traffic operations and patterns along this roadway. North Tryon Street/US-29 serves as an arterial route to local neighborhood streets; and with the project North Tryon Street/US-29 would be redesigned and rebuilt to create a complete urban street. The redesigned roadway will accommodate more diverse modes of transportation including light rail, buses, automobiles, pedestrians and bicyclists.

Generally, accessibility for transit patrons, bicyclists and pedestrians within the Northeast Corridor would be positively affected by the proposed project by providing another mode of transportation for residents and a more efficient option to automobile and bus travel. In addition, the frequency at which transit would be provided within this corridor would also increase with the proposed project. Pedestrian improvements (sidewalks, crossings, etc.) are also proposed and the City of Charlotte would identify desired improvements beyond direct station access in a separate project called the Northeast Corridor Infrastructure Project (NECI). Bicycle lanes are planned for North Tryon Street/US-29 as part of the proposed project and bicycle parking spaces are also planned at stations. Specific details on how travel

and accessibility would be altered as a result of the proposed project are included in Chapter 3.0: Transportation.

The proposed project would be grade-separated at 14 roadways to eliminate most conflicts between vehicular traffic and the proposed Light Rail Alternative. Nine of these grade-separations would be new structures and one would involve modification of an existing structure. In addition, new signals and the addition of turn lanes would also help to alleviate vehicular traffic conflicts resulting from the proposed project. However, construction of the proposed project within the median of North Tryon Street/US-29 would restrict left turns across the roadway from some side streets. Motorists in these restricted locations would be allowed to make turns and u-turns at signalized intersections. Motorists would be required to drive a minimal distance to make permitted turns. In addition, there are locations where the proposed project would cross streets and require motorists to wait for the light rail traffic to pass. Some of these locations already experience wait times for vehicles due to the existing railway traffic. Increased wait times at these locations, in addition to new crossing locations along North Tryon Street/US-29, are not expected to negatively affect vehicular travel patterns or accessibility within the corridor. As a result, accessibility for vehicles within the corridor is not anticipated to change significantly under the Light Rail Alternative.

There is potential for transit patrons to utilize neighborhood streets for parking. This potential exists at walk-up stations where park-and-ride lots would not exist, as well as at park-and-ride stations where dedicated parking could overflow. Overflow parking in neighborhoods would affect available on-street parking in neighborhoods, as well as introduce additional traffic. However, overflow parking on neighborhood streets along the LYNX Blue Line light rail service has not been an evident problem.

Displacements and Relocations: Property acquisitions would be required for development of the proposed Light Rail Alternative. Acquisitions would primarily be required for development of the station areas with parking facilities and at locations where the proposed alignment would transition from the existing rail corridor and North Tryon Street/US-29. Development of the proposed Light Rail Alternative would require the full and partial acquisition (including easements) of approximately 220 or 229 parcels, depending on the Sugar Creek Station Park-and Ride option selected. These acquisitions would total approximately 132 or 139 acres. These acquisitions would result in approximately 20 or 23 displacements, most of which would occur at industrial and commercial properties. Residential property would be acquired from the Mallard Creek Apartments in the University City South neighborhood, described in further detail in the next section.

Noise and Vibration: Noise monitoring was conducted at noise sensitive receptors within the neighborhoods immediately adjacent to the proposed alignment. A noise and vibration impact assessment was conducted and is detailed in Chapter 13.0: Noise and Vibration. While individual noise and vibration impacts may occur at various sites along the proposed project corridor, those individual impacts do not constitute an effect on the overall neighborhood, with the exception of noise and vibration impacts to the Pines Mobile Home Park in the Hidden Valley neighborhood, described in further detail in the next section.

Visual and Aesthetics: The proposed Light Rail Alternative would introduce a new visual element within or adjacent to many neighborhoods. However, concern for visual/aesthetic impacts are eliminated largely because of existing land uses (office buildings, historic warehouses, etc.) that screen residential areas from the proposed alignment and the industrial context of the existing rail corridor.

In addition, individual visual and aesthetic impacts may occur at various sites along the proposed project corridor. However, those individual impacts do not necessarily constitute an effect on the overall visual and aesthetic quality of the neighborhood. In one instance, the proposed project would change the visual context of homes located along the existing freight tracks within the Hampshire Hills neighborhood and result in a potential impact to approximately six homes along Leafmore Drive, Clintwood Drive, St. Anne Place and Prince Charles Street. The proposed Light Rail Alternative would require the removal of existing vegetation in this location, and the construction of a retaining wall and fencing in this location, but would not result in an impact to the visual context to the overall Hampshire Hill neighborhood. Details of the visual impacts are included in Chapter 7.0: Visual and Aesthetic Resources.

Cohesion: Generally, the proposed Light Rail Alternative would be located along neighborhood boundaries and/or along an existing transportation corridor. As a result, the proposed project would not create a new physical barrier to neighborhood residents or physically divide neighborhoods.

Neighborhood Assessments

An assessment of the effects of the proposed Light Rail Alternative for each neighborhood in the study area was undertaken with regards to travel patterns and accessibility; displacements and relocations; noise and vibration; visual and aesthetics; and cohesion. The following summarizes the assessment of impacts to neighborhoods that could be negatively affected by the proposed Light Rail Alternative. Neighborhoods that would experience no negative impacts are not included in this discussion.

North Charlotte (NSA 44): The proposed Light Rail Alternative would be located along the northern portion of the North Charlotte neighborhood, adjacent to the existing rail corridor and industrial, commercial and residential uses. Two stations for the proposed project would be located within the North Charlotte neighborhood, namely the 36th Street Station and the Sugar Creek Station.

Residential uses within this neighborhood are located within 100 feet of the proposed project (primarily homes along Bearwood Avenue and Howie Circle). Multi-family residential uses can be found approximately 150 feet from the proposed project, between North Davidson Street and the existing rail corridor. The remainder of the residential development within this neighborhood is located on the east side on North Davidson Street, approximately 150 feet or greater from the proposed project. The proposed Light Rail Alternative would be constructed primarily within existing rail right-of-way through North Charlotte.

North Charlotte is accessed primarily from North Davidson Street, 36th Street, Craighead Road and Sugar Creek Road. At-grade crossings with the rail corridor currently exist at 36th Street, Craighead Road and Sugar Creek Road; however, grade-separations would be constructed as part of the proposed project in these locations and would improve travel and accessibility within North Charlotte. In addition, the North Davidson Street and Sugar Creek intersection is currently unsignalized and would become signalized as part of the proposed project. The Light Rail Alternative is not expected to negatively change travel patterns or accessibility for North Charlotte residents. Access would be improved because of the grade separation of 36th Street and the railroad, eliminating delays related to train crossing. In addition, it is expected that North Charlotte residents would benefit from the increased access to transit and other transportation options provided by the Light Rail Alternative as the majority of the neighborhood would be located within one mile of the proposed project.

The Light Rail Alternative would not result in the displacement or relocation of residents within North Charlotte. Partial and full acquisitions would be required along the rail corridor where additional right-of-way would be needed for the alignment and where parcels would be needed for the development of the proposed stations. These properties are developed with industrial and commercial uses.

As part of the Noise and Vibration Impact Assessment, noise monitoring sites were selected on North Davidson Street and Bearwood Avenue. Comparing existing noise conditions against anticipated project-related noise, it was determined that noise impacts would not occur within North Charlotte.

Additionally, the proposed Light Rail Alternative would be visible from the North Charlotte neighborhood and the proposed project would result in the introduction of new visual elements. However, the views would not be significantly different from the existing views of the rail corridor and industrial areas and as a result, only potential visual/aesthetic impacts would occur. Due to the size of the North Charlotte Historic District and the multiple locations that the proposed project would be visible from, this would constitute a potential impact for the entire neighborhood. However, this impact would not be considered significant.

The proposed Light Rail Alternative would be located alongside the North Charlotte neighborhood, but the Light Rail Alternative would not create a new physical barrier to North Charlotte or physically divide the neighborhood. Therefore, neighborhood cohesion would not be altered by the proposed Light Rail Alternative.

Hidden Valley (NSA 140): The proposed Light Rail Alternative would be located within the median of North Tryon Street/US-29, primarily at-grade, along the southern and eastern portions of the Hidden Valley neighborhood. The alignment would be located approximately 500 feet or more from the majority of residential uses within this neighborhood. However, the Pines Mobile Home Park is located approximately 250 feet north of the proposed project. As part of the Noise and Vibration Impact Assessment, noise monitoring sites were selected on Lambeth Drive, at the Pines Mobile Home Park, and on Kingview Drive, within a residential subdivision adjacent to the corridor. Comparing existing noise conditions against anticipated project-related noise, it was determined that moderate noise impacts would occur at 26 residences within the mobile home park on North Tryon Street/US-29. Because the introduction of noise would occur in an area with existing high noise levels, this would constitute a potential impact with regards to noise on the Hidden Valley neighborhood.

University City South (NSA 134): The proposed Light Rail Alternative would be located along the western edge of the University City South neighborhood and through the UNC Charlotte campus. The majority of uses along this portion of North Tryon Street/US-29 are commercial, office and institutional, mostly associated with UNC Charlotte and CMC-University. Some single-family residential uses can be found on Hampton Church Road and multi-family residential uses can be found south of Mallard Creek Church Road, on the proposed alignment. While it is expected that residents would benefit from the increased access to transit and other transportation options provided by the Light Rail Alternative, the University City South neighborhood would experience potential impacts as a result of the proposed project. Specifically, residential displacements would occur where the Light Rail Alternative crosses the Mallard Creek Apartment property. Partial acquisition of this property would be necessary and would result in the removal of one full building and the partial removal of another. These acquisitions would result in the relocation of the tenants who lease apartments within this building.

Noise impacts would occur in eight locations in the Mallard Creek Apartment complex. However, these individual property impacts would not be considered an impact on the neighborhood as a whole.

In addition, the proposed project would be visible from residential uses at the Mallard Creek Apartment complex and potentially significant visual/aesthetic impacts would result as the visual character would change significantly.

Harris-Houston (NSA 135): The proposed Light Rail Alternative would be located along the western portion of the Harris-Houston neighborhood. The majority of the alignment through this neighborhood would be located through industrial and vacant property adjacent to Kirk Farm Fields Park. Residential uses can be found within Harris-Houston at the Queen's Grant Mobile Home Park, located along the eastern portion of the alignment, just south of I-485. The proposed project would be located approximately 400 feet from this residential use and access to this neighborhood would be redesigned to accommodate the proposed project. Residents within this portion of the neighborhood would retain access to their neighborhood along the new access roadway to the I-485/N. Tryon Station. Development of the proposed I-485/N. Tryon Station would occur within this neighborhood along the eastern side of North Tryon Street/US-29, just south of I-485. While it is expected that residents would benefit from the increased access to transit and other transportation options provided by the Light Rail Alternative, the Harris-Houston neighborhood would be subjected to visual and aesthetic impacts as a result of the proposed project. Specifically, the park-and-ride garage at the proposed I-485/N. Tryon Station would be visible from residential uses within the neighborhood. The introduction of a new visual element in a setting where other transportation elements (e.g., North Tryon Street/US-29 and I-485) are present would result in potential visual/aesthetic impacts to mobile homes located along Esplanade Street. However, the impact would not be significant due to the natural vegetative screen that would remain.

6.2.2.2 Community Services and Social Service Providers

The development of transit projects (specifically rail) have the potential to delay emergency services when these vehicles are required to wait for the transit vehicle to cross an intersection. Several police and fire stations are located within the Northeast Corridor as well as a major medical center (CMC-University). A Preliminary Hazard Analysis will be conducted at 30 percent and 65 percent levels of design to further investigate and identify emergency service needs. In addition, CATS will coordinate with emergency

service providers to ensure that the design of the proposed project allows access for these services. Signal designs would be included as part of the proposed project to ensure that efficient emergency services are not impeded. Additional design measures are detailed in Chapter 16.0: Safety and Security.

Early design changes to bridge spans near CMC-University illustrate CATS' commitment to minimizing the impact to emergency services. Original bridge designs, and specifically retaining wall placement, created a potential impact to CMC-University's emergency and customer access. Additional engineering evaluation was undertaken and bridge approaches were adjusted to eliminate or avoid the closure of the CMC-University driveway from North Tryon Street/US-29.

The majority of the community facilities identified in Table 6-2 would experience a positive impact from increased access to transit and transportation choices. Two of these community facilities would experience potentially negative impacts from the proposed project. The following is a description of those potentially negative impacts.

A potential impact would result from the partial acquisition at the Crossroads Charter School. This acquisition would be at the rear of the parcel where the alignment would transition to North Tryon Street/US-29 and would consist of a minimal amount of property (approximately 10 percent of the entire parcel). The area of acquisition would be from an area that is currently used for parking and would not affect the use or functioning of this facility. Views of the school from North Tryon Street/US-29 would not be blocked or substantially altered other than the park-and-ride at the rear of the property. Therefore, the potential visual impact is not anticipated to be significant. A partial acquisition would also be required at the Zion Primitive Baptist Church on East Sugar Creek Road. The acquisition would consist of less than 15 percent of the entire parcel and the acquisition is not expected to affect the use or functioning of this facility.

Coordination between CATS and CMC-University was conducted during preliminary engineering to minimize proposed project impacts to this resource and maintain emergency access and patient entrances. A potentially significant visual impact would result at CMC-University, located at the intersection of W.T. Harris Boulevard and North Tryon Street/US-29, since the proposed project would block views of the medical center due to the proposed bridge over W.T Harris Boulevard. This could affect way-finding by non-emergency personnel in emergency conditions and patient visitors. In addition, partial acquisition on a portion of the parcel adjacent to North Tryon Street/US-29 would also be required. The acquisition would be minimal (less than 2 percent of the entire parcel) and would occur at a portion of the parcel that is not developed and would not affect the functioning use of CMC-University.

6.2.2.3 Environmental Justice

Overall, this proposed project would improve accessibility for all communities of concern including low-income, minority and transit-dependent populations. The specific impacts to communities of concern associated with this proposed project are outlined below. Overall, these impacts are minimal compared with the proposed project's benefits to the larger environmental justice populations including increased accessibility, a new mode choice and reduced travel times to/from Center City Charlotte.

The key criteria for an environmental justice analysis are whether or not adverse impacts identified in each of the environmental analysis categories are disproportionate within communities of concern. In other words, would the impacts within a minority or low-income community be appreciably more severe or greater in magnitude than those that would be experienced in non-minority or non low-income communities. Of the impacts described in the following sections, only the noise impacts to Pines Mobile Home Park (located within the Hidden Valley neighborhood) and Mallard Creek Apartments (located within the University City South neighborhood) would be considered adverse and disproportionate. The identified adverse impacts are generally capable of being mitigated and are expected to be reduced significantly with appropriate measures. These measures are outlined in Section 6.3.

Travel Patterns and Accessibility

With respect to transit service, the proposed Light Rail Alternative would provide a significant level of benefits for environmental justice populations, particularly the transit-dependent. The Light Rail Alternative would utilize an exclusive guideway that would provide increased reliability, increased service

frequencies and significant travel time savings over the No-Build Alternative. As an extension of the LYNX Blue Line light rail service, there would be an increase in transit accessibility as well as mobility to origins and destinations throughout the entire CATS system. Access would improve to employment centers along the existing LYNX Blue Line light rail service and within the Northeast corridor.

Three locations within communities of concern would be restricted to right-in/right out access only. The Light Rail Alternative would also have at-grade crossings with eight intersections within communities of concern. These roadway modifications would change travel patterns for both drivers and pedestrians; however, they would provide a safer environment. The impacts of the proposed physical roadway changes were analyzed to determine future level of service (LOS) at 55 intersections along the proposed alignment. Eighteen of these intersections are located in communities of concern. Eight of these are expected to experience an improved LOS with the Light Rail Alternative and four are expected to experience a decreased LOS. The four intersections located within communities of concern projected to experience a decreased LOS are as follows:

- Craighead Road and North Davidson Street
- Sugar Creek Road and Raleigh Street
- Eastway Drive and Curtiswood Drive
- North Tryon Street/US-29 and Northchase Drive

All four of the projected decreases would be to LOS E or F, and are thus considered significant and adverse. However, these four intersections would also experience a decreased LOS under the No-Build Alternative. Two of these are in the Sugar Creek/Rich Avenue neighborhood and two are in the Hampshire Hills neighborhood. However, these adverse impacts are not disproportionate within communities of concern. Pedestrian and bicycle LOS would improve under the Light Rail Alternative. These benefits would be realized throughout the corridor, including in communities of concern.

Displacements and Relocations

Overall, impacts resulting from acquisitions and displacements would not be adverse or disproportionate amongst minority and low-income communities under the Light Rail Alternative. No full property acquisitions of residences located within communities of concern are anticipated under the Light Rail Alternative. Twenty-one of the 25 full property acquisitions expected with the Light Rail Alternative are located within communities of concern. The majority of these acquisitions would be to commercial and industrial properties and five would be to vacant properties. These full acquisitions are potentially significant, and therefore adverse, but not disproportionate within communities of concern.

The Light Rail Alternative would require partial acquisition of approximately 195 or 204 parcels depending on the Sugar Creek Park-and-Ride option selected. Of these, four displacements would be required (three commercial/industrial uses and one residential use). These displacements are located within communities of concern and would be considered significant and adverse as these acquisitions would result in displacement. The three commercial displacements are located within a community of concern, along North Tryon Street/US-29, between Old Concord Road and University City Boulevard/NC-49 in “the weave” area. The displacement of these three businesses would be adverse. At this time, there is no visible evidence that these displacements are businesses that provide a unique or special service to a community of concern, therefore the impact is not disproportionate.

The residential displacement expected to result from a partial acquisition is located in a low-income community of concern (University City South neighborhood), at the Mallard Creek Apartments. This partial property acquisition would result from right-of-way needs and would involve the demolition of one apartment building within the complex, the demolition of a portion of another apartment building and the removal of a substantial portion of wooded area. CATS would compensate the property owner with fair market value of the property and relocation benefits would be paid to both the owner and tenants.

Community Services and Social Service Providers

Under the Light Rail Alternative, one community facility (a high school) located within a community of concern would experience impacts. Specifically, the Crossroads Charter High School (Hampshire Hills, Census Tract 15.06) would have a potential visual impact, as well as a potential impact related to a partial

acquisition. Though a new visual element would be introduced, other transportation elements are present (North Tryon Street/US-29). Additionally, the school would not be displaced and no physical alteration to the building would occur. This impact would not be considered adverse or disproportionate. The proposed Old Concord Road Station would be in close proximity to the Crossroads Charter High School, thus increasing the school's accessibility by transit. Zion Primitive Baptist Church (North Charlotte, Census Tract 14) is also located in a community of concern and would experience impacts. Specifically, the church would have a potential impact related to a partial acquisition. However, the church would not be displaced and no physical alteration to the building would occur. This impact would not be considered adverse or disproportionate. The partial acquisition of CMC-University would also occur within a community of concern (University City South, Census Tract 56.04), but the acquisition would occur on a portion of the parcel that is not developed. Therefore, the impact would not be considered adverse or disproportionate.

Neighborhoods

The Light Rail Alternative would not adversely or disproportionately affect neighborhoods with high concentrations of minority or low-income residents within the proposed project corridor. While some impacts would occur to specific properties, none of these impacts would collectively affect a neighborhood. The improved access to transit, more frequent service headways on rail and bus, and increased mobility to other destinations in the region would result in a positive impact to these communities of concern and transit-dependent populations.

Noise and Vibration: Moderate noise impacts are likely to occur at 32 locations within communities of concern as a result of the Light Rail Alternative. Of these, 26 are located in the Pines Mobile Home Park (Hidden Valley neighborhood) and the other six are located at the Mallard Creek Apartments (Buildings 2, 3, 4, 5, 6 and 7; University City South neighborhood). In addition, two buildings at Mallard Creek Apartments (Buildings 1 and 8) are expected to experience a severe noise impact as a result of the Light Rail Alternative. The severe noise impact at this location would be considered adverse. As no residential noise impacts are expected to occur outside of communities of concern under the Light Rail Alternative, these impacts would be considered disproportionate. Mitigation for this impact would be determined during final design and it is likely that this impact can be successfully mitigated.

The results indicate that vibration impacts would occur at one single-family residence in the Hampshire Hills neighborhood under the Light Rail Alternative. This neighborhood is considered a community of concern. The predicted impact is within one dB of the Federal Transit Administration (FTA) threshold and is therefore not considered a significant or adverse impact. Mitigation for this impact would be determined during final design and it is likely that this impact can be successfully mitigated. This impact would not be considered disproportionate.

Visual and Aesthetics: Ten potential impacts and one potentially significant, or adverse, impact are likely to occur to viewsheds within communities of concern under the Light Rail Alternative. The location and source of the potential impacts (introduction of a new visual element in a setting where similar visual elements are present) include:

- Alpha Mill Apartments (Optimist Park neighborhood) from the proposed elevated tracks and proposed retaining wall immediately behind this building.
- Herrin Brothers Coal and Ice Company (North Charlotte neighborhood) from the depression of 36th Street under the proposed light rail tracks and the proposed 36th Street Station.
- North Charlotte Historic District from a change in visual landscape associated with the view of the 25th Street Station, 36th Street Station, two bridges near 30th Street, and a bridge over Craighead Road.
- Hampshire Hills neighborhood from views of the proposed Light Rail Alternative, as well as a retaining wall that would be located along a portion of the proposed project corridor within Hampshire Hills.
- Businesses along North Tryon Street/US-29 between Old Concord Road and JW Clay Boulevard from bridges within the median of North Tryon Street/US-29 and from the potential to obstruct views of business signage.

- Crossroads Charter School (Hampshire Hills) from views of the proposed Old Concord Road Station and park-and-ride lot and proposed bridge over Old Concord Road.
- Toby Creek Greenway from an approximately 550-foot long bridge that would cross over this planned greenway resulting in disrupted views of a natural setting and resulting in vegetation removal along the bridge and light rail trackway. However, the visual character would be similar to existing trails located in the immediate vicinity.
- Kirk Farm Fields from the proposed Mallard Creek Church Station and park-and-ride lot that would be located immediately adjacent to this recreational facility. The impact is expected to be temporary because the trees and vegetation planted in this restored wetland are projected to grow and screen the views of the station and park-and-ride lot.
- Mallard Creek Greenway Extension where the proposed project would cross this planned greenway on an approximately 700-foot long bridge. This structure would disrupt views of a natural area but would not be out of character with other portions of the Mallard Creek Greenway that travels under major roadways in a largely urban environment. As a result, the visual character of the planned greenway would be similar to the other greenways within the Mecklenburg County Park and Recreation (MCPR) greenway system.
- Queen's Grant Mobile Home Park (University City North neighborhood) from the view of the proposed I-485/N. Tryon Station park-and-ride garage.

As noted previously, because many of these areas already house a rail corridor and/or major arterial roadway, the proposed light rail project elements would not be out of character with surrounding development and transportation uses. One potentially significant, or adverse, impact as a result of the Light Rail Alternative would occur within a community of concern at the Mallard Creek Apartments within the University City South neighborhood. Viewers residing in apartments along Michelle Linnea Drive who currently face a natural area would have views of the proposed Light Rail Alternative. However, these impacts to viewsheds would not be disproportionate amongst minority and low-income communities under the Light Rail Alternative. In addition, CATS would work with the property owner of Mallard Creek Apartments to develop landscape treatments along the trackway to minimize potential visual effects.

Community Outreach

A detailed Public Involvement Plan (PIP) was developed at the onset of the proposed LYNX BLE study process to actively seek public input throughout the planning and preliminary design of the proposed project. Various workshops and meetings, beginning in 2000 and continuing to the present, have afforded residents and business owners within communities of concern the opportunity to learn about the proposed project and to provide input. Additional detail regarding the PIP and the targeted Environmental Justice outreach efforts for the communities of concern is included in Chapter 22.0: Public Involvement and Agency Coordination.

6.2.3 Light Rail Alternative – Sugar Creek Design Option

When compared to the Light Rail Alternative alignment, the Light Rail Alternative – Sugar Creek Design Option would have different impacts to two neighborhoods (Hampshire Hills and Hidden Valley) and one community facility. The impacts to these two neighborhoods are no greater than the impacts to those same neighborhoods with the proposed Light Rail Alternative.

6.2.3.1 Neighborhoods

As with portions of the Light Rail Alternative, the Light Rail Alternative – Sugar Creek Design Option makes use of a major arterial roadway. As a result, uses along the proposed Light Rail Alternative – Sugar Creek Design Option are predominately commercial and industrial, with residential uses set back from these transportation facilities. For most of the neighborhoods identified in the corridor, residential areas are primarily 500 feet or more from the proposed alignment, reducing the potential for negative impacts to neighborhoods while still providing access to transit for these residents.

An assessment of each neighborhood was undertaken with regards to effects of the proposed Light Rail Alternative – Sugar Creek Design Option on travel patterns and accessibility; displacements and relocations; noise and vibration; visual and aesthetics; and cohesion. A general summary of these

findings is as follows.

Travel Patterns and Accessibility: Given the distance of the proposed project from neighborhoods, negative impacts to travel patterns and accessibility are not anticipated. However, the portion of this design option that would be constructed within North Tryon Street/ US-29 would change traffic operations and patterns within the corridor. The changes described in Section 6.2.2.1 relative to intersection widening, changes to signal timing, elimination of median openings, etc. would be the same for the Light Rail Alternative – Sugar Creek Design Option with an additional mile of North Tryon Street/US-29 experiencing similar impacts. Therefore, traffic patterns and accessibility are not expected to experience negative impacts. It is also expected that the Light Rail Alternative – Sugar Creek Design Option would provide another mode of transportation for residents and improve accessibility for all modes.

Displacements and Relocations: Property acquisitions would be required for development of the proposed Light Rail Alternative – Sugar Creek Design Option. Acquisitions would primarily be required for development of the station areas with parking facilities and at locations where the proposed alignment would transition from the existing rail corridor to North Tryon Street/US-29. Development of the proposed Light Rail Alternative with the Sugar Creek Design Option would require the full and partial acquisition of 245 parcels. These acquisitions would result in approximately 33 displacements, most of which would occur at industrial and commercial properties. Residential property would be subject to displacement where portions of a multi-family apartment complex would be acquired, the same as with the proposed Light Rail Alternative. In total, the Light Rail Alternative – Sugar Creek Design Option would result in the acquisition of an additional 15 to 22 acres of property and an additional 10 to 13 displacements over the proposed Light Rail Alternative.

Noise and Vibration: As part of the Noise and Vibration Impact Assessment for the Light Rail Alternative – Sugar Creek Design Option, noise and vibration monitoring sites were selected within adjacent neighborhoods. Comparing existing noise conditions against anticipated project-related noise, it was determined that noise impacts would occur within the Hidden Valley neighborhood at the Pines Mobile Home Park, the same impacts that would occur with the Light Rail Alternative. One vibration impact at a residential home on St. Anne Place in Hampshire Hills would be avoided with this design option. No additional noise impacts would occur with this design option over the proposed Light Rail Alternative.

Visual and Aesthetics: The proposed Light Rail Alternative – Sugar Creek Design Option would not introduce a new visual element within adjacent neighborhoods as the majority of this design option is located through commercial and industrial areas. As a result, concerns for visual/aesthetic impacts are eliminated largely because of existing land uses (e.g., commercial uses) that screen residential areas from the proposed alignment and because of the existing visual context of an existing transportation corridor. The Light Rail Alternative – Sugar Creek Design Option would avoid the visual impact on residential homes in Hampshire Hills along Leafmore Drive, Clintwood Drive, St. Anne Place and Prince Charles Street.

Cohesion: Given that North Tryon Street/US-29 forms the boundaries for several neighborhoods in the Northeast Corridor, the proposed Light Rail Alternative – Sugar Creek Design Option would not physically divide neighborhoods, reduce access to or disrupt the cohesion of existing communities. The alignment would also not be likely to alter neighborhood boundaries or the setting in which these neighborhoods exist. Additionally, access to neighborhoods would not be severed. In general, the impacts to neighborhood cohesion are no different than the impacts from the proposed Light Rail Alternative.

6.2.3.2 Community Services and Social Service Providers

Overall, the proposed Light Rail Alternative – Sugar Creek Design Option would not negatively impact community facilities located within the proposed project corridor. Partial acquisition of the Crossroads Charter High School property would still be required and would constitute a potential impact. The portion of this facility that would need to be acquired would be different from the proportion required for the Light Rail Alternative due to the difference in the two alignments and station development. This acquisition would not affect access to the facility and adequate parking facilities would remain available on the site.

6.2.3.3 Environmental Justice

Travel Patterns and Accessibility: Transportation impacts under the Light Alternative – Sugar Creek Design Option are nearly identical to those of the Light Rail Alternative. Of the eight intersections within communities of concern which would have an improved LOS under the Light Rail Alternative, seven of them would also have an improved LOS under the Light Rail Alternative – Sugar Creek Design Option. Three of the four intersections that would have a decreased LOS under the Light Rail Alternative would also have a decreased LOS under the Light Rail Alternative – Sugar Creek Design Option. The fourth would have no change in LOS with this design option. The three projected decreases in LOS would be significant and adverse, but they are not disproportionate within communities of concern. Environmental justice populations, particularly the transit-dependent, would experience a great increase in transit mobility. Pedestrian and bicycle LOS under the Light Rail Alternative – Sugar Creek Design Option would be identical to the Light Rail Alternative, in other words, improved over the No-Build Alternative condition.

Displacements and Relocations: A total of 31 property acquisitions with displacements within communities of concern would be required under the Light Rail Alternative – Sugar Creek Design Option. Of these displacements, 23 would result from full acquisitions and eight would result from partial acquisitions. These displacements would be considered adverse and disproportionate impacts as they result in approximately 10 to 13 additional displacements within communities of concern over the proposed Light Rail Alternative.

Community Services and Facilities: The Light Rail Alternative – Sugar Creek Design Option would not result in additional impacts to community facilities over the Light Rail Alternative. There would be no adverse or disproportionate impacts to community services or facilities in communities of concern.

Neighborhoods: The Light Rail Alternative – Sugar Creek Design Option would not adversely affect communities within the proposed project corridor. There would be no adverse or disproportionate impacts to neighborhood cohesion in communities of concern.

Noise and Vibration: Moderate noise impacts are likely to occur to three residences within communities of concern as a result of the Light Rail Alternative – Sugar Creek Design Option. Two of these impacts, at the Pines Mobile Home Park (Hidden Valley neighborhood), would also occur under the Light Rail Alternative. The third is a single-family residence on North Tryon Street/US-29. As no noise impacts are expected to occur outside of communities of concern under the Light Rail Alternative, these impacts would be disproportionate and adverse.

No additional vibration impacts are predicted under the Light Rail Alternative – Sugar Creek Design Option. In addition, the predicted impact under the Light Rail Alternative would not occur since the Light Rail Alternative – Sugar Creek Design Option would not pass by the residence on St. Anne Place.

Visual/Aesthetics: Three potential visual impacts are identified for the Light Rail Alternative – Sugar Creek Design Option, but are not considered significant:

- Republic Steel Warehouse from the proposed alignment passing through the middle of this property in addition to views of the proposed station and park-and-ride lot associated with this option.
- Business along North Tryon Street/US-29 (Dorton Street to Old Concord Road) from bridges within the median of North Tryon Street/US-29 and from the potential to obstruct views of business signage.
- Crossroads Charter School (Hampshire Hills) from views of the proposed Old Concord Road Station and park-and-ride lot.

The first two potential impacts are unique to the Light Rail Alternative – Sugar Creek Design Option. The potential impact to the Crossroads Charter School would also occur with the Light Rail Alternative.

6.3 Mitigation

CATS has conducted extensive public information activities to inform residents and provide the opportunity for participation in evaluating the proposed project, station locations, environmental concerns, etc. Public presentations have been offered to the public at-large, community groups, public officials,

institutional officials, and local, state, and federal agencies. As a result of public involvement, several design decisions were made. Chapter 22.0: Public Involvement and Agency Coordination summarizes these activities and meetings. Public involvement will continue through the Final EIS and comments and concerns from area residents will continue to be solicited.

6.3.1 Light Rail Alternative

6.3.1.1 Neighborhoods

Impacts to neighborhoods resulting from the proposed Light Rail Alternative will be reduced through a number of mitigation measures. Neighborhoods of particular concern include North Charlotte, Hidden Valley, University City South and Harris-Houston, that would be affected by displacements/relocations, changes to noise/vibration level and/or changes to the existing visual/aesthetic character. Mitigation measures that will be employed are as follows:

Travel Patterns and Accessibility: Additional traffic signals and modifications to traffic lanes will help mitigate the effects of the Light Rail Alternative on North Tryon Street/US-29, a primary thoroughfare along much of the proposed corridor. No additional mitigation, beyond what is listed in Chapter 3.0: Transportation is required.

Overflow parking in neighborhoods located near proposed stations will be monitored through visual survey to determine whether additional parking is needed. Additional parking would be added with the development of park-and-ride facilities within and near neighborhoods and existing parking would not be eliminated as a result of the proposed project. If overflow parking becomes an issue for adjacent neighborhood streets, local resources near the problematic stations will be assessed to determine whether additional dedicated or shared parking could be secured. If necessary, parking enforcement will be instituted, allowing only residents of particular neighborhoods to park on specified streets.

Displacements and Relocations: Where displacements and relocations are unavoidable, relocation services and payments will be provided. Property owners will be paid for property acquired and relocation procedures for displaced residents will be guided by the Uniform Relocation Assistance and Real Property Acquisition Policies Act. The Act requires that comparable replacement housing be available before displacements occur. Refer to Chapter 17.0: Acquisitions and Displacements for additional mitigation details.

Noise and Vibration: The FTA requires that mitigation for moderate impacts be incorporated into the proposed project when it is considered reasonable. For severe impacts, mitigation should be incorporated into a proposed project unless there are extenuating circumstances to prevent it. The goal is to gain substantial reductions in noise level. The most practical noise and vibration mitigation recommendations for properties affected by the Light Rail Alternative include rail vehicle skirts, sound barriers and sound insulation. Specific mitigation measures designed for each property will be proposed in the Final EIS based on a detailed noise assessment. Coordination with property owners regarding acceptable mitigation methods would occur prior to final design.

Visual/Aesthetic: Further coordination to finalize mitigation plans will occur for the property owners of Mallard Creek Apartments to develop landscape treatments, where practical, near the buildings that are closest to the trackway to minimize potential visual effects.

Cohesion: Neighborhood cohesion would not be negatively affected by the Light Rail Alternative. Therefore, mitigation measures are not needed.

6.3.1.2 Community Services and Social Service Providers

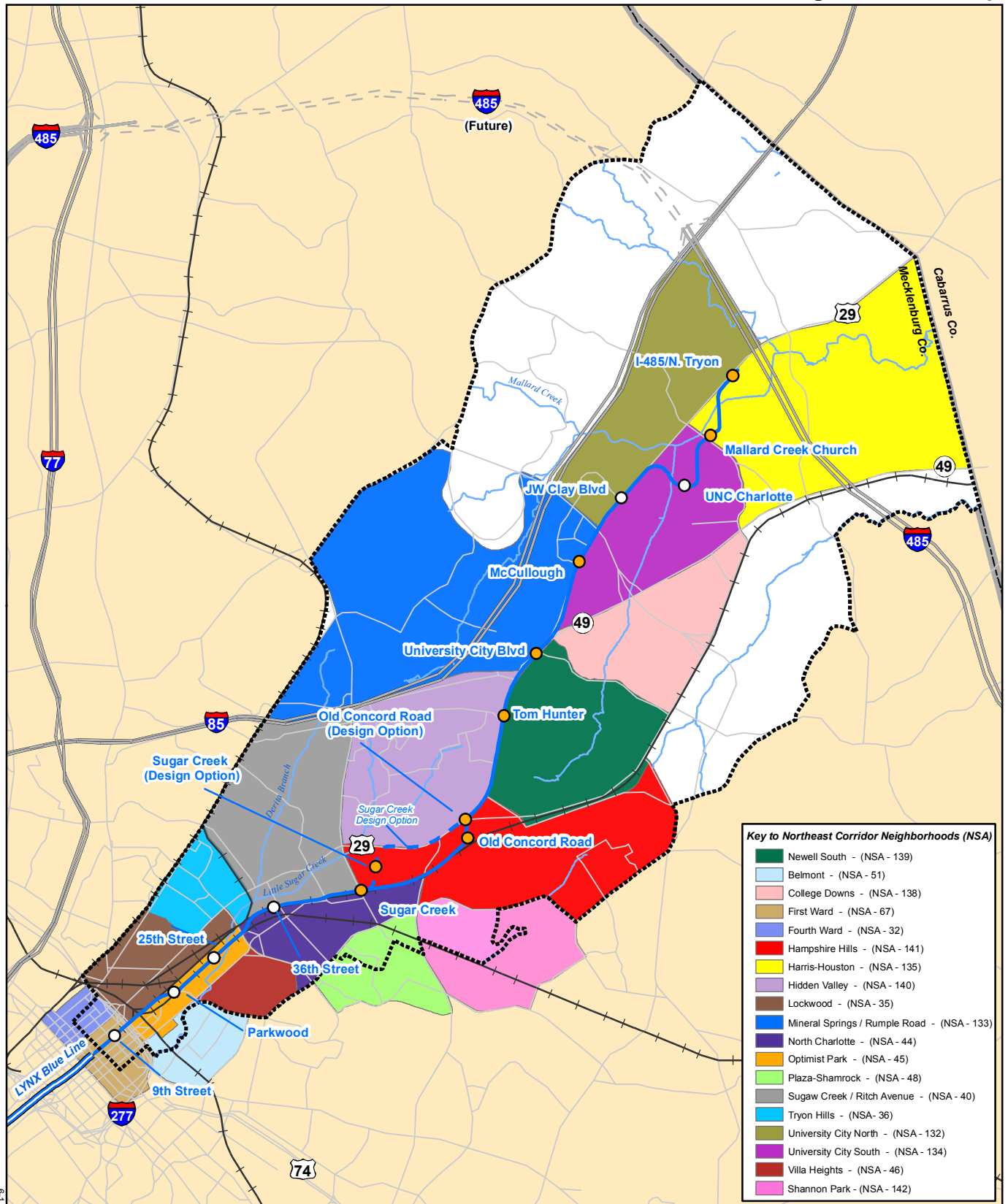
Mitigation measures will be necessary for potentially significant visual impacts at CMC-University that would result from the proposed Light Rail Alternative. CATS will continue to coordinate with CMC-University regarding design treatments and the type and location of directional signage.

6.3.1.3 Environmental Justice

As described previously, a detailed noise assessment will be undertaken to identify specific noise mitigation measures to address the potential adverse and disproportionate impacts to the Pines Mobile Home Park (Hidden Valley neighborhood) and Mallard Creek Apartments (University City South neighborhood).

6.3.2 Light Rail Alternative – Sugar Creek Design Option

Mitigation measures for impacts to neighborhoods, community services and environmental justice populations resulting from the proposed Light Rail Alternative – Sugar Creek Design Option will be the same as those described in Section 6.3.1.



Key to Northeast Corridor Neighborhoods (NSA)

[Green]	Newell South - (NSA - 139)
[Light Blue]	Belmont - (NSA - 51)
[Pink]	College Downs - (NSA - 138)
[Light Purple]	First Ward - (NSA - 67)
[Blue]	Fourth Ward - (NSA - 32)
[Red]	Hampshire Hills - (NSA - 141)
[Yellow]	Harris-Houston - (NSA - 135)
[Light Purple]	Hidden Valley - (NSA - 140)
[Brown]	Lockwood - (NSA - 35)
[Blue]	Mineral Springs / Rumble Road - (NSA - 133)
[Orange]	North Charlotte - (NSA - 44)
[Purple]	Optimist Park - (NSA - 45)
[Light Green]	Plaza-Shamrock - (NSA - 48)
[Grey]	Sugaw Creek / Ritch Avenue - (NSA - 40)
[Light Blue]	Tryon Hills - (NSA - 36)
[Green]	University City North - (NSA - 132)
[Purple]	University City South - (NSA - 134)
[Red]	Villa Heights - (NSA - 46)
[Pink]	Shannon Park - (NSA - 142)

Legend

[Dashed Line]	Northeast Corridor Limits	[Blue Line]	LYNX Existing Light Rail Transit	[Cross]	Railroads
[Blue Line]	Light Rail Transit	[Grey Line]	Highway	[Dashed Line]	County Line
[Blue Squares]	Design Options	[Grey Line]	Major Roads		
[Circle]	Proposed Stations	[Dashed Line]	Highway (Future Planned)		
[Orange Circle]	Proposed Stations with Park-and-Ride	[Wavy Line]	Streams		

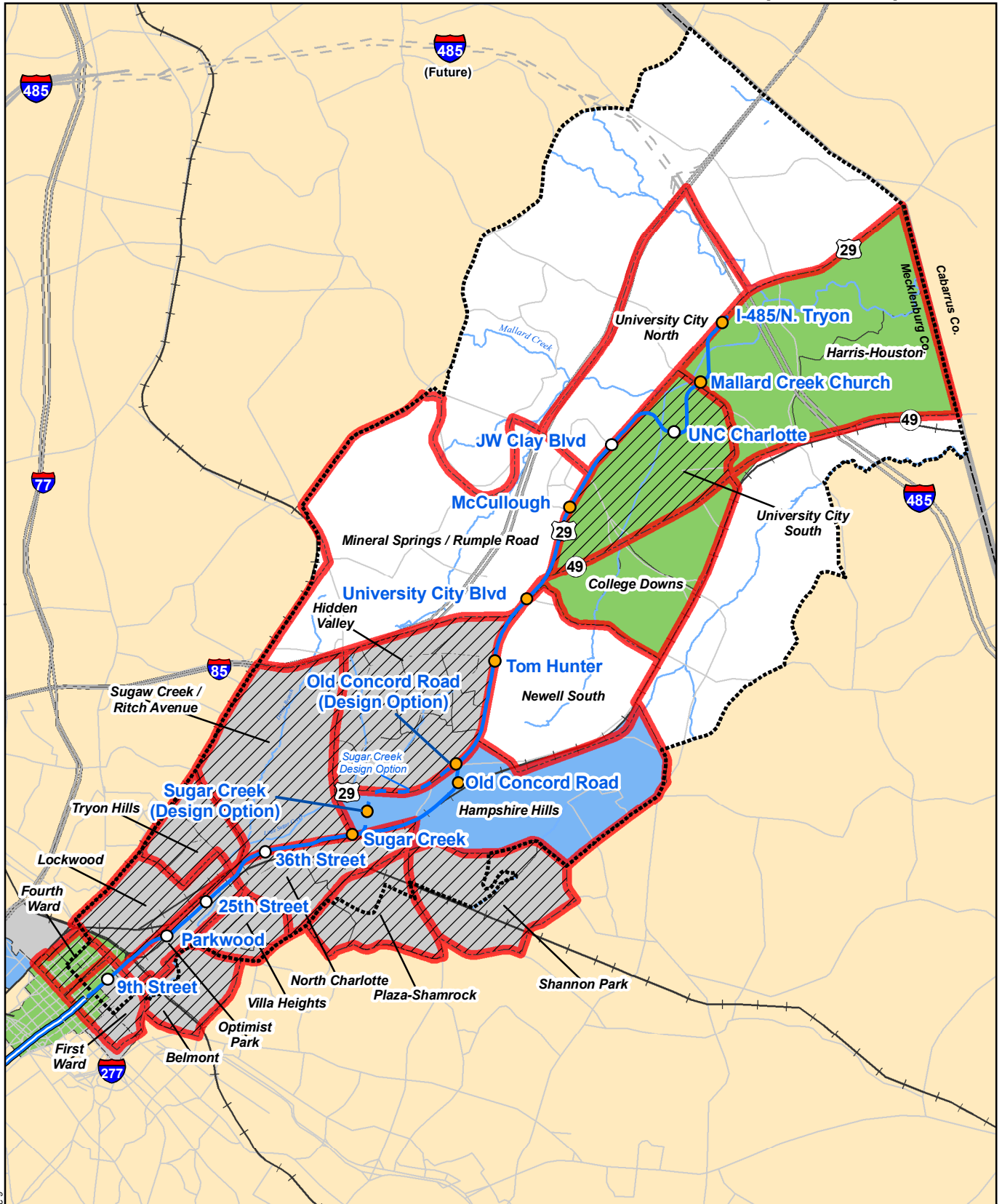
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Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

6-1_Neighborhoods Base map_CB_022610.pdf

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Environmental Justice and Transit Dependent Populations



- Legend**
- Northeast Corridor Limits
 - Light Rail Transit
 - Design Options
 - Proposed Stations
 - Proposed Stations with Park-and-Ride
 - Streams

- Lynx Existing Light Rail Transit
- Highway
- Highway (Future Planned)
- Major Roads
- County Boundary
- Railroads

- Environmental Justice Populations**
- Neighborhood Boundary
 - Low Income
 - Low Income / Minority
 - Minority
 - Transit Dependent Neighborhoods

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Data Source:
CATS, City of Charlotte GIS, RWA STV and
Mecklenburg County GIS

6-2_Environmental_Justice_CB_052610.pdf

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8.0 CULTURAL RESOURCES

This chapter discusses the archaeological and historic architectural resources within the Area of Potential Effect (APE) for the LYNX Blue Line Northeast Corridor Light Rail Project (LYNX BLE). It discusses the potential effects of the alternatives under study and their associated impacts. This chapter documents consultation with the North Carolina State Historic Preservation Office (SHPO) during the identification of resources, the determinations of effects, and efforts to minimize potential harm during construction and operation of the proposed project; mitigation measures are also discussed.

8.1 Affected Environment

The APE, or study area, for archaeological resources was the limits of construction for the 30 percent design plans, and was determined in consultation with the SHPO. The APE for historic architectural resources included all areas within that the project may cause changes to the character or use of historic properties, either directly or indirectly. As such, the APE was defined as approximately 250 feet on either side of the proposed centerline of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option. The following sections describe the affected environment for archaeological and historic resources.

8.1.1 Archaeological Resources

The Archaeology Identification Survey of the Proposed LYNX Blue Line Extension (Coastal Carolina Research, 2009) and its addendum of December 2009 were completed to identify new or previously recorded sites listed in or eligible for listing in the National Register (NR) within the APE. The survey identified that two previously recorded precontact Native American sites were located within the APE but were destroyed in the 1970s by development. Therefore, no known archaeological sites were found to be located within the APE.

8.1.2 Historic Resources

The existing conditions within the study area, or APE, are documented in the *Phase II Historic Resources Survey Report* (Mattson, Alexander & Associates (MAA), 2008). The survey meets the guidelines for architectural surveys established by the North Carolina SHPO and the North Carolina Department of Transportation (October 2003).

Fieldwork, conducted during October and November 2008, consisted of an architectural survey and site inspections of selected properties and neighborhoods that warranted intensive analysis. All residential, commercial, and industrial historic districts, as well as individual buildings, were examined. Potential historic properties identified during the research and fieldwork phase were evaluated against the Section 106 criteria for eligibility for listing in the National Register (36 CFR 60.4.). The resources determined to be in or eligible for listing in the NR are shown in Figure 8-1 and described in this section.

- Phillip Carey Company Warehouse (NR-Listed) (1): 301 East 7th Street, a two-story, brick building with a low-pitched, front gable roof. This warehouse served commercial establishments along the rail corridors within the Center City. It is a rare surviving warehouse in downtown Charlotte that dates to the early 20th Century and as such is listed in the National Register. It was locally-designated by the Charlotte Landmarks Commission in 1983.
- McNeil Paper Company Warehouse Complex (NR-Eligible) (2): 301-307 East 8th Street, two masonry buildings that occupy a site along the former Southern Railway frontage within the Center City. This complex of buildings is a rare vestige of the numerous commercial storage buildings that once lined the rail corridors of Charlotte. It is recommended for the National Register due to its importance of commerce in the early 20th century. It was added to the North Carolina Division of Culture and History's Study List in 2001 and was listed as a Local Historic Landmark in 1989.
- Orient Manufacturing Company/Chadwick Hoskins No. 3 (NR-Listed) (3): 311 East 12th Street, currently known as the Alpha Mill, was listed on the National Register in 2006 and 2007 as part of the certified rehabilitation of the property for use as apartments. The mill is listed for its importance with industry in Charlotte during the early 20th Century and for its architecture. The mill is one of a small group of surviving Charlotte cotton mills and is a substantial, brick, Romanesque Revival factory. It

was the second textile mill erected in Charlotte. It was listed as a Locally Designated Historic Landmark in 1984.

- Chadbourn Hosiery Mills (NR-Eligible) (4): 451 Jordan Place, a large, rectangular, masonry mill constructed in 1947. This mill represents the largest example of a hosiery mill in Charlotte and is one of two hosiery mills remaining in town. It is recommended eligible for the National Register due to its association with early industry and for its architecture. The mill is a stylish example of the postwar textile mill.
- North Charlotte Historic District (NR-Listed) (5): bound by the railroad tracks on the north, just south of Anderson Street on the east, Spencer Street to the southeast, Charles Avenue on the southwest and just north of Matheson on the west. This district was nominated to the National Register in 1990 for its association with industry and architecture. This historic district contains Charlotte's largest concentration of intact cotton mills and mill housing related to the rise of textile manufacturing in the Piedmont region of the U.S. The district encompasses 155 acres and over 400 resources. The majority of buildings date from 1903 and circa 1915. The district is oriented towards the former Southern Railway, now the North Carolina Railroad (NCRR), and North Davidson Street. This area is locally known as "NoDa."
- Herrin Brothers Coal and Ice Company Complex (NR-Eligible) (6): 315 East 36th Street, a well-preserved complex of functional, frame, brick, metal and concrete buildings historically associated with a small-scale fuel and ice operation. This complex is recommended eligible for the National Register for its association with commerce and for its architecture. It is one of two intact examples of such fuel and ice facilities remaining in Charlotte.
- Standard Chemical Products Plant (NR-Eligible) (7): 600 East Sugar Creek Road, a modernist office and laboratory that faces Sugar Creek Road at the former Southern Railway tracks, now the present day NCRR tracks. This 1956 building is recommended for the National Register for its association with early Charlotte industry and architecture. The plant is a notable example of post-World War II modernist architecture in Charlotte.
- Republic Steel Corporation Plant (NR-Eligible) (8): 601 Sugar Creek Road, a one-story office at the northwest corner of the property facing Sugar Creek Road and an expansive, brick and corrugated steel warehousing and fabrication units to the rear. This circa 1956 plant was recommended eligible for the National Register based on its association with early Charlotte industry and architecture. It is a modernist architectural style building with historic rail uses.
- General Motors Corporation Training Center (NR-Eligible) (9): 5500 North Tryon Street, is a large one-story, masonry facility with a flat roof, front office, adjacent auditorium, and a long classroom wing. The building was constructed in 1954 and served as a regional training center. It is recommended eligible for the National Register based on its association with early Charlotte commerce and its architecture. It is a fine, low-rise modernist building of the postwar era.

8.2 Environmental Consequences

The following sections describe the environmental consequences, or effects, to archaeological and historic architectural resources.

8.2.1 No-Build Alternative

Under the No-Build Alternative, there would be no changes to the existing transportation services or facilities in the Northeast Corridor, beyond those projects already committed. Therefore, the No-Build Alternative would have no effects on archaeological and historic architectural resources.

8.2.2 Light Rail Alternative

8.2.2.1 Archaeological Resources

No archaeological resources were found within the APE or at any of the proposed station locations. Therefore, it is expected that the Light Rail Alternative would have No Effect on archaeological resources. However, as these resources are underground and not visible, impacts to archaeological resources cannot be dismissed until construction activities begin. A plan for late discovery is discussed in Chapter 18.0: Construction Impacts.

8.2.2.2 Historic Resources

The determination of effects on historic architectural resources is documented in the report *Evaluation of Effects Report* (MAA, 2009) and is summarized in Table 8-1. The Light Rail Alternative would have No Effect on historic resources listed in or eligible for the National Register, with the exception of the Orient Manufacturing Company/Chadwick Hoskins No. 3; North Charlotte Historic District; Herrin Brothers Coal and Ice Company Complex; Standard Chemical Products Plant; and the General Motors Corporation Training Center, for which there would be No Adverse Effect. The proposed project would not alter any of the characteristics that qualify the historic resources listed in Table 8-1 for inclusion on the National Register. This is due primarily to the fact that no historic properties would be altered or removed by the proposed project, and the proposed project would not greatly alter the urban, industrial and rail-oriented view sheds of the historic resources. *De minimis* Section 4(f) findings are proposed for these resources. See Section 8.4.2 for additional detail regarding Section 4(f) and Appendix B: Agency Correspondence for SHPO’s concurrence with the proposed findings.

A general noise and vibration assessment was conducted in accordance with the Federal Transit Administration’s *Transit Noise and Vibration Impact Assessment* guidance manual, May 2006. Additional information is discussed in Chapter 13.0: Noise and Vibration. The proposed Light Rail Alternative would not have either a noise or vibration impact on historic resources.

**Table 8-1
Summary of Potential Historic Resource Impacts**

Resource	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option	Section 4(f)*
1. Philip Carey Company Warehouse	No Effect	No Effect	No Effect	n/a
2. McNeil Paper Company Warehouse Complex	No Effect	No Effect	No Effect	n/a
3. Orient Manufacturing Company/Chadwick Hoskins No. 3	No Effect	No Adverse Effect	No Adverse Effect	<i>de minimis</i> impact
4. Chadbourn Hosiery Mills	No Effect	No Effect	No Effect	n/a
5. North Charlotte Historic District	No Effect	No Adverse Effect	No Adverse Effect	<i>de minimis</i> impact
6. Herrin Brothers Coal and Ice Company Complex	No Effect	No Adverse Effect	No Adverse Effect	<i>de minimis</i> impact
7. Standard Chemical Products Plant	No Effect	No Adverse Effect	No Effect	<i>de minimis</i> impact
8. Republic Steel Corporation Plant	No Effect	No Effect	No Adverse Effect	<i>de minimis</i> impact
9. General Motors Corporation Training Center	No Effect	No Adverse Effect	No Effect	<i>de minimis</i> impact

* See Section 8.4.2 for additional detail.

Source: Evaluation of Effects Report (MAA, 2009) as concurred with by the SHPO on October 1, 2009 and January 11, 2010.

The following summarizes the effects of the Light Rail Alternative on each of the historic resources identified:

- Phillip Carey Company Warehouse (NR-Listed) (1): The proposed project would have No Effect on this resource. The light rail vehicles would run on the existing LYNX Blue Line tracks located behind this building, which would be relocated slightly to the north (away from the structure), and along tracks to be installed for the southbound trains. No additional right-of-way would be needed from this resource. The introduction of light rail near this resource would not alter the characteristics for which this resource is listed on the National Register.
- McNeil Paper Company Warehouse Complex (NR-Eligible) (2): The proposed project would have No Effect on this resource. The light rail vehicles would run on the existing LYNX Blue Line tracks located behind this building, which would be relocated slightly to the north (away from the structure), and along tracks to be installed for the southbound trains. The 9th Street Station would be located one block to the north of the property. The proposed project would not require the acquisition of land from

the property. The introduction of light rail near this resource would not alter the characteristics for which this resource is listed on the National Register.

- Orient Manufacturing Company/Chadwick Hoskins No. 3 (NR-Listed) (3): The proposed project would have a No Adverse Effect on this resource. Although the trackway would be constructed within the historic boundary of the property, the new tracks would be built within existing railroad right-of-way which has always overlapped the parcel boundaries of the historic mill. A retaining wall and bridge structure would be constructed along the north side of the property to elevate the light rail tracks over the existing CSX rail line. While the retaining wall and bridge would alter the views to and from the property, this would occur within the context of the property where views are historically industrial and rail-oriented and the views to the south are already compromised by the existing I-277 structures. There would be an effect on this property due to these two elements, but this effect would not be adverse and would not alter the characteristics for which this resource is listed on the National Register.
- Chadbourn Hosiery Mills (NR-Eligible) (4): The proposed project would have No Effect on the Chadbourn Hosiery Mills. This resource is located across Brevard Street from the proposed location of the Light Rail Alternative. The building does not have windows and, therefore, no views from the building would be altered. The existing Duke Energy electrical substation is located across the street and comprises the views from the building. The context of the resource is industrial and the light rail would not alter this resource or the characteristics which make it eligible for the National Register.
- North Charlotte Historic District (NR-Listed) (5): The proposed project would have a No Adverse Effect on this historic resource. The proposed Light Rail Alternative would include two tracks that parallel the south side of the existing railroad right-of-way, a station at 36th Street, relocation of the existing freight tracks, and the depression of 36th Street under the future light rail and existing freight tracks. At 36th Street, the proposed light rail line and relocated freight tracks would be approximately eight feet above the existing grade. Near 36th Street, the National Register boundaries for the North Charlotte Historic District overlap the existing railroad right-of-way. Portions of the proposed alignment and retaining walls would lie within the historic boundary. The action would occur largely within the existing right-of-way; however, minor land acquisition would be required within the North Charlotte Historic District at the Johnston Mill property for station access. Additionally, the rear loading area of the former Grinnell Manufacturing Company Building, a contributing resource to the historic district located at 36th Street and the railroad, would be eliminated. However, this would not alter the structure or its current use, as loading no longer occurs at this location. The 36th Street Station staircase and bicycle and pedestrian walkways, and the depression of 36th Street would also occur within the National Register boundaries of this district. All access to resources within the district would be maintained. This depression of 36th Street would result in an alteration of one of the streets within the district, but this alteration would not change the characteristics which make it eligible for the National Register. The existing freight track relocation would occur outside of the National Register boundaries. No structures within the historic district would be demolished or altered as a result of the proposed project.
- Herrin Brothers Coal and Ice Company Complex (NR-Eligible) (6): The proposed project would have a No Adverse Effect on this resource. An effect would occur as a result of the depression of 36th Street under the future light rail and relocation of existing freight tracks adjacent to this resource. A minor amount of land (approximately 344 square feet, less than 1 percent) would be acquired, but no buildings located on the property would be altered or demolished. The relocated freight tracks would extend through the southern edge of the property within the existing rail corridor. The proposed action would not require the alteration or demolition of any structures located on site. Access to the site would be maintained at its current location; however a temporary construction easement would be required to construct the retaining wall for the depression of 36th Street. The 36th Street Station would be constructed on the south side of the rail corridor, away from this resource, introducing a relatively minor, but new visual element to this resource. While some effects would occur as a result of the proposed project, these alterations would not change the characteristics which make it eligible for the National Register.
- Standard Chemical Products Plant (NR-Eligible) (7): The proposed project would have No Adverse Effect on this resource. The proposed light rail line would be constructed within the existing railroad right-of-way which is outside the National Register boundary for the property. An effect would occur as a result of the placement of the Sugar Creek Station within the existing railroad right-of-way over

Sugar Creek Road, which the North Carolina Railroad is planning to depress under the railroad. The station would be at the existing grade. The southeast corner of the property would need to be acquired to accommodate a sidewalk and ramp for the station. The area needed for the sidewalk and ramp is now part of a paved loading area, and no buildings or significant features would be demolished for the proposed project. While some effects would occur as a result of the proposed project, these alterations would not change the characteristics which make it eligible for the National Register.

- Republic Steel Corporation Plant (NR-Eligible) (8): The proposed project would have No Effect on this resource. The proposed project would be constructed within the existing railroad right-of-way which is outside the National Register boundaries of the property. Due to the industrial nature of this setting, the proposed project would not alter the characteristics which make this resource eligible for the National Register. No acquisition of the property would be needed, but a temporary construction easement would be.
- General Motors Corporation Training Center (NR-Eligible) (9): The proposed project would have a No Adverse Effect on this resource. The proposed project would require the acquisition of minor amounts of land (approximately 10 percent of the property) from the southeast corner of the property within the National Register boundaries. The proposed project would leave much of the existing parking lot for the building intact. The retaining walls for the bridge over the Old Concord Road/North Tryon Street/US-29 intersection would begin to ascend along the rear of this property. Because this property is surrounded by commercial and industrial land uses and this retaining wall would be constructed near the rear of the property, this change would not alter the views of this property. While these effects would occur as a result of the proposed project, the alterations would not change the characteristics which make it eligible for the National Register.

8.2.3 Light Rail Alternative – Sugar Creek Design Option

8.2.3.1 Archaeological Resources

There would be no differences in impacts to archaeological resources between the Light Rail Alternative and the Light Rail Alternative - Sugar Creek Design Option. See Section 8.2.2.1.

8.2.3.2 Historic Resources

The Light Rail Alternative – Sugar Creek Design Option would have the same effects to historic resources as the Light Rail Alternative, with the exception of the following resources. The Light Rail Alternative – Sugar Creek Design Option would have less of an effect on the Standard Chemical Products Plant and the General Motors Corporation Training Center, reducing their potential effect from No Adverse Effect to No Effect. However, the Light Rail Alternative – Sugar Creek Design Option would have more of an effect on the Republic Steel Corporation Plant than the Light Rail Alternative, resulting in No Adverse Effect rather than a No Effect. As with the Light Rail Alternative, *de minimis* Section 4(f) findings are proposed for the affected resources. See Section 8.4.2 for additional detail and Appendix B: Agency Correspondence for SHPO concurrence.

- Standard Chemical Products Plant (NR-Eligible) (7): The proposed project would have No Effect on this resource. No acquisition of the property or alteration of structures on this property would occur. The context in which this resource is located is industrial and therefore, the proposed project would not alter its setting or the characteristics which make this resource eligible for the National Register.
- Republic Steel Corporation Plant (NR-Eligible) (8): The proposed project would have No Adverse Effect on this resource. The proposed light rail alignment would bisect this property. Barrier fences would be installed to limit pedestrian access across the line. Crossing gates would also be installed at the crossing of the light rail line and Raleigh Street. The installation of barrier fences would introduce a new element but would not cause an adverse effect. Portions of the site are already divided by chain link fences. These changes would not alter the characteristics that make this resource eligible for the National Register.
- General Motors Corporation Training Center (NR-Eligible) (9): The proposed project would have No Effect on this resource. The proposed project would be located along the current southbound travel lanes of North Tryon Street/US-29 just north of this property. The Old Concord Road Station would be

located to the north of this resource. Due to the context of the property along a major thoroughfare and within a commercial and industrial area, the proposed project would have No Effect on this resource.

