



# I-277/I-77 Loop Strategic Plan

Submitted to the City of Charlotte  
in cooperation with



June 2013



# I-277/I-77 Loop Strategic Plan





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# Acknowledgments

The I-277/I-77 Loop Strategic Plan is envisioned to provide a blueprint for the 6.5 mile long loop surrounding Uptown Charlotte. This study was a collaborative effort between the Charlotte Department of Transportation (CDOT), Mecklenburg-Union Metropolitan Planning Organization (MUMPO), the North Carolina Department of Transportation (NCDOT), the Charlotte Center City Partners, Charlotte-Mecklenburg Planning Department, and the Charlotte Area Transit System (CATS). The project team sincerely thanks the following individuals who played a key role in the development of this Strategic Plan.

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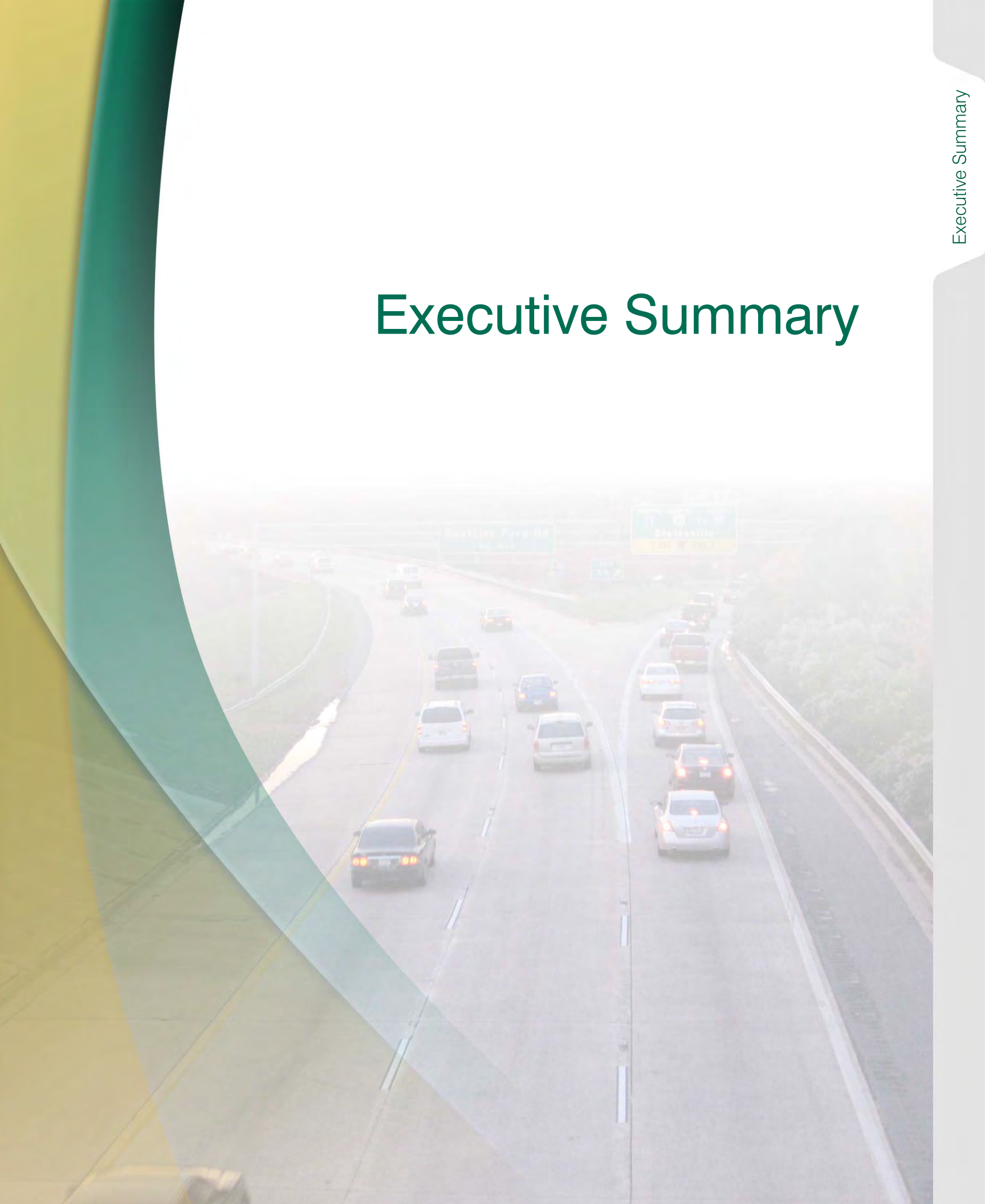
# Acronym List

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AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
CATS	Charlotte Area Transit System
CCTP	2006 Charlotte Center City Transportation Plan
C-D	Collector-Distributor Road
CDOT	Charlotte Department of Transportation
EB	Eastbound
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
HOT	High-Occupancy Toll
HOV	High-Occupancy Vehicle
LOS	Level of Service
LRTP	2040 Long Range Transportation Plan
M	Million
MOE	Measure of Effectiveness
MPO	Metropolitan Planning Organization
MUMPO	Mecklenburg-Union Metropolitan Planning Organization
N/A	Not Applicable
NB	Northbound
NCDOT	North Carolina Department of Transportation
SB	Southbound
TOT	Technical Oversight Team
VMT	Vehicle Miles Traveled
WB	Westbound



# Executive Summary



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# Executive Summary

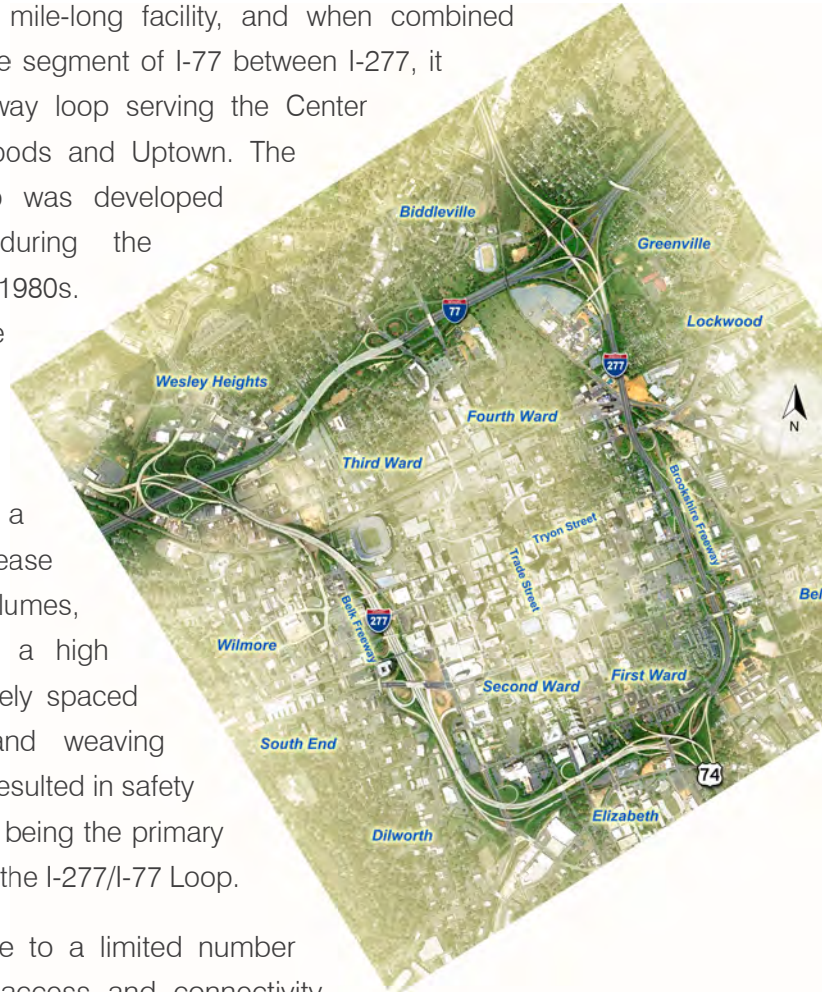
I-277 is a 4.5 mile-long facility, and when combined with the 2.0 mile segment of I-77 between I-277, it forms the freeway loop serving the Center City neighborhoods and Uptown. The I-277/I-77 Loop was developed incrementally during the 1970s and 1980s.

As Charlotte continued its dynamic growth over the years, a significant increase in traffic volumes, combined with a high number of closely spaced interchanges and weaving sections, have resulted in safety and congestion being the primary concerns along the I-277/I-77 Loop.

In addition, due to a limited number of multimodal access and connectivity points, many of the street and greenway connections crossing over or under the I-277/I-77 Loop are considered to be lacking acceptable pedestrian and bicycle facilities and separating the nearby neighborhoods from Uptown.

Recognizing these issues, the Charlotte Center City Transportation Plan and the Charlotte Center City 2020 Vision Plan recommended a comprehensive assessment of the Loop to address these transportation and urban/community design issues.

As a result, the City of Charlotte in collaboration with the Mecklenburg-Union Metropolitan Planning Organization (MUMPO) and the North Carolina Department of Transportation (NCDOT), contracted with RS&H to perform the I-277/I-77 Loop Study. The Study is envisioned to be the first phase of a multi-phase effort. The result of this Study is referred to as the I-277/I-77 Loop Strategic Plan.



*As Charlotte continued its dynamic growth over the years, a significant increase in traffic volumes, combined with a high number of closely spaced interchanges and weaving sections, have resulted in safety and congestion being the primary concerns along the I-277/I-77 Loop.*



## Study Purpose and Goals

- Define the current and future purpose and functionality of the I-277/I-77 Loop.
- Evaluate the current and future safety, capacity and operational conditions.
- Define potential projects to be nominated for inclusion in MUMPO's 2040 Long Range Transportation Plan (LRTP).
- Comply with Federal and State requirements.

## Study Area and Influence Area

The Study Area focuses on the I-277/I-77 Loop and its interchanges. The Loop has three freeway-to-freeway interchanges (also know as system interchanges) and ten freeway-to-arterial interchanges (also known as service interchanges). All major transportation facilities, particularly on the interstate level, have a much broader context and area of influence that extend past the facility borders. These facilities have major impacts on the surrounding land uses, other transportation facilities, and system operations. With this understanding, the Study also includes a broader, high level assessment of the influence area.

## Previous Studies

The high traffic volumes, combined with the recognized operational and design issues, have resulted in a number of studies that developed recommendations for the I-277/I-77 Loop. This Study incorporates a review and assessment of each of the prior studies to ensure consistency with existing plans and recommendations.

**Charlotte Center City Transportation Plan:** The Charlotte Center City Transportation Plan (CCTP) was adopted by City Council in 2006 and includes strategies, policies and action items to ensure and enhance the viability and livability of Center City.

The CCTP identified the I-277/I-77 Loop as a functional and physical boundary of Uptown. The CCTP identified diminishing the impediments created by the Loop for pedestrians and bicyclists and their connectivity and accessibility to Uptown as a major goal. In keeping with this overall goal, the CCTP recommended a number of interchange modifications. In addition, the CCTP also recommended a comprehensive study of the entire I-277/I-77 Loop to ensure that any recommendations are fully coordinated and complementary.

**Charlotte Center City 2020 Vision Plan:** The Charlotte Center City 2020 Vision Plan was adopted by City Council in 2011. This Vision Plan was developed





## Executive Summary

through a collaborative community planning process and identified a number of comprehensive transformative strategies. Specific to the I-277/I-77 Loop, the plan recommended modifications to the Loop to enhance connectivity between Uptown and its adjacent neighborhoods. The Plan, consistent with the CCTP, recommended that a comprehensive loop study should be undertaken.

In addition to these two major plans, a number of other previous plans within the Study and Influence Areas were reviewed. These plans included previous Interchange Modification Reports, the I-277 Connections Study, the Charlotte Area Transit System (CATS) Dual Hub Study, the 3rd/4th Street Safety Study of the Midtown Area Plan, the Regional Managed Lanes Study, and various development plans.

### Existing Conditions

A thorough evaluation of current and future safety, capacity and operational conditions were undertaken. This process resulted in the following:

- The heavy traffic demand along I-77 creates oversaturated traffic flow conditions during both peak hours. Along I-277, heavy congestion occurs at the three system (freeway-to-freeway) interchanges. As the traffic demand continues to increase in the Center City, traffic operations along I-77 and I-277 would further diminish and result in substantially longer queues.
- The facilities also have geometric design issues, which include short acceleration/deceleration lanes and insufficient weaving distances. When these geometric issues are combined with the heavy traffic demand, severe safety hazards exist at several locations.
- A review of historic three-year crash data indicated that over 80 percent of the Study corridor had crash rates higher than the statewide averages for similar facilities. The three system interchanges had crash rates as high as 2.5 to 3 times the statewide average.
- The evaluation also showed that there are limited acceptable opportunities for pedestrian and bicyclist crossings along I-277/I-77 Loop. Although the opportunities may occur relatively frequently, there are a number of prevalent issues that were identified resulting in unacceptable locations. Some of the issues identified include inadequate facilities for pedestrians and bicyclists causing conflicts with vehicular traffic, safety issues due to the vehicular conflicts and inadequate lighting, lack of maintenance and aesthetics, and a lack of a community sense of scale.

*The foundation for the ranking process of potential concepts was provided by the region's existing transportation policy framework set forth in MUMPO's LRTP ranking criteria for major roadway projects.*



## Study Process

The current and future conditions evaluation was followed by the concept development process. In order to ensure coordination with stakeholders, an I-277/I-77 Loop Study Technical Oversight Team (TOT) was formed and met regularly during the study development. This TOT, comprised of City of Charlotte and NCDOT staff, MUMPO staff, and representatives of Charlotte Center City Partners, provided a detailed review during the concept development process. Public input was also sought throughout the process via a the public workshop and informational updates provided on the City's website.

The TOT review process first focused on the three system interchanges followed by the service interchanges. Each interchange was evaluated for current and future design conformity to NCDOT and American Association of State Highway and Transportation Officials (AASHTO) design standards, functionality of interchange layout and lane configuration with current and future traffic patterns, and safety. Based on the analysis and input from the TOT members and the public, a total of 21 concepts were developed as shown in Figure ES-1.

Through coordination and collaboration with the TOT, each potential concept was ranked. Planning level cost estimates were developed based on the potential concepts for right-of-way and construction costs. The foundation for the ranking process of potential concepts was provided by the region's existing transportation policy framework set forth in MUMPO's LRTP ranking criteria for major roadway projects. A summary of the criteria scores for all of the potential concepts is included in Table ES-1.

## Summary of Recommendations

Based on the input from the TOT, ranking results and public input, the following recommendations were developed for the I-277/I-77 Loop Strategic Plan (see Figure ES-2):

- **Potential Concept A:** Reconstruct the interchange at I-77 and I-277 (John Belk Freeway) and I-77 between John Belk Freeway and Brookshire Freeway. This potential concept would involve a long term capital investment and an intensive reconstruction effort.
- **Potential Concepts B, C, and D:** Consolidate and reconstruct interchanges along I-77 between I-277 (John Belk Freeway) and I-277 (Brookshire Freeway). This potential concept would require coordination with the I-77 North Managed Lanes project and I-77 South Feasibility Study.



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- **Potential Concepts E, F, and G:** Modify the interchange at I-77 and I-277 (Brookshire Freeway). This potential concept would require coordination with the I-77 North Managed Lanes project, which is being currently studied for a possible public-private partnership project.
- **Potential Concepts H, I, and J:** Modify I-277 (Brookshire Freeway) between Independence Boulevard (US 74) and I-77. This potential concept would require additional study after the I-77 North Managed Lanes are constructed.
- **Potential Concepts L, M, ML-1, and ML-2:** Improve/add connections between I-277 and Independence Boulevard (US 74). This potential concept would involve accommodations for future managed lanes in this area. It should be noted that due to their close proximity, any improvements to the I-277 at Independence Boulevard (US 74) interchange may require improvements to the nearby Kenilworth Avenue/3rd Street/4th Street interchanges as well.
- No potential concepts are recommended for the I-277/I-77 Strategic Plan for I-277 (John Belk Freeway) between Kenilworth Avenue and I-77 as a result of the recent interchange modifications, since it would continue to function within acceptable roadway capacity limits for the next 20 to 30 years.
- Potential concepts to cap over or tunnel under portions of I-277 would have minimal to no impact on the functional operations of the I-277/I-77 Loop. These concepts are primarily economic development projects so they are not reflected as recommendations in the I-277/I-77 Loop Strategic Plan. However, any recommended concepts in these areas should be built in a way that allows for future implementation of the tunnels and caps. The connectivity and economic development benefits of the tunnels and caps would still have merit and should be considered through non-transportation related funding sources.

In the next phases of this Study, each of these recommendations will be further evaluated. Depending on available funding, additional designs will be created in order to implement these recommendations. During future phases, multi-modal and urban design elements will be incorporated.



Executive Summary

Table ES-1 Ranking Scores of Potential Concepts

Potential Concept	Congestion	Safety	Transit Parking/Drop Off	Land Use Planning/Quality of Life	Natural Environmental Impacts	Accessibility to Center City	Low Income and Minority Communities Impacts	Benefit-Cost Ratio	Total Points	Approx. Cost	Inclusion in the I-277 / I-77 Strategic Plan	Recommendation
A I-277 at I-277 (John Belk Fwy)	4	4	0	1	0	4	0	4	17	\$60M	✓	Submitted to MUMPO for Inclusion in the 2040 LRTP ✓
B I-77 at Trade St SB C-D Rd	3	3	0	1	0	3	0	3	13	\$10M	✓	✓
C I-77 at Trade St NB C-D Rd	3	3	0	-1	0	3	0	3	11	\$10M	✓	✓
D I-77 NB On-Ramp from Trade St / 5th St	3	3	0	-1	0	3	0	2	10	\$5M	✓	✓
E I-77 NB Off-Ramp to I-277 EB / Brookshire Fwy	2	4	0	0	0	0	0	3	9	\$2M	✓	-
F I-77 SB Off-Ramp to I-277 EB / Brookshire Fwy	4	4	0	0	0	3	0	4	15	\$15M	✓	-
G I-77 NB On-Ramp from I-277 WB / Brookshire Fwy	4	4	0	0	0	4	0	4	16	\$2M	✓	-
H I-277 (Brookshire Fwy) at Church St / Caldwell St interchange	3	3	0	2	0	0	0	3	11	\$11M	✓	✓
I New Connector Rd - Graham St to Church St	2	1	0	2	0	2	0	3	10	\$5M	✓	✓
J New Connector Rd - Church St to College St	0	0	0	2	0	2	1	1	6	\$15M	✓	-
K New Connector Rd - College St to Brevard St	0	0	0	2	0	2	2	1	7	\$21M	✓	-
L I-277 at Independence Blvd WB C-D Rd	4	4	0	1	0	4	0	4	17	\$22M	✓	✓
M I-277 at Independence Blvd EB C-D Rd	4	4	0	-1	0	4	0	4	15	\$22M	✓	✓
ML-1 I-277 at Independence Blvd - General Purpose Lanes Only	4	4	0	-1	0	4	0	4	15	\$60M	✓	✓
ML-2 I-277 at Independence Blvd - Managed Lanes Only	4	2	0	-1	0	4	0	4	13	\$35M	✓	✓
N Relocation of I-277/Carson Blvd Ramp	2	1	0	0	0	0	0	1	4	\$10M	✓	-
O Cap John Belk Fwy between Church St and LYNX Rail	0	0	2	5	0	0	0	1	8	\$328M*	✓	-
P Cap Brookshire Fwy between Davidson St and Caldwell St	0	0	0	5	0	0	2	1	8	**	✓	-
Q Tunnel Brookshire Fwy between Davidson St and College St	3	0	0	5	0	0	2	1	11	**	✓	-
R Convert Brookshire Fwy between Davidson St and College St into Boulevard	-3	-3	2	0	0	-1	-1	1	-5	**	-	-
S Convert 12th Street into two-way street	3	2	0	3	0	1	1	1	11	\$90M	✓	✓

The following ranking criteria were considered to be "Not Applicable" for the study and therefore are not used in this process: Accessibility to Other Employment Centers, Air Quality, and Intermodal Connectivity.

\* Preliminary cost estimates for Concept O were provided by the Charlotte Department of Transportation. Source: HNTB Institute, I-277 Planning Charette, 2008

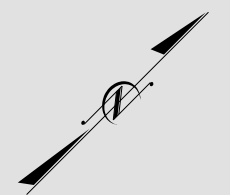
\*\* Additional planning and design studies will need to be performed before preliminary cost estimates are prepared for Concepts P, Q, and R.

**Figure ES-1:  
Potential Concepts**



**Legend**

- Proposed Alignment
- Removal of Asphalt
- Bridge / Cap

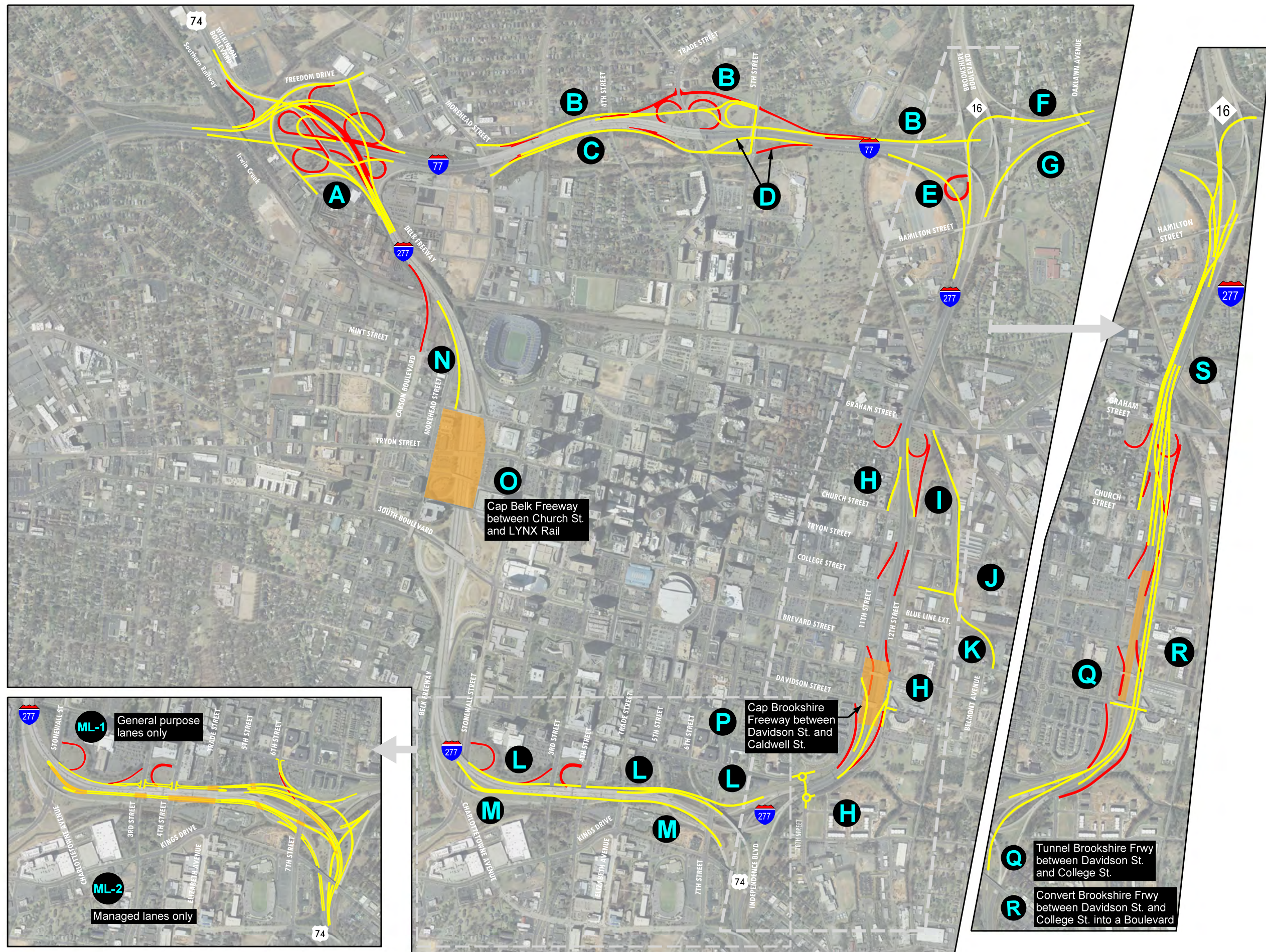


Scale: 1" = 1,200'

I-277 / I-77 Loop Strategic Plan



June 2013



**PC-A:** Reconstruct the interchange – a long term capital investment and an intensive reconstruction effort.

**PC-B, C, and D:** Consolidate and reconstruct interchanges.

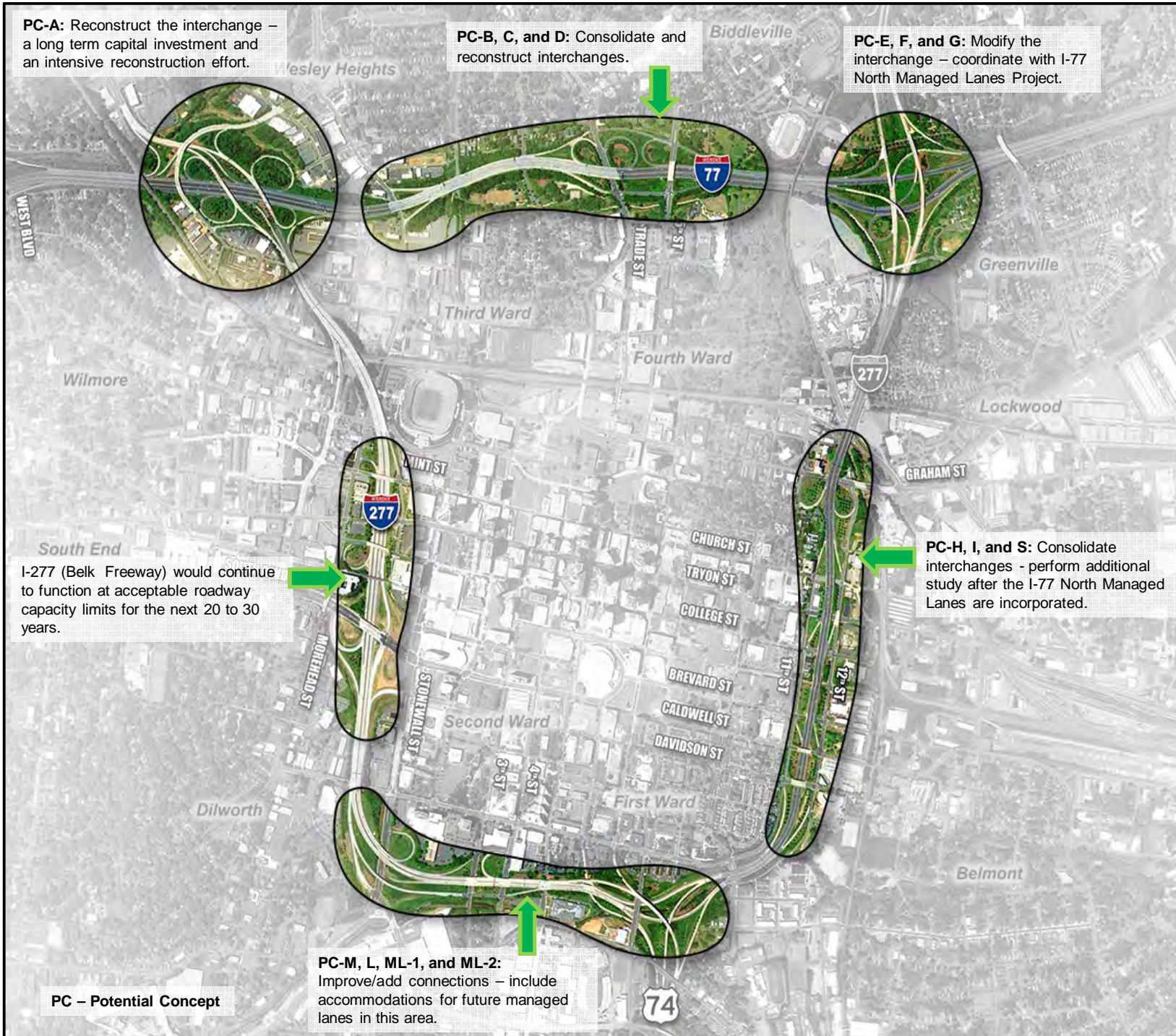
**PC-E, F, and G:** Modify the interchange – coordinate with I-77 North Managed Lanes Project.

