

FY 2011 National Infrastructure Investments

Opportunity Number: DTOS59-11-RA-TIGER3

LYNX BLUE LINE CAPACITY EXPANSION PROJECT

Applicant Information

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I. PROJECT DESCRIPTION

In November 2007, the LYNX Blue Line light rail project opened to great success in Charlotte, NC. The implementation of the LYNX Blue Line was the first step in implementing the [Centers, Corridors, and Wedges Growth Framework](#), originally introduced in 1994 as the region’s overarching vision to guide growth and development. The LYNX Blue Line has exceeded ridership projections and resulted in over \$1.4 billion of new and planned economic development along the South Corridor.

The Charlotte Area Transit System (CATS) LYNX Blue Line – proposes to upgrade the capacity of this line to meet current and future demand. The Blue Line Capacity expansion project provide the ability to operate three-car trains at increased frequencies, incrementally. These improvements will provide the power supply necessary to operate longer, more frequent trains. Additionally the station platforms will be increased in length to accept



Figure I-A - Typical Blue Line Transit Line

three-car trains. The existing Blue Line light-rail consists of a series of 15 transit stations with two-way, two-car movement through the system that spans from the I-485/South Blvd Station to the 7th Street Station in Uptown Charlotte (refer to Figure I-B for the Blue Line Station Map). Part of the original design, three car operation was ultimately removed as a result of preliminary ridership forecasts and cost cutting measures. Soon after the light rail became operational, it became evident that actual ridership was significantly more than the design ridership forecast. The Blue Line Capacity Expansion project is critical to increasing the capacity of the Blue Line Light Rail line to accommodate current ridership, expanded crowds during numerous special events and anticipated future daily ridership by lengthening certain station platforms and adding power substations to accommodate three-car trains. Additional power substations will allow trains to operate more frequently initially(CATS proposes to ultimately extend all station platforms) and also will power the longer trains operating for special events. Although the current request involves lengthening three platforms, CATS will continue to pursuing funding opportunities to expand the remaining platforms with the ultimate goal of operating three-car trains during normal operations. This is consistent with the plan for the Blue Line Extension Project, that is currently in the Preliminary Engineering phase and is anticipated to move into

Final Design in the Spring of 2012. Figure I-C provides a typical conceptual site plan of a platform retrofit.

The following benefits will be obtained through the construction of the project:

- Meet the demands of current ridership;
- Increase the capacity of the current line by providing sufficient power to operate two-car trains at 6-minute headways;
- Implementation of express trains which will in turn increase transit ridership by expanding capacity and resulting in travel time savings for the riders
- CATS must serve riders attending numerous significant events like Carolina Panther home games, concerts and sporting events at Bobcats arena, Conventions and the Charlotte Convention Use of three-car trains during special events will allow CATS to accommodate peak demands;
- Increased reliability to the system as a result of being able to provide backup power during substation outages;
- Move toward a system plan of operating three-car trains during normal operations. This will also result in a reduction of rail operating costs by operating longer trains instead of increasing train frequency
- Improve access and mobility in the corridor and throughout the region by providing expanded capacity in the system;
- Improve quality of transportation service by improving rider comfort;
- Preserve and protect the environment;
- Expand affordable, cost-effective transportation solutions, and
- Expand transportation improvements that function as part of the larger transportation system.
- Creation of 582 direct, indirect, or induced new jobs related to construction activity.

The scope of the project is variable depending on the amount of funding made available. The following is a summary of the potential improvement tiers:

- \$7 million (requesting \$5.6 million) – This option would allow us to complete planning and design to allow project construction through future funding opportunities.

- \$14.5 million (requesting \$11.6 million) – In addition to planning and design, this option provides for the completion of additional power supply that would allow trains to operate more frequently until platforms are extended to accept three-car trains.
- \$25 million (requesting \$20.0 million) – This most comprehensive option includes, planning and design, additional power to operate longer trains or more frequent service, and allows express service to operate from a lengthened platform at I-485 (end-of-the-line park and ride Station) to extended platforms at uptown stations (Third Street and Seventh Street Stations) that serve the stadium and arena.