8.3 Mitigation

8.3.1 Light Rail Alternative

No listed archaeological sites or archaeological remains were found within the study area or in any of the proposed station locations. Thus, no mitigation for archaeological resources is required for the Light Rail Alternative. A plan for late archaeological discovery is discussed in Chapter 18.0: Construction Impacts. Effects to minimize effects to historic resources were taken into account during the design of the proposed Light Rail Alternative.

8.3.2 Light Rail Alternative – Sugar Creek Design Option

No impacts to archaeological resources would result from the Light Rail Alternative – Sugar Creek Design Option. Therefore, no mitigation for archeological resources is required.

For the Sugar Creek Design Option, mitigation for historic resources is the same as for the Light Rail Alternative with the exception of additional requirements for the Republic Steel Corporation Plant. The No Adverse Effect determination for this resource was based on the conditions to retain a minimum distance of five feet from the closest structure and retain access to the site from Raleigh Street. These items have been incorporated into the design plans; therefore, no further mitigation is required.

8.4 Consultation

This section describes the consultation undertaken by the Federal Transit Administration (FTA) and Charlotte Area Transit System (CATS). Copies of consultation letters are provided in Appendix B: Agency Correspondence.

8.4.1 Section 106 Consultation

This section discusses consultation efforts with other interested parties, including SHPO and the general public. The purpose of consultation has been to share information on the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option and to discuss the following:

- Limits of the APE;
- Identification of historic resources deemed eligible for listing in the National Register (Determinations of Eligibility);
- Recommendation of effects; and,
- Avoidance, reduction or mitigation efforts that may be needed to offset any adverse effects on cultural resources.

FTA initiated consultation with the SHPO on March 5, 2005 in accordance with Section 106 of the National Historic Preservation Act. An early coordination meeting was held with the SHPO on June 18, 2008. Preliminary Evaluations for the Republic Steel Corporation and the Standard Chemical Company were submitted to the SHPO on May 9, 2008 and a letter concurring with these evaluations was provided on June 17, 2008. This input was used to further refine the alignment for the Light Rail Alternative – Sugar Creek Design Option to minimize impacts to these resources.

A request for consultation comments was sought on the APE and on the *Phase II Historical Architectural Resources Survey Report* dated November 7, 2008. Determinations of Eligibility were provided by the SHPO in a letter dated January 16, 2009. Another coordination meeting was held with the SHPO's office on September 15, 2009 to discuss the *Evaluation of Effects Report* (MAA, 2009) dated September 4, 2009. The determination of the effects discussed in that meeting, and listed in this chapter, was documented by CATS in a letter dated September 21, 2009. An addendum to the report was submitted to

SHPO on December 28, 2009. The SHPO provided written concurrence on the effects determination on October 1, 2009 and with the addendum on January 11, 2010.

The *Phase I Archaeological Survey Report* was submitted to the SHPO on March 25, 2009. An addendum to this report was submitted to the SHPO on January 5, 2010, to add the Sugar Creek Park-and-Ride Option 2. The SHPO concurred with the effects of the proposed project on April 8, 2009 and with the addendum on January 25, 2010. Copies of this correspondence are included in Appendix B: Agency Correspondence.

8.4.2 Section 4(f) *De Minimis* Finding for Historic Resources

Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 1653) declares that it is national policy to make a special effort to preserve the natural beauty of the countryside, publicly-owned parks, recreation areas, wildlife or waterfowl refuges, or any historic sites of national, state or local significance. Section 4(f) permits the use of such land for a transportation project only when the FTA has determined that there is no reasonable or prudent alternative to such use and the project includes all possible planning to minimize harm to the resource resulting from such use.

Section 6009 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (49 U.S.C. 303), also known as SAFETEA-LU, amended Section 4(f) statutory requirements to include an exception for use of protected land that would have a "*de minimis*" impact if the proposed project "will not adversely affect the activities, features, and attributes of a 4(f) resource." On December 13, 2005, FTA and Federal Highway Administration (FHWA) issued joint guidance for determining *de minimis* impacts to Section 4(f) resources. For historic properties, the *de minimis* criteria are met when:

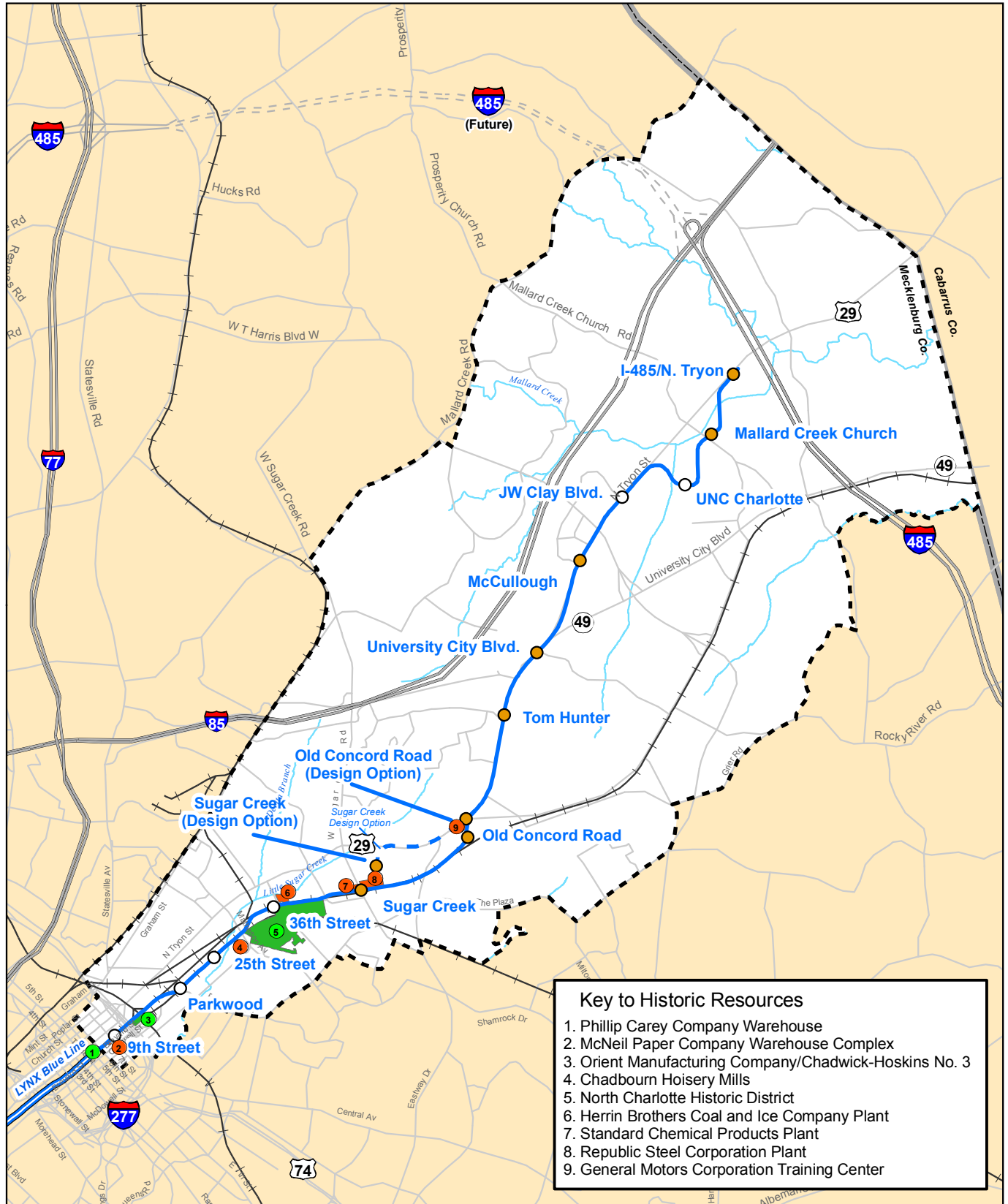
- 1) The process required by Section 106 of the National Historic Preservation Act results in the determination of a "No Adverse Effect" or "No Historic Properties Affected" with the concurrence of the SHPO in the Section 106 Consultation;
- 2) The SHPO is informed of FTA or FHWA's intent to make a *de minimis* impact finding based on their written concurrence in the Section 106 determination; and,
- 3) FTA or FHWA has considered the views of any consulting parties participating in the Section 106 consultation.

Due to the minor land acquisitions that would result in a transportation "use" of historic resources and the No Adverse Effect determinations by which the SHPO has concurred, FTA is proposing a *de minimis* Section 4(f) finding for the following resources:

- Orient Manufacturing Company/Chadwick Hoskins No. 3 (NR-Listed)
- North Charlotte Historic District (NR-Listed)
- Herrin Brothers Coal and Ice Company Plant (NR-Eligible)
- Standard Chemical Products Plant (NR-Eligible)
- Republic Steel Corporation Plant (Light Rail Alternative - Sugar Creek Design Option only) (NR-Eligible)
- General Motors Corporation Training Plant (NR-Eligible)

On January 28, 2010, FTA and CATS consulted with the SHPO regarding the *de minimis* finding. SHPO's concurrence was provided on February 3, 2010 and is contained in Appendix B: Agency Correspondence. No consulting parties participated in the Section 106 process. FTA seeks to obtain public input on this *de minimis* finding through the public and agency circulation period of this Draft EIS. Please direct your comments on this finding to the individuals identified in the preface. The final determination regarding the *de minimis* findings for these properties will be included in the Final EIS.

Historic Resources within the Northeast Corridor



- Key to Historic Resources**
1. Phillip Carey Company Warehouse
 2. McNeil Paper Company Warehouse Complex
 3. Orient Manufacturing Company/Chadwick-Hoskins No. 3
 4. Chadboim Hoisery Mills
 5. North Charlotte Historic District
 6. Herrin Brothers Coal and Ice Company Plant
 7. Standard Chemical Products Plant
 8. Republic Steel Corporation Plant
 9. General Motors Corporation Training Center

Legend

Northeast Corridor Limits	LYNX Existing Light Rail Transit	Railroads
Proposed Light Rail Alternative	Highway	County Line
Design Option	Major Roads	National Register Listed
Proposed Stations	Highway (Future)	National Register Eligible
Proposed Stations with Park-and-Ride	Streams	

Scale and Orientation

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Data Source: Mattson Alexander, Charlotte Area Transit System, STV/RWA, Mecklenburg County GIS Aerial (2007)

Historical Corridor_Base_Map_Rev.00.pdf

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9.0 PARKLANDS

This chapter describes publicly-owned parklands, recreation facilities, greenway trails and wildlife and waterfowl refuges located within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). It also discusses the potential effects on these resources for the alternatives under consideration in this Draft Environmental Impact Statement (EIS). Impacts to park and recreation facilities were determined based on the proximity of the identified resources to the proposed project. The types of impacts considered included: real estate acquisitions; visual impacts; noise and vibration impacts; and changing access to and from park resources. Mitigation measures are identified, where necessary.

9.1 Affected Environment

The study area for the public parklands evaluation was defined as the area located within 1,000 feet on either side of the proposed Light Rail Alternative and its design option. Information on park and recreation facilities was obtained through field surveys conducted in September and October 2009, the City of Charlotte geographic information system (GIS), Mecklenburg County GIS, the Mecklenburg County Park and Recreation (MCPR) web site and in coordination with MCPR.

No federal wildlife or waterfowl refuges were identified within the study area; and no facilities within the study area were developed with grants from the U.S. Land and Water Conservation Fund. Therefore, no park and recreation facilities regulated under Section 6(f) of the U.S. Land and Water Conservation Fund exist.

The publicly-owned park and recreation facilities within the study area are owned and operated by MCPR. Additional park and recreation resources in the corridor are located on the University of North Carolina at Charlotte (UNC Charlotte) campus, which is a state-owned university; however, park and recreation facilities located on the campus are not open to the general public, with the exception of the UNC Charlotte Fitness Trails that are currently maintained by MCPR. MCPR also has access easements on the campus for the use of trails that are part of the Mecklenburg County Greenway Plan. Coordination with UNC Charlotte regarding identification of publicly-owned recreation facilities on the state-owned campus as well as the identification of which campus recreation facilities were open for public-use was conducted in October and November 2008.

The following sections describe the existing park and recreation facilities, as well as planned and other potential future park and recreation facilities located within the study area. Existing facilities in the study area include four parks, two greenways, one recreation center (private, non-profit) and one special facility. Planned facilities in the study area include two planned greenways, the extension of an existing greenway and one greenway connector. In addition, MCPR is currently in discussion with owners of two parcels. These parcels could be transferred over to MCPR in the reasonable and foreseeable future for potential park uses.

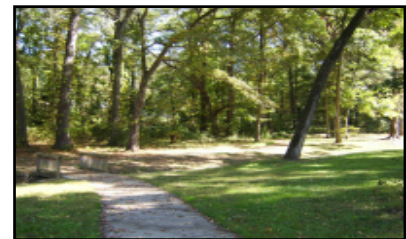
Planned facilities are defined as those included in the MCPR's adopted plans; the *Mecklenburg County Park and Recreation Greenway Plan Update 2008*; and the *Mecklenburg County Park and Recreation 10 Year Masterplan: 2008-2018*. Most of the projects identified as part of the five-year plan are funded and committed projects. The projects that are identified as part of the ten-year plan are anticipated to receive funding through a voter-approved referendum that was passed in 2008. Existing and planned park and recreation facilities are shown on Figures 9-1a and 9-1b. The following descriptions provide the facility name, location, acreage, park type (e.g. neighborhood, regional, etc.), the amenities offered and distance to the proposed Light Rail Alternative or design option. A number is provided for each of these facilities that corresponds to the key used in Figures 9-1a and 9-1b. All facilities in the study area are located within the City of Charlotte.

9.1.1 Existing Parks and Recreation Facilities

The following section provides a brief description of existing park and recreation facilities within or partially within the study area, shown on Figures 9-1a and 9-1b.

- Cordelia Park (1): Located at 2100 North Davidson Street, is a 24-acre neighborhood park that features natural wooded areas, a stream, a full-court basketball court, an outdoor swimming pool, a playground, picnic shelters with grills, a playground and a walking trail. Cordelia Park is currently the northern terminus of the Little Sugar Creek Greenway. The western edge of the park is located approximately 900 feet southeast of the proposed Light Rail Alternative corridor between the Parkwood Station and the 25th Street Station.
- Little Sugar Creek Greenway (2): A linear park located just south of the study area and terminates at Cordelia Park. The partially completed greenway follows Little Sugar Creek and extends approximately 15 miles from the South Carolina state line to Cordelia Park. The section of the greenway located adjacent to the proposed project study area includes a multi-use trail, several neighborhood connections and a community garden. In the study area, a completed portion of the greenway is located just south of Cordelia Park at East 17th Street, approximately 950 feet east of the proposed Light Rail Alternative corridor between the Parkwood Station and the 25th Street Station. A future greenway extension through Cordelia Park is anticipated; however, it is not included in the current Greenway Plans.
- Johnston Branch YMCA (3): Located at 3025 North Davidson Street, is a 4,500 square foot recreation facility, which features a fitness center, gymnasium and indoor pool. The facility offers a variety of exercise programs and educational programs, including preschool, afterschool care, adult education and English as a Second Language. A chapel and health center are also located in the facility. All activities at the site occur indoors, with the exception of a small playground area at the rear of the building. The YMCA is a charitable, non-profit organization and access is limited to YMCA members or program participants. The site is located approximately 500 feet southeast of the proposed Light Rail Alternative corridor between the 25th Street Station and the 36th Street Station.

- Howie Acres Park (4): Located at 4200 Redwood Avenue, is a 13-acre neighborhood park that features a half-court basketball court, a picnic shelter with a grill, a playground and a walking trail. The park is located directly adjacent to the North Carolina Railroad (NCRR) right-of-way (ROW) along the east side of the proposed Light Rail Alternative corridor between the Sugar Creek Station and the Old Concord Road Station. The park has pedestrian and bicycle access points within the neighborhood at Bearwood Avenue, Redwood Avenue and Howie Circle.



Wooded buffer at Howie Acres Park.

- Eastway Park (5): Located at 423 Eastway Drive, is a planned 126-acre district sports park. Construction for Phase I of this park began in 2008. Phase I facilities will include athletic fields, restroom facilities and parking areas. Future phases of this park are planned and will be built as funding becomes available. The site is primarily wooded with some wetland areas. The park is located directly adjacent to the NCRR ROW between the proposed Sugar Creek and –Old Concord Road stations.



Wooded buffer at Eastway Park.

- UNC Charlotte Fitness Trails (6): Located on the UNC Charlotte campus just east of North Tryon Street/US-29, is a special facility that features fitness trails, fitness stations (outdoor exercise equipment), bike paths and nature trails. Wooded picnic areas and a small pond are also available to visitors. The trails are located directly adjacent to the proposed Light Rail Alternative corridor between the JW Clay Blvd. Station and the UNC Charlotte Station. The trails are open for use by the general public and are currently maintained by MCPR but campus expansion plans and changes to the existing easements for these trails, along with the planned Toby Creek Greenway Connector, will result in UNC Charlotte taking over the maintenance of these trails in the near future. The trails are located between Carolinas Medical Center–University

(CMC–University) and undeveloped portions of the UNC Charlotte campus, creating both urban and natural settings.

- Mallard Creek Greenway (7): A linear park located approximately 400 feet to the west of the Light Rail Alternative. The greenway extends approximately 4.64 miles, including 1.18 miles of the University Research Trail and extends into the northern part of the proposed Light Rail Alternative study area. This portion of the Mallard Creek Greenway consists of a multi-use paved trail that connects a portion of UNC Charlotte to Kirk Farm Fields. The greenway is located in the proposed Light Rail Alternative corridor between the UNC Charlotte Station and the Mallard Creek Church Station.
- Kirk Farm Fields (8): Located at 210 East Mallard Creek Church Road, is a 36-acre park which features soccer fields and contains the eastern end of the Mallard Creek Greenway. A nature and wetlands viewing area and boardwalk are also located within the park. The park is located directly adjacent to the proposed Light Rail Alternative corridor between the Mallard Creek Church Station and the I-485/N. Tryon Station.

9.1.2 Planned Parks and Recreation Facilities

The following is a brief description of the planned park and recreation facilities within the study area or partially within the study area, shown on Figures 9-1a and 9-1b.

- Toby Creek Greenway (9): A planned linear park that will follow Toby Creek from University City Blvd./NC-49 through the UNC Charlotte campus. The future greenway will include a multi-use trail which will connect with Mallard Creek Greenway, just east of North Tryon Street/US-29. Design for the Toby Creek Greenway trail is complete; construction started in 2009.
- Toby Creek Greenway Connector (10): A planned greenway trail connector that will connect the Toby Creek Greenway and the UNC Charlotte campus to the future Barton Creek Greenway on the west side of North Tryon Street/US-29. The planned connector will be located between the planned Toby Creek Greenway and North Tryon Street/US-29 and is currently planned to be located on an easement that was granted to MCPR by UNC Charlotte. However, plans for expansion of the UNC Charlotte campus that include additional buildings and an extension of JW Clay Boulevard will require the relocation of this easement. UNC Charlotte has agreed to provide public greenway access through the area in conjunction with their development plans. This greenway connector is included in MCPR's five-year plan.
- Barton Creek Greenway (11): A planned linear park that will be constructed on the west side of North Tryon Street/US-29 near the intersection of North Tryon Street/US-29 and JW Clay Boulevard. This planned greenway will provide a connection to the planned Toby Creek Greenway trail and the UNC Charlotte campus. It would include a multi-use trail and is included in MCPR's ten-year plan.
- Mallard Creek Greenway Extension (12): A planned linear park that will follow Mallard Creek northeast from Mallard Creek Church Road to the Mecklenburg County-Cabarrus County line. It would include a multi-use trail and is included in MCPR's ten-year plan.

9.1.3 Potential Parks and Recreation Facilities

The following is a brief description of the two parcels under discussion between MCPR and individual owners for future park and recreation facilities within the study area.

- First Ward Park: An urban park planned to be located within a mixed-use development between East 7th Street, East 9th Street and North Brevard Street. The proposed development, called First Ward Urban Village, will include office and retail space, residential units, a park and an underground parking deck. The 4.5 acre park is part of a joint-venture between a private developer, UNC Charlotte, Mecklenburg County and the City of Charlotte and is planned to be built on top of an underground parking deck. The park, which will be owned and maintained by MCPR, will be located directly adjacent to the east side of the proposed Light Rail Alternative corridor between the current terminus

of the LYNX Blue Line and the 9th Street Station. UNC Charlotte’s new academic building will anchor the initial phase of the First Ward Urban Village development.

- **Cullman Avenue/Little Sugar Creek Floodplain Acquisition Project:** Located along Cullman Avenue to the east of Little Sugar Creek, is a voluntary property acquisition project initiated by Charlotte-Mecklenburg County Storm Water Services to eliminate structures within the Little Sugar Creek floodplain. The County purchased 11 properties along Cullman Avenue between 2003 and 2007. The conglomeration of these properties could provide an opportunity for the development of public open space or inactive parkland along Little Sugar Creek. The County-owned properties along Cullman Avenue are located between 150 and 500 feet west of the proposed Light Rail Alternative corridor, between the 25th Street Station and the 36th Street Station. Community involvement meetings were held in 2008 to help determine what should be developed on the site. A conceptual plan has been developed based on those meetings and includes a community garden, a walking trail, a dog park, a playground, an informal sports area and a pedestrian bridge. Formal plans have not been prepared but the potential exists for this publicly-owned land to become a parkland facility in the future with ownership being transferred to MCPR and to potentially be designed in conjunction with the proposed 36th Street Station.

9.2 Environmental Consequences

This section describes the permanent impacts (negative and positive) to park and recreation facilities that would result from the No-Build Alternative, the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option; only long-term impacts are discussed. Construction-related impacts, along with avoidance, minimization and mitigation measures are discussed in Chapter 18.0: Construction Impacts.

9.2.1 No-Build Alternative

No impacts to park and recreation facilities would result from the No-Build Alternative.

9.2.2 Light Rail Alternative

The proposed Light Rail Alternative would result in a potential impact to the planned Toby Creek Greenway, Kirk Farm Fields and the planned Mallard Creek Greenway Extension. Potential impacts to these facilities would be minimal or moderate, and would result from greenway crossings and visual intrusions. All other park and recreation facilities would not be negatively impacted by the proposed Light Rail Alternative. Table 9-1 lists the park and recreation facilities within the study area that would experience a potential impact under either the Light Rail Alternative or the Light Rail Alternative – Sugar Creek Design Option. The parenthetical numeric citation corresponds to the key used in Figures 9-1a and 9-1b.

**Table 9-1
Summary of Potential Impacts on Park and Recreation Facilities**

Resource	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option	Section 4(f)*
Kirk Farm Fields (8)	No impact	Potential impact	n/a	<i>de minimis</i> impact
Toby Creek Greenway (planned) (9)	No impact	Potential impact	n/a	<i>de minimis</i> impact
Mallard Creek Greenway Extension (planned) (12)	No impact	Potential impact	n/a	<i>de minimis</i> impact

*See Section 9.2.4 for additional details.

Note: n/a indicates that no additional park and recreational facilities are within the Light Rail Alternative – Sugar Creek Design Option

It is anticipated that for several park and recreation facilities, the proposed Light Rail Alternative would have a positive impact. The proximity of several proposed stations to existing park and recreation facilities would provide enhanced access, specifically for pedestrians or bicyclists, to these facilities. Accessibility to parks is a primary goal highlighted in the *Mecklenburg County Park and Recreation 10 Year Master*

Plan: 2008-2018. In particular, this plan strives to “provide transportation alternatives and to link to other transportation opportunities” by encouraging a connection of mass transit to parks and greenways. Park and recreation facilities likely to benefit from enhanced access include Cordelia Park, Little Sugar Creek Greenway, Johnson Branch YMCA, UNC Charlotte Fitness Trails, the planned Barton Creek Greenway, the planned Toby Creek Greenway, Mallard Creek Greenway and Kirk Farm Fields. An assessment of each park and recreation facility was undertaken with regards to negative affects of the proposed Light Rail Alternative. The following summarizes the assessment of impacts to existing and planned park and recreation facilities that would be negatively affected by the proposed Light Rail Alternative. Existing and planned parklands that would experience no negative impacts are not included in this discussion.

Kirk Farm Fields (8)

Kirk Farm Fields is located adjacent to the west side of the proposed Light Rail Alternative and Mallard Creek Church Station. No portion of the park would be acquired for the proposed project, nor would the existing access driveway on Mallard Creek Church Road be altered. The resource is primarily used for athletic fields, but also includes a wetland viewing area and boardwalk that is located approximately 125 feet west of the proposed Light Rail Alternative alignment and the Mallard Creek Church Station. The results of the noise and vibration general assessment (See Chapter 13.0: Noise and Vibration) indicate a potential moderate impact to the Kirk Farm Fields wetland viewing area would result from the proposed project. A detailed noise assessment, planned to be undertaken prior to the completion of the Final EIS, is needed to confirm this impact which was projected to be 0.5 of a decibel above the lower threshold for the moderate impact range.



Boardwalk at Kirk Farm Fields.

The proposed Light Rail Alternative would also result in a potential visual impact to the Kirk Farm Fields wetland viewing area as it would introduce a new visual element that would be seen by viewers on the boardwalk when looking to the south at the proposed Mallard Creek Church Station. This visual impact would be short-term in nature as existing vegetation would increase in density and maturity within the next ten to 15 years and would eventually block the view of the light rail station. This short-term visual impact would not alter the urban context of the larger setting of the boardwalk and existing conditions since viewers on the boardwalk currently have a view of Mallard Creek Church Road and its bridge over Mallard Creek from this same location. No long-term visual impacts would result since the existing vegetation would grow tall enough to sufficiently screen the light rail station from boardwalk viewers.

The proposed Light Rail Alternative would enhance access to this park as the proposed Mallard Creek Church Station would be located within a reasonable walking and bicycling distance (less than 300 feet) from the park. The potential moderate noise impact, short-term visual impact, and the improved access to the park and wetland viewing area would cumulatively result in a potential impact to this resource that overall would be not be considered significant.



Mallard Creek Greenway crossing under North Tryon Street/US-29.

Toby Creek Greenway (9) (planned)

The Toby Creek Greenway is a MCPR-planned trail within the UNC Charlotte campus. Construction of this facility began in 2009. The planned greenway would be crossed by the proposed Light Rail Alternative approximately 600 feet west of the proposed UNC Charlotte Station. The proposed alignment would cross the Toby Creek floodplain and greenway with a pre-stressed concrete bridge approximately 550 feet in length. Access to the trail would not be permanently interrupted by the Light Rail Alternative. An easement would be required in order to cross over the planned Toby Creek Greenway, similar to how the current Mallard Creek Greenway crosses under North Tryon Street/US-29. The proposed Light Rail Alternative would result in a potential impact to this planned trail as natural areas would be replaced with views of the proposed project. The proposed Light Rail Alternative would enhance pedestrian and

bicycle access to the Toby Creek Greenway as the proposed UNC Charlotte Station would be within a reasonable walking and bicycling distance (approximately 600 feet) of the trail.

Mallard Creek Greenway Extension (12) (planned)

The Mallard Creek Greenway Extension will extend the current greenway terminus at Kirk Farm Fields in Mecklenburg County northeast to the border of Cabarrus County. The proposed Light Rail Alternative would cross the planned greenway extension approximately 200 feet north of Kirk Farm Fields. A minimum clearing of approximately 70 feet in width would be required for the bridge over the Mallard Creek floodplain. Permanent access to the greenway would not be interrupted since a pre-stressed concrete bridge (approximately 700 feet in length) would span the Mallard Creek floodplain and greenway. The future trail would pass under the bridge, similar to how the current Mallard Creek Greenway crosses under North Tryon Street/US-29. An easement would be required for the bridge structure. The proposed Light Rail Alternative would result in a potential impact to this planned trail as the natural setting would be altered by the proposed project; however, trail activities would not be disrupted. Development of the proposed Light Rail Alternative would enhance access to this planned greenway as the proposed Mallard Creek Church Station would be located within a reasonable walking or bicycling distance (less than 300 feet) from the greenway.



Future Mallard Creek Greenway Extension at Kirk Farm Fields.

9.2.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would not result in additional impacts to park and recreation facilities, as there are no additional park and recreation facilities within the Light Rail Alternative – Sugar Creek Design Option. However, under this design option, Howie Acres Park and Eastway Park would be located farther from the proposed project. As such, the proposed project under this design option would enhance access to these park facilities to a lesser degree.

9.2.4 *De Minimis* Section 4(f) Impacts Findings

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966, as amended, protects historic resources, public parks and wildlife refuges from conversion to transportation uses unless: (1) it can be demonstrated that there is no feasible or prudent alternative to the use of such land, and (2) such use includes all possible planning to minimize harm to these resources. Section 4(f) applies to historic sites regardless of ownership, but only to publicly-owned parks, recreation areas and refuges.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), legislation established in 2005, authorizes the federal surface transportation programs for highways, highway safety, and transit for the five-year period 2005-2009. SAFETEA-LU also revises Section 4(f) for the first time since 1966. The legislation amends both Title 49 U.S.C. Section 303 and Title 23 U.S.C. Section 138 simplifying the process and allowing for the approval of projects that would have only *de minimis* impacts on those lands identified during the Section 4(f) analysis. This new provision allows USDOT agencies to make a *de minimis* finding in situations where impacts to Section 4(f) resources would be minimal.

The FTA and CATS informed MCPR, the local agency with jurisdiction over the resources, of their intent to propose *de minimis* findings for each of the following resources: Kirk Farm Fields; the planned Toby Creek Greenway; and the planned Mallard Creek Greenway. A copy of this letter detailing the basis for the *de minimis* findings and MCPR's concurrence with this proposed finding is contained in Appendix B: Agency Correspondence. In addition, FTA is seeking public review/input on this *de minimis* finding as part of the Draft EIS circulation/public hearing and a final determination will be included in the Final EIS.

9.3 Mitigation

The following discusses mitigation measures associated with the identified permanent and direct impacts to park and recreation facilities.

9.3.1 Light Rail Alternative

The following mitigation measures will be undertaken for each facility to minimize potential moderate impacts to parklands:

Kirk Farm Fields

- A detailed noise assessment will be conducted prior to the completion of the Final EIS to further evaluate the potential for impact to this resource and to identify if mitigation measures are required. CATS has coordinated with the MCPR regarding the potential moderate noise impact to this resource and the agency has indicated that these impacts are a minor concern (Appendix B: Agency Coordination). Further coordination with MCPR will occur if the predicted noise levels from the detailed noise assessment indicate that a moderate impact would result, and MCPR input will be sought as to whether mitigation is feasible and prudent.

Toby Creek Greenway (planned)

- Vegetative screens will be maintained to the extent practicable, and where existing vegetation must be removed, landscaping will be planted where the ROW width would allow.
- CATS will coordinate with MCPR to ensure that the bridge would not conflict with the Toby Creek Greenway (planned).
- CATS will coordinate with MCPR to minimize impact to the Toby Creek Greenway (planned) during construction of the proposed Light Rail Alternative.
- CATS will notify MCPR 48 hours in advance of temporary closure of greenways due to construction.

Mallard Creek Greenway Extension (planned)

- Vegetative screens will be maintained to the extent practicable, and where existing vegetation must be removed, compatible landscaping will be planted where the ROW width allows.
- CATS will coordinate with MCPR to minimize bridge conflicts with Mallard Creek Greenway Extension (planned).
- CATS will notify MCPR 48 hours in advance of temporary closure of greenways due to construction.



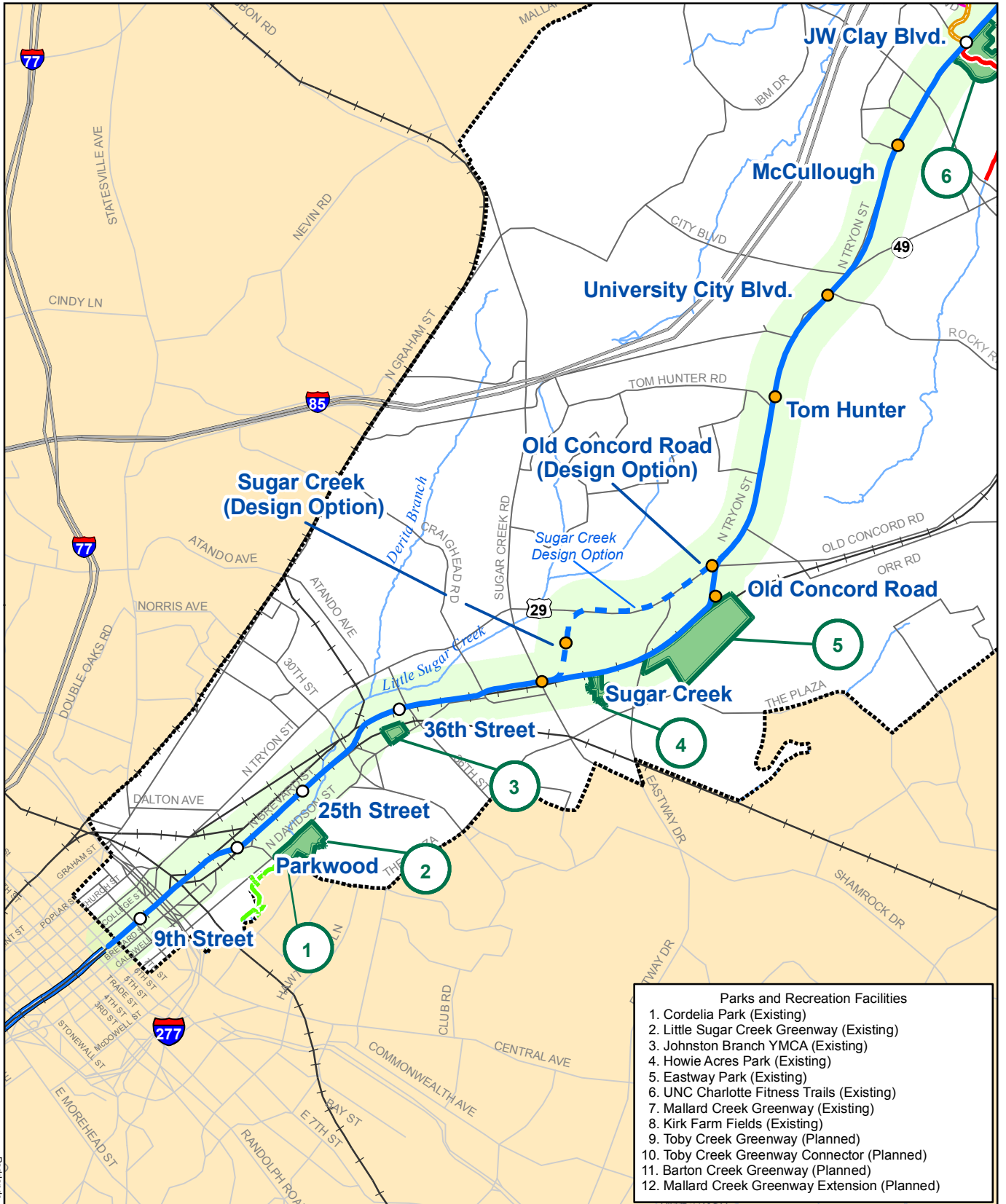
Example of bridge type proposed over Mallard Creek Greenway Extension (planned).

The proposed Light Rail Alternative could also provide an opportunity for inclusion of public spaces within the station areas that could serve park-like functions. Opportunities for the design of public spaces at station locations are possible at Parkwood Station, 36th Street Station, JW Clay Blvd. Station and UNC Charlotte Station. CATS will coordinate with MCPR to determine a suitable way to provide a connection between the greenway and the proposed Mallard Creek Church Station.

First Ward Park has not been evaluated for environmental consequences due to the currently limited information regarding this facility and unknown nature of its future park amenities. However, CATS is attentive of the project and will continue to coordinate the 9th Street Station design and construction with the developer of this adjacent project. CATS will also coordinate with Mecklenburg County regarding the Cullman Avenue/Little Sugar Creek Floodplain Acquisition Project, if necessary.

9.3.2 Light Rail Alternative – Sugar Creek Design Option

No mitigation beyond that listed for the Light Rail Alternative is proposed, as there are no additional impacts that would result from this design option.



- Parks and Recreation Facilities**
1. Cordelia Park (Existing)
 2. Little Sugar Creek Greenway (Existing)
 3. Johnston Branch YMCA (Existing)
 4. Howie Acres Park (Existing)
 5. Eastway Park (Existing)
 6. UNC Charlotte Fitness Trails (Existing)
 7. Mallard Creek Greenway (Existing)
 8. Kirk Farm Fields (Existing)
 9. Toby Creek Greenway (Planned)
 10. Toby Creek Greenway Connector (Planned)
 11. Barton Creek Greenway (Planned)
 12. Mallard Creek Greenway Extension (Planned)

Legend

Northeast Corridor Limits	Lynx Blue Line	Railroads	Existing Greenways
Proposed Light Rail Alternative	Highway	Streams	5yr Future Greenways
Design Option	Highway (Future Planned)	County Line	10yr Future Greenways
Proposed Stations	Highway (Under Construction)	Mecklenburg County Parks	
Proposed Stations with Park-and-Ride	Major Roads	Parklands Study Area	

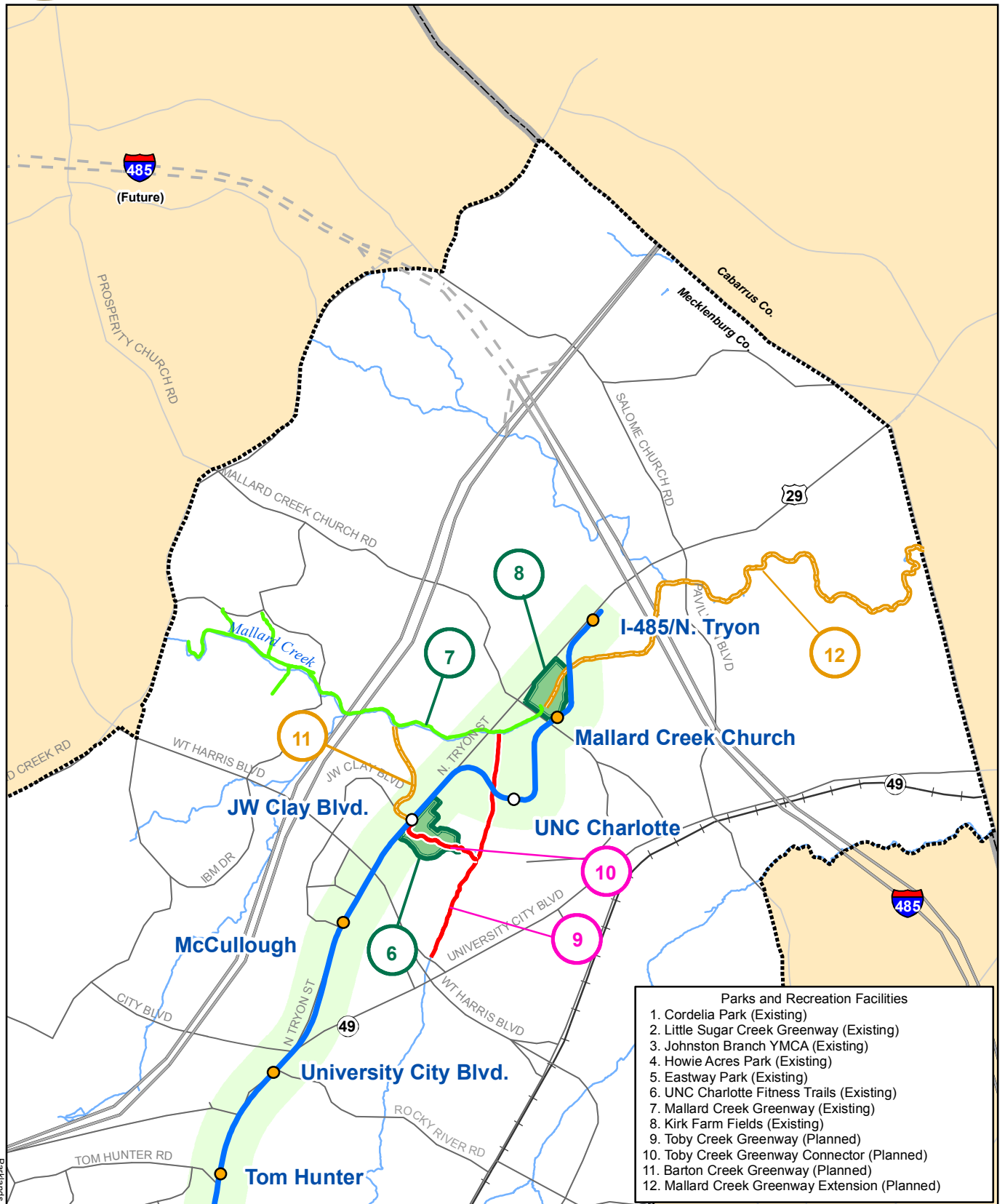
0.5 0.25 0 0.5
Miles

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Parklands_Overview_Southern_Map_CB_033010.pdf

04/19/10

Park and Recreation Facilities in Northern Portion of Corridor



- Parks and Recreation Facilities**
1. Cordelia Park (Existing)
 2. Little Sugar Creek Greenway (Existing)
 3. Johnston Branch YMCA (Existing)
 4. Howie Acres Park (Existing)
 5. Eastway Park (Existing)
 6. UNC Charlotte Fitness Trails (Existing)
 7. Mallard Creek Greenway (Existing)
 8. Kirk Farm Fields (Existing)
 9. Toby Creek Greenway (Planned)
 10. Toby Creek Greenway Connector (Planned)
 11. Barton Creek Greenway (Planned)
 12. Mallard Creek Greenway Extension (Planned)

Legend

Northeast Corridor Limits	Lynx Blue Line	Railroads	Existing Greenways
Proposed Light Rail Alternative	Highway	Streams	5yr Future Greenways
Design Option	Highway (Future Planned)	County Line	10yr Future Greenways
Proposed Stations	Highway (Under Construction)	Mecklenburg County Parks	
Proposed Stations with Park-and-Ride	Major Roads	Parklands Study Area	

0.5 0.25 0 0.5
Miles

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Parklands_Overview_Northern_Map_CB_03/30/10.pdf

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10.0 NATURAL RESOURCES

This chapter presents information about the natural resources located within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). It also discusses the potential effects of the alternatives under study in this Draft Environmental Impact Statement (EIS) and identifies any needed mitigation.

10.1 Affected Environment

The affected environment includes aquatic and terrestrial ecosystems. Definitions of area descriptions used in this chapter are as follows:

- study area denotes the area bounded by the proposed construction limits and/or right-of-way limits and is the area studied for potential impacts; and,
- project corridor refers to the larger geographic description of the project location.

The proposed project corridor encompasses large amounts of developed, disturbed and maintained areas. Field surveys were conducted along the proposed LYNX BLE alignment on multiple dates between September 2008 and December 2008. Additional field surveys were conducted along the railroad right-of-way portion of the alignment in February 2009 and in additional areas of refinement in June, July, October and November 2009. Additional field surveys for threatened and endangered species were conducted in July 2010. The field investigators walked the following locations: the proposed Light Rail Alternative right-of-way, approximately 200 feet wide; the proposed station locations; the proposed park-and-ride facility locations; and, the area encompassing the Light Rail Alternative – Sugar Creek Design Option. Additional technical information on natural resources within the study area may be found in the supporting *Natural Resources Technical Report* (July 2010).

This section describes the ecosystems encountered in the study area, as well as the relationship between flora and fauna within those ecosystems. Composition and distribution of biotic communities throughout the study area are reflective of topography, hydrologic influences and past and present land uses in the study area.

10.1.1 Plant Communities

Plant species were observed and recorded during field visits and are documented in the supporting *Natural Resources Technical Report* (July 2010). No formal sampling for fauna was undertaken. Published range distributions and habitat analysis are used in estimating fauna expected to be present in the project vicinity.

The land surrounding the proposed project is urban and suburban, and consequently, the wooded communities in the study area are generally highly disturbed. Based on the field reviews, two different terrestrial communities were identified in the study area: maintained/disturbed and mixed pine/hardwood forest. In accordance with the *Classification of the Natural Communities of North Carolina* by M.P. Schafale and A.S. Weakley (Schafale, 1990), a natural community is defined as a community “whose characteristics and functioning are shaped by the process of evolution and ecological interactions of long periods of time, without the overriding influence of modern human activities.” Based on this naturalness definition and for purposes of this discussion, areas that are roadsides, maintained or disturbed areas are not applicable for natural community classification.

As a result of their disturbed nature, the majority of the study area forested communities cannot be classified according to the North Carolina Natural Heritage Program’s (NCNHP) Classification of the Natural Communities of North Carolina and are identified as Maintained/Disturbed.

Maintained/Disturbed Community

Since the proposed alignment generally follows the existing railroad corridor or streets, the majority of vegetative communities that would likely be impacted in the study area consist of disturbed (maintained) right-of-way and landscaped commercial/industrial properties. Commercial and industrial facilities are generally located directly adjacent to the proposed alignment and there are numerous road crossings and

longitudinal encroachments. The vegetation displays the highly disturbed nature of the area, consistent with the urban locale.

Mixed Pine/Hardwood Forest

The natural, relatively undisturbed wooded areas that are located within a portion of the proposed Old Concord Road Station park-and-ride lot, the University of North Carolina at Charlotte (UNC Charlotte) campus and the proposed Mallard Creek Church Station park-and-ride lot are classified as a mixed pine/hardwood forest community. Groundcover is sparse or absent. Stunted vegetation and a mixed canopy characterized these areas.

Important Natural Areas

Important natural areas include those with plants and animals that are so rare, or the natural communities are so significant that they merit special consideration as land-use decisions are made. As defined by the NCNHP, there are no important natural areas along the proposed project corridor (NCNHP website, accessed 2009).

10.1.2 Wildlife

Observations of wildlife and signs of wildlife use were noted during field investigations conducted from September 2, 2008 through November 5, 2009 and on September 19-23, 2005. Although highly disturbed, the proposed project corridor provides habitat for some bird populations. Birds seen or heard during the field visits included 24 species, with others expected but not seen or heard due to their nocturnal and/or secretive nature. Mammals common to urban environments can be expected to live in the proposed project corridor, including, but not limited to white-tailed deer (*Odocoileus virginianus*), opossum (*Didelphis virginiana*), gray squirrel (*Sciurus carolinensis*) and eastern cottontail (*Sylvilagus floridanus*). Ditches and vernal pools along the proposed project corridor may provide habitat for amphibians, while streams along the study area may support aquatic populations. Pollution has reduced the available habitat for most fish species, though some do occur. A detailed list of wildlife observed or expected in the proposed project corridor is included in the supporting *Natural Resources Technical Report* (July 2010).

10.1.3 Farmlands

The study area is predominantly urbanized or developed. No land in the study area is currently in use as farmland. "Prime farmland does not include land already in or committed to urban development or water storage" (7 CFR Part 658.3). Since the proposed project corridor is urbanized, it is not subject to the requirements of the Farmland Protection Policy Act.

10.1.4 Forests

The current forest resources in Mecklenburg County are primarily pine, mixed pines or hardwoods. The 1971 North Carolina Conservation Needs Inventory reported that approximately 51 percent, or 170,000 acres, of the county was forested (USDA, 1980), although this number is probably considerably less today due to the tremendous growth in the county since 1980. The majority of the forest communities located along the proposed project corridor are fragmented and reflect the highly disturbed history of the area.

Urban Forestry Opportunities

Urban forestry is the care and management of urban forests (i.e., tree populations in urban settings, for the purpose of improving the urban environment). Because of the patchy nature of the forest in the study area, the opportunities for urban forestry are limited. The USDA Soil Survey of Mecklenburg County suggests forest management and productivity based on soil type (USDA, 1980). However, the majority of the study area is classified as Cecil-Urban soils that are not rated for forestry potential due to the large amount of fill and other disturbance. The other major soil classes along the corridor have forestry potential from moderate to very high. However, these soils occur in relatively small patches within the study area and there are no concentrations of large trees, with the exception of a portion of the UNC Charlotte campus and the proposed Mallard Creek Church Station park-and-ride lot.

10.1.5 Protected Species

Species with the federal classification of Endangered (E) or Threatened (T), Proposed (P) for such listing, or Threatened due to Similarity of Appearance (T [S/A]) are protected under the Endangered Species Act (ESA), as amended (16 United States Code (USC) 1531 *et seq.*). A review of the NCNHP Database and the U.S. Fish and Wildlife Service (USFWS) webpage for species and habitat descriptions was completed. Information was also provided by the USFWS during the scoping phase of this project (See Appendix B: Agency Correspondence). Within Mecklenburg County, there are currently four federally endangered species listed by the USFWS, protected under the ESA. These species are smooth coneflower (*Echinacea laevigata*), Schweinitz’s sunflower (*Helianthus schweinitzii*), Carolina heelsplitter (*Lasmigona decorata*), and Michaux’s sumac (*Rhus michauxii*). The USFWS also lists candidate species and species of special concern. Table 10-1 shows the federal and state-listed species in Mecklenburg County.

**Table 10-1
Federal and State-Listed Species in Mecklenburg County**

Common Name	Scientific Name	Federal Status	State Status
Vertebrates			
American eel	<i>Anguilla rostrata</i>	FSC	None
A carpsucker	<i>Carpoides sp. cf. velifer</i>	None	SC
Star-nosed mole	<i>Condylura cristata</i> pop. 1	None	SC
Timber rattlesnake	<i>Crotalus horridus</i>	None	S3
Carolina darter	<i>Etheostoma collis collis</i>	FSC	SC
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	T
Loggerhead shrike	<i>Lanius ludovicianus</i>	None	SC
Invertebrates			
Carolina elktoe	<i>Alasmidonta robusta</i>	None	SX(extirpated)
Carolina heelsplitter	<i>Lasmigona decorata</i>	E	E
Creeper	<i>Strophitus undulatus</i>	None	T
Carolina creekshell	<i>Villosa vaughaniana</i>	FSC	E
Vascular Plants			
Tall larkspur	<i>Delphinium exaltatum</i>	FSC	E-SC
Smooth coneflower	<i>Echinacea laevigata</i>	E	E-SC
Piedmont aster	<i>Eurybia mirabilis</i>	FSC	SR-T
Schweinitz's sunflower	<i>Helianthus schweinitzii</i>	E	E
Shoals spiderlily	<i>Hymenocallis coronaria</i>	FSC	None
Carolina birdsfoot- trefoil	<i>Lotus unifoliolatus</i> var. <i>helleri</i>	FSC	SR-T
Michaux's sumac	<i>Rhus michauxii</i>	E	E-SC
Georgia aster	<i>Symphotrichum georgianum</i>	C	T
<p>Federal Protection Status <u>E=Endangered</u> – In danger of extinction through all or a significant portion of its range. Protected under the ESA. <u>T=Threatened</u> – Likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Protected under the ESA. <u>C=Candidate</u> – Under consideration for official listing for which there is sufficient information to support listing. No federal protection. <u>BGEPA=Bald and Golden Eagle Protection Act</u> – In the July 9, 2007 Federal Register, the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife, effective on August 8, 2007. The bald eagle continues to be afforded protection pursuant to the Bald and Golden Eagle Protection Act. <u>FSC=Federal Species of Concern</u> – A species under consideration for listing, for which there is insufficient information to support listing at this time. No federal protection.</p>			

Source: USFWS website, <http://nc-es.fws.gov/es/cntylist/mecklenburg.html>. Accessed December, 2008.

General surveys were conducted within the study area for the federally and state listed species with the exception of aquatic surveys. Charlotte-Mecklenburg Land Use and Environmental Services Agency (LUESA) regularly tests stream systems for fish, macroinvertebrates and benthos. The Carolina heelsplitter has not been located within Mecklenburg County within recent years and is believed to be extirpated from Mecklenburg County (North Carolina Natural Heritage Program website, 2009). Table 10-2 shows the Federally Endangered/Threatened Species in Mecklenburg County and summarizes the findings of the survey.

**Table 10-2
Federally Endangered/Threatened Species in Mecklenburg County**

Species		Federal Status	County Occurrence	Potential Habitat (y/n)	Biological Conclusion
Common Name	Scientific Name				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	Current	n	No Effect
Carolina Heelsplitter	<i>Lasmigona decorata</i>	E	Current	y	No Effect
Michaux's Sumac	<i>Rhus michauxii</i>	E	Historic	y	No Effect
Schweinitz's Sunflower	<i>Helianthus schweinitzii</i>	E	Current	y	No Effect
Smooth Coneflower	<i>Echinacea laevigata</i>	E	Current	y	No Effect

Federal Protection Status

E=Endangered – A taxon in danger of extinction through all or a significant portion of its range.

T=Threatened – A taxon likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

BGEPA=Bald and Golden Eagle Protection Act – In the July 9, 2007 Federal Register, the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife, effective on August 8, 2007. The bald eagle continues to be afforded protection pursuant to the Bald and Golden Eagle Protection Act.

Source: North Carolina Natural Heritage Program website, <http://www.ncnhp.org/Pages/guide.htm>. (Accessed December, 2008.)

Smooth Coneflower (*Echinacea laevigata*), State and Federal Listed Endangered

The study area may provide the proper habitat requirements preferred by this species. No individuals of smooth coneflower were observed during field surveys of the study area during the last week of September and the first week of October, 2007, or between September 2008 and November 2009. Additional field surveys were conducted in July 2010 during the blooming period of this species. No individuals were observed.

Schweinitz's sunflower (*Helianthus schweinitzii*), State and Federal Listed Endangered

The study area may provide the proper habitat requirements preferred by this species. Correspondence from the NCNHP indicates that one population was found in 1994-1995 along the proposed project corridor about one and one-half miles southwest of the Charlotte Motor Speedway. NCNHP Program biologists searched for this population in 2003 and 2005, but were unable to locate the population, so it was assumed extirpated. Correspondence from the USFWS indicates that a historic population of Schweinitz's sunflower had been found near the proposed project corridor's northern terminus and recommended a detailed botanical analysis be conducted for the project. Scientists examined the proposed project corridor during the last week of September and the first week of October, 2007 and did not find any specimens. The study area was searched again by scientists between September 2008 and November 2009, during the blooming period for Schweinitz's sunflower and no specimens were found.

Carolina heelsplitter (*Lasmigona decorata*), State and Federal listed Endangered

Potential habitat may exist within Toby Creek and Mallard Creek located within the proposed project corridor. Potential habitat characteristics such as undercut shaded banks with extensive root systems and buried logs and rocks within the channel were observed in both streams. However, existing water quality may be a limiting factor in the occurrence of Carolina heelsplitter within these streams. The general stagnant and apparent non-oxygenated conditions of the water make this habitat considerably less than optimal. No in-stream field investigations were made. Given the degraded habitat and the lack of any recent records of this mussel occurring in Mecklenburg County, the likelihood that this mussel occurs in the study area is concluded to be remote.

Michaux's sumac (*Rhus michauxii*), State and Federal listed Endangered

No individuals of Michaux's sumac were observed within the proposed project corridor. The NCNHP was contacted to provide the locations of the nearest populations of Michaux's sumac. The NCNHP

determined that no populations were present within several miles of the study area. Field surveys of the study area were conducted during the last week of September and the first week of October, 2007, between September 2008 and November 2009 and again in July 2010 (during the blooming period for Michaux's sumac). No individuals of Michaux's sumac were observed during any of these field visits. The study area has the proper habitat requirements preferred by this species but there are no known populations within the proximity of the site, so it is unlikely that Michaux's sumac would be found in the study area.

Federal and State Candidate Species

As indicated on Table 10-1, there is one federal candidate species in Mecklenburg County (the Georgia aster). Direct surveys for this species were conducted during the last week of September and the first week of October 2007, and between September 2008 and November 2009 during the blooming period for Georgia aster. No specimens were found.

Federal Species of Concern and State-Listed Species

FSC are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Federal species of concern are defined as those species that may or may not be listed in the future. These species were formally candidate species or species under consideration for listing for which there was insufficient information to support a listing of Endangered, Threatened, Proposed Endangered or Proposed Threatened. North Carolina protects state endangered and threatened species through state laws. The only state-listed species that was found was the Carolina birdsfoot-trefoil.

NCNHP correspondence indicates that a population of Federal Species of Concern and State-Significantly Rare Carolina birdsfoot-trefoil (*Lotus unifoliolatus* var. *helleri*) was found in 1994 in scattered locations along the proposed project corridor, between the Charlotte Motor Speedway and the I-85 interchange. Carolina birdsfoot-trefoil was found by CATS' consultants at three sites along the railroad right-of-way portion of the proposed project corridor during the last week of September and the first week of October, 2007. Carolina birdsfoot-trefoil is not rare in the southern Piedmont.

Bald Eagle and Golden Eagle Protected Species

The bald eagle was removed from the Federal List of Threatened and Endangered Species, effective on August 8, 2007. However, the bald eagle continues to be afforded protection pursuant to the Bald and Golden Eagle Protection Act. Suitable habitat for bald eagle does not exist in the study area or within 660 feet (the buffer recommended under the *National Bald Eagle Management Guidelines*) of the study area. Field reviews were conducted between September 2008 and November 2009. No individuals of this species were observed during field surveys. The surveys revealed a lack of foraging habitat and large bodies of water within the study area and within the immediate project vicinity. Therefore, based on the habitat requirements for bald eagle and the lack of preferred habitat within the study area and immediate vicinity, this species is not expected to be found within the study area.

10.2 Environmental Consequences

This section describes the potential environmental impacts to natural resources from the alternatives under consideration, as summarized in Table 10-3. Aquatic natural resource impacts are discussed in Chapter 11.0: Water Resources, and temporary construction impacts are described in Chapter 18.0: Construction Impacts.

**Table 10-3
Summary of Estimated Natural Resource Impacts**

Location	Type of Natural Resource Area	Permanent Impact (Y/N) - Type	Light Rail Alternative Area of Impact (acres)	Light Rail Alternative – Sugar Creek Design Option (acres)
Old Concord Road Station and park-and-ride lot	Forested Area	Yes - Clearing	5.35	3.78
UNC Charlotte campus	Forested Area	Yes - Clearing	9.13	9.13
Mallard Creek Church Station and park-and ride lot	Forested Area	Yes - Clearing	5.41	5.41
Forested Area Totals:			19.89	18.32

Note: Areas that fall outside the alternative alignment are designated with “ - ” to indicate impacts are not applicable.
Source: 30% Preliminary Engineering Design Plans (March 2010) and Mecklenburg GIS mapping data (2007).

10.2.1 No-Build Alternative

Since no construction would occur under No-Build Alternative, no impacts to plant communities, wildlife, farmlands and forests and protected species would occur.

10.2.2 Light Rail Alternative

Based on 30% Preliminary Engineering Design Plans, the majority of the anticipated impacts would be to the maintained/disturbed vegetative community type. This would include roadways, commercial, industrial and residential properties.

10.2.2.1 Plant Communities

The vegetative communities likely to be cleared in the study area consist of disturbed (maintained) right-of-way and landscaped commercial/industrial properties.

10.2.2.2 Wildlife

Long term impacts to wildlife would result from the elimination and/or fragmentation of forested habitat. The majority of the wildlife species common to the corridor are typical of urban and/or disturbed environments and would adapt and recover quickly. It is expected that most wildlife capable of relocating would relocate to other existing habitat near the proposed project corridor, either temporarily or permanently. The loss of terrestrial forested habitat and fragmentation of forested habitat may result in the displacement and/or loss of some wildlife species.

10.2.2.3 Farmlands

No farmlands are located along the project corridor; therefore, no impacts to farmlands would occur.

10.2.2.4 Forests

The Light Rail Alternative would result in clearing impacts to an estimated 19.89 acres of mixed pine/hardwood forest community. The majority of the impacts to the forest resources would result from clearing associated with the construction of park-and-ride lots.

The construction of the proposed Old Concord Road Station park-and-ride lot would result in forest resources impacts, as it would require the removal of a portion of the mixed pine/hardwood forest community located at that site. It is estimated that approximately 5.35 acres of this wooded area would be cleared by the Light Rail Alternative proposed Old Concord Road Station park-and-ride lot.

Also, the construction of the proposed Light Rail Alternative alignment through the UNC Charlotte campus and construction of the proposed UNC Charlotte Station would require the removal of a portion of the mixed pine/hardwood forest community located on that site. Approximately 9.13 acres of this wooded

area would be cleared by the construction of the Light Rail Alternative alignment and UNC Charlotte Station.

Finally, the construction of the proposed alignment, the Mallard Creek Church Station and the proposed Mallard Creek Church Station park-and-ride lot would require the removal of a portion of the mixed pine/hardwood forest community located at that site. Approximately 5.41 acres of this wooded area would be cleared by the construction of the proposed alignment, the Mallard Creek Church Station and the proposed Mallard Creek Church Station park-and-ride lot.

10.2.2.5 Protected Species

Literature and field reviews were performed to determine the presence of appropriate habitat and the likelihood of the occurrence of each species within the study area. A completed literature review coupled with the protected species habitat field reviews revealed that the four federally endangered species listed by the USFWS and the NCNHP databases for Mecklenburg County are not likely to occur in the study area, resulting in a biological conclusion of “No Effect.” USFWS concurrence for this biological conclusion is being requested as part of the review of this Draft EIS. The final determination regarding the “No Effect” finding will be included in the Final EIS.