I-277 (Belk Freeway) would continue to function at acceptable roadway capacity limits for the next 20 to 30 years.

**PC-H, I, and S:** Consolidate interchanges - perform additional study after the I-77 North Managed Lanes are incorporated.

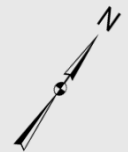
**PC-M, L, ML-1, and ML-2:** Improve/add connections – include accommodations for future managed lanes in this area.

**PC – Potential Concept**



## Figure ES2: Study Recommendations

Note:  
Potential concepts to cap over or tunnel under portions of I-277 would have minimal to no impacts on the functional operations of the I-277/I-77 Loop. These concepts are primarily economic development projects so they are not reflected as recommendations in the I-277/I-77 Loop Strategic Plan. However, any recommended concepts in these areas should be built in a way that allows the future implementation of the tunnels and caps. The connectivity and economic development benefits of the tunnels and caps would still have merit and should be considered through non-transportation related funding sources.

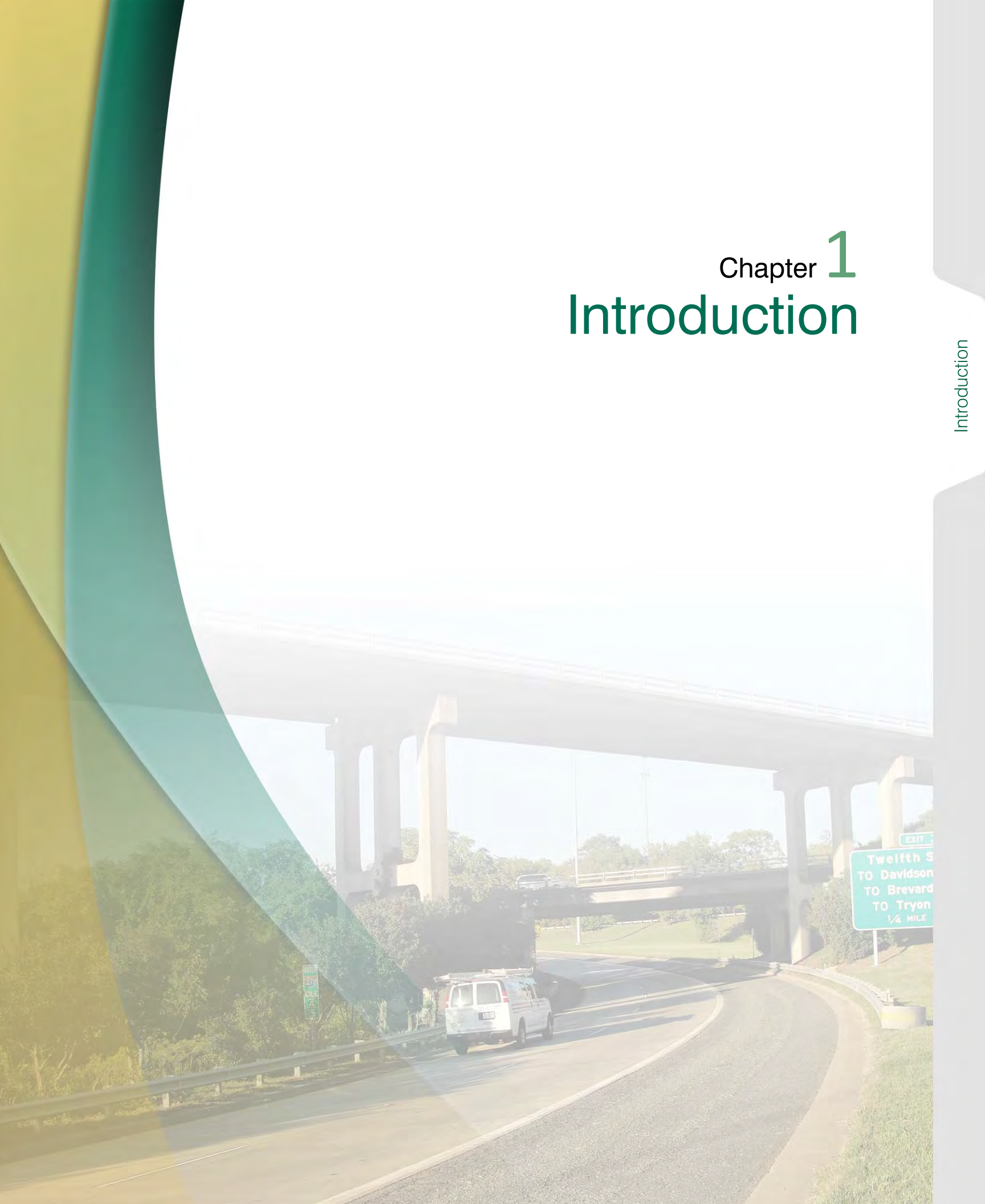


Not to Scale

I-277 / I-77 Loop Strategic Plan

# Chapter 1

# Introduction



EXIT  
Twelfth S  
TO Davidson  
TO Brevard  
TO Tryon  
1/4 MILE

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# Chapter 1

## Introduction

The Charlotte Department of Transportation (CDOT), in collaboration with the Mecklenburg-Union Metropolitan Planning Organization (MUMPO) and the North Carolina Department of Transportation (NCDOT), contracted with RS&H to perform the I-277/I-77 Loop Study.



*The I-277/I-77 Loop Study is envisioned to be the first phase of a multi-phase effort. The purpose of the Loop Study is to evaluate the future capacity, operational, and safety conditions of the Loop in order to define projects for the 2040 MUMPO LRTP.*

The I-277/I-77 Loop Study is envisioned to be the first phase of a multi-phase effort. I-277 is a 4.5 mile long facility that when combined with a two-mile segment of I-77, forms a loop surrounding the center of Charlotte (see Figure 1-1).

The purpose of the I-277/I-77 Loop Study is to evaluate the future capacity, operational, and safety conditions of the Loop in order to define potential concepts for the 2040 MUMPO Long Range



Transportation Plan (LRTP). The results of this Study, as presented in this report, are referred to as the I-277/I-77 Loop Strategic Plan.

The urban context also makes it essential to evaluate potential concepts to ensure that consistency with existing adopted plans is achieved. It also ensures that the physical elements of the future Loop are compatible with the City's vision of a Center City for multimodal transportation, with accessibility to adjacent neighborhoods. This consistency and compatibility will sustain and enhance the vitality of the largest "downtown area" between the Nation's capital and Atlanta, Georgia.

The I-277/I-77 Loop was developed incrementally from segments of Independence Boulevard, I-77, the Brookshire Freeway, and the John Belk Freeway. The northern portion of I-277, known as the Brookshire Freeway, was built in the early 1970s. It was originally named the Northwest Expressway, but was renamed in the mid-1970s in honor of one of Charlotte's former mayors. The southern portion of I-277, named after John Belk, another of Charlotte's former mayors, opened in two sections during the 1980s, replacing a portion of Independence Boulevard. The western piece of the Loop, I-77, was built in the 1970s. Figures 1-2, 1-3, and



1-4 depict the changing landscape over time with the planning, construction, and completion of the I-277/I-77 Loop.

As Charlotte continued its dynamic growth, since the completion of I-277, the role of Center City as a vital economic hub for the region has also grown. Today, I-277 and its interchanges provide primary access to Center City which is the region's major economic engine, as well as a business, cultural and entertainment hub. The significant increase in traffic volumes over the last several decades combined with the high number of closely spaced interchanges and weaving requirements have resulted in safety becoming a primary concern.

In addition to safety and traffic congestion issues, the I-277/I-77 Loop has been viewed as a physical barrier, separating nearby neighborhoods from Uptown and limiting multimodal access and connectivity. Although the number of connections across the I-277/I-77 Loop is very high compared to many other corridors in Charlotte, the multimodal accommodations, accessibility, and design features are lacking in many locations. Recognizing these issues, the Charlotte Center City Transportation Plan (CCTP) and the Charlotte Center City 2020 Vision Plan recommended a comprehensive assessment of the Loop to address these transportation and urban/community issues. This I-277/I-77 Loop Study has been initiated as a result of these recommendations.

## Study Purpose and Goals

The I-277/I-77 Loop Study is a multifaceted study that incorporates a technical traffic and safety analysis to develop recommendations addressing the safety and congestion issues on the Loop facility. The Study also incorporates a focus on multimodal transportation and community planning and design within the Loop's area of influence and connectivity with Uptown. This comprehensive approach ensures the coordination and compatibility with the recommendations from the CCTP and the Charlotte Center City 2020 Vision Plan.

The identified purpose and goals of the Study include the following:

- **Define the current and future purpose and functionality of the I-277/I-77 Loop.** The purpose of the Loop and its functionality have evolved over time as Charlotte has grown. One of the goals of the Study is to develop an understanding of the existing role the Loop plays in the transportation system and how that role may change in the future. Also critical in the assessment is the development of an understanding of how the facility interfaces with the transportation network as a whole, and the development of recommendations



# Chapter 1

## Introduction

*The Charlotte Center City 2020 Vision Plan recommended a comprehensive assessment of the Loop to address the transportation and urban/community issues in Center City. This I-277/I-77 Loop Study has been initiated as a result of the recommendations.*

that will assist in the provision of a safe, accessible, and connected system that serves the mobility needs of all users.

- **Evaluate the current and future safety, capacity and operational conditions.** The evaluation of the current and future conditions of the I-277/I-77 Loop is a critical step in fully understanding the issues, needs and deficiencies, both now and in the future. The goal of fully understanding the existing and future conditions provides the foundation for developing short, mid, and long-range recommendations to address the existing and future needs.
- **Define potential concepts to be nominated for inclusion in MUMPO's 2040 LRTP.** The ultimate goal of the Study is the implementation of recommendations to address the existing and future deficiencies identified in the evaluation phases. This implementation begins with the identification of potential concepts through the transportation planning process. These recommendations prioritize potential concepts for inclusion in the Mecklenburg-Union Metropolitan Planning Organization's (MUMPO) upcoming 2040 Long Range Transportation Plan (LRTP) for further study. The recommendations do not include specific project designs.
- **Comply with federal and state requirements.** Before any system or interchange improvements are undertaken, there are federal and state requirements that must be met. The intent of the Study is to ensure that the requirement for a short- and long-term operational analysis of the facility, set forth by the NCDOT and the Federal Highway Administration (FHWA), would be completed before any modifications to the system or service interchanges could be undertaken.

## Study Area and Influence Area

The Project Study and Influence Areas are found in Figure 1-5. The Study Area is highlighted in green and the Influence Area is highlighted in blue. The Study Area focuses on the I-277/I-77 Loop and its interchanges. The Loop has three freeway-to-freeway interchanges (also known as system interchanges) and ten freeway-to-arterial interchanges (also known as service interchanges). These interchanges are listed below and are also shown in Figure 1-5.

### Study System Interchanges:

- I-77 at I-277 (John Belk Freeway)/US 74 (Exit 9/Exit 1B and 1C)
- I-77 at I-277 (Brookshire Freeway)/NC 16 (Exit 11/Exit 5A and 5B)
- I-277 at US 74 (Independence Boulevard) (Exit 2B)



**Study Service Interchanges:**

- I-77 at Morehead Street (US 29/NC 27) (Exit 10A)
- I-77 at Trade Street and 5th Street (Exits 10B and 10C)
- I-277 at Graham Street (US 29/NC 49) (Exit 3B)
- I-277 to Church Street and Tryon Street (Exit 3B)
- I-277 to Davidson Street, Brevard Street, Tryon Street, and McDowell Street (Exit 3A)
- I-277 to College Street and 11th Street (Exit 3A)
- I-277 to US 29 to NC 27/Freedom Drive (Exit 1A)
- I-277 at Carson Boulevard (Exit 1D)
- I-277 to College Street, South Boulevard, Caldwell Street, Stonewall Street, Kenilworth Avenue (Exit 1E)
- I-277 to Kenilworth Avenue, Charlottetowne Avenue, 3rd Street, and 4th Street (Exit 2A)



The Study includes a detailed safety and operational analysis to identify the deficiencies within the Study Area, and to develop specific alternatives and recommendations for addressing those deficiencies.

All major transportation facilities, particularly on the interstate level, have a much broader context and area of influence that extend past the facility borders. These facilities have major impacts on the surrounding land uses, other transportation facilities, and system operations. With this understanding, the Study also includes a broader, high level assessment of the influence area, which is also shown in Figure 1-5. Although no specific recommendations were identified outside of the I-277/I-77 Loop at this time, other facilities in the influence area will need to be evaluated further as the design of potential concepts is further developed.

**Previous Studies**

High traffic volumes, combined with recognized operational and design issues, have resulted in a number of studies that developed recommendations for the I-277/I-77 Loop. This current Study incorporates a review and assessment of each prior study to ensure consistency with existing plans and recommendations.



# Chapter 1

## Introduction

*This Loop Study includes a detailed safety and operational analysis to identify the deficiencies within the Study Area, and to develop specific alternatives and recommendations for addressing those deficiencies.*

### Charlotte Center City Transportation Plan

The CCTP includes adopted strategies, policies, and action items to ensure and enhance the viability and livability of Center City. These transportation policies adopted in 2006 include:

- Consistency with the City of Charlotte Transportation Action Plan
- Recognition that Center City is a destination and the I-277 Loop is a primary thoroughfare and distributor for this destination
- Recognition that ramps should be modified or added to serve Center City
- Identification of one-way streets to remain one-way and the recommendation for the conversion of other one-way streets to two-way facilities
- Identification of new street segments to be completed
- Enhancement of pedestrian travel through the modification or elimination of identified high speed connectors and turn lanes
- Development of a comprehensive and collaborative parking management strategy and policy
- Integration of transit as a vital element of the transportation system and accompanying transit supportive strategies and activities
- Recognition of the importance of pedestrian and bicycle modes, and enhancement of pedestrian and bicycle accommodations and facilities

The CCTP identified the I-277/I-77 Loop as a functional and physical boundary of Uptown. The CCTP identified a major goal to diminish the impediments created by the Loop for pedestrian and bicycle connectivity and accessibility to Uptown. In keeping with this overall goal, the CCTP recommended a number of interchange modifications including the recently completed Caldwell Street/South Boulevard interchange and the Stonewall/Kenilworth/Independence interchange. In addition, the plan also recommended a comprehensive study of the entire I-277/I-77 Loop to ensure that recommendations are fully coordinated and complementary. The major interchange modification recommendations from the CCTP are shown in Figure 1-6.



## Charlotte Center City 2020 Vision Plan

The Charlotte Center City 2020 Vision Plan was adopted by the City Council in 2011. This vision plan, developed through a collaborative community planning process, identified a number of comprehensive, transformative strategies. These strategies focused on broad areas including multimodal transportation, land use, urban design, economic development, culture and the arts, neighborhoods and communities, retail and services, and public open space and recreation.



Specific to the I-277/I-77 Loop, the plan recommended modifications to the Loop to enhance connectivity between Uptown and its adjacent neighborhoods. The plan, consistent with the CCTP, recommended that a comprehensive Loop Study should be undertaken. The City has initiated a study of all of the Loop crossings. Other recommendations included a park cap of the southern portion of the Loop for better connectivity. A rendering of this recommendation is shown in Figure 1-7.

In addition to these two major plans, a number of other previous plans within the study and influence areas were reviewed. These plans included previous Interchange Modification Reports, the I-277 Connections Study, the 2030 Transit Corridor System Plan, the Charlotte Area Transit System (CATS) Dual Hub Study, the 3rd/4th Street Safety Study of the Midtown Area Plan, the Regional Managed Lanes Study, and various development plans.



# Chapter 1

## Introduction

### *Role of Multimodal Elements and Urban Design*

As noted previously, the foundations of this Study were based on the recommendations from the CCTP and the Charlotte City Center 2020 Vision Plan. Both of these plans incorporate a strong focus on an integrated, multimodal transportation system that provides mobility for all users, regardless of mode. Both of these plans recognize the importance of good pedestrian and bicycle connectivity and accessibility which will ensure and enhance the continued vitality of Center City. The Study's goals were crafted to incorporate the multimodal elements as an integral part of the effort.



*In the next phases of this Study, each of the potential concepts identified in this Study will be further evaluated and improved designs developed. During these phases, multimodal and urban design elements also will be incorporated.*

The analysis for this Study included the assessment of employment centers, parking, and multimodal accessibility and connectivity. The locations and densities of the major employment centers within the influence area are shown in Figure 1-8.

In correlation with the employment centers, the location and density of the parking supply within Uptown and the influence area is also an important consideration. The existing parking supply and the corridors used to access the parking facilities are shown in Figure 1-9.

As noted above, the accessibility and connectivity from adjacent neighborhoods to Uptown has been an important focus throughout the various planning efforts in the last decade. Figure 1-10 depicts the existing connections across the I-277/I-77 Loop. These connections are stratified as primary auto-oriented connections which are shown in red, and those connections that may better accommodate multimodal facilities (pedestrian, bicycle, and transit facilities) are shown in green. This effort provided information for interchanges that could potentially be consolidated and/or modified.

In summary, the primary goal of this Study is to identify potential concepts to improve operational and safety conditions along the I-277/I-77 Loop. In the next phases of this Study, each of these potential concepts will be further evaluated and improved designs developed. During these phases, multimodal and urban design elements will also be incorporated.



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# Chapter 1

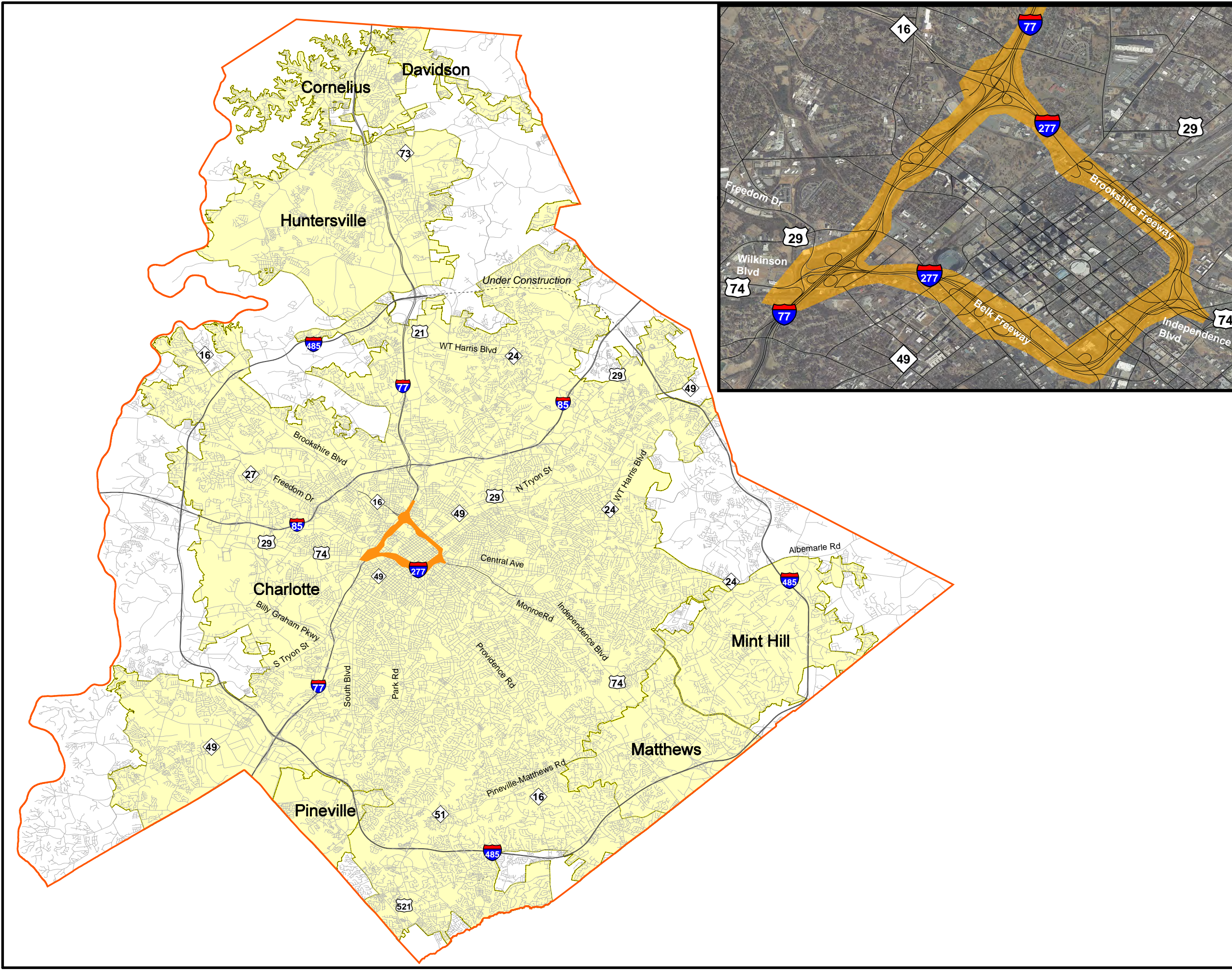
## Introduction

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1-1	Regional Context
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**Figure 1-1: Regional Context**

Source: Charlotte Department of Transportation



Not To Scale

I-277 / I-77 Loop Strategic Plan



June 2013

**Figure 1-2:  
Historic Aerials  
Years 1966 and 1978**

Source: Charlotte Department  
of Transportation



- Legend**
- Future Bank of America Stadium
  - Future Time Warner Cable Arena
  - Charlotte City Center Mall  
(Future Metropolitan Community)

1945

Independence Boulevard  
(US 74/NC 27) opens as  
Charlotte's first urban highway

Charlotte Coliseum opens  
(currently named Bojangles  
Coliseum)

Charlotte's first enclosed mall,  
Charlotte City Center Mall, opens (currently  
the site of the Metropolitan Mixed-  
Use Community)

Stanford R. Brookshire  
becomes Mayor

John M. Belk  
becomes Mayor

Northwest Freeway (NC 16) opens  
from Independence Boulevard to  
Belhaven Boulevard, north of I-77

Northwest Freeway (NC 16)  
renamed Brookshire Freeway after  
the former Mayor

1980

1949-1950

1955

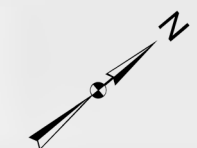
1959

1961

1969

1970-1971

1975



Not To Scale

**I-277/I-77 Loop Strategic Plan**



**Figure 1-3:  
Historic Aerials  
Years 1983 and 1993**

Source: Charlotte Department  
of Transportation



- Legend**
- Future Bank of America Stadium
  - Future Time Warner Cable Arena
  - Charlottetown Mall  
(Future Metropolitan Community)



1980

First section of Belk Freeway (I-277) opens from Independence Blvd. to Kenilworth Ave. - Named for the former mayor

Discovery Place, "hands-on" museum, opens

Second portion of the Belk Freeway (I-277) opens from Kenilworth Ave. to I-77

Independence Blvd. (US 74) and Wilkinson Blvd. (NC 27) rerouted on Belk Freeway (I-277)

Brookshire Freeway signed as I-277

1995

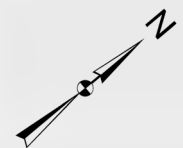
1981

1981

1987-1988

1988

1989



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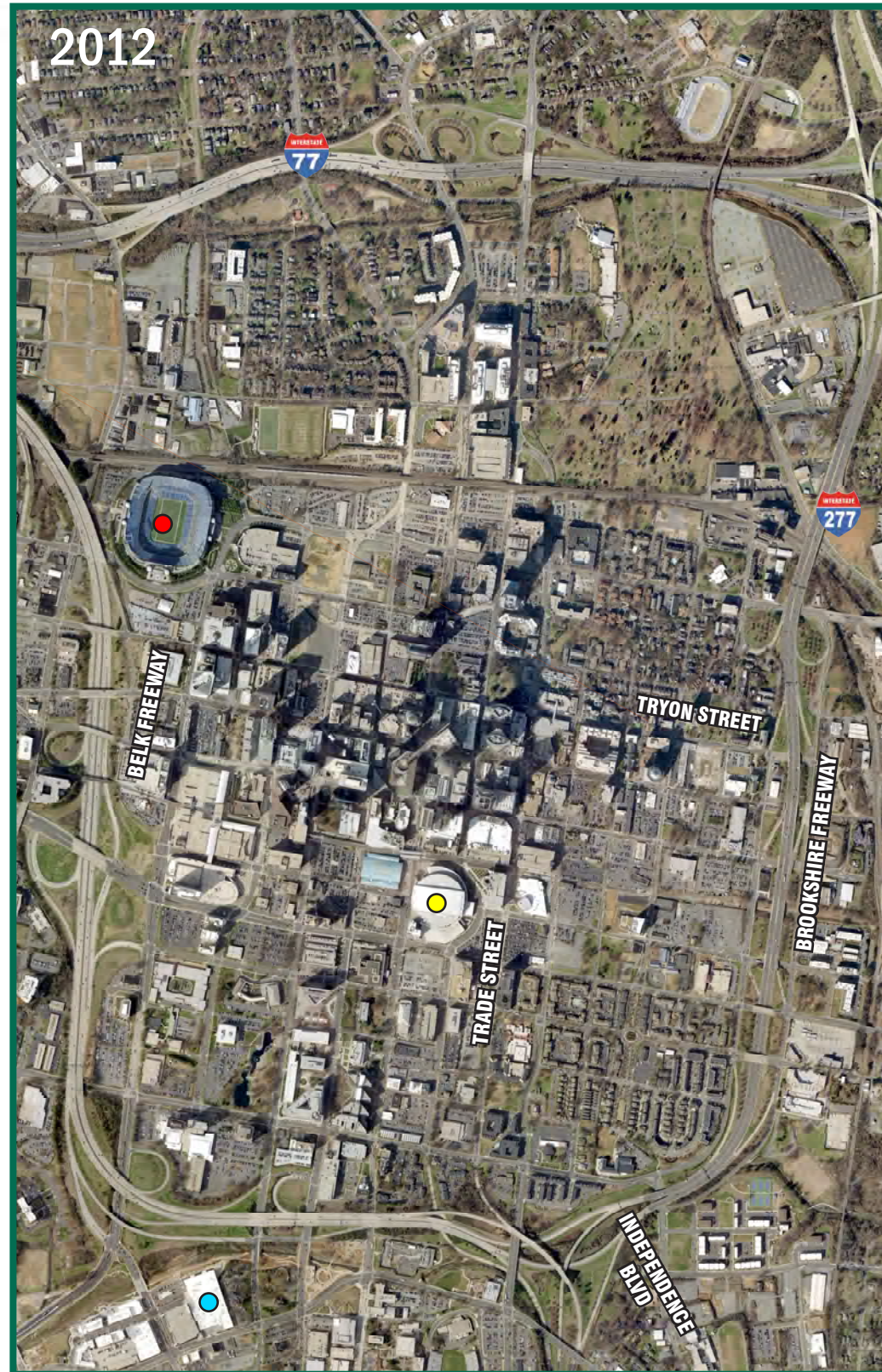
**I-277/I-77 Loop Strategic Plan**





**Legend**

- Bank of America Stadium
- Time Warner Cable Arena
- Charlotte Mall  
(Future Metropolitan Community)



**1995** **2013**

Ericsson Stadium  
(currently Bank of  
America Stadium) opens



1996

Ericsson Stadium is renamed  
Bank of America Stadium

2004

Charlotte Bobcats Arena  
(currently Time Warner Cable  
Arena) opens

2005

Charlottetown Mall is demolished  
and replaced with a mixed-use  
complex named Metropolitan

2006-2007

Belk Freeway interchanges at  
Stonewall St., Kenilworth Ave. and  
South Blvd are rebuilt.