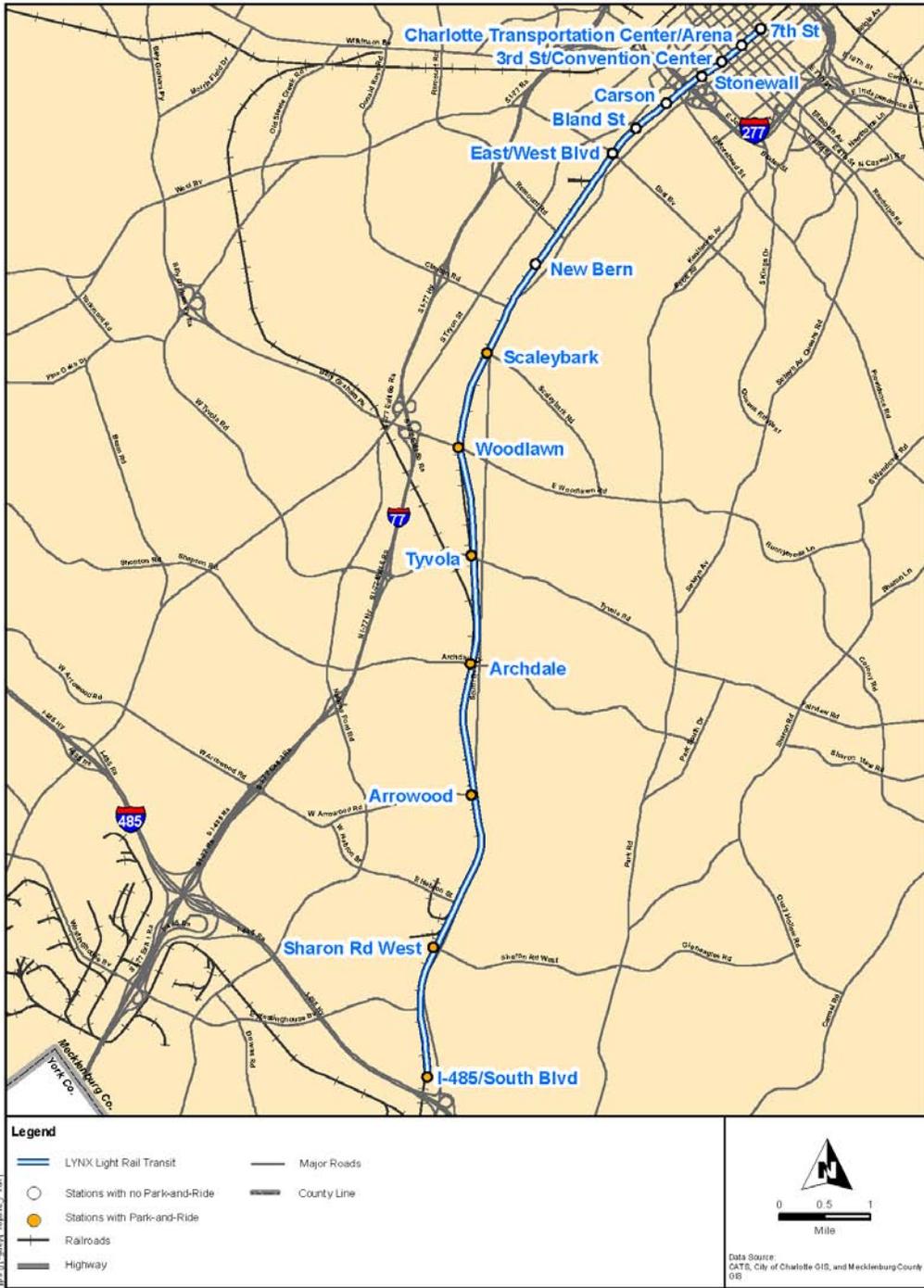


Figure I-B - LYNX Blue Line Station Map

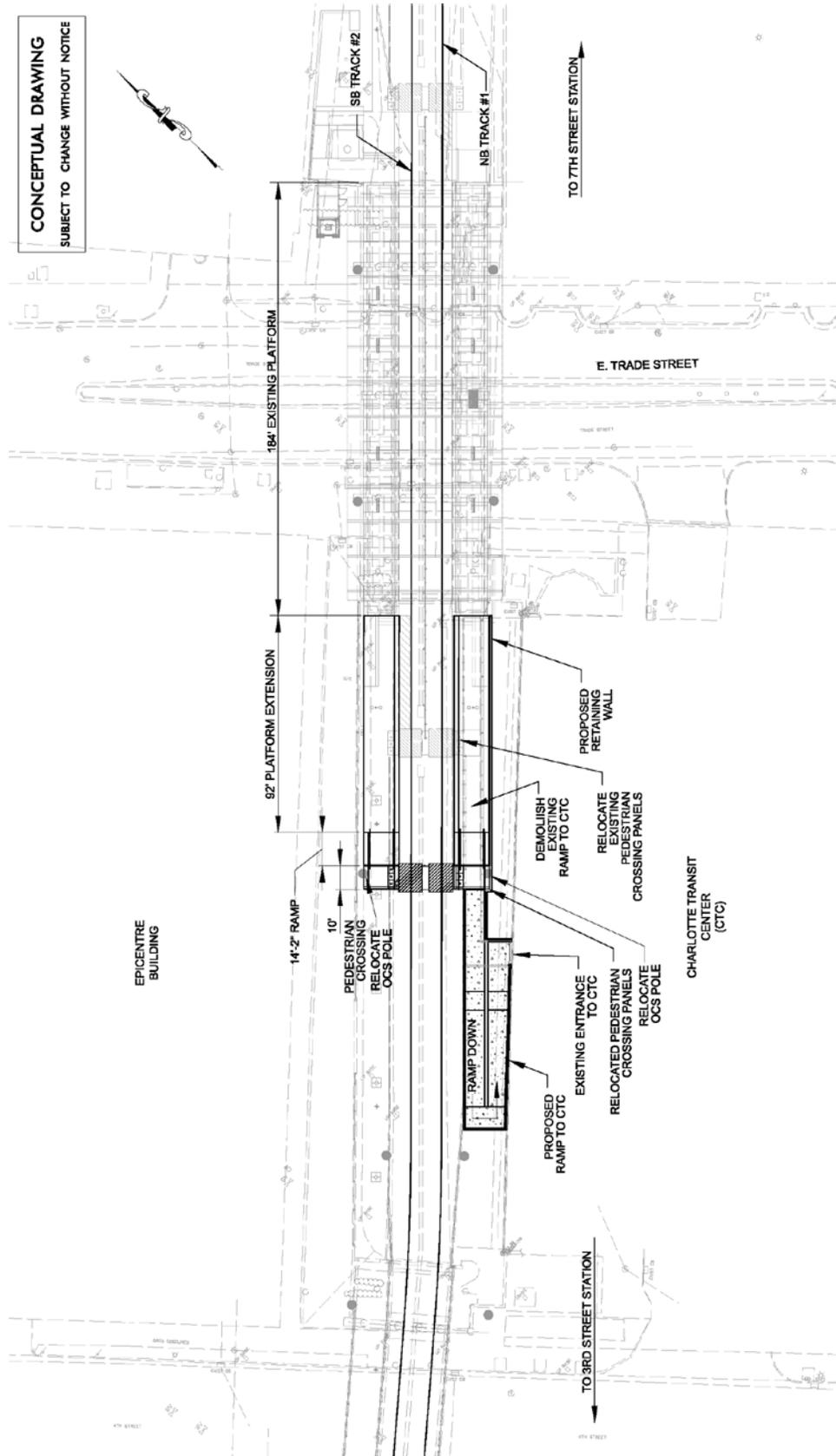


Figure I-C - Typical Platform Retrofit Conceptual Plan

II. PROJECT PARTIES

Profile of Government:

The City of Charlotte, located in Mecklenburg County, North Carolina, is the largest city between Baltimore and Jacksonville, Florida. Incorporated in 1768, the City covers 299 square miles with an estimated population of 756,912. Charlotte is the core of the Charlotte-Gastonia-Concord Metropolitan Statistical Area (MSA), an area of over 1.8 million people that includes six counties. Located in the the Piedmont Region of the Carolinas, two hours east of the Appalachian Mountains and three and one-half hours west of the Atlantic Ocean. New York City is 631 miles to the northeast and Atlanta is 256 miles to the southwest. Location and growth reinforce the City's role as a regional center in the Southeast.

The City of Charlotte has had a council-manager form of government since 1929.