Federal Species of Concern and State-Listed Species

The review of Federal Species of Concern (FSC) and State-Listed Species and field reviews revealed one FSC, i.e., the Carolina birdsfoot-trefoil. The Carolina birdsfoot-trefoil is a federal species of concern. Federal species of concern are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until the species is formally proposed or listed as Threatened or Endangered. A population of Carolina birdsfoot-trefoil would be destroyed by the fill that is proposed within this area of the alignment as part of the Light Rail Alternative. Although Carolina birdsfoot-trefoil is a FSC, it is not rare in the southern Piedmont. The USFWS will be notified of this finding and appropriate coordination will occur. Should this species be formally proposed or listed as Endangered or Threatened prior to construction, formal consultation with USFWS will be completed and details will be included in the Final EIS. Comment is also requested from the North Carolina Department of Agriculture, which administers the North Carolina Plant Protection and Conservation Act, and the NCNHP as part of the review of this Draft EIS.

10.2.3 Light Rail Alternative – Sugar Creek Design Option

Overall, the Light Rail Alternative – Sugar Creek Design Option would result in overall clearing impacts of 18.32 acres of mixed pine/hardwood forest community. The construction of the proposed Light Rail Alternative – Sugar Creek Design Option Old Concord Road Station would impact approximately 3.78 acres of mixed pine/hardwood forest community. This represents an incremental net impact avoidance of approximately 1.56 acres over the Light Rail Alternative.

The proposed Light Rail Alternative – Sugar Creek Design Option would avoid the area of the Carolina birdsfoot-trefoil population. Therefore, no impact would occur if the Light Rail Alternative – Sugar Creek Design Option is selected for implementation.

10.3 Mitigation

This section discusses the mitigation that may be required for the ecosystems and natural resources impacted by the proposed project.

10.3.1 Light Rail Alternative

Because the anticipated impacts would be to the maintained/disturbed community type, no mitigation would be required for the Light Rail Alternative.

No mitigation is required for the plant communities within the study area. Replacement trees, shrubs and herbs may be provided where the width of the right-of-way will accommodate the space needed for these

plants to properly grow. In addition, the park-and-ride facilities will be designed to accommodate 8 percent of tree cover in accordance with the City of Charlotte Tree Ordinance.

No mitigation is required for wildlife within the project area. The majority of the wildlife species that are common to the project corridor are typical of urban and/or disturbed environments and would adapt and recover quickly.

There are no farmlands located along the project corridor. Therefore, no mitigation is required.

The elimination of forest resources may be mitigated in part by implementing urban forestry practices. During the construction phase, the contractor should be strongly encouraged to send any felled trees to a chipper, so that the cleared material is reused.

No mitigation is required for protected species within the study area. As noted, USFWS concurrence for the biological conclusion of “No Effect” is being requested as part of the review of the Draft EIS. The final determination regarding the finding will be included in the Final EIS. The Carolina birdsfoot-trefoil is a FSC not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until the species is formally proposed or listed as Threatened or Endangered. However, should this species be formally proposed or listed as Endangered or Threatened prior to construction, formal consultation with USFWS will be completed.

10.3.2 Light Rail Alternative – Sugar Creek Design Option

The mitigation described for the Light Rail Alternative would also pertain to the Light Rail Alternative – Sugar Creek Design Option.

11.0 WATER RESOURCES

This chapter contains information concerning water resources located in the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) project corridor. Water resources information includes physical aspects of the resources, their relationship to major water systems, best usage standards and water quality of the resources. Potential impacts to jurisdictional streams, floodplains and wetlands in the study area for the alternatives under study in this Draft Environmental Impact Statement (EIS) are estimated and summarized. Mitigation is identified as necessary. Additional technical information may be found in the supporting *Natural Resources Technical Report* (July, 2010).

11.1 Affected Environment

Background research on water resources, including streams, wetlands and other area features, as well as field investigations on multiple dates were conducted. The field investigators walked the following locations: the proposed Light Rail Alternative right-of-way, approximately 200 feet wide; the proposed station locations; the proposed park-and-ride facility locations; and the area encompassing the Light Rail Alternative – Sugar Creek Design Option in order to identify the water resources located within the project corridor. The following section summarizes these investigations.

11.1.1 Groundwater

The North Carolina Division of Water Quality (NCDWQ) regulates groundwater by preventing pollution, managing and restoring degraded groundwater and protecting groundwater resources. Groundwater levels and flow in the project vicinity vary widely, largely due to urban development. According to the United States Department of Agriculture/Soil Conservation Service (USDA SCS) Soil Survey of Mecklenburg County, North Carolina, the groundwater levels vary throughout the study area. The highest water tables within the study area are anticipated to be in the areas mapped as Monacan soils in the Little Sugar Creek drainage corridor, the railroad crossing of an unnamed tributary to Little Sugar Creek east of the proposed 36th Street Station and the wetland areas mapped in the Mallard Creek floodplain. Perched water tables associated within the areas mapped as Helena soils may be found in the area of the proposed Sugar Creek Station Park-and-Ride – Sugar Creek Design Option, the proposed Old Concord Road Station park-and-ride lot and along the railroad right-of-way between the proposed Sugar Creek Station and the proposed Old Concord Road Station. A list of public water supply wells and privately-owned wells within the project vicinity and a limited area of the project region was also reviewed. According to the Mecklenburg County Land Use and Environmental Services Agency (LUESA) Groundwater & Wastewater Services, one public water supply groundwater well and ten locations of privately-owned wells lie within approximately 2,000 feet of the LYNX BLE. According to the Charlotte-Mecklenburg Utilities Department (CMU), one well is within the proposed light rail alignment on the University of North Carolina at Charlotte (UNC Charlotte) campus.

11.1.2 Surface Waters

The proposed project corridor is located in two drainage basins, the Catawba and Yadkin River Basins as shown in Figure 11-1. The southern portion of the study area is located within the Lower Catawba watershed of the Catawba River Basin, which is referred to as the Santee River Basin by the USGS. The northern portion of the study area is located within the Rocky River watershed of the Yadkin River Basin, which is referred to as the Upper Pee Dee River Basin by the USGS. Major streams in the southern half of the project region (Upper Little Sugar Creek and Briar Creek in the Catawba River Basin) generally flow in a southerly direction, while streams in the northern half of the project region (Mallard Creek in the Rocky River watershed of the Yadkin River Basin) generally flow in a northeasterly direction.

Surface water features, or drainages, within the project corridor were evaluated to determine the types of streams (i.e., perennial streams, intermittent streams, or ephemeral channels), according to U.S. Army Corps of Engineers (USCOE) and NCDWQ guidelines. Each feature was evaluated as to whether it was defined as a "water of U.S." by the USCOE or whether it was included in the jurisdiction of the NCDWQ. The jurisdictional streams within the study area are listed in Table 11-1 from south to north and shown in Figure 11-2. Stream jurisdictional boundaries, as well as the hydrologic classification were field-verified by the USCOE and NCDWQ on July 21, 2009. Subsequent to this agency field review, the USCOE issued a notification of jurisdictional determination dated October 21, 2009 and an updated notice of determination on December 2, 2009 (Appendix B).

11.1.3 Floodplains and Regulatory Floodways

The Federal Emergency Management Administration (FEMA), in cooperation with federal, state, and local governments, has developed floodway boundaries and Flood Insurance Rate Maps (FIRM) for Mecklenburg County. In Mecklenburg County, this information is available on the Charlotte-Mecklenburg Property Ownership and Land Records Information System (POLARIS website, accessed December, 2008).

Floodplains are land areas adjacent to rivers and streams that are subject to recurring inundation. Owing to their continually changing nature, floodplain areas and other flood-prone areas need to be examined in light of how they might affect or be affected by development. Community Floodplains were established by Mecklenburg County in 2000. Unlike FEMA floodplains that are established by FEMA officials and identify current floodway boundaries, Community Floodplains identify what areas will be prone to flooding in the future, once land upstream is paved and built upon. As such, they are known as the future floodplains or Community Floodplains. The floodplain regulations restrict development from occurring within these areas. Floodplains within the project corridor are shown on Figure 11-3.

Rivers and streams where FEMA has prepared detailed engineering studies may have designated floodways. A floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. For most waterways, the floodway is where the water is likely to be deepest and fastest and is the area of the floodplain that should be reserved (kept free of obstructions) to allow floodwaters to move downstream. Placing fill or buildings in a FEMA Floodway may block the flow of water and increase flood elevations. The Community Encroachment Area is a floodway with a surcharge of 0.1 foot. This creates a wider floodway than the FEMA Floodway. Floodways within the project corridor are shown on Figure 11-3.

According to the FIRM maps for Mecklenburg County, the study area falls outside of the FEMA 100-year floodplain for the proposed Light Rail Alternative alignment, with the exception of proposed crossings of Little Sugar Creek (Stream F), Toby Creek (Stream U), the unnamed tributary to Mallard Creek (Stream T) and Mallard Creek (Stream M), and the encroachment into the floodplain at the proposed 36th Street Station. The Little Sugar Creek Community Floodplain is within the project corridor and extends for approximately 400 feet along the north side of North Brevard Street. The floodplain area along the south side of North Brevard Street extends for approximately 300 feet. An existing bridge on North Brevard Street crosses Little Sugar Creek (Stream F) adjacent to the study area. The Little Sugar Creek floodplain west of 36th Street extends along the project corridor for approximately 500 feet, to the proposed 36th Street Station.

The portion of Toby Creek (Stream U) within the project corridor has a wide Community Floodplain that extends for nearly 1,000 feet along the proposed Light Rail Alternative. The floodplain widths at Toby Creek extend from 600 to 800 feet perpendicular across the channel.

The project corridor crosses an unnamed tributary (Stream T) to Mallard Creek northeast of the UNC Charlotte campus. The Community Floodplain at this location extends for approximately 1,000 feet along the proposed Light Rail Alternative and becomes part of the Mallard Creek floodplain as the alignment turns to cross East Mallard Creek Church Road. The project corridor crosses the Community Floodplain and Community Encroachment Area at the crossing of the unnamed tributary.

**Table 11-1
Description of Jurisdictional Streams in the Study Area**

Stream Name	Channel Bottom Width ¹	Bank Height ¹	Substrate	Description of Drainage ²	Hydrology	Area (acres)	Linear Feet
Stream C	8-10 ft.	4-5 ft.	Sand, silt, cobble, rock	Crosses under railroad right-of-way. Low flow with depths less than 3".	Perennial	0.14	306
Stream D	3-4 ft.	5-6 ft.	Sand, silt, cobble, rock	Tributary to Stream C. Parallels railroad right-of-way. Low flow with depths less than 3".	Intermittent	0.14	396
Stream F (Little Sugar Creek)	20-22 ft.	10-14 ft.	Sand, silt, rock, boulders	Crosses under North Brevard Street. High flow observed with depths greater than 14". Fish observed.	Perennial	0.31	662
Stream J	4-6 ft.	4-6 ft.	Sand, silt, gravel, rock	Exposed portion from East 30th Street culvert discharge. Low flow with depths less than 6".	Perennial	0.03	103
Stream K	4-6 ft.	4-6 ft.	Sand, silt, gravel	Exposed portion from Stream J culvert. Low flow with depths less than 4".	Perennial	0.03	192
Stream N	8-10 ft.	1-2 ft.	Sand, silt	Exposed portions of stormwater drainage to Linear Wetland Y. Headwater pond over 1' deep. No flow in channel.	Intermittent	0.02	77
Stream A	6-16 ft.	6-10 ft.	Sand, silt, cobble, rock	Crosses under and parallels railroad right-of-way and North Davidson Street. Low flow with depths less than 6".	Perennial/ Intermittent	0.108	1,009
Stream B	4-5 ft.	5-6 ft.	Sand, silt	Parallels east side of railroad right-of-way north of Bearwood Avenue. Low flow with depths less than 4".	Intermittent	0.013	122
Stream P	4-5 ft.	2-3 ft.	Sand, silt, rock	Two branches parallel west side of railroad right-of-way. Low flow with depths less than 4".	Intermittent	0.15	1,638
Stream S	6-8 ft.	3-5 ft.	Sand, silt, cobble, rock	Exposed portion in the middle of proposed Sugar Creek Station park-and-ride lot. Low flow depths less than 4".	Perennial	0.05	355
Stream Z	4-5 ft.	3-4 ft.	Sand, silt, cobble, rock	Two non-jurisdictional ephemeral branches on west side of railroad right-of-way drain to culvert and create intermittent stream on east side. Low flow with depths less than 6".	Intermittent	0.01	84
Stream E	4-8 ft.	6-10 ft.	Sand, silt, gravel	Crosses under railroad right-of-way at the proposed Old Concord Road Station park-and-ride lot. Has two non-jurisdictional ephemeral tributaries at park-and-ride site. Low flow with depths less than 4".	Intermittent	0.09	577
Stream X	2-4 ft.	4-6 ft.	Sand, silt	Located at the proposed University City Blvd. Station park-and-ride lot. Drains through Wetland X. Low flow with depths less than 2".	Intermittent	0.04	622
Stream U (Toby Creek)	20-25 ft.	8-10 ft.	Sand, silt, cobble, rock	Located on the UNC Charlotte campus. High flow observed with depths greater than 24". Fish observed.	Perennial	0.43	768
Stream T	10-12 ft.	1-2 ft.	Sand, silt, cobble, rock	Located on the UNC Charlotte campus. Moderate flow observed with depths greater than 6".	Perennial	0.22	890
Stream M (Mallard Creek)	20-25 ft.	12-15 ft.	Sand, silt, rock, boulders	Located north of the proposed Mallard Creek Church Station park-and-ride lot. High flow observed with depths greater than 6". Fish observed.	Perennial	0.42	548
Stream Q	12-14 ft.	1-2 ft.	Sand, silt, gravel	Located at the proposed I-485/N. Tryon Station from Wetland Q culvert discharge. Low flow. Fish observed.	Perennial	0.04	296
TOTALS:						2.241	8,645

¹ - All stream dimensions are approximate

² - Descriptions based on field surveys conducted between September 2, 2008 and November 5, 2009.

At Mallard Creek (Stream M), the Community Floodplain is approximately 900 feet wide and extends into a portion of the I-485/N. Tryon Station. The project corridor crosses approximately 600 feet of the Community Encroachment Area at the crossing of Mallard Creek.

11.1.4 Wetlands

Surveys of the proposed project study area, including the proposed stations and park-and-ride facility locations, were conducted from September 2008 through November 2009. Potential wetland communities were first identified by reviewing National Wetlands Inventory maps and hydric soil lists for the study area and then conducting field visits to verify the presence/absence of a wetland. Jurisdictional wetlands are defined in the field as areas that exhibit positive evidence of three environmental parameters: hydrophytic vegetation, wetland hydrology and hydric soils. Boundaries of the wetlands were determined through observations of vegetation and surficial hydrology, as well as soil samples. Soil samples were taken where hydrology and vegetation indicated the potential presence of a wetland. Soil samples were evaluated using a shovel to a depth of approximately 16 inches. Soils were compared to a Munsell Color chart (1994) to evaluate chroma values and to note the presence of mottling and oxidized root channels, which indicate the presence of hydric soils.

The results of the on-site field review conducted by environmental scientists indicate that there are 13 jurisdictional wetland areas located within the study area, as shown in Figure 11-2. Table 11-2 summarizes the wetlands and the area and linear feet of linear wetlands that are located within the study area. These jurisdictional wetland boundaries were delineated, flagged in the field and the boundaries were surveyed. All jurisdictional wetland area boundaries have been verified by the USCOE and a Notification of Determination was issued on October 21, 2009 and updated on December 2, 2009.

**Table 11-2
Jurisdictional Wetlands Located Within the Study Area**

Wetland Label	Special Form ¹	Wetland Type	Description of Drainage	Area (acres)	Linear Feet
C	Linear	Emergent	Swale that discharges stormwater from East 16 th Street	0.02	296
Y	Linear	Forested	Swale behind RR and commercial building	0.14	527
A	Linear	Forested	Swale behind RR and commercial building	0.012	265
A		Scrub-Shrub/ Emergent	Created as a result of grading for a drainage improvement project	0.22	n/a
P	Isolated	Open Water/ Emergent	In the backyard of a residence, appears to have subsurface connection to Stream P	0.02	n/a
O	Isolated	Forested	Former detention basin	0.16	n/a
E		Forested	Drains directly into Stream E	0.06	n/a
X		Forested	Downstream of Stream X, ends at a recently built headwall and pipe culvert	0.36	n/a
R	Isolated	Forested	A running trail created a berm that impedes drainage and created the wetland	0.07	n/a
T		Forested	Stormwater and flooding of Stream T contribute to the hydrology	3.39	n/a
W		Forested	Stormwater and flooding of Stream T contribute to the hydrology	1.19	n/a
N		Forested	Created to provide mitigation for NCDOT, part of County's Mallard Creek Park	1.25	n/a
Q	Linear	Forested	Swale from a pipe culvert under North Tryon Street/US-29	0.03	125
TOTALS:				6.922	1,213

Based on field delineations and GPS surveys conducted between September 2, 2008 and November 5, 2009.

¹Isolated wetlands considered non-jurisdictional by USCOE but may be regulated by NCDWQ.

11.2 Environmental Consequences

Anticipated impacts to water resources, notably jurisdictional streams and wetlands as well as regulated floodplain areas are described in the following sections. The impacts to streams, floodplains and wetlands by alternative are summarized in Tables 11-3, 11-4 and 11-5, respectively.

11.2.1 No-Build Alternative

Under the No-Build Alternative, no construction would take place; therefore, no impacts to the water resources in the project corridor would result.

11.2.2 Light Rail Alternative

Preliminary impact estimates to the jurisdictional features for the proposed Light Rail Alternative are based on design assumptions as shown in the *30% Preliminary Engineering Design Plans* completed March 2010. Preliminary cut and fill limits were placed as an overlay on the GPS survey of the jurisdictional stream and wetland features to estimate the impacts identified. In many instances the impacts are less than the total area studied. Estimated impacts are subject to refinement based on the continuance of the design and further development of the engineering plans. The current level of design estimates the final construction limits. Final construction limits as well as temporary construction easements, staging areas, etc., will be addressed and refined in further stages of design.

11.2.2.1 Groundwater

Two project components that would require excavation include the depression of 36th Street beneath the light rail and freight tracks and carrying of the light rail below North Tryon Street/US-29 onto the UNC Charlotte campus. There are no wells within the vicinity of the proposed project at 36th Street; therefore, no groundwater impacts would be anticipated as a result of excavation. The well located on the UNC Charlotte campus within the proposed project alignment is no longer in use. CATS and/or UNC Charlotte will complete the abandonment/closure process per North Carolina Department of Environment and Natural Resources (NCDENR) requirements prior to construction of the project. It is anticipated that the well will be filled and sealed and the outer well casing will be grouted to a minimum depth of 20 feet or removed, per state regulations. It is anticipated that groundwater would therefore not be impacted by the proposed project. The next closest public water supply well to the project corridor is more than 1,500 feet away. As such, no other groundwater impacts would be anticipated. The 10 privately-owned wells that are within 2,000 feet of the project corridor would not be affected by the operation of the light rail vehicles because the vehicles do not have gasoline or oils that could spill and contaminate the groundwater. Additionally, each station location and park-and-ride facility would implement best management practices (BMPs) for the collection and treatment of stormwater runoff.

11.2.2.2 Surface Waters

Table 11-3 identifies the impacts to streams that would result from the proposed Light Rail Alternative. With the exception of Streams F, B, E, X, U and M, the remaining jurisdictional streams in the study area would be disturbed by the proposed Light Rail Alternative. Linear Wetland Y, Linear Wetland A, Wetland A, Isolated Wetland P, Wetland E, Isolated Wetland R, Wetland T, Wetland W and Linear Wetland Q would also be disturbed by the proposed Light Rail Alternative. A total of 3,262 linear feet of streams (23,256 square feet) would be relocated, have bridge structures placed within or would be piped.

Stream C is a perennial unnamed tributary to Little Sugar Creek (Stream F) located in the Little Sugar Creek Watershed, Catawba River Basin. Based on *30% Preliminary Engineering Design Plans*, it is anticipated that approximately 30 linear feet of Stream C would need to be piped, extending from the existing pipe culvert, in order to widen the railroad right-of-way embankment for the proposed alignment. Additionally, a riprap apron approximately 60 feet in length would be placed in Stream C at the discharge point for the extended pipe resulting in 90 linear feet of disturbance to Stream C.

Stream D is an intermittent jurisdictional unnamed tributary to Stream C located in the Little Sugar Creek Watershed, Catawba River Basin. Approximately all 396 linear feet of Stream D would be filled and the drainage relocated to the toe of the embankment created for the proposed alignment.

Stream F is a perennial stream (Little Sugar Creek) located in the Little Sugar Creek Watershed, Catawba River Basin. Stream F flows from north to south, across the proposed alignment and under North Brevard Street. Stream F would be bridged for the LYNX BLE and no direct impacts to Stream F would result. However, due to the proximity of the stream to the estimated final construction limits, this area will be evaluated in further stages of design for impacts due to temporary construction activities.

Stream J is a perennial unnamed tributary to Little Sugar Creek (Stream F) located in the Little Sugar Creek Watershed, Catawba River Basin. Approximately all 103 linear feet of Stream J would be filled for the construction of a new access to the Duke Energy substation.

Stream K is a perennial, unnamed tributary to Stream F located in the Little Sugar Creek Watershed, Catawba River Basin. Pipe replacement and the subsequent addition of a riprap apron would disturb approximately 54 linear feet of Stream K.

Stream N is an intermittent stormwater drainage feature located in the Little Sugar Creek Watershed, Catawba River Basin. Approximately all 77 linear feet of Stream N would be filled by the embankment created for the proposed alignment.

Stream A is a perennial/intermittent unnamed tributary to Little Sugar Creek (Stream F) located in the Little Sugar Creek Watershed, Catawba River Basin. Approximately 111 linear feet of the perennial portion of Stream A would be piped or channelized by the embankment created for the relocated freight tracks associated with the proposed light rail alignment. Intermittent Stream A is an unnamed tributary to perennial Stream A located parallel to North Davidson Street in the Little Sugar Creek Watershed, Catawba River Basin. Approximately all 791 linear feet of the intermittent portion of Stream A would be disturbed by piping.

Stream P is an intermittent channel located in the Little Sugar Creek Watershed, Catawba River Basin. Approximately 1,280 linear feet of Stream P would be disturbed by piping.

Stream Z is an intermittent, unnamed tributary to Briar Creek located in the Briar Creek Watershed, Catawba River Basin. Pipe replacement and the subsequent addition of a riprap apron will create fill impacts to Stream Z totaling approximately 44 linear feet.

Stream E is an intermittent unnamed tributary to Briar Creek located in the Briar Creek Watershed, Catawba River Basin. Impacts to Stream E would be avoided by the proposed Old Concord Road Station park-and-ride lot that would be constructed for the proposed LYNX BLE Project. However, due to the proximity of the stream to the estimated final construction limits, this area will be evaluated in further stages of design for impacts due to temporary construction activities.

Stream X is an intermittent unnamed tributary to Doby Creek located in the Mallard Creek Watershed, Yadkin-Pee Dee River Basin. Impacts to Stream X would be avoided by the proposed University City Blvd. Station park-and-ride lot that would be constructed for the proposed LYNX BLE Project. However, due to the proximity of the stream to the estimated final construction limits, this area will be evaluated in further stages of design for impacts due to temporary construction activities.

Stream T is a perennial tributary to Mallard Creek (Stream M) located in the Mallard Creek Watershed, Yadkin River Basin. Approximately 176 linear feet of Stream T would be piped for the proposed LYNX BLE Project.

Stream Q is a perennial unnamed tributary to Mallard Creek (Stream M) located in the Mallard Creek Watershed, Yadkin-Pee Dee River Basin. Approximately 140 linear feet of Stream Q would be disturbed by fill and the proposed stormwater outfall at the proposed I-485/N. Tryon Street Station park-and-ride garage.

**Table 11-3
Summary of Estimated Stream Impacts**

Jurisdictional Area	Type of Jurisdictional Area	Permanent Impact (Y/N)	No-Build Alternative	Light Rail Alternative		Light Rail Alternative – Sugar Creek Design Option	
				Length of Impact (lf)	Area of Impact (ft ²)	Length of Impact (lf)	Area of Impact (ft ²)
Stream C	Perennial	Yes	0	90	2,361	90	2,361
Stream D	Intermittent	Yes	0	396	5,972	396	5,972
Stream F	Perennial	No Impact	0	0	0	0	0
Stream J	Perennial	Yes	0	103	1,356	103	1,356
Stream K	Perennial	Yes	0	54	327	54	327
Stream N	Intermittent	Yes	0	77	849	77	849
Stream A	Perennial	Yes	0	111	2,486	111	2,486
Stream A	Intermittent	Yes	0	791	791	791	791
Stream B	Intermittent	No Impact	0	0	0	0	0
Stream P	Intermittent	Yes	0	1,280	5,760	0	0
Stream S	Perennial	Yes	0	0	0	211	1,414
Stream Z	Intermittent	Yes	0	44	311	0	0
Stream E	Intermittent	No Impact	0	0	0	0	0
Stream X	Intermittent	No Impact	0	0	0	0	0
Stream U	Perennial	No Impact	0	0	0	0	0
Stream T	Perennial	Yes	0	176	1,936	176	1,936
Stream M	Perennial	No Impact	0	0	0	0	0
Stream Q	Perennial	Yes	0	140	1,107	140	1,107
TOTALS:			0	3,262	23,256	2,149	18,599

The Light Rail Alternative is based on 30% Preliminary Engineering Design Plans (March, 2010) and field survey data.
 The Light Rail Alternative – Sugar Creek Design Option is based on 15% Preliminary Engineering Design Plans (January 2009) and field survey data.

11.2.2.3 Floodplains and Regulatory Floodways

Table 11-4 provides estimates of impacts, based on 30% Preliminary Engineering Design Plans, to Community Floodplains, Community Encroachment Areas, and FEMA Floodways for the proposed Light Rail Alternative, and the Light Rail Alternative – Sugar Creek Design Option. Figure 11-3 shows the locations where the proposed Light Rail Alternative would encroach into the floodplain. All totaled, the proposed Light Rail Alternative would result in estimated impacts of 8.47 acres (368,812 square feet) in Community Floodplains, 0.87 acre (37,746 square feet) in Community Encroachment Areas and 0.2 acre (8,902 square feet) in FEMA Floodways.

It is anticipated the bridge crossing of Little Sugar Creek adjacent to North Brevard Street would require the construction of two bridge end bents and two center bents. The two end bents would not impact any regulatory floodways. The two center bents would be composed of two columns each, each column with a drilled shaft, for a total of four drilled shafts within the Community Floodplain and Community Encroachment Area. Approximately 17 square feet of Community Floodplain and 46 square feet of Community Encroachment Area may be affected by the two center bents. The two end bents would impact approximately 30 square feet of Community Encroachment Area and 4,090 square feet of Community Floodplains. A total of 76 square feet of Community Encroachment Area and 4,107 square feet of Community Floodplain would be affected at this location.

A portion of the proposed access drive and the drainage associated with the Duke Energy substation would encroach upon the Little Sugar Creek Community Floodplain. The extent of the impact to the Community Floodplain of Little Sugar Creek at the Duke Energy substation access drive would be approximately 2,611 square feet.

The relocation of the freight tracks behind the Cullman Avenue industrial facilities would encroach upon a portion of the Little Sugar Creek Community Floodplain. The relocation of the freight tracks would affect approximately 1.19 acres (51,791 square feet) of the Community Floodplain of Little Sugar Creek at this location.

The portion of Toby Creek (Stream U) within the project corridor has a wide Community Floodplain Area that extends for nearly 1,000 feet. The proposed bridge crossing of Toby Creek would require two bridge end bents armored with riprap and eleven interior bents. Each of the 11 center bents would be supported by three columns, each column with a five foot diameter drilled shaft. This would result in six interior bents (18 drilled shafts) within the FEMA Floodway, two interior bents (six drilled shafts) within the Community Encroachment Area and three interior bents (nine drilled shafts) within the Community Floodplain. One proposed end bent with riprap is wholly within the Community Encroachment Area, and one proposed end bent with riprap is partially within the Community Floodplain. A total of 352 square feet of FEMA Floodway, 11,540 square feet of Community Encroachment Area and 39,696 square feet of Community Floodplain would be affected at this location.

The proposed project corridor crosses an unnamed tributary to Mallard Creek (Stream T) as it leaves the UNC Charlotte campus. The Community Floodplain at this location extends for approximately 1,000 feet and becomes part of the Mallard Creek floodplain as the alignment turns to cross East Mallard Creek Church Road. A portion of the Community Encroachment Area and the Community Floodplain would be disturbed at the crossing of this unnamed tributary. Approximately 1.95 acres (84,735 square feet) of Community Floodplain and 0.24 acre (10,244 square feet) of Community Encroachment Area may be affected at this location.

The crossing of Mallard Creek Church Road would require improvements to East Mallard Creek Church Road within the FEMA Floodway, Community Encroachment Area and Community Floodplain of Mallard Creek. A portion of the Mallard Creek Church Station park-and-ride lot would be built within the Community Floodplain of Mallard Creek. A total of 8,400 square feet of FEMA Floodway, 7,918 square feet of Community Encroachment Area and 2.41 acres (104,973 square feet) of Community Floodplain would be affected at this location.

At the Mallard Creek (Stream M) crossing, the floodplain is approximately 900 feet wide. The bridge crossing of Mallard Creek would require two bridge end bents armored with riprap and seven interior

bents. Each of the interior bents would be supported by two columns, each column with a five foot diameter drilled shaft. This results in six interior bents (12 drilled shafts) within the FEMA Floodway, one interior bent (two drilled shafts) and one partial end bent with riprap within the Community Encroachment Area. The remainder of that end bent with riprap and the whole of the other end bent with riprap is within the Community Floodplain. A total of 150 square feet of FEMA Floodway, 7,968 square feet of Community Encroachment Area and 1.28 acres (55,823 square feet) of Community Floodplain would be affected at this location.

A portion of the I-485/N. Tryon Station park-and-ride garage is located in the Mallard Creek (Stream M) Community Floodplain. Approximately 0.58 acre (25,076 square feet) of Community Floodplain would be affected by the garage and the proposed stormwater outfall at this location.

**Table 11-4
Summary of Estimated Floodplain Impacts**

Location	Type of Potential Jurisdictional Area	Permanent Impact (Y/N)	No-Build Alternative	Light Rail Alternative Area of Impact (ft ²)	Light Rail Alternative – Sugar Creek Design Option Area of Impact (ft ²)
Little Sugar Creek (Stream F)	Community Floodplain	Yes	0	4,107	4,107
Little Sugar Creek (Stream F)	Community Encroachment Area	Yes	0	76	76
Duke Energy Access Drive	Community Floodplain	Yes	0	2,611	2,611
36th Street Station/ Cullman Avenue Area	Community Floodplain	Yes	0	51,791	51,791
Toby Creek (Stream U)	Community Floodplain	Yes	0	39,696	39,696
Toby Creek (Stream U)	Community Encroachment Area	Yes	0	11,540	11,540
Toby Creek (Stream U)	FEMA Floodway	Yes	0	352	352
Stream T	Community Floodplain	Yes	0	84,735	84,735
Stream T	Community Encroachment Area	Yes	0	10,244	10,244
Mallard Creek Church Road and Station	Community Floodplain	Yes	0	104,973	104,973
Mallard Creek Church Road and Station	Community Encroachment Area	Yes	0	7,918	7,918
Mallard Creek Church Road and Station	FEMA Floodway	Yes	0	8,400	8,400
Mallard Creek (Stream M)	Community Floodplain	Yes	0	55,823	55,823
Mallard Creek (Stream M)	Community Encroachment Area	Yes	0	7,968	7,968
Mallard Creek (Stream M)	FEMA Floodway	Yes	0	150	150
I-485/N. Tryon Street Station	Community Floodplain	Yes	0	25,076	25,076
TOTALS:					
Community Floodplain:			0	368,812	368,812
Community Encroachment Area:			0	37,746	37,746
FEMA Floodway:			0	8,902	8,902

The Light Rail Alternative is based on 30% Preliminary Engineering Design Plans (March, 2010).

The Light Rail Alternative – Sugar Creek Design Option is based on 15% Preliminary Engineering Design Plans (January 2009).

11.2.2.4 Wetlands

Table 11-5 provides estimates of impacts to jurisdictional wetlands for the proposed Light Rail Alternative. Linear Wetland Y, Linear Wetland A, Wetland A, Isolated Wetland P, Wetland E, Isolated Wetland R, Wetland T, Wetland W and Linear Wetland Q would be affected by the proposed Light Rail Alternative. All totaled, the proposed Light Rail Alternative would fill and/or cause disturbance to an estimated 1.522 acres of wetlands. No impacts would result to Linear Wetland C, Isolated Wetland O, Wetland X or Wetland N.

Linear Wetland Y (approximately 0.14 acre, 527 linear feet), is a small, linear palustrine forested wetland located north of the railroad right-of-way and west of 36th Street. Approximately all 0.14 acre of Linear Wetland Y would be filled by the construction of an embankment and a retaining wall for the planned relocation of the existing freight tracks.

Linear Wetland A (approximately 0.012 acre, 265 linear feet) is a small, linear palustrine forested wetland located north of the railroad right-of-way and west of Craighead Road. It is anticipated that all 0.012 acre of Linear Wetland A would be filled by the planned relocation of the existing freight tracks.

Wetland A (approximately 0.22 acre) is a small palustrine scrub-shrub/emergent wetland located on either side of intermittent Stream A, located north of North Davidson Street. It is anticipated that all 0.22 acre of Wetland A would be filled by the construction of a retaining wall and the backfill to raise the alignment to the planned elevation.

Isolated Wetland P (approximately 0.02 acre) is a small, isolated, palustrine open water/emergent wetland located adjacent to and west of the railroad right-of-way in the backyard of a residential dwelling located at the end of Leafmore Drive. It is anticipated that all 0.02 acre of Isolated Wetland P would be filled by the proposed project.

Wetland E (approximately 0.06 acre) is a small, palustrine forested wetland, located at the proposed Old Concord Road Station proposed park-and-ride lot. It is anticipated that the proposed Old Concord Road station park-and-ride lot may impact nearly all 0.06 acre of Wetland E.

Isolated Wetland R (approximately 0.07 acre) is a small, isolated, palustrine forested wetland located on the UNC Charlotte campus, west of the proposed UNC Charlotte Station and east of Toby Creek. It is anticipated that approximately 0.04 acre of Isolated Wetland R would be filled by the proposed project.

Wetland T (approximately 3.39 acres) is the largest of the palustrine forested wetlands mapped in the study area and is located on the UNC Charlotte campus within the western floodplain of the unnamed tributary (Stream T) to Mallard Creek. Approximately 0.80 acre of Wetland T would be filled in order to raise the alignment to the proposed elevation.

Wetland W (approximately 1.19 acres) is a palustrine forested wetland located within the eastern floodplain of the unnamed tributary (Stream T) to Mallard Creek. Approximately 0.20 acre of Wetland W would be filled in order to raise the alignment to the proposed elevation.

Linear Wetland Q (approximately 0.03 acre, 125 linear feet), is a small, linear palustrine forested wetland located at the proposed I-485/N. Tryon Station park-and-ride garage. It is anticipated that all 0.03 acre of Linear Wetland Q would be filled by the construction of the garage.

**Table 11-5
Summary of Estimated Wetland Impacts**

Jurisdictional Area	Type of Jurisdictional Area	Permanent Impact (Y/N)	No-Build Alternative	Light Rail Alternative Area of Impact (acres)	Light Rail Alternative – Sugar Creek Design Option Area of Impact (acres)
Linear Wetland C	Emergent Wetland	No Impact	0	0	0
Linear Wetland Y	Forested Wetland	Yes	0	0.14	0.14
Linear Wetland A	Forested Wetland	Yes	0	0.012	0.012
Wetland A	Scrub-Shrub/ Emergent Wetland	Yes	0	0.22	0.22
Isolated Wetland P	Emergent/ Open Water Wetland	Yes	0	0.02	0
Isolated Wetland O	Forested Wetland	No Impact	0	0	0
Wetland E	Forested Wetland	Yes	0	0.06	0
Wetland X	Forested Wetland	No Impact	0	0	0
Isolated Wetland R	Forested Wetland	Yes	0	0.04	0.04
Wetland T	Forested Wetland	Yes	0	0.80	0.80
Wetland W	Forested Wetland	Yes	0	0.20	0.20
Wetland N	Forested Wetland	No Impact	0	0	0
Wetland Q	Forested Wetland	Yes	0	0.03	0.03
TOTALS:			0	1.522	1.442

The Light Rail Alternative is based on 30% Preliminary Engineering Design Plans (March, 2010) and field survey data.

The Light Rail Alternative – Sugar Creek Design Option is based on 15% Preliminary Engineering Design Plans (January 2009) and field survey data.

11.2.3 Light Rail Alternative – Sugar Creek Design Option

Stream S is a perennial, unnamed tributary to Little Sugar Creek (Stream F) located in the Little Sugar Creek Watershed, Catawba River Basin. It is anticipated that approximately 211 linear feet of Stream S would need to be piped for the proposed Sugar Creek Station Light Rail Alternative – Sugar Creek Design Option park-and-ride lot for the proposed LYNX BLE Project. However, as indicated on Table 11-3, the Light Rail Alternative – Sugar Creek Design Option would avoid impacts to Stream P and Stream Z (totaling 1,324 linear feet) for an incremental net impact avoidance of 1,113 linear feet (4,657 square feet) of stream impacts compared to the proposed Light Rail Alternative. A total of 2,149 linear feet of streams (18,599 square feet) would be relocated, have bridge structures placed within or would be piped for the Light Rail Alternative – Sugar Creek Design Option.

As indicated on Table 11-4, the Sugar Creek Design Option would result in no change in the estimated impacts to the Community Floodplains, Community Encroachment Areas and the FEMA Floodways as calculated for the proposed Light Rail Alternative. The proposed Light Rail Alternative – Sugar Creek Design Option would result in estimated impacts of 8.47 acres (368,812 square feet) in Community Floodplains, 0.87 acre (37,746 square feet) in Community Encroachment Areas and 0.2 acre (8,902 square feet) in FEMA Floodways.

As summarized in Table 11-5, the proposed Light Rail Alternative – Sugar Creek Design Option would avoid impacts to Isolated Wetland P (0.02 acre) and Wetland E (0.06 acre) for an incremental net impact avoidance of 0.08 acre of wetlands when compared with the proposed Light Rail Alternative. The proposed Light Rail Alternative – Sugar Creek Design Option would fill and/or cause disturbance to an estimated 1.442 acres of wetlands.

11.3 Mitigation

This section describes measures that will be used to reduce the adverse impacts to water resources, as well as mitigation that may be required for groundwater, surface waters, floodplains and regulatory floodways and wetland impacts.

11.3.1 Light Rail Alternative

Water resources within the study area intersect the project corridor, thereby making impacts to waters of the U.S. and floodplains as a result of the proposed Light Rail Alternative largely unavoidable. Efforts to minimize the potential impacts to water resources were incorporated during the preliminary design phase. Specific mitigation measures that will be implemented to compensate for unavoidable impacts will be refined and presented in the Final EIS. The following sections describe the mitigation currently identified for the groundwater, surface water, floodplain and wetland resource impacts described in this Chapter.

As a result of the identified impacts, it is anticipated that a Section 404 permit application will be required. The permit application must be completed during final design before construction activities may commence. This permit will require the discussion of the measures employed throughout planning and design in order to avoid/minimize impacts to waters of the U.S. The 404 permit application must also include a compensatory mitigation proposal, which outlines the plan to provide compensation to offset permanent losses of waters of the U.S.

11.3.1.1 Groundwater

Efforts will be implemented to reduce the effects of the proposed Light Rail Alternative on groundwater resources. The North Carolina Erosion and Sediment Control Planning and Design Manual (1988 - updated June 2006), the City of Charlotte Land Development Standards Manual Series 3000 and the North Carolina Department of Transportation design specifications will be used to minimize the impacts to terrestrial and aquatic habitats. These sediment and erosion control measures will help to protect aquatic resources that may contribute to groundwater recharge within the study area. As noted in Section 11.2.2.1, CATS and/or UNC Charlotte will complete the abandonment/closure process to seal the existing out-of-service well located within the proposed alignment on the UNC Charlotte campus.

11.3.1.2 Surface Water

The proposed Light Rail Alternative would affect approximately 3,262 linear feet of streams based on the *30% Preliminary Engineering Design Plans* (March 2010). Additional efforts to minimize impacts to streams will be considered during future design efforts. Efforts will be made to minimize the use of riprap at pipe inlets and outfalls, relocate channels using natural channel design techniques, when practicable, and minimize impacts to streambanks at proposed bridge locations.

Where avoidance or minimization is not feasible or practicable, compensatory mitigation will be considered. Compensatory mitigation consists usually of the restoration of existing degraded wetlands or waters, or the creation of waters of the U.S. of equal or greater value than the waters to be disturbed. This type of mitigation is only undertaken after avoidance and minimization actions are exhausted and should be undertaken, when practicable, in areas near the impact site (i.e., on-site compensatory mitigation).

It is anticipated that the Charlotte Umbrella Stream and Wetland Mitigation Bank (Umbrella Bank) may be utilized to provide mitigation to satisfy the federal Clean Water Act compensatory mitigation requirements. In the event the purchase of available credits from the Umbrella Bank do not satisfy the project's mitigation requirements, then, in accordance with the "Memorandum of Agreement Among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U.S. Army Corps of Engineers, Wilmington District" (MOA), July 22, 2003, the NCDENR Ecosystem Enhancement Program (EEP) may also be requested to provide mitigation via purchase of in-lieu fee credits. A final determination regarding mitigation for impacts to waters of the U.S. rests with the USCOE and NCDWQ and compensatory mitigation for impacts will be resolved during the permitting phase of the project. In the case of public transportation projects, the mitigation plan must be implemented before the proposed project is open to the traveling public.

11.3.1.3 Floodplains and Regulatory Floodways

Hydraulic studies will be performed prior to completion of the 65 percent design stage. If hydraulic studies determine that the proposed Light Rail Alternative would cause an increase in the 100-year flood

elevation, the following applies: 1) any increase greater than 0.00 feet will require a Conditional Letter of Map Revision (CLOMR), 2) a CLOMR will not be issued for the project if the proposed increase (greater than 0.00 feet) impacts an existing habitable structure, 3) for development outside of the FEMA floodway, but within the Community Encroachment Area, an increase in base flood elevation of up to 0.10 feet is permissible without obtaining a Community Letter of Map Revision (CoLOMR) if no habitable structures are impacted, and 4) a CoLOMR is required for increases within the Community Encroachment Area greater than 0.10 feet. CATS may make floodplain modifications to decrease the 100-year flood elevation to within 0.1 feet to avoid purchasing property. If the preferred alternative involves significant encroachment of the floodplain, the final environmental document must include: 1) Federal Transit Administration's finding that the proposed action is the only practicable alternative, 2) supporting documentation reflecting consideration of alternatives to avoid/reduce adverse impacts on the floodplain.

The 30 percent design plans call for bridging over three perennial streams, Little Sugar Creek (Stream F), Toby Creek (Stream U) and Mallard Creek (Stream M), in an effort to minimize impacts to Community Floodplains, Community Encroachment Areas and the FEMA Floodways. These bridges will be designed to minimize impacts to floodplains and regulatory floodways.

Charlotte Stormwater Services reviewed the *15% Preliminary Engineering Design Plans* dated January 6 and January 20, 2009 and requested that the project engineers work with Charlotte and County Stormwater Services make sure the proposed work does not significantly affect FEMA Floodways, Community Floodplains and Community Encroachment Areas and that the appropriate approvals and permits are obtained. Charlotte Stormwater Services will also review the *30% Preliminary Engineering Design Plans* to ensure the proposed LYNX BLE project's compliance with floodway and floodplain regulations.

11.3.1.4 Wetlands

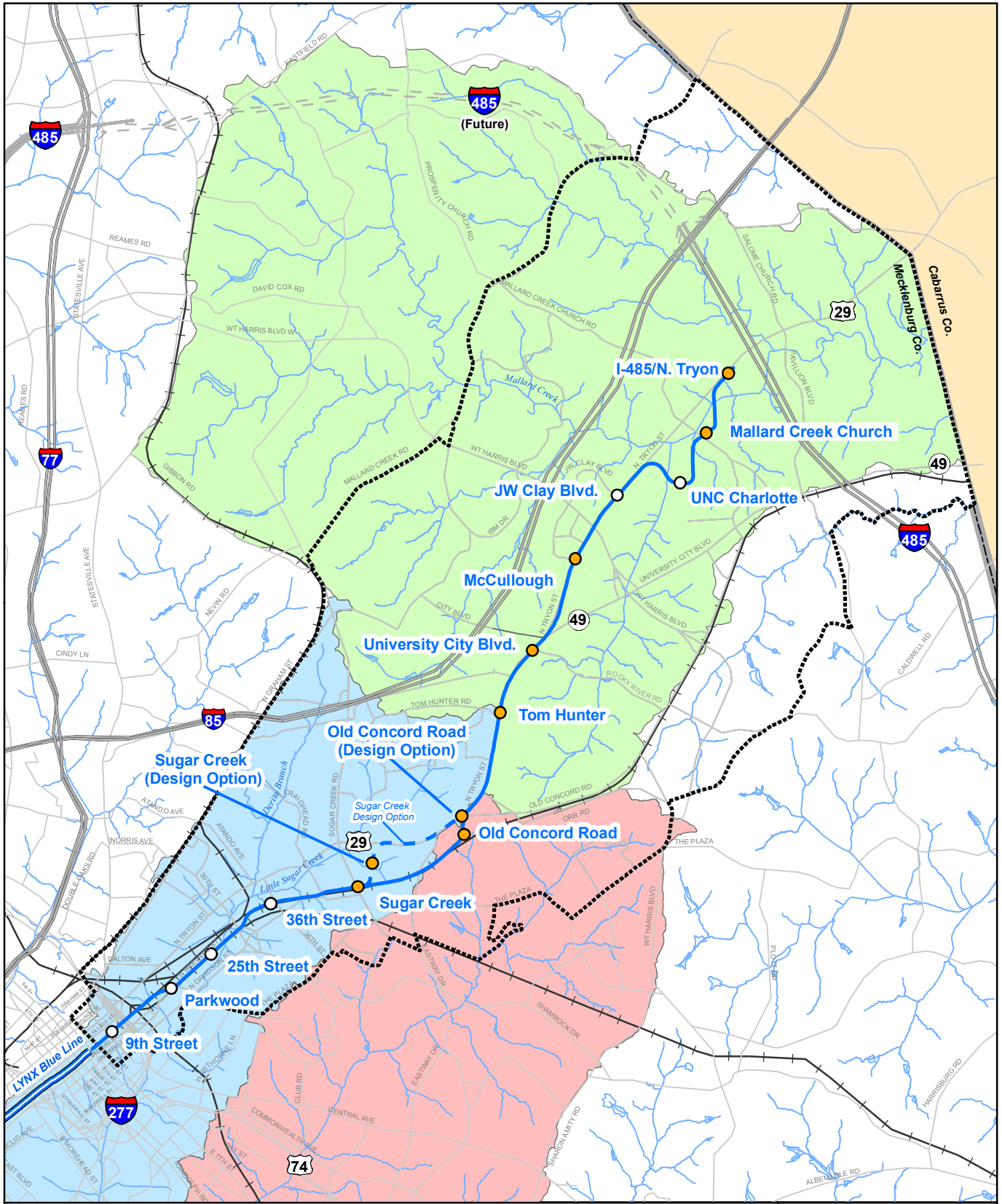
The proposed Light Rail Alternative would affect approximately 1.522 acres of wetlands. Three general types of wetland mitigation include avoidance, minimization and compensatory mitigation. Additional efforts to avoid and minimize impacts to wetlands will be considered during continued preliminary engineering design efforts. Efforts to minimize potential impacts to wetlands may include the following: steepening fill slopes where practicable; use of retaining walls or similar structures; locating construction staging areas away from wetlands; and demarcating preserved wetland areas prior to construction.

The Charlotte Umbrella Bank may be utilized to provide mitigation to satisfy the federal Clean Water Act compensatory mitigation requirements for this project in the event on-site mitigation is not feasible and/or practicable. If the purchase of available credits from the Umbrella Bank would not satisfy the project's mitigation requirements, then, EEP may also be requested to provide mitigation via purchase of in-lieu fee credits. A final determination regarding mitigation for impacts to waters of the U.S. rests with the USCOE and NCDWQ and compensatory mitigation for impacts would be resolved during the permitting phase of the proposed Light Rail Alternative.

Specific mitigation for Wetland N, an NCDOT mitigation site that exists within Kirk Farm Fields park adjacent to the proposed Mallard Creek Church Station, will include the continued avoidance of this wetland in the preliminary engineering and final design plans. Proposed development at this location will be directed to the south side of Wetland N and retaining walls would be employed north of the proposed Mallard Creek Church Station to avoid possible additional impacts. Similar avoidance and minimization strategies will be utilized in other segments of the project where feasible and practicable.

11.3.2 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would not require any additional mitigation over the proposed Light Rail Alternative. The water resource impacts of this design option would be fewer than with the proposed Light Rail Alternative. If selected for implementation, the same mitigation outlined in Section 11.3.1 will be undertaken for the Light Rail Alternative – Sugar Creek Design Option.



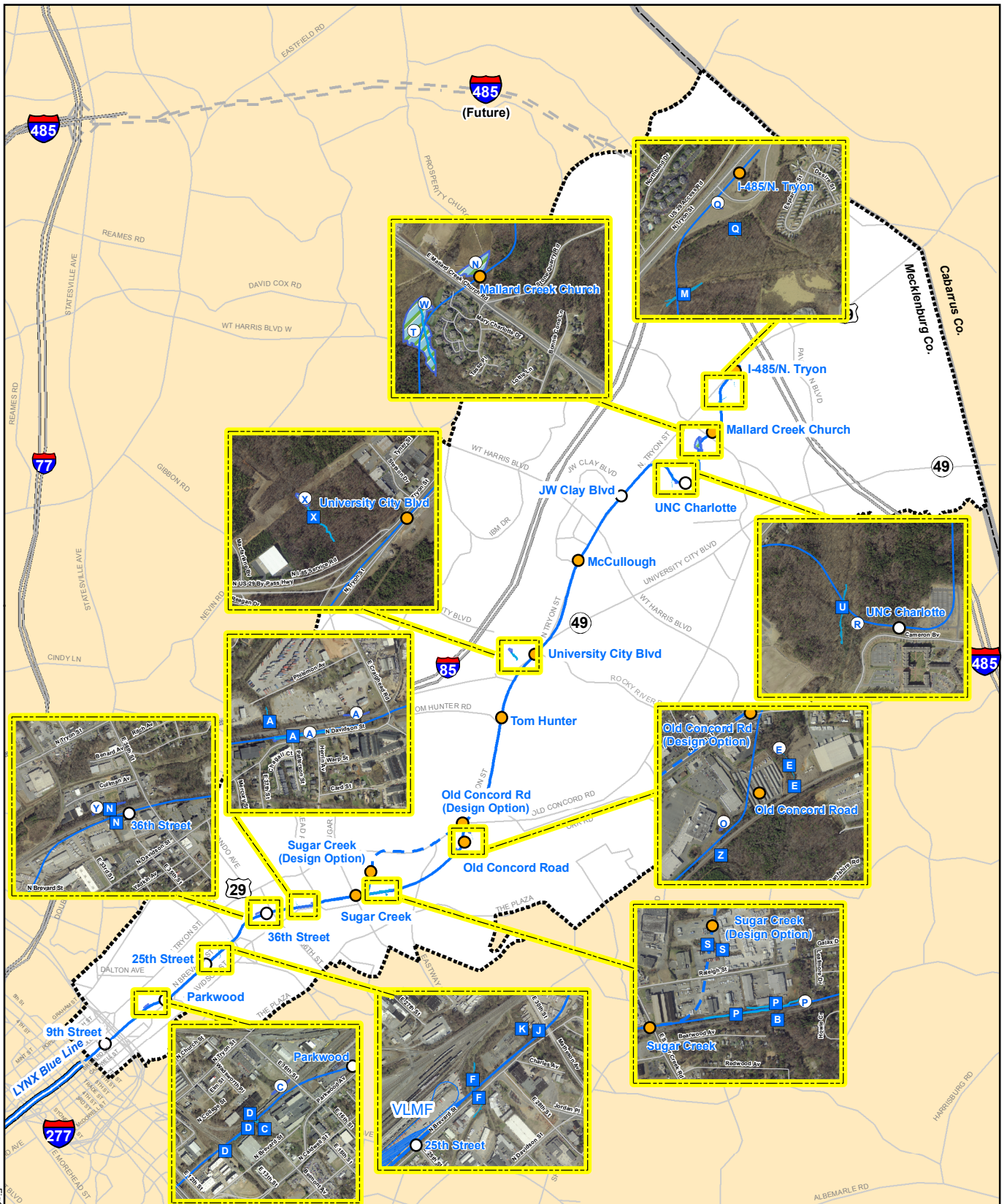
Legend					
	Northeast Corridor Limits		LYNX Existing Light Rail Transit		Railroads
	Light Rail Transit		Highway		County Line
	Design Option		Major Roads		Mallard Creek Watershed, Yadkin River Basin
	Proposed Stations		Highway (Future)		Briar Creek Watershed, Catawba River Basin
	Proposed Stations with Park-and-Ride		Streams		Upper Little Sugar Creek Watershed, Catawba River Basin

0 0.5 1
Mile

Data Source: CATS, City of Charlotte GIS, and Mecklenburg County GIS

Watersheds_Figures_CB_122909.pdf

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Legend

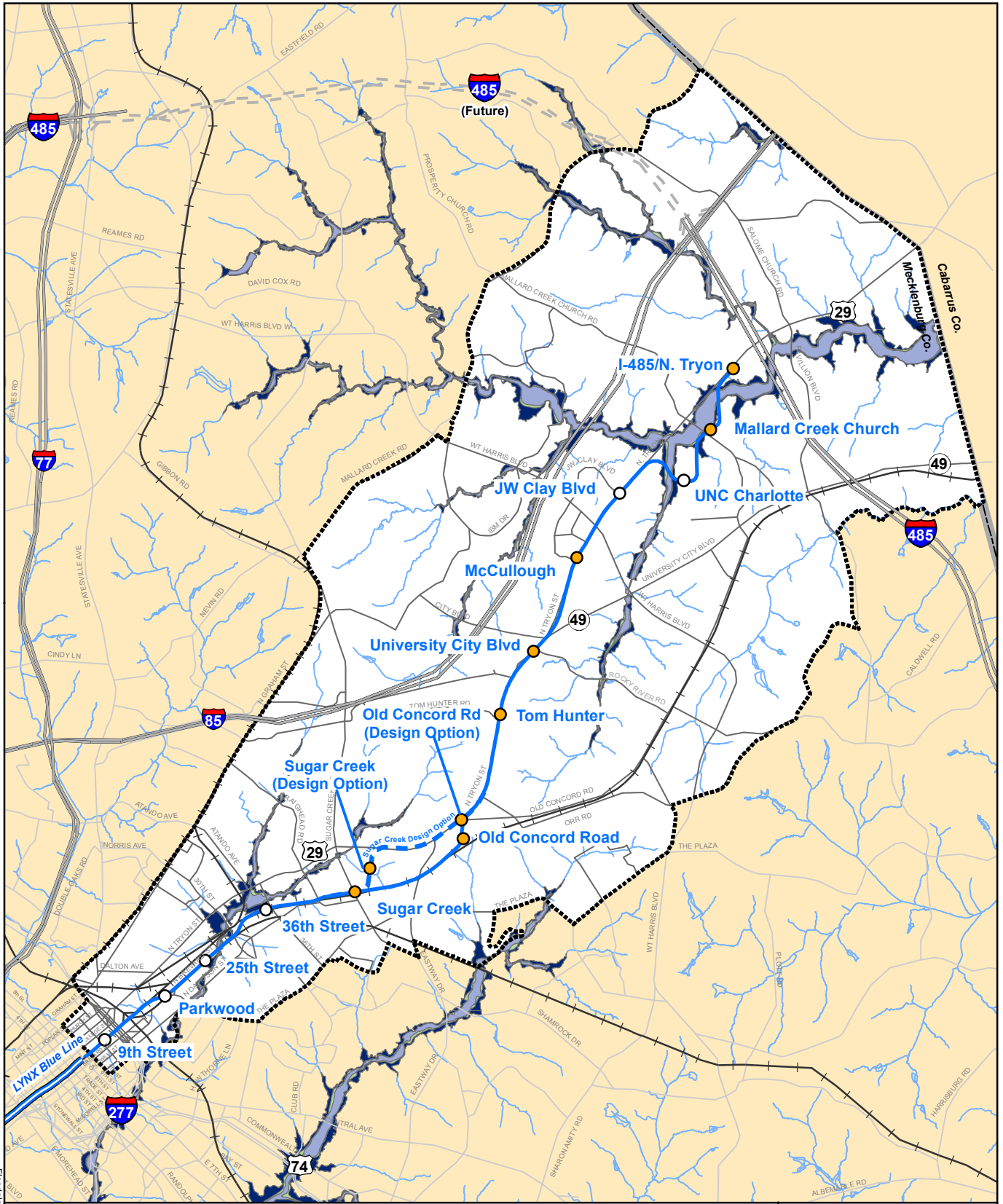
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| Northeast Corridor Limits | Railroads | Streams |
| Light Rail Transit | Highway | Jurisdictional Wetland |
| LYNX Existing Light Rail Transit | Major Roads | Jurisdictional Streams |
| Proposed Stations | Highway (Future) | |
| Proposed Stations with Park-and-Ride | County Line | |

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Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Fig 11-2 - Waters and Wetlands_CB_010710.pdf

1/7/09



Legend

- | | | |
|--------------------------------------|------------------|-----------------------------|
| Northeast Corridor Limits | Railroads | Streams |
| Light Rail Transit | Highway | FEMA Floodway |
| LYNX Existing Light Rail Transit | Major Roads | Community Floodplains |
| Proposed Stations | Highway (Future) | Community Encroachment Area |
| Proposed Stations with Park-and-Ride | County Line | |

0 0.5 1
Mile

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

Floodplains_and_Regulated_FloodwaysRev000.pdf

11_12_09

12.0 AIR QUALITY

This chapter describes the existing air quality within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) and discusses the National Ambient Air Quality Standards (NAAQS) and federal regulations protecting air quality. In addition, projected year (2030) air quality conditions at various intersections and proposed parking facilities associated with the alternatives under consideration in this Draft Environmental Impact Statement (EIS) are also detailed. Mitigation measures are identified. Additional technical information may be found in the supporting *Air Quality Technical Report* (January 2010).

12.1 Legal and Regulatory Context

12.1.1 Air Quality Standards

Air quality is regulated under the federal Clean Air Act (CAA) of 1970 and 1990, as amended (42 USC Sections 7401-7671q). The CAA was enacted for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare and productivity. The Environmental Protection Agency (EPA) is the federal regulatory agency charged with administering the CAA. The CAA established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings.

The EPA classifies urban environments as being either in "attainment" or "non-attainment." An urban area that exceeds the NAAQS for one or more pollutants is said to be in "non-attainment" of the NAAQS enforced under the CAA. The EPA established primary and secondary NAAQS for six air pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), particulate matter (PM) and lead (Pb). The designation of an area is determined on a pollutant-by-pollutant basis.

Attainment areas can be further categorized as a maintenance area for attainment, which means that the urban area has exceeded NAAQS levels for one or more pollutants in the past. Efforts in these maintenance areas must be made in order to maintain the status quo and not exceed the NAAQS. Non-attainment areas are classified in severity by pollutant depending on the degree of exceedance(s) over the NAAQS.

In accordance with 40 CFR 93.116, a "Federal Highway Administration/Federal Transit Administration project must not cause or contribute to any new localized CO or Particulate Matter of less than 10 micrometers or less (PM₁₀) violation or increase the frequency or severity of any existing CO or PM₁₀ violation in CO and PM₁₀ non-attainment and maintenance areas. This criterion is satisfied if it is demonstrated that no new local violations will be created and the severity or number of existing violations will not be increased as a result of the project."

12.1.2 Project-Level Conformity Determination

The CAA requires that a State Implementation Plan (SIP) be prepared for each non-attainment or maintenance area. The SIP is a state plan of ways it will meet the NAAQS under the deadlines established by the CAA. The SIP is approved by the EPA, but contained within the state air pollution laws.

In North Carolina, the North Carolina Department of Environment and Natural Resources, Division of Air Quality (DAQ) develops the SIP, which is the document that describes how North Carolina will maintain or achieve compliance with the NAAQS (NCGS 143-215). Metropolitan Planning Organizations (MPOs) must then demonstrate that expected emissions from their transportation system are within the mobile source emission budgets in the applicable SIP. Transportation projects must come from conforming transportation plans/programs, and conforming transportation plans/programs must conform to the SIP.

The process of ensuring that a region's transportation planning activities contribute to attainment of the NAAQS, or "conform" to the purposes of SIP, is referred to as transportation conformity. In order to receive federal transportation funds within a non-attainment area or a maintenance area, the area must

demonstrate through a federally mandated conformity process that the transportation investments, strategies and programs, taken as a whole, contribute to the air quality goals defined in the state air quality plan. Mecklenburg County is required to complete conformity analyses on its transportation plan with respect to mobile source emission budgets due to the air quality “maintenance area” designation for CO.