2009

Nascar Hall of Fame  
opens

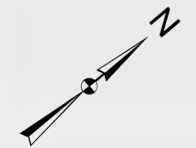


2010

**2013**

**Figure 1-4:  
Historic Aerials  
Years 1999 and 2012**

Source: Charlotte Department  
of Transportation



Not To Scale

**I-277/I-77 Loop Strategic Plan**



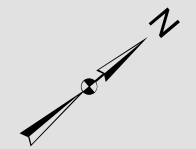
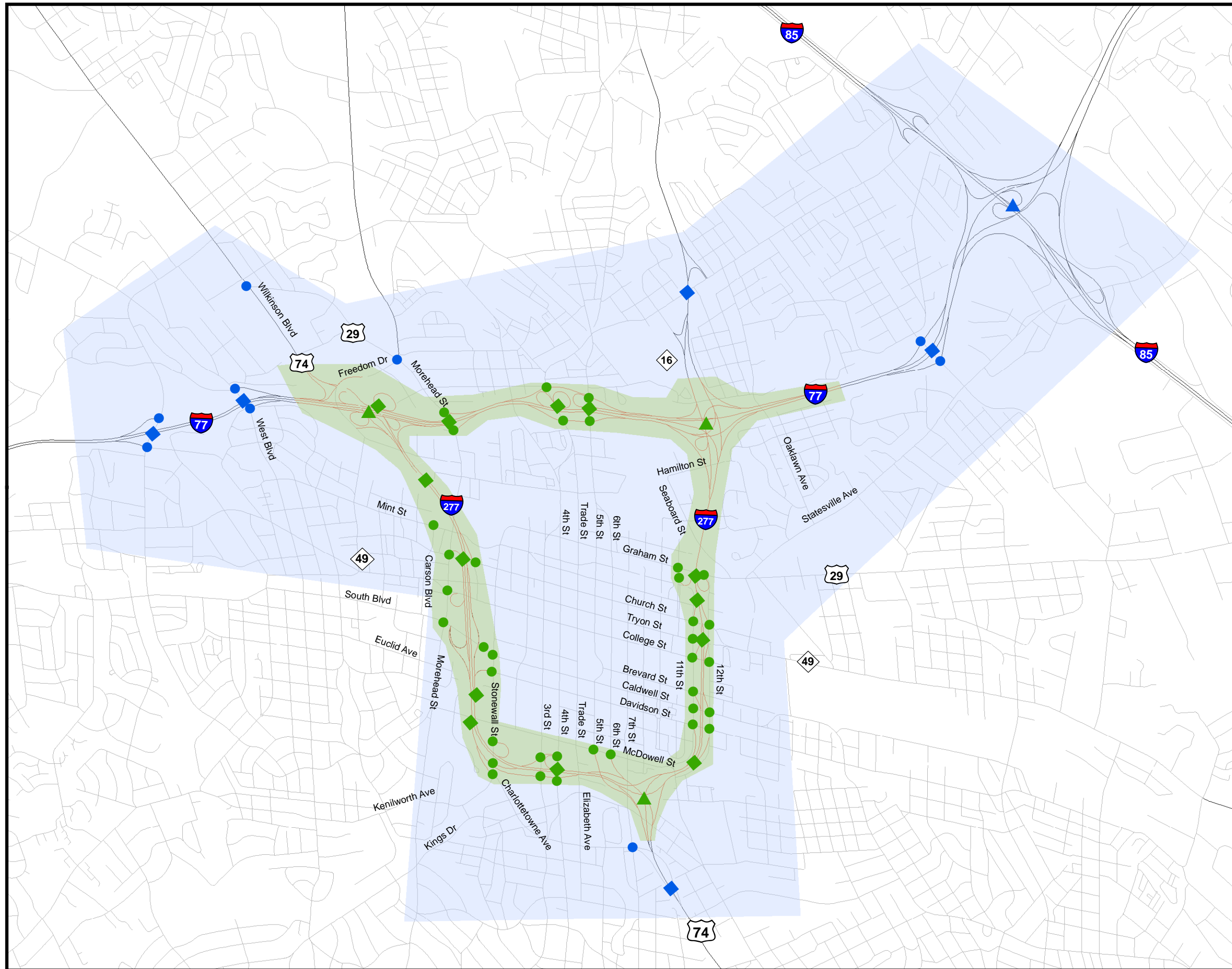
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**Figure 1-5: Study Area and Influence Area**

**Legend**

- ▲ Study System Interchange
- ◆ Study Service Interchange
- Study Intersection
- Project Influence Area
- Project Study Area

Source: Charlotte Department of Transportation



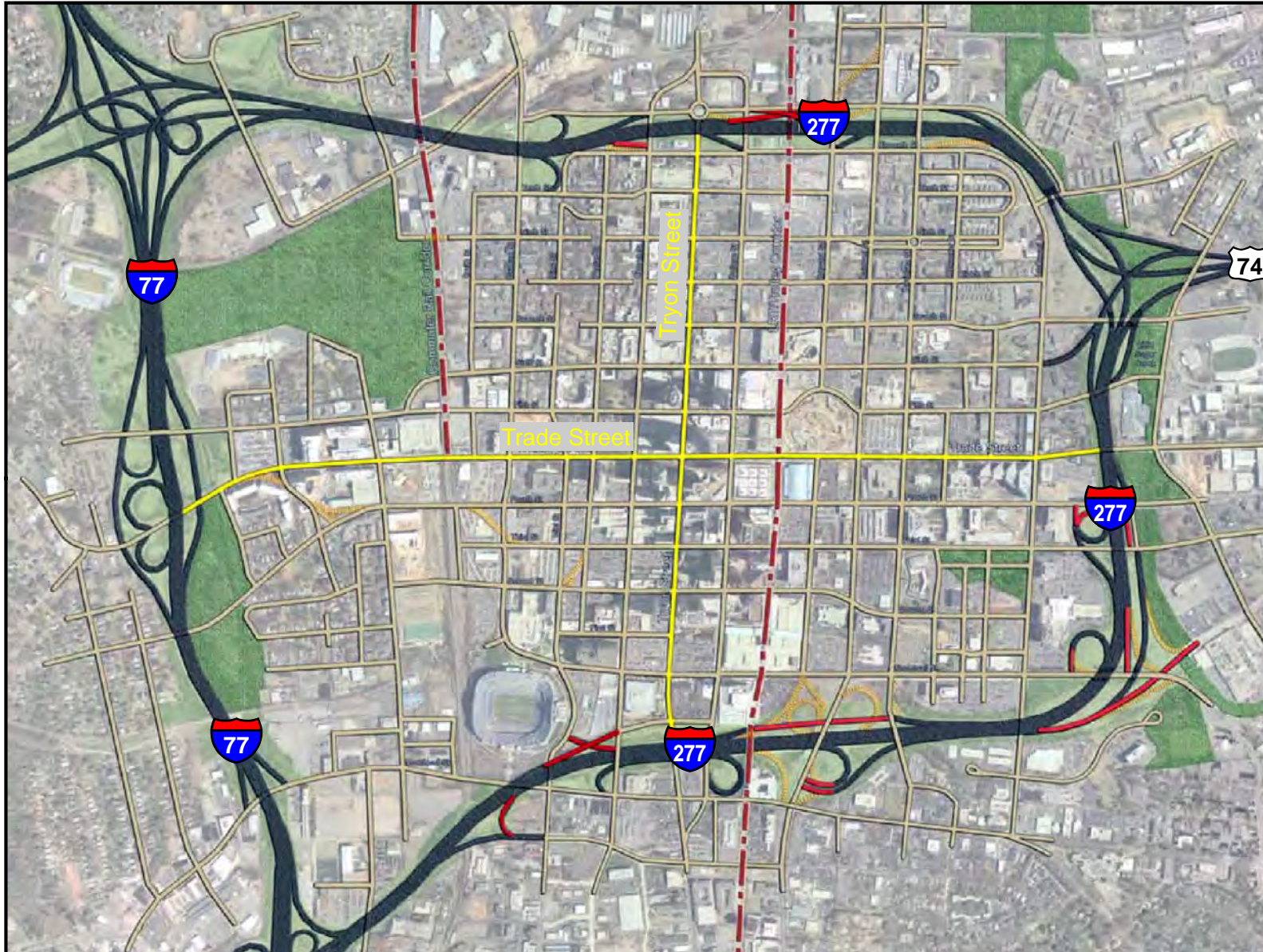
Scale: 1" = .5 mile

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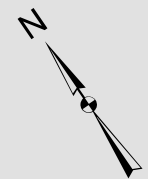
**Figure 1-6: 2006 CCTP Recommendations**



**Legend**

-  Eliminate Roadway
-  Improve Existing Roadway/Construct New Roadway

Source: 2006 Center City Transportation Plan (CCTP), Charlotte Department of Transportation



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I-277 / I-77 Loop Strategic Plan

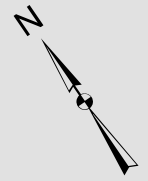






**Figure 1-7: John Belk Freeway Cap**

Source: 2020 Center City Vision Plan

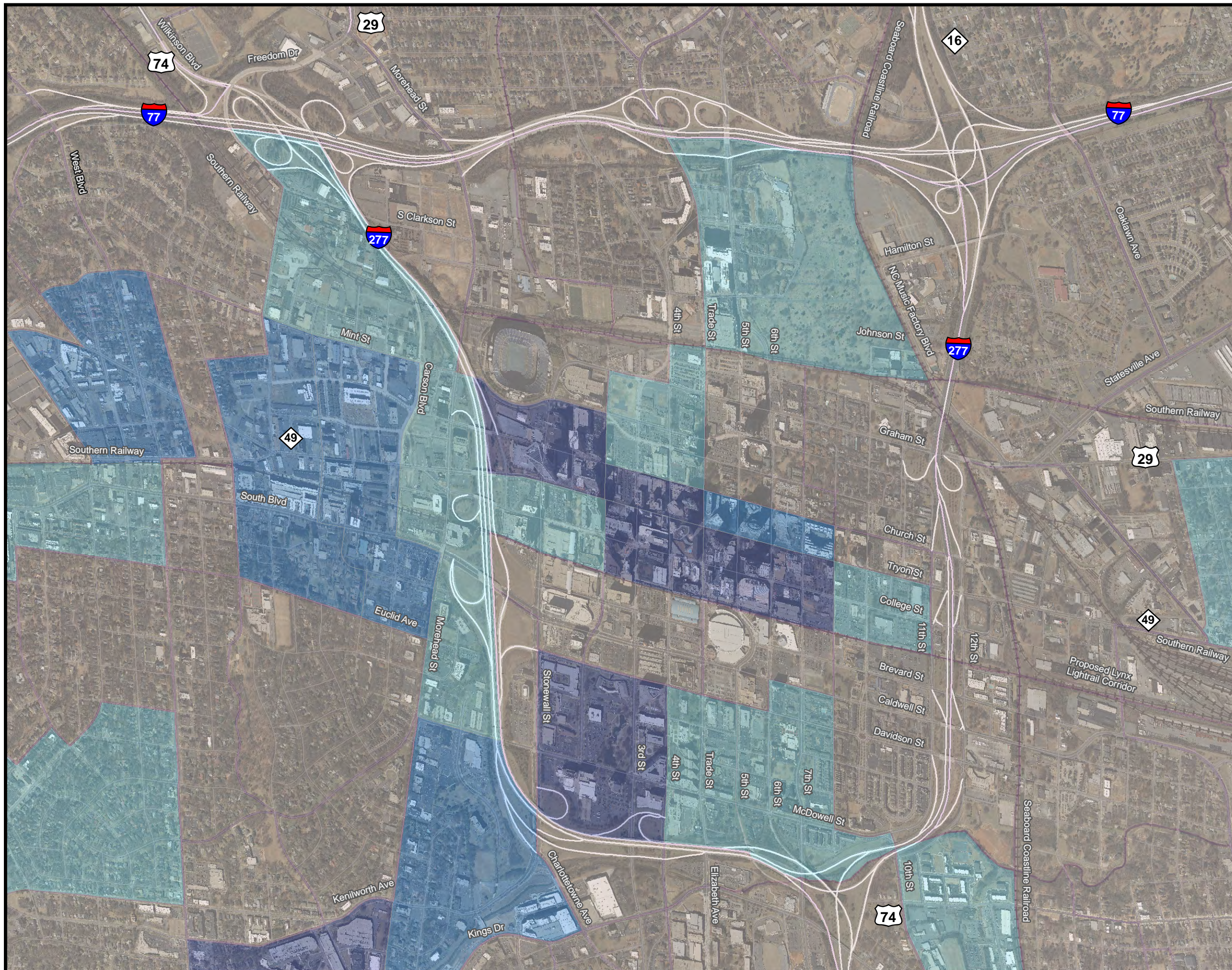


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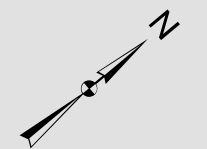
**Figure 1-8: 2010  
Employment Data**



**Legend**

- Total Employment**
- 0 - 1,000
  - 1,001 - 2,000
  - 2,001 - 5,000
  - > 5,000

Source: 2010 socio-economic data.  
Metrolina Regional Travel Demand  
Model.



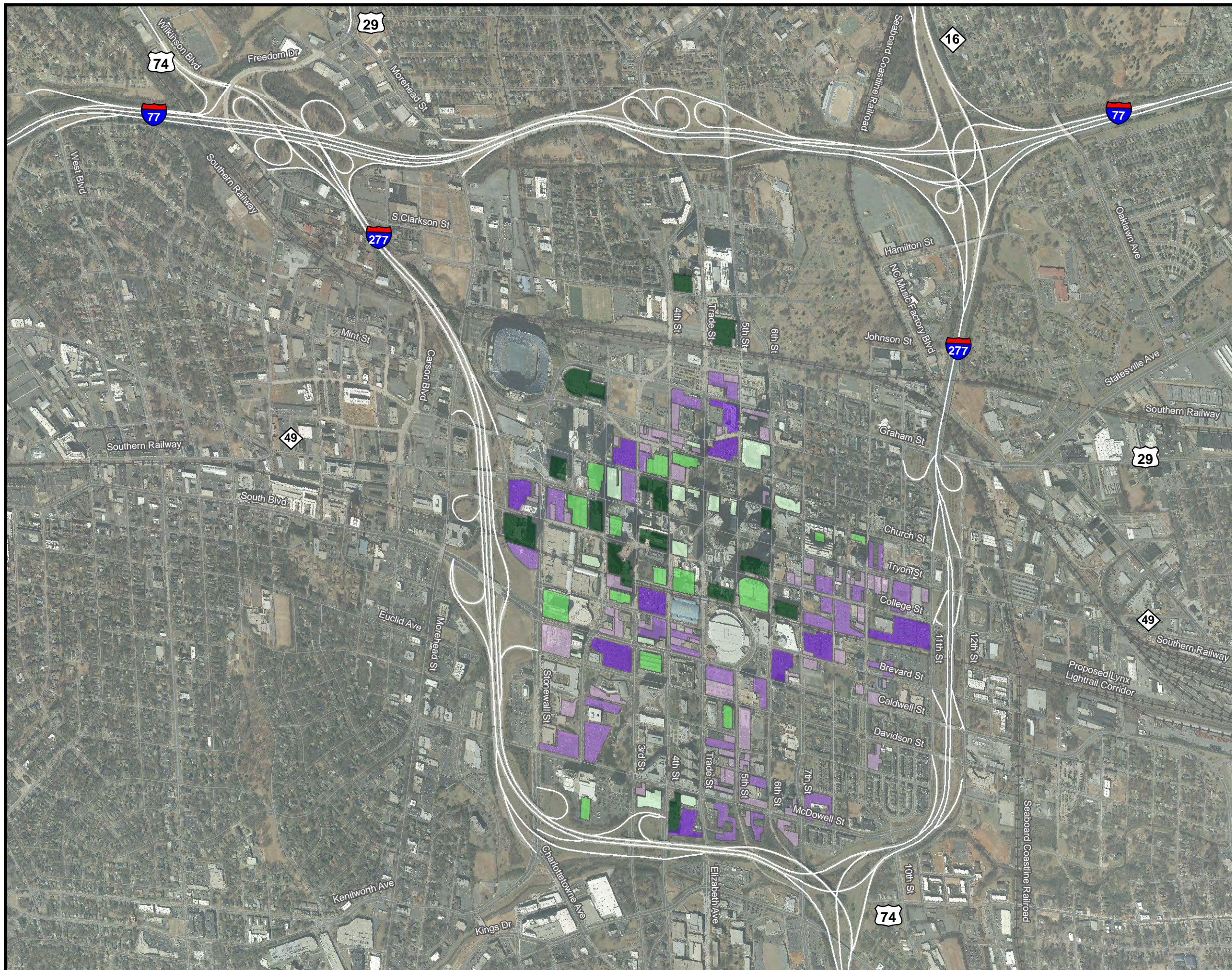
Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan



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**Figure 1-9: 2012 Uptown Parking Facilities**



**Legend**

**Surface Lots**

# of Spaces (# of Lots)

< 100 (75)

100 - 250 (28)

> 250 (10)

**Parking Decks**

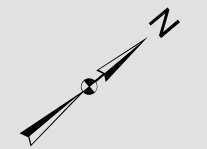
# of Spaces (# of Decks)

< 500 (15)

500 - 1000 (15)

> 1000 (14)

Source: Charlotte Department of Transportation, 2012 Data.



Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan



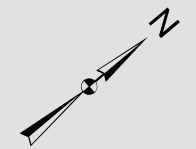
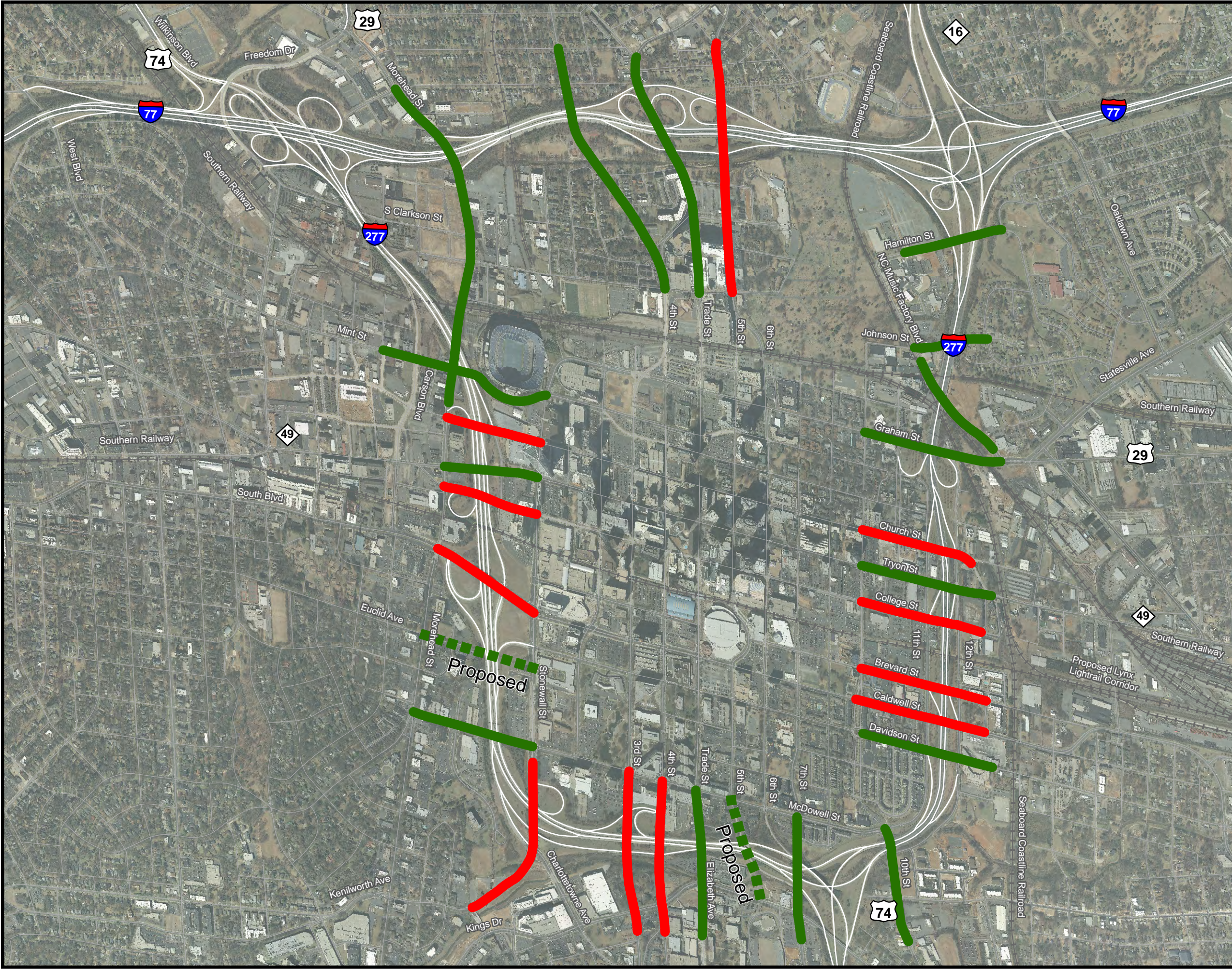
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**Figure 1-10: Existing Connections Across I-277 / I-77 Loop**

**Legend**

- Primarily Auto-Oriented Connections
- Primarily Multi-Modal Oriented Connections

Source: Charlotte Department of Transportation



Scale: 1" = .25 mile

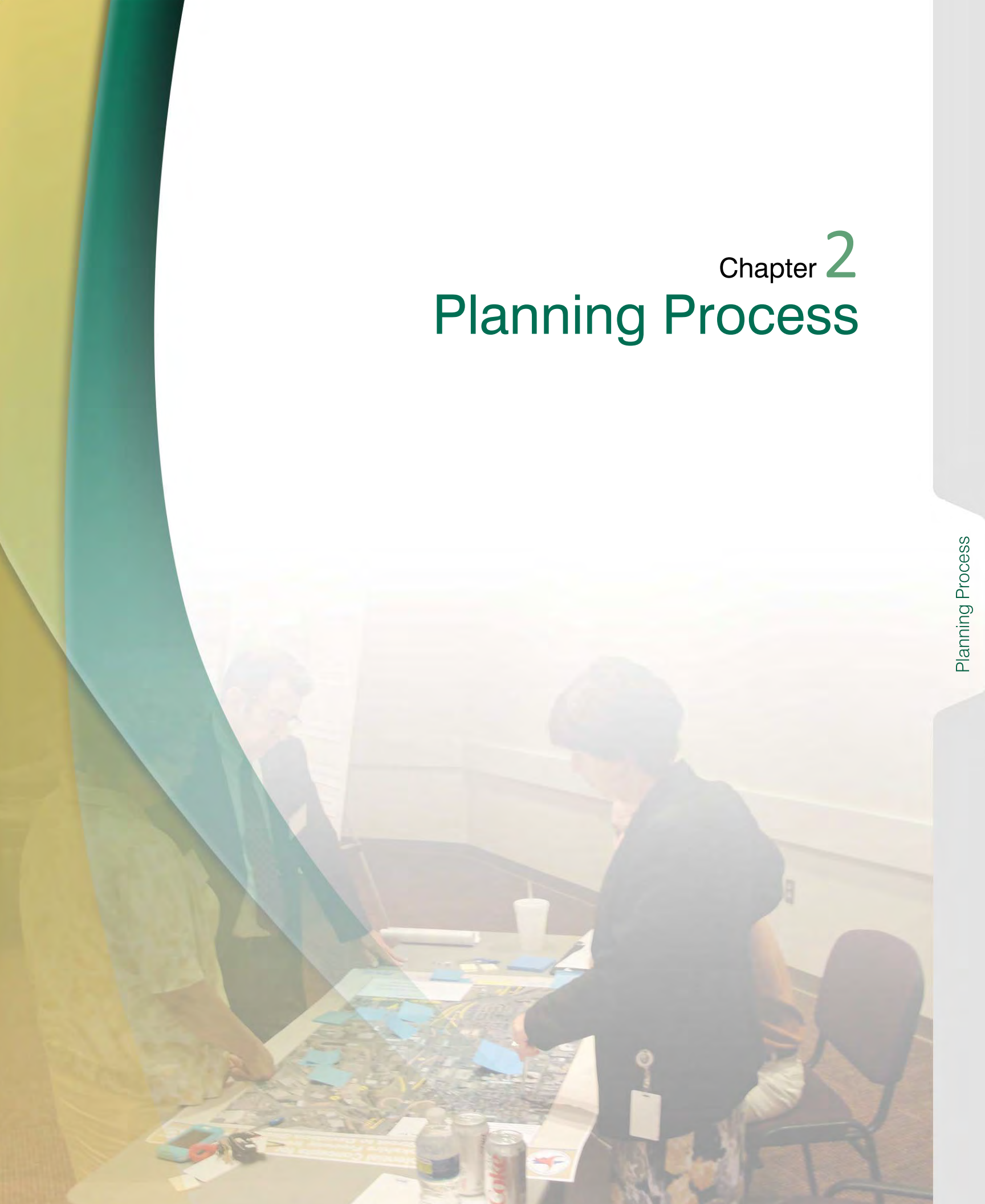
I-277 / I-77 Loop Strategic Plan



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# Chapter 2

## Planning Process



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## Planning Process

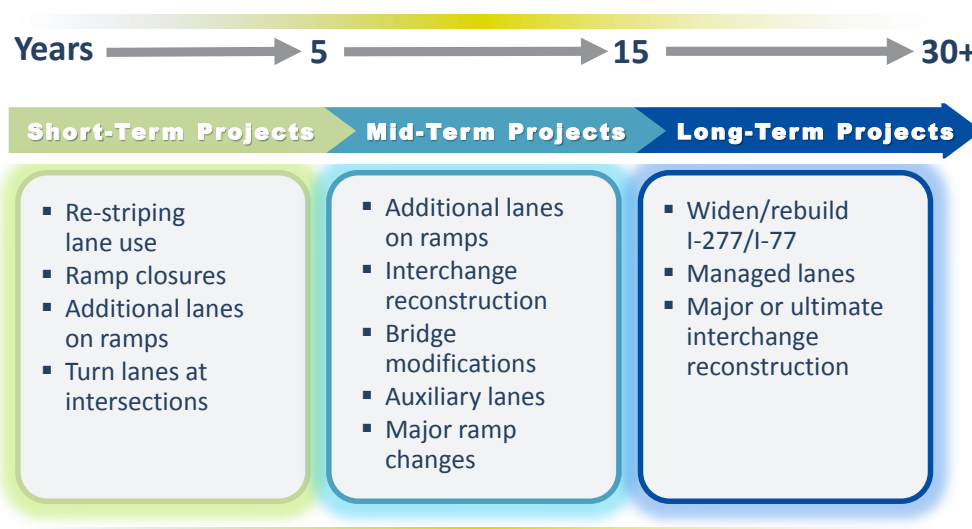
The I-277/I-77 Loop Study focuses on the development of recommendations to ultimately be evaluated for the MUMPO's 2040 LRTP. The planning process for transportation projects is a comprehensive effort to move from a determination of need to project implementation. Graphic 2-1 below depicts the overall transportation planning process and describes how the I-277/I-77 Loop Study recommendations are part of this process. As can be seen from the graphic, this Study is in the very beginning stages of the transportation planning process. Several other evaluation steps (such as environmental and interchange modification studies) and detailed roadway designs will be performed in the subsequent steps. The I-277/I-77 Loop Study will identify and prioritize recommendations for potential concepts when more in depth study is required. These recommended potential concepts will be nominated for inclusion in MUMPO's LRTP.