FY2010 FINANCIAL HIGHLIGHTS

- The assets of the City exceeded its liabilities at the close of the FY2010 by \$8,473,8 million.
- At the close of FY2010, the City's governmental funds reported combined fund balances of \$636,7 million An increase of \$25.6 in comparison with the previous year.
- The unreserved fund balance in the General fund was \$100.7 million as of June 30, 2010. Of this amount \$100.3 million is undesignated and represents a traditional fund balance reserved for emergencies, liquidity, and overall financial strength.
- The City maintained its AAA bond rating from all three major rating agencies.
- The City of Charlotte has received a Certificate of Achievement for Excellence in Financial Reporting for its Comprehensive Annual Financial Reports (CAFR) presented by the Government Financial Officers Association of the United States and Canada.

The City's Certified Annual Financial Report for the year ending June 30, 2010 can be viewed at as an attachment

The [Charlotte Area Transit System](#) (CATS) is the Public Transit Department of the City of Charlotte and the largest transit system in North and South Carolina.

CATS Profile:

Services: Bus, Rail, ADA Paratransit, Vanpool

Primary Service Area:	527 Square Miles in City of Charlotte, Towns of Cornelius, Davidson, Huntersville, Matthews, Mint Hill, Pineville
Population in Primary Service Area:	929,372
FY2011Ridership	24.9 million
FY2011Average Weekday Trips	81,912

Currently, CATS operates the largest transit system between Washington, D.C., and Atlanta, with a consistent increase in ridership. Over a twelve year period, ridership has increased 80%. The system provides transit services to a seven-county, two-state, metropolitan area with a population of 1,725,000, which includes Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, and Union Counties in North Carolina and York County in South Carolina. CATS currently operates 323 buses with 74 bus routes which are a combination of local, express and regional bus routes. In November 2007, CATS opened the first light rail line in the Carolinas, which is a 9.6-mile (15.5-km) line known as the LYNX Blue Line. It runs between Uptown Charlotte and I-485 just north of Pineville, using a railroad right-of-way paralleling South Boulevard in its entirety. With 15 stations and twenty light rail vehicles in operation, the LYNX Blue Line has exceeded opening year ridership projections by 65% and is approaching the future year forecast of 18,200 riders nearly 15 years ahead of schedule.

Agent’s Technical, Legal, and Financial Capacity:

The Metropolitan Transit Commission (MTC) (comprised of the Chief Elected Official of Mecklenburg County, the City of Charlotte, Towns of Cornelius, Davidson, Huntersville, Matthews, Mint Hill, Pineville and the Regional Representative on the North Carolina Board of Transportation) provides policy and long-term planning direction for CATS. To ensure regional involvement and participation, the MTC also includes five non-voting members representing local governments outside Mecklenburg County and one non-voting member from the South Carolina Department of Transportation. The Charlotte City Council approves and appropriates (annually) the MTC recommended CATS budgets and approves all procurement actions. Two citizen committees review CATS operations and financial activities and report/recommend actions to the MTC.

As a regional system, CATS program is based on the “2025 Integrated Transit/Land-Use Plan for Charlotte-Mecklenburg”, created by the City and County, with significant participation by the six suburban Towns (Davidson, Huntersville, Cornelius, Pineville, Matthews, and Mint Hill) the Charlotte-Mecklenburg Board of Education and the Transit Planning Advisory Committee. The Plan proposed a rapid transit system as a means of supporting land use initiatives in the region – to sustain economic growth while protecting citizens “quality of life”. Some of the community wide benefits to be addressed by mass transportation were identified as reduction in total Vehicles Miles Traveled (VMT); more effective traffic management strategies; compliance with

air quality requirements; shortening travel times; and providing lifestyle choices less dependent on private auto usage.

CATS' Chief Executive Officer (CEO) is a City of Charlotte employee, appointed by the Charlotte City Manager with the concurrence of the Mecklenburg County Manager and an MTC representative. The Chief Executive Officer is responsible for the development of long range transportation plans; operating and capital programs and budgets, and leadership and management of the transit program in the region.

CATS' CEO is supported by an Executive Leadership Team responsible for Development and Planning, Operations, Finance, Marketing, and Support Services programs of the transit system. Additionally, CATS' program is supported by the Planning, Engineering, Budget, Finance, Human Resource, Technology, Equipment Management and Legal Departments of the City of Charlotte.

Transit activities are organized and staffed by the City of Charlotte. CATS' bus operations and maintenance program is staffed by contractors who are managed by a transit management company.

CATS is funded locally by a one half cent Sales & Use tax which was approved by the voters of Mecklenburg County in 1998. CATS' financial management is controlled by Generally Accepted Accounting Principles and strong Financial Policies adopted by the Metropolitan Transit Council (MTC).

In order to demonstrate its strong financial capacity to achieve long-term plans, CATS maintains a net debt service coverage ratio (i.e. relationship between debt service expense and net sales tax revenue) of 1.15 and an annual unobligated fund balance of \$100 million.

Over the past 10 years, CATS has received \$396,885,848 in Federal funds, which includes a Full Funding Grant Agreement (FFGA) for the LYNX Blue Line; \$167,458,373 in State funds in support of its capital program; and \$102,439,376 in State operating assistance. The North Carolina Department of Transportation (NCDOT) signed a State Full Funding Grant Agreement with the City for 25% of the project cost of the LYNX Blue Line, two years before execution of the Federal Full Funding Grant Agreement for the project.

CATS is in a unique financial position of receiving, from NCDOT, 50% of the local share of projects which receive Federal funding. This is a result of the State of North Carolina's approved legislation authorizing NCDOT to provide the matching share of federal public transportation assistance programs through State appropriations. Additionally, the State Secretary of Transportations is authorized to enter into State Full Funding Grant Agreements with transit agencies to provide State matching funds for New Starts Fixed Guideway projects.

The Federal Transit Administration (FTA) Region IV has conducted financial capacity and financial management audits of CATS and the City of Charlotte, prior to execution of the Federal Full Funding Grant Agreement and a spot financial audit of the FFGA in FY2009. The Transit

Fund is subject to annual external audits prior to preparation of the annual Certified Accounting Financial Report. CATS' financial management and capacity is considered sound.

The CATS Program has been recognized for excellence by FTA and the FHWA as follows:

- In 2008, CATS was awarded FTA's Silver Preeminent STAR "Outstanding Innovation" Award in recognition of successful innovation and development of best practices within Public Transportation.
- In FY2009, CATS received the Award of Excellence for Intermodal Transportation Facilities from the Federal Highway Administration for the LYNX Blue Line light rail station at I-485 and South Boulevard.