Project level conformity decisions are made on entire projects as defined by the CAA. Any transportation project funded through the Federal Transit Administration (FTA) must be listed in the metropolitan region’s Transportation Improvement Program (TIP). The TIP identifies the transportation projects and strategies that the Metropolitan Planning Organization (MPO) and state Department of Transportation plan to undertake. The TIP is the region’s way of allocating its limited transportation resources among the various capital and operating needs of the area, based on a clear set of short-term transportation priorities. The TIP must conform to the SIP for air quality in accordance with the CAA. The LYNX BLE is included in the State and Mecklenburg-Union Metropolitan Planning Organization (MUMPO) conforming Transportation Improvement Program (TIP) entitled *FY2009-2015 Transportation Improvement Program*, (May 2008) and *2035 Long Range Transportation Plan (LRTP)*.

The *Metrolina Conformity Analysis and Determination Report*, dated February 8, 2010, documents the region’s compliance with the provisions of the CAA in concurrence with all conformity requirements as detailed in 40 CFR Parts 51 and 93 (the Transportation Conformity Rule) and 23 CFR Part 450 (the Metropolitan Planning Regulations as established in the Transportation Equity Act for the 21st Century [TEA-21]). On May 3, 2010, based on the conformity determinations and comments by the EPA, the Federal Highway Administration and FTA issued its finding that the MUMPO 2035 LRTP and FY2009 – 2015 TIP conform to the purposes of the SIP.

12.2 Affected Environment

This section discusses the existing air quality NAAQS compliance attainment status for the six criteria pollutants within the region. The affected environment section also reviews the model results for the existing CO concentrations by location of air quality monitoring site in Mecklenburg County.

12.2.1 Existing Regional Level Air Quality Attainment Status

The Charlotte-Gastonia-Rock Hill, NC-SC area is the name of the present eight-county area classified by the EPA for NAAQS. This area is currently classified as an attainment area for all NAAQS, with the exception of 8-hour O₃. Additionally, Mecklenburg County is also classified by the EPA for NAAQS. Mecklenburg is in attainment for all NAAQS except for 8-hour O₃ and is classified as a maintenance area (not classified) for CO. Table 12-1 lists the NAAQS Attainment by geography.

**Table 12-1
NAAQS Attainment Status, 2009**

NAAQS	Charlotte-Gastonia-Rock Hill, NC-SC Area Attainment Status	Mecklenburg County Attainment Status
CO	Attainment	Maintenance
O ₃ (8-hour average)	Non-attainment	Non-attainment
NO ₂	Attainment	Attainment
SO ₂	Attainment	Attainment
PM ₁₀	Attainment	Attainment
PM _{2.5}	Attainment	Attainment
Pb	Attainment	Attainment

12.2.2 Existing Corridor Level Carbon Monoxide Concentrations

The results of the mobile source air quality modeling analysis under existing conditions (2009) are provided in Table 12-2. The values shown are the maximum CO concentrations estimated near each intersection during the peak traffic period. As shown in Table 12-2, no violations of the 1-hour or 8-hour NAAQS for CO are estimated under existing conditions.

**Table 12-2
Existing Maximum Carbon Monoxide Concentrations at Intersections, 2009**

Intersection	Maximum CO Concentration (ppm)		Location of Maximum CO Concentration
	1-Hour Average NAAQS – 35ppm	8-Hour Average NAAQS – 9ppm	
North Tryon Street/US-29 and Sugar Creek Road	3.9	3.2	Receptor 14 - At Sidewalk-west of Sugar Creek Road and approximately 130 feet north of North Tryon Street/US-29
North Tryon Street/US-29 and I-85 Connector	2.0	1.7	Receptor 2 - Parking lot north of North Tryon Street/US-29
North Tryon Street/US-29 and University City Blvd./NC-49	1.9	1.6	Receptor 2 - Parking lot south of North US 29 Bypass Highway
North Tryon Street/US-29 and W.T. Harris Boulevard	3.9	3.2	Receptor 8 - Sidewalk north of North Tryon Street/US-29, about 100 feet east of W.T. Harris Boulevard
North Tryon Street/US-29 and Mallard Creek Church Road	3.1	2.6	Receptor 14 - Sidewalk west of East Mallard Creek Church Road and about 120 feet north of North Tryon Street/US-29

12.3 Environmental Consequences

This section includes an evaluation of the direct air quality impacts of the No-Build Alternative, the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. Maximum CO concentrations at intersections by alternative are shown in Table 12-3 and described in this section. Construction-related impacts are discussed in Chapter 18.0: Construction Impacts.

12.3.1 No-Build Alternative

The No-Build Alternative would not result in a reduction in VMT as would occur with the Light Rail Alternative. Therefore, the selection of the No-Build Alternative would require that the LRTP be updated to remove the proposed LYNX BLE project. This would also require that MUMPO re-evaluate the conformity analysis for the LRTP.

The results of the mobile source air quality modeling analysis under No-Build (2030) conditions are provided in Table 12-3. The values shown are the maximum CO concentrations estimated near each intersection during the peak traffic period.

No violations of the 1-hour or 8-hour NAAQS for CO are expected under the No-Build Alternative, as no additional parking facilities would be built. As a result, there would be no air quality impacts under the No-Build Alternative and no further parking lot analyses would be required for this alternative.

**Table 12-3
Maximum Carbon Monoxide Concentrations at Intersections by Alternative, 2030**

Intersection	1-Hour Average NAAQS – 35ppm			8-Hour Average NAAQS – 9ppm			Location of Maximum Concentration		
	No-Build	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option	No-Build	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option	No-Build	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
North Tryon Street/US-29 and Sugar Creek Road	2.5	2.6	2.5	2.1	2.2	2.1	At Sidewalk-west of Sugar Creek Road and about 215 feet north of North Tryon Street/US-29	At Sidewalk-west of Sugar Creek Road and about 215 feet north of North Tryon Street/US-29	At Sidewalk-south of North Tryon Street/US-29 and about 130 feet west of Sugar Creek Road
North Tryon Street/US-29 and I-85 Connector	1.6	1.7	1.6	1.3	1.4	1.3	Parking lot south of North Tryon Street/US-29	Parking lot south of North Tryon Street/US-29	Same as Light Rail Alternative
North Tryon Street/US-29 and University City Blvd./NC-49	1.7	1.7	1.7	1.4	1.4	1.4	Parking lot at northwest corner of North Tryon Street/US-29 and Stetson Drive	Parking lot at northwest corner of North Tryon Street/US-29 and Stetson Drive	Same as Light Rail Alternative
North Tryon Street/US-29 and W.T. Harris Boulevard	2.5	2.5	2.5	2.1	2.1	2.1	West of W.T. Harris Boulevard, about 70 feet south of North Tryon Street/US-29	West of W.T. Harris Boulevard, about 70 feet south of North Tryon Street/US-29	Same as Light Rail Alternative
North Tryon Street/US-29 and Mallard Creek Church Road	2.4	2.4	2.4	2.0	2.0	2.0	West of East Mallard Creek Church Road and about 120 feet north of North Tryon Street/US-29	West of East Mallard Creek Church Road and about 120 feet north of North Tryon Street/US-29	Same as Light Rail Alternative

12.3.2 Light Rail Alternative

12.3.2.1 Regional Level Impacts

The Light Rail Alternative would provide a reduction in regional vehicle miles traveled (VMT) by approximately 55 million miles (Table 12-4). This regional reduction in VMT would subsequently reduce annual CO, NO_x and VOC emissions (Table 12-4), which would not be achieved under the No-Build Alternative.

**Table 12-4
Comparison of Regional Emissions for the No-Build and Light Rail Alternative, 2030**

Factor	No-Build Alternative	Light Rail Alternative	Change from No-Build
Annual Regional VMT (millions of miles/year)	36,954	36,899	-55
Annual CO Emissions (tons) ¹	180,782	180,514	-268
Annual NO _x Emissions (tons) ²	6,355	6,345	-10
Annual VOC ³	9,939	9,925	-14

¹ EPA Emissions Factor 2030 – 4.438, ² EPA Emissions Factor 2030 – 0.156, ³ EPA Emissions Factor 2030 – .244

12.3.2.2 Corridor Level Impacts

The results of the mobile source air quality modeling analysis under the proposed Light Rail Alternative (2030) conditions are provided in Table 12-3. The values shown are the maximum CO concentrations estimated near each intersection during the peak traffic period. No violations of the 1-hour or 8-hour NAAQS for CO are projected under the Light Rail Alternative. The proposed LYNX BLE project is an element of MUMPO’s adopted 2035 LRTP and is included in the *FY2009–2015 Transportation Improvement Program*, which were both found to conform to the purposes of the SIP on May 3, 2010. Therefore, the proposed Light Rail Alternative is included in a transportation program that conforms to the SIP.

12.3.2.3 Station Area Impacts

The two structures that comprise the proposed parking garages for the Sugar Creek Station Park-and-Ride Option 2 and the I-485/N. Tryon Station would be the only proposed parking facilities that would require a Transportation Facilities Construction Permit from the Mecklenburg County Land Use & Environmental Services Agency (LUESA) Air Quality Section. As such, the EPA’s computer model PAL 2.1 was used to predict maximum CO concentrations generated by traffic at these proposed parking facilities.

Preliminary engineering conceptual plans were used to model the proposed maximum number of spaces for these decks in order to represent a “worst-case” scenario. For air quality modeling purposes, the Sugar Creek Station Park-and-Ride Option 2 garage includes a maximum of 1,300 parking spaces on up to four levels; and the I-485/N. Tryon Station parking garage includes a maximum of 2,089 parking spaces. The current 30% *Preliminary Engineering Design Plans* (March 2010) represent refinements to the conceptual plans and provide for 1,010 and 1,959 spaces at these park-and-rides, respectively.

Carbon monoxide concentrations from the PAL model output were given in grams/cubic meter and were converted to ppm. Table 12-5 lists the predicted 2030 maximum CO concentrations (which include the background concentration of 1.1 ppm) for the design proposed for each station. No violations of the 1-hour or 8-hour NAAQS for CO are expected due to the operation of these parking facilities. These results are expected to satisfy the permit requirements as outlined by MCAPCO.

**Table 12-5
Light Rail Alternative
Predicted Maximum Carbon Monoxide Concentrations at Parking Facilities, 2030**

Station Name	Maximum CO Concentration (ppm)		Location of Maximum CO Concentration
	1-Hour Average NAAQS – 35 ppm	8-Hour Average NAAQS – 9 ppm	
Sugar Creek Station Park-and-Ride Option 2	2.1	1.7	Residence on Sugar Creek Road and Bearwood Avenue
I-485/N. Tryon Station	1.8	1.5	Southwest Corner of Proposed Garage

12.3.3 Light Rail Alternative – Sugar Creek Design Option

The results of the mobile source air quality modeling analysis for the Light Rail Alternative – Sugar Creek Design Option (2030) are provided in Table 12-3. The results represent the future conditions with the proposed project and take into account the variations in traffic due to the alignment turning north just northeast of Sugar Creek Road instead of at Old Concord Road. The values shown are the maximum CO concentrations estimated near each intersection during the peak traffic period. No violations of the 1-hour or 8-hour NAAQS for CO are expected under this design option. There would be no difference in regional VMT reduction between the Light Rail Alternative – Sugar Creek Design Option and the Light Rail Alternative.

12.4 Mitigation

12.4.1 Light Rail Alternative

Since traffic volumes at the “worst-case” intersections (intersections expected to generate the highest microscale CO concentrations) would not be predicted to cause exceedances of the NAAQS, no remaining intersections carrying proposed project-generated vehicular traffic would be expected to cause exceedances of the NAAQS. Therefore, the Light Rail Alternative would not be expected to cause exceedances of the NAAQS and mitigation would not be required.

Mecklenburg County LUESA Air Quality Section recently notified CATS about the newly developed EPA on-road mobile source emissions model known as the Motor Vehicle Emissions Simulation (MOVES) (see Appendix B: Agency Correspondence). MOVES will replace the previous MOBILE6.2 model. Once the EPA publishes a Notice of Availability in the Federal Register, MOVES will be the official model for mobile source emissions. This change may alter the methodology required to apply for a Transportation Facilities Construction Permit for the parking garages.

As such, CATS will continue coordination with Mecklenburg County LUESA Air Quality Section. This coordination will need to occur prior to modeling air quality for a Transportation Facilities Construction Permit, and before permit application. CATS will confirm the determination of the use of MOVES, as well as the applicability of the permit for each proposed park-and-ride facility. All of these activities will take place once the station site plans have been approved for construction.

12.4.2 Light Rail Alternative – Sugar Creek Design Option

Mitigation for this design option would be the same as the Light Rail Alternative. Therefore, no additional mitigation is required.

13.0 NOISE AND VIBRATION

This chapter describes the location of potential noise and vibration sensitive receptors within the study area for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). It also discusses the potential long-term and short-term affects to these receptors for the alternatives under consideration in this Draft Environmental Impact Statement (EIS). Mitigation measures are identified, where noise or vibration impacts are predicted. Additional technical information may be found in the supporting *Noise and Vibration Technical Report* (June 2010), *Noise and Vibration Technical Report Addendum #1* (June 2010) and *Noise and Vibration Technical Report Addendum #2* (June 2010).

13.1 Noise and Vibration Impact Assessment Guidelines

The process for assessing the potential impact for noise and vibration reported in this Draft EIS followed the U.S. Federal Transit Administration (FTA) guidance manual *Transit Noise and Vibration Impact Assessment* (May 2006). This process involves three levels of assessment: 1) screening, 2) general assessment and 3) a detailed assessment. A screening is typically done for locating project alignments and involves the identification of noise sensitive receptors along a corridor. A general assessment identifies the existing noise levels, the noise sensitive receptors along a corridor, projects a project-related noise level, estimates potential impact and recommends a range of mitigation options. For purposes of this Draft EIS, a general assessment was conducted. A detailed assessment will be completed prior to the Final EIS in order to identify specific noise conditions and mitigation methods for each sensitive receptor.

13.1.1 Human Perception of Noise

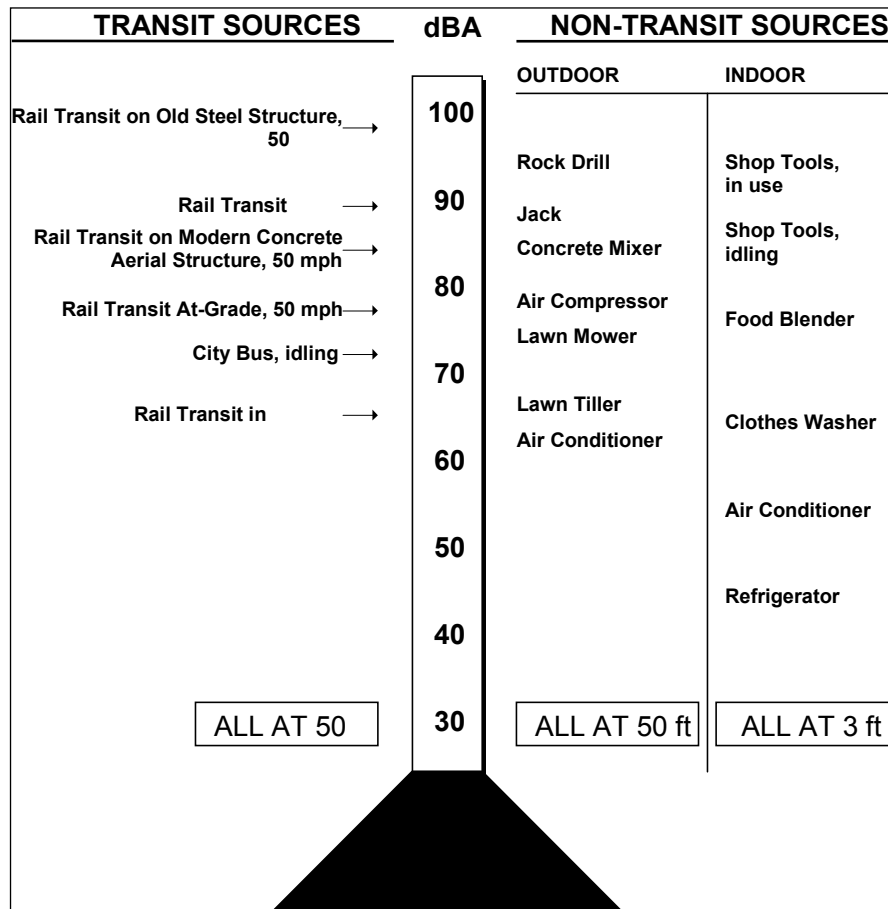
Noise is typically defined as unwanted or undesirable sound. Urban environments are comprised of “background noise” consisting of daily urban sounds such as traffic, air conditioners, telephones, bird calls and other familiar noises. Human reaction to sounds above this background noise is dependent on the intensity or level (such as high or low pitch sounds), the frequency and the variation in the sound level. The U.S. Environmental Protection Agency (EPA) has studied human annoyance to noise and has quantified the level of noise that most humans recognize in an urban environment as new noise. Community reaction in the EPA studies identified ranges of reaction from “no reaction” to “vigorous action.” The body of research developed by the EPA on the subject of noise served as the basis for the development of the FTA guidance manual for identifying noise and vibration impacts for transit projects.

Noise is generated in two ways: through the air as “airborne noise” and through the ground as “ground-borne noise.” Airborne noise is the most common form of noise while ground-borne noise is created from vibration, such as the rattling of dishes that occurs in houses located close to freight railroad tracks.

Noise is measured in a logarithmic unit called a decibel (dBA). Human perception of noise is measured in decibels on a scale that has been weighted to middle and high frequency sounds that are more discernible to humans. This scale is called an A-weighted scale. By using this scale, the range of normally encountered sound can be expressed by values from 0 to 120 decibels. On a comparative basis, a 3-decibel change in sound level generally represents a barely-noticeable change outside the laboratory, whereas a 10-decibel change in sound level would typically be perceived as a doubling (or halving) in the loudness of a sound.

Noise levels are commonly measured and analyzed in two ways: Leq (sound level equivalent) and Ldn (24-hour day night average). Leq is a steady sound level over a specified period of time, such as one hour. It is often used to determine noise near areas where quiet is essential at all hours, such as a school or a park. The Ldn is commonly used to describe the 24-hour day-night average and assigns a 10-decibel penalty to night-time hours. Ldn is commonly used to analyze noise impacts in areas where people sleep. Figure 13-1 provides examples of typical noise environments and criteria. In most communities, Ldn is generally found to range between 55 dBA and 75 dBA. As shown in Figure 13-1, this spans the range between an “ideal” residential environment and the threshold for an unacceptable residential environment according to U.S. Federal agency criteria.

Figure 13-1
Typical Noise Environments



Source: FTA, *Transit Noise and Vibration Impact Assessment*, May 2006.

13.1.1.1 Federal Transit Administration Noise Criteria

The general noise assessment identifies buildings or properties within proximity to the project area with the potential to experience a noise impacts. With respect to rail noise, the FTA has established criteria to assess potential impacts of transit projects. These criteria do not generally apply to industrial or commercial areas since they are generally compatible with high noise levels. These criteria group noise sensitive land uses into the following three categories:

Category 1: Buildings or parks where quiet is an essential element of their intended purpose.

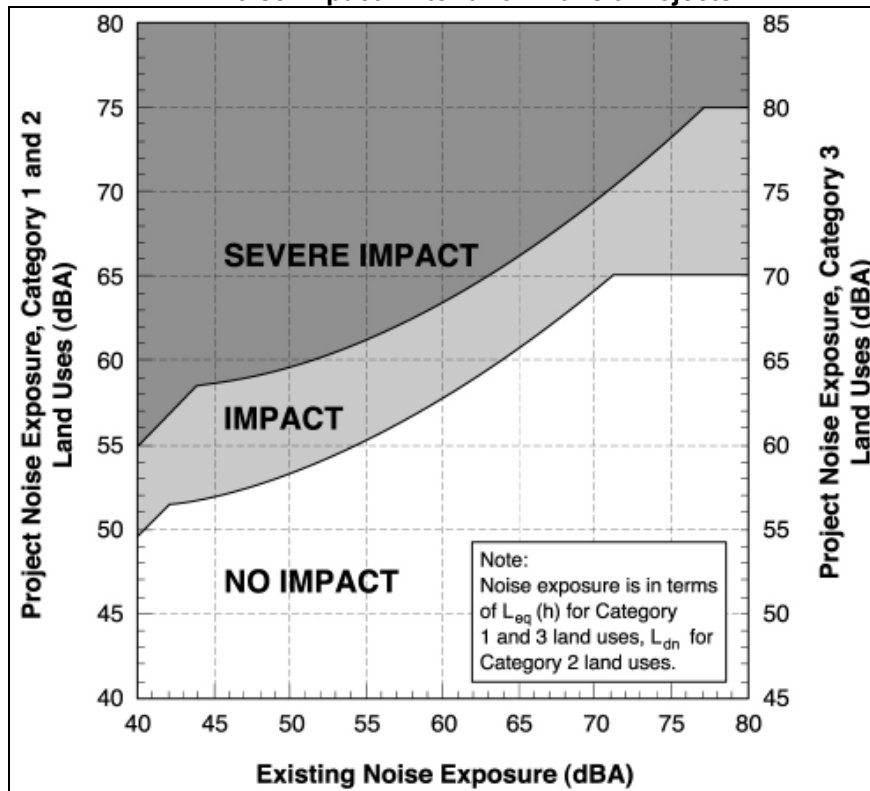
Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals and hotels where night-time sensitivity is assumed to be of utmost importance.

Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material.

Noise impacts resulting from a proposed project are determined by comparing the existing and future project-related outdoor noise levels as illustrated in the graph provided in Figure 13-2. Existing noise exposure is shown on the x-axis, horizontal, of the graph, and the y-axis, vertical, shows the additional noise exposure from the transit project that would cause either moderate or severe impact. Essentially, as the existing level of ambient noise increases, the allowable level of transit noise also increases, but the total amount, by which that community’s noise can increase, without an impact, is reduced. Noise level

increases, defined by the FTA guidance as “moderate impacts” or “severe impacts”, occur when the existing levels are surpassed by more than the allowable increase by the project-related noise.

Figure 13-2
FTA Noise Impact Criteria for Transit Projects



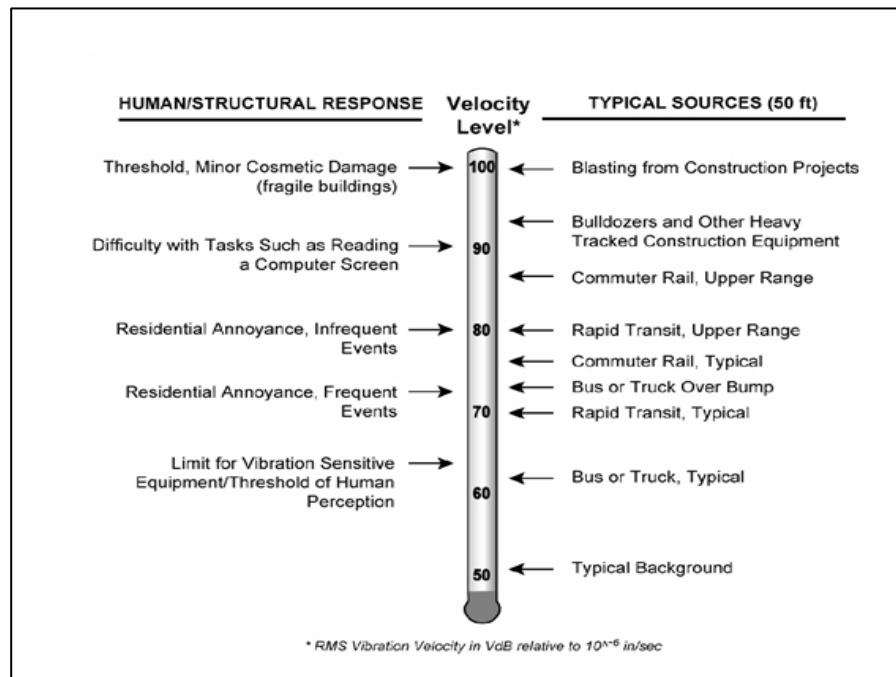
Source: FTA, *Transit Noise and Vibration Impact Assessment*, May 2006.

13.1.1.2 Human Perception of Ground-Borne Vibration

In addition to noise, rail transit projects have the potential to cause ground-borne vibration. Ground-borne vibration generally occurs most frequently with transit systems that are built underground. However, at-grade rail transit projects can also result in ground-borne vibration under certain soil and rock conditions. Ground-borne vibration is vibration that moves through the ground to a stationary object, such as a building. An example of ground-borne vibration is movement of wall hangings as a freight train passes by a residence. Ground-borne vibration from transit vehicles is usually characterized in terms of the “smoothed” root mean square (RMS) vibration velocity level, in decibels (VdB), with a reference quantity of one micro-inch per second. VdB is used in place of dB to avoid confusing vibration decibels with sound decibels.

Figure 13-3 illustrates typical ground-borne vibration levels for common sources. As shown, the range of interest is from approximately 50 to 100 VdB, from imperceptible background vibration to the threshold of damage. Although the approximate threshold of human perception of vibration is 65 VdB, annoyance is usually not significant unless the vibration exceeds 70 VdB.

**Figure 13-3
Typical Vibration Levels**



Source: FTA, *Transit Noise and Vibration Impact Assessment*, May 2006.

13.1.1.3 Federal Transit Administration Vibration Criteria

Similar to the FTA noise criteria, the FTA vibration criteria are based on three land use categories, although the categories are somewhat different. One important difference is that outdoor spaces are not included in Category 3 for vibration. This is because human annoyance from ground-borne vibration requires the interaction of the ground vibration with a building structure. Consequently, the criteria apply to indoor spaces only and there are no vibration impact thresholds for outdoor spaces such as parks. Table 13-1 illustrates the FTA ground-borne vibration impact criteria, based on land use and train frequency. For residential buildings (Category 2), the threshold applicable to this project is 72 VdB. The applicable threshold for schools and churches (Category 3) is 75 VdB. There are some buildings, such as concert halls, recording studios and theaters that can be very sensitive to vibration but do not fit into any of the three categories listed in Table 13-1. These buildings usually warrant special attention during the project development process of a transit project due to their sensitivity.

It should also be noted that Table 13-1 includes separate FTA criteria for ground-borne noise, the “rumble” that can be radiated from the motion of room surfaces in buildings due to ground-borne vibration. Although expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are set significantly lower than for airborne noise to account for the annoying low-frequency character of ground-borne noise. Because airborne noise often masks ground-borne noise for above-ground (i.e. at-grade or elevated) rail systems, ground-borne noise criteria are primarily applied to subway operations where airborne noise is not a factor. For the at-grade transit system associated with the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, ground-borne noise criteria are applied only to buildings with sensitive interior spaces that are well insulated from exterior noise where a potential for exposure may occur.

**Table 13-1
Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact
Criteria for General Assessment**

Land Use Category	GBV Impact Levels (VdB re: 1 micro-inch / sec)			GBN Impact Levels (dBA re: 20 micro Pascals/sec)		
	Frequent Events ¹	Occasional Events ²	Infrequent Events ³	Frequent Events ¹	Occasional Events ²	Infrequent Events ³
Category 1: Buildings where vibration would interfere with interior operations	65 VdB	65 VdB	65 VdB	n/a ⁴	n/a ⁴	n/a ⁴
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primary daytime use	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

¹ “Frequent Events” is defined as more than 70 vibration events per day.

² “Occasional Events” is defined as between 30 and 70 vibration events per day.

³ “Infrequent Events” is defined as less than 30 vibration events per day.

⁴ n/a means “not applicable”. Vibration-sensitive equipment is not sensitive to ground-borne noise.

Source: FTA, *Transit Noise and Vibration Impact Assessment*, May 2006.

13.2 Affected Environment

Noise and vibration-sensitive land uses were identified by screening Geographic Information Systems (GIS) data for buildings with residential or institutional uses nearby the proposed alignment. For rail traffic from a light rail transit project such as the LYNX BLE, the FTA-defined noise screening distance for locations with unobstructed views is 350 feet. The screening distance when intervening buildings are present is 175 feet. Vibration screening distances are 450, 150 and 100 feet for vibration Category 1, 2 and 3 land uses, respectively. Field observations were made to identify and confirm sensitive land use locations within the larger study area to ensure that the maximum screening distance of 450 feet for vibration was captured.

13.2.1 Existing Ambient Noise Levels

Noise-sensitive receptors along the project corridor were identified based on preliminary alignment drawings, aerial photographs, visual surveys and land use information. Monitoring sites were selected on the basis of several factors, the most important of which was the site’s potential sensitivity to changes in noise or vibration levels. Each site selected was either representative of a unique noise environment or that of similarly situated receptors nearby. While the majority of the selected sensitive receptors are residential in nature, schools, churches and medical offices were also identified. Both long-term (24-hour) and short-term monitoring was conducted at numerous sites along the proposed alignment. A tabulation of the existing noise levels is provided in Table 13-2. Monitoring locations are shown on Figures 13-4a and 13-4b.

13.2.2 Existing Vibration Conditions

Existing vibration levels near sensitive receptors would primarily be the result of vehicular traffic on local roadways and existing rail activity. UNC Charlotte provided vibration data that was previously collected at two of their existing academic buildings, Duke Centennial Hall and Grigg Hall. At Duke Centennial Hall, the greatest measured vertical vibration level was approximately 46 VdB (monitored in 2002). At Grigg Hall, the greatest measured vertical vibration level was approximately 43 VdB (monitored in 2007). The Duke Centennial Hall monitoring was taken prior to the actual construction of the building, while the Grigg Hall monitoring was taken within the buildings existing research facilities, which incorporates the use of a dual vibration isolation system. As such, the most accurate measure of existing vibration would be at Duke Centennial Hall as readings were taken on solid ground. While the Grigg Hall monitoring is not representative of a true measure of existing vibration conditions, it does serve to demonstrate the effectiveness of the current vibration isolation system within the building.

**Table 13-2
Noise Monitoring Results – Existing Noise Exposure**

Site# ¹	Monitoring Location Description	Date	Duration (hour)	Existing Noise Exposure	
				Ldn ²	Leq ³
1	United Presbyterian Church, 201 East 7th Street	10/04/2005	1	61.0	63.0
2	Alpha Mill Apartments, 220 Alpha Mill Lane	10/01/2008	1	71.0	59.1
3	House, 234 Parkwood Avenue	10/01/2008	1	72.7	73.9
4	House, 405 19th Street	10/03/2005	24	69.0	69.0
5	House, 423 East 22nd Street	10/01/2008	1	60.1	56.0
6	3312 Benard Avenue ⁴	n/a	n/a	71.3	n/a
6	GDR Holiness Church, 2604 North Brevard Street	10/04/2005	1	59.0	61.0
7	Highland Mill Residential Apts., 2901 North Davidson Street	10/01/2008	1	63.1	61.3
8	The Colony , 3440 North Davidson Street (1st floor commercial, 2nd floor residential)	10/03/2005	24	69.0	71.0
9	House, 4031 Bearwood Avenue ⁵	n/a	n/a	65.0	n/a
10	House, 342 St. Anne Place	12/15/2008	24	71.4	58.8
11	Elmore Mobile Home Park, 4832 North Tryon Street	10/02/2008	1	53.8	50.2
12	Crossroads Charter High School, 5500 North Tryon Street/US-29	10/02/2008	1	69.6	71.8
13	Pines Mobile Home Park, 5635 North Tryon Street	10/02/2008	1	54.0	50.8
13	Harbor Baptist Church, 5801 Old Concord Road	10/02/2008	1	59.8	62.0
15	Holiday Motel, 6001 North Tryon Street/US-29	10/03/2005	24	70.0	68.0
16	House, 201 Kingview Drive	10/08/2008	24	63.6	66.4
17	InTown Suites, 110 Rocky River Road	10/04/2005	1	62.0	64.0
18	Residence Inn by Marriott, 8503 North Tryon Street at Ken Hoffman Drive	10/06/2008	1	66.1	66.4
19	Carolinas Medical Center-University, 8800 North Tryon Street	10/06/2008	1	58.1	60.1
20	UNC Charlotte Duke Centennial Hall	10/06/2008	1	63.3	65.3
21	Ashford Green Apartments, 230 Barton Creek Drive	10/03/2005	24	62.0	61.0
22	Residence, UNC Charlotte Laurel Hall	10/08/2008	24	62.1	55.3
23	Mallard Creek Apartments, 420 Michelle Linnea Drive (1)	10/07/2008	1	50.5	52.5
24	Hunt Club Apartments, 208 Northbend Drive	10/04/2005	1	63.0	65.0
25	Queen's Grant Mobile Homes, 124 Carnival Street	10/06/2008	1	55.4	52.5

¹ See Figures 13-4a and 13-4b.

² Day-Night Sound Level (Ldn): Used to characterize community noise over a 24-hour period.

³ Equivalent Sound Level (Leq): A descriptor used to characterize loudness of fluctuating noise. Leq represents a constant sound that, over the specified period, has the same sound energy as the fluctuating sound.

⁴ Represents a calculated existing noise level derived from existing rail traffic.

⁵ Noise level obtained from Table 5-7 of the FTA *Transit Noise and Vibration Impact Assessment*, May 2006.

Source: STV, *Noise and Vibration Technical Report*, 2010; STV, *Noise and Vibration Technical Report Addendum #1*, 2010; STV, *Noise and Vibration Technical Report Addendum #2*, 2010.

13.3 Environmental Consequences

This section includes an evaluation of the direct noise and vibration impacts of the No-Build Alternative, the proposed Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. Construction-related impacts, along with avoidance, minimization, and mitigation measures, are discussed in Chapter 18.0: Construction Impacts.

13.3.1 Noise Impacts

The prediction of noise impacts involves a determination of project-related noise levels at several noise sensitive locations and then comparing them to the applicable FTA noise criteria. These locations included single-family residences, multi-family apartment buildings, hotels, schools, churches, medical facilities and passive parks where quiet is essential.

13.3.1.1 No-Build Alternative

Light rail would not be constructed under this alternative; therefore, no noise impacts would occur.

13.3.1.2 Light Rail Alternative

FTA's general assessment for noise compares the project-related noise against existing conditions, obtained from field measurements, to determine the potential for impact. Project-related noise is calculated for each noise receiver and accounts for all anticipated noise sources. Noise sources associated with light rail are typically generated from the following elements:

- Wheel/rail interaction;
- Horns (at and approaching grade crossings) and crossing gate bells;
- Traction power substations;
- Aerial structures that may amplify sound;
- Traction motor;
- Vehicular access to stations; and
- Maintenance and storage facilities.

Table 13-3 lists the sensitive receptors that would be likely to experience a moderate or severe impact. Noise impacts are likely to occur at 14 Category 1 and Category 2 land uses (or representative clusters), including 11 moderate impacts and two severe impacts. The footnotes for Table 13-3 identify if noise would primarily result from noise sources other than wheel/rail interaction. One receptor, UNC Charlotte's Laurel Hall may experience noise impacts resulting from wheel squeal.

Impacts were predicted at six separate impact locations along the alignment. At the Pines Mobile Home Park, a total of 26 individual residential building properties would experience a moderate impact. At the Mallard Creek Apartments, six individual residential buildings would experience a moderate impact, while two individual residential building properties would experience a severe impact. The remaining four locations would be moderately impacted; including: the InTown Suites Hotel building, Residence Inn by Marriott Hotel building, Carolinas Medical Center-University (CMC-University) and one area of noise-sensitive parkland at the Kirk Farm Fields Wetland Viewing Area. In addition to the predicted noise impacts, the potential for wheel squeal noise was identified at two locations along the alignment; the UNC Charlotte – Laurel Hall Student Residence Hall and the Kirk Farm Fields Wetland Viewing Area. Noise impact locations are shown in Figure 13-5. Noise impacts would not occur at any of the Category 3 land uses as a result of the proposed Light Rail Alternative.

Train Operations / Grade Crossings / Substations:

With the proposed project, light rail operations would consist of 234 total train movements per day. These movements represent the number of times a receptor would be exposed to a train passby during a 24-hour period. Procedures in the FTA's Transit Noise and Vibration Impact Assessment manual were used to forecast noise levels due to wheel/rail interaction as well as the blowing of light rail horns and grade crossing bells where applicable. It was determined that 26 residences in the Pines Mobile Home Park would be moderately impacted from light rail operations on the elevated bridge over Old Concord Road into the median of North Tryon Street/US-29. The InTown Suites Hotel would be moderately affected by increased noise levels from a substation. At this location, predicted substation noise levels were also added to those noise levels predicted for the light rail operations and grade crossings. The Residence Inn by Marriott would be moderately affected by the addition of a signalized intersection at North Tryon Street/US-29 and Ken Hoffman Drive where the light rail would be required to use horns at and approaching the grade crossing and the crossing gate bells. Likewise, CMC-University would also be

**Table 13-3
Noise Impact General Assessment (2009) Category 1 and 2 Land Uses, Light Rail Alternative**

Description	Land Use	Existing Ldn (dBA)	Speed (mph)	Distance to Source (feet)	Impact Thresholds		Project - Related Prediction Ldn (dBA)	Type of Impact	# Impacts
					Impact	Severe			
Pines Mobile Home Park, 5635 North Tryon Street (1st Row)	SFR	54	35	230	55	61	58.1	Moderate	4-SFU
Pines Mobile Home Park, 5635 North Tryon Street (2nd Row)	SFR	54	35	300	55	61	57.0	Moderate	22-SFU
InTown Suites, 110 Rocky River Rd.	Hotel	62	40	1,100 ³	59	64	59.6	Moderate	1-Hotel
Residence Inn by Marriott, 8503 North Tryon Street at Ken Hoffman Drive	Hotel	66	35	200 ³	61	67	61.6	Moderate	1-Hotel
Carolinas Medical Center – University, 8800 North Tryon Street	Hospital	58	35	290 ⁴	57	62	58.0	Moderate	1-Hospital
Campus Housing, UNC Charlotte Laurel Hall	Residence Hall	62	35	218	59	64	54.4	Potential wheel squeal ¹	1-Residence Hall
Mallard Creek Apartments, 420 Michelle Linnea Drive (1)	MFR	51	40	105	54	60	60.7	Severe	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (2)	MFR	51	40	240 ³	54	60	58.2	Moderate	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (3)	MFR	51	40	390 ³	54	60	56.5	Moderate	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (4)	MFR	51	40	125	54	60	59.6	Moderate	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (5)	MFR	51	40	530 ³	54	60	54.7	Moderate	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (6)	MFR	51	40	650 ³	54	60	56.4	Moderate	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (7)	MFR	51	40	750 ³	54	60	54.2	Moderate	1-MFU
Mallard Creek Apartments, 420 Michelle Linnea Drive (8)	MFR	51	40	100	54	60	63.8	Severe	1-MFU
Kirk Farm Fields Wetland Viewing Area, North Tryon Street/US-29 at Mallard Creek Church Road	Park	52.5	25	150 ³	59	65	59.0	Moderate Potential wheel squeal ¹	1-Park

SFR = Single-family Residential, MFR = Multi-family Residential, MU = Mixed Use, SFU = Single-family Unit, MFU = Multi-family Unit

¹Laurel Hall student residence is located near a track curve which could result in intermediate wheel squeal. However, wheel squeal was not included in noise predictions because wheel squeal noise levels are highly variable, making accurate noise projections extremely complex.

²Distance to VLMF

³Distance to at-grade crossing

⁴Distance to access road

Source: STV, *Noise and Vibration Technical Report*, 2010; STV, *Noise and Vibration Technical Report Addendum #2*, 2010.

moderately affected due to the addition of a signalized intersection, and resulting grade crossing noise, along North Tryon Street/US-29 at JM Keynes Drive. Finally, at the Mallard Creek Apartments, six buildings would be moderately impacted and two buildings would be severely impacted from light rail operations and the light rail grade crossing of Mallard Creek Church Road.

Stations and Park-and-Ride Lots:

Noise due to the operation of a light rail station would be primarily associated with automobile and bus traffic entering and exiting station drop-off and parking areas. The proposed stations would all be in areas where existing roadway vehicle traffic is substantial on nearby streets or freeways that would result in a small increment in noise arising from additional traffic bound to or from the light rail stations. As a result, no additional impacts are anticipated as a result of station noise and an analysis of station noise was not required. Vehicular access roads were also considered in the analysis and the results show that access roads would not cause an impact at any of the park-and-rides.

Wheel Squeal:

Based on the criteria for wheel squeal described previously, two potentially affected locations were identified along the proposed Light Rail Alternative. These locations include the UNC Charlotte Laurel Hall student residence and the Kirk Farms Fields Wetland Viewing Area. Both locations would be located near track curves which could result in intermediate wheel squeal as these curves have a turning radius of less than 450 feet.

Charlotte Research Institute (CRI) at the UNC Charlotte: The noise prediction results at the CRI buildings indicate that future noise levels would not result in impacts at any of the CRI buildings. The proposed Light Rail Alternative would be located in a depressed trackway in the vicinity of these buildings. Therefore, predicted noise levels would be reduced to even lower levels than those predicted due to the barrier like effect of the below-grade retaining walls. Reductions could range anywhere from six to 15dB.

Vehicle Light Maintenance Facility: The operation of the proposed VLMF would be primarily associated with light rail vehicles exiting the facility during morning peak periods, light rail vehicles entering the facility at the end of the day, maintenance and cleaning of vehicles, and movement of the light rail vehicles within the facility. The VLMF would be located at the site of the existing Norfolk Southern Intermodal Yard along Brevard Street. Most of the properties near the VLMF are industrial or commercial in nature, but some residential uses do exist less than 500 feet from the proposed site on 21st and 22nd Streets. The noise assessment determined that the VLMF would not result in impacts to these noise-sensitive receivers.

13.3.1.3 Light Rail Alternative – Sugar Creek Design Option

Table 13-4 shows the impact assessment results for noise Category 1 and 2 land uses (residences, quiet parks). No Category 3 land uses (schools and churches) would have predicted noise levels that would result in an impact. Impacts were predicted at two separate impact locations along the extent of the design option. One moderate impact would be predicted at an individual residence at 5234 North Tryon Street. At the Pines Mobile Home Park, a total of 26 individual residential building properties would be moderately impacted. The selection of the Light Rail Alternative – Sugar Creek Design Option would not eliminate any of the predicted impacts for the proposed Light Rail Alternative.

**Table 13-4
Noise Impact General Assessment (2009) Category 1 and 2 Land Uses
Light Rail Alternative – Sugar Creek Design Option**

Description	Land Use	Existing Ldn (dBA)	Speed (mph)	Dist to Source (feet)	Impact Thresholds		Project-Related Prediction Ldn (dBA)	Type/# of Impact
					Impact	Severe		
House, 5234 North Tryon Street	SFR	70	45	70	64	69	67.4	Moderate 1-SFU

Table 13-4 (continued)
Noise Impact General Assessment (2009) Category 1 and 2 Land Uses
Light Rail Alternative – Sugar Creek Design Option

Description	Land Use	Existing Ldn (dBA)	Speed (mph)	Dist to Source (feet)	Impact Thresholds		Project-Related Prediction Ldn (dBA)	Type/# of Impact
					Impact	Severe		
Pines Mobile Home Park, 5635 North Tryon Street (1st Row)	SFR	54	35	195	55	61	59.1	Moderate 4-SFU
Pines Mobile Home Park, 5635 North Tryon Street (2nd Row)	SFR	54	35	300	55	61	56.6	Moderate 22-SFU

SFR = Single-family Residential, MFR = Multi-family Residential, MU = Mixed use, SFU = Single-family unit, MFU = Multi-family unit
Source: STV, *Noise and Vibration Technical Report*, 2010

Train Operations / Grade Crossings / Substations:

A residence located at 5234 North Tryon Street/US-29 along the Light Rail Alternative – Sugar Creek Design Option would be affected by noise levels from project substations. At this location, predicted substation noise levels were also added to those noise levels predicted for the light rail operations and grade crossings.

Stations and Park-and-Ride Lots:

The only station that has sensitive noise receptors nearby would be the Old Concord Station – Sugar Creek Design Option. However, because this station would include an access road that is very close to a sensitive receptor (approximately 50 feet from the Crossroads Charter High School) its potential noise impact was conservatively included in the total noise impact assessment conducted for the high school. Results concluded that there would be no impact at the school.

Wheel Squeal: No sections of the Light Rail Alternative – Sugar Creek Design Option would have a track radius of less than 450 feet. As a result, it is not anticipated that sensitive noise receptors would be affected by wheel squeal.

13.3.2 Vibration Impacts

13.3.2.1 No-Build Alternative

No project-generated vibration impacts would occur under the No-Build Alternative.

13.3.2.2 Light Rail Alternative

Vibration predictions were made for both residential and institutional land uses (schools and churches) along the proposed light rail alignment. The results indicate that vibration impacts would occur at one receptor at 342 St. Anne Place, located fifty feet north of the proposed Light Rail Alternative alignment (Figure 13-5). Because this impact is within one dB of the vibration criteria level, a more detailed assessment of the proposed Light Rail Alternative would need to be conducted so that a more accurate determination of actual impact, if any, can be made. While there are other neighboring receptors located along the right-of-way, the next closest vibration-sensitive property would be located 70 feet from the alignment. At this distance and beyond, the assessment indicates that no additional vibration impacts would be projected to occur.

Charlotte Research Institute at UNC Charlotte: Screening for sensitive Category 1 vibration is based on a distance of 450 feet. Land uses for this category typically include vibration-sensitive research and manufacturing activities, hospitals with vibration-sensitive equipment and university research operations. However, the degree of sensitivity to vibration is dependent upon the specific equipment that would be affected by the vibration.

CRI personnel indicate that for several existing and future buildings, campus research activities would require vibration limits in the range of 42 – 60 VdB. To mitigate current vibration on sensitive equipment, several of the existing CRI campus buildings including Grigg Hall and the Bioinformatics Building (which is currently in the process of being constructed) employ the use of a dual vibration isolation system in the form of: 1) a central slab mounted on bedrock and isolated from the rest of the building; and, 2) individual mechanical vibration isolation platforms tailored for the various pieces of sensitive equipment.

Several buildings planned for future construction including the Epic Building and the Portal building will also include vibration sensitive research for which the required vibration limits may be even stricter at 36 VdB. Based on these strict vibration requirements, the vibration levels for the existing environment (which does not include existing rail activity) described previously (approximately 46 VdB) would already require some form of mitigation for much of their research activities. Consequently, the vibration criteria described in Table 13-1 would be inadequate to properly assess potential impacts from light rail on these buildings.

Because vibration limits for Category 1 are based on acceptable vibration levels for moderately vibration-sensitive equipment, such as optical microscopes and electron microscopes with vibration isolation systems, defining limits for equipment that is even more sensitive requires a detailed review of the specific equipment involved, the vibration frequencies at which they are sensitive and detailed field measurements of soil vibration characteristics. This type of review is usually performed during the detailed assessment associated with the final design phase of a project and not as part of the Draft EIS due to the increased level of specificity needed in the engineering design to properly assess the proposed impacts. The need for a more detailed assessment, along with continuing coordination with the Charlotte Research Institute, is acknowledged and affirmed.

13.3.2.3 Light Rail Alternative – Sugar Creek Design Option

No additional impacts over the proposed Light Rail Alternative would be observed at any of the vibration-sensitive receptor locations for the design option. The predicted impact at 342 St. Anne Place for the Light Rail Alternative would be eliminated as the design option would not pass by this receptor.

13.4 Mitigation

Each of the predicted impacts will be confirmed during a detailed assessment to be conducted following the Draft EIS public and agency comment period. Specific mitigation measures will be designed for each affected property during this assessment and will be documented in the Final EIS. These measures will be based on more accurate and specific operational engineering and environmental data that will be available for use in a detailed noise assessment. As such, they may differ with those mitigation measures recommended here.

13.4.1 Noise Mitigation

The FTA guidance states that for moderate impacts, mitigation will be incorporated into the project when it is considered reasonable and practicable. The evaluation of specific mitigation measures will include the overall noise reduction potential, the costs, the affect on transit operations and maintenance, and any new environmental impacts, such as visual affects, that may result from the proposed mitigation. Of the 12 moderate impacts, most are just over the impact threshold for a moderate impact, and therefore, the costs to provide mitigation will outweigh the benefit of mitigation. Specifically, mitigation is not anticipated for InTown Suites, Residence Inn by Marriott, Carolinas Medical Center-University, Kirk Farm Fields Wetland Viewing area, and Mallard Creek Apartments Buildings 5 and 7.

For severe impacts, FTA requires mitigation to be incorporated into a project unless there are extenuating circumstances to prevent it. The goal is to gain substantial reductions in noise level. Examples of general noise mitigation measures include, but are not limited to: operational restrictions; the use of vehicle skirts and resilient or damped wheels; sound barriers; and buffer zone acquisitions. Descriptions of the most practical mitigation recommendations are included in the following sections. Mitigation measures assume that the rail system will be maintained in its as-new condition.

13.4.1.1 Light Rail Alternative

The following includes potential mitigation measures that will be considered to mitigate the identified impacts of the proposed Light Rail Alternative, where sufficient decibel reduction can be achieved through mitigation. A detailed assessment will be conducted during final design to confirm the potential for impact and coordination with affected parties will occur at that time to select the most appropriate mitigation measures. A matrix of needed decibel reductions by each resource is provided in Table 13-5.

Rail Vehicle Skirts:

Depending upon the exact level of effectiveness, the modification of light rail vehicle skirts from a simple aesthetic use to one that could result in noise attenuation could eliminate or significantly reduce many of the impacts. This assumes a six to ten dB range of attenuation for wheel/rail noise. Impacts at the Pines Mobile Home Park could be eliminated. Impacts at the Mallard Creek Apartments could be reduced, but not eliminated.

Sound Barriers:

Sound barriers can either be located close to the source, at the affected receptor or somewhere in between. Sound barriers could be effective in eliminating severe and moderate impacts for many of the affected properties. A solid, impervious wall that is sufficiently high to block the direct view of the noise source could typically reduce community noise levels at locations within approximately 200 feet of the track. Sound barriers could be effective in eliminating moderate impacts for the Pines Mobile Home Park. For all potential barrier locations, the use of barriers should also require the simultaneous consideration of visual impacts. For the two locations that would be affected by wheel squeal, namely the UNC Charlotte Laurel Hall and Kirk Farm Fields, barriers located very close to the track could significantly reduce the level of wheel squeal by as much as 15 dB.

Resilient or Damped Wheels:

Resilient wheels are extremely efficient at attenuating wheel squeal. For the locations at UNC Charlotte Laurel Hall and Kirk Farm Fields, the noise impact from wheel squeal could likely be eliminated with reductions ranging from ten to 20 dB depending upon the frequency characteristics of the squeal noise.

Building Sound Insulation:

Building sound insulation most typically involves caulking and sealing gaps in the building envelope and installation of specially designed windows and solid-core doors. Depending on the quality of the original windows, such treatments can provide noise reductions as much as five to ten dB or more to building interiors. (Note: Noise impacts have been calculated based on distances to property exteriors). One or more of the apartment buildings at Mallard Creek Apartments and the Pines Mobile Home Park could benefit from sound insulation.

13.4.1.2 Light Rail Alternative – Sugar Creek Design Option

The following includes potential mitigation measures that will be considered to mitigate the identified impacts of the Light Rail Alternative – Sugar Creek Design Option. A detailed assessment will be conducted to confirm the impacts described herein and identify the most effective and practical mitigation techniques. CATS will coordinate with the affected property owners during the evaluation of mitigation effectiveness.

Rail Vehicle Skirts:

Depending upon the exact level of effectiveness, the use of vehicle skirts could eliminate many of the impacts projected for the Light Rail Alternative – Sugar Creek Design Option. Only slightly moderate impacts would remain at the Pines Mobile Home Park.

Sound Barriers:

Sound barriers could be effective in eliminating moderate impacts for the Pines Mobile Home Park. However, noise from crossing bells may not be adequately blocked for all receptors. For all potential barrier locations, the use of barriers would also require the simultaneous consideration of visual impacts.

**Table 13-5
Needed Decibel Reduction for the Light Rail Alternative**

Receptor Description	Land Use ¹	Noise Source to Receptor Distances (feet) ²			Type of Impact	# Impacts ¹	Needed Decibel Reduction to Eliminate Impact ³
		Distance to Track	Distance to Grade Crossing	Distance to Substation			
Pines Mobile Home Park, 5635 North Tryon Street (1st Row)	SFR	230	1,200	n/a	Moderate	4-SFU	3.1
Pines Mobile Home Park, 5635 North Tryon Street (2nd Row)	SFR	300	1,200	n/a	Moderate	22-SFU	2.0
InTown Suites, 110 Rocky River Road	Hotel	220	1,100	220	Moderate	1-Hotel	0.6
Residence Inn by Marriott, 8503 North Tryon Street at Ken Hoffman Drive	Hotel	112	200	n/a	Moderate	1-Hotel	0.6
Carolinas Medical Center-University 8800 North Tryon Street	Hospital	245	290	n/a	Moderate	1-Hospital	1.0
Campus Housing, UNC Charlotte Laurel Hall	Residence Hall	218	n/a	n/a	Potential Wheel Squeal	1-Residence Hall	Wheel squeal elimination
Mallard Creek Apartments, 420 Michelle Linnea Drive (1)	MFR	105	300	n/a	Severe	1-MFU	6.7
Mallard Creek Apartments, 420 Michelle Linnea Drive (2)	MFR	240	240	n/a	Moderate	1-MFU	4.2
Mallard Creek Apartments, 420 Michelle Linnea Drive (3)	MFR	300	390	n/a	Moderate	1-MFU	2.5
Mallard Creek Apartments, 420 Michelle Linnea Drive (4)	MFR	125	500	n/a	Moderate	1-MFU	5.6
Mallard Creek Apartments, 420 Michelle Linnea Drive (5)	MFR	310	530	n/a	Moderate	1-MFU	0.7
Mallard Creek Apartments, 420 Michelle Linnea Drive (6)	MFR	190	650	n/a	Moderate	1-MFU	2.4
Mallard Creek Apartments, 420 Michelle Linnea Drive (7)	MFR	320	750	n/a	Moderate	1-MFU	0.2
Mallard Creek Apartments, 420 Michelle Linnea Drive (8)	MFR	100	100	n/a	Severe	1-MFU	9.8
Kirk Farm Fields Wetland Viewing Area, North Tryon Street/US-29 at Mallard Creek Church Road	Park	150	225	n/a	Moderate/ Potential Wheel Squeal	1-Park	0.1/Wheel squeal elimination

¹ SFR = Single-family residential, MFR = Multi-family residential, SFU = Single-family unit, MFU = Multi-family unit

²For each property, the source to receptor distances when bolded represents the dominant noise sources affecting that property.

³No mitigation is proposed for reductions equal or less than 1 decibel

Source: STV, *Noise and Vibration Technical Report*, 2010; STV, *Noise and Vibration Technical Report Addendum #2*, 2010.

Building Sound Insulation:

The single-family home at 5234 North Tryon Street/US-29 could benefit from sound insulation as it is the only affected property in the immediate area. Assuming a five to ten dB reduction, moderate impacts could be eliminated.

Relocate or Insulate Substation:

For the single-family home at 5234 North Tryon Street/US-29, relocating or using a sound proof enclosure for the substation nearby would reduce the level of noise impact. This could be used separately or combined with the building sound insulation.

A matrix of needed decibel reductions for properties that could experience an increase in predicted noise levels is provided in Table 13-6.

**Table 13-6
Needed Decibel Reductions for the Light Rail Alternative – Sugar Creek Design Option**

Receptor Description	Land Use	Noise Source to Receptor Distances (feet)			Type/# of Impact	Needed Decibel Reduction to Eliminate Impact
		Distance to Track	Distance to Grade Crossing	Distance to Light Rail Substation		
House, 5234 North Tryon Street	SFR	70	409	85	Moderate 1-SFU	3.4
Pines Mobile Home Park, 5635 North Tryon Street (1st Row)	SFR	195	195	n/a	Moderate 4-SFU	4.1
Pines Mobile Home Park, 5635 North Tryon Street (2nd Row)	SFR	300	300	n/a	Moderate 22-SFU	1.6

SFR = Single-family residential, SFU = Single-family unit
For each property, the source to receptor distances when bolded represents the dominant noise sources affecting that property.
Source: STV, *Noise and Vibration Technical Report*, 2010

13.4.2 Vibration Mitigation

13.4.2.1 Light Rail Alternative

Many vibration impacts can be controlled or eliminated by the use of several general control measures. As described in the FTA manual, these measures include:

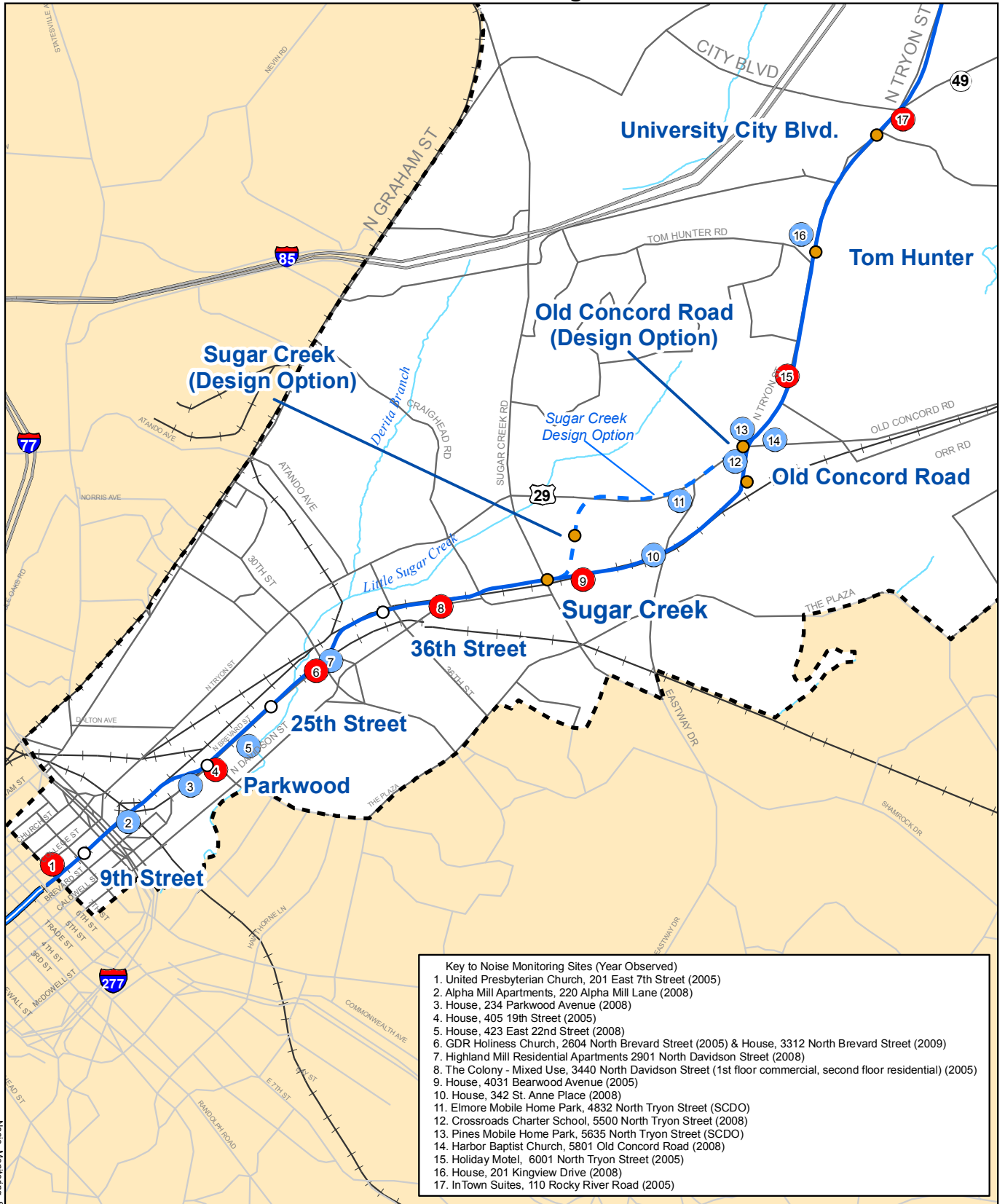
- High Resilience Rail Fasteners
- Ballast Mats
- Floating Slab Track Bed
- Resilient Supported Ties

The vibration assessment indicates that only one residence, located at 342 St. Anne Place would experience a project-related vibration impact. However, the projected impact is less than 1 dB over the vibration threshold limit. Consequently, of the control measures listed previously, the use of ballast mats would be successful at effectively reducing the predicted vibration level below the FTA threshold.

Several buildings within the UNC Charlotte campus were identified that could potentially be affected by vibration from the proposed Light Rail Alternative. Because of the sensitive nature of the research, a more detailed review of the potential vibration impact is required. A detailed assessment will be conducted during final design to confirm the impacts described herein and identify the most effective and practical mitigation techniques. CATS will coordinate with the affected property owners during the evaluation of mitigation effectiveness.

13.4.2.2 Light Rail Alternative – Sugar Creek Design Option

The proposed Light Rail Alternative – Sugar Creek Design Option would not result in vibration impacts. Therefore, mitigation measures are not proposed.