*The planning process for transportation projects is a comprehensive effort to move from a determination of need to project implementation.*

Graphic 2-1  
General Project Implementation Steps



Graphic 2-2  
Timeline for Various Types of Projects



Graphic 2-2 shows various concept implementation strategies with short-, mid- and long-term timelines. This Study includes a detailed operational analysis of the I-277/I-77 Loop mainline and each of its interchanges. The results of the analysis will form the basis for short-term recommendations that focus on operational solutions with no significant community impacts or additional right-of-way requirements.

Mid-term recommendations were also developed as part of this Study. These recommendations address bottlenecks identified in the operational analysis and will potentially have some impact on the community, as well as some potential needs for additional right-of-way.

The last component of the recommendations of this Study focuses on long-term solutions. These long-term recommendations include significant re-construction and modifications to the facility, as well as potential rights-of-way requirements.





### Potential Concept Development Process

The potential concept development process was accomplished through detailed review by the Technical Oversight Team (TOT), comprised of City of Charlotte, NCDOT and MUMPO staff, and representatives for Charlotte Center City Partners. Public input was also sought through the process via a public workshop and informational updates provided on the City's website. This comprehensive evaluation and review process is described in the following section.



*The TOT, comprised of City of Charlotte, NCDOT and MUMPO staff, and representatives for Charlotte Center City Partners, played a significant role in providing input and guidance throughout the planning process.*

The potential concepts were developed based on safety analyses, interchange consolidation/reconfiguration, and operational improvements. The Study Team also developed planning level cost estimates for potential concepts.

The review process first focused on the three system interchanges followed by the service interchanges. Each interchange was critiqued for current and future design conformity to NCDOT and American Association of State Highway and Transportation Officials (AASHTO) design standards, functionality of interchange layout and lane configuration with current and future traffic patterns, and safety. This included:

- Design conformity to NCDOT and AASHTO design standards
  - Determine if the current design meets design standards based on road classification and expected design speed
  - Meet current design standards for future modifications to existing interchanges
  - Minimize impacts to the natural and human environment while conforming to design standards
- Functionality of interchange layout and lane configuration with current and future traffic patterns
  - Estimate current and future traffic flow conditions (volume-to-capacity ratios) of interchanges
  - Recommend sufficient number of lanes, storage lengths, and weaving lengths to accommodate the dominant traffic movements



- Safety
  - Provide adequate weaving distances at interchanges around the Loop
  - Provide adequate storage lengths at ramp termini intersections and control traffic spilling onto the I-277/I-77 Loop

### *Planning Level Cost Estimates*

Planning level right-of-way and construction cost estimates were developed for the potential concepts. Based on the conceptual layouts, right-of-way was estimated for each potential concept. Average costs per acre for real estate were obtained from MUMPO's 2035 LRTP for each land use type: commercial, office, industrial, residential, and other. Using the right-of-way areas and average costs per acre, the right-of-way cost was estimated.

Using the conceptual layouts, approximate construction material quantities were developed by the design engineers. An average unit cost was applied to these quantities to develop planning level construction costs. These average unit costs were obtained from NCDOT and were based on NCDOT projects that have been recently constructed in the Charlotte Metro area.

The cost estimates also included the following contingencies:

- Structures and Utilities: 15 percent
- Roadway: 55 percent
- Right-of-way: 50 percent
- Environmental Mitigation: 10 percent

It should be noted that the combined right-of-way and construction costs were rounded to the nearest \$1 million (M) for each potential concept. Detailed cost estimates for each potential concept are included in Appendix A.



### Concept Ranking Methodology

The foundation for the ranking process of potential concepts recommended in the I-277/I-77 Loop Study was provided by the region's existing transportation policy framework set forth in MUMPO's ranking methodology for major roadway projects. This evaluation process was developed to aid in the development of the LRTP by evaluating how potential roadway projects support the goals of the region. There are a total of 11 evaluation criteria used to determine each potential concept's level of support. As each criterion is applied to potential concepts, individual scores are awarded. These individual scores are then totaled for a cumulative score for every potential concept. Concepts are then ranked in priority order by this cumulative score.

Point values range from a maximum of positive five to a minimum of negative five. A score of positive five indicates that a potential concept has a very highly positive impact on the region, while a score of negative five indicates that a potential concept has a very highly negative impact on the region. To reflect the significance of a criterion, the available points may not meet this maximum and minimum. The following describes each of the LRTP project ranking criteria and how those criteria were subsequently used in the ranking process for this Study.

#### 1. Congestion

This criterion is based on output from the TransCAD travel demand model. For each project, the score is determined according to the daily vehicle volumes that the project would provide in the horizon year. Projects resulting in the highest volumes per lane receive the highest scores (5 being the highest possible), while projects resulting in lower volumes per lane receive lowest scores (0 being the lowest). If a project decreases capacity, negative points are awarded. Scores are determined separately for widening projects and for new location projects.

#### Applicability to the Study

Each of the potential concepts was assessed for its potential to reduce congestion by comparing the capacity provided by the potential concept with the travel demand. Potential concepts were considered differently depending on if they are widening potential concepts or new location potential concepts. The highest scores were assigned to those potential concepts that were projected to achieve the highest amount of congestion relief.



## 2. Safety

Safety scores are determined by projects' abilities to reduce or remove crash potential. Points are awarded based upon project type, such as widening or median addition. Projects can receive anywhere from -5 to 5 points, with projects providing the greatest potential for safety improvement receiving the highest scores.

### *Applicability to the Study*

Potential concepts were scored for safety based on their relative effects on crash potential. The point breakdown structure was determined by how potential concepts address safety in relation to one another. Of the 21 potential concepts, those with the highest potential to improve safety received the highest score (4), while those with a negative effect on safety received the lowest score (-3).

## 3. Transit Parking/Drop Off

The purpose of this criterion is to identify projects that promote transit use, including rapid transit, express bus transit, and transit hubs. Projects are scored based on their accessibility to transit service. Projects can receive between 0 and 5 points for this criterion.

### *Applicability to the Study*

In the application of the criterion in scoring the concepts, those potential concepts that provide access to the Lynx Blue Line Light Rail received 2 points, while all others received 0 points.

## 4. Supports Local Land Use Planning and Improves Quality of Life

The purpose of this criterion is to assess how well a project supports local land use plans and policies and enhances the quality of life. Effects of a project on elements such as the urban environment, parks, and historic properties are all considered in determining how supportive it is of already established planning goals and objectives. A project may receive between 0 and 5 points in this category.

### *Applicability to the Study*

Potential concepts with the greatest potential to improve and enhance connections to surrounding neighborhoods received the highest scores.



**5. Impacts on Natural Environment**

For this criterion, documented environmentally sensitive areas are identified, and projects are assessed for their potential impact to these sites. The highest score awarded for this criterion, for no impacts, is 3, while projects that have any negative impact on an environmentally sensitive area receive a negative score from 0 to -5.

*Applicability to the Study*

All of the potential concepts are anticipated to have no effects on documented environmentally sensitive areas, therefore all projects received a score of 0.

**6. Improves Accessibility to a Center City (either Charlotte or Monroe)**

This criterion reflects the importance of a project providing access to the region's city centers of Charlotte and Monroe. The distances from projects to these two city centers are measured and points are awarded based on this distance and the number of lanes added by a project either through widening or as a new facility. Projects can receive between 0 and 5 points for this criterion. Non-radial roadways receive 0 points for this criterion.

*Applicability to the Study*

Potential concepts were scored for this criteria based on their relative effects on improving access to/from Center City. The awarded scores ranged from 4 to -1, based on their effect.

**7. Increases Accessibility to Other Employment Centers**

The purpose of this criterion is to encourage economic growth by providing access to employment centers. Projects are awarded points based on the size of the economic center to which access is provided by the project. Projects receive between 1 and 5 points if they provide access to employment centers with 1,000 or more employees, and 0 points if less than 1,000 employees.

*Applicability to the Study*

If a potential concept was previously evaluated for the Center City criterion, it is not evaluated for the accessibility to employment centers criterion. Therefore, all potential concepts received no score for this criterion.



## 8. Impacts on Air Quality

Projects are evaluated on their potential to reduce air quality through reduced vehicle miles traveled (VMT). This reduction is achieved by providing facilities that would increase vehicle occupancy, encourage non-motorized travel, or create new roadway connections. Projects are awarded between -3 and 2 points.

### *Applicability to the Study*

No potential concepts recommended in the I-277/I-77 Loop Study propose the addition of VMT reduction techniques, such as methods of supporting increased vehicle occupancy, encouraging non-motorized travel, or creating new roadway connections. Therefore, this criterion was not considered as part of the overall scoring since all potential concepts have the same effect, and all potential concepts received no score.

## 9. Supports Low Income and Minority Communities

Projects are assessed for their support of low income and minority communities so that negative impacts to these communities are avoided, and positive social and economic effects on these populations are instead encouraged. These communities are identified through U.S. Census data: low income communities are those in which there is a high percentage of low income households in a Census tract relative to the tract's total number of households. Minority communities are those in which there is a high percentage of minorities in a Census tract relative to the tract's total population. Projects can receive between 0 and 5 points for this criterion.

### *Applicability to the Study*

Up to 2 points were assigned for this category depending on the level of impact that potential concepts would have on low income and minority communities, and how this compares to potential community benefits of the proposed potential concepts. Scores were assigned in relation to one another; potential concepts with the least potential impacts were given a score of 2, while potential concepts with the most potential impacts were given a score of -1.



### **10. Promotes Intermodal Connectivity**

This criterion is meant to aid in improving access to and between existing and potential intermodal facilities, such as airports, train stations, and freight terminals. Projects can receive between 0 and 5 points for this criterion.

#### *Applicability to the Study*

Potential concepts recommended in the I-277/I-77 Loop Study do not seek to promote intermodal activity, and have no effect on intermodal activity in the region. Therefore, the criterion for intermodal connectivity was not considered as part of each potential concept's overall score.

### **11. Provides Benefits that Outweigh Potential Concept Costs**

With this criterion, projects are evaluated for the benefits that they would provide versus their respective per mile construction costs, or the benefit-cost ratio. Each project's total points from the previous criteria are divided by the per mile construction cost, and a score from 0 to 5 is awarded based on each project relative to one another.

#### *Applicability to the Study*

Once the benefit-cost ratio was determined for each potential concept, up to 5 points were assigned based upon potential concepts' ratios in relation to one another. The potential concepts with the highest benefit-cost ratios were given a score of 4, while the potential concepts with the lowest benefit-cost ratios were given a score of 1.



### Study Team and Stakeholders

As noted previously, the TOT played a significant role in providing input and guidance throughout the planning process. The TOT included representatives from the organizations shown in Table 2-1. This TOT met four times during the course of the Study to provide significant input at key milestones during the planning process.

*Table 2-1  
Technical Oversight Team*

Technical Oversight Team (TOT)	
Charlotte Department of Transportation	North Carolina Department of Transportation
Mecklenburg-Union Metropolitan Planning Organization	Charlotte Center City Partners
Charlotte Area Transit System	City of Charlotte Planning Department

At the Study kick-off meeting, held on January 5, 2012, the Study overview, the Study approach, and the Study schedule were discussed. The first TOT meeting was held on March 28, 2012, and provided the TOT with a detailed study approach, a detailed review of the existing conditions and interactive exercises to brainstorm preliminary concepts. In order for the members of the TOT to fully understand the operational issues, a bus tour of the I-277/I-77 Loop during the afternoon rush hour was arranged. Several members of the TOT toured the entire Loop, stopped at various locations to observe the existing roadway deficiencies, and discussed possible solutions to some of the problems.

At the second TOT meeting on June 6, 2012, team members were given an overview of the comments received from the public meeting/workshop held on June 5, 2012. After a review of the public comments, the results of the concepts analyses were reviewed and discussed. A team workshop was held to refine the identified concepts and develop the implementation process.

The third meeting of the TOT was held on August 9, 2012. At this meeting the potential concepts were reviewed and the ranking process was initiated. A workshop/discussion to brainstorm the implementation process and the next steps for the Study were discussed. This meeting resulted in a number of potential concepts which will be further evaluated using the project ranking criteria.

The fourth and final meeting of the TOT was held on October 30, 2012. At this meeting the findings of the Study were discussed.





# Chapter 2

## Planning Process

### Public and Agency Outreach

In addition to the TOT involvement and input, additional input for the Study was obtained through public and other agency outreach. CDOT developed a website to provide regular updates on the Study process and concept plans for various potential concepts were posted.

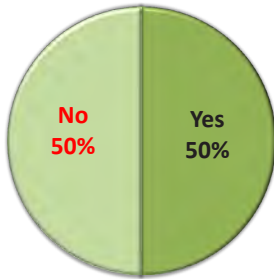
Meetings with local officials and committees involved in the transportation planning process were also held at key milestones during the Study. This additional effort ensured that all of the stakeholders were informed and involved during the planning process.



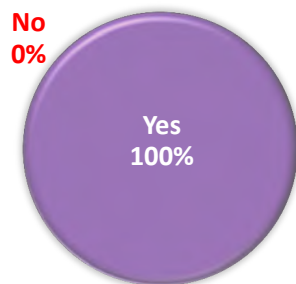
The public workshop, held on June 5, 2012, at the Charlotte-Mecklenburg Government Center, had 39 attendees.

Each attendee had the opportunity to review the analysis, potential concepts, and other Study related information in detail. Representatives from the Study Team were readily available to answer any questions, and to provide additional or more detailed information regarding the Study. In addition to verbal comments, attendees were requested to provide comments and feedback in written format on a comment card provided as shown in Graphic 2-3. Twenty-two comment cards were received (included in Appendix B). In addition to comments regarding the concepts, participants were asked a variety of background questions to help frame their responses. These questions and the feedback received regarding the concepts and the clarity of the information presented are shown in the left margin on pages 2-11 to 2-14.

**Do you work in Uptown?  
(20 responses)**



**Do you travel to Uptown for  
other reasons?  
(20 responses)**



Graphic 2-3  
Comment Cards for Public Workshop

**I-277/I-77 (Uptown) Loop Study**  
Public Workshop  
Comment Card  
June 5, 2012

**MUMPC**

If possible, please return this "Comment Card" before leaving tonight.

Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

1) What is the zip code in which you reside? \_\_\_\_\_

2) Do you work uptown?  Yes  No

3) Do you travel to Uptown for other reasons?  Yes  No

4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

**A. Brookshire Freeway**  
Freeway Segment: \_\_\_\_\_  
Interchanges: \_\_\_\_\_  
Surface Streets: \_\_\_\_\_

**B. John Belk Freeway**  
Freeway Segment: \_\_\_\_\_  
Interchanges: \_\_\_\_\_  
Surface Streets: \_\_\_\_\_

**CHARLOTTE** Continued on back... **RSH**

Page 1 of 2

**I-277/I-77 (Uptown) Loop Study**  
Public Workshop  
Comment Card  
June 5, 2012

**MUMPC**

If possible, please return this "Comment Card" before leaving tonight.

**C. I-77**  
Freeway segment: \_\_\_\_\_  
Interchanges: \_\_\_\_\_  
Surface Streets: \_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?  
\_\_\_\_\_  
\_\_\_\_\_

7) Were the existing conditions explained clearly?  Yes  No

8) Were the future conditions explained clearly?  Yes  No

9) Were the concepts explained clearly?  Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_  
Email Address (Optional): \_\_\_\_\_  
Address (Optional): \_\_\_\_\_

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:  
Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202  
FAX: 704-541-3081  
Email: [vcoleman@charlottenc.gov](mailto:vcoleman@charlottenc.gov)

**CHARLOTTE** **RSH**

Page 2 of 2

Based on your travel on I-277 and I-77, do you agree with our findings? (18 responses)



Additional comments were received with regard to specific interchange concepts or other key areas of interest. These comments are the following:

**I-77 at John Belk Freeway**

- Freedom Drive is key connection (3 comments).
- Reduce the interchange footprint so we can have a greenway.
- Do not eliminate the Morehead Street or Freedom Drive ramps.
- Morehead Street is a heavily used exit and the only connection to the triangular space between I-77 and I-277.

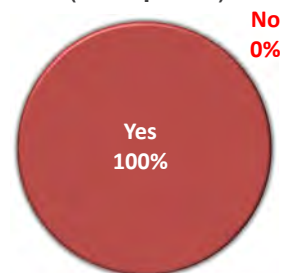
**I-77 at Trade Street/5th Street**

- The presented improvements are good (4 comments).
- Connection to 5th Street is more important than to Trade Street (2 comments).
- Redevelopment along Trade Street should be a priority with access to I-77 located on 5th Street.

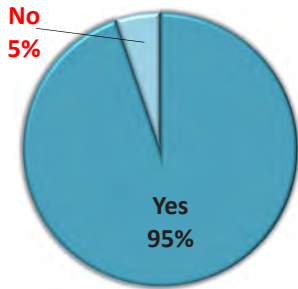
**I-77 at Brookshire Freeway**

- The Brookshire Freeway exit to I-77 North needs a longer ramp or more lanes.
- Brookshire Freeway to I-77 North has a lot of congestion and motorists merge into exit ramp late.

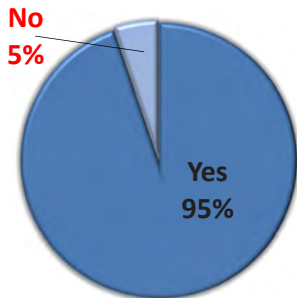
Were the existing conditions explained clearly? (19 responses)



**Were the future conditions explained clearly?**  
(19 responses)



**Were the concepts explained clearly?**  
(19 responses)



### Brookshire Freeway

- The presented improvements are good (8 comments).
- The presented improvements are not good (3 comments).
- 10th Street needs to connect between Church Street and Davidson Street.
- Need access to/from Graham Street, especially with new developments including the NC Music Factory, but do not keep the loop exit.
- Convert 12th Street to two-way near Graham Street (3 comments).
- There will be increased congestion in Uptown with the reduction in access options from Brookshire Freeway.
- Avoid closing 12th Street or convert 11th Street to two-way from Church Street to Caldwell Street.

### I-277 at Independence Boulevard

- The presented improvements are good.
- Consider how these changes could enhance greenway connections.
- The improvements presented are good for 3rd Street and 4th Street (6 comments).
- Remove the ramp from Stonewall Street.

### John Belk Freeway at 3rd/4th/Stonewall Street

- The presented improvements are good (8 comments).
- Keep the loop from Stonewall Street.

### Boulevard/Cap Options

- Convert John Belk Freeway into a boulevard (4 comments).
- Cap to build connectivity.

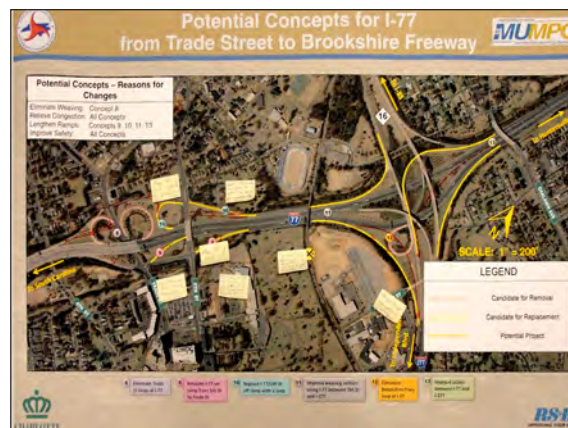
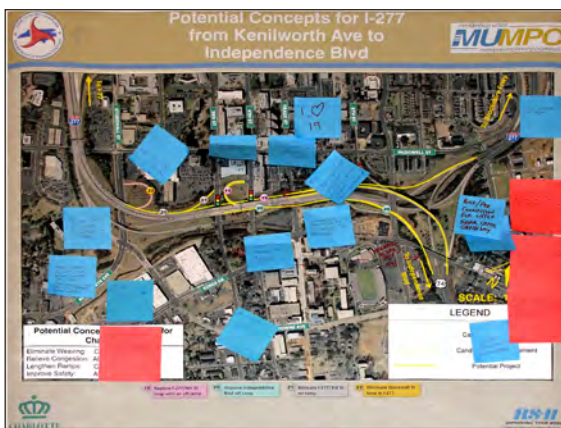
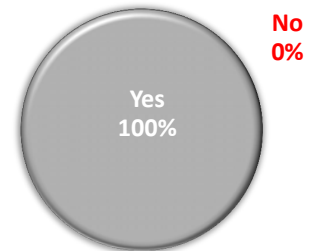
### Pedestrian and Bicycle Facilities

- Pedestrians and bicyclists do not like loops.
- Consider the Irwin Creek and Little Sugar Creek Greenways while designing potential concepts.
- New structures should have ped/bike facilities.
- Improve the connectivity for ped/bike facilities between McDowell Street and S. Tryon Street to downtown.
- Convert all one-way pairs to two-way streets.
- Add bike lanes to the N. Davidson Street bridge.

## Other

- Redevelopment opportunities have been missed; Tryon Street could be positively affected by major infrastructure changes that are not shown.
- Consider how the trains and surface streets connect/overlap.
- Tryon Street should go over the train tracks.
- There should be more of a focus on getting people out of cars and into public transit.
- Eliminate these names (John Belk Freeway/Brookshire Freeway) and just call it I-77 S/N & I-277 W/E or inner/outer.
- A reduction in access points will require better signage and wayfinding.
- Focus on redevelopment opportunities.

**Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?**  
(17 responses)



**During June 5, 2012 public workshop, attendees reviewed the potential concepts and provided valuable feedback.**

# Chapter 3

## Existing Conditions

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## Existing Conditions

The I-277/I-77 Loop includes several elements that are unusual for a facility of this functionality and length, and these elements have a great impact on the existing safety and operational conditions. The Loop is characterized by three freeway-to-freeway (system) interchanges and the freeway segments that connect them. The following are the three system interchanges:

- I-77 at I-277 (John Belk Freeway)/US 74 (Exit 9/Exit 1B and 1C)
- I-77 at I-277 (Brookshire Freeway)/NC 16 (Exit 11/Exit 5A and 5B)
- I-277 at US 74 (Independence Boulevard) (Exit 2B)

In addition to the system interchanges, the facility includes ten service interchanges. There are two service interchanges on the I-77 portion of the Loop, four service interchanges on the I-277 (John Belk Freeway) portion of the Loop, and four service interchanges on the I-277 (Brookshire Freeway) portion as described below.

- I-77 between I-277 (John Belk Freeway)/US 74 and I-277 (Brookshire Freeway/ NC 16)
  - I-77 at Morehead Street (US 29/NC 27) (Exit 10A)
  - I-77 at Trade Street and 5th Street (Exits 10B & 10C)
- I-277 (Brookshire Freeway) between I-77 and US 74 (Independence Boulevard)
  - I-277 at Graham Street (US 29/NC 49) (Exit 3B)
  - I-277 to Church Street and Tryon Street (Exit 3B)
  - I-277 to Davidson Street, Brevard Street, Tryon Street, and McDowell Street (Exit 3A)
  - I-277 to College Street and 11th Street (Exit 3A)
- I-277 (John Belk Freeway) between US 74 (Independence Boulevard) and I-77
  - I-277 to US 29 to NC 27/Freedom Drive (Exit 1A)
  - I-277 at Carson Boulevard (Exit 1D)
  - I-277 to College Street, South Boulevard, Caldwell Street, Stonewall Street, Kenilworth Avenue (Exit 1E)
  - I-277 to Kenilworth Avenue, Charlottetowne Avenue, 3rd Street, and 4th Street (Exit 2A)



The number of system and service interchanges for the I-277/I-77 Loop was compared with similar Center City loop facilities in major metropolitan areas across the country. Average system and service interchange densities are 0.5 and 1.0 per mile, respectively. The I-277/I-77 Loop's system interchange density (0.47) is similar to the average, whereas the service interchange density (1.38) is significantly greater than the average. It should be noted that only Los Angeles, California has a higher service interchange density (1.44) than the I-277/I-77 Loop. This comparison is shown in Table 3-1.