III. GRANT FUNDS, SOURCES/USES OF PROJECT FUNDS

In this application, the City of Charlotte, Charlotte Area Transit System is applying for a Federal grant of \$20,000,000 (80% of total project costs), which will be matched with \$5,000,000 of local funds (20% of total project costs), provided by CATS. On August 22, 2011, the Charlotte City Council approved the TIGER III Discretionary grant application and the commitment of local matching funds available in CATS' approved FY2012 Capital Budget.

In 1998, the voters of Mecklenburg County, which includes Charlotte, Huntersville, Cornelius, Davidson, Matthews, Mint Hill, and Pineville, approved a ½-percent increase in the sales tax to fund CATS and local transit. Since then, sales tax revenue has been used to fund the local share for the LYNX Blue Line light-rail system, which opened in 2007 with ridership that has far surpassed estimates, as well as a very substantial increase in local bus service. The transit sales taxes are also used to fund the local share of other transit projects.

The Mecklenburg-Union Metropolitan Planning Organization has adopted the 2035 LRTP and Conformity Determination with concurrence from USDOT. The Platform Retrofit project is covered under the LYNX Blue Line Enhancements as #[TE-5101](#) and Northeast Corridor Transit way under #[TE-4901](#) in the STIP, dated 04/02/09.

IV. SELECTION CRITERIA

Benefit-Cost Analysis (BCA) Methodology

The Benefit-Cost Analysis is a comparison of values – the cost to construct the project compared to the benefits of the project. Specifically it is used to measure the extent to which a project improves the lives of the people it affects. The benefits represent the amount that all the people in the nation would jointly be willing to pay to implement the project in order to feel that the benefits justified the project's costs.

Following USDOT guidance for the benefit-cost analysis as part of the TIGER III Discretionary Grant application process, the primary factors utilized in the BCA include the cost of the project compared to monetized, quantified, and qualified benefits of the project. Benefit-cost annual user

benefits are estimated over a 20-year lifecycle, where appropriate, in constant dollars for each benefit category. Again it is important to note that the BCA is consistent with CATS ultimate plan to add power and lengthen all stations to accommodate three-car trains.

Long Term Outcomes

- Reduced Vehicle Miles Traveled (VMT)
- Improved condition of existing transportation facilities and systems
- Long-term growth in employment, production, or other high-value economic activity
- Improved livability of communities across the nation (e.g. travel time savings, vehicle operating cost savings, increased access)
- Improved energy efficiency and reduced greenhouse gas emissions
- Reduced number, rate, and consequences of surface transportation-related crashes, injuries and fatalities

Job Creation & Economic Stimulus

- Short-term job creation (during construction period)
- New or expanded business opportunities

Future benefits and costs are discounted to current dollars using a real discount rate of 7 percent following guidance, provided by Office of Management and Budget (OMB) in Circulars A-4 through A-94. An alternative real discount rate of 3 percent was used for the monetization of pavement maintenance savings (*State of Good Repair* criteria) because the use of funds dedicated to the project would be other public expenditures rather than private investment.

The monetization of costs and benefits of the project were calculated over a 20-year period and discounted back to present value (in 2010 dollars). Values were inflated 1.8 percent annually-consistent with recent OMB economic assumptions- in planning construction for large facility projects including both the construction/acquisition and operations phase.

This project is projected to open in 2015 with a 20-year benefit-cost period (through 2034).

Guidance and General Assumptions

The USDOT provides guidance for the benefit-cost analysis as part of the TIGER III Discretionary Grant application process in CFR Vol. 75, No. 104, Docket No. DOT-OST-2010-0076. DOT believes that benefit-cost analysis, including the monetization and discounting of costs and benefits in a common unit of measurement in present day dollars, is an important discipline. The Federal Register stipulates that for the BCA to yield useful results, full consideration of costs and benefits is necessary, including fuel and travel time savings, reductions in greenhouse gas emissions, water quality impacts, quality of life impacts, and other costs and benefits that are more indirectly related to vehicle-miles.

Table IV-A summarizes the benefits of the “Primary Selection Criteria” based on the TIGER III Discretionary Grant guidance.

Table IV-A. Primary Selection Criteria		
Criteria	Net Benefit	Description
Long Term Outcomes		
State of Good Repair	Reduce Life Cycle Costs	Reductions in rail operating costs due to operating longer trains instead of increasing train frequency
	Roadway Pavement Maintenance Savings	Reductions in pavement maintenance costs due to less roadway usage allowed by platform retrofit
Economic Competitiveness	Economic Development	New capital investment and property appreciation created as a result of increased service capacity
Livability	Travel Time Savings	Door-to-door trip time savings to transit users due to enhanced ridership
	Vehicle Operating Cost Savings	Reductions in monetary costs to drivers switching to public transit due to improved parking opportunities allowed by improved service
	Increased ridership and improved access for economically disadvantaged and non-disadvantaged population	Increased access to special events and enhanced job opportunities for disadvantaged and non-disadvantaged people allowed by improved service
	Reduced parking costs	Reduction in capital expenditures to provide parking stemming from increased ridership
Sustainability	Emissions Reductions (VOC, CO, NOX, PM, SO2, CO2)	Reductions in pollutants and greenhouse gases from auto use due to improved parking opportunities and enhanced ridership allowed by improved service
Safety	Accident Reduction	Reductions in insurance premiums, property losses, injuries, and deaths due to reductions in automobile use for transit users allowed by improved service
Job Creation & Economic Stimulus		
Job Creation	Short-Term Job Creation	Amount/wages of new jobs created during construction period
Economic Stimulus	New or Expanded Business Opportunities	Enhanced Transit Oriented Development opportunities created as a result of improved service

As stipulated in the guidance, estimates of benefits are presented in monetary terms whenever possible. In the absence of a monetary measurement, the measurements of benefits are expressed in other forms such as quantitative measurement (in physical, non-monetary terms such as ridership estimates, emissions levels, etc.) and qualitative benefits (quality of life, etc.).

Project Cost

The CATS Blue Line – ultimate project to increase capacity of the Blue Line has a total capital cost of \$67,000,000 (2010 dollars). Table IV-B summarizes the discounted capital cost value of the project in 2010 dollars at a 3 percent discount rate assuming that 20 percent of the project is constructed in 2012, 30 percent in 2013, 30 percent in 2014 and the remaining 20 percent in 2015.