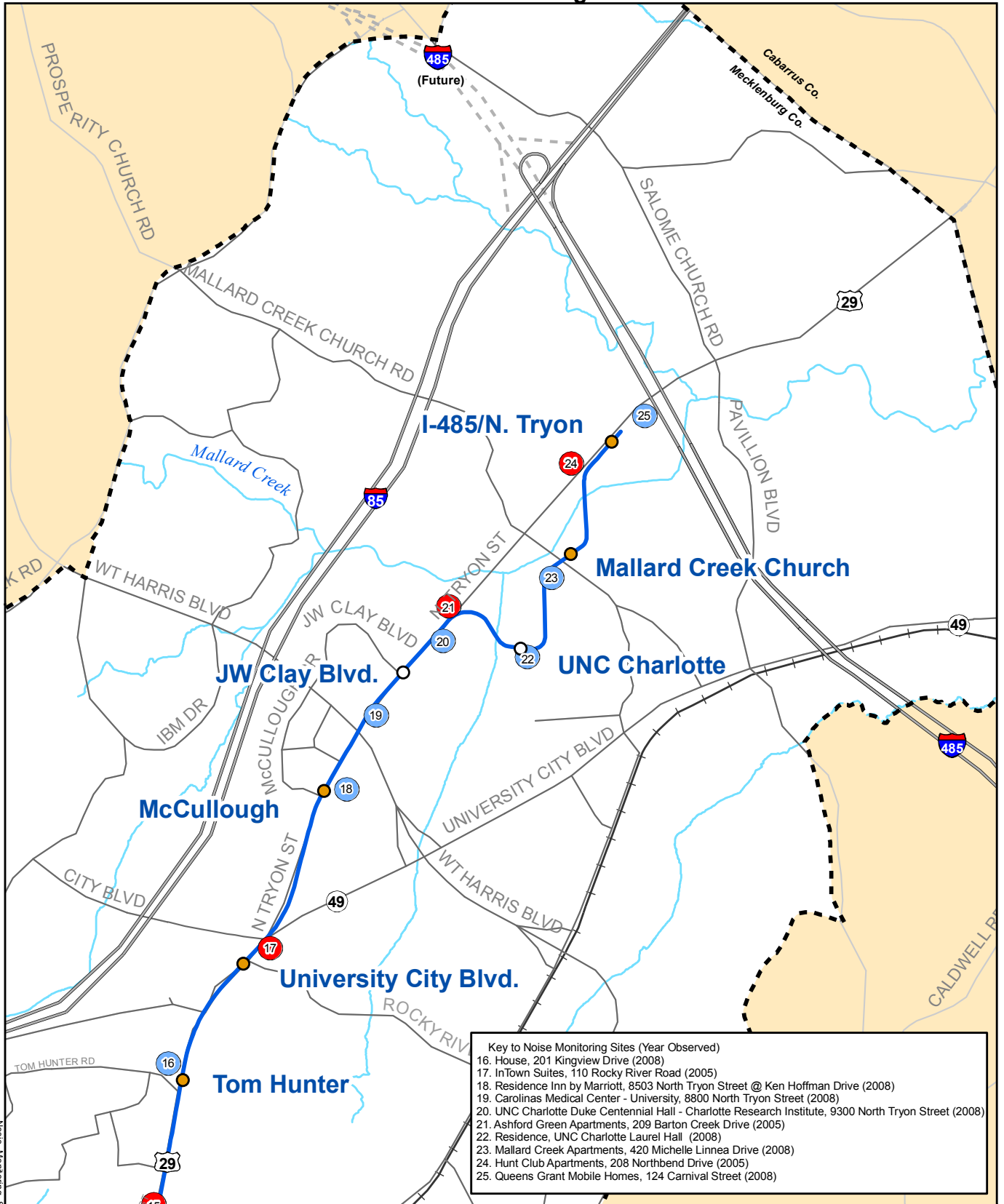
Noise_Monitoring_Sites_Southern_Map_Fig-13-4a_Rev-00.pdf

Legend		Noise Monitoring Sites	
Northeast Corridor Limits	LYNX Existing Ligh Rail Tranist	2005 Noise Monitoring Sites	
Light Rail Transit	Highway	2008 Noise Monitoring Sites	
Design Option	Highway (Future)		
Proposed Stations	Major Roads		
Proposed Stations with Park-and-Ride	Railroads		

0 0.25 0.5
Mile

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County
GIS, STV Field Investigation, 2009

Noise Monitoring Sites in Northern Portion of Corridor



Key to Noise Monitoring Sites (Year Observed)

16. House, 201 Kingview Drive (2008)
17. InTown Suites, 110 Rocky River Road (2005)
18. Residence Inn by Marriott, 8503 North Tryon Street @ Ken Hoffman Drive (2008)
19. Carolinas Medical Center - University, 8800 North Tryon Street (2008)
20. UNC Charlotte Duke Centennial Hall - Charlotte Research Institute, 9300 North Tryon Street (2008)
21. Ashford Green Apartments, 209 Barton Creek Drive (2005)
22. Residence, UNC Charlotte Laurel Hall (2008)
23. Mallard Creek Apartments, 420 Michelle Linnea Drive (2008)
24. Hunt Club Apartments, 208 Northbend Drive (2005)
25. Queens Grant Mobile Homes, 124 Carnival Street (2008)

Legend		Noise Monitoring Sites	
Northeast Corridor Limits	LYNX Existing Light Rail Transit	2005 Noise Monitoring Sites	
Light Rail Transit	Highway	2008 Noise Monitoring Sites	
Design Option	Highway (Future)		
Proposed Stations	Major Roads		
Proposed Stations with Park-and-Ride	Railroads		

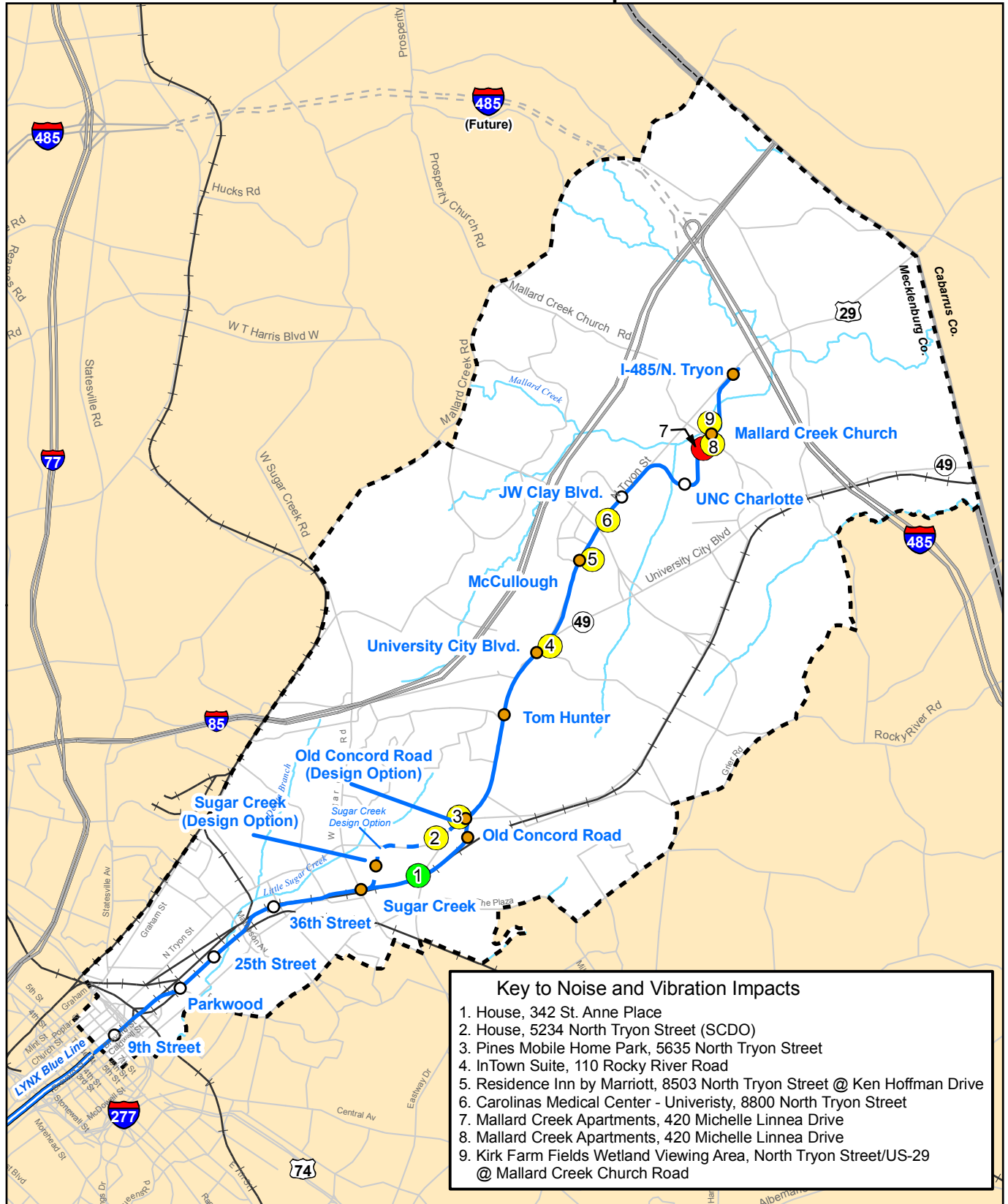
0 0.25 0.5
Mile

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County
GIS, STV Field Investigation, 2009

Noise_Monitoring_Sites_Northern_Map_Fig13-4b_Rev00.pdf

6/20/09

Noise and Vibration Impacts within the Northeast Corridor



Key to Noise and Vibration Impacts

1. House, 342 St. Anne Place
2. House, 5234 North Tryon Street (SCDO)
3. Pines Mobile Home Park, 5635 North Tryon Street
4. InTown Suite, 110 Rocky River Road
5. Residence Inn by Marriott, 8503 North Tryon Street @ Ken Hoffman Drive
6. Carolinas Medical Center - Univeristy, 8800 North Tryon Street
7. Mallard Creek Apartments, 420 Michelle Linnea Drive
8. Mallard Creek Apartments, 420 Michelle Linnea Drive
9. Kirk Farm Fields Wetland Viewing Area, North Tryon Street/US-29 @ Mallard Creek Church Road

Legend

Northeast Corridor Limits	LYNX Existing Light Rail Transit	Railroads
Proposed Light Rail Alternative	Highway	County Line
Design Option	Major Roads	Moderate Noise Impact
Proposed Stations	Highway (Future)	Severe Noise Impact
Proposed Stations with Park-and-Ride	Streams	Vibration Impact

0 0.5 1
Mile

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County
GIS, STV Field Investigation, 2009

Noise & Vibration Impacts_Rev.00.pdf

2010

14.0 ENERGY USE

This chapter quantifies the expenditure of energy associated with the alternatives under study in this Draft Environmental Impact Statement (EIS). Energy is consumed in the construction, maintenance and operation of transportation systems. Transportation energy use is typically evaluated in terms of direct energy and indirect energy. Direct energy involves energy associated with the direct operation of the transportation system, consisting primarily of vehicle propulsion energy. Indirect energy consumption involves the energy expenditures associated with the physical implementation of the transportation system (facility and vehicle construction).

Energy is commonly measured in terms of British Thermal Units (BTUs), or the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. This unit of measurement provides a comparison of energy consumption for energy produced from different sources, such as petroleum, coal, nuclear and wind power.

14.1 Affected Environment

According to the U.S. Energy Information Administration (EIA), gross energy use in the U.S. was estimated at 101.5 quadrillion BTUs in 2007. Of this total, 29 quadrillion BTUs were consumed by transportation, representing approximately 28 percent of the nation’s gross energy consumption. Energy sources used for transportation include petroleum, coal, natural gas and electricity. Petroleum accounted for 95 percent of the energy used by transportation, and natural gas and renewable energy accounted for 2 percent of the energy used by transportation.

Transportation in the state of North Carolina accounts for 2.6 percent of total energy use in the U.S. (State Energy Profiles, 2009). Transportation energy in the Charlotte region is primarily derived from petroleum-based fuels (e.g., gasoline and diesel fuel). A small portion of the regional transportation energy is derived from electricity used to provide power to the existing LYNX Blue Line light rail service. Electricity is provided by Duke Energy, the sole provider of electrical power to the Charlotte region.

14.2 Environmental Consequences – Direct Energy

The following sections quantify the regional transportation system energy expenditures associated with direct operation of the alternatives under study. Table 14-1 illustrates the annual vehicle propulsion energy use for motorized vehicles, as well as for light rail vehicles.

**Table 14-1
Comparison of 2030 Estimated Daily Energy Consumption**

Vehicle Class	Regional VMT (Daily)		(BTU/ Veh-mile) ³	Daily Energy Consumption (BTU millions)		
	No-Build	Light Rail Alternative ^a		No-Build	Light Rail Alternative	Light Rail ^a vs. No-Build
Passenger Vehicles ¹	83,661,197	83,519,938	5,960	523,743	497,779	-842
Commercial Vehicles ¹	11,287,284	11,287,284	23,260	262,542	262,542	0
Bus ² (Diesel)	45,541	46,994	37,310	1,699	1,753	54
Light Rail ² (Electric)	3,624	7,737	62,797	228	486	258
Total	94,997,646	94,861,953		788,212	762,560	-530

Notes: ^a Represents energy consumption of both the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option since no change in energy consumption is anticipated between the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option.

Sources: ¹Passenger and Commercial VMT from AECOM and Metrolina Regional Travel Demand Model, 2009; ²Bus and Light Rail VMT from LYNX BLE Bus and Rail Operating and Maintenance Quantities and Costs, 2009; and LYNX BLE LRT Operating and Maintenance Quantities and Costs, 2009; ³Transportation Energy Data Book: Edition 27- 2008 (U.S. Department of Energy, 2008, Chapter 2, Table 2.12 and Table 2.16).

14.2.1 No-Build Alternative

The regional direct transportation energy consumption for the No-Build Alternative is estimated to be 788 Billion BTUs per day in 2030.

14.2.2 Light Rail Alternative

The Light Rail Alternative would extend the existing LYNX Blue Line light rail service system and the bus network would be modified and enhanced throughout the Northeast Corridor to maximize transit coverage and transit access to the light rail service. As a result, the daily energy consumption for electric Light Rail service would increase by 258 million BTUs and the energy use for bus service would increase by approximately 54 million BTUs compared to the No-Build Alternative.

Passenger vehicle travel within the corridor would be significantly reduced by the improved transit service, thereby reducing passenger vehicle energy consumption by 842 million BTUs per day. Overall, the implementation of the Light Rail Alternative would result in an estimated net reduction in regional energy use of 530 million BTUs compared to the No-Build Alternative. Therefore, less energy would be consumed and an overall benefit would result. No negative impacts would result under the Light Rail Alternative.

14.2.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would have the same operating characteristics and would result in the same reductions in direct energy consumption as the Light Rail Alternative. Therefore, no difference in impact would result from the selection of this design option.

14.3 Environmental Consequences – Indirect Energy

The following sections quantify indirect energy expenditures associated with construction of transportation infrastructure and acquisition/replacement of buses and/or light rail vehicles. Energy factors for various construction categories are used to estimate the amount of energy necessary to extract raw materials, manufacture and fabricate construction materials, transport materials to the work site and to complete construction activities. Thus, the estimated values capture energy consumption required from the source of the raw materials to the finished project. Local consumption of fossil fuels to operate construction equipment and transport materials is typically a small portion of the total indirect energy. There is a positive correlation between the cost of a project and total energy use associated with manufacturing, transport and construction activities: the higher the cost of a project, the higher the total energy use.

14.3.1 No-Build Alternative

No new transit facilities or light rail stations would be constructed in the corridor under the No-Build Alternative; therefore, no indirect energy consumption impacts are anticipated.

14.3.2 Light Rail Alternative

The Light Rail Alternative consists of the construction of the light rail guideway including track and structures, stations, park-and-ride facilities, systems components and other related infrastructure. It also includes the acquisition of additional light rail vehicles. Table 14-2 tabulates the estimated indirect energy consumption for the various components. Compared to the No-Build Alternative, the Light Rail Alternative is estimated to consume an additional 4,101 Billion BTUs of total indirect energy. The operational savings discussed in Section 14.3 outweigh the indirect energy consumption over the life of the project and would not constitute a potential impact.

**Table 14-2
Comparison of Estimated Indirect Energy Consumption**

Category	Light Rail Alternative ^a (BTU Billions)
Guideway	1,623.6
Systems	1,293.2
Stations/Parking	1,022.0
Maintenance Facility	94.2
Infrastructure Subtotal	4,033.0
Vehicles	68.0
Total	4,101.0

Notes: ^a Represents the Light Rail Alternative and the design options as no change between the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would occur.
Sources: CATS BLE Team - 15% Preliminary Engineering Design Plans and Cost Estimate; Energy Factors from *Energy and Transportation Systems* (Caltrans, 1983).

14.3.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option is estimated to result in the same indirect energy consumption as the Light Rail Alternative as it would not substantively differ in overall infrastructure and the number of rail vehicles required. Therefore, no difference in impact would result from the selection of this design option.

14.4 Mitigation

14.4.1 Light Rail Alternative

The expanded transit service of the Light Rail Alternative would provide a more energy-efficient transportation system for those who would otherwise use fuel-operated vehicles. The Light Rail Alternative would have a positive effect on direct operating energy consumption for transportation due to reduced energy consumption compared to the No-Build; therefore, mitigation is not warranted. Over the life of the proposed project, the operational savings would outweigh the indirect energy consumption. Construction-related impacts, along with mitigation and preventative measures, are discussed in Chapter 18.0: Construction Impacts.

14.4.2 Light Rail Alternative – Sugar Creek Design Option

The proposed Light Rail Alternative – Sugar Creek Design Option is estimated to result in the same energy consumption impacts as the Light Rail Alternative. Therefore, no additional mitigation would be required.

15.0 HAZARDOUS AND CONTAMINATED MATERIALS

This chapter describes the procedures used to determine the potential presence for known hazardous and contaminated materials within the study area of the LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). In addition, this chapter presents the results of a corridor level field review and a search of local, state and federal databases for known hazardous or contaminated materials sites are presented for the alternatives under consideration in this Draft Environmental Impact Statement (EIS). Mitigation measures to minimize impacts are also described.

15.1 Affected Environment

To identify the existing conditions, limited Phase I Environmental Site Assessments (ESA) were conducted for each full property acquisition and the project corridor. These evaluations were conducted in general accordance with the American Society for Testing and Materials (ASTM) Standard for Environmental Site Assessments: *Phase I Environmental Site Assessment Process (ASTM E-1527-05)*. The intent of the limited Phase I ESAs was to provide 1) an early indication of hazardous or contaminated materials that may be encountered and 2) identification of mitigation measures and associated mitigation costs for activities associated with the implementation of the alternatives under study. The long nature of the rail corridor and the objectives of determining immediate potential impacts to the proposed LYNX BLE necessitated some deviation from the ASTM standards. These limitations are documented in each of the limited Phase I ESAs performed for this study.

These reports are available for review as separate documents and are listed in Appendix G. Activities conducted during the development of the Phase I ESAs included:

- Field Review - a limited site reconnaissance was conducted to identify potential evidence of contamination;
- Database Search - a review of state and federal databases of previously reported environmental violations; and,
- Review of Phase I ESAs - a review of ESAs completed in the study area for other projects as provided by other City departments.

The computer database search of federal and state records to identify sites with potential environmental conditions located within 650 feet of the proposed Light Rail Alternative alignment was obtained by Environmental Database Resources on October 2, 2008 (EDR, 2008). This search revealed 351 reports on sites with one or more of the following environmental conditions:

- Contaminated sites under state and/or federal jurisdiction that are categorized as Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or State Hazardous Waste Sites (SHWS).
- Sites that have had Leaking Underground Storage Tank (LUST) incidents. LUST incidents mostly involve leaks of petroleum products such as gasoline and diesel fuels.
- RCRA Treatment, Storage or Disposal (TSD) sites. These are sites that generate, store, treat or dispose of RCRA hazardous waste.
- RCRA hazardous waste Large Quantity Generators (LQG) and Small Quantity Generators (SQG).
- Sites with Underground Storage Tanks (USTs). USTs typically contain liquid petroleum products such as gasoline, diesel or heating fuels.
- Sites with activities regulated by the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) regulating pesticides, the Toxic Substances Control Act (TSCA) regulating toxic compounds such as Polychlorinated Biphenyls (PCB) and asbestos, sites with surface impoundments for wastes and sites with Underground Injection Control (UIC) activity.

Of the 351 sites identified, 84 sites were determined to warrant further consideration because of their proximity to the study corridor and/or topographic position relative to the study corridor. Table 15-1 details the results of the state and federal databases review. In addition to the sites identified in Table 15-1, arsenic levels in soils and ballast materials have been found to be above background levels along former and existing railroad grades. The presence of arsenic within these areas was discovered during the

Charlotte Trolley Project construction and again tested for during the South Corridor Light Rail Project. Based on these experiences, arsenic impacted soils are likely present along the proposed right-of-way, in the area that is adjacent or within existing railroad right of way. The source of arsenic is suspected to be the normal application of an herbicide product. The City of Charlotte has obtained a guidance letter from the Director of the North Carolina Division of Waste Management regarding handling options, including beneficial reuse of the soils.

**Table 15-1
State and Federal Database Review**

Federal Databases	Sites
CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System	1
CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned	3
CORRACTS: Corrective Action Report	1
RCRA-TSDF: RCRA-Transporters, Storage and Disposal	1
RCRA-LQG: RCRA-Large Quantity Generators	1
RCRA-SQG: RCRA-Small Quantity Generators	2
RCRA-CESQG: RCRA-Conditionally Exempt Small Quantity Generators	19
RCRA-NonGen: RCRA-Non Generators	20
ERNS: Emergency Response Notification System	3
State and Local Records	Sites
FTTS: FIFRA/ TSCA Tracking System-FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)	2
HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing	2
FINDS: Facility Index System/Facility Registry System	106
SHWS: Inactive Hazardous Sites Inventory	8
HSDS: Hazardous Substance Disposal Site	3
IMD: Incident Management Database	56
SWF/LF: List of Solid Waste Facilities	2
HIST LF: Solid Waste Facility Listing	2
LUST: Leaking Underground Storage Tank List	47
LUST TRUST: State Trust Fund Database	6
UST: Petroleum Underground Storage Tank Database	61
DRYCLEANERS: Dry Cleaning Sites	2
BROWNFIELDS: Brownfields Projects Inventory	3

Source: EDR, October 2, 2008.

Hazardous/contaminated materials evaluations were conducted within the study area during 2009. These evaluations were conducted to identify recognized environmental conditions (REC), historical recognized environmental conditions (HREC) and the likelihood of soil and groundwater contamination. These evaluations were conducted in general accordance with the American Society for Testing and Materials (ASTM) Standard for Environmental Site Assessments: *Phase I Environmental Site Assessment Process (ASTM E-1527-05)*.

15.2 Environmental Consequences

The following sections describe the potential impacts to each of the alternatives under study in this Draft Environmental Impact Statement (EIS).

15.2.1 No-Build Alternative

Since no property acquisition would occur under the No-Build Alternative, no impacts from hazardous and contaminated materials would occur with this alternative.

15.2.2 Light Rail Alternative

The limited Phase I ESAs referenced in Section 15.1 identified locations where there is potential for hazardous or contaminated materials to affect costs and construction schedule for the proposed Light Rail Alternative. The hazardous and contaminated materials sites mentioned would increase capital costs because of federal and state remediation requirements. The capital costs reported in Chapter 2.0:

Alternatives Considered include preliminary estimates for the remediation of contaminated or hazardous materials based on the conclusions of the limited Phase I ESAs. With mitigation, the proposed Light Rail Alternative could result in an environmental condition that remediates adverse environmental conditions to levels below state and federal standards. Improved conditions would result in a positive impact from the proposed Light Rail Alternative. Improvement over existing conditions would not be achieved by the No-Build Alternative.

15.2.2.1 Corridor Level Impacts

The *Limited Phase I ESA, Proposed Light Rail Alternative Alignment Corridor Study* (September 2009) examined potential impacts along the length of the proposed project right-of-way. Table 15-2 provides a summary of the most significant areas of concern that would occur on properties to be acquired for the proposed Light Rail Alternative. Adjacent properties that may also be of concern are described in the corridor study.

An incident rating system was included to help assess the potential for impacts based on the degree of hazard for the contamination potentially encountered. Properties were rated, on a scale of 1 to 4, based on the degree of hazard as follows:

1. Remediated groundwater contamination (lowest degree of hazard).
2. Remediated soil contamination.
3. Non-remediated groundwater contamination.
4. Non-remediated soil contamination (highest degree of hazard).

Sites having USTs with no documented contamination incidents (that were not on or adjacent to the proposed corridor right-of-way) were excluded from the tables.

15.2.2.2 Station Impacts

Proposed park-and-ride locations were each evaluated in separate limited Phase I ESAs as listed in Appendix G. Each of these sites was visually evaluated during field reconnaissance visits conducted in support of the Phase I ESA development. Table 15-3 identifies the items of concern for properties to be acquired for the park-and-ride facilities. Sites of concern were only noted to potentially occur on two station park-and-ride sites: Sugar Creek Station Park-and-Ride Option 1 and the Tom Hunter Station. Other sites beyond the limits of the park-and-ride location have potential to affect the subject properties and are detailed in the each park-and-ride facility Phase I ESAs.

15.2.3 Light Rail Alternative – Sugar Creek Design Option

The items of concern listed in Table 15-2 would remain a concern with the Light Rail Alternative – Sugar Creek Design Option as these properties are located on the alignment where the base alignment and the design option would be the same. There would be one difference in station level impacts presented in Table 15-3 as the Sugar Creek Station Park-and-Ride Option 1 properties would not be acquired. One property, Former Marel Cleaners at 5542 North Tryon Street, would be located on the Old Concord Road Station for this design option whereas the proposed Light Rail Alternative alignment itself would be on this property. Therefore, there is one less property of concern between the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option.

**Table 15-2
Items of Concern/Hazardous Material Sites, Light Rail Alternative**

Name and Address	Description	Degree of Hazard
Railroad grade arsenic from herbicides along railroad right-of-way, from station 683 to 920.	Contamination from past use of arsenic-based herbicide was discovered along south corridor and is suspected along northeast corridor.	4
North College Street Property 900 North College Street	Brownfields property with land use restrictions imposed because of soil and groundwater contamination.	4
Norfolk Southern Intermodal Terminal 16th Street and Parkwood Avenue	Soil contamination from RECs and HRECs.	4
Former Harper Crawford Bag Company 401 Parkwood Avenue	HREC: On-site hazardous materials in drums, documentation incomplete. No information on IMD incident readily available.	2
Former Harrison J. King 1609 North Brevard Street	Soil Contamination.	2
1803 North Brevard Street	One gallon diesel surface spill.	2
Former Carolina Consolidators 400 E. 33rd Street	Soil and groundwater contamination.	4
Detrex Chemical 3114 Cullman Avenue	185-gallon surface spill, 1 gallon lost to storm sewer, 175 gallons recovered.	2
Former INX International Ink Company 3200 Cullman Avenue	Lead and chromium soil contamination.	4
Former Newco Fibre 430 East 36th Street	Soil and groundwater contamination.	4
Herrin Brothers Coal & Ice 315 East 36th Street	No documented incidents. Three USTs in use and four removed. Potential HREC.	3
Former Marel Cleaners 5542 North Tryon Street	HREC: Historic dry cleaner.	3

*NDI — No documented incident but site is a potential concern.
Source: Corridor Phase I ESAs (referenced in Appendix G).

**Table 15-3
Park-and-Ride Station Items of Concern/Hazardous Material Sites, Light Rail Alternative**

Name and Address	Description	Degree of Hazard
Sugar Creek Station, Option 1		
Former Kaiser Fluid Technologies 530 Sugar Creek Road	Soil and groundwater contamination from LUST.	4
Tryon Mall Cleaning Center 451 East Sugar Creek Road	Active dry cleaner.	NDI
Former Henkel Corporation 600 East Sugar Creek Road	On-site PCB use, minor fuel spill, butyl stearate spill.	2
Cottman Transmission Center 501 East Sugar Creek Road	UST, HREC: Service Station	NDI
Tom Hunter Station		
Rama Cleaners 118 Tom Hunter Road	HREC: Historic dry cleaner.	NDI
Former BP/Conoco Phillips 6501 North Tryon Street	Soil and groundwater contamination from LUST.	4
Former 7-Eleven Store 118 Tom Hunter Road	UST, HREC: Former gasoline station	NDI

Source: Individual Phase I ESAs performed for park-and-ride facilities (referenced in Appendix G).

15.3 Mitigation

The presence of soil and/or groundwater contamination, or the existence of hazardous materials within existing or proposed rights-of-way, can adversely affect the cost and schedule to complete a transportation project. Early identification of potential contamination sites provides valuable information for the alternatives evaluation, design, right-of-way acquisition and construction plans.

15.3.1 Light Rail Alternative

Mitigation of arsenic contaminated soil generated from construction activities for the proposed Light Rail Alternative will be beneficially re-used or disposed as special waste consistent with arsenic contaminated soil handling on the Vintage Trolley and South Corridor Light Rail projects. Assessment of the vertical and horizontal extent of arsenic impacts will be necessary to prepare the appropriate design requirements.

Phase II ESAs will be performed for all full or partial property acquisitions determined to be at risk of hazardous material contamination. Results of these assessments will be used to determine appropriate property valuations and provide detail for design requirements, including but not limited to protection of human health and the environment, waste management practices and work and monitoring practices required for the smooth execution of construction activities. For sites of low concern, CATS will use a special provision in the construction contract specifications for the excavation and disposal of non-hazardous contaminated sites,

15.3.2 Light Rail Alternative – Sugar Creek Design Option

Mitigation commitments for the Light Rail Alternative – Sugar Creek Design Option would be the same as stated in Section 15.3.1 for the proposed Light Rail Alternative.

16.0 SAFETY AND SECURITY

This chapter describes the efforts of the Charlotte Area Transit System (CATS) to provide safe and secure operations of its transit services, vehicles, transit centers, light rail stations, park-and-ride lots and administrative and operating facilities associated with the alternatives under study in this Draft Environmental Impact Statement (EIS). This chapter also includes an evaluation of the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) facilities for safety or security. Mitigation is identified as necessary.

16.1 Affected Environment

The Charlotte-Mecklenburg Police Department provides law enforcement within the City of Charlotte and some areas of Mecklenburg County. The Mecklenburg County Sheriff's Office provides additional law enforcement in Mecklenburg County. The University of North Carolina at Charlotte (UNC Charlotte) has its own police department with officers certified by the State of North Carolina. The campus is patrolled 24 hours a day, seven days a week. Officers patrol the campus in cars, on bicycles and on foot. There are over 200 emergency blue phones located on campus.

CATS provides law enforcement on transit vehicles, at transit stations and at park-and-ride lots through the Transit Police Unit. CATS Transit Police Unit personnel are certified through the Charlotte-Mecklenburg Police Academy. As needed, CATS supplements their Transit Police Unit by using private law enforcement companies such as Allied Barton Security Services. This unit provides roving patrols at CATS facilities and on CATS vehicles. Surveillance of the transit stations is conducted through monitoring of Closed Circuit Televisions (CCTV) placed on each station platform and in park-and-ride facilities. Fare Inspectors provide roving fare inspection services on all CATS light rail vehicles and at CATS light rail stations. Blue Light emergency phones are located on station platforms and throughout the park-and-ride facilities. Passenger assistance phones for non-emergency use are located on each of the ticket vending machines that are also located on the station platforms.

Crime Prevention Through Environmental Design (CPTED) concepts deter criminal activity for transit stations and facilities and are used in the design of all CATS facilities. The basic principal of CPTED is to increase natural surveillance by providing good sight-lines and avoiding conditions such as tall landscaping and other features that can provide individuals with areas to hide or ways to obstruct mechanical methods of surveillance such as CCTV cameras.

16.2 Environmental Consequences

16.2.1 No-Build Alternative

The No-Build Alternative would have no impact on safety and security within the project corridor.

16.2.2 Light Rail Alternative

The proposed station platforms and the park-and-ride lots would be designed using CPTED principles in accordance with CATS' 2009 *LYNX Blue Line Extension, Northeast Corridor Light Rail Project's Design Criteria*.

16.2.2.1 Design Elements to Provide Safe and Secure Operations

Station Platforms and Park-and-Ride Facilities:

The station platforms are being designed using CPTED design principles to increase natural surveillance opportunities. CCTV cameras would be placed on every platform and in park-and-ride facility and monitored by Transit Police and CATS' Operations personnel. Blue light emergency phones would be available at regular intervals at park-and-ride locations. The ticket vending machines would contain Passenger Assistance Telephones that would link to the central control center. Transit Police would provide roving patrols along the corridor, at stations, and at the proposed park-and-ride facilities. Dedicated Fare Inspectors would monitor proof of payment. Intercoms on transit vehicles would be used to make emergency announcements. Each station platform would be equipped with a public notification

system to inform transit users of emergency procedures. Safety elements that would be put in place for multi-use paths and access to the station and park-and-ride lots would include transition walkways; blue light emergency phones; limited entry and exit points; and provisions for handicapped persons. The design of the parking garages for Sugar Creek Station Park-and-Ride Option 2 and the I-485/N. Tryon Station also includes office space for on-site security.

Rail Safety:

Between 30th Street and Old Concord Road the light rail would operate in the NCRR right-of-way. The design would include a separation of at least 54 feet between the existing freight tracks and the proposed light rail tracks. Fencing would be placed between the existing freight and proposed light rail tracks that would contain an intrusion detection device to alert the CATS Rail Operations Control Center in the event of a derailment of either a CATS Light Rail Vehicle (LRV) or a freight train that would cause a break in the fence. Gates with an active warning system would be used at all grade crossings. As required by the Federal Railroad Administration (FRA), horns would be used to alert motorists, pedestrians and bicyclists that a train is approaching the crossing.

Vehicular, Bicycle, and Pedestrian Safety:

Vehicle, bicycle and pedestrian safety provisions would be made to minimize conflicts between automobiles, bicyclists and pedestrians. Crossings would be clearly marked with signage and would be limited to dedicated locations. Rail crossing gates would be used to stop vehicles at the railroad tracks. The gates would include an active warning system that would alert the control center of any interference with the gates. Bicycle and pedestrian crossings would be provided at all street and rail crossings. Fencing would be placed along the edge of all retaining walls in areas where evacuation paths are adjacent to the tracks.

From approximately Old Concord Road to just north of JW Clay Boulevard, the light rail would operate in the median of North Tryon Street/US-29 with platforms located in the center of the roadway. The right-of-way of North Tryon Street/US-29 is owned by North Carolina Department of Transportation (NCDOT) and an eight-foot clear zone would be provided between the light rail trackway and adjacent traffic. Left turns and U-turns would be limited to locations at signalized intersections in order to reduce conflicts with light rail vehicles. Walkways and crosswalk signal boxes would be provided to facilitate pedestrian and bicycle movements at all intersections and to provide crossings between the park-and-ride facilities and the station platforms.

16.2.2.2 Operational Provisions for Safety and Security

The CATS Office of Safety and Security oversees the security operations of the CATS transit facilities and vehicles and manages the safety review of all plans for CATS capital improvements such as light rail. Team members are certified in CPTED procedures and conduct design reviews for all CATS capital facilities. The General Manager for the Office of Safety and Security serves as the Chairperson of CATS' Safety and Security Review Committee. As such, the General Manager oversees the safety certification process with the Federal Transit Administration (FTA) and ensures that the design criteria address the requirements of the PMP and SSMP. Responsibilities also include the application of the design criteria during the design and construction phases of the proposed project.

The Office of Safety and Security is actively engaged in efforts to improve and reduce security threats to transit patrons and employees. The Office operates under a set of Standard Operating Procedures that are updated on an annual basis. All CATS employees are certified under a Transit Worker Identification Certification program and are identified with badges that provide access to the CATS facilities in which they work.

Office of Safety and Security staff are members of a number of committees that coordinate law enforcement and safety activities in the Charlotte-Mecklenburg region and within North Carolina, including: the Fire Life Safety Committee, FTA's roundtable related to transit and terrorism, and the North Carolina Joint Terrorism Task Force. The Office of Safety and Security conducts a vigorous safety training program for all CATS staff, including light rail operators, Transit Police, designers and City management staff.

The design elements of the proposed Light Rail Alternative and the procedures of the CATS Office of Safety and Security indicate that CATS is taking proactive measures to provide safe and secure transit operations. The proposed Light Rail Alternative would provide a center of activity at the transit stations that would provide the opportunity for increased pedestrian traffic and more natural surveillance of the transit facilities and the surrounding community, resulting in a positive impact on safety and security within the communities that the stations are located in.

The proposed Light Rail Alternative would result in a change in the configuration of North Tryon Street/US-29; however, the redesign of North Tryon Street/US-29 with added light rail facilities would result in restricted turning movements and the redesign of crosswalks at each station location. These modifications would improve conditions for vehicles over the No-Build Alternative at signalized intersections where protected only phasing would be provided. The proposed Light Rail Alternative would require pedestrians to be alert to both automobile traffic and light rail traffic while crossing over North Tryon Street/US-29 and would therefore make the pedestrian crossing of the street more complex. While pedestrians would have to be aware of both light rail and motor vehicles when crossing the street, pedestrian signals and railroad gates and signals would be provided to help inform pedestrians when they should cross the street and/or railroad tracks. A pedestrian refuge area would also be provided between the light rail tracks and adjacent traffic lanes at all signalized intersections. Stations that have center platforms would add an additional stopping point where pedestrians can stand. The proposed Light Rail Alternative has the potential to result in a short-term increase in vehicular conflicts while drivers, bicyclists and pedestrians are getting accustomed to the alteration of North Tryon Street/US-29 and the need to look for both automobiles and light rail vehicles. No long-term negative impact on safety and security would be anticipated.

16.2.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would include similar design elements and the same operational provisions for safety and security as the Light Rail Alternative.

16.3 Mitigation

16.3.1 Light Rail Alternative

The design elements listed in Section 16.2.2.1 will be included in the project design to provide for safe and secure operations of the proposed Light Rail Alternative. Through their participation in the engineering plan design review process, the Charlotte Department of Transportation will ensure that the design elements specifically related to walkways and crosswalk signal boxes for pedestrians traveling to and from the light rail station in the immediate vicinity of the station platforms and park-and-ride lots are included in the project design.

Under this alternative, CATS will also continue its public outreach regarding driver safety within the Northeast Corridor to minimize potential for vehicular and pedestrian/vehicular conflicts that could occur as a result of the light rail line running in the existing median of North Tryon Street/US-29.

16.3.2 Light Rail Alternative – Sugar Creek Design Option

In addition to the design elements listed in Section 16.2.2.1 and mitigation described in 16.3.1, CATS will provide increased Transit Police patrols between Sugar Creek Road and Old Concord Road if this design option is selected for implementation.

17.0 ACQUISITIONS AND DISPLACEMENTS

This chapter describes the potential property acquisitions and resulting displacements for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE). "Full acquisitions" entail the purchase of an entire parcel, whereas "partial acquisitions" entail the purchase of a portion of a parcel. "Displacements" would occur when a full acquisition is necessary, or when a partial acquisition would result in an impact that would affect the continued economic viability or use of a property.

17.1 Acquisitions and Displacements

17.1.1 No-Build Alternative

No acquisitions of property or resulting displacements would occur as a result of the No-Build Alternative.

17.1.2 Light Rail Alternative

The majority of the proposed Light Rail Alternative would be constructed within existing transportation corridors (rail and roadway). However, portions of the proposed project would be constructed in areas where there is insufficient right-of-way (ROW) width (rail and roadway) and in areas outside of existing rail and roadway corridors, such as where the proposed project would transition from existing rail corridors to existing roadway corridors. Park-and-ride facilities are proposed at several of the station locations and would also require property acquisition for their development. Additional areas that would potentially require acquisition of property for modification of existing streets and railway ROWs include areas of potential widening, relocation and intersection improvements. New access roads, bridge structures and ancillary facilities related to the development and implementation of the Light Rail Alternative, including power substations, signal houses and crossing equipment (gates and signals), would also require the acquisition of property. Estimates on the proposed acquisitions and displacements resulting from implementation of the proposed Light Rail Alternative are based on preliminary engineering at a 30 percent level of design and analysis by the City of Charlotte Real Estate Division. These estimates on the acquisitions and displacements necessary for the proposed project are subject to refinement as the level of design proceeds for the proposed Light Rail Alternative.

Implementation of the proposed Light Rail Alternative would require the full and partial acquisition of parcels along the proposed corridor and would potentially result in the displacement of residential, commercial, industrial and office uses. The Light Rail Alternative may also include the acquisition and/or trade of railroad ROW. Specific areas that are likely subject to acquisitions and displacements include the following.

- Norfolk Southern plans to relocate their intermodal yard, located just east of North Brevard Street, to an area near Charlotte-Douglas International Airport. As a result, CATS intends to acquire the existing intermodal yard property for a Vehicle Light Maintenance Facility (VLMF). The VLMF is planned to provide maintenance, repair, interior cleaning and inspection of light rail vehicles. The facility would be located within the existing site and would consist of approximately 20 acres. The existing intermodal facility on this site is voluntarily moving to the new location near the airport. This relocation is not a direct result of the LYNX BLE and the acquisition of the parcels would not result in any displacements. The entire site is not needed for the proposed light rail facilities and the remaining portions could be used for redevelopment opportunities through the City of Charlotte. In addition, four other parcels in this area would also be acquired for the proposed alignment and VLMF. Three of the parcels are developed with industrial uses and one is vacant.
- Full and partial acquisitions of industrial and commercial properties would be necessary in the area where the proposed alignment would transition from the existing rail corridor to North Tryon Street/US-29 approximately 2,600 feet north of Eastway Drive.
- Full and partial acquisitions would result between Old Concord Road and where North Tryon Street/US-29 and University City Blvd./NC-49 meet (also known as "the weave"). Existing ROW along this segment of North Tryon Street/US-29 is not wide enough to accommodate the proposed Light Rail Alternative. It is anticipated that additional ROW would be required in this area, including up to 10 feet along the east side of North Tryon Street/US-29 and approximately 30 feet on the west side

of North Tryon Street/US-29. The City of Charlotte is proceeding with safety improvements that convert the existing “weave” configuration to at-grade signalized intersections at the US-29/I-85 connector and at the convergence of US-29/NC-49. The design of this project included sufficient right-of-way for the proposed Light Rail Alternative; therefore, no additional acquisition would be anticipated in this area. Existing ROW would also be inadequate from “the weave” project to the University of North Carolina at Charlotte (UNC Charlotte) campus. It is anticipated that additional ROW would be required to accommodate the proposed Light Rail Alternative along this section of North Tryon Street/US-29. The acquisitions through this section would occur in a symmetrical pattern with approximately 30 feet of land to be acquired from each side of the street. These sections of North Tryon Street/US-29 encompass primarily commercial properties, which would be subject to partial and full acquisition.

- Where the Light Rail Alternative transitions from UNC Charlotte towards East Mallard Creek Church Road, full acquisition of a multi-family building and partial acquisition of an adjacent multi-family building would be required from the Mallard Creek Apartments.
- Where the Light Rail Alternative crosses East Mallard Creek Church Road to transition back to North Tryon Street/US-29 just south of Kirk Farm Fields park, vacant parcels in this area would be subject to partial acquisition.
- The proposed Light Rail Alternative would also require the acquisition of parcels for the development of park-and-ride facilities at seven of the proposed station locations, including Sugar Creek Station (Park-and-Ride Options 1 and 2), Old Concord Road Station, Tom Hunter Station, University City Blvd. Station, McCullough Station, Mallard Creek Church Station and I-485/N. Tryon Station. Acquisition of parcels for development of these facilities constitutes the majority of the full acquisitions that would be required for the proposed Light Rail Alternative.
- Acquisitions would also be required for potential roadway improvements that are related to the development of the proposed Light Rail Alternative. These roadway improvements include a relocated access road to a Duke Energy Substation off North Brevard Street.



Multi-family building near East Mallard Creek Church Road that would be subject to partial acquisition, resulting in residential displacement.

Full Property Acquisitions

Full property acquisitions for the proposed Light Rail Alternative are listed in Appendix C and include entire parcels that would be needed for development of the proposed Light Rail Alternative, or portions of parcels in which impacting that portion would impede its functional capabilities and future use. Such impacts could include, but are not limited to, removing or limiting access to a property or the removal of parking spaces such that its continued use is no longer viable.

Based on preliminary engineering, the majority of these acquisitions would occur where the proposed alignment would transition from the existing rail corridor to North Tryon Street/US-29 near Old Concord Road and in the locations of proposed park-and-ride facilities. The properties that would be affected consist of industrial, commercial and vacant uses. Approximately 25 parcels totaling 3,327,217 square feet (76.4 acres) would be required with the Sugar Creek Station Park-and-Ride Option 1. Approximately 25 parcels totaling 3,095,601 square feet (71.0 acres) would be required with the Sugar Creek Station Park-and-Ride Option 2. Of the 25 parcels that may be fully acquired, owners and/or tenants would be displaced at 19 businesses with the Sugar Creek Station Park-and-Ride Option 1 and displacements at 16 businesses would occur with the Sugar Creek Station Park-and-Ride Option 2. These acquisitions and displacements would result in a potentially significant impact. Additional detail regarding acquisitions and displacements within communities of concern is located in Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, within Section 6.2.2.3.

Partial Property Acquisitions

Partial property acquisitions for the proposed Light Rail Alternative are listed in Appendix C and include parcels where portions or strips of property would be needed for development of the Light Rail Alternative, as well as temporary construction easements (TCEs) and permanent easements.

Based on estimates from preliminary engineering, the proposed Light Rail Alternative would require partial acquisition of approximately 195 parcels totaling 2,721,880 square feet in area (62.5 acres), 1,231,500 square feet (28.3 acres) in TCEs and 95,400 square feet (2.2 acres) in permanent easements with the Sugar Creek Station Park-and-Ride Option 1. The proposed Light Rail Alternative would require partial acquisition of approximately 204 parcels totaling 2,651,580 square feet in area to be acquired (60.8 acres), 1,242,900 square feet (28.5 acres) in TCEs and 95,400 square feet (2.2 acres) in permanent easements with the Sugar Creek Station Park-and-Ride Option 2. The partial acquisitions that would be required would generally consist of less than 10 percent of the total parcel area in many cases.



Commercial corridor on North Tryon Street/US-29 that would be subject to partial acquisitions for roadway widening.

Of the parcels that may be affected by partial acquisitions (195 parcels for the Sugar Creek Station Park-and-Ride Option 1 or the 204 parcels for Sugar Creek Station Park-and-Ride Option 2), four of the partial acquisitions would result in displacement; including three commercial/industrial uses and one commercial residential (multi-family) use. Impacts to these four properties would be considered potentially significant as the change to these properties would significantly alter their respective uses. Additional detail regarding acquisitions and displacements within communities of concern is located in Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, within Section 6.2.2.3. TCEs would be required where the proposed Light Rail Alternative ROW is constrained and additional areas would be needed for access to the ROW during construction. These temporary easements, where needed, would extend approximately ten feet beyond the ROW limits of the proposed Light Rail Alternative. Permanent easements would be needed primarily for drainage purposes and are relatively minor (a total of 2.2 acres for the entire project).

The majority of the partial property acquisitions would result from ROW needs, particularly along the North Tryon Street/US-29 corridor. These partial property acquisitions could result in the removal of parking spaces; fixtures, such as business signage, lights, mailboxes and fences; landscaping elements, including vegetation and hardscapes; and/or other miscellaneous personal property.

CATS has received approval from FTA for a protective purchase of a portion of Parcels 08303101 and 08303142, between 30th Street and the proposed “The Yards at NoDa” development.

Use of existing railroad ROWs would also be necessary for implementation of the proposed Light Rail Alternative. Existing railroad ROWs are currently owned by various railroad entities, including Norfolk Southern (NS), North Carolina Railroad (NCR), the Aberdeen, Carolina and Western Railway Company (AC&W) and the CSX Corporation. It is anticipated that use of existing ROWs would be accomplished through a variety of means including ROW usage agreements and leases, easements, ROW acquisition and possibly municipal agreements. Specifically, acquisition of existing railroad ROWs would be required from NS and NCR from approximately East 16th Street to Little Sugar Creek. From Little Sugar Creek to East 30th Street, NS ROW would be acquired from a portion of the NS intermodal yard. From NoDa to the point where the proposed Light Rail Alternative would leave the existing rail corridor (near Old Concord Road), a ROW usage agreement and/or lease would be required from NCR.

Easements

To meet project objectives, CATS would likely need to acquire easements for construction of the proposed Light Rail Alternative. Based on *30% Preliminary Engineering Design Plans*, approximately 95,400 square feet (2.2 acres) would be needed for permanent easements (primarily for drainage purposes). Anticipated temporary construction easements (TCEs) have also been determined based on estimates from *30% Preliminary Engineering Design Plans*. Permanent easements and TCEs are summarized in Appendix C. Easements would provide a right to use land to construct, operate and/or maintain the proposed Light Rail Alternative. The landowner would retain the title to the land and would be able to continue to use the property in ways that are compatible with the Light Rail Alternative. Permanent easements would be sought in lieu of purchase where feasible for the proposed Light Rail

Alternative. For example, the proposed Light Rail Alternative would pass through the UNC Charlotte campus, and it is anticipated that CATS would negotiate an easement agreement with UNC Charlotte for the Light Rail Alternative corridor. Additionally, where the Light Rail Alternative crosses into existing NCDOT ROW along the North Tryon Street/US-29 corridor, ROW easements or municipal agreements would be negotiated where practical. TCEs would also be required.

Business Damages Due to Obstructed Views

As indicated in Chapter 7.0: Visual and Aesthetics, some businesses along North Tryon Street/US 29 may experience impacts related to visual conditions. Businesses along North Tryon Street/US-29 between Old Concord Road and JW Clay Boulevard may experience obstruction of views of their sites from the roadway due to bridge construction. These bridges would obstruct the views across North Tryon Street/US-29 and block views to neighboring businesses. Business signage may also be relocated due to strip property acquisitions proposed on each side of the roadway. Businesses would be monetarily compensated for signage replacement/relocations if a portion of their property is acquired to accommodate the light rail project, or may be paid damages if their views are permanently obstructed by a light rail bridge/retaining wall. These sites will be identified during final design.

17.1.3 Light Rail Alternative – Sugar Creek Design Option

The Light-Rail Alternative – Sugar Creek Design Option alignment would require widening of North Tryon Street/US 29 from Dorton Street to Old Concord Road of up to 50 feet on the west side of North Tryon Street/US 29. Acquisitions that would be required for the proposed Light Rail Alternative – Sugar Creek Design Option would be that same as the acquisitions for the proposed Light Rail Alternative, where the same right-of-way is proposed to be used. Due to the variation of the alignment and station locations for the proposed Light Rail Alternative – Sugar Creek Design Option, the potential acquisitions and displacements would differ in some locations.



Industrial area located on Raleigh Street within the Light Rail Alternative – Sugar Creek Design Option alignment that would be subject to partial and full acquisitions, resulting in business displacements.

Full Property Acquisitions

Full property acquisitions for the proposed Light Rail Alternative – Sugar Creek Design Option are summarized in Appendix C.

The proposed Light Rail Alternative – Sugar Creek Design Option would require the full acquisition of approximately 31 parcels totaling 3,821,741 square feet (87.7 acres). The proposed alignment would require acquisition of industrial and commercial properties where the alignment would transition from the existing rail corridor to North Tryon Street/US-29, approximately 200 feet north and east of Sugar Creek Road. The proposed Light Rail Alternative – Sugar Creek Design Option would also require the acquisition of parcels for the development of park-and-ride facilities at two stations proposed for the Sugar Creek Design Option that differ from those of the previously described proposed Light Rail Alternative, namely the Sugar Creek Station and Old Concord Road Station. These acquisitions would result in 25 displacements, with most displacements occurring at industrial and commercial businesses. These displacements would constitute a potentially significant impact. Additional detail regarding acquisitions and displacements within communities of concern is located in Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, within Section 6.2.3.3.

Partial Property Acquisitions

Potential partial property acquisitions for the proposed Light Rail Alternative – Sugar Creek Design Option are listed in Appendix C and include properties where portions or strips of property would be needed for construction of the Light Rail Alternative, as well as temporary construction easements (TCEs).

The proposed Light Rail Alternative – Sugar Creek Design Option would require partial acquisition of approximately 214 parcels totaling approximately 2,860,050 square feet in area to be acquired (65.7 acres). A total of 33 displacements would occur for the proposed Light Rail Alternative – Sugar Creek Design Option along the entire alignment. One displacement would occur at a commercial residential (multi-family) use and the remainder would occur at commercial and industrial businesses. Additional

detail regarding acquisitions and displacements within communities of concern is located in Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, within Section 6.2.3.3. The segment of the Light Rail Alternative – Sugar Creek Design Option between Sugar Creek road and Old Concord Road would require partial acquisition of 49 parcels totaling 315,600 square feet (7.2 acres) and 4 displacements would occur at commercial, industrial and office uses. The existing ROW along North Tryon Street/US-29, where the proposed alignment would transition into the median of North Tryon Street/US-29 just north of Dorton Street and continue north to Old Concord Road, is not wide enough to accommodate the proposed Light Rail Alternative. It is anticipated that an additional 30 to 50 feet of ROW would be needed along the north side of North Tryon Street/US-29. This section of North Tryon Street/US-29 is comprised primarily of commercial properties and is where the majority of partial acquisitions would occur. The partial acquisitions that would be required generally encompass less than 10 percent of the total parcel area (see Appendix C). Displacements for owners and renters of these properties would be considered potentially significant as the change to these properties would significantly alter their respective uses. Residential displacements would not occur as part of the proposed segment of the Light Rail Alternative – Sugar Creek Design Option.

Summary of Property Acquisitions

The total estimate of property acquisitions that would be necessary for the proposed Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option are summarized in Table 17-1.

**Table 17-1
Comparison of Property Acquisitions**

Alignment	Total Proposed Acquisition (Square Feet)	Proposed TCE (Square Feet)	Proposed Permanent Easement (Square Feet)	Partial Acquisitions (Number of Parcels)	Full Acquisitions (Number of Parcels)	Displacements
*Light Rail Alternative	6,049,097	1,231,500	95,400	195	25	23 Total 22 Business 1 Residential
**Light Rail Alternative	5,747,181	1,242,900	95,400	204	25	20 Total 19 Business 1 Residential
Light Rail Alternative - Sugar Creek Design Option	6,681,791	1,339,000	n/a	214	31	33 Total 32 Business 1 Residential

* Parcels expected to be acquired for the Light Rail Alternative – Sugar Creek Station Park-and-Ride Option 1

** Parcels expected to be acquired for the Light Rail Alternative – Sugar Creek Station Park-and-Ride Option 2

Source: City of Charlotte Engineering and Property Management Department, April 2009 and June 2010

17.2 Mitigation

17.2.1 Light Rail Alternative

The Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (Uniform Act) provided for uniform and equitable treatment of persons displaced from their homes, businesses or farms by federal and federally assisted programs and established uniform and equitable land acquisition policies. The Uniform Act ensures that property owners receive fair market value for their property and that displaced persons receive fair and equitable treatment and do not suffer disproportionate injuries because of programs designed for overall public benefit. The North Carolina Relocation Assistance Act (North Carolina General Statutes Chapter 40A and 136) and Municipal Code of the City of Charlotte (Article V, Section 7.81) are similar state and local regulations that also ensure property owner protection.

All acquisitions and displacements will be completed in accordance with these federal, state and local regulations. These regulations ensure that no person be required to move from their home unless affordable, decent, safe and sanitary replacement housing is available, and which is not generally less desirable with regards to public utilities and public and commercial facilities than the home from which they are displaced. The Uniform Act ensures consistent and fair treatment for owners of real property.

The Uniform Act provides for certain relocation payments in addition to the amount a person receives as just and adequate compensation for their property proposed for acquisition. The Uniform Act also establishes a uniform policy for the fair and equal treatment of persons who are required to move from their homes, apartments or businesses as a result of governmental action.

The City of Charlotte will implement a ROW Acquisition and Relocation Program to comply with the Uniform Act. CATS will be responsible for implementation of the program through the *Real Estate Acquisition and Relocation Plan*, which identifies the policies and procedures necessary for compliance with requirements relating to ROW appraisal, acquisition, relocation and property management. The policies and procedures also incorporate requirements for compliance with state requirements.

Once parcels needed for implementation of the proposed Light Rail Alternative are identified, the City of Charlotte will make reasonable efforts to negotiate and acquire real property at the appraised value. Buildings, structures and other improvements, including fixtures and removable building equipment that are considered to be part of the property, will be considered in negotiations. If the acquisition of only part of a property will affect the economic viability and continued use of that property such that it would leave the owner with an uneconomic remnant, the City of Charlotte will offer to acquire the remaining portion of the property, or remnant, if the owner desires. Where TCEs are required, property owners will be compensated for any loss of access during the construction period and the properties will be restored, at a minimum, to their previous condition.

Businesses

Relocation payments for a displaced business will either entail a fixed payment in lieu of other actual moving and related expenses that will be an amount equal to the average annual net income of the business, or a payment for actual, reasonable and necessary moving expenses including, but not limited to:

- Transporting personal property from the displacement site to a replacement site;
- Packing, crating and, if necessary, storing personal property;
- Insuring against loss or damage of personal property while in transit or storage;
- Removing and reinstalling machinery and equipment, including reconnecting utilities;
- Reprinting stationery, business cards, checks, etc.;
- Reimbursement for expenses incurred in searching for a replacement site;
- Payment for actual direct losses of personal property sustained by a business relocation;
- Re-establishment reimbursement for expenses as prescribed by the Uniform Act; and,
- Searching Fees.

A business opting to move based on reimbursement of actual, reasonable and necessary expenses may have a commercial mover and contractors perform the move, or move themselves for the same cost. In the case of a partial acquisition where the business itself is not to be relocated, owners of eligible on-premise signs are entitled to reimbursement for the actual, reasonable and necessary cost of moving the sign to the remaining portion of the property. These costs may include a direct loss payment if the sign cannot be relocated; or a re-establishment payment to defray the costs of replacing the sign that cannot be re-erected in another location because it is, or will be, in conflict with federal, state or local regulations. In the case of a partial acquisition, where it is necessary to remove miscellaneous personal property from the proposed ROW, owners of the personal property are entitled to reimbursement for the actual, reasonable and necessary costs of moving the personal property.

Residential

For residential relocations, a relocation plan will be established that will inventory the characteristics and needs of persons to be displaced. It is anticipated that the following information will be obtained and utilized.

- Number of people and families to be displaced;
- Size of families, age and gender of children;
- Number of elderly and handicapped;
- Area of preferred location;

- Type of unit preferred;
- Need for schools, social and public services;
- An estimated inventory of currently available comparable replacement dwellings;
- A discussion of relocation issues and possible solutions;
- A discussion of the impact on the human environment in where the proposed project would be located including racial, ethnic, age and income considerations;
- An estimate of the business operations to be displaced and the affect of their displacement on the economy of the area;
- An analysis of Federal, State and community programs currently in operation in the project area that would affect the availability of housing; and,
- Detailed information on concurrent displacement and relocation by other governmental agencies or private concerns.

Relocation Assistance Benefits will be available to eligible residential occupants, businesses and owners of personal property that will be affected by acquisition of all or part of real property. Each displaced person will be provided written and verbal information that fully explains the relocation services and eligibility requirements for payments of replacement housing and moving expenses.

The City of Charlotte will maintain the following information in its real estate office to assist in the relocation of people and personal property:

- Lists of replacement dwellings available, without regard to race, color, religion or national origin, drawn from various sources, suitable in price, size and condition for individuals and families;
- Current and continuing lists of suitable commercial properties and locations for displaced businesses;
- Current information as to security deposits, rents, closing costs, typical down payments, interest rates and terms for residential real property in the area;
- Maps showing the location of schools, parks, playgrounds, shopping centers, and public transportation routes in the area;
- Schedules and costs of public transportation;
- Information explaining the relocation program, local ordinances pertaining to housing, building codes, open housing, consumer education literature on housing, shelter costs and family budgeting; and,
- Subscriptions to apartment directory services, and neighborhood and metropolitan newspapers.

In addition, relocation personnel will contact and exchange information with other public and private agencies providing services that may be useful to persons being relocated. Such agencies include: the local Housing Authority; City and County Social Service Agencies; Department of Housing and Urban Development; Veterans Administration; Small Business Administration; other city, county, and state agencies providing services appropriate to the displacee; and private agencies. Contact will also be maintained with the local real estate community, including real estate brokers, real estate boards, property managers, apartment owners and managers, and home building contractors.

Displaced persons may choose to relocate without City of Charlotte aid and advisory services and still be eligible for relocation payments, including replacement housing payment and moving cost reimbursement for residential tenants and homeowners; and a fixed payment in lieu of actual moving and related expenses, or a payment for actual, reasonable and necessary moving expenses, re-establishment and searching fees for businesses.

Only one parcel would be subject to residential displacement as a result of the proposed project. It is anticipated that residents displaced from this parcel will be able to find comparable replacement housing and that this displacement would not negatively affect overall housing opportunities in Mecklenburg County.

17.2.2 Light Rail Alternative – Sugar Creek Design Option

Proposed full and partial property acquisitions that would result from the Light Rail Alternative – Sugar Creek Design Option would be subject to the Uniform Act and the same mitigation measures described in Section 17.2.1.

18.0 CONSTRUCTION IMPACTS

This chapter summarizes anticipated construction impacts and mitigation measures for the proposed Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. A qualitative analysis has been performed to identify construction impacts in order to determine where preventative measures to minimize the adverse impacts of construction activities might be warranted. Since the No-Build Alternative would not include construction activities, it also would not create any construction-related impacts.

Impacts to the natural and built environments would be anticipated during construction of the proposed Light Rail Alternative; however, these impacts would be temporary and intermittent. The use of mitigation techniques and adherence to applicable construction regulations will help reduce the severity of impacts encountered during construction.

18.1 Construction

The construction of a major capital improvement project such as the LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) involves four major steps before revenue service can begin: final design, pre-construction activities, construction and testing. These major steps are described in the following sections.