*Table 3-1  
Comparison of Similar Center City Loop Facilities*

Location	Roadways	Circumference (mi)	Number of Interchanges		Population	Interchange Density (interchanges/mile)	
			System	Service		System	Service
Dallas, TX	I-35E/I-30/US 75/SR 366	5.5	5	3	1,197,816	0.91	0.55
Richmond, VA	I-95 / I-195/ I-64	11	4	9	204,214	0.36	0.82
Nashville, TN	I-65/I-40/I-24	8.3	4	7	601,222	0.48	0.84
Houston, TX	I-45/I-10/US 59/US 90	5.8	3	5	2,099,451	0.52	0.86
Phoenix, AZ	I-10/I-17	13	3	13	1,445,632	0.23	1.00
Detroit, MI	I-75/I-375/SR 10	7.5	4	8	713,777	0.53	1.07
Columbus, OH	I-70/I-670/I-71	6.5	4	7	787,033	0.62	1.08
Los Angeles, CA	I-10/I-110/I-5	9.7	5	14	3,792,621	0.52	1.44
Charlotte, NC	I-277 / I-77	6.5	3	9	731,424	0.46	1.38
<b>Average</b>		<b>8.2</b>	<b>4</b>	<b>8</b>	<b>1,285,910</b>	<b>0.51</b>	<b>1.00</b>

Sources: Google Earth, <http://2010.census.gov>

### Existing Geometric and Physical Features

The existing (as-built) I-277/I-77 Loop was investigated during field visits and using aerial photography. The physical features of the roadway that were evaluated included the right-of-way, typical section, design speed, horizontal and vertical alignment, environmental constraints, structures, and drainage. The current facilities were designed and constructed in various phases in the 1970s and 1980s, based on the needs of both NCDOT and the City of Charlotte. At the time of development, the design standards set forth by AASHTO and NCDOT were used to design and construct the facility. Some of the geometric features of the facility have become obsolete due to population growth, vehicular demand and changes in design standards and agency preferences.

The preliminary assessment of the design and operational issues identified on the I-277/I-77 Loop is shown in Figure 3-1. The following sections provide additional details of these issues. Figures 3-2 and 3-3 show the location and sufficiency ratings for all structures in the Study Area.

*A comparison of similar loop facilities of eight other cities indicated that the I-277/I-77 Loop has the second highest service interchange density at 1.38.*





*As projects are funded for various locations around the Loop, the pedestrian and bicycling environment and improvements to accommodate both should be included as part of the design.*



### **Right-of-Way**

I-77 and I-277 are fully-controlled access facilities that are classified as Interstate Highways. The right-of-way width varies by location throughout the Loop, but generally falls between 150 feet and 550 feet along the segments, with wider right-of-way at interchanges.

### **Typical Section**

For the most part, I-77 and I-277 are six-lane facilities, with three 12-foot travel lanes in each direction. There are numerous locations where additional auxiliary lanes exist between interchanges. Traffic is separated by a median barrier that varies in height due to center bridge piers and overhead signing.

### **Design Speed**

The design speed is the maximum safe maintainable speed of a facility under the design conditions. Both horizontal and vertical design elements are affected by the design speed of a given roadway. The current speed limit along I-77 in the Study Area is 55 miles per hour (mph) with an assumed design speed of 60 mph. The current speed limit along I-277 varies between 50 mph and 55 mph with an assumed design speed ranging from 55 mph to 60 mph.

### **Pedestrian and Bicycle Gateways**

A recent study completed by CDOT identified a total 33 gateways (11 overpasses and 22 underpasses) across I-277/I-77 Loop. These gateways are shown in Figure 3-4. While some of these gateways have acceptable accommodations for pedestrians and bicyclists, there are several issues identified at a majority of these gateways. These issues include the following:

- Inadequate lighting
- Lack of maintenance – litter, overgrown landscaping
- Inadequate sidewalks or bike lanes
- Lack of sense of scale
- Safety
- Aesthetics
- Conflicts with vehicular traffic

As projects are funded for various locations around the Loop, the pedestrian and bicycling environment and improvements to accommodate both should be included as part of the design.

### I-77 at I-277 (John Belk Freeway)/US 74 Interchange

This interchange functions as the main entrance into Center City for drivers heading from the south and from the airport to the west. The major issues leading to traffic operational challenges at this location include:

- Total of 16 entrance/exit ramps within half a mile radius:
  - Eight ramps associated with John Belk Freeway/Wilkinson Boulevard.
  - Three ramps associated with Freedom Drive.
  - Four ramps associated with West Boulevard and Morehead Street.
  - One ramp associated with Carson Boulevard.
- Short ramp acceleration and/or deceleration lanes.
- Oversaturated mainline conditions along I-77 southbound, resulting in traffic backups onto I-277 westbound, mainly during PM peak periods.
- Several short weaving sections along I-277 and I-77:
  - I-77 SB Collector-Distributor (C-D) between US 74 (Wilkinson Boulevard) on-ramp and West Boulevard off-ramp.
  - I-77 NB C-D between West Boulevard on-ramp and I-277 off-ramp.
  - I-77 NB C-D between loop from US 74 EB and ramp to I-277 EB.
  - I-77 SB C-D between loop from I-277 WB and loop to I-277 EB.
  - I-277/US 74 WB between loop from I-77 NB and loop to I-77 SB.



Graphic 3-1  
I-77 at I-277 (John Belk Freeway)/US 74 Interchange



**Horizontal and Vertical Alignment:** The existing interchange meets or exceeds the current design standards for a 55 mph facility with the exception of two of the loops: I-77 NB to US 74 WB (Wilkinson Boulevard) and I-77 SB to I-277 (John Belk Freeway) EB, which have substandard horizontal alignments.

**Structures:** There are ten structures that are currently part of this interchange (shown in Table 3-2). All the structures over I-77, including the railroad bridge just south of the interchange, have sufficient vertical clearances above I-77. However, these structures have piers in the median and on the shoulders of I-77 and the C-D. These piers may require new structures if I-77 is widened. Two of these ten structures are categorized as functionally obsolete and one is structurally deficient. It should be noted that a bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.

*Table 3-2  
Existing Structures I-77 at I-277 (John Belk Freeway)/US 74 Interchange*

Structure ID	Facility Carried	Facility or Feature Intersected	Year Built/ Rebuilt	No. of Spans	Structure Roadway Width/Deck Width (Feet)	Sufficiency Rating	Structure Status	Minimum Vertical Clearance (Feet)	Horizontal Under Clearance (Feet)
R217	Southern Railroad	I-77	1968	5	N/A	0	Functionally Obsolete	25+	N/A
126	Freedom Drive (SR 4886)	I-77	1970	5	50.0/59.5	89.7	Not Deficient	15.4	18.3
44	I-277 Outer Loop/US 74	I-77	1970	6	40.0/45.5	67	Not Deficient	16.7	18.4
48	I-277 Inner Loop/US 74	I-77	1970	6	42.2/45.5	68	Not Deficient	16.0	18.3
C15	US 74	Irwin Creek	1954	4	N/A	89	Not Deficient	N/A	N/A
35	US 74 Ramp	Irwin Creek	1954	3	22.3/84.4	65	Structurally Deficient	N/A	N/A
122	Freedom Drive (SR 4886)	US 74	1970	3	56.0/65.2	77	Functionally Obsolete	15.9	4.3
C493	Freedom Drive (SR 4886)	Irwin Creek	1970	4	N/A	89	Not Deficient	N/A	N/A
C495	I-277 Inner Loop to I-77 S	Irwin Creek	1970	4	N/A	87	Not Deficient	N/A	N/A
C494	I-277 Inner Loop to I-77 S	Irwin Creek	1970	4	N/A	100	Not Deficient	N/A	N/A

Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.

**Environmental Constraints:** Environmental constraints reviewed for this Study Area include major developments and environmentally sensitive features such as streams, parks, schools and other features (shown in Figure 3-5). The majority of the area adjacent to this interchange is either fully developed and/or includes various environmentally sensitive features.

The following are environmentally sensitive features in the vicinity of I-77/I-277 (John Belk Freeway)/US 74 Interchange:

- Bryant Park is located near the intersection of Freedom Drive/Morehead Street.
- Stewart Creek runs parallel to Freedom Drive.
- Irwin Creek runs parallel to I-77.
- Several tributaries of Stewart Creek and Irwin Creek run through the interchange.

As a result of these environmental constraints, possible improvements at this interchange would be limited.

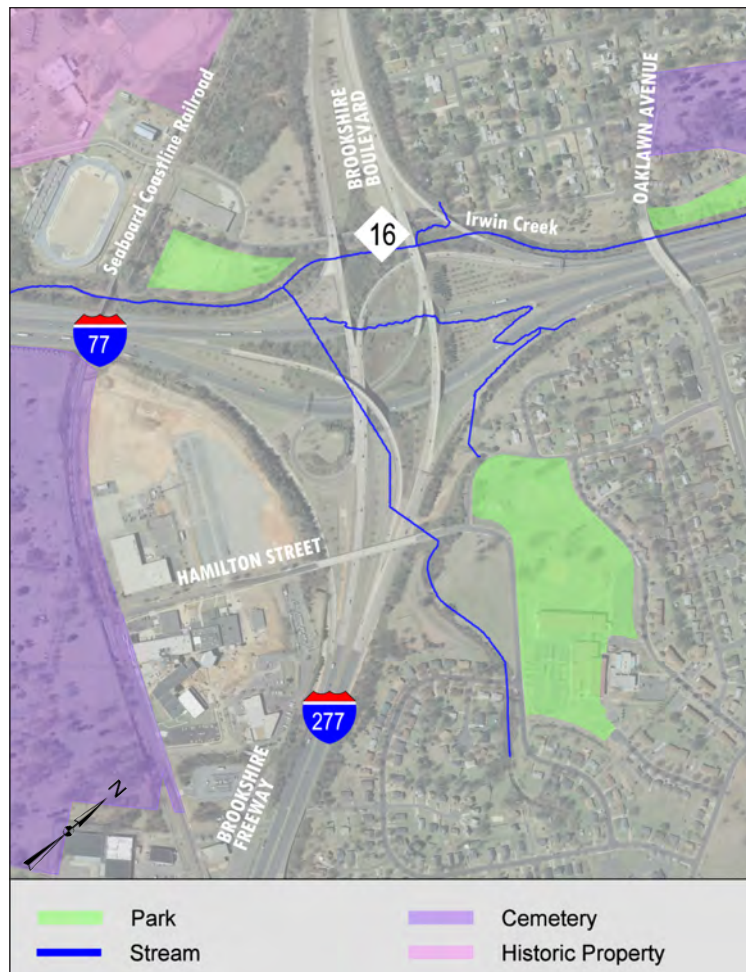


### I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange

This interchange functions as the main entrance into Center City for drivers heading from the north and northeast Charlotte. The following are the major issues leading to traffic operational challenges at this location:

- Ramps with short acceleration and/or deceleration lanes.
- Oversaturated mainline conditions along I-77 northbound, resulting in traffic backups onto I-277 westbound, mainly during PM peak periods.
- Five left-side entrance/exit ramps.

**Horizontal and Vertical Alignment:** This interchange meets or exceeds the current design standards for a 55 mph facility with the exception of the flyover ramp from I-77 SB to I-277 (Brookshire Freeway) EB. This flyover ramp has a radius of approximately 400 feet, which correlates to a driving speed of 35 mph to 40 mph. This flyover ramp joins I-277 (Brookshire Freeway) on the left-side. There are four other left-side exit and entrance ramps that are part of this interchange. While left-side entrances are permitted, they are not typical nor preferred.



Graphic 3-2  
I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange



**Structures:** There are 13 structures that are currently part of this interchange (shown in Table 3-3). The existing structures are all on horizontal curves which limit changes to the existing alignments. Bridge piers are located in close proximity to adjacent ramps and mainlines which would inhibit the opportunity to add lanes without major structure construction. Six of these 13 structures are categorized as functionally obsolete and two are structurally deficient.

**Environmental Constraints:** The following are major developments and environmentally sensitive features found in the vicinity of this interchange:

- Residential neighborhoods are located in the northeast and northwest quadrants of the interchange.
- Greenville Park and Biddleville Park are located in the northeast and southwest quadrants of the interchange, respectively.
- Irwin Creek runs parallel to I-77 on the west.
- Several retail and entertainment stores are located in the southeast quadrant (including NC Music Factory).
- Several tributaries of Irwin Creek run through the interchange.
- Elmwood and Pinewood Cemeteries are located in the southeast quadrant of this interchange.
- Seaboard Coast Line Railroad runs parallel to NC 16 (Brookshire Boulevard) and crosses I-77 just south of this interchange.



**Table 3-3**  
Existing Structures I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange

Structure ID	Facility Carried	Facility or Feature Intersected	Year Built/ Rebuilt	No. of Spans	Structure Roadway Width/Deck Width (Feet)	Sufficiency Rating	Structure Status	Minimum Vertical Clearance (Feet)	Horizontal Under Clearance (Feet)
R271	Seaboard Coastline RR	I-77	1970	6	N/A	0	Functionally Obsolete	N/A	N/A
342	NC 16 SB	Andrill St & Irwin Creek	1972	4	46.0/49.8	48.79	Structurally Deficient	20.9	30.2
341	NC 16 SB	I-77 SB	1972	3	40.0/42.0	94	Functionally Obsolete	20.5	36.0
281	I-77 Ramp to I-277 Inner Loop	I-77 SB	1972	3	28.0/33.3	95	Functionally Obsolete	17.0	31.2
340	I-277 Ramp to I-77 SB	I-77 NB & I-277 Inner Loop	1972	4	29.5/33.4	66	Not Deficient	16.3	46.4
339	I-277 Outer Loop/NC 16	I-77 NB & I-277 Ramp to I-77 SB	1972	4	73.5/76.5	96	Not Deficient	16.1	25.7
345	NC 16 NB	I-77 Ramp, Irwin Creek, City St	1972	3	48.5/52	64.7	Structurally Deficient	19.1	16.2
282	I-77 NB Ramp to NC 16	I-77 SB	1972	3	21.5/29.5	78	Functionally Obsolete	18.6	61.0
338	NC 16 NB	I-77 SB	1972	3	36.8/40.6	78	Functionally Obsolete	22.1	59.3
337	I-277 Outer Loop/NC 16	I-77 NB	1972	3	44.8/47.8	95	Not Deficient	20.0	76.0
335	Hamilton Street	I-277 Outer Loop/NC 16	1972	8	28.0/40.4	50.6	Not Deficient	16.4	23.5
283	I-77 SB Ramp to NC 16	Andrill St & Irwin Creek	1972	4	23.5/27.5	83	Functionally Obsolete	17.2	26.0
286	Oaklawn Ave	I-77 & Irwin Creek	1971	5	52.0/64.4	96.6	Not Deficient	15.1	52.0

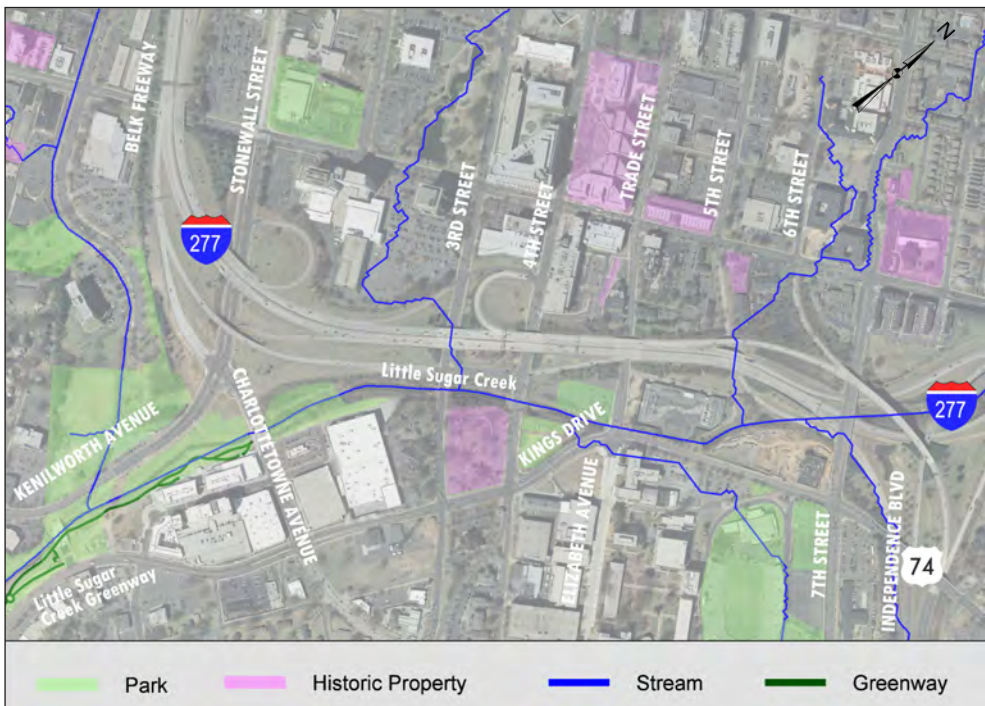
Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.



### I-277 at US 74 (Independence Boulevard) Interchange

This interchange functions as the main entrance into Center City for drivers heading from the east. The following are the major issues leading to traffic operational challenges at this location:

- Significant vertical grade changes throughout the interchange.
- Ramps with short acceleration and/or deceleration lanes.
- Oversaturated mainline conditions along US 74 EB, resulting in traffic backups onto I-277 eastbound, mainly during PM peak periods.
- Short weaving sections along I-277 and US 74:
  - I-277 EB between 4th Street on-ramp and US 74 EB off-ramp.
  - I-277 WB between US 74 WB on-ramp and 4th Street off-ramp.
  - I-277 WB between US 74 WB on-ramp and Davidson Street off-ramp.
  - I-277 EB between Caldwell Street on-ramp and US 74 EB off-ramp.



Graphic 3-3  
I-277 at US 74 (Independence Boulevard) Interchange

**Horizontal and Vertical Alignment:** This existing interchange is a fully directional three level interchange that satisfies current horizontal and vertical design standards set forth by AASHTO and NCDOT. However, there are significant grade differences throughout this interchange, which result in challenging sight distance and drainage issues. The geometric footprint is also limited due to environmental constraints which are discussed on the following page.

*Traffic operational challenges along Brookshire Freeway between I-77 and Independence Boulevard are the result of too many entrance/exit ramps and short acceleration and deceleration lanes for several of these ramps.*





Table 3-4  
Existing Structures I-277 at US 74 (Independence Boulevard) Interchange

Structure ID	Facility Carried	Facility or Feature Intersected	Year Built/ Rebuilt	No. of Spans	Structure Roadway Width/Deck Width (Feet)	Sufficiency Rating	Structure Status	Minimum Vertical Clearance (Feet)	Horizontal Under Clearance (Feet)
315	I-277 Outer Loop/ NC 16	10th Street	1970	3	55.0/58.3	60.04	Functionally Obsolete	18.5	10.0
316	I-277 Inner Loop/ NC 16	10th Street	1970	3	55.2/59.4	79.28	Not Deficient	16.8	6.0
C77	I-277 Ramp to US 74 EB	Sugar Creek	1972	3	N/A	87	Not Deficient	N/A	N/A
47	I-277 Outer Loop	I-277 Ramp to US 74 EB	1954	4	N/A	89	Not Deficient	N/A	N/A
309	US 74 WB Ramp to I-277 Inner Loop	I-277, NC 16, NC 27, US 74 EB	1971	10	37.0/42.0	100	Not Deficient	16.8	29.3
C299	I-277 Outer Loop/ US 74 EB	Sugar Creek	1971	3	N/A	72	Not Deficient	N/A	N/A
404	NC 27	I-277/NC 16, US 74 EB, 5th St	1971	5	64.0/76.5	69	Not Deficient	18.0	61.9
451	I-277 Inner Loop/ US 74 WB	5th Street	1981	3	28.0/31.9	78	Functionally Obsolete	22.7	16.1
452	I-277 Outer Loop	5th Street	1981	3	100.0/103.9	83.7	Not Deficient	16.4	11.0
403	Central Avenue	US 74 Ramps	-	-	-	-	-	-	-

Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.

**Structures:** There are 10 structures that are currently part of this interchange (shown in Table 3-4). Due to right-of-way constraints and environmentally sensitive features, the structures associated with this interchange are comprised of several short spans with multiple piers, some adjacent to the shoulders of the interchange ramps and through lanes. The current interchange also lies in close proximity to 7th Street and Central Avenue, making future upgrades to the interchange a difficult task without new structures. Two of these ten structures are categorized as functionally obsolete.

**Environmental Constraints:** The following are major developments and environmentally sensitive features found in the vicinity of this interchange:

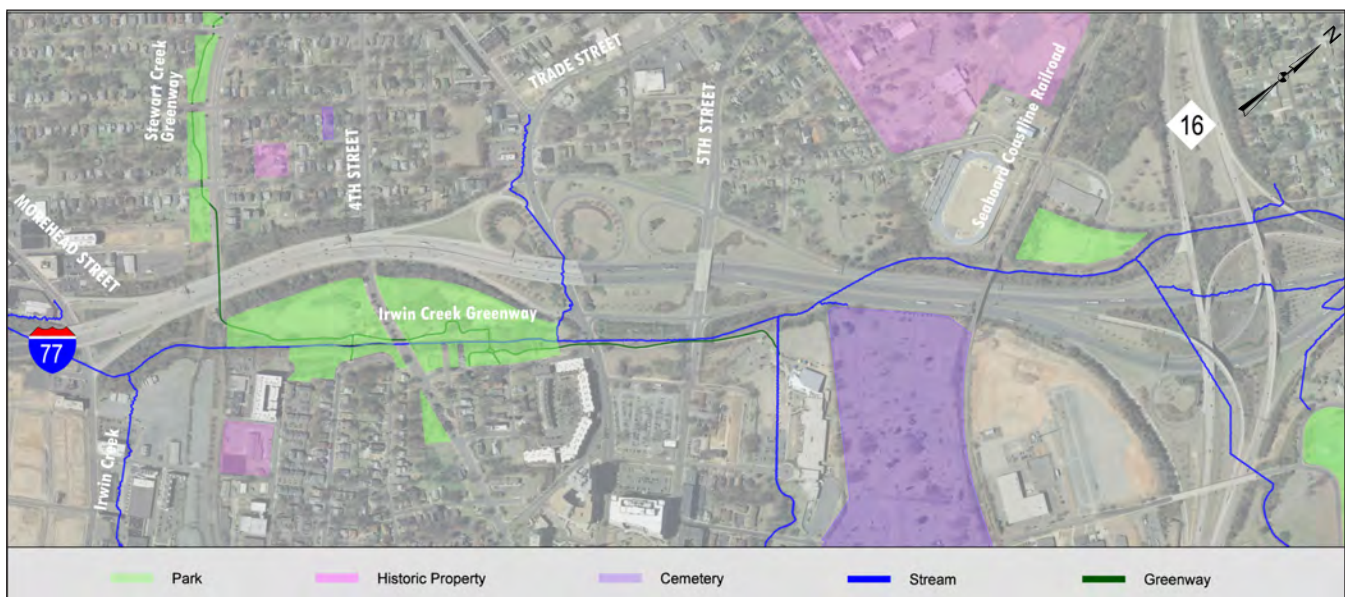
- Major electric transmission station in the southeast quadrant of the interchange.
- Several facilities associated with Central Piedmont Community College (CPCC) including a new Culinary Arts Building and recently renovated historic football stadium.
- Little Sugar Creek and its tributaries run through the interchange.



### I-77 between I-277 (John Belk Freeway)/US 74 and I-277(Brookshire Freeway/NC 16)

This two-mile-long freeway segment has four lanes in each direction with additional auxiliary lanes between interchanges. In 2010, this facility carried 131,000 Annual Average Daily Traffic (AADT). The following are the major issues leading to traffic operational challenges at this location:

- Ramps with short acceleration and/or deceleration lanes.
- The two loops at I-77 SB/Trade Street have radii below the minimum desirable radius of 230 feet.
- Short weaving sections along I-77:
  - I-77 NB between Morehead Street on-ramp and Trade Street off-ramp.
  - I-77 NB between 5th Street on-ramp and I-277 EB (Brookshire Freeway) off-ramp.
  - I-77 SB between Brookshire Boulevard on-ramp and 5th Street off-ramp.
  - I-77 SB between Trade Street loop ramps, which has less than 500 feet of weaving distance.
  - I-77 SB between Trade Street on-ramp and Morehead Street off-ramp.



Graphic 3-4  
I-77 between I-277 (John Belk Freeway) and I-277(Brookshire Freeway)



**Structures:** There are 10 structures along this segment of the Loop (shown in Table 3-5). None of the structures along this segment are categorized as functionally obsolete, functionally deficient, or structurally deficient.

**Environmental Constraints:** The following are major developments and environmentally sensitive features found in the vicinity of this interchange:

- Frazier Park is located along this segment to the east.
- Irwin Creek runs parallel to I-77 on the east and crosses I-77 two times along this segment.
- Irwin Creek Greenway crosses I-77 between Morehead Street and 4th Street.