Table IV-B. CATS South Corridor Retrofit Project		
Project Cost Discounted Value (2010\$)		
Year		Value
Total Capital Cost (2010\$)		\$67,000,000
2011	0%	\$0
2012	20%	\$13,641,200
2013	30%	\$20,830,112
2014	30%	\$21,205,054
2015	20%	\$14,391,164
Discounted Value	100%	
<u>Discount Rate</u>		
3%		\$63,175,003

Primary Selection Criteria:

a. Long-Term Outcomes

Long term outcomes provide desirable long-term benefits for a nation, metropolitan area, or region. Following USDOT guidance as part of the TIGER II Discretionary Grant application process, the following five categories of long term outcomes were evaluated for their potential impact:

i. *State of Good Repair*

Addressing Capacity Constraints

A 2009 survey found that 8 percent of trains, on average, as many as 25 percent of the trains were over capacity during the peak periods. This indicates a critical need to increase capacity based on current peak-period ridership.



Figure IV-A - Typical Car During Peak Event

The need is even greater when event-generated demand is considered. In 2009, there were an estimated 407 events generating 8.6 million annual attractions (an average of 21,000 per event). These attractions have a potential average transit mode share of 17 percent, generating 1.4 million attractions per year (based on a standard 300 day annual attraction and 25 percent peak period ridership) further constraining system capacity. The 2009 event-related ridership adds an average 1,167 peak period trips. At the current 10-minute headway, an average of 25 persons are added to each car, which already average peak-period loads based on board surveys of 118 to 125 persons. For background data on the operation and ridership analysis that has been performed, reference [Feasibility Study](#) and [Ridership Operations Planning Summary](#).



Figure IV-B - Typical Event Day Platform Loading

The capacity constraints limit the ability to accommodate event-related growth and may limit continued growth in base peak period growth.

There is also a need to expand capacity to accommodate the planned rail line extension, although projected capacity constraints and associated economic benefits are not based on the need generated by the BLE nor are any of the economic benefits dependent on the BLE. The benefits and costs of the Blue Line Capacity expansion project are treated as an independent action not dependent on any future fixed transportation investment.

Expanding platforms to accommodate three-car trains would address the capacity issues and could result in significant operational cost savings. Operating three-car trains with 10 minute headways would increase peak hour capacity by 50 percent and eliminate the need to switch to two-car trains with 6 minute headways. This would save on both operational costs and the cost of purchasing four new LRT vehicles (additional traction power supply is necessary to operate trains at 6-minute headways, also).

The City has estimated reduced annual Operation and Maintenance (O&M) costs from operating three-car trains on the expanded platform at 10 minute headways versus the need to operate two-

car trains at 6-minute headways. In addition to the annual O&M cost savings, the Blue Line capacity Expansion Project would eliminate the need to purchase **four new rail cars** to serve headways required with two-car platforms (both the options require additional power supply). This results in an overall benefit to the project.

O&M Cost Savings

With the implementation of the three car service along the Blue Line, the overall system is enabled to handle additional capacity without having to decrease headway or increase the number of trains operating in the system. This benefit is even further identified once the Northeast Corridor (Blue Line Extension) light rail becomes operational. The BLE is currently in the FTA New Starts Program, Preliminary Engineering Phase, and includes three car platforms for the full route. While this benefit is not captured with the overall benefit/cost analysis the overall benefit to the system’s efficiency is substantial. Once stations are constructed in the northeast portion of Charlotte, ridership projection models increase significantly over the present day ridership. The addition of the three car operation on the existing Blue Line will become even more crucial to the efficient operation of the overall system.

The total discounted lifecycle (20-year period) monetized value of O&M cost savings to CATS amounted to \$55,600,000 (2010 dollars) based on discount rate of 3 percent. The opening year operating cost savings totaled \$3,300,000.

Table IV-C. O&M Cost Savings		
	Opening Year	Lifecycle (Discounted 2010\$)
O&M Cost Savings	\$3,246,484	\$55,631,916

Removal of the capacity constraints would eliminate a freeze on additional event-related ridership based on past trends. Assuming a 3 percent per year growth in event related demand that is unconstrained by capacity issues; significant new ridership is generated above the estimated 1.4 million attractions per year, resulting in new benefits.

Table IV-D shows the potential impact on transit trips and associated VMT reduction which translates into a series of quantifiable economic benefits.

Table IV-D. Projected Reduced VMT by Special Events								
Venue	Event Description	Current Event Attendance	Current Daily Attractions	Events per year	Current Annual Attractions	Transit Mode Share	2010 Transit Trips	Total VMT Reduced
BOA Stadium	Panthers / Other Events	72,794	145,588	10	1,455,880	18%	262,058	6,787,419

Time Warner Arena	Bobcats NBA	14,526	29,052	40	1,162,080	18%	209,174	4,703,774
	Bobcats Preseason	8,166	16,332	3	48,996	18%	8,819	212,995
	Checkers Hockey	5,311	10,622	36	382,392	18%	68,831	1,662,335
	CIAA Basketball	14,000	28,000	6	168,000	18%	30,240	730,330
	Concerts	11,785	23,570	15	353,550	5%	17,678	512,318
	Other Events	12,409	24,818	15	372,270	5%	18,614	539,444
Knights Baseball Stadium	Knights Baseball	6,500	13,000	75	975,000	18%	175,500	4,238,522
Convention Center, Nascar Hall of Fame	Convention Center	1,350,000	2,700,000	1	2,700,000	5%	135,000	3,912,482
UNCC Uptown Campus Building	UNCC Main campus events	2,000	4,000	200	800,000	60%	480,000	23,185,076
Total		1,497,491	2,994,982	401	8,418,168		1,405,914	46,484,695

Charlotte has seen an increase in the number, the scale and the significance of special events.

Pavement Maintenance Savings

Infrastructure projects that improve the state of good repair of transportation infrastructure can significantly reduce the long term maintenance and repair costs. The development of the BLE project will result in reduction in annual VMT due to an increase in overall transit capacity. Reductions in VMT have a direct impact on a wide range of issues, including environmental, time savings, energy usage, and safety. Each of these impacts and their associated economic values are discussed in the following sections.

Over a 20-year lifecycle period, the project will provide a total reduction of more than 47 million VMT on nearby roadways, thus reducing overall pavement maintenance costs. The total discounted lifecycle (20-year period) monetized value of pavement maintenance savings amounted to \$115,500 (2010 dollars) based on discount rate of 3 percent. The opening year pavement maintenance savings totaled approximately \$490.