18.1.1 Final Design

Final design would follow the approval of the 65% Preliminary Engineering Design plans and approval to enter final design. The final design submission would include: sealed Construction Plans; Erosion and Sediment Control Plans; Traffic Control Plans; Traffic Signal Plans; Construction Specifications/Special Provisions; Quantity Summary; and the Cost Estimate.

18.1.2 Pre-Construction Activities

Pre-construction activities, as the name suggests, must occur prior to the beginning of construction activities. These activities typically include: construction contracts development; construction community outreach and education programs; environmental permits and approvals; property acquisition; and vehicle procurement. If either the Light Rail Alternative or Light Rail Alternative – Sugar Creek Design Option is chosen for implementation at the conclusion of the Environmental Impact Statement (EIS) process, pre-construction activities may begin immediately following the execution of a Record of Decision following the Final EIS.

18.1.3 Construction Activities

Construction activities include those items required to construct the light rail track, overhead catenary system, signal and safety systems, ancillary facilities, and all proposed construction required for the light rail to be able to physically operate for revenue service.

As described in the *Bid Packaging Strategy* (November 2009) document, in order to procure the services and goods needed to complete the construction of the light rail, the work is divided into separate “bid packages.” The proposed Light Rail Alternative and the design option would be accomplished through the implementation of at least eleven construction contracts. These packages would be assembled and scheduled to expedite construction, combine similar work, accommodate bonding and foster competitive bidding. The bid packages are planned to be assembled into the following categories:

- One or more advanced utility relocations
- Three civil and roadway packages, broken down by segments
- Freight track relocation plans
- Track construction
- Station finishes
- Park-and-ride facilities
- Parking garages

- Vehicle Light Maintenance Facility (VLMF)
- One or more systems contracts (traction power, overhead catenary system, signals and communication system)
- Fare collection

These packages would be advertised and awarded to the qualified low bidder through the Design-Bid-Build delivery method.

18.1.4 Testing

Following construction, testing of completed light rail components would occur. This involves the required testing of light rail vehicles. Construction would be planned to be sufficiently complete from uptown to the planned storage yard at the VLMF to facilitate testing of the light rail vehicles prior to operation. Project wide systems testing would also occur following construction activities. Systems to be tested include: communication systems; fare collection systems; signal systems; traction power substations; and overhead catenary systems.

18.2 Construction Education and Outreach Plan

Construction of the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would temporarily affect local businesses, residences and traffic operations along the entire alignment. A Community Relations Program is planned to provide general construction scheduling information, coordination of construction work with adjacent business activities and assistance with the resolution of issues that may develop between local residents, motorists, the contractor and the sponsoring agency. The details of the program will be included in a Construction Education and Outreach Plan, to be executed prior to and during construction activities. The program would be implemented by the Charlotte Area Transit System (CATS) and the City of Charlotte.

18.3 Construction Regulations

The North Carolina Division of Water Quality (NCDWQ) regulates groundwater by preventing pollution, managing and restoring degraded groundwater and protecting groundwater resources. To improve water quality, Mecklenburg County enacted a Surface Water Improvement and Management (SWIM) program. Under this program, the County enacted a stream buffer ordinance to protect surface waters. Jurisdictional Waters of the United States are defined by 33 CFR 328.3(b) and are protected by Section 404 of the Clean Water Act (33 U.S.C. 1344), which is administered and enforced in North Carolina by the U.S. Army Corps of Engineers (USCOE), Wilmington District. Construction activities would also require adherence to the federal, state and local agency guidelines.

18.4 Construction Schedule

The overall construction and start-up would take approximately five years. This includes over a year for advanced utility relocations, over three years of construction and approximately six months of testing and pre-revenue service activities.

18.5 Construction Methods

The Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would require the construction of basic elements not found in typical roadway projects, such as: stations, park-and-ride facilities, parking garages, VLMF, track bed, trackwork and catenary poles and wires. A number of methods would be used to construct the proposed alignment of the Light Rail Alternative. These methods would vary depending on the geographic conditions and the design. The construction methods include at-grade, retained fill, built-up fill, grade separated and underpass configurations. A description of the proposed alignment for the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option can be found in Chapter 2.0: Alternatives Considered.

18.5.1 At-Grade Configuration



At-grade configuration example.

An at-grade configuration would position the proposed alignment at the same level as the ground surface. The actual construction for the at-grade configurations would take place within the street crossings, as is typically seen in city street construction projects in the surrounding area. The intersections that would include an at-grade configuration under the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option can be found in Chapter 3.0: Transportation. Construction of the at-grade configurations would involve traffic detours and temporary lane closures.

The equipment utilized during construction would be consistent with street construction. Pavement cutting machinery, rubber-tired excavators and all-terrain cranes would be necessary for at-grade construction.

18.5.2 Retained Fill Configuration

Construction of the retained fill portions of the proposed alignment would precede and/or follow construction of grade-separated sections, such as bridges. In a retained fill configuration, the location of the proposed alignment would be elevated above the existing ground on fill material.

Construction of the retained fill configurations would begin with excavation for retaining wall footings, which would typically be performed using excavators or backhoes. Piles may be required depending on soil conditions and design requirements. Piles would be installed using either conventional pile drivers or vibratory pile driving equipment. Mechanically stabilized earth (MSE) walls would subsequently be constructed. An earth embankment would form a part of the structure. Both driven and hand-operated compacting equipment would be necessary for the backfilling operations.



Retained fill configuration example.

18.5.3 Built-Up Fill Configuration

Built-up fill construction would occur where the proposed light rail tracks run on earth embankments that will be constructed on top of the existing ground. The height of the embankments would vary along the proposed alignment. In some instances, the track profile would be raised above the existing ground on built-up fill, then onto retained fill and then onto a grade separated bridge structure.

Construction of the built-up fill would be typical of earthen embankment construction. Construction equipment would include: bulldozers, dump trucks, excavators and graders. Erosion control measures, including silt fences, detention basins and seeding and drainage measures, including ditches, catch basins and underground pipes would generally involve smaller construction equipment.

18.5.4 Grade Separated Configuration

Construction would include grade separations between the proposed alignment and roadways and/or freight tracks. A grade separated configuration would consist of an aerial crossing with a bridge structure that would separate the proposed track operations from the roadway and/or freight track network. The intersections that would include a grade separated configuration under the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option can be found in Chapter 3.0: Transportation.

Actual construction for the grade separated configuration would be typical to new bridge construction projects. Temporary lane and road closures would be utilized to accommodate construction sequencing.



Grade separated configuration example.

When practical, temporary road closures would occur during nighttime hours to minimize traffic disruptions. Temporary roadway widening would be anticipated to accommodate construction operations and maintenance of traffic.

Grade separated configurations would require the construction of foundation systems, which would require excavation by means of track-mounted excavators or backhoes. Additionally, drill rigs and/or pile driving equipment would be used to install various foundation elements. Cranes, track-mounted and/or

truck mounted, would subsequently be used to erect superstructure components, such as girders. Additional all-terrain cranes would be utilized when installing other various bridge components.

18.5.5 Underpass Configuration

The underpass configuration would position the proposed alignment below grade entailing excavation of material to form a trench and/or covered passageway. The underpass configuration would be situated just north of Grove Lake Drive, where the proposed alignment would cross under the North Tryon Street/US-29 northbound travel lanes and enter the University of North Carolina at Charlotte (UNC Charlotte) campus.

Staged construction would be required for this underpass configuration. Temporary shoring would be utilized during the construction operations. Soil nail walls with concrete wall facing and bottom slab and overhead support structures would be constructed for maintaining grade above the proposed alignment.



Underpass configuration example.

Construction equipment necessary for both at-grade and grade-separated construction would be used for the construction of the underpass configuration. Additionally, specialty equipment for soil nail wall installation would be required.

18.5.6 Trackwork Installation

Light rail track construction would include the installation of the fixed guideway elements, such as: ballast, ties and rail. These items would be placed in construction staging areas throughout the corridor to minimize haul distances and facilitate construction. The contractor would be responsible for obtaining the construction staging areas.

18.5.7 Parking Facilities

Transit only park-and-ride lots would be constructed at seven station locations and construction would utilize grading equipment, asphalt pavers and rollers.

Three surface parking lots are proposed under the Sugar Creek Park-and-Ride Option 1, which would realign Raleigh Street. Construction equipment used in typical highway construction projects would be used for the road realignment, such as: pavement breakers, loaders, haulers, grading equipment, asphalt pavers and rollers.

Parking garages would be constructed at the Sugar Creek Station Park-and-Ride Option 2, four levels on two separate garage structures; and at the I-485/N. Tryon Station, five levels within one garage structure. For the Sugar Creek Station Park-and-Ride Option 2, the existing topography would cause varying portions of each garage structure to be situated below grade. A vehicular bridge and a separate pedestrian bridge would connect the two parking garages on the top level. An additional pedestrian bridge

would span the freight railroad tracks to the north and connect to a staircase and elevator to access the Sugar Creek Station platform. For the I-485/N. Tryon Station, the existing topography would cause a portion of the structure to be situated below grade. Pedestrians would walk out to the station platform from the third level; therefore, a pedestrian bridge is not necessary.

Foundation systems for the parking garages would require excavation by means of track-mounted excavators or backhoes. Drill rigs and pile driving equipment would be used to install various foundation elements. Cranes, track-mounted and/or truck-mounted, would subsequently be used to erect parking garage structure components, such as girders. Concrete pumps and vibrators would be utilized when placing concrete for the parking garage structures. Additional all-terrain cranes would be utilized when installing the vehicular and pedestrian bridge components. Careful coordination between the contractor and freight railroad will be required when constructing the pedestrian bridge over the freight railroad tracks so that the freight tracks remain open during all phases of construction.

18.5.8 Vehicle Light Maintenance Facility

The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option propose the construction of a VLMF to provide light maintenance, repair, interior cleaning, inspection and testing of light rail vehicles. The VLMF would be comprised of: the site, track yard and a building that would house the Rail Car Services and Rail Operations. The facility would be located within the existing Norfolk Southern Intermodal Yard located just northeast of Brevard Street and would occupy approximately 18 acres.

Construction of the VLMF would utilize equipment used in typical highway and building construction. Light rail tracks would also be installed, which would include ballast, ties and rail. The VLMF building would require foundation construction by means of excavators, backhoes, concrete pumps and vibrators.

18.6 Utilities

The proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would conflict with existing utilities along North Tryon Street/US-29 and where the proposed project within the existing rail corridor could cross roadways. Access to utilities that require constant inspection and maintenance would not be allowed to be located within the clearance envelope of the light rail vehicles and tracks. Those utilities within the proposed right-of-way would be the most likely to require relocation.

The utilities affected include: electrical power utilities, primarily overhead electric lines and poles; telecommunication, including telephone and cable (both above and below ground); water and sewer mains; natural gas utilities; and traffic signals and communications.

A substantial amount of the utility adjustments and relocations would occur between Old Concord Road and JW Clay Boulevard, along North Tryon Street/US-29. The proposed Light Rail Alternative alignment would be situated in the median and would necessitate the widening of North Tryon Street/US-29. Many utilities run parallel to, and cross, North Tryon Street/US-29, which creates conflicts with the proposed construction. Widening would require that these utilities be relocated to make room for the new typical section. Asymmetrical widening is proposed from Old Concord Road to the “weave,” which will minimize the number of utility relocations required in this segment. If the Light Rail Alternative – Sugar Creek Design Option is chosen, there would be additional utility adjustments and relocations along North Tryon Street/US-29, since the proposed alignment would require more median construction than the Light Rail Alternative. Asymmetrical widening is also proposed for this section.

The construction of the underpass configuration where the light rail tracks would descend below the northbound side of North Tryon Street/US-29 would require excavation below existing underground utilities. The change in ground elevations would require relocations of existing underground utilities and aerial utility poles. Staged construction would allow relocations to occur once a portion of the roadway excavation is complete.

Mitigation techniques would include relocation, removal and protection (e.g., pipe casing). Utility conflicts would typically be addressed via in-kind replacement. In certain cases, overhead utilities may be

relocated underground. Existing utilities in conflict with the proposed Light Rail Alternative would potentially be relocated to “utility corridors” identified by the engineering team. These utility corridors would potentially be located between the back-of-curb and the outside ROW.

Construction equipment typically required for relocating utilities would include excavators/backhoes, trenchers, boring machines, trucks, cranes and generators/compressors. Utility relocations located in existing streets would require the demolition of pavement, sidewalks and curbs where open trench construction is employed. This work would require breaking operations consistent with sawing, jack hammering or breaking. In order to repair the damaged structures, concrete or asphalt construction methods would be utilized. Jack and bore and tunneling methods would reduce the amount of demolition needed and would typically be employed at sensitive locations, major intersections and perpendicular crossings. The design of utility adjustments and relocations would be developed as part of the final construction plans. Relocations would be addressed in the traffic control plans by the use of lane closures or temporary road closures.

To minimize scheduling conflicts and coordination issues during construction, it is anticipated that numerous utility relocations would occur prior to the start of major construction activities. This advance utility relocation would facilitate the subsequent construction and minimize delays required to resolve utility conflicts.

18.7 Transportation, Traffic and Parking

Construction of the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would affect numerous major and minor roadways. Careful planning would be required to reduce disruptions to traffic. The majority of the proposed Light Rail Alternative construction would take place in, or immediately adjacent to, the railroad right-of-way or would occur within the median of North Tryon Street/US-29. If the Light Rail Alternative – Sugar Creek Design Option is chosen, additional impacts would occur to local business access and traffic patterns, since the proposed alignment would occupy additional length in the median of North Tryon Street/US-29. Currently, there is no on-street parking along North Tryon Street/US-29 or the side streets. As a result, only private parking lots would be affected by construction activities.

The staging of construction would require astute planning and coordination to minimize the need for traffic detours while maintaining adequate traffic flow. Maintaining business access and safe passage of materials and equipment throughout the construction areas would be priorities for the contractor. Temporary lane and road closures would be required during construction of the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. CATS and its contractors would coordinate with the traffic control divisions of CDOT and NCDOT to maintain reasonable and safe traffic operations along the corridor.

Construction in or adjacent to railroad right-of-way would require planning and coordination with NCR, NS and CSX railroads. Track construction staging plans would be developed to maintain freight track operations throughout construction. Construction within the railroad right-of-way would be subject to the control of railroad flagmen as required by the freight railroads.

18.8 Land Use, Community Facilities and Businesses

A combination of newly acquired right-of-way, permanent easements and temporary construction easements would be necessary for the construction of the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. Temporary construction easements would typically be acquired to provide the necessary room to construct the proposed features. The contractor would be required to return these easement areas to the appropriate condition based on the plan specifications and the existing conditions. The contractor would be responsible for negotiating the rights to, or purchasing, staging areas needed for construction. The contractor would be responsible for returning these sites to the appropriate conditions, as agreed upon with the individual property owners. CATS may choose to make land that is purchased for the construction of the project available to the contractor for staging areas. The conditions for the use of these areas would be addressed in the specifications. However, CATS would not purchase property for the sole purpose of providing staging areas.

Construction of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would cause temporary impacts to community facilities (i.e. police station, fire station, school) due to access restrictions and temporary blocking of adjoining roadway intersections. The availability of alternative routes, in addition to the temporary duration of construction periods, would minimize the disruptions to the community facilities. Furthermore, alternative routes would ensure that access to the community facilities is maintained throughout all phases of construction.

Local businesses would be affected by the construction of the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option due to access restrictions, loss of parking and landscape, business signage removal, traffic congestion, noise, dust and aesthetic disruptions. CATS would be responsible for providing local business owners with notification of traffic interruptions and descriptions of alternative routes. Furthermore, attempts would be made to minimize the duration of parking disruptions.

18.9 Displacements and Relocation of Existing Uses

Property acquisitions would be required for both the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option. However, no additional displacements or relocations are anticipated due to construction activities outside the planned right-of-way. The contractor would be responsible for identifying potential staging areas and negotiating mutually agreeable terms with individual property owners in order to secure permission to utilize them. Property owners would be compensated; therefore, mitigation would not be required. A detailed list of the partial property acquisitions and displacements, along with the necessary temporary construction easements, can be found in Appendix C.

18.10 Visual and Aesthetic Qualities

The construction activities related to the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would be highly visible but would only temporarily affect the visual environment, with the exception of trees that must be removed to accommodate construction activities. Temporary visual impacts would include the presence and movement of construction machinery, equipment, building materials, temporary roads and access ways, construction cranes, temporary construction fences and screens. Furthermore, staging areas would be dispersed along the alignment and would require temporary access for the storage of equipment and materials. Nighttime construction may occur, subject to local regulations. Lights used for nighttime construction could affect residents within one or two blocks of the construction or staging areas. Impacts from lights used during nighttime operations would be minimized by aiming construction lights directly at the work area and/or shielding the lights to avoid disturbing nearby residences. Additional access and clearing would potentially be required at bridge construction sites. These and any other areas requiring temporary access would be restored in accordance with the appropriate construction contract special provisions. Construction of the Light Rail Alternative would also affect existing landscaping. Where existing vegetation serving to buffer adjacent properties is altered or removed, vegetation or other screening would be restored as outlined in the *Urban Design Framework*.

18.11 Neighborhoods, Community Services and Environmental Justice

Construction of the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option is not anticipated to significantly impact communities within the proposed project corridor. Despite the close proximity of the Howie Acres community to Sugar Creek Road, construction of the Light Rail Alternative in this area would not isolate the community, as access would be maintained throughout all phases of construction. Similarly, lengthening of the bridge on Eastway Drive would not isolate the Hampshire Hills neighborhood. Access to this neighborhood would be maintained during all phases of construction. There is a potential impact to the neighborhood related to traffic from construction vehicles and equipment to access the railroad right-of-way. To avoid this impact, CATS would include provisions that restrict contractors from accessing the worksite through the Hampshire Hills neighborhood. Access would occur along the right-of-way. Furthermore, CATS and its contractors would continuously coordinate with community service providers (i.e. police, fire and ambulance service) to ensure emergency vehicles have access to all areas.

18.12 Air Quality

Construction activities for the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option could result in increases in localized air quality emissions. Potential air quality impacts would be related to increases in fugitive dust, particulates (PM_{2.5}, PM₁₀) and gaseous pollutant emissions (CO, VOCs, and NO_x) from mobile and stationary construction related equipment. Pollutant emissions would be generated from the following construction activities:

- Excavation related to cut-and-cover construction;
- Mobile emissions from construction workers' private vehicles as they travel to and from the construction site;
- Mobile emissions from trucks delivering and hauling construction supplies and debris to and from the construction site;
- Stationary emissions from on-site construction equipment; and
- Mobile emissions from diverted vehicles due to road closures and vehicles whose speeds are slowed because of increased congestion caused by construction activity.

In addition, under the Light Rail Alternative – Sugar Creek Design Option, the transition from the existing NCRR right-of-way to the North Tryon Street/US-29 median would involve substantially more building demolition than the Light Rail Alternative in the area of Raleigh Street. The additional demolition could generate a considerable amount of dust, which would have a greater impact to the existing air quality during construction.

Any increase in construction related pollutant emissions from both the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would be temporary in nature with exposure to construction related dust lasting only the duration of construction. Staged construction would proceed in a linear fashion with site excavation, bed preparation and track installation beginning at one or more locations along the proposed alignment. As such, although the overall construction would last approximately three years, the period of time for which specific locations would be exposed to increased emissions would be far less. Air quality impacts would be minimized by adherence to the following recommended construction control measures:

- Shutting off construction equipment not in direct use;
- Watering areas of exposed soil;
- Covering open body trucks transporting materials to and from construction sites;
- Rerouting truck traffic away from schools and residential communities when possible;
- Repaving and/or replanting exposed areas as soon as possible following construction;
- Employing adequately secured tarps, plastic or other material to further reduce dust emissions from debris piles; and
- Prohibiting delivery trucks or other equipment from idling during periods of extended unloading or inactivity.

18.13 Noise and Vibration

18.13.1 Noise

Noise during construction would be an inconvenience to nearby residents and some businesses. The most common noise source in construction areas would be from engine powered machinery, such as bulldozers, cranes and generators. Mobile equipment would operate in a sporadic manner, while stationary equipment would generate noise at fairly constant levels. The loudest and most disruptive construction activities would be associated with pile driving, which would occur in areas where bridges would be constructed. Building demolition incorporates several types of construction related machinery, which could also produce significant potential community disruption. Chapter 13.0: Noise and Vibration provides some typical construction equipment noise emission levels. In general, the majority of construction activities fall within the 75 to 95 decibel range at 50 feet. The human ear perceives noise to be intrusive at around 65 decibels and detrimental at 90 decibels. At 80 decibels, people must shout to be heard. Hearing protection is recommended at noise levels above 90 decibels. Construction noise at

locations further than 50 feet from the source would decrease by approximately six decibels for each doubling of the distance from the source. For example, if the noise level is 90 decibels at 50 feet from a jackhammer, it would decrease to about 84 decibels at 100 feet from that noise source (Bearden, 2006). Noise impacts resulting from a proposed project are determined by comparing the existing and future project-related outdoor noise levels. Essentially, as the existing level of ambient noise increases, the allowable level of noise generated by construction also increases, but the total amount by which a community's noise can increase without an impact is reduced.

South of 30th Street, construction noise would be similar to that produced by typical highway/bridge and city street construction projects. This section would include one bridge structure over the CSX tracks and two bridges over Little Sugar Creek and the VLMF site, which includes the Site Yard and a VLMF building containing Rail Car Services and Operations. Pile foundations for the bridge structures would typically be used, which would require the use of pile hammers. Although this section would include pile driving, any potential elevated noise levels would be relatively short in duration. The other major construction operations in this area would be grading and track construction. However, as these would be done in a linear fashion, any potential elevated noise levels would be temporary.

In the area between 30th Street and the proposed Old Concord Road Station, construction noise levels would be typical of those experienced during highway construction projects. Construction of several bridges, park-and-ride facilities and the parking garages associated with the Sugar Creek Station Park-and-Ride Option 2 would be anticipated in this section. A combination of pile and/or drilled shaft foundations would most likely support the bridges and parking garages. The other major construction operations in this section would be grading and track construction. Construction noise related to bridge and retaining wall construction could potentially be experienced by the Howie Acres and Hampshire Hills communities under the Light Rail Alternative. Construction of the bridge over Sugar Creek Road could produce noise impacts to the Howie Acres community, while the bridge at Eastway Drive could produce noise impacts to the Hampshire Hills community. Additionally, constructing the parking garage associated with the Sugar Creek Station Park-and-Ride Option 2 could produce elevated noise levels to a portion of the Howie Acres community. The alignment for the Light Rail Alternative – Sugar Creek Design Option shifts north towards North Tryon Street/US-29 approximately 300 feet east of Sugar Creek Road and would not likely affect the Hampshire Hills community.

North of the Old Concord Road Station to the entrance into the North Tryon Street/US-29 median, potential construction noise would be typical of highway and bridge construction projects. As with other project sections, construction operations in this area would include pile driving activities. The Light Rail Alternative would propose a bridge over Old Concord Road and noise from the pile driving operations would be greater than those under the Light Rail Alternative – Sugar Creek Design Option, which does not propose a bridge in this area.

Construction activities within the median of North Tryon Street/US-29 could potentially result in elevated noise levels. Activities in this area would generally include the widening of North Tryon Street/US-29 to accommodate the median width required for the proposed light rail alignment. Widening operations would include demolition, utility relocations, grading, retaining wall construction, paving and signalization. Construction of the proposed light rail would begin once roadway widening is sufficiently complete to allow traffic shifts. This would include grading, drainage, utility relocations, retaining wall, bridge and track construction.

A significant portion of the construction on the UNC Charlotte campus would be on a greenfield site removed from residents and businesses. Construction in this section would include the underpass construction, grading, drainage and track construction. The other major elements in this section would be the construction of two stations and two bridges. The station construction would be closer to the business/residential locations than the bridge construction. The bridges in this area would most likely require pile driving or drilled shaft operations. The underpass construction would require major excavation.

The I-485/North Tryon Station would include the construction of a station, light rail bridges, parking garage and all associated entrance roadways and surface lots. Construction noise could result from pile

driving, grading and other typical highway construction activities. Construction of the I-485/North Tryon Station and the accompanying design elements could produce elevated noise levels to the Harris-Houston neighborhood, particularly the Queen's Grant Mobile Home Park south of I-485. The majority of the construction noise would result from pile driving for the bridges and parking garage.

A detailed noise assessment would be conducted to accurately assess the potential for temporary and long-term noise impacts. Site specific mitigation would be developed at that time when sufficient engineering detail is available.

18.13.2 Vibration

Vibration would result from the use of construction equipment, such as pile hammers, jack hammers and hoe rams. The movement of heavy equipment, such as large vibratory compaction equipment, dump trucks and bulldozers, would also contribute to vibration. The nature of this type of vibration is temporary and intermittent. Generally speaking, sensitive receivers for highway and light rail construction would not experience vibration unless they are in close proximity to the construction operations. A damage threshold for fragile buildings (such as historic structures) is 0.2 inches per second (Harris Miller Miller and Hanson Inc., 2006). Chapter 13.0: Noise and Vibration details the typical vibration source levels for construction. Preliminary engineering indicates that construction operations would maintain adequate distances from historic buildings.

Construction of the Light Rail Alternative would take place adjacent to two historic properties in the Center City: McNeil Paper Company Warehouse Complex (301-307 East 8th Street), Philip Carey Company Warehouse (301 East 7th Street). Construction in this area would include grading, drainage, utility relocations and track construction, which are not likely to create vibration impacts. Construction of the Light Rail Alternative in the NoDa neighborhood at 36th Street would take place close to historic resources: Herrin Brothers Coal and Ice Company Complex (315 East 36th Street) and two contributing properties to the North Charlotte Historic District, the Johnston & Mecklenburg Mill (407 East 36th Street) and Newco Fiber Company (430 East 36th Street). The proposed bridges, station and retaining walls at this site would require construction operations such as pile driving that would produce significant vibration. The close proximity of the construction activities to the historic properties will be examined in the detailed vibration assessment and resulting impacts may require minimization techniques.

Some residential properties along the NCRR right-of-way would be in close proximity to the construction of the proposed retaining walls and bridges. As a result, these residences could experience vibration resulting from construction activities.

Under the Light Rail Alternative, the proposed bridge over Old Concord Road would occupy an area near a historic property that is currently operating as the Crossroads Charter High School. The anticipated foundation type for this structure would include driven piles and drilled shafts. Retaining walls would be proposed for the bridge approaches. Pile driving, drilled shaft installation and compaction equipment could generate vibrations that may affect this facility. The Light Rail Alternative – Sugar Creek Design Option would not include a bridge in this location. The demolition of the buildings for the proposed park-and-ride lot may result in temporarily elevated vibration levels for the Crossroads Charter High School.

Several planned and existing buildings on the UNC Charlotte campus contain vibration sensitive equipment. Some of these facilities would be adjacent to the proposed light rail alignment entering campus. The anticipated construction operations of the Light Rail Alternative would include pavement removal and excavations. If rock is encountered at this site, excavation could generate substantial vibrations. A survey of the UNC Charlotte campus revealed that the existing and planned buildings employ the use of a vibration isolation system that protects the buildings' sensitive research instrumentation from localized ambient vibration. However, because vibration from construction activities would likely exceed any ambient levels, UNC Charlotte personnel should be notified in advance of any severe vibration causing operations so the use of any sensitive instrumentation could be coordinated around construction activities.

A detailed vibration assessment would be conducted to accurately assess the potential for temporary and long-term vibration impacts. Site-specific mitigation would be developed when sufficient engineering detail is available.

18.14 Natural Resources

Impacts to wildlife would result from both temporary impacts from construction and long term impacts from the elimination and/or fragmentation of forested habitat. Construction noise and construction staging may temporarily displace some wildlife species. The majority of the wildlife species common to the corridor are typical of urban and/or disturbed environments and would adapt and recover quickly. It is expected that most wildlife capable of relocating would temporarily relocate to other existing habitat near the proposed project corridor until construction has completed and vegetation along the construction limits has been re-established. The loss of terrestrial forested habitat and fragmentation of forested habitat may result in the displacement and/or loss of some wildlife species.

18.15 Water Resources

Excavation, grading and other construction activities would require adjustments and modifications to existing stormwater infrastructure. These construction activities could increase sediment levels in stormwater runoff. Staged construction of the proposed stormwater system would reduce disruptions to existing flow characteristics; however, the increased sediment load has the potential to enter nearby waterways without proper Best Management Practice (BMP) measures. The BMP measures would comply with federal, state and local guidelines on sediment discharge thresholds, particularly the City of Charlotte Post-Construction Controls Ordinance (PCCO). A detailed analysis of the sediment load anticipated to be generated by the proposed project, in addition to the BMP measures that would be employed, would be outlined in the Erosion and Sediment Control Plans developed during final design. The various water systems that would be subject to construction-related impacts are outlined in the subsequent sections.

18.15.1 Floodplains

The Federal Emergency Management Administration (FEMA) develops and updates floodway boundaries for Mecklenburg County. Construction of the Light Rail Alternative would take place in three floodplains: Little Sugar Creek, Toby Creek and Mallard Creek. FEMA has mandated that projects can cause no rise in the regulatory floodway, and a one-foot cumulative rise for all projects in the base (100-year) floodplain. Mitigation of the impacts related to construction of the Light Rail Alternative would be conducted in accordance with federal, state and local agency regulations.

Construction equipment would encroach upon the Little Sugar Creek Floodplain during construction of the bridge crossing adjacent to North Brevard Street, a portion of the proposed access drive to the Duke Energy substation and a portion of the proposed freight alignment behind the Cullman Avenue industrial facilities. The bridge crossing of Little Sugar Creek adjacent to North Brevard Street would require the construction of two bridge end bents and two center bents. The two end bents would not impact regulatory floodways. The two center bents would be composed of two columns each, each column with a drilled shaft, for a total of four drilled shafts within the mapped Community Floodplain and Community Encroachment Area. The proposed alignment behind the Cullman Avenue industrial facilities (including the 36th Street Station) would encroach upon a portion of the Community Floodplain of Little Sugar Creek for construction of fill embankments and retaining walls.

Toby Creek has a wide Community Floodplain Area northwest of the proposed UNC Charlotte Station. The proposed bridge crossing of Toby Creek would require the construction of approach fill embankments, two bridge end bents and 11 interior bents. Each of the 11 interior bents would be supported by three columns, each column with a five foot diameter drilled shaft. This would result in six interior bents (18 drilled shafts) within the FEMA floodway, two interior bents (six drilled shafts) within the Community Encroachment Area and three interior bents (nine drilled shafts) within the Community Floodplain. One proposed end bent is wholly within the Community Encroachment Area, and one proposed end bent is partially within the Community Floodplain.

Mallard Creek is the last floodplain that would potentially be affected by construction equipment. The proposed Light Rail Alternative would cross the Mallard Creek floodplain twice. The first crossing occurs at an unnamed tributary to Mallard Creek (Stream T) as the proposed alignment leaves the UNC Charlotte campus. Fill embankments would encroach upon a portion of the Community Floodplain Area and the Community Encroachment Area at the crossing of this unnamed tributary. The second crossing would occur south of the I-485/North Tryon Station. The bridge crossing of Mallard Creek would require the construction of approach fill embankments, two bridge end bents and seven interior bents. Each of the interior bents would be supported by two columns, each column with a five foot diameter drilled shaft. This would result in six interior bents (12 drilled shafts) within the FEMA Floodway; and one interior bent (two drilled shafts) and one partial end bent within the Community Encroachment Area. The remainder of the end bent and the whole of the other end bent would be located within the Community Floodplain. Additionally, construction activities at the southeast corner of the I-485/North Tryon Station park-and-ride parking garage and perimeter roadway would encroach on the floodplain.

18.15.2 Groundwater

Ten privately-owned groundwater wells and one public groundwater well are located within the study area. There is also a well located on the UNC Charlotte campus. Groundwater could potentially be affected by excavation near the wells. However, field observations have verified that the groundwater wells would be located at distances that would exclude them from experiencing any impacts; or, in the case of the well at UNC Charlotte, which is located within the proposed alignment, groundwater would not be impacted as the well is currently planned for closure. It is possible that excavation activities could encounter groundwater during the construction of the underpass configuration and the parking garage associated with the Sugar Creek Park-and-Ride Option 2, at which time dewatering would occur in accordance with all applicable rules and regulations.

18.15.3 Surface Waters

Federal, state and local governments monitor and enforce water quality standards. Construction could result in the generation of temporary impacts to surface water quality and sediment runoff. Construction activities within the floodplains could potentially increase sediment loads to perennial streams if proper erosion control methods are not consistently employed. The named perennial streams in the project vicinity include: Little Sugar Creek, Toby Creek and Mallard Creek. Other unnamed perennial streams also exist and include: Streams C, J, K A, S and T, described in Chapter 11:0 Water Resources. Minor impacts to streams that could result from construction include the degradation of water quality as a result of changes to the existing landscape. Development of the light rail stations and park-and-ride facilities could also result in changes to existing runoff patterns, which may generate soil erosion during construction. Water quality and runoff issues would be addressed for the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option through the development of a comprehensive Erosion and Sediment Control plan developed during final design. Also, the proposed storm water design would accommodate the changes in the runoff.

18.15.4 Wetlands

Permanent impacts to wetlands would occur under the proposed Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option due to fill slope encroachment, bridges, foundation elements and retaining walls. These long term impacts are discussed in Chapter 11.0: Water Resources. Heavy construction equipment such as dozers, track-mounted excavators and truck hauling equipment would be utilized during fill operations. Construction activities that may impact wetlands include increased stormwater runoff and increased sedimentation in wetland areas. The temporary effect on wetlands as a result of construction activities would be reduced by minimizing work inside wetlands to the extent feasible and as required by permits. Careful planning and coordination would reduce any unnecessary encroachment into wetlands. As previously noted, water quality and runoff issues would be addressed for the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option through the development of a comprehensive Erosion and Sediment Control plan developed during final design. Proposed storm water design would accommodate the changes in the runoff as well.

18.15.5 Jurisdictional Streams

Permanent impacts to jurisdictional streams would occur under the proposed Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option due to fill slope encroachment, bridges, foundation elements and retaining walls. These long term impacts are discussed in Chapter 11.0: Water Resources. Heavy construction equipment such as dozers, track-mounted excavators and truck hauling equipment would be utilized during fill operations and extensions of existing drainage pipes. Construction activities have the potential to increase stormwater runoff and sedimentation entering jurisdictional streams. These temporary effects on jurisdictional streams resulting from construction activities would be reduced by minimizing work inside jurisdictional streams to the extent feasible and by utilizing proper erosion and sedimentation controls and other measures as required by permits.

18.16 Cultural, Historical and Archaeological Resources

Constructing the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would have the potential to create impacts to cultural, historical and archaeological resources. Construction impacts to these resources would generally result from activities that directly disturb a resource or produce a secondary detrimental effect to the value of the resource. Direct disturbance of a resource would consist of discovering archaeological artifacts during construction, such as excavation or grading operations. The disturbance of archaeological artifacts would be controlled by the construction contract special provisions, which will require the contractor implement a Late Discovery Archaeological Recovery Plan. Direct disturbance is not anticipated but has the potential to occur due to the proximity of historic buildings. Secondary effects also are not anticipated but could occur as a result of negligent construction practices. They could potentially include the discharge of dust, failure to restore surrounding construction areas to preconstruction conditions or poorly implemented aesthetic features.

There are several resources adjacent to the proposed light rail alignment where construction impacts would potentially occur, such as vibration in the vicinity of the proposed 36th Street Station. The vibration impacts are anticipated to be temporary and benign to the surrounding properties. Specific areas where these issues warrant evaluation and consideration are described in Chapter 8.0: Cultural, Historical and Archaeological Resources. Contractors would be instructed to maintain as much distance from historic buildings as practical. The Light Rail Alternative – Sugar Creek Design Option would bring construction activities closer to additional historic buildings not affected by the Light Rail Alternative.

18.17 Parklands

Construction of the Light Rail Alternative would have moderate impacts to parklands. Impacts to the Toby Creek Greenway (planned), which would be completed prior to construction, and Mallard Creek Greenway Extension (planned) would be due to overhead bridges crossing the greenways. Impacts to these areas would include temporary trail closures during certain construction activities. Access to the trails would generally be maintained during most construction activities and the temporary closures would be minimized to the extent practical.

Impacts to the Kirk Farm Fields park would involve temporary visual, noise and vibration impacts to the wetland viewing area. These temporary impacts would result from excavation and grading associated with station and retaining wall construction. The Mallard Creek Church Station would be located approximately 150 feet southwest of the boardwalk used to access the wetland viewing area. Construction activities would be restricted to areas adjacent to the park and outside the Kirk Farm Fields park boundary.

18.18 Energy

Approximately 30 percent, or 1,210 Billion BTUs, of the total estimated demand for indirect infrastructure energy (excluding vehicles) is estimated to be consumed locally during construction, including transporting materials and operating construction equipment (Caltrans, *Energy and Transportation Systems*, 1983). This additional energy expenditure would comprise a small fraction of the total regional energy consumed annually for transportation and would not impact regional energy sources or fuel availability.

18.19 Hazardous and Contaminated Materials

Hazardous and contaminated material impacts during construction would typically result from the removal and transportation of material on the site or the discovery of previously unidentified materials during construction. Both of these situations would be addressed by contract requirements consistent with federal, state or local law or agency regulations.

Materials necessary for construction that would be transported to the site would typically consist of native or manufactured materials. Manufactured materials would typically include concrete, metal components, reinforcing steel, fencing or similar elements that would not contain hazardous or contaminated materials. Native materials incorporated into the construction would typically consist of borrow material or select material for use in embankments and MSE retaining wall type applications. As a precautionary measure, the contractor would be required to submit the sources and the appropriate testing for approval, which would prevent hazardous or contaminated materials from being incorporated into construction operations.

Based on preliminary site investigations, several locations may contain contaminated and/or hazardous materials requiring removal and/or remediation as noted in Chapter 15.0: Hazardous and Contaminated Materials. For these operations, the contractor would be required to properly remove, contain and transport the materials in accordance with all applicable regulations. Additionally, the contractor would be required to clean its vehicles to prevent off-site contamination. This would be applicable to several sites and for equipment involved in the removal of the existing railroad ballast, which is potentially contaminated with arsenic.

There is a possibility that arsenic contaminated soil may be encountered during construction within the former freight track corridor. Any arsenic contaminated soil would be disposed of as special waste consistent with methods employed during the construction of the Charlotte Trolley and LYNX Blue Line rail projects. These same requirements would be included in the construction contract special provisions. Proper handling of arsenic contaminated soil would minimize potential impacts.

Construction operations that could potentially discharge hazardous or contaminated materials would require on-site remediation so that contamination would not occur. These construction operations would include the demolition of existing buildings that may contain materials such as lead or asbestos and the painting of the existing steel girders, such as in the Eastway Drive Bridge modifications. The contractor would be responsible for removal, remediation and disposal of any contaminated materials encountered during construction activities.

Accidental spills from equipment would be another source of potentially hazardous or contaminated materials during construction. These types of spills typically occur as a result of mechanical failure of the equipment or during maintenance or repair of the equipment. The contractor would be responsible for removal, remediation and disposal of any accidental spills during construction.

The excavation of previously unidentified hazardous or contaminated materials during construction would be another potential source of impacts. Procedures for safely handling this potential circumstance would be included in the contract specifications, which would require conformance to all appropriate safety and environmental controls including the containment and remediation of any potential contaminated materials. The environmental investigations would minimize the potential for encountering previously unknown contaminated materials, but this risk would not be eliminated completely since portions of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would be located in older industrial areas where complete information is either unknown or unavailable.

18.20 Safety and Security

The Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option would be constructed according to generally accepted principles of safety and security. As a result, adverse safety and security impacts are not anticipated during construction. Pedestrian and bicyclist safety in the vicinity of construction activities would be provided through the use of temporary construction fencing and barricades around construction sites. Access to the construction sites would be controlled. The maintenance of traffic plan, developed during final design, would address motorist safety through the

construction work zones. Furthermore, police, fire and ambulance services would have continuous access to all areas.

To eliminate potential health concerns, an investigation would be undertaken prior to the commencement of construction by the contractor of each location where potential concerns have been identified. The investigation would include the development of a health and safety plan to be implemented during construction to minimize the potential exposure of workers to contaminants and hazards. In addition, all on-site personnel would be required to follow all applicable local, state and OSHA construction codes and regulations. Any contaminated materials encountered during construction would be handled and disposed of in accordance with all applicable federal, state and local regulations and in compliance with the site-specific health and safety plan.

18.21 Mitigation

Construction of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option could generate a variety of impacts to the existing environment and surrounding features. These potential impacts would be neither permanent nor severe. A summary of the mitigation techniques that will be applied is listed in Table 18-1.

**Table 18-1
Summary of Mitigation Techniques During Construction**

Impact Type	Mitigation
Utility	<ol style="list-style-type: none"> 1. Coordinate with utility owners to ensure maintenance of utility services and timely relocation 2. Relocate, remove and protect existing utilities.
Transportation, Traffic and Parking	<ol style="list-style-type: none"> 1. Schedule construction activities during off-peak hours, where practical. 2. Develop Maintenance of Traffic Plan. 3. Coordinate freight schedule and construction activities with the railroads.
Land Use, Community Facilities and Businesses	<ol style="list-style-type: none"> 1. Coordinate with local business owners and provide advance notification of roadway disruptions and descriptions of alternative routes. 2. Provide temporary entrance signs during construction.
Visual and Aesthetic	<ol style="list-style-type: none"> 1. Shield and aim night work lights directly at the work zone. 2. Stage construction activities to limit the duration of impacts at individual locations.
Neighborhoods, Community Services and Environmental Justice	<ol style="list-style-type: none"> 1. Inform local property owners, through the Construction Education and Outreach Plan, of roadway disruptions. 2. Provide continuous coordination with community service providers to maintain access for emergency vehicles. 3. Restrict contractors from accessing the railroad right-of-way through the Hampshire Hills neighborhood.
Air Quality	<ol style="list-style-type: none"> 1. Shut off construction equipment not in direct use. 2. Water areas of exposed soil. 3. Cover open body trucks transporting materials to and from construction sites. 4. Reroute truck traffic away from schools and residential communities when possible. 5. Repave and/or replant exposed areas as soon as possible following construction. 6. Adequately secure tarps, plastic or other material over debris piles. 7. Prohibit idling of delivery trucks or other equipment during periods of extended unloading or inactivity.
Noise and Vibration	<ol style="list-style-type: none"> 1. Conduct detailed noise and vibration assessment during final design and employ recommended mitigation techniques identified within the assessment.
Natural Resources	<ol style="list-style-type: none"> 1. Best management practices (BMP) would be followed by the contractor during construction. BMP would include the demarcation of the construction limits and staging areas prior to the initiation of construction, to limit the disturbances to the vegetative community.
Water Resources	<ol style="list-style-type: none"> 1. Minimize disturbed areas. 2. Apply prompt stabilization. 3. Employ an erosion and sediment control plan to treat stormwater runoff. 4. Prevent the storage of fill or other materials in floodplains, to the extent practicable. 5. Stage construction of proposed stormwater systems to reduce the duration of construction disturbances to a given area. 6. Recycle topsoil removed during construction by using it to reclaim disturbed areas and enhance regrowth. 7. Avoid excessive slopes during excavation and blasting operations to reduce erosion. 8. Use isolation techniques, such as berming or diversion, for in-stream construction near wetlands.
Cultural Resources	<ol style="list-style-type: none"> 1. Stop construction activities immediately upon the discovery of any new cultural resources. 2. Maintain minimum allowable distances from historic resources, to the extent practicable.
Parklands	<ol style="list-style-type: none"> 1. Restrict construction to areas adjacent to the Kirk Farm Fields park boundary. 2. Notify MCPRP 48 hours in advance of temporary closures of greenways due to construction.
Energy	<ol style="list-style-type: none"> 1. Measures to minimize energy consumption during construction could include limiting the idling of construction equipment and employee vehicles, as well as locating staging areas and material processing facilities as close as practical to work sites.
Hazardous and Contaminated Materials	<ol style="list-style-type: none"> 1. Dispose of hazardous materials according to applicable federal, state and local guidelines. 2. Clean construction vehicles to prevent off-site contamination.
Safety and Security	<ol style="list-style-type: none"> 1. Provide construction barriers and fencing to secure construction sites and staging areas.

19.0 SECONDARY AND CUMULATIVE EFFECTS

This chapter assesses the secondary (indirect) effects and cumulative (incremental) effects of the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option when added to the past, present and reasonably foreseeable future actions of related projects in the study area. This chapter also includes a discussion of the recommended mitigation measures. The No-Build Alternative is not included in this assessment, as there would not be any actions likely to result in secondary or cumulative effects.

19.1 Definition of Terms

19.1.1 Secondary Effects

The CEQ Regulations (40 CFR Section 1508.8) define “effects” as direct and secondary (indirect) effects:

- **Direct Effects:** Effects which are caused by the [proposed] action and occur at the same time and place (40 CFR 1508.8 (a)).
- **Indirect Effects:** Effects which are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related to effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8 (b)).

The terms “effects” and “impacts” are considered synonymous, as used in the CEQ regulations. For the purpose of this chapter, “indirect effects” are referred to herein as “secondary effects.” An example of a secondary effect is when a bypass is built around a town and commercial development ensues at the interchange that would not have otherwise occurred without the construction of the bypass. The commercial development is therefore considered a secondary effect of the construction of the bypass.

19.1.2 Cumulative Effects

The CEQ defines the term cumulative impact as: the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

In the simplest terms, analyzing cumulative effects means considering, and accounting for, the impacts of a proposed action in the context of everything else that is going on, has gone on, or probably will go on in the vicinity of the proposed project. Once the effects have been determined, appropriate mitigation strategies can be defined to wholly or partially manage the effects contributed by the proposed project.

An example of cumulative effects would be the construction of a new bridge, a gas station and a 60-lot residential subdivision. All of which would cause the removal of nine acres of wetlands and each project would need to mitigate its proportional impact on the nine acres of wetlands. When looked at individually, each individual project impacts on wetlands seem minor, but when looked at in total, the wetland loss is much more significant.

19.2 Affected Environment

This section discusses baseline conditions for the affected environment, including general trends and community goals. Areas discussed include location influences, demographic trends, planning/policy goals, future development trends, notable resources and air quality. The transportation and land use planning goals provide a platform for assessing the proposed project’s potential for secondary and cumulative effects. Detailed information on the affected environment, trends, relevant plans are documented in the *Secondary and Cumulative Effects Technical Memorandum* (May 2010).

19.2.1 Regional Location Influences and Implications

Center City Charlotte is where the existing LYNX Blue Line terminates and where the proposed LYNX BLE would begin. It is the region's largest employment center, housing workers, residences, office space, retail space, and numerous entertainment, recreational, institutional/educational and cultural destinations. The proposed LYNX BLE Northeast Corridor contains the North Davidson "NoDa" Historic Arts District, as well as the University City employment center that includes large employment complexes, medical facilities, and the University of North Carolina at Charlotte (UNC Charlotte) main campus. These destinations, as well as the corridor's connection to other corridors and activity centers, will continue to influence growth attractiveness and development potential within the Northeast Corridor through 2030.

The City of Charlotte and Mecklenburg County have adopted policies to achieve growth management goals to help guide and manage land use in the proposed project corridor. These policies are discussed in greater detail in Chapter 4.0: Land Use, Public Policy and Zoning. Specifically, the *Centers, Corridors, and Wedges Growth Framework*, Draft 2010 recommends the concentration growth in five linear growth areas. These corridors are centered on high capacity transportation facilities, existing highways and planned transit improvements, and their ability to link neighborhoods, commercial and institutional uses and other districts.

19.2.2 Demographic and Employment Trends

Chapter 1.0: Purpose and Need and Chapter 5.0: Socio-Economic Conditions include discussions on existing and future demographic trends. Population densities within Mecklenburg County are expected to increase within the 2030 analysis timeframe. The Northeast Corridor is anticipated to gain a substantial share of the population growth in the county. Likewise, employment share in the Northeast Corridor is projected to increase significantly (60 percent) by 2030. The University City area is expected to remain the largest employment area outside of Center City Charlotte.

19.2.3 Planning and Policy Documents and Zoning Ordinances

To accomplish growth management goals, the City of Charlotte and Mecklenburg County have developed documents and strategies to help guide and manage land use in the proposed project corridor. These policies, guidelines and plans are described in detail in Chapter 4.0: Land Use, Public Policy and Zoning.

The Northeast Corridor includes properties that fall within a wide range of zoning districts, reflecting varying types and intensities of residential, commercial, and industrial uses. These vary from low-density districts of a more suburban character to high intensity, transit-supportive districts. As an implementation strategy for the development of property surrounding the proposed transit stations (within a ½-mile radius), properties may be rezoned with the appropriate transit-supportive zoning districts as part of the station area planning process. The three transit-supportive zoning districts in the currently adopted City of Charlotte Zoning Ordinance include the Uptown Mixed use District (UMUD), the Mixed Use Development District (MUDD) and the Transit Oriented Development District (TOD).

In October 2003, the Charlotte City Council approved a new set of TOD Zoning Districts applicable to areas within approved transit station area plans, including the Residentially Oriented (TOD-R) zoning district, the Employment Oriented (TOD-E) zoning district and the Mixed-Use Oriented (TOD-M) zoning district. The City has also implemented a number of overlay districts, including the Pedestrian Overlay District (PED) and the Transit Supportive Overlay (TS), to help encourage mixed-use, pedestrian-friendly and transit-supportive development.

19.2.4 Development Trends/Future Land Use

The Northeast Corridor has experienced significant change in the past few years, emerging with three distinct characteristics: the edgy, in-town district along North Davidson Street to NoDa; an aging suburban corridor along North Tryon Street/US-29 from Sugar Creek Road to Tom Hunter Road; and a suburban corridor experiencing mixed success from University City Boulevard north to I-485. It is projected that the North Davidson Street area will continue to fuel strong opportunities for intensification of residential, retail and creative office opportunities, particularly around the Parkwood, 25th and 36th

Street stations. Retail abandonment, limited interstate access and economic stagnation are expected to temper the pace of development in the Sugar Creek Road to Tom Hunter Road area. The University City area and its proposed stations could benefit from several large-scale potentially catalytic projects. These projects include: Belgate; UNC Charlotte expansion and associated development projects; and University Place.

The variations in development and land use patterns in the corridor will vary from existing patterns mostly around station areas. These variations from existing uses would likely be the transition to mixed-use designations in areas where there is the greatest potential for TOD. Existing land use policies and development regulations support the implementation of the proposed Light Rail Alternative. Existing and future development would be served by the improved transportation access and options that the proposed Light Rail Alternative would provide.

19.3 Potential Secondary Effects

Reasonable and foreseeable secondary effects are discussed by alternative in the following sections. The secondary effects described are those resulting from the potential for induced development and the potential effects on notable features and communities of concern. The potential for land use changes in the corridor overall is influenced by the characteristics of the seven land use districts provided in Chapter 4.0: Land Use, Public Policy, and Zoning, such as their development and land use patterns, neighborhood characteristics, and transportation infrastructure. While transit does not directly cause development to occur, it does help to direct development where infrastructure can better support it. Compact development patterns, achieved by the application of TOD zoning districts at station locations, reduce the cost of providing utilities, facilities, and services to new residential and commercial developments.

19.3.1 Light Rail Alternative

The potential for growth and land use changes in the overall corridor as a result of the proposed project is low-to-moderate under the Light Rail Alternative. Most of the area within the corridor contains neighborhoods in an urban or suburban setting. Overall, the proposed project is not likely to cause a substantial change in type or intensity of land use. The only exceptions to this are the vacant/undeveloped areas in the northeast portions of the corridor from University City Blvd./NC-49/NC-49 to I-485. This area contains growth-inducing factors such as the presence of developable land and the likely expansion of water and sewer service. However, any induced growth within the corridor would not be of such significant magnitude that a quantitative watershed analysis is necessary.

Based on land use policies and rezonings (discussed in Chapter 4.0: Land Use, Public Policy and Zoning), it is reasonably foreseeable that the corridor would experience infill development, revitalization, and redevelopment activities as a result of the proposed project. However, the study area will experience growth and development in the study time frame with or without the proposed project, as evidenced by population and employment projections for the Northeast Corridor (see Chapter 1.0: Purpose and Need). The proposed project is not likely to influence if growth will occur in the corridor, but rather where and how the growth would occur.

Growth associated with the proposed project would occur in a more compact development pattern due to the incentives to provide TOD opportunities at station areas that have a higher potential for land use changes and redevelopment. Project-induced activity would occur in the PIA around proposed stations consistent with land use plans and policies (described in Chapter 4.0: Land Use, Public Policy and Zoning) adopted to guide and manage the anticipated growth in the study area. The proposed project also could affect the timing of planned/future developments as it is reasonable and foreseeable that development in the stations areas could occur in anticipation of the Light Rail Alternative.

These secondary effects are anticipated to be positive in terms of their effect on the corridor and the region overall. The Planning Department recognizes the need for proactive regional growth management, as well as redevelopment and revitalization prospects, to keep growth within existing developed areas as much as possible.

Development pressure has already been seen in the northeast corridor, with this trend anticipated to continue through 2030. Future development/redevelopment and land use changes in the corridor is related to policies that focus and manage anticipated growth rather than as a direct result of the Light Rail Alternative. Growth and investment is already apparent partially due to University City Partners (UCP) investments and UNC Charlotte's expansion plans.

Most of proposed project's direct effects would affect vacant, commercial, office, and industrial properties, which would encourage indirect transitions of industrial uses to mixed use. Some stations are more susceptible to major changes in the magnitude, duration, likelihood, and location of growth.

Potential positive and negative secondary effects from the project are listed in Table 19-1. Secondary effects of TOD resulting from the proposed project are anticipated and desirable, as there is a nexus between TOD and the transit system initiative. The relationship is that TOD is used to support rail transit, while at the same time to leverage the development opportunity that a rail station may provide (Boarnet and Compin, *Journal of the American Planning Association*, Winter 1999). TOD would not otherwise occur without the implementation of the light rail portion of the proposed project, and likewise, the TOD is needed to support transit initiatives by means of increased ridership and system enhancement and growth.

Factors that would help encourage TOD in the corridor include:

- The strong local and regional support for meeting the proposed project goals and objectives.
- The increasing growth and market demand anticipated for the region.
- Past and future public and private efforts to revitalize and/or redevelop areas of need.
- Existing and forthcoming supportive land use policies.
- The "success" of the existing LYNX Blue Line and therefore likely support in the northeast corridor.
- Consistency with the *Centers, Corridors, and Wedges Growth Framework*, Draft 2010 and the *2025 Integrated Transit/Land Use Plan*.

Land Use Changes/Redevelopment Potential at Stations

As part of the station area planning process, the Planning Department has undertaken preliminary planning for the Light Rail Alternative stations. These plans reflect a conceptual vision for any new development or redevelopment around each of the stations. Detailed Station Area Plans would be further developed as part of future activities to ensure that the type, location, intensity, and land use mix is appropriate for the goal of transit-supportive future development. This station area planning process will continue after the selection of the Preferred Alternative at the conclusion of the Draft EIS. Input from the community, including affected persons within each station area, will be sought in the development of these plans.

Secondary effects to the properties adjacent to stations are reasonably foreseeable and somewhat easier to identify due to the preliminary planning for these areas. The *LYNX BLE Secondary and Cumulative Effects Assessment Technical Memorandum* summarizes the development potential associated with the proposed project, including residential and employment growth for the overall corridor and within ½-mile radius of each station. This information was obtained from the *City of Charlotte Estimated Development Potential for Transit Corridors and Activity Centers, 2008-2035* (Noell Consulting Group, 2009) and the *LYNX BLE FY 2011 New Starts Report Submission* (October 2009), which provides quantitative estimates of development potential within the analysis timeframe.

**Table 19-1
Potential Secondary Project Effects**

Potential Positive Secondary Effects	Potential Negative Secondary Effects
<ul style="list-style-type: none"> • Improved mobility options through mode choices. • Improved regional transit accessibility and accessibility to adjacent land uses. • Reduction in overall commuter times. • Reduced motor vehicle costs. • Reduction in auto emissions and improved air quality. • Increase in property values associated with new development/redevelopment. • Increased sales-tax revenue. • Increased usage of community amenities (i.e. parks, recreation centers, cultural and entertainment venues, etc.) • Discourage urban sprawl. • Encourage conservation of natural resources and environmentally sensitive land through compact development. • Efficient use of available land for new development. • Redevelopment potential of existing vacancies/underutilized properties. • Support for more sustainable development. • TOD encouragement of diverse and affordable housing opportunities. • Transition to balanced and more pedestrian-friendly corridor. 	<ul style="list-style-type: none"> • Impacts to streams/wetlands and water quality due to development/redevelopment activities. • Redevelopment within station areas could result in gentrification of neighborhoods and loss of affordable housing. • Potential destruction/redevelopment of historic properties or incompatibility with surrounding uses to historic districts/properties from development/redevelopment activities. • Increased traffic and demands on infrastructure from associated development around transit station areas. • Public opposition to increased density and new development patterns near neighborhoods. • Increased demand for public services (i.e. emergency and police).

Based on the development potential analyzed:

- The corridor would see slightly lower population and employment growth than the metropolitan area.
- The population growth for the total of all station areas (91 percent) is substantially higher than for the projected corridor growth (41.4 percent) and for the metropolitan area (53.6 percent).
- The highest growth in population and employment would occur in the University City Core (McCullough Drive to UNC Charlotte), the High Intensity Urban Core (at East 9th Street), and New Suburban Communities/Greenfields (around University City Blvd./NC-49) areas.
- The least growth in population and employment would occur in the Suburban Communities (Sugar Creek Road to Tom Hunter Road) area.
- The highest population growth is projected to occur around McCullough Station, and the highest employment growth is projected to occur around the I-485/N. Tryon Station.
- Although the corridor is projected to experience moderate growth in population (41.4 percent) and employment (59.7 percent), the overall density of this growth isn't anticipated to vary much between existing and future conditions. However, in station areas the density is expected to increase.

Economic and market conditions and project timing could affect station area redevelopment and TOD potential. Additionally, the density of existing development; amount of property available for development/redevelopment; achieved rents or unit prices in the area; density of new development occurring in the station area; also could affect redevelopment and TOD potential. Based on information obtained for the analysis, the following project-specific outcomes are reasonably foreseeable:

- Redevelopment and infill development (i.e. high density residential development) is already apparent in the High Intensity Urban Core (East 9th Street).
- Trend for industrial redevelopment in the Industrial Communities areas such as Parkwood Avenue to East 25th Street.

- New development, mostly employment-generating, would be contained in the New Suburban Communities/Greenfields area.

Overall, 9th Street, McCullough, University City Blvd./NC-49, and the UNC Charlotte Stations have the strongest development/redevelopment opportunities, with the 9th Street Station ranked highest in terms of development potential. Mallard Creek Church and the I-485/N. Tryon Stations are Greenfield areas with development/redevelopment opportunities. The 36th Street and Parkwood Stations are also areas with moderate infill development/redevelopment opportunities. Sugar Creek, 25th Street, Old Concord Road, and Tom Hunter Stations have the most limited development opportunities, particularly without significant public incentives.

19.3.2 Light Rail Alternative – Sugar Creek Design Option

Since the Light Rail Alternative station locations are in proximity to the stations for the Light Rail Alternative – Sugar Creek Design Option, the secondary effects for the design option would be the same as for the Light Rail Alternative. There would be no differences in secondary effects and minor differences in the effects on notable features between the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option.

19.4 Potential Cumulative Effects

A cumulative effect includes the total effect on a natural resource, ecosystem, or human community due to past, present and future activities or actions of federal, non-federal, public, and private entities. Projects can include other transportation projects, private or public development projects including residential, commercial or industrial development, public policy changes, and changes to environmental conditions including point and non-point discharges into surface waters. A cumulative impact assessment is resource specific, although not all resources directly impacted by a project will result in cumulative effects.

19.4.1 Past Activities

Traditional development patterns have generally followed a sprawling land use pattern. Low-density residential uses have developed in isolation from employment centers and shopping. Office parks, shopping centers, apartments and single-family subdivisions gradually creep further and further from Center City Charlotte into the outer areas of the corridor. This pattern of land use has resulted in the following cumulative effects:

- Loss of open space;
- Degradation of water and air quality;
- Decreased mobility due to declining levels of service of roadways (i.e. traffic congestion);
- Increased commute times due to traffic congestion;
- Increases in auto dependency and fuel consumption;
- Loss of sense of place and community due to isolation of land uses;
- Isolation (i.e. separation) of employees from activity centers, homes, daycare and schools;
- Decline in economic activity in Center City Charlotte and other employment centers;
- Reduced economic opportunity in existing buildings, facilities, and services; and
- Overall decline in quality of life.

19.4.2 Present Activities

The region has implemented land use policies and plans to change past trends and focus future development into growth corridors and activity centers. Present activities include both private and public projects within the corridor. The private projects include new mixed-use developments, single family and multi-family residential development and a variety of other commercial and office development.

Specifically, Center City Charlotte has experienced recent development activity, including residential development. Additionally, development has recently occurred within the NoDa area. This development has been primarily positive due to the proximity to the proposed transit corridor, the consistency with local

land use policies and the mixed nature of the development. UNC Charlotte also has significant construction underway to accommodate enrollment growth.

There are also a variety of public projects underway, including roadway improvements, water and sewer line installations and streetscape improvements. The most significant current project in the corridor is the City of Charlotte's project at North Tryon Street/US-29 and University City Blvd./NC-49, to convert the "weave" configuration into two at-grade, signalized intersections. The project will improve safety for vehicles, pedestrians and bicyclists in the area.