Table 3-5

Existing Structures I-77 between I-277 (John Belk Freeway) and I-277 (Brookshire Freeway)

Structure ID	Facility Carried	Facility or Feature Intersected	Year Built/ Rebuilt	No. of Spans	Structure Roadway Width/Deck Width (Feet)	Sufficiency Rating	Structure Status	Minimum Vertical Clearance (Feet)	Horizontal Under Clearance (Feet)
C219	I-77	Irwin Creek	1972	4	N/A	74	Not Deficient	N/A	N/A
221	I-77 NB	US 29, NC 27 (Morehead St)	1996	3	66.0/68.5	94	Not Deficient	16.2	10.5
222	I-77 SB	US 29, NC 27 (Morehead St)	1970/1995	3	62.0/64.8	89.5	Not Deficient	16.6	47.5
227	I-77	Piedmont & North RR Abandoned	1996	3	155.0/158.0	78	Not Deficient	N/A	N/A
230	I-77 NB	4th Street	1996	3	74.0/74.4	63.09	Not Deficient	15.3	10.0
231	I-77 SB	4th Street	1995	3	78.5/82.0	71.84	Not Deficient	15.0	8.0
243	I-77 SB	West Trade St	1972/1996	3	78.4/71.2	81.26	Not Deficient	15.7	64.0
241	I-77 NB	West Trade St	1972/1996	3	62.1/64.6	77.8	Not Deficient	17.8	68.0
245	W. 5th St	I-77	1969	4	68.0/80.5	93	Functionally Deficient	16.3	66.5
C248	I-77	Irwin Creek	1972	4	N/A	72.4	Not Deficient	N/A	N/A

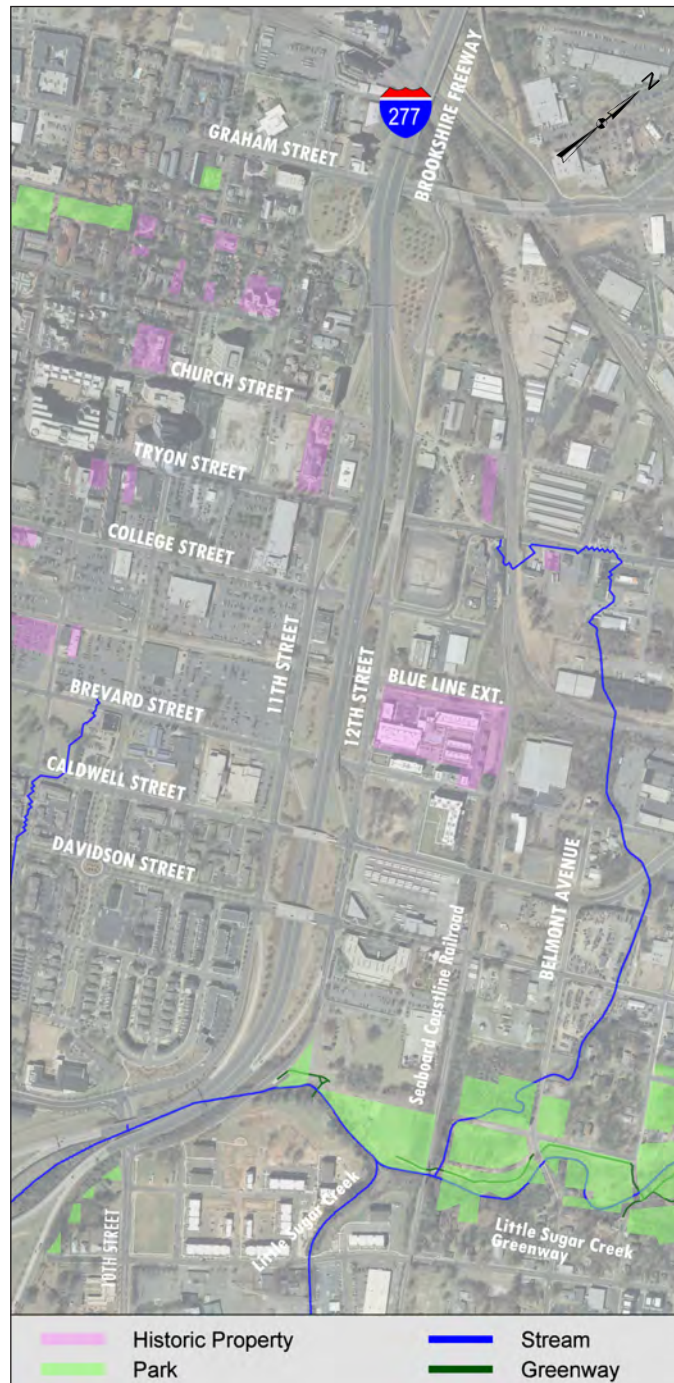
Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.



### I-277 (Brookshire Freeway) between I-77 and US 74 (Independence Boulevard)

This two-mile-long freeway segment has three lanes in each direction with additional auxiliary lanes between interchanges. In 2010, this facility carried 104,800 AADT. Traffic operational challenges along this segment are the result of too many entrance/exit ramps (ten entrance/exit ramps along one-mile portion of this segment) and short acceleration and deceleration lanes for several of these ramps. 11th Street and 12th Street are one-way streets, which run parallel to I-277 on either side. Together, these two streets function as service roads for I-277 in this area. Due to the short entrance/exit ramps to/from I-277, there are several hazardous locations along 11th Street, 12th Street and other service roads in this area.

**Structures:** There are 13 structures that are currently part of the I-277 (Brookshire Freeway) segment of the Loop as shown in Table 3-6. One of the structures along this segment is categorized as structurally deficient.



Graphic 3-5  
I-277 (Brookshire Freeway) between I-77 and  
US 74 (Independence Boulevard)



**Environmental Constraints:** The following are major developments and environmentally sensitive features found in the vicinity of this interchange:

- LYNX Blue Line Extension (light rail) and Southern Railway cross I-277 along this segment.
- Seaboard Coast Line Railroad runs parallel to I-277 on the north.
- Historic Alpha Mills is located along 12th Street near Brevard Street.

Table 3-6

Existing Structures I-277 (Brookshire Freeway) between I-77 and US 74 (Independence Boulevard)

Structure ID	Facility Carried	Facility or Feature Intersected	Year Built/Rebuilt	No. of Spans	Structure Roadway Width/Deck Width (Feet)	Sufficiency Rating	Structure Status	Minimum Vertical Clearance (Feet)	Horizontal Under Clearance (Feet)
330	I-277/NC 16	US29/NC 49 (Graham St)	1971	3	124.9/132.5	70	Not Deficient	14.9	70.4
101	US 29	Seaboard Coastline RR	1994	3	76.0/88.6	100	Not Deficient	23.2	24.8
108	US 29/NC 49	Southern RR	2005	3	76.0/88.6	100	Not Deficient	23.0	24.0
328	I-277/NC 16	Church St	1973	3	102.4/108.3	91.29	Not Deficient	15.3	14.0
327	I-277/NC 16	Tryon St	1973	3	110.8/116.0	98	Not Deficient	15.5	17.3
138	E. 12th St	Tryon St	-	-	-	-	-	-	-
326	I-277/NC 16	N. College St	1967	3	118.2/125.5	85	Not Deficient	17.8	39.3
408	E. 11th St	Southern RR	-	-	-	-	-	-	-
322	I-277/NC 16	Abandoned RR	1967	3	106.0/113.6	88	Not Deficient	N/A	N/A
320	I-277/NC 16	Brevard St	1967	3	57.0/135.3	68	Structurally Deficient	16.5	53.0
318	Caldwell St	I-277/NC 16	1973	4	40.0/52.5	83.69	Not Deficient	15.4	56.5
317	Davidson St	I-277/NC 16	1973	4	64.0/76.8	84.27	Not Deficient	15.6	54.5
C314	I-277/NC 16	Sugar Creek	1972	3	-	72	Not Deficient	99.9	52.5

Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.



### I-277 (John Belk Freeway) between US 74 (Independence Boulevard) and I-77

This 2.5-mile-long freeway segment has three lanes in each direction with additional auxiliary lanes between interchanges. In 2010, this facility carried 82,000 AADT. In recent years, NCDOT and the City of Charlotte completed upgrades at the interchanges of Caldwell Street/South Boulevard and Kenilworth Avenue/Charlottetowne Avenue. The C-D road along I-277 between Davidson Street and Church Street keeps the entrance/exit traffic on the C-D road and helps the I-277 through-traffic flow uninterrupted. As a result, traffic demand along this segment of I-277 flows at good Levels of Service.

The segment of I-277 between McDowell Street and US 74 has short acceleration/deceleration lanes and short weaving segments. One of the most challenged intersections, in terms of traffic operations, along the entire I-277/I-77 Loop is located along this segment at I-277 WB off-ramp at 4th Street. Due to the one-way configuration, traffic heading to 3rd Street needs to make a U-turn at this ramp termini intersection, which causes a significant operational and safety hazard for traffic.

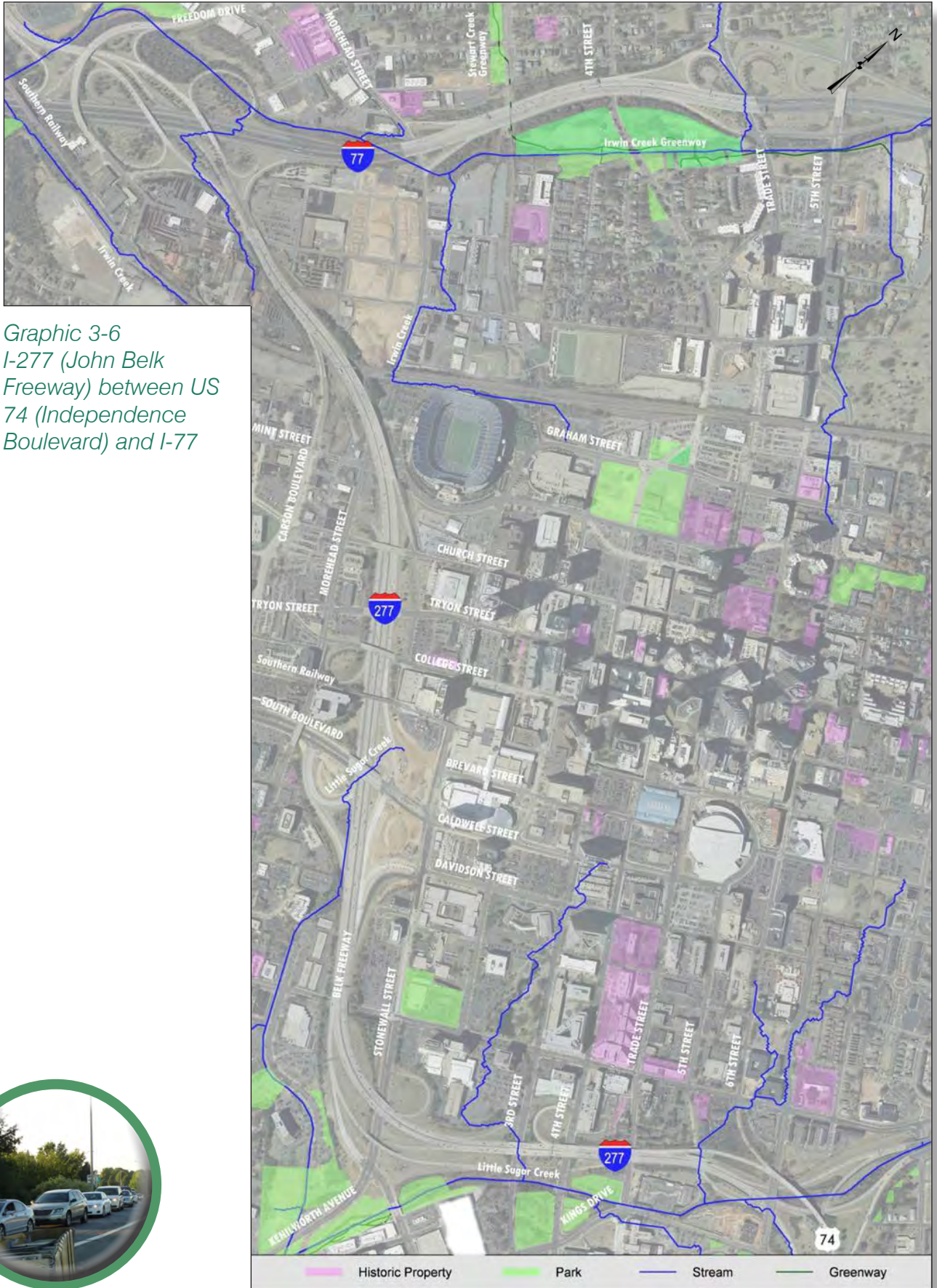
**Structures:** There are 30 structures that are currently part of the I-277 (John Belk Freeway) segment of the Loop as shown in Table 3-7. Eleven of the structures along this segment are categorized as functionally obsolete.

**Environmental Constraints:** The following are major developments and environmentally sensitive features found in the vicinity of this interchange:

- Recently built Little Sugar Creek Greenway runs parallel to I-277 to the east.
- Little Sugar Creek and Little Sugar Creek Greenway run parallel to I-277 between Kenilworth Avenue and US 74.
- Little Sugar Creek's tributaries cross I-277 twice along this segment.
- Recently built Little Sugar Creek stream restoration project is located immediately adjacent to I-277/4th Street on-ramp.

*The intersection of 4th Street at I-277 WB off-ramp is one of the most challenged intersections, in terms of traffic operations, along the entire I-277/I-77 Loop.*





Graphic 3-6  
I-277 (John Belk Freeway) between US 74 (Independence Boulevard) and I-77



Table 3-7

Existing Structures I-277 (John Belk Freeway) between US 74 (Independence Boulevard) and I-77

Structure ID	Facility Carried	Facility or Feature Intersected	Year Built/ Rebuilt	No. of Spans	Structure Roadway Width/Deck Width (Feet)	Sufficiency Rating	Structure Status	Minimum Vertical Clearance (Feet)	Horizontal Under Clearance (Feet)
450	I-277/US 74	Elizabeth Ave	1981	3	110.2/119.8	83	Not Deficient	15.0	14.9
C232	-	-	-	-	-	-	-	-	-
449	I-277/US 74	NC 16 N	1981	3	108.1/111.0	89	Not Deficient	16.1	32.0
C533	NC 16 N	Little Sugar Creek	1956	3	N/A	89	Not Deficient	14.0	52.0
448	I-277/US 74	NC 16 S	1981	3	112.2/114.0	97	Not Deficient	15.7	31.6
C534	NC 16 S	Little Sugar Creek	1956	3	N/A	89	Not Deficient	14.0	40.0
164	Under Construction	-	-	-	-	-	-	-	-
399	Baxter Street	Little Sugar Creek	1959	3	-	-	-	-	-
479	I-277/US 74 SB	Stonewall St	1986	3	62.5/65.3	77.38	Not Deficient	15.2	6.0
478	I-277/US 74 NB	Stonewall St	1986	3	54.5/57.3	97	Not Deficient	18.4	16.0
522	I-277/US 74 Ramp	Stonewall St	1988	4	31.9/35.1	96.4	Not Deficient	20.7	31.9
487	I-277 NBL	NC 27/ McDowell St	1986	3	77.4/80.3	84.61	Functionally Obsolete	19.5	77.4
488	I-277 NBL	NC 27/ McDowell St	1986	3	77.4/80.3	84.61	Functionally Obsolete	19.8	66.3
489	SR3998/ South Blvd	I-277/US 74	1986	3	104/118.8	81	Not Deficient	17.5	54.8
163	NC 27/ Morehead St	SR 3998/ Independence	1988	4	52/64.5	81.27	Not Deficient	16.7	75.0
257	NC 27/ Morehead St	Charlotte Transit RR	1977	3	40/57.5	62.83	Functionally Obsolete	20.4	40.0
R518	Southern Railroad	I-277/US 74	1987	6	N/A	0	Functionally Obsolete	20.8	70.0
517	College Street	I-277	1987	3	40/47.67	64	Functionally Obsolete	16.8	22.4
516	Tryon Street	I-277/US 74	1987	4	59/71.6	75	Functionally Obsolete	20.1	56.1
515	Church Street	I-277/US 74	1987	4	40.2/52.7	85.21	Not Deficient	18.3	99.9
510	I-277 NBL	US 29/NC 49	1987	2	62.5/65.33	86.56	Functionally Obsolete	18.0	54.0
509	I-277 NBL	US 29/NC 49	1987	2	62.5/65.33	86.56	Functionally Obsolete	18.0	54.0
507	I-277 NBL	US 29/NC 49	1987	2	62.4/65	85.56	Not Deficient	24.3	53.8
508	I-277 SBL	US 29/NC 49	1987	2	72/77.2	92.93	Not Deficient	29.8	40.3
R94	Southern Railroad	US 29/NC 49	1950	3	N/A	15	Functionally Obsolete	14.7	48.0
R68	Southern Railroad	US 29/NC 49	1958	3	N/A	15	Functionally Obsolete	19.3	48.0
118	I-277/US 74 Ramp	Southern RR	1988	5	27.8/80.9	88.2	Not Deficient	21.8	8.0
505	I-277 NB	Southern RR	1987	3	62.5/65.0	80.76	Not Deficient	27.8	11.8
506	I-277 SB	Southern RR	1987	3	62.5/65.0	87.04	Not Deficient	30.0	11.9
78	I-277	Clarkson St	1986	3	117.8/123.5	84	Functionally Obsolete	15.1	4.0

Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders and rails.



### Safety Conditions

This I-277/I-77 Loop Study included an evaluation of the crashes along 3.5 miles of I-77 (between West Boulevard and Oaklawn Avenue) and the entire 4.5-mile-long I-277. Crash data was obtained from the NCDOT for the 36-month period from November 2008 through October 2011. There were approximately 1,861 crashes along these corridors during the three-year study period.

The I-277/I-77 Loop traffic safety conditions were analyzed using two different screening approaches. The first approach focused on the crash rate per corridor segment. The crash rate analysis determines high crash locations along the corridor. The second approach was based on the crash types at these high crash locations to help determine the primary causes for the crashes. The analysis of crash type provided an indication of possible deficiencies in geometric conditions within the study corridor.

#### Crash Rate Analysis

Crash rate is one measure of the relative safety of a roadway. Higher crash rates indicate a deficiency in safety or capacity conditions. Crash rates for the Study Corridor were calculated from the AADT and the number of reported crashes for each freeway segment. NCDOT uses a crash rate based upon the number of crashes per 100 million vehicle miles of travel for roadways. The statewide average crash rate for similar facilities (urban interstates) for the years 2008 through 2011 was 102 crashes per 100 million vehicle miles of travel.

Table 3-8 and Figure 3-6 provides the number of crashes and crash rates for the three-year period for each segment. Of the 8-mile-long I-77 and I-277 corridors analyzed for safety conditions, approximately five miles had crash rates over 155 (1.5 times statewide average crash rate), whereas approximately 1.5 miles had crash rates between 102 and 155. The remaining 1.5 miles had crash rates of 102 or less. These higher crash rates are the result of heavy congestion, short acceleration/deceleration lengths, significant weaving traffic volumes and roadway geometry.

The following six segments had crash rates over 155, which is 1.5 times the statewide average crash rate of 102:

1. I-77 between West Boulevard and Morehead Street
2. I-77 between 5th Street and I-277 (Brookshire Freeway)
3. I-77 between I-277 (Brookshire Freeway) and LaSalle Street
4. I-277 (Brookshire Freeway) between I-77 and Graham Street
5. I-277 (John Belk Freeway) between US 74 and McDowell Street
6. I-277 (John Belk Freeway) between I-77 and Carson Boulevard

*Of the 8-mile-long I-77 and I-277 corridors analyzed for safety conditions, approximately five miles had crash rates over 155 (1.5 times statewide average crash rate), whereas approximately 1.5 miles had crash rates between 102 and 155. The remaining 1.5 miles had crash rates of 102 or less.*



The following two segments had crash rates between 102 and 155, which moderately exceeds the statewide average crash rate:

1. I-77 between Morehead Street and 5th Street.
2. I-277 (Brookshire Freeway) between Graham Street and Caldwell Street.

The following segments had crash rates less than 102, which is at or below the statewide average crash rate:

1. I-277 (Brookshire Freeway) between Caldwell Street and US 74.
2. I-277 (John Belk Freeway) between McDowell Street and Carson Boulevard.

*Table 3-8  
Historic Crash Data November 2008 to October 2011*

#	Segment	Total Crashes for Three Years	Segment Length (miles)	Annual Average Daily Traffic Volume	Crash Rate (Per 100 Million of Entering Vehicle Miles Travelled)
1	I-77: north of West Blvd to Morehead St	336	0.8	142,000	284
2	I-77: Morehead St to north of 5th St	196	1.0	139,000	137
3	I-77: north of 5th St to north of I-277	364	1.1	152,000	206
4	I-77: north of I-277 to LaSalle St	222	0.7	169,000	168
5	I-277: I-77 to east of Graham St	330	0.9	108,000	306
6	I-277: east of Graham St to Caldwell St	54	0.6	80,000	108
7	I-277: Caldwell St to north of US 74	21	0.4	84,000	53
8	I-277: north of US 74 to McDowell St	202	1.0	85,000	211
9	I-277: McDowell St to east of Carson Blvd	48	1.0	80,000	54
10	I-277: east of Carson Blvd to I-77	88	0.5	82,000	196
	Total	1,861	8.0	-	-

Source: NCDOT, Nov. 2008 to Oct. 2011



### Crash Type Analysis

Crash types were grouped into the following five categories:

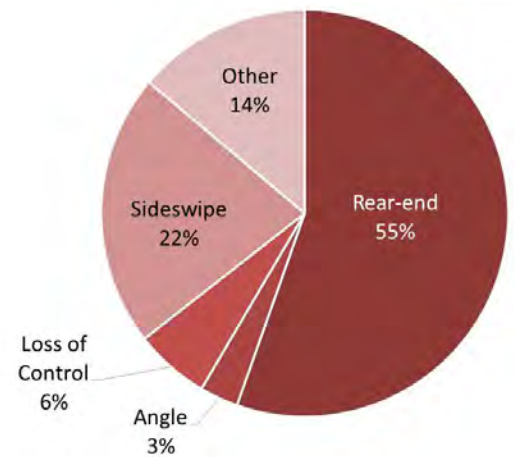
- Rear-end
- Angle (Left-turn/right-turn and angle)
- Loss of control
- Sideswipe
- Other Type (i.e. fixed object, other collision with vehicle, unknown, head-on, etc.)

As shown in Table 3-9 and Chart 3-1, the most common type of crash was, by far, rear-end (55 percent) followed by sideswipe (22 percent) and other (14 percent). There were zero pedestrian or bicycle crashes in the Study Area, which is understandable given that all of the roads studied are freeways with pedestrian and bicycle prohibitions. Of the total 1,861 crashes, five were fatal (<1 percent), 600 resulted in personal injuries (32 percent) and 1,256 were property damage only (68 percent) (see Table 3-10 and Chart 3-2).

In summary, the most common crash type along the I-277/I-77 Loop was rear-end. Rear-end type crashes commonly occur at locations that experience long periods of congestion and are often the result of sudden stops coupled with inadequate following distance. Due to the fact that the majority of the Study Corridor is congested at peak times, a high number and percentage of rear-end collisions is to be expected.

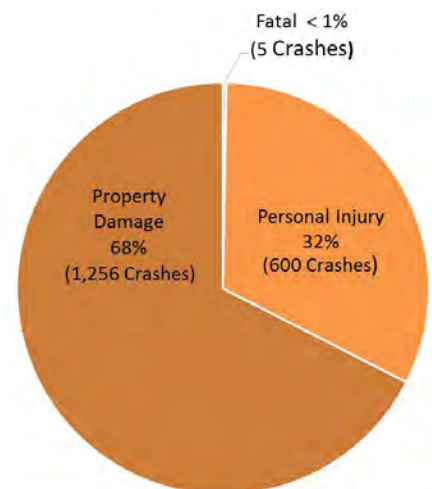


*Chart 3-1  
Percent of Crashes by Type*



Source: NCDOT, Nov. 2008 to Oct. 2011

*Chart 3-2  
Percent of Crashes by Severity*



Source: NCDOT, Nov. 2008 to Oct. 2011

Table 3-9  
Historic Crashes by Type November 2008 to October 2011

#	Segment	Rear-End		Left/Right/ Angle		Loss of Control		Sideswipe		Other	
		#	% of Total	#	% of Total	#	% of Total	#	% of Total	#	% of Total
1	I-77: north of West Blvd to Morehead St	209	62%	4	1.19%	8	2.38%	71	21.13%	44	13.10%
2	I-77: Morehead St to north of 5th St	69	35%	6	3.06%	7	3.57%	45	22.96%	69	35.20%
3	I-77: north of 5th St to north of I-277	174	48%	5	1.37%	15	4.12%	107	29.40%	63	17.31%
4	I-77: north of I-277 to LaSalle St	143	64%	0	0.00%	2	0.90%	54	24.32%	23	10.36%
5	I-277: I-77 to east of Graham St	245	74%	11	3.33%	21	6.36%	36	10.91%	17	5.15%
6	I-277: east of Graham St to Caldwell St	15	28%	3	5.56%	11	20.37%	16	29.63%	9	16.67%
7	I-277: Caldwell St to north of US 74	4	19%	1	4.76%	7	33.33%	5	23.81%	4	19.05%
8	I-277: north of US 74 to McDowell St	97	48%	13	6.44%	20	9.90%	57	28.22%	15	7.43%
9	I-277: McDowell St to east of Carson Blvd	15	31%	12	25.00%	14	29.17%	1	2.08%	6	12.50%
10	I-277: east of Carson Blvd to I-77	60	68%	2	2.27%	6	6.82%	12	13.64%	8	9.09%
	Total	1,031	55%	57	3.06%	111	5.96%	404	21.71%	258	13.86%

Source: NCDOT, Nov. 2008 to Oct. 2011



Table 3-10  
Historic Crashes by Severity November 2008 to October 2011

#	Segment	Fatal		Injury		Property Damage Only	
		No.	% of Total	No.	% of Total	No.	% of Total
1	I-77: north of West Blvd to Morehead St	0	0%	90	27%	246	73%
2	I-77: Morehead St to north of 5th St	1	1%	51	26%	144	73%
3	I-77: north of 5th St to north of I-277	1	0%	95	26%	268	74%
4	I-77: north of I-277 to LaSalle St	0	0%	60	27%	162	73%
5	I-277: I-77 to east of Graham St	2	1%	138	42%	190	58%
6	I-277: east of Graham St to Caldwell St	0	0%	15	28%	39	72%
7	I-277: Caldwell St to north of US 74	0	0%	10	48%	11	52%
8	I-277: north of US 74 to McDowell St	0	0%	79	39%	123	61%
9	I-277: McDowell St to east of Carson Blvd	0	0%	29	60%	19	40%
10	I-277: east of Carson Blvd to I-77	1	1%	33	38%	54	61%
Total		5	<1%	600	32%	1,256	67%

Source: NCDOT, Nov. 2008 to Oct. 2011



## Capacity Conditions

In addition to the identified design and operational issues, the traffic demand along the I-277/I-77 Loop continues to experience congestion issues. The 2010 travel demand on both the John Belk and Brookshire portions of I-277 range from 54,000 to 108,000 vehicles per day. The greatest concentration of traffic occurs during the AM and PM peak hours. The I-77 portion of the Loop carried between 126,000 and 169,000 AADT in 2010. These traffic volumes are shown in Figure 3-7.

The following describes the capacity analysis methodology as well as the results of the 2010 Existing Conditions capacity analyses.

### Freeway Capacity Analysis

The freeway capacity analyses were performed in three steps for this project. The first step analyzed capacity on the mainline of the freeway; the second step analyzed capacity for merge/diverge movements; and the third analyzed capacity for weaving segments. All of these analyses were performed using the methodologies described in the 2000 Highway Capacity Manual (HCM). In this methodology, the Level of Service, defined in six levels from A to F, is estimated based on the density of passenger cars per mile per lane. Level of Service A represents no congestion; Level of Service E represents long delays; and Level of Service F represents demand exceeding the capacity. Table 3-11 summarizes the Level of Service thresholds used in the freeway capacity analyses. Freeway capacity analysis results are shown on Figure 3-8.