Table IV-E. Pavement Maintenance Savings		
	Opening Year	Lifecycle
VMT Avoided	119,323	46,484,695
Pavement Maintenance Savings (Discounted 2010\$)	\$489	\$115,452

ii. *Economic Competitiveness*

The Blue Line Platform Retrofit project will increase economic competitiveness by providing improved access to special events, as well as associated parking cost savings to users and enhanced land use and development. An innovative program to market and promote transit utilization for events will be implemented to attract major new events that only can be accommodated by enhanced transportation capacity. This project will provide enhanced opportunities for local area residents to access nearby special events, educational facilities, cultural amenities, institutional development, and job opportunities.

iii. *Livability*

Livability benefits are measured in monetary values, such as parking fee savings, vehicle operating cost savings in relation to reduced VMT, as well as qualitative values, such as increased access to special events and enhanced job opportunities for disadvantaged and non-disadvantaged people due to the improved access allowed by project.

Parking Cost Savings

The project is anticipated to reduce a total of 2.9 million parked vehicles over the 20-year lifecycle. These figures are based upon the estimated event attendance, transit mode share, vehicle occupancy, and parking costs factors for Uptown Charlotte. Assuming 3 persons per vehicle per trip, the total discounted value of parking savings is \$18,000,000 (2010 dollars) over 20-year lifecycle, based on a discount rate of 7 percent.

Venue	Event Description	Occup per Vehicle	Opening Year Transit Trips above Baseline	2010 Vehicle Trips	2010 Parking Cost per Vehicle	Total Lifecycle Reduced Vehicles Parked	Total Discounted Value of Parking Savings
BOA Stadium	Panthers / Other Events	3	8,341	2,780	\$20	395,563	\$4,136,965
Time Warner Arena	Bobcats NBA	3	6,657	2,219	\$15	280,935	\$2,275,686
	Bobcats Preseason	3	281	94	\$10	13,312	\$69,612
	Checkers Hockey	3	2,191	730	\$5	103,896	\$271,647
	CIAA Basketball	2.5	962	321	\$15	45,646	\$358,036
	Concerts	2.5	563	188	\$15	32,020	\$251,158
	Other Events	3	592	197	\$5	33,715	\$264,457
Knights Baseball Stadium	Knights Baseball	3	5,586	1,862	\$10	264,908	\$1,385,259
Convention Center, Nascar Hall of Fame	Convention Center	2.5	4,297	1,432	\$10	244,530	\$1,278,700
UNCC Uptown Campus Building	UNCC Main campus events	1.5	15,277	5,092	\$10	1,449,067	\$7,577,484

	Total		44,746	14,915		2,863,592	\$17,869,004
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Vehicle Operating Cost Savings

Vehicle operating costs are generally one of the most recognizable user costs because they include out-of-pocket costs associated with owning, operating and maintaining a vehicle. These costs include fuel and oil consumption, maintenance and repairs, tire wear, and vehicle depreciation. Usually considered a fixed cost, depreciation is partly variable because increased driving increases the frequency of vehicle repairs and replacement, thus reducing vehicle resale value. The reduction in VMT allowed by the project reduces the vehicle operating costs because vehicles are traveling fewer miles on the roadway.

Table IV-G outlines the estimated average costs per mile for each of the operating costs associated with owning, operating, and maintaining a vehicle based on input values provided by the American Automobile Association Vehicle Cost Estimates (*Your Driving Costs 2009*) for a medium sedan.

Table IV-G. Vehicle Operating Cost Inputs	
	Cost/Mile
Gas & Oil	\$0.1054
Maintenance	\$0.0451
Tires	\$0.0087
Depreciation	\$0.1000
Operating Costs/Mile	\$0.2592

Source: Average costs based on Medium Sedan. Your Driving Costs 2009, American Automobile Association Vehicle Cost Estimates, Depreciation costs/mile based on The Costs of Driving (Victoria Transport Policy Institute, 2010)

The total discounted lifecycle (20-year period) monetized value of vehicle operating cost savings amounted to \$6,000,000 (2010 dollars) based on discount rate of 7 percent. The opening year vehicle operating cost savings totaled \$42,000.

Table IV-H. Vehicle Operating Cost Savings		
	Opening Year	Lifecycle
VMT Avoided	119,323	46,484,695
Vehicle Operating Cost Savings (Discounted 2010\$)	\$42,242	\$5,862,733

iv. Environmental Sustainability

Transportation projects generate environmental costs in the form of emissions from “criteria pollutants” (e.g. NO_x, SO_x, and particulates) and greenhouse gases, such as carbon dioxide

(CO₂). Similar to vehicle operating cost savings, the monetization of emissions benefits are based on the reduction in VMT which, in turn, reduces the amount of emissions produced.

The six primary types of emissions measured include: nitrous oxide (NO_x), sulfur dioxide (SO_x), carbon dioxide (CO₂), carbon monoxide (CO), particulate matter (PM) and volatile organic compounds (VOC). The opening year average emissions (expressed in grams per mile) and the monetized value (per ton) is provided in Table IV-I. The input data used to generate these emission factors was provided by Mecklenburg County Air Quality (MCAQ).

The source model used to obtain the air quality emission factors was Mobile 6.2.03, one of EPA’s sanctioned mobile source emission models. Per unit costs as specified in the TIGER III guidance were applied to the reduced VMT to determine annual emission costs, or reduction savings.

Table IV-I. Emissions Reductions per VMT		
Pollutant	Opening Year Average Emissions (grams per mile)	Opening Year Monetized Value per Ton
NOX	0.35	\$4,112
SOX	0.009	\$16,447
CO2	485.5	\$34
CO	3.965	\$514
PM	0.0129	\$172,697
VOC	0.435	\$1,748

Source: Model used to obtain mobile emissions factors was Mobile 6.2.03. Input factors provided by Mecklenburg County Air Quality (MCAQ)

The total discounted lifecycle (20-year period) monetized value of emission reductions savings totaled \$583,000 (2010 dollars) based on discount rate of 7 percent. The opening year emission reduction savings totaled \$4,100.