19.4.3 Future Activities

There are numerous planned private projects and publicly-funded capital improvements, related to or separate from the proposed LYNX BLE. Chapter 3.0: Transportation, describes local and state planned or programmed roadway improvements. In addition to these improvements, several large transportation projects that would affect overall travel and freight mobility in the region are in the planning stages. These projects are currently being proposed by MUMPO, CATS, NCDOT and the Norfolk Southern Corporation.

CATS Corridor System Plan Projects

- 2030 Transit Corridor System Plan: On November 15, 2006 the Metropolitan Transit Commission (MTC) adopted the *2030 Transit Corridor System Plan* which plans for 25 miles of commuter rail, 21 miles of light rail (including 9.6 miles of the existing Blue Line), 16 miles of streetcar, 14 miles of bus rapid transit and an expanded network of buses and other transit facilities. The proposed LYNX BLE Light Rail Alternative is included in the plan.
- LYNX Blue Line Light Rail (South Corridor): The LYNX BLE creates projected 2030 ridership loads that require either 1) the operation of ten-minute headways with 3 car trains or 2) six-minute headways with 2 car trains. Both scenarios require retrofit improvements to the existing Blue Line light rail (*South Corridor Improvements*, STV Inc., 2009).

Other Transportation Projects

- Sugar Creek Grade Separation Project: This project is included in the 2009-2015 TIP. The project will grade separate the rail crossing by depressing Sugar Creek Road under the freight tracks. CATS is coordinating with NCDOT Rail and NCRR so that the light rail crossing is accommodated by this project. This project allows the Sugar Creek Station to be on the bridge, which will be at-grade with surrounding land use, improving visibility and access.
- Charlotte Rail Improvement and Safety Project (CRISP): Several rail companies and government agencies are working to improve the overall railway system in the Charlotte region. These entities include: NCDOT, CATS, the City of Charlotte, CSX, NS, and the North Carolina Railroad (NCRR). The goal of the Charlotte Rail Improvement and Safety Project (CRISP) is to create or maintain accommodations for potential higher rail speeds along the entire rail corridor (see Figure 19-1). The proposed Light Rail Alternative preserves the future CRISP project through a shift of the existing freight tracks to the west at 36th Street. This shift accommodates the proposed CRISP project and allows adequate separation between the freight and light rail tracks, while preserving the historic buildings along the east side of the corridor.
- High Speed Rail: North Carolina and Virginia have formed a bi-state commission to review and encourage the development of a high speed (110 mph) passenger rail service from Washington, D.C. to Charlotte. Plans call for an increase in passenger rail service over a 20-year period between Charlotte, Raleigh, Richmond, and Washington D.C., which would result in significant reductions to travel time through track upgrades and expansions. The timing of the high speed rail is unknown at this time.
- Completion of the I-485 Loop: Interstate 485 (I-485) is a partially-completed beltway around the Charlotte region. The incomplete portion is located in northeast Charlotte, Mecklenburg County, to the northwest of the terminus of the Northeast Corridor, and will consist of an eight-lane freeway from NC 115 (Old Statesville Road) to west of the existing portion of I-485. NCDOT plans to start right-of-way acquisition in 2010 and other funding sources are being considered to allow construction of the project by 2013.
- I-85 Widening: This TIP project will widen approximately 13 miles of I-85 from US-29/NC-49 in Mecklenburg County to NC 73 in Cabarrus County. This project could benefit travel along North

Tryon Street/US-29 by diverting inter-county traffic from North Tryon Street/US-29 to I-85, thereby relieving some of the congestion at intersections.

Other Local Projects

Development activity in the Northeast Corridor is increasing as the corridor provides a vital link between two major activity centers in the area (Center City Charlotte and University City). Center City Charlotte has seen a significant amount of development in the last decade consisting primarily of office, retail and residential uses. University City has likewise seen a considerable amount of development activity in all sectors, including office, retail, commercial and residential (single-family and multi-family) uses.

- Northeast Corridor Infrastructure Program (NECI): The City of Charlotte has initiated this program of infrastructure improvements, which are intended to support and encourage future development in the Northeast Corridor. The program will include intersection enhancements, improved connectivity, streetscapes, sidewalks and bicycle routes. Implementation of these improvements will enhance access to neighborhoods and businesses and promote transit-oriented development in station areas. The program will be similar to the South Corridor Infrastructure Program (SCIP) implemented in parallel with the South Corridor Light Rail Project.
- Charlotte Research Institute (CRI): The Charlotte Research Institute campus covers 102 acres of land on UNC Charlotte's grounds and currently contains eight buildings. Construction is underway for a ninth building for Bioinformatics and construction will soon begin on three additional buildings for engineering research and education.
- UNC Charlotte Master Plan – To accommodate increased student enrollment and the expanded educational mission of UNC Charlotte, a campus master plan has been developed that outlines significant expansion needed to accommodate future growth. Expanded academic, administrative and student support space will result in the addition of nearly two million square feet of facilities in the campus core. An additional 275,000 square feet of development is expected for student fitness, health education and recreational support. A conference center and hotel and a 40,000 square foot visitor's center are also included.
- Rezoning Requests: The Planning Department has received numerous requests for rezonings in the corridor since 2006. These approved rezonings are illustrated in Figures 19-2a and 19-2b. There were 64 approved rezoning cases in the project corridor since 2006. Eleven of those cases consisted of requests to rezone industrial properties to high density residential or mixed-use zoning classifications. Ten cases consisted of requests to increase residential zoning to a higher density or mixed use. The number of requests for rezonings in the corridor demonstrates that the corridor has and continues to attract development/redevelopment potential and interest. Furthermore, these incremental projects demonstrate the continuing transition of the corridor, with a major regional activity center and a vital regional connection to other activity centers and corridors.

19.4.4 Cumulative Effects

A cumulative impact assessment may be thought of as a comparison of the past, present and reasonable foreseeable future condition of a specific resource and the effects that multiple actions have on the resources, ecosystems and human communities of concern. In determining potential cumulative effects, the past, present and future activities identified in Sections 19.4.1 – 19.4.3, were reviewed in conjunction with the potential project effects on notable features shown in Table ES-1.

19.4.4.1 Light Rail Alternative

Cumulative Effects on Notable Environmental Features

The direct and indirect effects of the proposed LYNX BLE are summarized in Table ES-1. It is reasonably foreseeable that the proposed project, combined with non-project activities, could cumulatively result in minor negative impacts to notable environmental features. However, these effects would likely occur with or without the proposed project.

- Development and infrastructure improvements with the potential to cumulatively affect water quality through erosion and stream sedimentation. Increasing non-point source pollution associated with increasing impervious surfaces and land disturbing activities.

- Cumulative water quality impacts are likely to be an issue in the northern portion of the corridor where existing development is sparse, but includes vacant land that would continue to be attractive for growth due to the I-485 completion.
- Habitat loss resulting from conversion of agricultural or undeveloped land to urban and suburban development. Development is expected to continue in the corridor, resulting in habitat loss and conversion of forest to urban/suburban uses.

Cumulative Effects of Multiple Actions

There are a number of projects planned that cumulatively would improve the mobility of people and goods along and through the Northeast Corridor. Combined, these actions are not likely to result in significant additional direct effects beyond those identified individually by each project. Should the construction schedules of the projects all occur within the same time period, the temporary effects from those activities could negatively affect the surrounding communities. At the present time, specific project plans and construction schedules are unknown and therefore specific construction-related cumulative effects cannot be determined. The proposed LYNX BLE is likely to be constructed close in time and place with the NCDOT's Sugar Creek Grade Separation Project. The project would either be constructed before or in conjunction with the construction of the proposed LYNX BLE.

Cumulative CATS Actions

As previously discussed, CATS has programmed major transit projects throughout the region beyond the current action described in the Draft EIS. The adopted *2030 Transit Corridor System Plan* consists of multiple transit improvements in five corridors, a series of improvements in Center City Charlotte, and bus service and facility improvements throughout the rest of the region.

The implementation of transit projects in multiple corridors as part of the development of an overall transit system plan would improve mobility and accessibility throughout the region. The development of the *2030 Transit Corridor System Plan* provides benefits to the traveling public through new services; expansion of existing services; and improved connectivity and accessibility. It also is expected to reduce dependency on auto use and reduce the associated auto-generated roadway congestion, air pollution emissions and energy consumption.

It is anticipated that the implementation of the *2030 Transit Corridor System Plan* would provide benefits on several fronts:

- Transit-dependent populations would be better served.
- More transportation choices in terms of mode, frequency, and destination.
- Linkage of low income urban communities with suburban employment centers.
- Enhancement of property valuations along the transit corridor, particularly adjacent to station areas.
- Reduction in overall emissions traditionally tied to vehicle miles of travel growth.

As noted in Section 19.4.3, retrofit improvement options for the LYNX Blue Line Light Rail (South Corridor) include platform extensions at stations and additional substations. The options include either:

- 1) 3-car train sets operating at ten minute headways – This option would necessitate extending the length of the existing 2-car platforms at each of the 15 LYNX Blue Line stations in the South Corridor and adding four additional substations to meet the traction power requirements. The environmental effects for longer station platforms and additional substations were assessed in the South Corridor Light Rail Project's Draft and Final Environmental Impact Statements. Potential impacts include noise and vibration impacts related to light rail operations, as well as impacts to natural resources related to platform and substation improvements.
- 2) 2-car train sets operating at six minute headways - Based on existing delays and a test run of six minute headways performed in 2008, this option has the potential to impact vehicular traffic, particularly along the segment within South Boulevard from Scaleybark Road to Clanton Road. In addition, three additional substations are needed for this six minute headway operation option.

Cumulative effects to notable resources and the affected environment are reasonably foreseeable, as both projects would have their own direct and indirect effects on natural resources, traffic patterns, and the surrounding human environment (i.e. noise, visual and social effects). However, direct and indirect negative impacts to notable resources and the affected environment are not in the same study areas/corridors. Furthermore, it is anticipated that overall cumulative impacts would be beneficial from a corridor system perspective. The projects, when combined, would provide a benefit to the traveling public with new and expanded services; improved connectivity and accessibility; reduced dependency on auto use; and reduced roadway congestion and associated air pollution emissions and energy consumption.

A re-evaluation of the South Corridor Light Rail Project Final EIS will be completed to assess the changes to the affected environment and the potential impacts associated with both retrofit options. Appropriate technical studies, including a detailed traffic analysis and measures to mitigate impacts associated with six minute headway operation, will be performed during the re-evaluation.

19.4.4.2 Light Rail Alternative – Sugar Creek Design Option

The cumulative effects for the Light Rail Alternative – Sugar Creek Design Option would be the same as those described in section 19.4.4.1 for the Light Rail Alternative. No additional cumulative effects would result from the Light Rail Alternative – Sugar Creek Design Option.

19.5 Commitment of Resources

19.5.1 Relationship of Local Short-Term Uses Versus Long-Term Productivity

The most disruptive short-term impact associated with the proposed project would occur during land acquisition and project construction (see Chapter 18.0: Construction Impacts). Any short-term uses of human, physical, socio-economic, cultural and natural resources would contribute to the long-term benefits of improved access to employment centers, a transportation alternative that can easily respond to increased demand, improvements in both transit accessibility and availability in the Northeast Corridor, and improved air quality in the region. The long-term benefits of implementing transit supportive land use policies would also be realized.

The proposed project would provide a substantial improvement to an established, overburdened transportation corridor. In addition, the proposed project would meet the City of Charlotte's and Mecklenburg County's desires to implement long-range plans that integrate land use and transportation policies.

19.5.2 Irreversible and Irrecoverable Commitment of Resources

Construction of the proposed project would result in commitments of natural, physical, man-made and financial resources. While some of these resources would be recovered within a relatively short period of time, other resources would be irreversibly and irretrievably committed to the project. Fossil fuels, labor, and construction materials such as steel, cement, aggregate, and bituminous material would be expended during construction. These materials are generally not retrievable; however, the use of these materials would not have an adverse effect upon the continued availability of these resources. Construction would also require an expenditure of federal, state and local funds, which are not retrievable.

Employment during the construction period for the proposed LYNX BLE would include 8,592 jobs, including: direct employment such as construction workers; indirect employment by businesses that provide goods and services to construction firms; and induced jobs created as a result of additional purchases made by individuals/households due to increased income from direct or indirect employment. Operation and maintenance of the proposed LYNX BLE would add approximately 96 new jobs for rail by 2030.

The commitment of these resources is based on the recognition that residents in the area, region and state will benefit from the improved quality of the transportation system. These benefits will consist of

improved accessibility and mobility, savings in time and greater availability of quality services that are anticipated to outweigh the commitment of these resources.

19.6 Mitigation

Section 19.4 identified the secondary and cumulative effects of the alternatives under study in this Draft EIS. Where effects have been identified, mitigation must be provided. For cumulative effects, the mitigation must be appropriate to the level of contribution to the impact.

19.6.1 Secondary Effects

19.6.1.1 Light Rail Alternative

Secondary negative development effects resulting from the project would be minimized through the station area planning process, which would include public outreach to property-owners within a ½-mile of station locations, detailed in Chapter 4.0: Land Use, Public Policy and Zoning. Specific mitigation would be identified during that process through specific zoning recommendations to minimize effects on notable features and area neighborhoods and discourage development and redevelopment within adjacent neighborhoods located outside of the station area.

Table 19-2 includes mitigation measures recommended for each of the potential negative secondary effects identified for the Light Rail Alternative.

19.6.1.2 Light Rail Alternative – Sugar Creek Design Option

The secondary effects would be the same as those for the Light Rail Alternative. Therefore, no additional mitigation beyond that identified for the Light Rail Alternative would be required.

19.6.2 Cumulative Effects

19.6.2.1 Light Rail Alternative

Mitigation measures specific to notable environmental resources identified in their respective chapters within this Draft EIS. In order to minimize the potential cumulative construction effects of the NCDOT Rail Division's Sugar Creek Grade Separation Project, CATS will continue to coordinate with NCDOT Rail Division regarding the project schedules and minimize neighborhood effects to the extent practicable. CATS is also coordinating the design of the LYNX BLE project with NCDOT Rail and NCRR related to accommodations for the CRISP program and High-Speed Rail plans. Construction activities occurring in the same area for these projects may be consolidated and/or closely coordinated to minimize impacts on neighborhoods and businesses in the area.

Regarding the LYNX Blue Line Light Rail (South Corridor), a traffic analysis and re-evaluation of the South Corridor Final EIS will be undertaken to identify specific measures to mitigate the potential impacts to the existing South Corridor LYNX Blue Line.

19.6.2.2 Light Rail Alternative – Sugar Creek Design Option

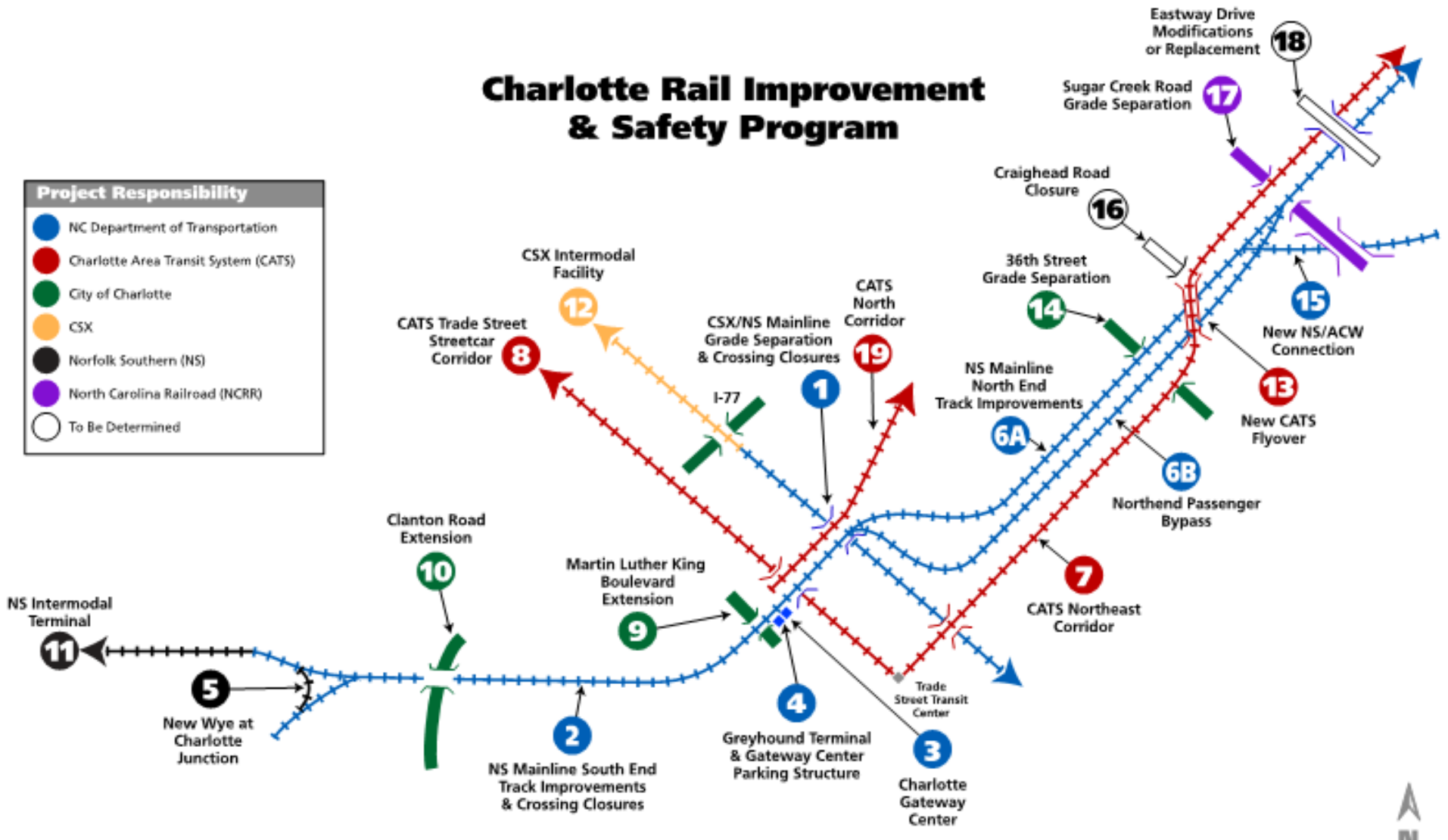
Mitigation measures specific to the resource areas are identified in their respective chapters within this Draft EIS. Therefore, no additional mitigation measures would be required for the Light Rail Alternative – Sugar Creek Design Option.

Table 19-2
Mitigation Measures for Secondary Effects

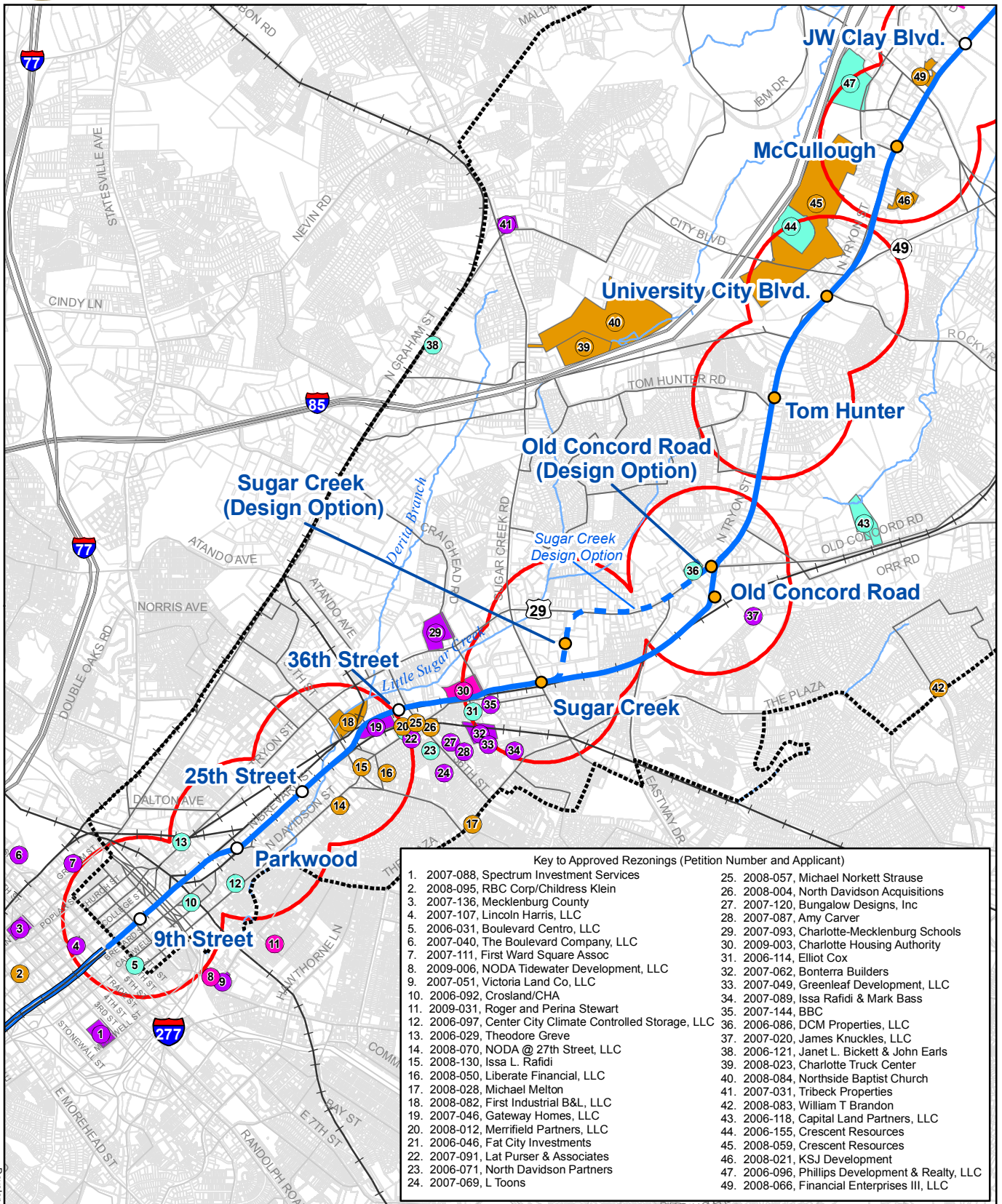
Negative Secondary Effects	Project Mitigation	Available Mitigation
Redevelopment within station areas could result in gentrification of neighborhoods and loss of affordable housing	Affordable housing strategies and preservation of existing neighborhoods to be developed with station area plans	City of Charlotte Housing Policy requires/encourages affordable units in multi-family residential development, and the Charlotte-Mecklenburg General Development Policies call for preserving and protecting existing stable neighborhoods as part of the station areas principles
Destruction or redevelopment of historic properties from development / redevelopment activities	Notification to the Landmarks Commission of National Register Eligible properties that could be designated as Local Landmarks to afford them protection	Once local landmark status is provided the following techniques can be used by the Landmarks Commission: demolition delays; certificate of appropriateness; rehabilitation code
Increased traffic and demands on infrastructure from associated development in station areas	Convenient access to light rail and bus services	A separate project program known as the Northeast Corridor Infrastructure (NECI) Program is currently underway to identify needed infrastructure improvements to support existing and future development
Public opposition to dense development patterns near neighborhoods	Public outreach/education regarding the benefits of transit supportive development; public involvement in station area plan development	Station Area Plans that incorporate neighborhood preservation principles
Water resources and water quality	Coordination with City of Charlotte's Stormwater Services to minimize impacts to water resources and water quality during the station area planning process	NPDES permitting, enforcement of SWIM Buffers, continued implementation of policies to discourage urban sprawl and focus development into the centers and corridors

Charlotte Rail Improvement & Safety Program

Project Responsibility	
●	NC Department of Transportation
●	Charlotte Area Transit System (CATS)
●	City of Charlotte
●	CSX
●	Norfolk Southern (NS)
●	North Carolina Railroad (NCRR)
 	To Be Determined



Data Source: Charlotte Department of Transportation, NCDOT Rail Division



Key to Approved Rezoning (Petition Number and Applicant)

1. 2007-088, Spectrum Investment Services	25. 2008-057, Michael Norkett Strause
2. 2008-095, RBC Corp/Childress Klein	26. 2008-004, North Davidson Acquisitions
3. 2007-136, Mecklenburg County	27. 2007-120, Bungalow Designs, Inc
4. 2007-107, Lincoln Harris, LLC	28. 2007-087, Amy Carver
5. 2006-031, Boulevard Centro, LLC	29. 2007-093, Charlotte-Mecklenburg Schools
6. 2007-040, The Boulevard Company, LLC	30. 2009-003, Charlotte Housing Authority
7. 2007-111, First Ward Square Assoc	31. 2006-114, Elliot Cox
8. 2009-006, NODA Tidewater Development, LLC	32. 2007-062, Bonterra Builders
9. 2007-051, Victoria Land Co, LLC	33. 2007-049, Greenleaf Development, LLC
10. 2006-092, Crosland/CHA	34. 2007-089, Issa Rafidi & Mark Bass
11. 2009-031, Roger and Perina Stewart	35. 2007-144, BBC
12. 2006-097, Center City Climate Controlled Storage, LLC	36. 2006-086, DCM Properties, LLC
13. 2006-029, Theodore Greve	37. 2007-020, James Knuckles, LLC
14. 2008-070, NODA @ 27th Street, LLC	38. 2006-121, Janet L. Bickett & John Earls
15. 2008-130, Issa L. Rafidi	39. 2008-023, Charlotte Truck Center
16. 2008-050, Liberate Financial, LLC	40. 2008-084, Northside Baptist Church
17. 2008-028, Michael Melton	41. 2007-031, Tribek Properties
18. 2008-082, First Industrial B&L, LLC	42. 2008-083, William T Brandon
19. 2007-046, Gateway Homes, LLC	43. 2006-118, Capital Land Partners, LLC
20. 2008-012, Merrifield Partners, LLC	44. 2006-155, Crescent Resources
21. 2006-046, Fat City Investments	45. 2008-059, Crescent Resources
22. 2007-091, Lat Purser & Associates	46. 2008-021, KSJ Development
23. 2006-071, North Davidson Partners	47. 2006-096, Phillips Development & Realty, LLC
24. 2007-069, L Toons	49. 2008-066, Financial Enterprises III, LLC

Legend

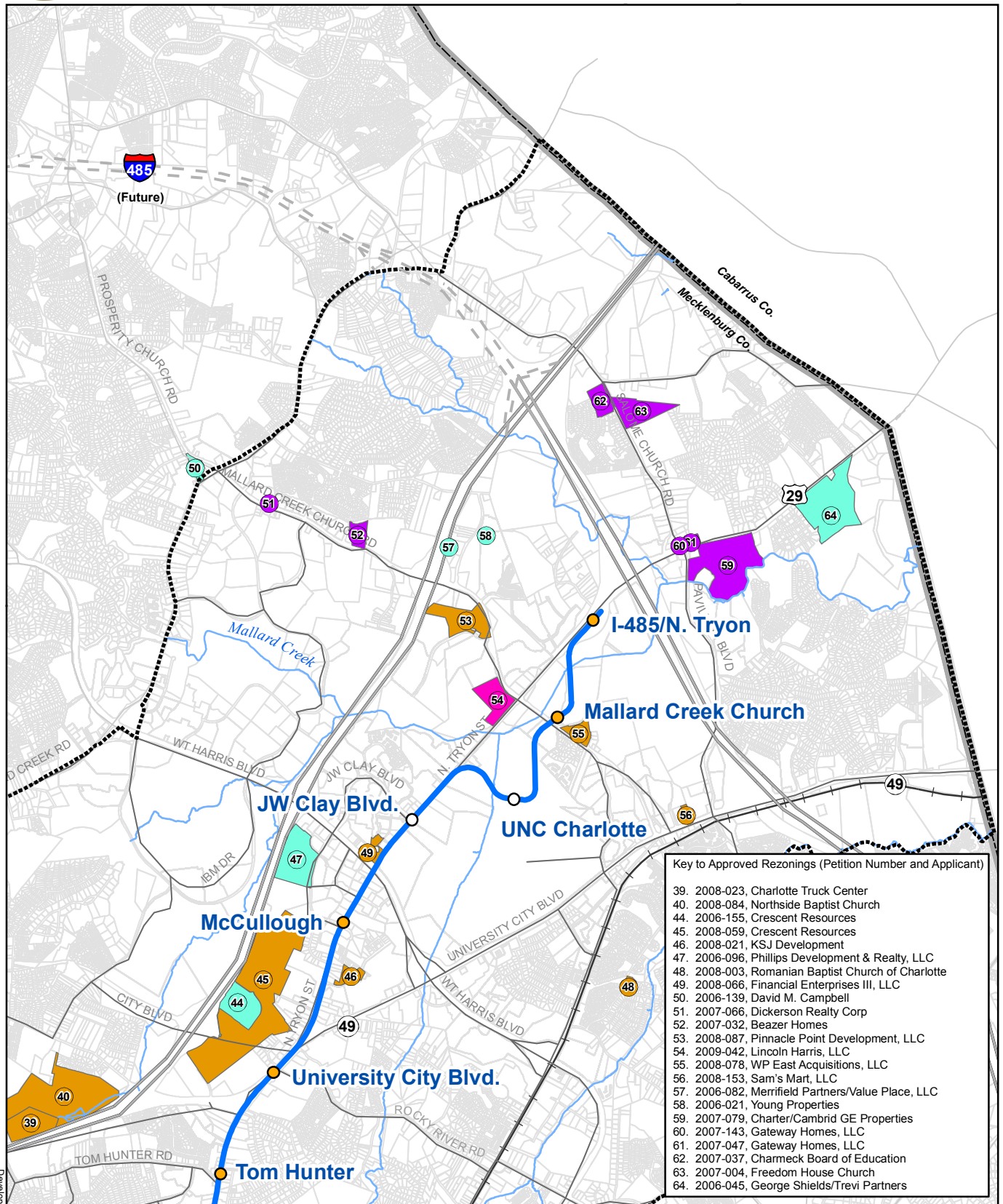
Northeast Corridor Limits	Streams	Project Impact Study Areas
Proposed Light Rail Alternative	Lynx Blue Line	Approved Rezoning
Design Option	Highway	2006 Approved Rezoning
Proposed Stations	Highway (Future Planned)	2007 Approved Rezoning
Proposed Stations with Park-and-Ride	Major Roads	2008 Approved Rezoning
	Railroads	2009 Approved Rezoning

0.5 0.25 0 0.5
Miles

Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

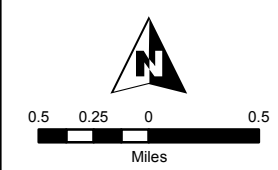
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120809



Legend

- Northeast Corridor Limits
- Lynx Blue Line
- Project Impact Study Areas
- Proposed Light Rail Alternative
- Highway
- 2006 Approved Rezonings
- Design Option
- Highway (Future Planned)
- 2007 Approved Rezonings
- Proposed Stations
- Major Roads
- 2008 Approved Rezonings
- Proposed Stations with Park-and-Ride
- Railroads
- 2009 Approved Rezonings



Data Source:
CATS, City of Charlotte GIS, and Mecklenburg County GIS

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20.0 FINANCIAL ANALYSIS

This chapter discusses the financial strength of the Charlotte Area Transit System (CATS) and CATS' ability to undertake a second major capital investment and operate and maintain its existing transit services. The analysis compares the financial implications of the No-Build Alternative, Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option. The general assumptions are the same for all three alternatives.

CATS *2030 Transit Corridor System Plan* calls for transit development in five corridors originating in Center City Charlotte and carrying passengers to every corner of Mecklenburg County. CATS implemented North Carolina's first, very successful light rail operation, the LYNX Blue Line, in November 2007. The \$462.7 million, 9.6-mile light rail line was the result of a funding partnership between the Federal Transit Administration (FTA), the State of North Carolina, and the local voter approved ½-percent sales and use tax.

CATS' financial capacity rests on the demonstrated strength of the voter approved ½-percent sales and use tax, the City of Charlotte's AAA investment bond rating and the very strong CATS Financial Policies, which require an annual year-end \$100 million fund balance and a 3.0x gross debt coverage ratio. CATS gross debt coverage ratio is utilized to ensure CATS debt service obligations are not greater than 1/3 of annual transit sales tax revenue in a given year.

The State of North Carolina is a major funding partner for CATS. The North Carolina Department of Transportation (NCDOT) is one of North Carolina's largest state government agencies with responsibility for highways, rail, aviation, ferries, bicycle and pedestrian facilities and public transit. NCDOT operates annually on a \$3.9 billion budget funded by both state and federal sources and employs more than 14,000 employees. NCDOT is led by a Transportation Secretary and is governed by the North Carolina Board of Transportation. The Board is designated as the agency of the State of North Carolina responsible for administering all programs relating to public transportation. NCDOT's strong support of CATS' rapid transit projects is demonstrated in State Statute 136-44.20, which authorizes the NCDOT Board of Transportation and the Secretary to enter into State Full Funding Grant Agreements (FFGA) to provide State matching funds for "new start" fixed guideway projects upon completion and approval of projects into preliminary engineering and in anticipation of federal funding. For Charlotte's South Corridor Light Rail Project, NCDOT executed a State FFGA with the City of Charlotte for a 25 percent share of the project cost two years prior to the execution of the Federal FFGA. A further measure of the State's commitment to public transit is North Carolina House Bill 1005, which was signed into law in 2009 and provides financial support for rail projects that do not qualify for Federal funding.

20.1 LYNX BLE Northeast Corridor Light Rail Project Capital Costs

The Light Rail Alternative is estimated to cost \$1,205.5 million in year-of-expenditure dollars, and the Light Rail Alternative Sugar Creek Design option is assumed to cost \$1,277.0 million in year-of-expenditure dollars based on revised 15 percent design cost estimates (July 2009), with the addition of the estimated construction cost for the Vehicle Light Maintenance Facility. Table 20-1 provides a cost breakdown by standard cost category as required by FTA and includes soft costs (such as preliminary engineering, final design project management for design and construction) and set asides for financing costs and allocated and unallocated contingencies. A 3.25 percent annual capital cost escalation rate is assumed. Capital expenditures begin with Preliminary Engineering in FY2008 and continue through the end of the project in FY2022.

**Table 20-1
Capital Cost Estimate (Thousands of Year of Expenditure Dollars)**

Description	Light Rail Alternative	Light Rail Alternative - Sugar Creek Design Option
Guideway and Track Elements	\$208,099	\$213,464
Stations, Stops, Terminals, Intermodal	\$53,152	\$54,061
Support Facilities: Yards, Shops, Admin Buildings	\$54,137	\$55,596
Sitework and Special Conditions	\$148,948	\$158,920
Systems	\$118,699	\$120,581
Right-of-way, Land, Existing Improvements	\$124,099	\$171,531
Vehicles	\$159,851	\$159,851
Professional Services	\$188,951	\$191,736
Unallocated Contingency	\$107,039	\$107,831
Finance Charges	\$42,494	\$43,383
Total Project Capital Cost	\$1,205,469	\$1,276,954

20.2 Sources of Funds for General Capital Funds

The CATS long-range transportation plan includes two types of capital projects. The first category involves general capital investment. Examples of general capital projects are: replacing old buses and vanpool vehicles and keeping bus garages and shelters in a state of good repair. General capital projects are often funded by federal grants CATS receives each year on a formula basis, such as Section 5307 Urban Area Formula Assistance. These types of federal grants provide 80 percent of the funding for a project and the other 20 percent may come from CATS’ sales tax revenues and grants from the State of North Carolina. In some cases, such as building new maintenance garages, the financial analysis assumes that CATS will use securities known as Certificates of Participation (COPS), to spread the payments out over a 10 to 30-year period depending on the life of the asset.

As discussed in Section 20.0, NCDOT funded 25 percent of the cost of the LYNX Blue Line (South Corridor) light rail project and is committed to funding 50 percent of the local share of the Northeast Corridor capital costs. For Federal grant programs, other than Section 5309 New Starts, a local match is calculated based on 80 percent Federal and 20 percent local allocation. On most federal grant programs, NCDOT continues to fund half of the local 20 percent local share, i.e. 10 percent of the Project cost.

20.2.1 Federal Sources

FTA Section 5307 Federal Formula Funds: The Federal Formula Funds Program (49 U.S.C. 5307) makes federal resources available to urbanized areas for transit capital projects and for transportation planning. Federal Formula funds are apportioned annually on the basis of legislative formulas. For areas such as Charlotte with a population of 200,000 and more, the formula is based on a combination of bus revenue vehicle miles, passenger miles, fixed guideway revenue miles, fixed guideway route miles, population and population density.

FTA Section 5309 Discretionary: In addition to providing funds for new fixed guideway systems (New Starts), the federal transit capital investment program (49 U.S.C. 5309) provides capital assistance for modernization of existing rail systems and new and replacement buses and facilities.

FTA 5309 Fixed Guideway Modernization Program: A formula program that allocates funds to meet the capital replacement needs of rail systems and dedicated busways. The statutory formula for allocating funds contains seven tiers. Funding under the last three tiers (5, 6, 7) applicable to CATS is apportioned based on the latest available route miles and revenue vehicles miles on segments at least seven years old as reported to the National Transit Database (NTD). New facilities must be in operation for seven years to qualify for this program.

Congestion Mitigation Air Quality (CMAQ) Program: Jointly administered by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), the CMAQ program was reauthorized in 2005 under SAFETEA-LU. The CMAQ program provides over \$8.6 billion in funds to State DOTs, MPOs and transit agencies to invest in projects that reduce air pollutants emitted from transportation-related sources. The formula for distribution of funds, which considers an area's population by county and the severity of its ozone and carbon monoxide and ozone non-attainment/maintenance areas, is continued.

American Recovery and Reinvestment Act (ARRA), 2009: The System Capital Funding Plan includes \$20.8 million awarded to CATS in FY2010 from the Transit Capital Assistance formula of ARRA funds. This will be expended on a rehabilitation of the 28-year-old CATS Davidson Street Bus Facility.

Department of Homeland Security: CATS has received Department of Homeland Security Grant Funds since FY2007 and anticipates receiving them throughout this plan. As these grant funds are 100% funded by the Department of Homeland Security and require no local match, the corresponding Department of Homeland Security expenditures offset the anticipated revenues.

Section 5339 Planning: In FY2010, CATS received \$237,500 for completion of Alternatives Analysis on the Charlotte Streetcar Project.

20.2.2 State Sources

State Matching Funds: The State of North Carolina typically provides one-half of the local matching share required for Federal Transit Administration grants, such as Section 5307 Urban Area Formula Assistance and Section 5309 Bus Discretionary grants. Federal Highway Program grants applied to mass transit purposes may also be matched by the State of North Carolina.

State Technology Grants and Other: The State of North Carolina makes allocations to public transit agencies on a project-by-project basis for introduction of new technologies to improve transit operations.

20.2.3 Other Sources

Charlotte Area Transit System (CATS): CATS share of local matches would come from the ½-percent sales and use tax dedicated to undertaking future transit improvements and operating the current and expanded transit system. Voters in Mecklenburg County approved the sales tax in November 1998 and it has been collected since April 1999. By statute, revenues from the sales and use tax can only be applied to expenditures for planning, construction and operation of a county-wide public transportation system.

20.3 Sources of Funds for Corridor Capital Projects

The second type of CATS capital project involves corridor investments. This is the funding mechanism used to fund the LYNX Blue Line (South Corridor) and is anticipated for the LYNX BLE. Funding for the LYNX BLE project is planned to be funded 50 percent by federal grants, 25 percent by state grants and 25 percent by CATS from sales tax revenues.

The planned contributions for the LYNX BLE from each of the funding partners on an annual basis are shown in Table 20-2 for the Light Rail Alternative and in Table 20-3 for the Light Rail Alternative – Sugar Creek Design Option.

20.3.1 Federal Sources

FTA Section 5309 New Starts Program: The financial plan includes estimated funding for the Northeast Corridor from the New Starts program. FTA New Starts grants are expected to fund 50 percent of corridor capital investments. The FTA authorized the Northeast Corridor Light Rail Project (LYNX BLE) to advance into Preliminary Engineering in November 2007. The proposed project has received federal allocations from the New Starts program of \$4.65 million in Federal Fiscal Year (FFY) 2008 and \$20.3 million in FFY2009. The House and Senate have approved a \$14.7 million allocation as part of the Omnibus appropriations bill for FFY2010.

Table 20-2
Light Rail Alternative Scenario
(\$-millions)

Light Rail Alternative	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Total Project Cost in YOE Dollars	11.3	12.9	12.9	17.7	29.0	54.6	70.1	85.9	227.9	265.4	194.5	127.0	14.1	75.2	6.9	1205.5
Federal 5309 New Starts	0.0	2.0	23.2	14.7	30.0	30.0	0.0	47.4	100.0	100.0	100.0	100.0	14.4	37.6	3.5	602.7
State New Start Match – 25%	0.0	1.0	11.6	7.4	15.0	15.0	0.0	23.7	57.0	66.3	48.6	31.8	3.5	18.8	1.7	301.4
CATS 25%	11.3	10.0	0.0	0.0	0.0	0.0	0.0	52.4	70.9	99.0	37.3	0	0	18.8	1.7	301.4
Total Project Cost (10-100)	11.3	12.9	34.8	22.1	45.0	45.0	0.0	123.4	227.9	265.4	185.9	131.8	18.0	75.2	6.9	1205.5

Table 20-3
Light Rail Alternative – Sugar Creek Design Option Scenario
(\$-millions)

Light Rail Alternative	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Total Project Cost in YOE Dollars	11.5	13.1	14.8	23.1	33.0	68.2	70.4	56.4	161.2	296.5	275.3	169.3	8.0	68.8	7.4	1277.0
Federal 5309 New Starts	0.0	2.0	23.2	14.7	30.0	30.0	0.0	45.4	80.6	100.0	100.0	100.0	74.5	34.4	3.7	638.5
State New Start Match – 25%	0.0	1.0	11.6	7.4	15.0	15.0	0.0	22.7	40.3	74.1	68.8	42.3	2.0	17.2	1.8	319.2
CATS 25%	11.5	10.2	0.0	0.0	0.0	0.0	0.0	51.0	40.3	122.3	37.9	44.2	0.0	0.0	1.8	319.2
Total Project Cost (10-100)	11.5	13.1	34.8	22.1	45.0	45.0	0.0	119.0	161.2	296.5	206.8	186.5	76.5	51.6	7.4	1277.0

20.3.2 State Sources

North Carolina Department of Transportation: CATS is currently in discussions with NCDOT to replicate the funding agreement of the LYNX Blue Line (South Corridor) light rail project, in which the state participated in 25 percent of the total project costs.

20.3.3 Other Sources

Charlotte Area Transit System (CATS): Twenty-five percent of the proposed project’s total capital cost would be funded using revenues from the CATS ½-percent sales and use tax dedicated to undertaking future transit improvements and operating the current and expanded system. Voters in Mecklenburg County approved the sales tax in November 1998 and it has been collected since April 1999. By statute, revenues from the sales-and-use tax can only be applied to expenditures for planning, construction and operation of a county-wide public transportation system. The sales tax receipts in CATS capital revenues are the funds remaining after operating expenses are paid.

20.4 Capital Investment Program

The alternatives analyzed under this Draft Environmental Impact Statement (EIS) are described in detail in Chapter 2.0: Alternatives Considered and are summarized as follows:

- The No-Build Alternative assumes a fleet expansion to 372 buses in 2030 and the continued operation of the current LYNX Blue Line (South Corridor) light rail service. This compares to a current fleet of 324 in FY2010.
- The Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option are both being considered for the Northeast Corridor. In addition to the light rail line, CATS would improve bus service to the light rail stations, resulting in a bus fleet of 383 vehicles in FY2030.

Table 20-4 demonstrates characteristics of the alternatives.

**Table 20-4
2030 Characteristics of Financial Scenarios**

Characteristics	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Peak Buses – 2030	310	319	319
Bus Fleet – 2030	372	383	383
Annual Revenue Bus Hours	991,712	1,027,178	1,027,178
Annual Unlinked Trips (Bus)	37,697,550	40,883,056	40,883,056
Annual Unlinked Trips - Rail	7,074,900	14,241,000	14,241,000

The funding sources and expenditure categories for the entire CATS capital program under the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option are shown in Tables 20-5 and 20-6.

**Table 20-5
CATS Sources of Capital Funding Expenditures – Light Rail Alternative**

Capital Revenues	2010-2030 Total
Non-Federal Capital Funds	
Balance from Operations	\$694,042
Net Debt Proceeds	\$195,000
Investment and Other Capital Income	\$42,827
CATS Capital Funds	\$931,869
State Match for Section 5307 - Formula Funds	\$66,729
State Match for Proposed New Start - Northeast Corridor	\$300,387
State Match for Section 5309 - Bus and CMAQ	\$1,900
State Match for Section 5309 - Fixed Guideway Modernization	\$7,413
State Technology Grants & Other	\$4,190
State Capital Funds	\$380,619
Total Non-Federal Sources	\$1,312,488
Federal Funds	
Section 5307 - Formula Funds	\$546,465
Section 5339 - Planning	\$237
Proposed New Start - Northeast Corridor	\$600,775
Section 5309 - Fixed Guideway Modernization	\$59,362
Section 5309 - Bus, CMAQ	\$34,704
ARRA Grant, Homeland Security Grant and Other	\$56,850
Total Federal Funds	\$1,298,392
Total Capital Revenues	\$2,610,880
Capital Expenditures	
Bus and Bus Amenities, Rail Facilities and Equipment, and Other Capital	\$769,035
State of Good Repair	\$54,613
Rapid Transit Program	
Proposed New Start - Northeast Corridor	\$1,185,975
Other Corridors	\$21,071
Total Capital Expenditures	\$2,030,695
Total Debt Service Expenditures	\$422,637
Balance, Capital Program	\$157,548

**Table 20-6
CATS Sources of Capital Funding and Expenditures
Light Rail Alternative – Sugar Creek Design Option
Year-of-Expenditure Dollars (thousands)**

Capital Revenues	2010-2030 Total
Non-Federal Capital Funds	
Balance from Operations	\$690,143
Net Debt Proceeds	\$210,000
Investment and Other Capital Income	\$46,916
CATS Capital Funds	\$947,059
State Match for Section 5307 - Formula Funds	\$66,729
State Match for Proposed New Start - Northeast Corridor	\$318,259
State Match for Section 5309 - Bus and CMAQ	\$1,900
State Match for Section 5309 - Fixed Guideway Modernization	\$7,413
State Technology Grants and Other	\$4,190
State Capital Funds	\$398,491
Total Non-Federal Sources	\$1,345,549
Federal Funds	
Section 5307 - Formula Funds	\$546,465
Section 5339 - Planning	\$237
Proposed New Start - Northeast Corridor	\$636,517
Section 5309 - Fixed Guideway Modernization	\$59,361
Section 5309 - Bus, CMAQ	\$34,704
ARRA Grant, Homeland Security Grant and Other	\$56,850
Total Federal Funds	\$1,334,133
Total Capital Revenues	\$2,679,682
Capital Expenditures	
Bus and Bus Amenities, Rail Facilities and Equipment, and Other Capital	\$757,084
State of Good Repair	\$54,613
Rapid Transit Program	
Proposed New Start - Northeast Corridor	\$1,257,460
Other Corridors	\$21,071
Total Capital Expenditures	\$2,090,228
Total Debt Service Expenditures	\$436,310
Balance, Capital Program	\$153,144

20.5 Operating Program

20.5.1 Operating Income

CATS operating program is predominantly funded from two key sources: farebox and the dedicated ½-percent sales and use tax. Additional sources of operating income include: service reimbursements; interest income; maintenance of effort payments by the City of Charlotte, Mecklenburg County and the Town of Huntersville; State maintenance assistance; and other miscellaneous sources.

½-Percent Sales and Use Tax: Effective August 21, 1997, Subchapter VIII of Chapter 105 of the North Carolina General Statutes was amended to add a new Article 43, Local Government Public Transportation Sales and Use Tax Act, which authorized the collection of a ½-percent sales and use tax in Mecklenburg County, with proceeds from the new tax to be used exclusively for public transportation. On November 3, 1998, Mecklenburg County voters approved the measure in a referendum to support the implementation of the *2025 Integrated Transit/Land Use Plan*, and the Mecklenburg Board of County Commissioners passed a resolution on February 16, 1999 levying the tax effective April 1, 1999. From FY2003 to FY2008, the ½-percent sales and use tax has averaged an annual growth rate of 7.3 percent and generated between 55-60 percent of CATS total operating income, and is projected to continue doing so throughout the analysis period. The FY2008-10 recession in the national economy significantly impacted income from the ½-percent sales and use tax in FY2009. It is too early to determine the long-term impact of the FY2008-10 recession. CATS has established projected sales tax growth in concurrence with prior economic recessions and recoveries. In terms of annual average growth rates, CATS projects a 3.5 percent growth in FY2011, 5.5 percent in FY2012, and 7.5 percent in FY2013-2015, followed by a long term growth rate of 5.5 percent, as shown in Table 20-7.

Farebox: Farebox revenue totaled approximately \$21.7 million in FY2009 and is forecast to grow to \$80.1 million in FY2030. Farebox revenue estimates are the product of ridership estimates and average fare assumptions. The Operating Plan breaks the farebox revenue into two sources, i.e. existing system (which includes fares from the LYNX Blue Line light rail service in the South Corridor) and proposed fares from the LYNX BLE.

Maintenance of Effort: Annual payment from the City of Charlotte, Mecklenburg County, and the Town of Huntersville in the amount of \$18.6 million (with no escalation). This payment is required by statute and is a condition for CATS to receive its sales and use tax revenue. It has remained constant at the \$18.6 million level since FY1999.

Service Reimbursements: These are fees collected pursuant to local transportation partnership CATS has with various local entities, including the UNC Charlotte campus circulator and the Wachovia CIC shuttle. Regional Express Services are also included in the service reimbursement revenues. Service reimbursements amount to approximately \$1.4 million in FY2010-11, and are projected to escalate at 4.0 percent per annum thereafter.

Interest Income: The financial analysis assumes a long-term interest rate on fund balances of approximately 3.0 percent.

State Maintenance Assistance Program (SMAP): NCDOT provides operating assistance to transit properties in North Carolina on an annual basis. NCDOT's annual appropriation for SMAP to its urban areas has remained constant over the past few years. From FY2008-2010, CATS has received approximately 38 percent of NCDOT's SMAP appropriation. It is projected that this income will escalate at 4.0 percent per annum from FY2011. The anticipated escalation is based on CATS working with NCDOT to modify the current SMAP formula, which does not currently include light rail in the calculation.

**Table 20-7
2000 - 2020 CATS Sales Tax Revenues (millions)**

	ACT 2000	ACT 2001	ACT 2002	ACT 2003	ACT 2004	ACT 2005	ACT 2006	ACT 2007	ACT 2008	ACT 2009	BUD 2010
Sales Tax	\$53.1	\$54.9	\$51.1	\$50.1	\$53.9	\$59.0	\$65.6	\$70.4	\$71.1	\$61.7	\$62.7
Growth Rate		3.4%	-7.0%	-1.9%	7.6%	9.6%	11.1%	7.3%	1.0%	-13.2%	1.6%
	PROJ 2011	PROJ 2012	PROJ 2013	PROJ 2014	PROJ 2015	PROJ 2016	PROJ 2017	PROJ 2018	PROJ 2019	PROJ 2020	
Sales Tax	\$64.9	\$68.5	\$73.6	\$79.1	\$85.1	\$89.8	\$94.7	\$99.9	\$105.4	\$111.2	
Growth Rate	3.5%	5.5%	7.5%	7.5%	7.5%	5.5%	5.5%	5.5%	5.5%	5.5%	

20.5.2 Operating Expense

In the Light Rail Alternative and the Light Rail Alternative – Sugar Creek Design Option about 60 percent of CATS future operating expenses would be for bus services on existing and expanded routes. The LYNX Blue Line (South Corridor) light rail service represents approximately 10 percent of CATS' total operating expenses from 2010 – 2030. Vanpools and special transportation services for disabled and human services recipients (Paratransit Services) are projected to require over \$326 million or over 8 percent of all expenses. More than 4 percent of CATS' operating expenses would be for administrative costs. The LYNX BLE (Northeast Corridor) light rail operations are anticipated to consume approximately 5 percent of all operating expenses. The remaining 11 percent of operating expense would be for Direct Support services such as Transit Security and Facilities Maintenance. A summary is depicted in Tables 20-8 and 20-9.

**Table 20-8
2010 – 2030 CATS Operating Revenue and Expense
Light Rail Alternative
Year-of-Expenditure Dollars (thousands)**

Operating Revenue	2010-2030	
Existing System Fares	\$933,532	20.9%
Proposed Northeast Corridor Fares	\$105,673	2.4%
Service Reimbursements	\$44,693	1.0%
Interest Income	\$75,358	1.7%
Maintenance of Effort	\$390,587	8.7%
State Operating Assistance	\$435,931	9.8%
Other	\$38,772	0.9%
½ -percent Sales Tax	\$2,445,181	54.6%
Operating Revenues	\$4,469,728	100.0%
Operating Expense	2010-2030	
Bus Direct O & M	\$2,337,420	60.3%
Other Direct Services	\$450,845	11.6%
Paratransit and Vanpool	\$326,784	8.4%
South Corridor	\$386,059	10.0%
Northeast Corridor	\$207,892	5.4%
Administrative Overhead	\$168,209	4.3%
Operating Expenses	\$3,877,209	100.0%
Operating Balance	\$592,519	

Table 20-9
2010 – 2030 CATS Operating Revenue and Expense
Light Rail Alternative – Sugar Creek Design Option
Year-of-Expenditure Dollars (thousands)

Operating Revenue		2010-2030	
Existing System Fares	\$933,532	20.9%	
Proposed Northeast Corridor Fares	\$105,673	2.4%	
Service Reimbursements	\$44,693	1.0%	
Interest Income	\$71,459	1.6%	
Maintenance of Effort	\$390,587	8.7%	
State Operating Assistance	\$435,931	9.8%	
Other	\$38,772	0.9%	
Half-Cent Sales Tax	\$2,445,181	54.8%	
Operating Revenues	\$4,465,829	100.0%	
Operating Expense		2010-2030	
Bus Direct O & M	\$2,337,419	60.3%	
Other Direct Services	\$450,845	11.6%	
Paratransit and Vanpool	\$326,784	8.4%	
South Corridor	\$386,059	10.0%	
Northeast Corridor	\$207,892	5.4%	
Aministrative Overhead	\$168,209	4.3%	
Operating Expenses	\$3,877,208	100.0%	
Operating Balance	\$588,620		

20.6 Financial Projections

Table 20-10 summarizes the results of the three financial scenarios corresponding to the alternatives analyzed in this Draft EIS by adding together CATS capital and operating revenues and expenses. Year-by-year cash flow calculations were completed for each alternative to support these findings. CATS has the fiscal capacity to build the Light Rail Alternative or its design option in the Northeast Corridor and operate its existing bus and light rail services with an ending balance in 2030 of approximately \$158 million for the Light Rail Alternative and \$153 million for the Light Rail Alternative – Sugar Creek Design Option. The state and local funding sources to accomplish this program are already committed in the form of the CATS sales and use tax and creation of the State Transit Trust Fund.

Table 20-10
2010 – 2030 Capital and Operating Summary Forecast
Year-of-Expenditure Dollars (thousands)

	2010-2030	2010-2030	2010-2030
	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option	No-Build
Opening Balance	\$101,523	\$101,523	\$101,523
Operating Revenue			
Existing System Fares	\$933,532	\$933,532	\$918,004
Proposed Northeast Corridor Fares	\$105,673	\$105,673	\$0
Service Reimbursements	\$44,693	\$44,693	\$44,693
Interest Income	\$75,358	\$71,459	\$152,042
Maintenance of Effort	\$390,587	\$390,587	\$390,587
State Operating Assistance	\$435,931	\$435,931	\$435,931
Other	\$38,772	\$38,772	\$38,772
Half-Cent Sales Tax	\$2,445,181	\$2,445,181	\$2,445,181
Operating Revenues	\$4,469,728	\$4,465,829	\$4,425,210
Operating Expense			
Bus Direct O & M	\$2,337,420	\$2,337,419	\$2,337,420
Other Direct Services	\$450,845	\$450,845	\$438,843
Paratransit and Vanpool	\$326,784	\$326,784	\$326,784
South Corridor	\$386,059	\$386,059	\$386,059
Northeast Corridor	\$207,892	\$207,892	\$0
Aministrative Overhead	\$168,209	\$168,209	\$168,209
Operating Expenses	\$3,877,209	\$3,877,208	\$3,657,315
Operating Balance	\$592,519	\$588,620	\$767,895
Capital Revenues			
Federal Grants	\$1,298,391	\$1,334,134	\$735,507
State Grants	\$380,619	\$398,491	\$99,177
Other Capital Funds	\$237,827	\$256,916	\$333
CATS Operating Balance	\$592,519	\$588,620	\$767,895
Capital Revenues	\$2,509,356	\$2,578,160	\$1,602,912
Capital Expense			
Debt Service	\$422,637	\$436,310	\$255,320
Other Capital Outlays	\$823,648	\$811,697	\$797,608
Rapid Transit Expansion	\$1,207,046	\$1,278,531	\$81,277
Capital Expense	\$2,453,331	\$2,526,539	\$1,134,205
Balance	\$157,548	\$153,144	\$570,230

20.7 Forecast Risks

Long-range financial forecasts hold risks that revenue projections will fall short or expenses will grow faster than expected. If costs should grow, or federal funding is delayed, CATS has the financial capacity to borrow against its future revenues. Additional debt capacity exists if necessary. Spreading out large capital construction costs, like using a mortgage to finance buying a home, gives CATS flexibility in matching revenues and future cash outlays. The financing scenarios demonstrate that CATS has the fiscal capacity to build either of the light rail scenarios as long as the ½-percent sales tax stabilizes and bus ridership projections are realized.

Capital Costs: Should the capital costs for the Light Rail Alternative exceed the \$1,205.5 million budget by \$60 million (approximately 5 percent), CATS could address the higher costs with additional debt. This scenario is run by assuming that an additional \$20 million in debt proceeds would offset the increase in capital expenditures. However, debt service payments would increase by \$19.0 million in years FY2019-30 (assuming 30-year debt and a fixed 5.0 percent interest rate). Should this need arise, CATS would still be able to maintain a minimum gross debt service coverage ratio of 3.0x and net debt service coverage ratio of 1.15x in all years except 2019 (1.12x), and a minimum annual fund balance of \$100 million.

½-percent Sales Tax: The projections assume an average ½-percent sales tax growth rate of 5.5 percent in FY2016 through FY2030 versus the 7.3 percent average growth rate realized between FY2003 and FY2008. Should a lower average growth rate of 5.25 percent be assumed, CATS would still be able to maintain a minimum gross debt service coverage ratio of 3.0x and net debt service coverage ratio of 1.15x in all years except 2020 -2028, where the ratio fell to a low of 1.08x. A minimum fund balance of \$100 million would be maintained in all years and the fund balance would total \$113.7 million in FY2030. Because the ½-percent sales tax revenue comprises approximately 60 percent of CATS' operating revenue in the base case financial projections, a reduction in the sales tax growth rate may be considered a surrogate for several different downside scenarios in the operating program (e.g. lower ridership, lower fares, higher bus operating costs, etc.).

21.0 EVALUATION OF ALTERNATIVES

This chapter evaluates how the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) would meet the Purpose and Need (Chapter 1.0) and evaluates the effectiveness of the alternatives under consideration. The information in this chapter is derived from the other chapters of this Draft Environmental Impact Statement (EIS) and provides the basis for decision-makers and the public to assess the benefits, costs and environmental consequences against the goals of the proposed project. Equity considerations and trade-offs are also presented.

21.1 Project Goals and Effectiveness

The goals established for the LYNX BLE were based on the principles developed for the Northeast Corridor Major Investment Study (MIS). The principles stem from the transit goals established for the *Centers and Corridors Concept Plan* (1994) and the *2025 Integrated Transit/Land Use Plan* (1998). Objectives from the updated *Centers, Corridors and Wedges Growth Framework*, Draft 2010, were also considered. The goals and objectives of the proposed project are as follows:

Goal 1 – Land use: Support the region’s Centers, Corridors and Wedges vision

Objectives:

- Provide transit improvements that are consistent with land use plans and policies
- Provide transit improvements that are compatible with existing or desired community character, as well as neighborhood preservation
- Provide transit connections to transit-supportive areas
- Support existing and planned land use patterns
- Promote transit-supportive development within station areas
- Provide a strong link to integrating land use and transportation
- Promote growth in an area that can support new development and away from areas that cannot support new development

Goal 2 – Mobility: Improve access and mobility in the corridor and throughout the region; Increase transit ridership; Improve quality of transportation service

Objectives:

- Offer people a choice in meeting mobility needs
- Reduce dependence on congested roadways
- Increase transit ridership
- Increase transit mode share
- Provide travel time savings
- Provide service for transit-dependent populations
- Provide connections to activity centers, special event venues, and cultural sites
- Improve convenience and reliability of transit service

Goal 3 – Environment: Preserve and protect the environment

Objectives:

- Minimize disruptions to communities
- Minimize negative effects on natural resources
- Minimize negative effects on cultural resources
- Support air quality improvements
- Support sustainable growth in the region

Goal 4 – Financial: Develop affordable, cost-effective transportation solutions

Objectives:

- Ensure capital and operating and maintenance costs are consistent with funding levels
- Minimize operating and maintenance costs
- Optimize cost-effectiveness

Goal 5 – System Integration: Develop transportation improvements that function as part of the larger transportation system

Objectives:

- Develop improvements that provide through-service and connections to other corridors
- Ensure operating efficiency
- Balance use of system capacity

The effectiveness of the proposed project is the extent to which an alternative accomplishes the purposes that the proposed project is intended to address. The following sections evaluate the effectiveness of each of the five goals established for the proposed project.