Table 3-11  
Freeway Level of Service Criteria

Level of Service	Density Range (pc/mi/ln)		
	Mainline Segments	Merge/Diverge Junctions	Weaving Segments
A	0 - 11	< 10	< 10
B	11 - 18	> 10 - 20	> 10 - 20
C	18 - 26	> 20 - 28	> 20 - 28
D	26 - 35	> 28 - 35	> 28 - 35
E	35 - 45	> 35	> 35 - 43
F	> 45	Demand exceeds capacity	> 43

Source: Highway Capacity Manual, Pages 23-3 and 25-5, Transportation Research Board, Washington, D.C., 2000.



## Mainline Capacity Analysis

A freeway mainline capacity analysis was conducted for 133 segments in the AM and PM peak hours, of which 120 mainline segments of the Loop function at Level of Service D or better throughout the day, which is an acceptable rate of flow. Traffic demand at the remaining 13 mainline segments, shown in Table 3-12, approaches or exceeds the roadway capacity limits (Level of Service E or F) in either the AM or PM peak hour.

*Table 3-12  
2010 Mainline Capacity Analysis Results*

Freeway Segment	Level of Service (worst of AM/PM)
I-77 SB south of West Boulevard	E
I-77 NB south of West Boulevard	E
I-77 NB south of C-D at I-277 (John Belk Freeway)/US 74	F
I-77 SB south of C-D at I-277 (John Belk Freeway)/US 74	E
I-77 SB north of C-D at I-277 (John Belk Freeway)/US 74	F
I-77 SB north of Trade Street/5th Street	F
NC 16 EB east of Beatties Ford Rd	E
I-77 SB north of C-D at I-277 (Brookshire Freeway)/NC 16	F
I-77 NB north of I-277 (Brookshire Freeway)/NC 16	E
I-277 (Brookshire Freeway) Inner Loop/NC16 between I-77 Ramps	E
US 74 WB east of Charlottetowne Avenue	E
US 74 EB west of Charlottetowne Avenue	E
US 74 EB east of Charlottetowne Avenue	F



### Merge/Diverge Capacity Analysis

A freeway merge/diverge capacity analysis was performed for 74 merge/diverge junctions in the AM and PM peak hours, of which 69 merge/diverge junctions function at Level of Service D or better throughout the day, which is an acceptable rate of flow. Traffic demand at the remaining five junctions, shown in Table 3-13, approaches or exceeds the roadway capacity limits (Level of Service E or F) in either the AM or PM peak hour.

*Table 3-13  
2010 Merge/Diverge Capacity Analysis Results*

Ramp Junction	Level of Service (worst of AM/PM)
I-77 SB at I-77 HOV entrance ramp	F
I-277 Brookshire Freeway) Inner Loop at I-77 SB entrance ramp	F
I-77 NB C-D at I-77 NB exit ramp	F
I-77 NB C-D at I-77 NB entrance ramp	F
I-277 Outer Loop C-D at I-277 (John Belk Freeway) Outer Loop entrance ramp	F





## Weaving Capacity Analysis

In general, weaving segments are formed when an on-ramp (merge junction) is closely followed by an off-ramp (diverge junction) and they are joined by an auxiliary lane less than 2,500 feet long. There are 22 freeway weaving segments in the Study Area, of which 17 weaving segments function at Level of Service D or better throughout the day, which is an acceptable rate of flow. Traffic demand at the remaining five segments, shown in Table 3-14, approaches or exceeds the roadway capacity limits (Level of Service E or F) in either the AM or PM peak hour.

Table 3-14  
2010 Weaving Capacity Analysis Results

Freeway Segment	Level of Service (worst of AM/PM)
I-77 NB near West Boulevard	E
I-77 NB C-D south System to System	F
I-77 NB C-D near 5th Street	F
I-277 (Brookshire) Freeway WB near Graham Street	F
I-277 (John Belk Freeway) EB near 3rd Street	F



### Intersection Capacity Analysis

Intersection capacity analyses were performed using SYNCHRO software. A total of 43 signalized intersections and nine unsignalized intersections were analyzed for AM and PM peak hours. Of these intersections, 37 intersections function at Level of Service D or better throughout the day, which is an acceptable rate of flow. Traffic demand at the remaining six intersections, shown in Table 3-15, approaches or exceeds the capacity limits (Level of Service E or F) in either the AM or PM peak hour. Intersection capacity analysis results are shown on Figure 3-8.

*Table 3-15  
2010 Intersection Capacity Analysis Results*

Intersection	Intersection Type	Level of Service (worst of AM/PM)
10th Street and Graham Street	Signalized	E
Tryon Street and 11th Street	Signalized	E
Caldwell Street and 12th Street/I-277 (Brookshire Freeway) Outer Loop On-ramp	Signalized	F
7th Street and Charlottetowne Avenue	Signalized	E
South Boulevard and I-77 (John Belk Freeway) Inner Loop Ramps	Signalized	F
LaSalle Street and I-77 SB Ramp	Unsignalized	F

### Travel Speed Analysis

A micro-simulation analysis was performed for the I-277/I-77 Loop (using VISSIM software) to determine the system performance and identify areas of congestion using typical analytical models, such as those that incorporate HCM methodologies. The simulation Study Area included all of the freeway interchanges of I-77 between Remount Road and I-85, as well as the interchanges and key intersections along the I-277 Loop. VISSIM models were constructed to analyze the 2010 and 2040 planning horizons and evaluated both the AM and PM peak hour periods. Detailed discussion of the simulation development and analysis is included in Appendix C.

The primary measure of effectiveness (MOE) used for the simulation analysis was average segment speed. This MOE was obtained using the link evaluation file, which obtained the average speed for the segment (set up as 100 feet) based on the peak hour duration. The average speed data represents the average of five simulation runs. Figure 3-9 illustrates the worst (lowest) speed output of the AM and PM peak hour periods. The three categories of travel speed include Failure (0 to 25 mph), Acceptable (25 to 45 mph), and Good (45+ mph).



For the 2010 Existing Conditions scenario, several areas of the I-277/I-77 Loop had low travel speed, which is an indicator of congestion and queuing. As shown in Table 3-16, four freeway segments have failing speeds along them.

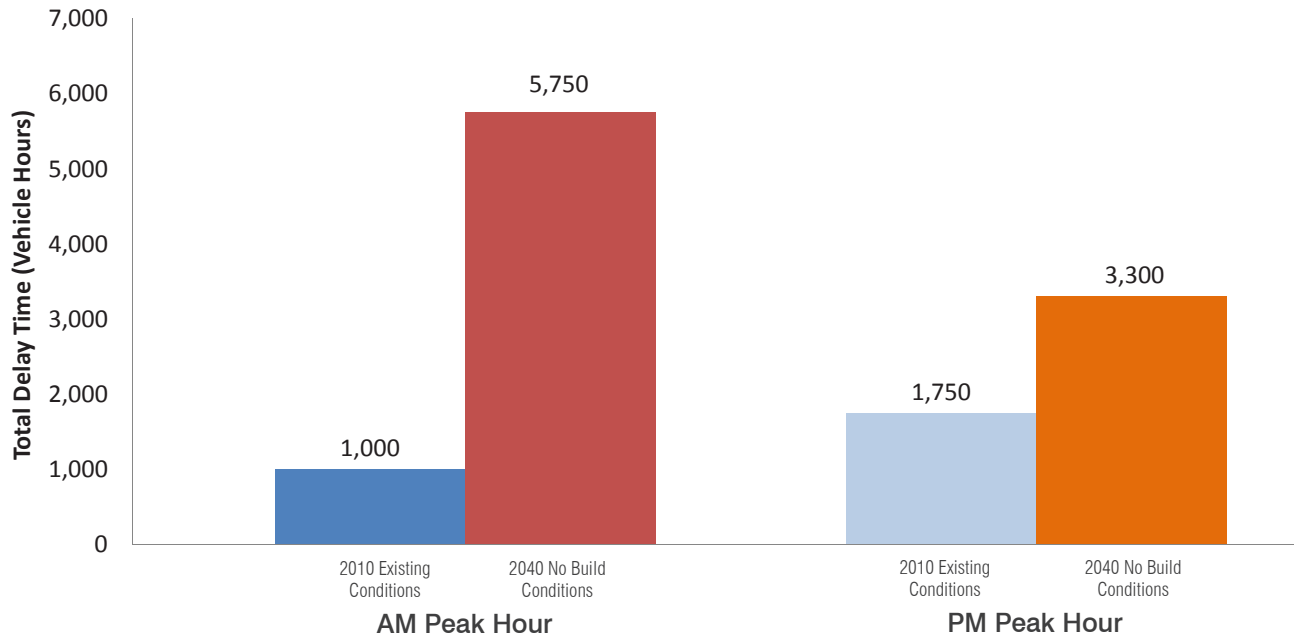
A 2040 No Build Scenario was developed to evaluate the level of congestion if no improvements are made to the I-277/I-77 Loop and its surrounding roadway network. This scenario maintained the same roadway geometry as the 2010 Existing Conditions Scenario. Due to the continued growth in the Study Area, the 2040 No Build Scenario had significantly more congestion throughout the Study Area. Chart 3-3 shows the increase in total delay time between years 2010 and 2040. During the AM peak hour, total delay time for the micro-simulation network would increase by approximately 5.8 times (from 1,000 vehicle hours to 5,750 vehicle hours). During the PM peak hour, total delay would increase by approximately 1.9 times (from 1,750 vehicle hours to 3,300 vehicle hours). This increase would add to the congestion existing along the Study Area roads currently.

*Table 3-16  
2010 Travel Speed Analysis Results*

Freeway Segments with Failure Conditions
I-77 NB and SB from Remount Road to Morehead Street
I-77 Loops and Ramps at I-277/John Belk Freeway
I-277 at Independence Boulevard Interchange (several ramps and mainline)
I-77 at I-277/Brookshire Interchange (primarily WB to NB movement)



Chart 3-3  
Total Delay Time for Micro-Simulation Network  
2010 Existing and 2040 No Build Conditions



### Conclusions

Based on the data and the analyses, the I-277/I-77 Loop has substantial safety and operational issues that occur throughout the Loop. The heavy traffic demand along I-77 creates oversaturated traffic flow conditions during both peak hours. Along I-277, heavy congestion occurs at the three system interchanges.

The facilities also have geometric and design issues, which include short acceleration/ deceleration lanes and insufficient weaving distances. When these geometric issues are combined with the heavy traffic demand, severe safety hazards exist at the service interchanges and along the cross-streets.

In addition, the analysis found that there are limited acceptable opportunities for pedestrian and bicyclist crossings along the I-277/I-77 Loop. Although the opportunities may occur relatively frequently, there are a number of prevalent issues that were identified, such as lack of maintenance and aesthetics, inadequate facilities for pedestrians and bicyclists resulting in conflicts with vehicular traffic, safety issues due to the conflicts and inadequate lighting, and a lack of community sense of scale.

These findings, which include the geometric and design deficiencies, congestion and safety issues, multimodal deficiencies and lack of community character and scale, combine to form a clear need for a comprehensive review and development of a Strategic Plan for the I-277/I-77 Loop.



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# Chapter 3

## Existing Conditions

### List of Figures – Chapter 3

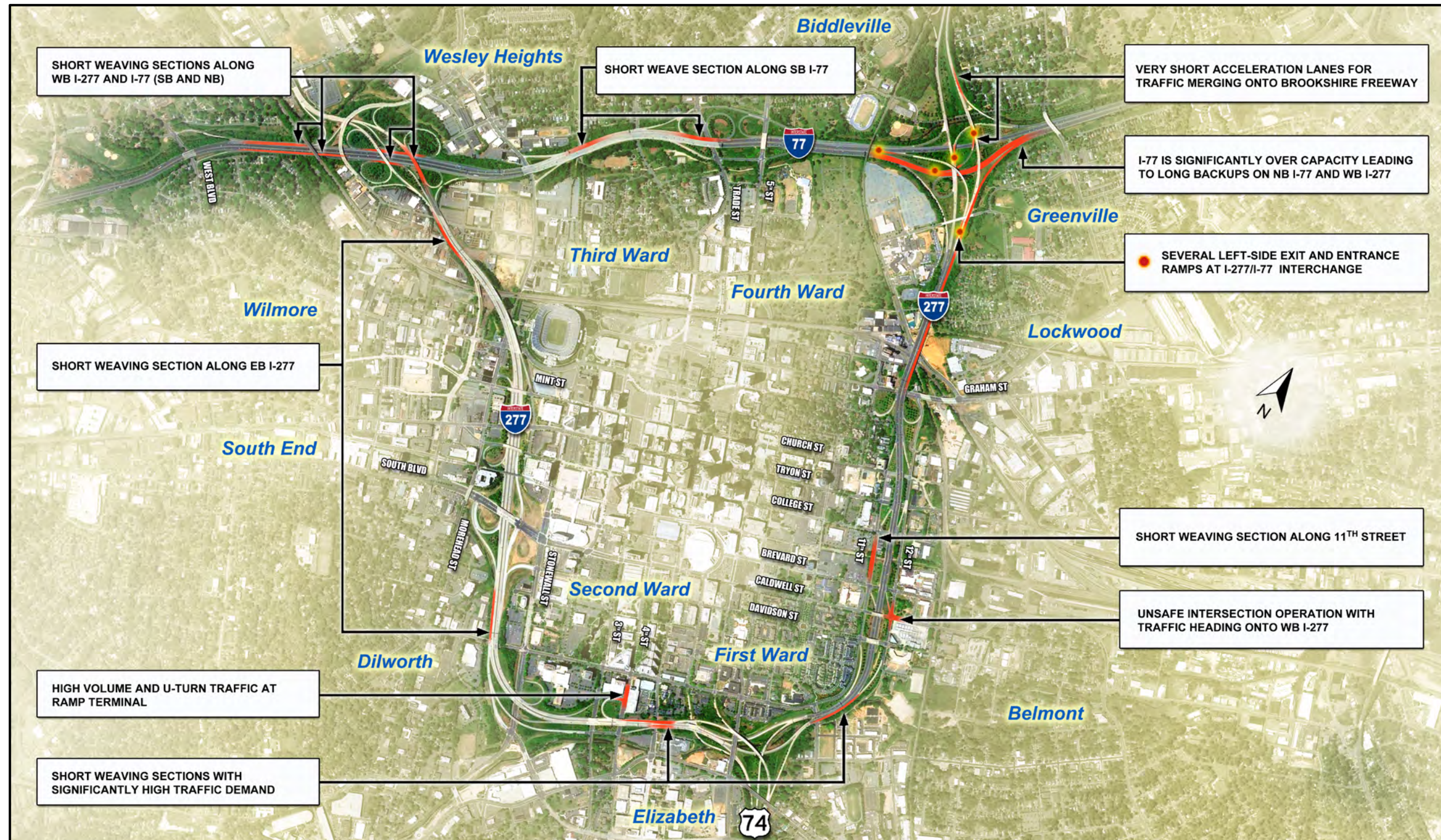
3-1	Existing Roadway Deficiencies
3-2	Structures in the Study Area
3-3	Structure Sufficiency Rating
3-4	Uptown Gateways
3-5	Environmental Constraints
3-6	Historic Crash Analysis
3-7	2010 Daily Traffic Volumes
3-8	2010 Capacity Analysis
3-9	2010 Travel Speed Analysis



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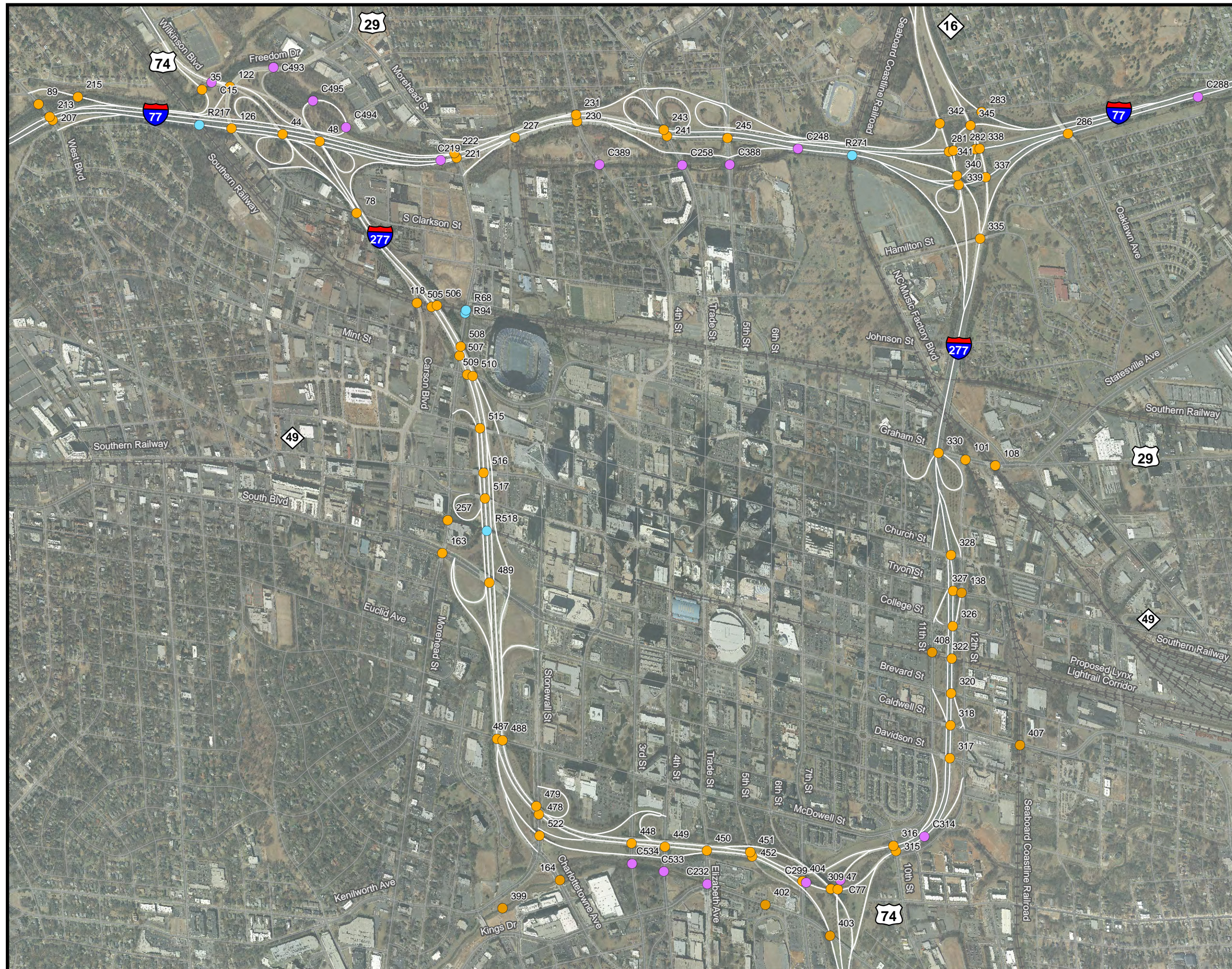
**Figure 3-1: Existing Roadway Deficiencies**



Not To Scale

I-277 / I-77 Loop Strategic Plan

**Figure 3-2: Structures in the Study Area**

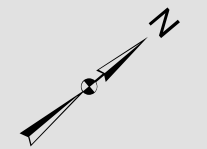


**Legend**

**Structure Type**

- Culvert
- Bridge
- Railroad
- XXX NCDOT Structure Reference ID

Source: NCDOT Bridge Data



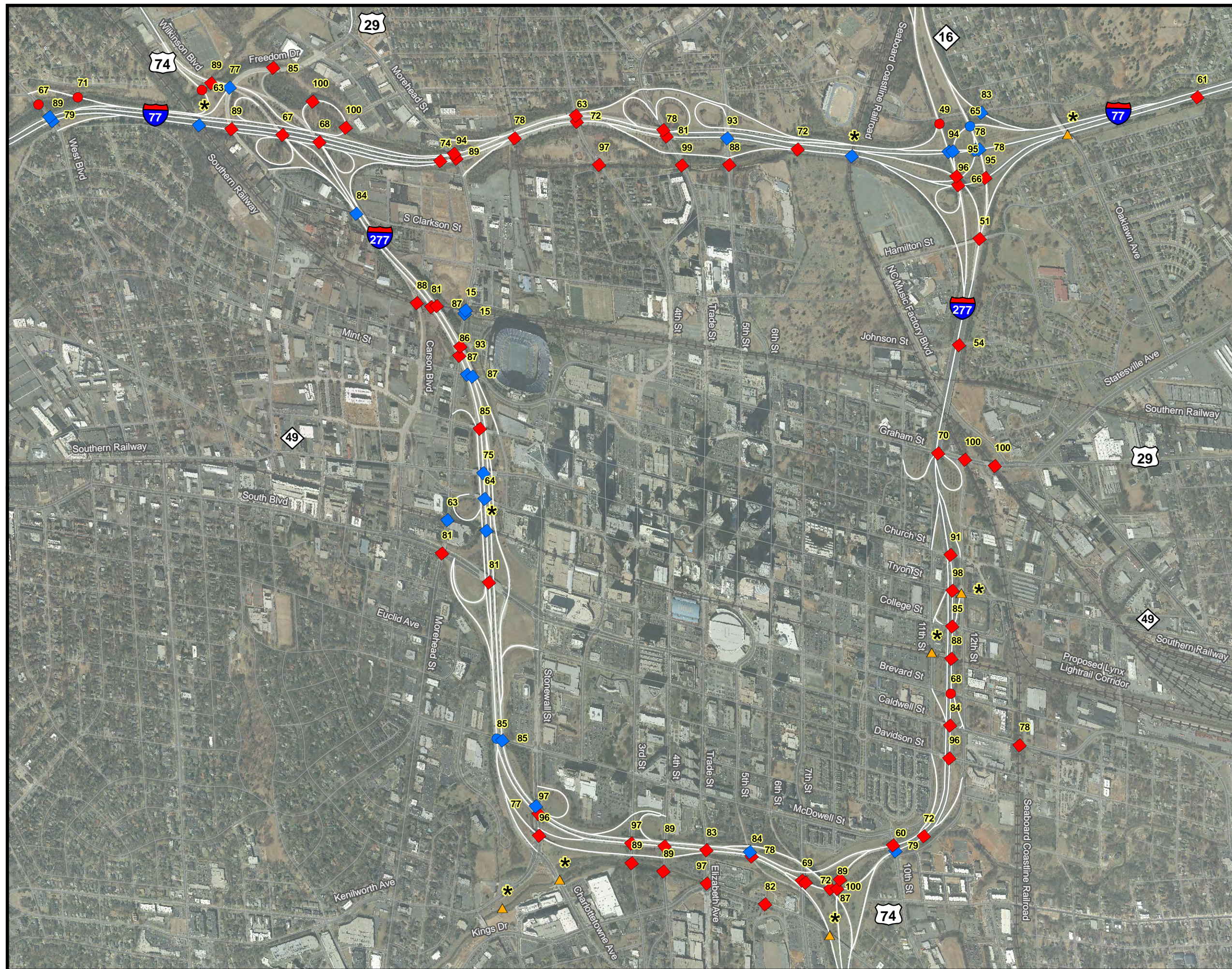
Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan



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**Figure 3-3: Structure Sufficiency Rating**

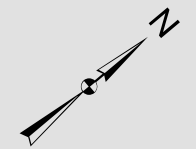


**Legend**

- ◆ Not Structurally Deficient  
Not Functionally Obsolete
- Structurally Deficient  
Not Functionally Obsolete
- ◆ Not Structurally Deficient  
Functionally Obsolete
- Structurally Deficient  
Functionally Obsolete
- ▲ Not Rated
- XX Sufficiency Rating
- \* Data Not Available

Source: NCDOT Bridge Data, (2012 Data)

Note: A bridge is structurally deficient when it has elements that need to be monitored and/or repaired to maintain its structural integrity. It does not mean that the bridge is unsafe. A bridge is functionally obsolete when its layout no longer meets current design standards for width shoulders, and rails.



Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan



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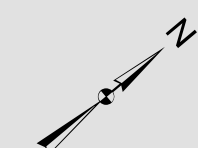
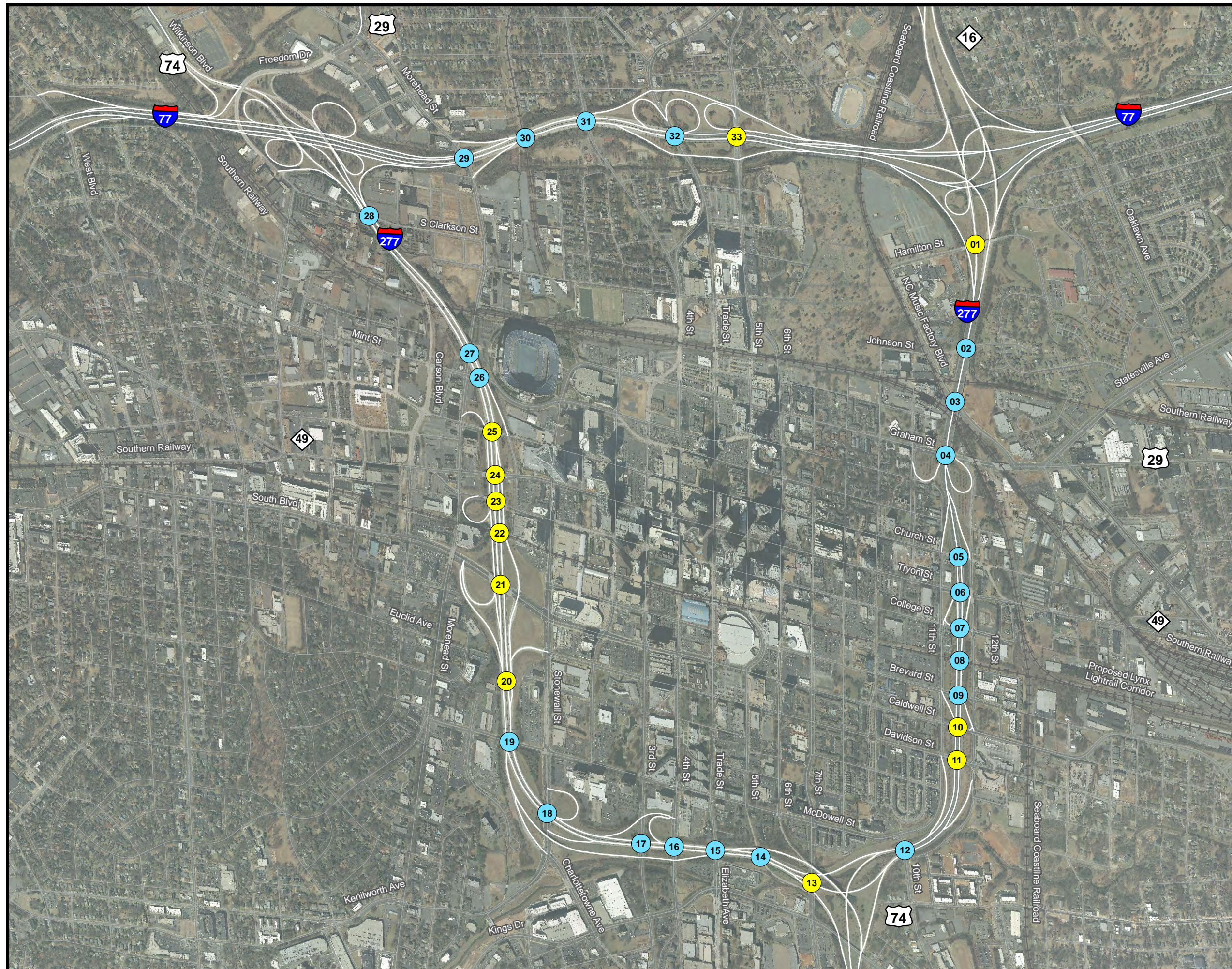
**Figure 3-4: Uptown Gateways**

**Legend**

- Overpass
- Underpass

Note: Over/Underpasses of railroads are not included in this figure.