Table IV-J. Emissions Reduction Savings		
	Opening Year	Lifecycle (Discounted 2010\$)
NOX	\$259	\$22,464
SOX	\$27	\$2,440
CO2	\$2,958	\$409,923
CO	\$366	\$81,274
PM	\$400	\$52,565

VOC	\$137	\$14,423
Total	\$4,146	\$583,089

v. Safety

Safety benefits are an effect of reduced VMT provided by the project because a reduction in miles traveled theoretically reduces the incidence of traffic crash injuries and fatalities. The Federal Secretary of Transportation memorandum entitled “*Treatment of the Economic Value of a Statistical Life in Departmental Analysis – 2009 Annual Revision*” (March 2009) provides guidance on the value of a statistical life (VSL) and fractional VSL values based upon the severity of injuries resulting from the crashes that were utilized to determine safety benefits as part of the project.

Table IV-K. Injury Categories, Fractional VSL and Injury Type Distribution				
Injury Level	Type	Fraction of VSL	% of Total Injuries	Value of VSL
1	Minor	0.0020	76.00%	\$12,000
2	Moderate	0.0155	19.00%	\$93,000
3	Serious	0.0575	3.50%	\$345,000
4	Severe	0.1875	0.25%	\$1,125,000
5	Critical	0.7625	0.25%	\$4,575,000
6	Fatal	1.0000	N/A	\$6,000,000

Source: U.S. Department of Transportation, Treatment of the Economic Value of a Statistical Life in Department Analyses - 2009 Annual Revision

Based on national averages for estimated traffic fatality rates and injury rates per 100 million VMT, the estimated monetary value of injuries and fatalities reduced as a result of the project was determined. The total discounted lifecycle (20-year period) monetized value of crash reductions savings is \$1,800,000 (2010 dollars), based on discount rate of 7 percent. The opening year crash reduction savings totaled \$16,000.

Table IV-L. Crash Reduction Savings		
	Opening Year Value	Lifecycle (Discounted 2010\$)
Level 1 (Minor)	\$1,189	\$135,159
Level 2 (Moderate)	\$2,304	\$261,871
Level 3 (Serious)	\$1,574	\$178,952

Level 4 (Severe)	\$367	\$41,681
Level 5 (Critical)	\$1,491	\$169,504
Level 6 (Fatal)	\$8,996	\$1,022,584
Total	\$15,921	\$1,809,752

b. Job Creation and Economic Stimulus

The construction of the BLE will result in an increase in short-term jobs. The President’s Council of Economic Advisors document “Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009,” (May 2009) provides guidance to estimate the number of direct, indirect, and induced jobs created by the infusion of federal government stimulus funds. The guidance estimates that every \$92,136 of direct government spending creates one job-year of work. For each job-year of work, 64 percent are related to direct or indirect jobs and 36 percent are related to jobs induced in the larger regional economy.

Applying these figures to the \$53,600,000 of federally requested project costs yields approximately 582 total job-years, including 372 direct or indirect job-years and 210 induced job-years.

Table IV-M. Job-Years Created from Requested TIGER Funds	
Total Job-Years Created	
Total TIGER Funds Requested	\$53,600,000
Government Spending Per Job-Year	\$92,136
Number of Job-Years Created	582
Direct & Indirect Job-Years	
% of Total Job-Years Created	64%
Total Direct & Indirect Job-Years	372
Induced Job-Years	
% of Total Job-Years Created	36%
Total Induced Job-Years	210
<i>Source: President's Council of Economic Advisors, "Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009," May 2009</i>	

An input-output analysis (based on the Bureau of Labor Statistics RIMS II input-output model) was conducted to provide another measure of the short-term job and economic growth created as a result of the project. This analysis estimated the direct, indirect, and induced employment, economic output, earnings, and associated fiscal impacts of the project during the construction period.

Table IV-N. Summary of Economic and Fiscal Impact (Construction Period) LYNX Blue Line – Platform Retrofit (2010\$)	
Economic Impact (Direct and Indirect)	
Jobs	447
Payroll	\$13,900,000
Material Purchases	\$27,500,000
Consumer Expenditures	\$8,100,000
Fiscal Impact	
Income Tax	\$594,869
Direct Sales Tax	\$705,008
Indirect Sales Tax	\$88,128
Total	\$1,388,005
<i>Source: BBP Economic and Fiscal Impact Model (based on BLS RIMS II)</i>	

Summary Benefit-Cost

As part of this TIGER III application, the costs and benefits of the CATS LYNX Blue Line Capacity Expansion Project have been estimated over a 20-year lifecycle period at a present value using a 7 percent discount rate or a 3 percent discount rate, where applicable.

Benefits have been estimated for each primary evaluation criteria. Table IV-O summarizes the projected monetized economic benefits, and associated costs, resulting from the construction of the project. The discounted economic value of project-related benefits that can be monetized will equal approximately \$97 million over a 20-year period. With a discounted cost of \$63,200,000, the projected net benefit is \$33,900,000 representing a benefit-cost ratio of 1.5.

Table IV-O. Summary of Project Quantifiable Benefits and Costs	
	Discounted Value
O&M Savings	\$55,631,916
Special Event Parking Savings	\$17,869,004
Pavement Maintenance Savings	\$115,452
Vehicle Operating Cost Savings	\$5,862,733
Emissions Reductions	\$583,089
Accident Cost Savings	\$1,809,752
Cost Avoidance of Rail Car Purchase	\$15,174,132

TOTAL BENEFITS (Discounted)	\$97,046,079
Capital Cost	\$67,000,000
TOTAL COST (Discounted)	\$63,175,003
Net Benefit	\$33,871,076
B-C Ratio (2010 Dollars)	1.5

For a full breakdown of the data for the BCA Report, please see the attached [BCA](#) and [BCASummary](#).

Sensitivity Analysis:

In accordance with the benefit-cost analyses rating guidelines, we have undertaken sensitivity analyses to show how changes in key assumptions affect the outcomes of the analysis. Based on this evaluation we are confident the net present value of benefits exceeds the net present value of costs. The net present value of the benefits would have to be reduced by over 20 percent and costs increased over the same percentage before benefits are less than the costs.

Secondary Selection Criteria:

c. Innovation

The City of Charlotte/CATS is planning to implement this innovative transit project that is designed to incorporate adjacent existing and future land uses together with transportation planning to promote higher usage of the transit infrastructure and to benefit the overall local and regional economy. Along the LYNX Blue Line corridor, the construction of the light rail has been the main catalyst for over \$1.4 billion in development and redevelopment since its opening. Between the years of 2006 and 2008 CATS has experienced the largest increase in transit mode share of any transit focused municipality in the country. The expansion of the Blue Line stations to three car capacity will provide additional opportunities and incentives to continue to advance the transit infrastructure with the Charlotte region.