21.1.1 Effectiveness of Goal 1: Support the region's Centers, Corridors and Wedges vision

The No-Build Alternative would not support the region's Centers, Corridors and Wedges vision, as the Northeast Corridor would not implement a fixed guideway transit option that would allow the corridor to effectively combine transit and land use plans. Under the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, the proposed LYNX BLE project would support the *Centers, Corridors and Wedges Growth Framework*, Draft 2010, for the Charlotte-Mecklenburg region (see Chapter 4.0: Land Use, Public Policy and Zoning). As envisioned in these plans, future development would be focused into areas that can support new development, or are in need of redevelopment, and away from areas that cannot support new growth. The highest intensity of development would be encouraged around transit stations. By focusing future growth in corridors with multiple travel alternatives, the region would be able to grow in a manner that promotes continued access and mobility and that enhances the quality of life for residents and employees. Both the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would support that vision.

To determine the LYNX BLE's effectiveness in supporting the above land use goals, population and employment densities were evaluated. The total population within the Northeast Corridor is approximately 89,360 persons and is projected to increase 41 percent by 2030. The Center City itself is projected to experience a population increase of 208 percent persons between 2008 and 2030. The total employment within the Northeast Corridor is approximately 79,736 jobs and is estimated to grow by 60 percent to 127,317 by 2030. The largest employment area in the corridor (outside of Center City Charlotte) is the University City area, which includes University Research Park, University Place and the University of North Carolina at Charlotte (UNC Charlotte). Employment within Center City Charlotte is 68,630 jobs and is projected to increase 62 percent to 111,069 jobs by 2030.

Under the No-Build Alternative, existing and future populations and employment within the corridor would continue to be served by the bus system, with some expansion of bus service in the future. As such, population growth and employment growth within the corridor may not be concentrated for effective service by transit. Under the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, these populations and employment centers would be better focused to station areas, thereby allowing a more effective use of transit and land use plans.

Neighborhood preservation is an important component of the Centers, Corridors and Wedges vision that should also be supported. While the No-Build Alternative would be compatible with existing community character, it would not be effective in encouraging certain desired elements of community character such as revitalization and connectivity. The Light Rail Alternative and Light Rail Alternative – Sugar Creek

Design Option, however, would be effective in encouraging such character. For example, the proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would alter existing land uses at proposed station locations. Station Area Plans would be formally adopted and implemented. In addition, a Northeast Corridor Infrastructure (NECI) program is under development and would consist of multi-modal improvements (e.g. intersection enhancements, improved connectivity, streetscape improvements, sidewalks, and bicycle routes) to enhance access to neighborhoods and business and to promote transit-oriented development in the station areas.

The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would introduce new elements into the proposed project corridor. These new elements include: the light rail vehicles and trackway; station platforms and park-and-ride lots; the overhead catenary system; electrical substations, signal houses, and crossing cases; and, bridges and retaining walls. To minimize the potential visual and physical effects of the proposed light rail project, the City of Charlotte and the Charlotte Area Transit System (CATS) have employed three key techniques aimed at providing a well designed project that fits into the context of its surrounding environment. These include: the development of station area plans; incorporation of the *Urban Design Framework* into the proposed project's design criteria; and, the Art in Transit Program. With these techniques, the proposed project would provide improvements that are compatible with existing or desired community character. As the majority of the proposed Light Rail Alternative or Light Rail Alternative – Sugar Creek Design Option would be constructed within existing transportation corridors (rail and roadway), neighborhood preservation goals would be attained.

21.1.2 Effectiveness of Goal 2: Improve access and mobility in the corridor and throughout the region; increase transit ridership; improve quality of transportation service

Improve access and mobility

Under the No-Build Alternative, improvements to access and mobility would be limited to additional bus service within the Northeast Corridor as the No-Build Alternative includes improvements to service frequency for six routes. Under the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, 13 transit stations with connections to bus service and park-and-ride options would be created. The proposed Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would improve mobility in areas with the highest levels of employment in the Charlotte metropolitan area, including Center City Charlotte and the University City area (as described in Section 21.1.1). The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would also improve access to transit by providing station facilities, more frequent and reliable service, pedestrian and bicycle improvements, and parking facilities. In addition, the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would provide a seamless and direct connection to destinations along the existing LYNX Blue Line light rail service.

Since the Northeast Corridor is comprised of a large number of residents that are transit-dependent, access to travel is a major concern for area households. Ten percent of the housing units in the corridor have no vehicles available to travel to and from work or for any other purpose. The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would also improve mobility and access in areas with large numbers of residents who are transit-dependent.

Increase transit ridership

The Northeast Corridor, which has few arterials and minimal cross-town connections, has several major roadways and intersections currently experiencing peak hour volumes that exceed capacity. Approximately 23 percent of the existing intersections along the project operate at congested levels of service. Much of the growth in the Charlotte-Mecklenburg region in the 1980s and 1990s occurred quickly in a dispersed pattern of jobs and residences with limited connectivity between uses. These land use patterns have resulted in people driving more and making longer trips, leading to traffic volumes that exceed roadway capacity and result in unacceptable levels of service in many locations throughout the region. Projections show that high growth rates will continue, further burdening the regional transportation system. The regional model indicates that the region is expected to experience a projected 57 percent increase in regional person trips, a 59 percent increase in daily Vehicle Miles Traveled (VMT), and a 70 percent increase in daily Vehicle Hours Traveled (VHT) from 2008 to 2030. Continued population and

employment growth are expected to increase travel demand, resulting in deteriorating conditions on area roadways, despite planned roadway widening and intersection improvements. Traffic volumes are expected to increase on nearly all area roadways, especially at the outer end of North Tryon Street/US-29, where volumes are expected to roughly double by 2030.

The Northeast Corridor is a major employment, shopping and educational destination from all across the region, anchored by Center City Charlotte at the southern end and University City at the northern end. As such, the Northeast Corridor is a major generator of trips from throughout the region, as well as a significant number of intra-corridor trips. Based on adopted land use policies, the travel market between corridors will strengthen. Connections between the Center City campus and the main campus of UNC Charlotte will be important. In addition, special events and tourism are another travel market in the corridor.

The Light Rail Alternative would operate in a dedicated right-of-way, free from traffic congestion; therefore it is projected that the Light Rail Alternative would provide a significant travel time savings over the No-Build Alternative. For this reason, total transit trips would be greater for the Light Rail Alternative than for the No-Build Alternative, and dependency on highly congested roadways would be reduced. The Light Rail Alternative would also increase transit ridership. Compared to the No-Build Alternative, approximately 18,300 additional riders would utilize transit under the Light Rail Alternative. Ridership on the light rail system is projected to increase from 23,700 daily riders on the existing LYNX Blue Line under the No-Build Alternative, to a total of 47,500 daily light rail boardings for the entire alignment (South to Northeast) under the Light Rail Alternative; this represents an addition of 23,800 riders per day on the light rail system alone. It is expected that transit times and trips under the Light Rail Alternative – Sugar Creek Design Option would be comparable to the Light Rail Alternative.

Improve quality of transportation service

As noted, the Light Rail Alternative has the advantage of providing faster service over the No-Build Alternative. For example, when comparing peak hour travel times from UNC Charlotte to Center City Charlotte, the Light Rail Alternative would take just over 25 minutes for in-vehicle travel times, whereas under the No-Build Alternative, the in-vehicle travel time using bus service would take nearly 58 minutes. Comparable travel by automobile would take nearly 36 minutes to travel from UNC Charlotte to Center City Charlotte.

The proposed project would improve the quality of transportation service by providing a frequent and reliable service in the Northeast Corridor. Congestion on arterial roadways and highways influence the reliability of travel by automobile and bus. Light rail traveling in dedicated right-of-way would not be subject to congested roadway conditions, resulting in dependable and on-time service. The proposed project would travel between major growth and employment centers with six-minute to ten-minute headways during peak periods.

An analysis of over 55 intersections was conducted to determine the effects of the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option on traffic operations within the corridor. The analysis generally shows minor increases in automobile delay with the Light Rail Alternative, compared to the No-Build Alternative. Additional signalized intersections, turn lanes, and grade separations were included in the project design to address potential traffic impacts.

Table 21-1 provides a comparison of mobility improvements for the alternatives.

Table 21-1
Comparison of Mobility Improvements

	No-Build Alternative	Light Rail Alternative ¹
Total Daily Light Rail Boardings	23,700	47,500
Total Daily Transit Ridership	83,041	101,302
Annual Trips to Special Markets (Stadium, Arena, Convention Center, UNC Charlotte)	n/a	1,212,068
Transit System User Benefits (annual hours of travel time savings) ²	n/a	2,891,383 - 3,820,570 ²
Service Reliability	Low	High

¹ No Difference between Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option

² Range is based on the Light Rail Alternative compared to the TSM Alternative modeled as a Premium Mode (similar to rail) versus the TSM Alternative as a Non-Premium Mode (bus).

Source: CATS LYNX BLE, Northeast Corridor, FY11 New Starts Submittal Mobility and Cost-Effectiveness Template; AECOM, Metrolina User Benefit Summary, FY11 New Starts forecasts

21.1.3 Effectiveness of Goal 3: Preserve and protect the environment

During the Draft EIS, a range of environmental impacts were analyzed with the intent to preserve the natural and cultural richness of the project area. The impacts that were assessed included the effects of the No-Build, Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option on natural and human resources, including: land use, socio-economics, visual and aesthetic character, historical and archeological resources, air quality, noise and vibration, energy, utilities, hazardous and contaminated materials, protected species, wetlands and surface waters, parklands, and neighborhoods, community services, environmental justice populations. Chapters 3.0 through 19.0 provide a thorough discussion of the probable impacts of the No-Build, Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option. Table ES-1 in the Executive Summary provides a summary of the environmental impacts.

The No-Build Alternative would result in fewer impacts to natural resources. However, the No-Build would result in increased daily VMT (approximately 141,259 more than under the Light Rail Alternative), increased auto emissions, and thus could impact regional air quality conformity. The No-Build Alternative would result in greater impacts to socio-economic conditions in that it would not create as many jobs or encourage investment along the corridor.

Under the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, land use and transportation plans would be implemented. Impacts to natural resources would be limited primarily to wetland and stream impacts, noise and visual impacts, and visual and aesthetic impacts. However, mitigation measures are expected to minimize these impacts. Additionally, it is anticipated that the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would result in a decrease in VMTs, thereby reducing auto emissions, which are known to have a negative impact on air quality.

21.1.4 Effectiveness of Goal 4: Develop affordable, cost-effective transportation solutions

Affordability is measured by the financial feasibility of an alternative, which is the extent to which sufficient funding is available or can be developed, to support construction, operation and maintenance. The financial capacity of the proposed project rests on the demonstrated strength of the voter-approved ½-percent sales and use tax, the City of Charlotte’s AAA investment bond rating, and CATS Financial Policies, which require an annual year-end \$100 million unobligated fund balance. The estimated capital cost of the proposed Light Rail Alternative is \$948.6 million (2009 dollars). The Light Rail Alternative – Sugar Creek Design Option would cost an additional estimated \$57.9 million (2009 dollars). CATS’ system-wide operations and maintenance costs are expected to be approximately \$112.7 million annually for the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, compared to \$95.7 million for the No-Build Alternative. A review of operating and capital revenues and expenses reveals a positive balance for the No-Build, Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option (Chapter 20.0: Financial Analysis). CATS has the fiscal capacity to build either the Light Rail Alternative or Light Rail Alternative – Sugar Creek Design Option in the Northeast Corridor and operate

the existing bus and light rail services with an ending balance in 2030 of approximately \$165 million for the Light Rail Alternative and \$143 million for the Light Rail Alternative – Sugar Creek Design Option. The state and local funding sources to accomplish this program are already committed in the form of the CATS sales and use tax and creation of the State Transit Trust Fund. Therefore, it is anticipated that the proposed project could be built within project budget and could be operated and maintained with available revenue.

Cost-effectiveness is the extent to which an alternative provides a level of benefit that is commensurate with its costs (and relative to other alternatives). The cost-effectiveness index is used to determine the advantages of the proposed project, and is determined by a formula in the Federal Transit Administration’s (FTA) New Starts Criteria (*Technical Guidance on Section 5309 New Starts Criteria*, 1997). The formula inputs difference in annualized capital and operating costs between the Light Rail Alternative and the Baseline/TSM Alternative divided by the annualized user benefits (travel time savings) for the Light Rail Alternative compared to the Baseline/TSM Alternative, i.e., the annualized cost per hour of travel time savings. The cost effectiveness value for the Light Rail Alternative is \$16.59, meaning that is the average cost per new rider. The Light Rail Alternative – Sugar Creek Design Option was not evaluated for cost effectiveness since the Metropolitan Transit Commission (MTC) adopted the proposed Light Rail Alternative as the preferred route for the proposed project on April 22, 2009; however, as capital costs are \$57,980,000 more for the design option, it would be less cost effective.

**Table 21-2
Comparison of Costs and Cost-Effectiveness**

	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
Estimated Capital Cost, (millions of dollars, 2009)	\$0.0	\$948.6	\$1,006.5
Annual O&M Costs (millions of dollars, 2009)	\$95.7	\$112.7	\$112.7
Cost-Effectiveness ¹	n/a	\$16.59 – \$21.22 ²	n/a
Operating Cost per Passenger Mile	n/a	\$0.70	\$0.70

¹ Incremental annualized cost in forecast year divided by annualized user benefits (FTA New Starts Criteria)

² Range is based on the Light Rail Alternative compared to the Baseline/TSM Alternative modeled as a Premium Mode (similar to rail) vs. a Non-Premium Mode (bus). FY11 New Starts Report cost-effectiveness was \$16.01-\$20.45. The table reflects the revised 15% cost estimate with the VLMF cost.

Source: CATS LYNX BLE Cost-Effectiveness Templates, 2010.

21.1.5 Effectiveness of Goal 5: System Integration

As previously described, the region’s Center, Corridors and Wedges vision is vital to the success of combining transit and land use plans within the Northeast Corridor. Part of that vision is development of improvements within each of the five targeted corridors that facilitates through service and connections among the corridors. The planned improvements are outlined in the *2030 Transit Corridor System Plan* (2006). As the No-Build Alternative would not support the region’s Centers, Corridors and Wedges vision, this alternative would not fulfill Goal 5. The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option, however, would as those alternatives focus growth in corridors with multiple travel alternatives that promotes continued access and mobility within the system.

21.2 Equity

Equity is the extent to which each alternative provides fair distribution of benefits, costs and impacts across various subgroups in the corridor. The benefits to land use, access and mobility, and environment would be realized by residents within the proposed corridor, while some potential impacts would occur to those same residents. The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would improve access and mobility within the proposed project corridor, thereby improving access to employment centers, educational facilities and cultural/recreational/entertainment facilities. It is not anticipated that any one group would receive a disproportionate benefit, or lack of benefit, of these uses. Furthermore, it is not expected that any one group would receive a disproportionate share of the financial burden of the proposed project. The proposed project would be funded by a combination of federal, state,

and local funds. Existing funding structures would continue to support other services and capital programs throughout the proposed project corridor and beyond.

Overall, the proposed LYNX BLE would improve accessibility for all communities of concern including low-income, minority and transit-dependent populations. While some impacts would occur within these communities, these impacts would be minimal compared with the proposed project's benefits to the larger environmental justice populations, including increased accessibility, a new mode choice, and reduced travel times to/from Center City Charlotte.

21.3 FTA New Starts Criteria and Project Status

The proposed project is following the FTA planning and project development process for projects that are considered new start fixed guideway or rail projects, called "New Starts." New Start projects, such as the proposed LYNX BLE, are those for which the local transit agency (i.e. CATS) is seeking discretionary federal funding from the Section 5309 New Starts Program. In accordance with federal transportation law, called the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU), FTA has developed and uses the *New Starts Criteria* to decide whether projects may advance into preliminary engineering or final design, and to evaluate and rate projects in support of funding recommendations.

A project that does not have an overall project rating of "Medium" or better cannot advance into the next phase of FTA's project development process. Projects must receive an overall rating of at least "Medium" to be eligible to receive Section 5309 funding. Each year FTA submits its *Annual Report on Funding Recommendations* to Congress as a companion document to the annual budget submitted by the President. The report provides recommendations for the allocation of New Starts funds under Section 5309 of Title 49 of the United States Code. As required by SAFETEA-LU, FTA uses the following project justification criteria to evaluate New Starts projects: mobility improvements; environmental benefits; cost effectiveness; operating efficiencies; transit-supportive land use policies, existing and future land use patterns, and economic development; and other factors. FTA must also consider the local financial commitment for the proposed project. In total, the criteria are intended to measure the overall merits of the project and the sponsor's ability to build and operate it. The most recent report, which is for fiscal year 2011, is located at the following webpage, with the LYNX BLE presented on page A-153: http://www.fta.dot.gov/publications/reports/reports_to_congress/publications_11092.html

FTA reviews the project justification and local financial commitment criteria for each candidate project and assigns a rating for each criterion. For some of the project justification criteria, the proposed project is compared against a New Starts "baseline alternative", in this case is the TSM Alternative. The New Starts baseline alternative consists of improvements to the transit system that are relatively low in cost and represent the "best that can be done" to improve transit without a major capital investment in new transit guideway infrastructure. As such, the New Starts baseline alternative is usually different from the No-Build Alternative which is the NEPA baseline against which environmental impacts are measured in this Draft EIS.

A candidate project is given an overall rating of "High", "Medium-High", "Medium", "Medium-Low" or "Low", based on ratings assigned by FTA to each of the project justification and local financial commitment criteria described above. These ratings are important, as FTA considers them in its decision to recommend projects for New Starts funding. Specifically, FTA will not recommend funding for projects which are rated "Medium-Low" or "Low." Moreover, Federal budget constraints mean that a "High", "Medium-High" or "Medium" rating does not automatically translate into a funding recommendation, although the potential for receiving New Starts funding is much greater with these ratings.

The New Starts evaluation of a project is an on-going process. FTA's evaluation and rating occurs annually in support of budget recommendations presented in the *Annual Report on Funding Recommendations* and intermittently when the project sponsor requests FTA approval to enter into preliminary engineering or final design. Consequently, as proposed New Starts projects proceed through the project development process, information concerning costs, benefits, and impacts is refined and the

ratings are updated to reflect new information. The following sections represent FTA’s most recent rating of the LYNX BLE, which results in an overall project rating of “Medium.” A summary of the ratings reported in the *Annual Report of Funding Recommendations, Fiscal Year 2011*, for the LYNX BLE is provided in Table 21-3. The proposed project was advanced into Preliminary Engineering based on this rating.

**Table 21-3
Summary of New Starts Criteria Ratings
LYNX BLE Northeast Corridor Light Rail Project**

Category	Rating
Project Justification	Medium
Mobility Improvements	Medium-High
Environmental benefits	High
Operating efficiencies	Medium
Cost Effectiveness	Medium
Transit-supportive (existing) land use	Low
Economic development	Medium-High
Local Financial Commitment	Medium
Section 5309 New Starts Share of Total Cost: 50 percent	Medium
Capital Finance Plan	Medium-High
Operating Finance Plan	Medium
Overall Project Rating	Medium

Source: *Annual Report of Funding Recommendations, Fiscal Year 2011, New Starts, Small Starts, and Paul S. Sarbanes Transit in Parks Program, 2010*

21.3.1 Project Justification: Medium

The project justification takes into account the following six factors:

Mobility Improvements: Medium-High

In its evaluation of the mobility improvements that would be realized by implementation of a proposed project, FTA evaluates four measures:

1. User Benefits per Passenger Mile on the Project
2. Number of Transit Dependents Using the Project
3. Transit Dependent User Benefits per Passenger Mile on the Project
4. Share of User Benefits Received by Transit Dependents Compared to Share of Transit Dependents in the Region

User benefits: This measure essentially represent all the travel time savings to transit riders in the forecast year that result from the New Starts project as compared to the New Starts baseline alternative. The benefits include reductions in walk times, wait times, transfers, and, most importantly, in-vehicle times. In order to rate projects in comparison to other proposed New Starts, this measure is normalized by the annual passenger miles traveled on the New Starts project in the forecast year. The result is a measure of the intensity of the user benefits.

Number of Transit Dependent Individuals Using the Project and Transit Dependent User Benefits per Passenger Mile on the Project: These two measures represent the number of transit dependents affected by the project and the intensity of the benefits to those transit dependent users. The first is self explanatory while the second is defined the same as the measure of user benefits per passenger mile described above but for transit dependent passengers.

Share of User Benefits Received by Transit Dependents Compared to Share of Transit Dependents in the Region: This measure represents the extent to which the project benefits transit dependents compared to their regional representation. For example, if 10 percent of the user benefits for the project accrued to transit dependents, but they represented 20 percent of the region’s population, the measure would be 0.5, indicating that the project did not benefit transit dependents compared to their share of the region’s population.

Environmental Benefits: High

In its evaluation of environmental benefits that would be realized through the implementation of a proposed project, FTA considers the current air quality designation of the project area by the U.S. Environmental Protection Agency (EPA). This measure is defined for each of the transportation-related pollutants (ozone, CO, and PM-10 and PM-2.5) as the current air quality designation by EPA for the metropolitan region in which the proposed project is located, indicating the severity of the metropolitan area's noncompliance with the health-based EPA standard (NAAQS) for the pollutant, or its compliance with that standard. FTA has found that the air quality information submitted to assess the environmental benefits does not significantly distinguish the competing New Starts projects. While FTA reports the information submitted by project sponsors on environmental benefits to Congress in the *Annual Report on Funding Recommendations*, it does not formally incorporate this measure in its evaluation of New Starts projects.

Operating Efficiencies: Medium

Based upon its prior experience in evaluating New Starts projects, FTA has previously determined that locally-generated and reported information in support of the operating efficiencies criterion does not distinguish in any meaningful way differences between competing major transit capital investments. FTA further believes that the anticipated operating efficiencies of proposed New Starts projects are adequately captured under its measure for evaluating project cost effectiveness.

Cost Effectiveness: Medium

Significant among the project justification criteria is cost effectiveness, which is the annualized capital and operating cost per hour of user benefits for the forecast year. It captures the additional costs of the New Start project compared to the transportation benefits to transit riders. User benefits are defined identical to the measure used in the mobility improvements criterion.

New Starts projects must be rated "Medium" for cost effectiveness, in addition to receiving an overall "Medium" rating, in order to be considered by the Federal Transit Administration for New Starts funding.

Transit-Supportive Land Use: Low

This criterion reflects the population and employment densities within 0.5 mile of each proposed station in the project.

Economic Development: Medium-High

This criterion addresses the extent that transit-oriented development is likely to occur in the New Start project's corridor. FTA explicitly considers the following transit supportive land use categories and factors:

1. Transit Supportive Plans and Policies, including the following factors:
 - Growth management;
 - Transit supportive corridor policies;
 - Supportive zoning regulations near transit stations; and
 - Tools to implement land use policies.
2. Performance and Impacts of Policies, including the following factors:
 - Performance of land use policies; and
 - Potential impact of transit project on regional land use.

21.3.2 Local Financial Commitment: Medium

Proposed New Starts projects must be supported by evidence of stable and dependable financial resources to construct, operate and maintain the existing and the new transit system. The measures FTA uses to evaluate local financial commitment are:

Local Share: Medium

FTA examines the proposed share of total project costs from sources other than Section 5309 New Starts, including Federal formula and flexible funds, the local match required by federal law, and any

additional capital funding. The share of the project cost covered from funding sources other than Section 5309 new Starts will be 50 percent.

Strength of Capital Financing Plan: Medium-High

FTA looks at the stability and reliability of the proposed capital financing plan, including the current capital condition of the project sponsor, the level of commitment of capital funds to the proposed project and to other projects, the financial capacity of the project sponsor to withstand cost overruns or funding shortfalls, and the reliability of the capital cost estimates and planning assumptions.

Strength of Operating Financing Plan: Medium

FTA looks at the ability of the sponsoring agency to fund operation and maintenance of the entire system (including existing service) as planned, once the guideway project is built. This includes: an examination of the current operating condition of the project sponsor; the level of commitment of operating funds for the transit system; the financial capacity of the project sponsor to operate and maintain all proposed, existing and planned transit services; and the reliability of the operating cost estimates and planning assumptions.

The fiscal year 2011 report to Congress shows the project cost and funding source amounts that FTA relied on in rating the project's local financial commitment. Chapter 20 of this DEIS shows the amounts now expected to be available from these sources at the time this DEIS was prepared. It is normal for financial plans to evolve at this stage of project development, but FTA will assess the financial plans again before deciding whether to approve the project into Final Design, the next stage of project development.

21.4 Summary and Significant Trade-Offs

The ability to satisfy the project goals is measured through the effectiveness, performance and efficiency of each of the alternatives. The desirability of an alternative is determined by the quantity and quality of a given product or service delivered to or consumed by users at minimum cost. In other words, the most attractive alternative would be the one in which the qualitative and quantitative benefits (e.g., increased mobility, increased ridership, etc.) outweigh the costs (e.g., environmental impacts, financial expenditures, etc.). This Draft EIS compares the No-Build Alternative to the Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option and illustrates that the two Build Alternatives address the goals and objectives of the proposed project. The Light Rail Alternative and Light Rail Alternative – Sugar Creek Design Option would enhance accessibility, improve mobility, and support land use goals that would not be possible under the No-Build Alternative. The following summarizes the evaluation of the alternatives against the adopted goals and the assessment of impacts documented in this Draft EIS. Additionally, the trade-off between the benefits and costs of the proposed alternatives is discussed for each alternative. A summary of the proposed alternatives versus the goals of the proposed project is presented in Table 21-4.

Table 21-4
Summary of the Proposed Alternatives versus the Project Goals

Goal	No-Build Alternative	Light Rail Alternative	Light Rail Alternative – Sugar Creek Design Option
1: Land use	<ul style="list-style-type: none"> • Would not support the region’s Centers, Corridors and Wedges vision • Existing development trends would continue in areas that cannot support new development 	<ul style="list-style-type: none"> • Would support the region’s Centers, Corridors and Wedges vision • Would support existing and planned land use patterns • Would provide a link to integrate land use and transportation • Would promote growth in areas that can support new development 	Would fulfill the goals as equally as the Light Rail Alternative
2: Mobility	<ul style="list-style-type: none"> • Would provide limited improvements in mobility options • Would not improve quality of transportation service 	<ul style="list-style-type: none"> • Would provide mobility options that is time-competitive with travel by automobile • Would increase transit ridership • Would provide significant travel time savings • Would provide improved service levels for transit-dependent populations 	Would fulfill the goals as equally as the Light Rail Alternative
3: Environment	<ul style="list-style-type: none"> • Would not support desired changes in land use patterns • Would not impact natural resources • Higher emissions due to increased traffic would not support Air Quality improvements 	<ul style="list-style-type: none"> • Would support sustainable growth patterns • Would impact natural resources, but impacts would be minimized and/or mitigated • Would support Air Quality improvements due to reduced auto dependence • Use of existing railroad and roadway rights-of-way will minimize impacts to natural and built environment 	Would fulfill the goals as equally as the Light Rail Alternative, though would result in variations to natural resource impacts.
4: Financial	<ul style="list-style-type: none"> • Consistent with projected funding levels 	<ul style="list-style-type: none"> • Consistent with projected funding levels • Provides a Cost-Effectiveness alternative 	Would be consistent with projected funding, though would be more costly and less cost-effective.
5: System Integration	<ul style="list-style-type: none"> • Would not support through-service and would provide limited connections to other corridors 	<ul style="list-style-type: none"> • Would provide through service to existing light rail line and implement part of the 2030 Transit Corridor System Plan 	Would fulfill the goals as equally as the Light Rail Alternative

21.4.1 No-Build Alternative

The No-Build Alternative would not fulfill Goal 1 to support region’s Centers, Corridors and Wedges vision as no improvements would be made that are consistent with land use plans and policies. Likewise, the No-Build Alternative would not fulfill Goal 2 to improve access and mobility within the corridor and throughout the region. The No-Build Alternative would not encourage the use of transit. Travel time savings would not be realized and service improvements for transit-dependent populations would not be provided or would be limited. Similarly, Goal 5, which encourages system integration, would not be realized under the No-Build Alternative. The No-Build Alternative would not fulfill Goal 3 to preserve and protect the environment. Under the No-Build Alternative, population growth and land use would not be concentrated to the City’s centers and corridors, and urban sprawl could continue. This could result in continued impacts to natural resources as development trends could continue in outlying areas of the

metropolitan region. Additionally, an alternative to the automobile and bus would be not available, resulting in no improvements to air quality. The No-Build Alternative would fulfill Goal 4 by providing a cost effective alternative that ensures capital and O&M costs are consistent with funding levels.

21.4.2 Light Rail Alternative

The Light Rail Alternative would fulfill each of the project goals. Goal 1, to focus growth in the Northeast Corridor directing new development and redevelopment around transit stations, would be attained as the Station Area Plans would employ the City's Zoning Ordinance to implement land uses that are transit supportive. The Light Rail Alternative would also fulfill Goal 2, to improve access and mobility within the Northeast Corridor and the region. The Light Rail Alternative would increase transit ridership, improve transit travel times, and improve mobility for transit-dependent populations. The Light Rail Alternative would fulfill Goal 3, to protect the environment, by supporting sustainable growth through transit-supportive development plans. Increased transit use would reduce vehicle miles of travel by automobiles, thereby resulting in a reduction in automobile emissions. This reduction in automobile emissions would result in improvements to local air quality. However, the Light Rail Alternative would result in impacts to other natural resources such as wetlands and streams. These impacts would be minimized or mitigated as described in this Draft EIS. Goal 4, to develop affordable, cost-effective transportation solutions, can be attained under the Light Rail Alternative as projected capital and operating and maintenance costs are consistent with anticipated funding levels. However, though the Light Rail Alternative is only slightly higher to the No-Build Alternative in terms of system-wide annual operating and maintenance cost, the capital costs are significantly greater. Goal 5, which encourages system integration, would be realized under the Light Rail Alternative as it would provide through service to the existing light rail line, and implement part of the *2030 Transit Corridor System Plan*.

21.4.3 Light Rail Alternative – Sugar Creek Design Option

The Light Rail Alternative – Sugar Creek Design Option would fulfill each of the project goals in the same way as the Light Rail Alternative. However, capital costs associated with the Light Rail Alternative – Sugar Creek Design Option would be higher than under the Light Rail Alternative. Additionally, impacts to natural and human resources would differ slightly under the Light Rail Alternative – Sugar Creek Design Option as compared to the Light Rail Alternative.

In 2008, CATS conducted an alternatives analysis on the Light Rail Alternative – Sugar Creek Design Option, available under separate cover as the *Sugar Creek and North Carolina Railroad Alignment Alternatives Study* (February 2009), and presented the findings to the MTC. The MTC confirmed its preference for the Light Rail Alternative over the Light Rail Alternative – Sugar Creek Design Option due to lack of additional benefit to justify increased costs, largely associated with additional business and right-of-way impacts. The information from the aforementioned alternatives analysis and the additional detail on the potential environmental impacts detailed in this Draft EIS, coupled with the comparison of the results presented in this chapter, will further document the examination of the design option and allow public comments as input to the MTC's decision-making process.

22.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

This chapter describes the early and continuous efforts to involve the general public, interested and affected parties, and federal, state and local agencies in reviewing and selecting alternatives, identifying topics to be assessed in the Draft Environmental Impact Statement (EIS) along with involvement in minimizing, reducing or avoiding potential social, economic and environmental impacts.

22.1 Scoping Process

The process of project scoping initiated the public involvement activities for the initial phase of the “Transportation Improvements within the Northeast (University) Corridor” (i.e. LYNX BLE). Project scoping, required by federal law as part of the preparation of an EIS, is designed to encourage active consultation and participation of the public and all interested parties (including state and federal regulatory agencies) early in the EIS process. Scoping helps to identify alternative transit alignments and modes to be evaluated, as well as social, economic or environmental issues related to the proposed alternatives.

A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on September 29, 2000. The NOI described the proposed project and the project alternatives, the proposed scoping process, and included the public scoping meeting schedule, as well as the contact information for the Project Manager. In addition to the NOI, a separate scoping meeting notice was sent in advance (August 17, 2000 and August 31, 2000) to governmental agencies with jurisdiction in the corridor, inviting them to attend the agency scoping meeting. The advertised public scoping meetings were held: September 26, 2000 from 6:30 p.m. to 9:00 p.m. at Mallard Creek Presbyterian Church (ten people in attendance); September 27, 2000 at the Charlotte-Mecklenburg Government Center (12 people in attendance) from 6:30 p.m. to 9:00 p.m.; and on September 28, 2000 6:30 p.m. to 9:00 p.m. at Sugaw Creek Recreation Center (25 people in attendance). The purpose of these meetings was to receive input on the alternatives analysis and the potential impacts to be included in the scope of the EIS.

The agency scoping meeting (joint meeting with all of the corridor projects with a Center City Charlotte focus) was held on September 27, 2000 from 6:30 p.m. to 9:00 p.m. at the Charlotte-Mecklenburg Government Center (CMGC). The comprehensive list of invited agencies can be found in the *Major Investment Study (MIS) Scoping Summary Report* (2001). The purpose of the agency scoping meeting was to present information on all four corridor MISs and provide federal, state and local agencies an opportunity for questions and comments on the four corridors. Input and comments received at the agency scoping meeting were primarily related to how various resources should be addressed in the definition and analysis of alternatives. Specific questions and comments from all scoping meetings can be found in the *Major Investment Study (MIS) Scoping Summary Report*.

At the initiation of the Draft EIS, CATS solicited public and agency input through a scoping update process in 2005 and 2006. The purpose of these additional scoping outreach activities was to keep the public and other interested parties informed of the proposed LYNX BLE progress and to receive additional input as conceptual engineering and the Draft EIS progressed. During these efforts, concern was expressed to CATS regarding the alignment not entering and serving the University of North Carolina at Charlotte (UNC Charlotte) campus and regarding the proposed station spacing in the University City area. As a result of the scoping update process, the proposed project alignment was modified to include a campus alignment with a station and the station locations were adjusted within the University City area. The additional scoping outreach activities, including the public and agency written comments, are documented within the *Scoping Summary Report Update* (October, 2005).

In June 2006, the Metropolitan Transit Commission (MTC) adopted these changes and the Refined-Locally Preferred Alternative (R-LPA). The R-LPA was incorporated into the agency's *2030 Transit Corridor System Plan* and CATS subsequently entered into the Preliminary Engineering phase.

22.2 Public Involvement Program

A detailed Public Involvement Plan (PIP) was developed for the proposed LYNX Blue Line Extension Northeast Corridor Light Rail Project (LYNX BLE) to involve all stakeholders in the proposed project study process and to help the project team to define the transit and land use issues that characterize the

Northeast Corridor. The PIP is a plan for actively seeking input from the public throughout the planning, design and construction phases of the proposed project. The PIP identifies strategies to inform citizens of study activities and milestones and identifies forums and tools for public participation. The PIP reflects the CATS and the City of Charlotte’s well-established history of conducting proactive outreach programs in the community and focuses on achieving public awareness and interaction throughout the entire project LYNX BLE development process.

The PIP goals include the following:

- Inform/educate citizens in a factual and objective manner about the transit/land use plan and its associated opportunities and challenges in the Northeast Corridor;
- Proactively seek the participation and views of the Northeast Corridor community so transit/land use improvements reflect the needs of the community;
- Incorporate citizen feedback and input at all levels of the decision-making process; and,
- Ensure that all public involvement activities identify and address the needs of area minority and low-income populations in the Northeast Corridor.

Direct public participation includes scoping and focus group meetings, mailings, individual/group contacts, and the Draft EIS public hearing and circulation process. These activities are summarized below. Public participation will continue during final design and construction if the Light Rail Alternative, or its design option, is selected for implementation.

22.2.1 Public Workshops

Public workshops were held, beginning in July 2000, to obtain feedback on the proposed LYNX BLE. Throughout the planning process, representatives from the community have been invited to participate in public workshops to offer input on the proposed project. Between July 2000 and November 2009, 34 public workshops were held with a total of approximately 1,438 people in attendance. Public workshops generally follow an open-house format with a formal presentation. Attendees are given the opportunity to provide verbal and written feedback regarding the proposed project. Table 22-1 provides the dates, purpose, location and number of attendees for each meeting, and if applicable the number of postcards distributed for notification.

**Table 22-1
Summary of Public Workshops**

Date	Public Meeting	Attendance	Postcard Notification
07/20/2000	Corridor Kickoff Public Meeting, CMGC	93	n/a
09/26/2000	Major Investment Study (MIS) Scoping Public Meeting, Mallard Creek Presbyterian Church	10	n/a
09/28/2000	MIS Scoping Public Meeting, Sugaw Creek Recreation Center	25	n/a
01/08/2001	MIS Screening Public Meeting, Mallard Creek Presbyterian Church	18	n/a
01/23/2001	MIS Screening Public Meeting, Sugaw Creek Presbyterian Church	36	n/a
10/09/2001	MIS Public Meeting, Sugaw Creek Presbyterian Church	22	n/a
08/27/2002	MIS Public Meeting, Sugaw Creek Presbyterian Church	64	n/a
02/22/2005	EIS Kick-off Outreach Public Meeting	9	8,000
02/24/2005	EIS Kick-off Outreach Public Meeting	10	
03/01/2005	EIS Kick-off Outreach Public Meeting	25	
04/05/2005	Northeast Corridor Public Meeting	31	8,000
04/07/2005	Northeast Corridor Public Meeting	26	

Table 22-1 (continued)
Summary of Public Workshops

Date	Public Meeting	Attendance	Postcard Notification
06/07/2005	Northeast Corridor Station Location Workshop	18	8,500
06/09/2005	Northeast Corridor Station Location Workshop	20	
09/06/2005	Northeast Corridor Station Area Planning Workshop	23	8,500
09/08/2005	Northeast Corridor Station Area Planning Workshop	28	
12/06/2005	Northeast Corridor Public Workshop	29	6,600
12/07/2005	Northeast Corridor Public Workshop	25	
05/01/2006	Northeast Corridor Design Options Public Meeting	38	8,000
05/02/2006	Northeast Corridor Design Options Public Meeting	26	
06/05/2006	Northeast Corridor Public Meeting - Metropolitan Transit Commission (MTC) Presentation	40	8,000
06/06/2006	Northeast Corridor Public Meeting - MTC Presentation	34	
03/03/2008	Preliminary Engineering (PE) Kick-Off Presentation - Sugaw Creek Presbyterian Church	85	12,711
03/04/2008	PE Kick Off Presentation - University Hilton	105	
04/29/2008	UNC Charlotte Public Forum	100	n/a
07/10/2008	Sugar Creek vs. NCRR Alignment - Oasis Shriners Center	52	12,046
07/15/2008	Sugar Creek vs. NCRR Alignment - Sugaw Creek Presbyterian Church	84	
01/13/2009	Sugar Creek/NCRR Alignment Study Results and Recommendation and Station Site Plans - Sugaw Creek Presbyterian Church	94	11,580
01/15/2009	Sugar Creek/NCRR Alignment Study Results and Recommendation and Station Site Plans - Oasis Shriners Center	49	
02/16/2009	LYNX BLE Update - CMGC, City Employees	64	n/a
03/24/2009	Community Art Meeting - University Hills Baptist Church	10	n/a
03/31/2009	Community Art Meeting - Sugaw Creek Presbyterian Church	37	n/a
09/29/2009	LYNX BLE Update - Sugaw Creek Presbyterian Church	54	11,000
09/30/2009	LYNX BLE Update - Oasis Shriners Center	54	
Total	34	1,438	

22.2.2 Individual Meetings

As of November 2009, representatives from CATS’ LYNX BLE staff have participated in speaking engagements to inform the community and interested parties on the progress and scope of the proposed project. Several different organizations were involved in the individual meetings such as: home owners associations, chambers of commerce, and neighborhood organizations. LYNX BLE staff held a total of 86 individual citizen meetings with a total of approximately 3,613 people in attendance. Table 22-2 provides the dates, organizations and number of attendees for each meeting. In addition, CATS has met regularly with major stakeholders in the corridor, including representatives of the railroads, UNC Charlotte, and the North Carolina Department of Transportation (NCDOT).

**Table 22-2
Citizen Meetings**

Date	Organization/Event	Attendance
06/08/2000	Optimist Park Neighborhood Association Meeting	25
02/07/2001	Historic Rosedale Neighborhood Association Meeting	13
02/18/2001	Hunters Chase Neighborhood Association Meeting	15
03/13/2001	Autumnwood Neighborhood Association Meeting	13
06/22/2001	Belmont Neighborhood Jamboree	16
07/19/2001	Hidden Valley Neighborhood Meeting	21
07/24/ 2001	Derita Area Meeting	34
11/05/2001	Graham Heights Neighborhood Association Meeting	31
04/18/2000	First Union CIC Advisory Group Meeting	18
06/20/2000	First Union CIC Advisory Group Meeting	35
06/20/2000	I-85 Improvement Study Meeting	10
10/12/2000	Tryon North Development Corporation Kick-off	80
11/16/2000	Tryon North Development Corporation Meeting	38
07/18/2001	Tryon North Development Corporation Meeting	25
07/25/2001	UNC Charlotte Urban Institute Meeting	5
07/27/2001	Lowe's Motor Speedway	1
08/02/2001	Mayor's International Cabinet	40
08/21/2001	Landex (developer of King's Grant)	1
08/21/2001	Verizon Wireless Amphitheater (formerly Verizon Pavilion)	2
09/28/2001	University Research Park Stakeholders Meeting	10
10/02/2001	Southwest Cabarrus Rotary Club Meeting	25
11/29/2001	Meeting with Northeast Corridor Business/Neighborhood Leaders	22
06/01/2002	Historic North Charlotte Historic Home Tour and Festival	15
07/07/2002	University City Area Council Luncheon	60
08/15/2002	Tryon North Development Corporation representatives	4
08/15/2002	Cabarrus County Commissioners Meeting	45
11/13/2002	Hidden Valley Community Development Corporation	14
06/24/2004	Tryon North Development Corporation	25
07/08/2004	University City Area Council Luncheon	40
07/14/2005	University City Area Chamber	80
10/18/2005	North Davidson (NoDa) Business and Homeowners' Associations	28
10/20/2005	Northwest Area Council Economic Development Conference	200
04/12/2006	District Four meeting with Councilman Barnes	25
02/06/2007	Rotary Club, Lowes Speedway Club	21
11/01/2007	University City Partners (UCP) Annual Conference	80
11/12/2007	University Research Park (URP) Community Meeting	10
01/02/2008	Northeast Coalition of Neighborhoods	40
01/29/2008	Coldwell Bankers	22
02/13/2008	University City Partners	55
02/18/2008	UNC Charlotte Students - History/AIT project	30
03/05/2008	North Tryon Development Corporation	35
05/01/2008	UNC Charlotte Students Exhibit - History/AIT Project	60

**Table 22-2 (continued)
Citizen Meetings**

Date	Organization/Event	Attendance
06/03/2008	Hidden Valley Community Association	35
06/03/2008	NoDa Business and Homeowners' Associations	60
06/10/2008	Howie Acres and Herrinwood Community Meeting	8
07/17/2008	Developers Meeting	24
08/05/2008	NoDa Neighborhood Association	40
09/12/2008	UNC Charlotte Engineering Class	60
09/30/2008	NoDa Board	10
10/01/2008	UCP Urban Design Meeting	10
10/02/2008	UCP Annual Meeting	60
11/08/2008	Carolinas Medical Center	8
11/11/2008	NoDa Neighborhood Association	30
12/02/2008	Hidden Valley Community Association	12
01/27/2009	Knollwood Acres Homeowner's Group	15
02/04/2009	North End Partners	20
02/10/2009	Villa Heights	24
02/19/2009	Quarterly Stakeholder Meeting	12
03/24/2009	WBAV FM (V101.9) radio interview with Bea Thompson	n/a
04/14/2009	NoDa Board Meeting	7
04/22/2009	UCP – Economic Development Conference	80
04/22/2009	Earth Day Event at UNC Charlotte	50
04/26/2009	Welwyn Home Owners Association	25
05/03/2009	Fanta Festival at McAlpine Creek Park	75
05/05/2009	NoDa Neighborhood Association	25
05/16/2009	Neighborhood Symposium	452
05/21/2009	La Tremenda radio station (1310 AM)	n/a
05/27/2009	Quarterly Stakeholder Meeting	8
06/08/2009	Charlotte Area Bicycle Alliance (CABA)	23
06/18/2009	Charlotte Chamber of Commerce Annual Meeting	125
08/03/2009	Johnson & Wales University Charlotte (JWU) orientation fairs	100
08/04/2009	Hidden Valley National Night Out	150
08/17/2009	Latin American Chamber of Commerce of Charlotte	35
08/20/2009	Quarterly Stakeholders Meeting	17
08/27/2009	UNC Charlotte WOW! Fall Vendor Fair	30
09/01/2009	Johnson & Wales University Charlotte (JWU) orientation fairs	100
09/09/2009	CATS Interim CEO provided an update to CATS rail operators and maintenance employees	32
09/12/2009	Hidden Valley Neighborhood Annual Parade and Festival	25
09/28/2009	UNC Charlotte - Geography Class	15
10/01/2009	University Research Park	40
10/12/2009	Sixth Annual North Carolina Transportation Hall of Fame	300
10/13/2009	University of North Carolina at Chapel Hill - Navigating America	14
10/17/2009	University of North Carolina at Chapel Hill - Navigating America	14
10/26/2009	Professional Engineers of NC (PENC), South Piedmont	25
11/12/2009	Howie Acres Neighborhood Association	23
11/19/2009	UNC Charlotte - Urban Transportation Design	26
Totals	86	3,613

22.2.3 Newsletters

The LYNX BLE project team publishes a newsletter, entitled *Blue Line Extension (Northeast Corridor) Transitions*, to provide interested citizens with updates on the proposed project. The newsletter features articles about the proposed project and includes information about land use, economic development, upcoming meetings and other projects within the corridor. The publication is mailed to those on the project mailing list and e-mailed to those enrolled in the City of Charlotte’s electronic subscription service. The newsletter is made available at, but not limited to, corridor public meetings, neighborhood presentations, transit fairs and the CATS offices in the Charlotte-Mecklenburg Government Center. Table 22-3 lists the newsletter distribution for *Blue Line Extension (Northeast Corridor) Transitions*.

**Table 22-3
Blue Line Extension (Northeast Corridor) Transitions
Newsletter Distribution**

Newsletter Issue Date	Circulation Per Newsletter
Winter 2005	n/a
Summer 2005	1,485
Spring 2006	n/a
Fall 2006	860
Winter 2007 (2030 Corridor System Plan Summary)	n/a
Summer 2007	868
Winter 2008	874
Spring 2008	870
Summer/Fall 2008	762
Summer/Fall 2009	775

22.2.4 Website

Throughout the course of the proposed project, a LYNX BLE project specific web site has been maintained. The website is available through a link on CATS primary website located at www.ridetransit.org.

Information contained on the website includes the following:

- Description of the proposed project
- Map of the proposed alignment and station locations
- Information about light rail stations and vehicles including renderings
- Transit Station Area Principles
- Published editions of the *Blue Line Extension (Northeast Corridor) Transitions* newsletter
- Notification of upcoming public involvement activities
- Summaries and presentations of past public meetings
- Frequently asked questions about the proposed project
- Comment card allowing users to provide input into the proposed project
- LYNX BLE Fast Facts
- Draft EIS and supporting documents

22.2.5 Citizens Transit Advisory Group

The Citizens Transit Advisory Group (CTAG) is an ongoing advisory committee of the MTC with system-wide responsibilities. The CTAG reviews long-range transit system planning and proposed operating and capital programs from the community’s perspective, and makes recommendations to the MTC – the policy-setting board for CATS. While the CTAG is not a policy-making body, its recommendations to the MTC ensure public involvement in transit planning. CTAG contains 13 citizens appointed by the MTC members from their respective jurisdictions. The Mayor of Charlotte and Chairman of the Mecklenburg

County Board of Commissioners also appoint one member each. The CTAG membership is as follows (with number of appointees from each MTC member jurisdiction in parenthesis):

- Mecklenburg County Board of Commissioners (3)
- City of Charlotte City Council (3)
- Charlotte-Mecklenburg Schools Board of Education(1)
- Town of Cornelius (1)
- Town of Davidson (1)
- Town of Huntersville (1)
- Town of Matthews (1)
- Town of Mint Hill (1)
- Town of Pineville (1)

22.2.6 Transit Services Advisory Committee

The Transit Services Advisory Committee (TSAC) reviews, makes recommendations and provides input into short-range transit operations. The TSAC is made up of customers of CATS and are appointed by the City of Charlotte, Mecklenburg County, and the six Mecklenburg County Towns. The TSAC focuses on day-to-day operations of the transit service to ensure that it meets the needs of the community. It makes recommendations to the MTC on issues within its sphere of interest, and promotes public involvement in short-term transit planning.

22.3 Project Mailing Lists

CATS maintains a county-wide, corridor database for use in direct mail contacts with corridor property owners, occupants and other stakeholders. The original list of approximately 500 names was obtained from the *2025 Integrated Transit/Land Use Plan* public involvement efforts. The corridor database has been supplemented with additional individuals, organizations and other interested parties who have requested to be added to the list. The current database for all of the CATS Corridors contains approximately 6,800 contacts.

The LYNX BLE project database is part of the CATS Corridor database and includes a mailing list for people specifically interested in the LYNX BLE. There are currently 870 mailing addresses (as of November 2009) listed in the LYNX BLE project database, including individuals located in and around the Northeast Corridor study area and/or individuals who have expressed specific interest in the LYNX BLE. The LYNX BLE project database is used for distribution of LYNX BLE public meeting invitations, newsletters and other relative LYNX BLE information, as needed.

CATS also maintains a list of property owners and residents within a ¼-mile on each side of the proposed project alignment and/or property owners and residents within ½-mile of the proposed transit stations. This list is developed using the parcels contained in the Mecklenburg County Geographic Information System (GIS). The property owners and residents list supplements the LYNX BLE project database and is used for notifications of public meetings.

Additionally, there are approximately 1,161 email subscriptions to the City of Charlotte's electronic subscription service. These email subscribers receive public meeting, newsletter notifications and other relative LYNX BLE information, as needed.

22.4 Environmental Justice Outreach

The proposed LYNX Blue Line Extension (LYNX BLE) is committed to meeting all environmental justice requirements necessary to comply with Executive Order 12898. As such, CATS identified specific communities of concern located along the proposed alignment where the community is primarily minority or low-income. Concentrations of transit-dependent populations, such as elderly, children and households without a vehicle, as well as other special population groups near the proposed project, such as Limited English Proficient (LEP) were also identified. Additional information about these communities of concern is detailed in Chapter 6.0: Neighborhoods, Community Services and Environmental Justice.

CATS outreach has been customized and personalized to ensure that everyone in the community has an opportunity to engage in the public process. Given the importance of outreach to the communities of concern with potential project impacts identified in this Draft EIS, CATS has designed outreach to specifically target environmental justice communities. As detailed in Chapter 6.0: Neighborhoods, Community Services and Environmental Justice, communities of concern with potential adverse impacts include: Pines Mobile Home Park (located within the Hidden Valley neighborhood), Hampshire Hills, and Mallard Creek Apartments (located within the University City South neighborhood). To date, targeted outreach has included:

Hampshire Hills

Residents and business owners located in Hampshire Hills received notification and had the opportunity to participate in the public meetings held at Sugaw Creek Presbyterian Church, located adjacent to the Hampshire Hills neighborhood. These meetings were advertised in English and Spanish and made accessible to residents and business owners located within this community of concern. Due to the proximity of the Hampshire Hills neighborhood to the Hidden Valley Neighborhood, the additional meetings described below for the Hidden Valley neighborhood were also made accessible to residents and business owners of Hampshire Hills.

Pines Mobile Home Park (Hidden Valley)

The Pines Mobile Home Park is located in the Hidden Valley neighborhood. Residents and business owners in Hidden Valley received notification and had the opportunity to participate in public meetings held at Sugaw Creek Presbyterian Church, located across from the Hidden Valley neighborhood. These meetings were advertised in English and Spanish and made accessible to residents and business owners located within this community of concern.

Hidden Valley has multiple registered neighborhood groups including a community association, neighborhood association, community development corporation, and a political action committee. CATS has made presentations at several neighborhood meetings. CATS was able to coordinate door-to-door distribution of bilingual project updates and public meeting invitations with the distribution of the neighborhood newsletter. Additionally, CATS was able to distribute bilingual project updates and public meeting invitations at Hope Haven, located within the Hidden Valley community. CATS staff participated with an information booth for both the annual Hidden Valley National Night Out event as well as the neighborhood festival. These neighborhood events were also open to adjacent neighborhoods like Hampshire Hills.

Mallard Creek Apartments (University City South)

The University City South neighborhood area includes several neighborhood and condominium associations as well as multiple managed apartment communities. Since there is no single neighborhood association for this community of concern, public meetings were held within proximity to the University City South Neighborhood; the location of the Mallard Creek Apartments. These meetings were advertised in English and Spanish and made accessible to residents and business owners located within this community of concern.

Additionally, CATS held a forum at UNC Charlotte, which was open to the public, and held adjacent to the Mallard Creek Apartments. This meeting was advertised through CATS and UNC Charlotte with the purpose of reaching out to residents living both on campus, and off-campus in the surrounding apartment communities, which includes the Mallard Creek Apartments.

Special Population Group - LEP Outreach

The proposed project corridor contains areas with concentrations of heavily Spanish-speaking populations. Specifically, limited English proficient Spanish-speaking populations are located within the Hampshire Hills and Hidden Valley communities of concern. For that reason, CATS provided additional Spanish language outreach to target these special population groups, both within the project corridor and the communities of concern. Outreach to date has included the following:

- A staff appearance on an hour-long talk show on La Tremenda (1310 AM) Spanish radio, providing project information in Spanish to listeners;

- An information booth with bilingual staff and project information at the annual Fanta Festival, a regional Hispanic festival;
- Door-to-door distribution of bilingual project updates and public meeting invitations in the Hidden Valley community;
- Distribution of bilingual project updates and public meeting invitations at Hope Haven, located in the Hidden Valley community;
- Project presentation updates at the Latin American Chamber of Commerce Charlotte, whose members represent Hispanic businesses in the community;
- Project presentation updates to the Latin American Coalition, Charlotte's oldest and largest Hispanic service agency;
- Spanish advertisements published in local Spanish papers to announce all project public meetings;
- Bilingual project materials posted on the CATS' project website, available 24 hours a day, 7 days a week;
- Bilingual customer service staff available through the CATS call center to provide translated project information as well as information about public meetings; and
- All public meetings are held at locations in close proximity to and easily accessible to communities of concern.

CATS plans to continue targeted outreach to communities of concern. Postcard notification that the Draft EIS is available for review and public comment, as well as the locations of public meetings and public hearing, will be sent to property owners located within $\frac{1}{4}$ mile of the alignment and $\frac{1}{2}$ mile at the station areas. Bilingual letter notification that the Draft EIS is available for review and public comment, as well as the locations of public meetings and public hearing, will be sent to organizations, groups and associations within the project corridor limits who are listed on the Charlotte-Mecklenburg Planning Department "Neighborhood Organization Contact List," including the communities of concern. Bilingual letter notification that the Draft EIS is available for review and public comment, as well as the locations of public meetings and public hearing, will also be distributed property owners with potential project impacts, including property owners with potential impacts within communities of concern.

Additionally, CATS will make efforts to distribute bilingual materials to communities of concern and when permitted post materials within common areas of property management offices. CATS will seek opportunities to present the Draft EIS findings to the communities of concern during their regularly scheduled meetings, where possible. Bilingual staff members will be available as requested during these meetings. Staff will also make an effort to appear on the local Spanish radio station to provide project information in Spanish to listeners, including public meeting and hearing information, as well as instructions on how to provide comments on the Draft EIS.

22.5 Agency Coordination

22.5.1 Federal Transit Administration/CATS Coordination Activities

CATS and the Federal Transit Administration (FTA) hold Quarterly Meetings. The purpose of these meetings is to review the status of CATS projects, including the LYNX BLE, address major issues and federal requirements, and for FTA to provide federal oversight and guidance.

22.5.2 City-wide Interdepartmental Coordination

CATS and the City of Charlotte have developed an integrated and coordinated approach to provide oversight and management of the LYNX BLE. A Project Management Plan (PMP) has been developed to assist with the management of all elements of the LYNX BLE. It provides an overview of the management requirements and programs that are needed to implement an efficient and cost-effective light rail system. The PMP describes the coordinated project management approach to planning, design, and implementing the proposed project. To accomplish this, three teams have been formed:

- Growth Strategy Steering Team (GSST);
- Corridor Collaboration Team (CCT); and,

- Blue Line Extension Project Team (BLE Project Team).

The GSST, chaired by the Assistant City Manager, is comprised of Key Business Executives (i.e., Department heads), and Deputy Directors from CATS, Engineering and Property Management (E&PM), Charlotte-Mecklenburg Planning Department (Planning), Charlotte Department of Transportation (CDOT), Neighborhood and Business Services (NBS), and Corporate Communications. The GSST provides City oversight and policy direction for growth strategy initiatives in all corridors, including the LYNX BLE. The GSST discusses the LYNX BLE on an as-needed basis at their regular meetings which are held twice a month.

The CCT facilitates proactive collaboration among the various city departments that have active projects located within the LYNX BLE corridor. Members of the CCT come from E&PM, CATS, Planning, CDOT, NBS Neighborhood and Economic Development, Charlotte-Mecklenburg Utilities (CMU) and Mecklenburg County Parks and Recreation (MCPR). These members are responsible for program/project development and implementation, including land use planning, economic development opportunities, transit projects, station area infrastructure initiatives and corridor infrastructure initiatives. The CCT meets monthly.

The LYNX BLE Project Team is an interdepartmental team with members from all CATS divisions, and other City and County departments involved in the planning and design of the proposed project, including Planning, CDOT, E&PM, NBS Neighborhood and Economic Development, CMU and MCPR. The LYNX BLE Project Team meets bi-weekly and reviews the status of the proposed project, discusses issues, and reviews and approves the scope of the proposed project.

22.6 Continued Coordination, Required Permits and Agency Approvals

To ensure that issues of the proposed project are fully evaluated, several agencies have been consulted during the planning and preliminary engineering phases of the proposed project, including the State Historic Preservation Office (SHPO), the U.S. Army Corps of Engineers, and the Mecklenburg County Park and Recreation Department. Pertinent correspondence relative to the interests of some agencies is included in Appendix B: Agency Correspondence. Coordination with local, state and federal agencies will continue.

22.6.1 Section 4(f) *De Minimis* Findings

As described in Chapter 9.0: Parklands and Chapter 8.0: Cultural Resources, FTA is seeking public input on the proposed *de minimis* Section 4(f) findings through the public and agency circulation of this Draft EIS. See also Appendix B: Agency Coordination for correspondence with MCPR and SHPO regarding the *de minimis* Section 4(f) findings.

22.6.2 Required Permits

Section 404, Clean Water Act: As a result of the identified impacts to surface waters and wetlands, it is anticipated that a Section 404 permit issued by the U.S. Army Corps of Engineers will be required for either the Light Rail Alternative or Light Rail Alternative – Sugar Creek Design Option. The permit application must be completed during Final Design before construction activities may commence. This permit will require the discussion of the measures employed throughout planning and design in order to avoid/minimize impacts to waters of the U.S. The 404 permit application must also include a compensatory mitigation proposal, which outlines the plan to provide compensation to offset permanent losses of waters of the U.S.

Erosion and Sedimentation Control: The North Carolina Division of Land Resources requires that an erosion and sedimentation plan be obtained before construction activities may commence. This permit will be issued by Mecklenburg County on behalf of the State.

Stormwater (NPDES) Permits: The North Carolina Division of Water Quality must issue stormwater permits for operators of point source discharges associated with construction activities when construction-related land disturbances are expected to exceed one acre. Charlotte Stormwater Services will also be consulted to ensure continued involvement and compliance with NPDES.

Air Quality Permits: In accordance with the Mecklenburg County Air Pollution Control Ordinance, two Transportation Facilities Construction Permits from the Mecklenburg County Land Use and Environmental Services Agency (LUESA) Air Quality Section will be required. These permits are required for the parking garages at the Sugar Creek Station Park-and-Ride Option 2 and the I-485/N. Tryon Station.

Mecklenburg County LUESA Air Quality Section recently notified CATS about the newly developed EPA on-road mobile source emissions model known as the Motor Vehicle Emissions Simulation (MOVES) (Appendix B: Agency Correspondence). MOVES will replace the previous Mobile 6.2 model. Once the EPA publishes a Notice of Availability in the Federal Register, MOVES will be the official model for mobile source emissions. This change may affect the methodology required to apply for a Transportation Facilities Construction Permit. As such, CATS will continue coordination with the Mecklenburg County LUESA Air Quality Section. This coordination will need to occur prior to modeling air quality for a Transportation Facilities Construction Permit, and before permit application. CATS will confirm the determination of the use of MOVES, as well as the applicability of the permit for each proposed park-and-ride facility. All of these activities will take place once the station site plans have been approved for construction.

22.6.3 Agency Approvals and Agreements

NCDOT Municipal Agreement: The City of Charlotte and NCDOT will execute a Municipal Agreement for the construction of the proposed project within the median of North Tryon Street/US-29.

State Property Office Approval: The UNC Charlotte Board of Trustees and the State Property Office have approved the granting of an easement for the alignment onto the UNC Charlotte campus through state owned property.

Other Third Party Agreements: A number of agreements with third parties would be required to implement the proposed project, including agreements with railroads and utilities, related to the construction, operation and funding of the LYNX BLE.