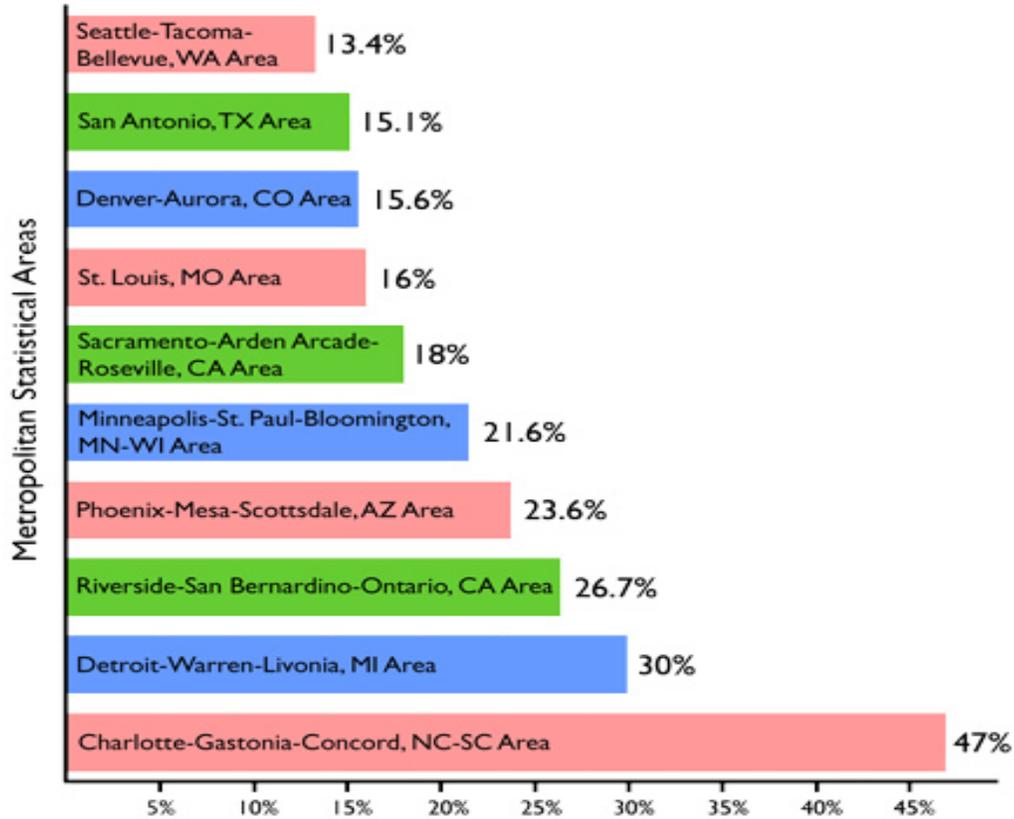


Figure IV-C - Rate of Increase in commuting via Transit between 2006 and 2008
(Based on data from the U.S. Census Bureau’s American Community Survey)

d. Partnership

The City of Charlotte has developed an organizational structure to implement the City’s growth strategy - *Centers, Corridors and Wedges*. A broader organizational framework also encourages the involvement of other key City departments in making policy and programmatic decisions and ensures coordination of the work among all the corridor projects. This framework is important to the LYNX Blue Line Capacity Expansion Project:

- Achievement of the project goals and objectives requires close coordination with the City departments responsible for land use planning and zoning and infrastructure planning and engineering to insure that the transit improvements being designed and built are fully integrated with these other activities and vice versa.
- Design and construction of the transit improvements must be closely coordinated with the City’s infrastructure improvements designed to support station area development to minimize costs and ensure proper timing of the respective improvements.

This integrated and coordinated approach brings all the key parties within the City to the table. The Growth Strategy Steering Team provides oversight of major corridor infrastructure projects, including transit.

This integrated management team includes representatives from key City departments – CATS, Engineering & Property Management, Charlotte-Mecklenburg Planning Department, Neighborhood and Business Services, and Charlotte Department of Transportation. This management approach allows for proactive coordination between the various city departments that need to be involved in the implementation of the corridor projects. As an integrated team, all agencies/departments concerned have an active role in the decision making process, ensuring a coordinated program that is consistent with other city-county plans and programs.

The following is a list of partnerships that have been established to help make the project a success. We anticipate letters of support to be forwarded as a part of this submission:

- Senator Kay Hagan (NC)
- Congressman Mel Watt (NC-12th)
- Congressman Sue Myrick (NC-9th), a formal letter of support is attached for the TIGER III project.
- Charlotte Mayor – Anthony Fox
- Eugene A. Conti, Jr., NCDOT, Secretary of Transportation; John Collett, NCDOT, Board of Transportation Member – Mr. Conti and Mr. Collett provided a formal Letter of Project Support for this project with the earlier TIGER II request which is attached.
- City Chamber of Commerce Letter of Support - Attached

V. PROJECT READINESS & NEPA INFORMATION

The LYNX Blue Line project, which began operations in November of 2007, was constructed with two-car platforms but designed to accommodate three-car. This includes the expansion of the platforms with minimal impact to the existing track construction. Upon reevaluation of the EIS, operations and construction on the retrofit could begin in June 2013. Please see schedule below.

Table V. Overall Project Schedule	
	Status/Completion Date
Conceptual Engineering	Complete
FEIS	Complete
Reevaluate FEIS	January 2013
Start of Construction	June 2013
Construction Complete	June 2015
Revenue Operation Date	June 2015

CATS will prepare a reevaluation of the South Corridor EIS to be reviewed. FTA has previously agreed that a reevaluation would be sufficient because the original FEIS and ROD included

three-car platforms and additional traction power substations. The re-evaluation can be completed within 12 months of project approval. .

VI. FEDERAL WAGE CERTIFICATION

The Charlotte Area Transit System certifies that it will ensure compliance to the Davis-Bacon act approved March 3, 1931 by the U.S. Congress and all its subsequent amendments. A copy of the Certification is attached.

VII. MATERIAL CHANGES TO PRE-APP FORM

Charlotte Area Transit System certifies that there has been no material changes related to the LYNX Blue Line Capacity Expansion project since submission of our Pre-Application Form.