Source: Charlotte Department of Transportation



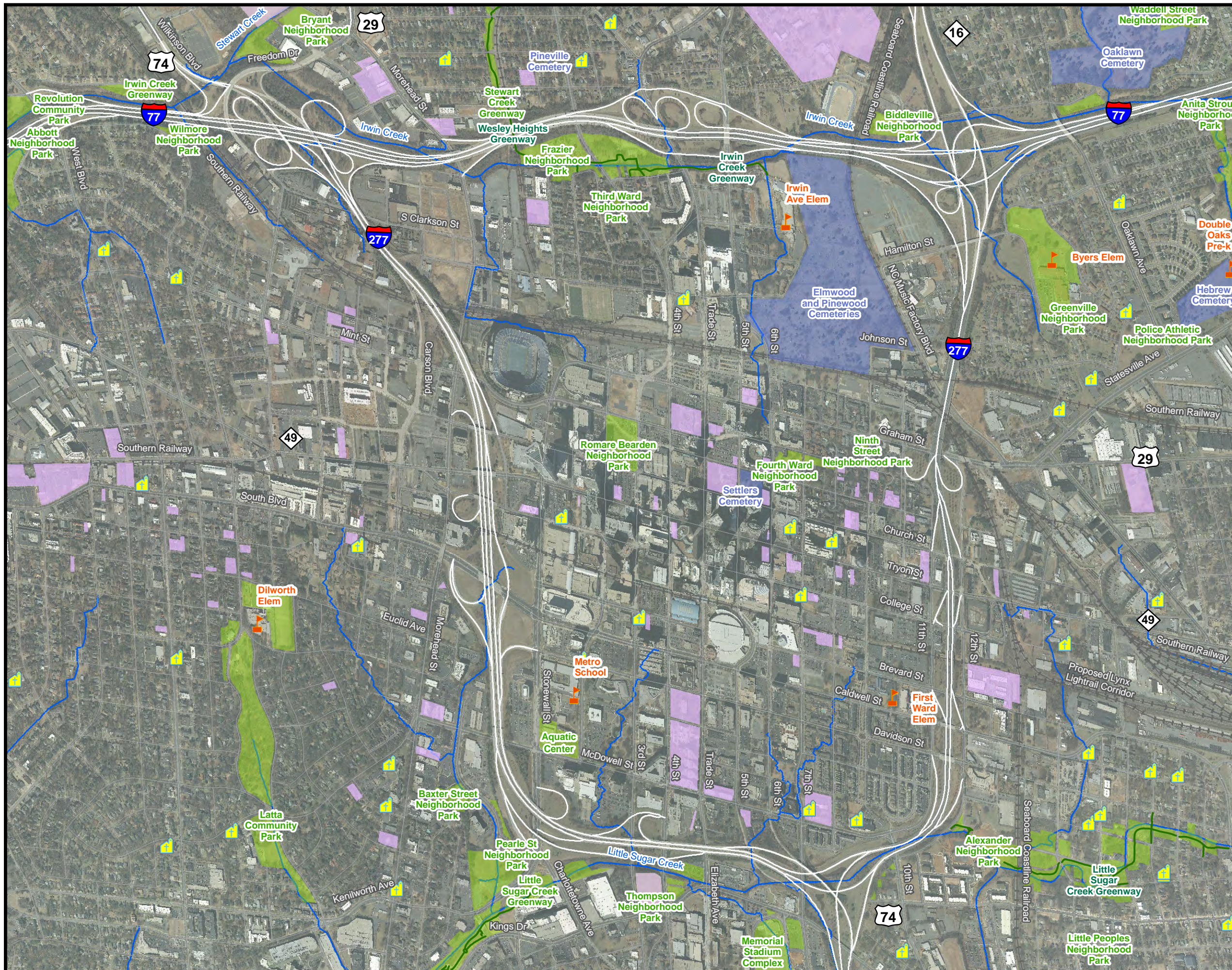
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I-277 / I-77 Loop Strategic Plan











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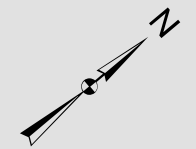
Figure 3-5: Environmental Constraints



**Legend**

-  School
-  Church
-  Greenway
-  Cemetery
-  Historical Property
-  Parks
-  Rail Roads
-  Streams

Source: Charlotte Department of Transportation GIS Data



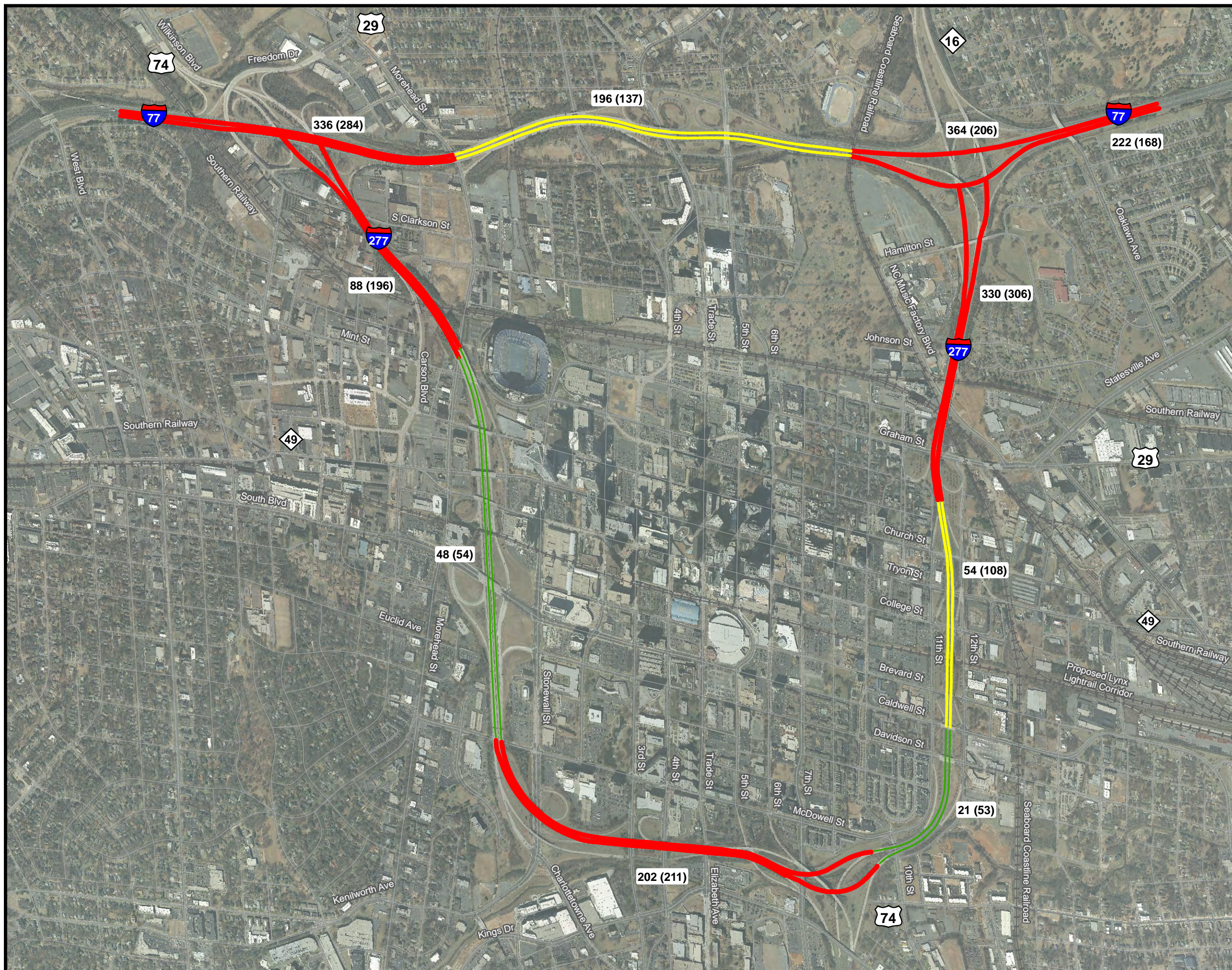
Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan



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**Figure 3-6: Historic Crash Analysis**



**Legend**

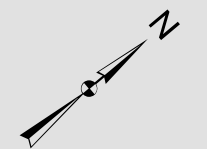
**Segment Crash Data**

- Below SAR
- 1 to 1.5 Times SAR
- > 1.5 Times SAR

XXX (XXX) Total number of crashes between Nov. 2008 and Oct. 2011 (Number of crashes per 100 million vehicle miles of travel = Crash Rate)

The Statewide Average Crash Rate (SAR) for Urban Freeways is 102 crashes per 100 Million Vehicle Miles of Travel from 2008 to 2011.

Source: North Carolina Department of Transportation



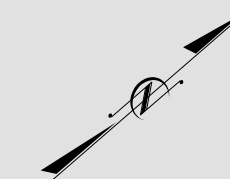
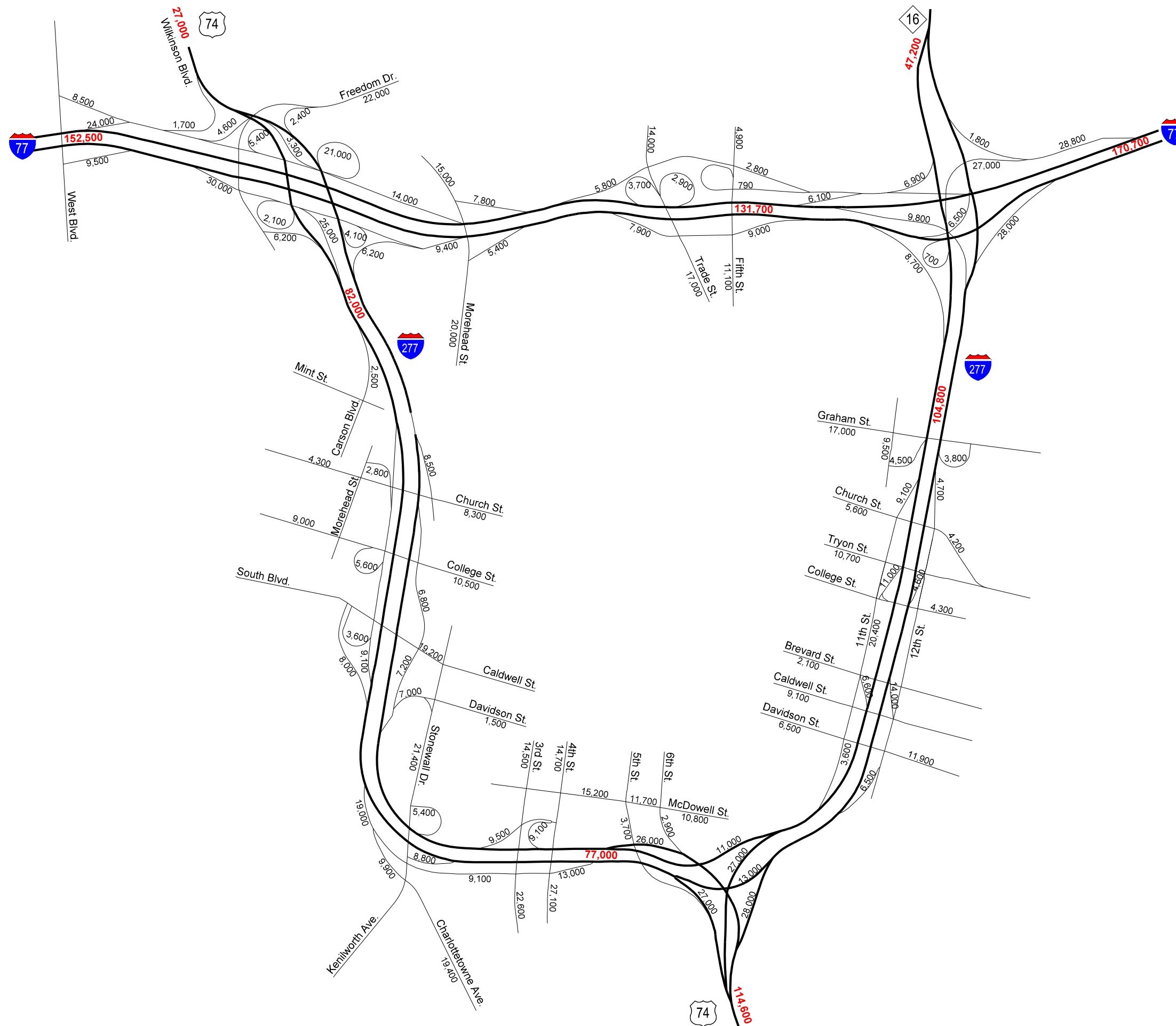
Scale: 1" = .25 mile

**Figure: 3-7  
2010 Daily  
Traffic Volumes**

**Legend**

XX 2010 Annual Average Daily  
Traffic Volumes (AADT)

Source: NCDOT and Charlotte  
Department of Transportation,  
Traffic Count Databases.



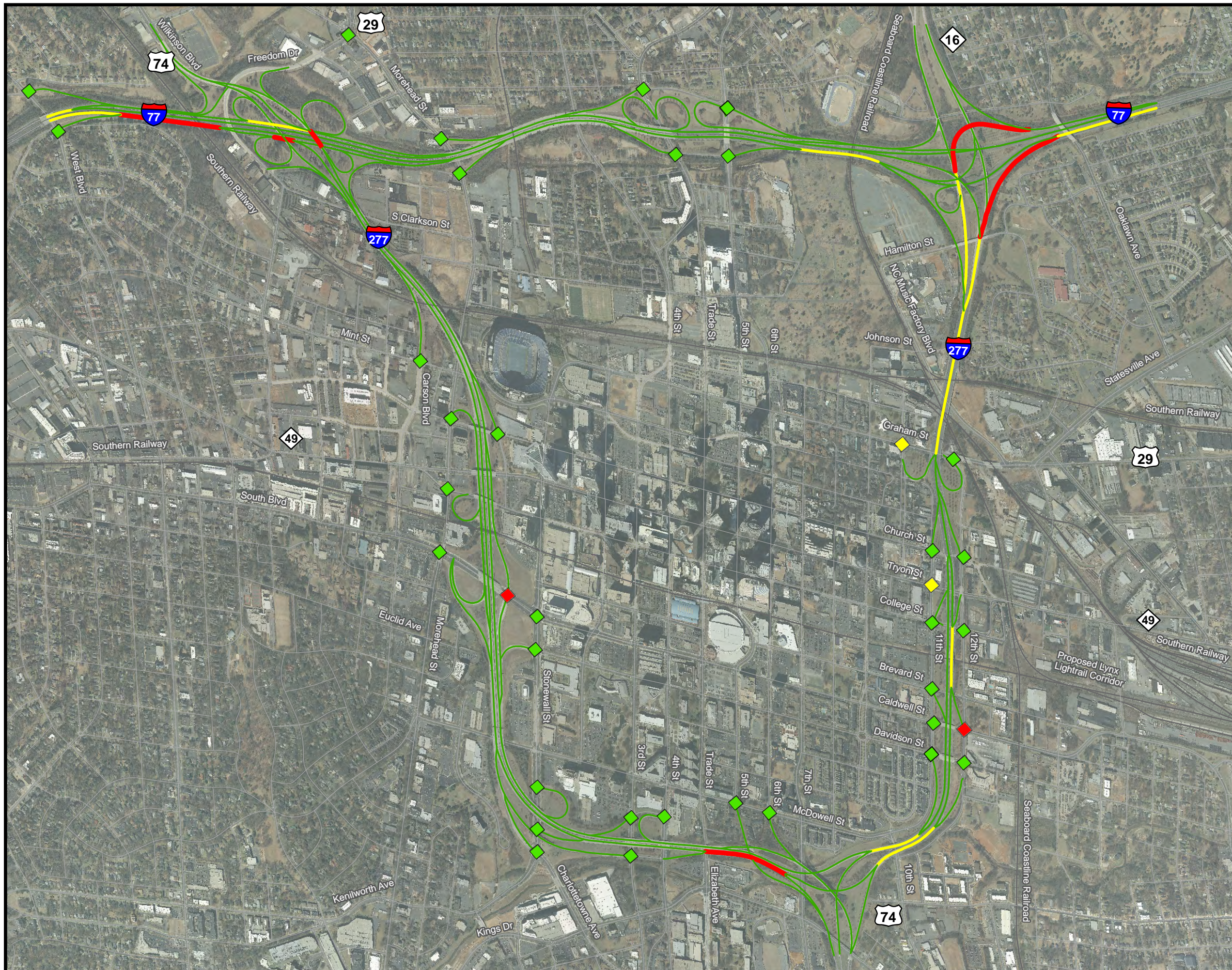
Not To Scale

I-277 / I-77 Loop Strategic Plan



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**Figure 3-8: 2010 Capacity Analysis**



**Legend**

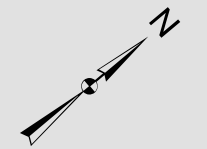
**Roadway Level of Service (LOS)**

- LOS D or Better (Below Roadway Capacity Limits)
- LOS E (At Roadway Capacity Limits)
- LOS F (Above Roadway Capacity Limits)

**Intersection Level of Service (LOS)**

- ◆ LOS D or Better (Below Intersection Capacity Limits)
- ◆ LOS E (At Intersection Capacity Limits)
- ◆ LOS F (Above Intersection Capacity Limits)

Source: North Carolina Department of Transportation



Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan



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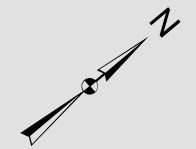
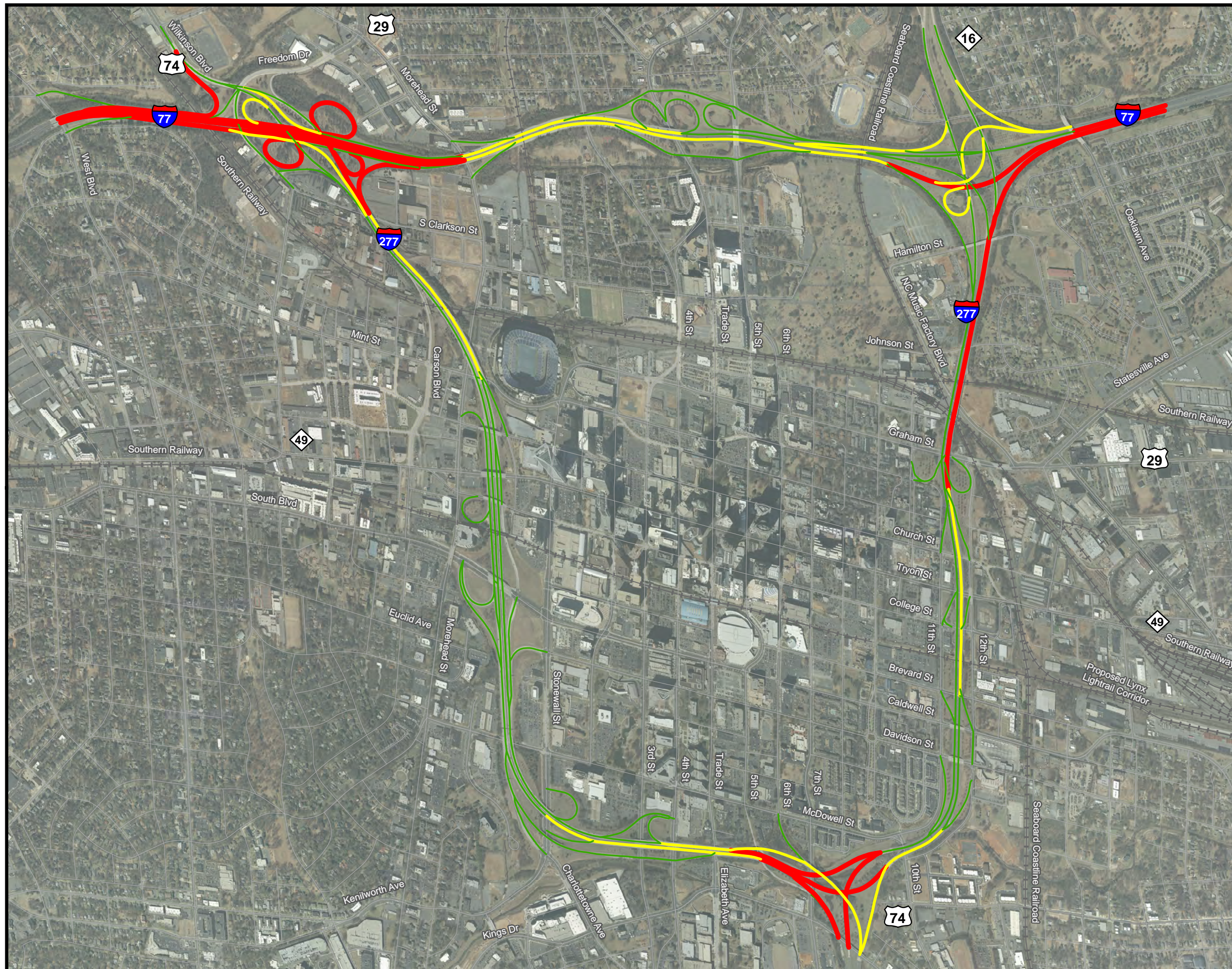
**Figure 3-9: 2010  
Travel Speed Analysis**

**Legend**

**Traffic Flow Conditions  
(Worst Case of AM/PM  
Peak Hour)**

- Good (Below Roadway Capacity Limits)
- Acceptable (At Roadway Capacity Limits)
- Failure (Above Roadway Capacity Limits)

Source: VISSIM Micro-Simulation



Scale: 1" = .25 mile

I-277 / I-77 Loop Strategic Plan

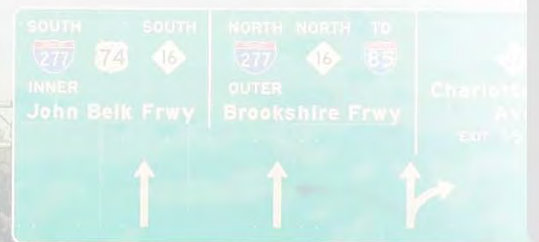


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# Chapter 4

## Potential Concepts and Ranking



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## Potential Concepts and Ranking

The development of the I-277/I-77 Loop Strategic Plan involves various steps which include:

- Determining the existing and future deficiencies along the I-277/I-77 Loop, as identified in the evaluation phases of the study.
- Providing potential concepts.
- Implementing recommendations to address deficiencies of the existing I-277/I-77 Loop.
- Providing a strategic approach for implementation.

The strategic approach for implementation begins with the inclusion of recommended potential concepts into MUMPO's upcoming 2040 LRTP for further study. The potential concepts outlined below focus on various alternatives along the I-277/I-77 Loop rather than specific project designs. Project design is a later phase in the process. The following section describes all potential concepts considered in this Study. As described in Chapter 2, these potential concepts were developed based on the TOT and public input.

Through coordination and collaboration with the TOT, each of the roadway ranking criteria was applied to the 21 potential concepts. The ranking criteria and scoring ranking methodology is described in detail in Chapter 2. Planning level cost estimates were developed based on potential concepts for right-of-way and construction costs. Detailed cost estimates for each potential concept are included in Appendix A. Note that as the potential concepts are nominated for inclusion into the MUMPO 2040 LRTP, point values may be adjusted by the MPO review committee. As previously discussed, point values range from a maximum of positive five to a minimum of negative five. A score of positive five indicates that a potential concept has a very highly positive impact on the region, while a score of negative five indicates that a potential concept has a very highly negative impact on the region.

The following section presents the major elements of each potential concept and describes how points were awarded to these potential concepts for each criterion. Each potential concept description includes a graphic depicting the proposed improvements (Graphics 4-1 through 4-13). Criteria ranking includes a table with the criteria ranking scores for the specific potential concept. The TOT discussed that some of the Potential Concepts would need to be analyzed and presented together as a group due to their proximity and/or interrelationship with each other.



In those situations, these concepts are presented as a group in this report. Figures 4-1 to 4-13 (included at the end of the chapter) also show an aerial of the existing configuration along with the proposed improvements of each potential concept.

### Potential Concept Specific Descriptions and Rankings

#### Potential Concept A: I-77/I-277 (John Belk Freeway) Interchange Reconstruction

This concept proposes rebuilding the interchange as a new two-level interchange connecting I-277, Wilkinson Boulevard, Freedom Drive, and I-77. The proposed concept would serve a dual purpose. The primary purpose of this concept is to provide direct access between I-277 and I-77 to the south, while maintaining as many of the existing connections as possible. The secondary purpose of this concept is to act as a service interchange to the adjacent streets. Traffic movements between Center City and I-77 (south or north), which are freeway to freeway movements at this interchange, would be accommodated by flyovers and free flow ramps or loops. Traffic movements between Wilkinson Boulevard and I-77 would be serviced by traffic signals. Potential Concept A is shown in Graphic 4-1 and Figure 4-1.



Graphic 4-1  
Potential Concept A



### Potential Concept A Scoring

This potential concept ranks very high in relieving congestion and improving traffic movements through the implementation of improved freeway-to-freeway connections. As mentioned in Chapter 3, this interchange has several short weaving and merge/diverge locations, and as a result, has one of the highest historic crash rates in the Study Area. The potential concept would eliminate these weaving and merge/diverge locations, so safety ranks high. Transit parking/drop off, the natural environment, and low income and minority communities would not be impacted. Accessibility to Center City ranks high with the potential improved efficiency of traffic movement. The potential concept involves a two-level interchange only, which would help to keep costs relatively low. In comparison with the potential benefits of this concept, the benefit-cost ratio ranks relatively high. Table 4-1 depicts the scoring by criteria for Potential Concept A.

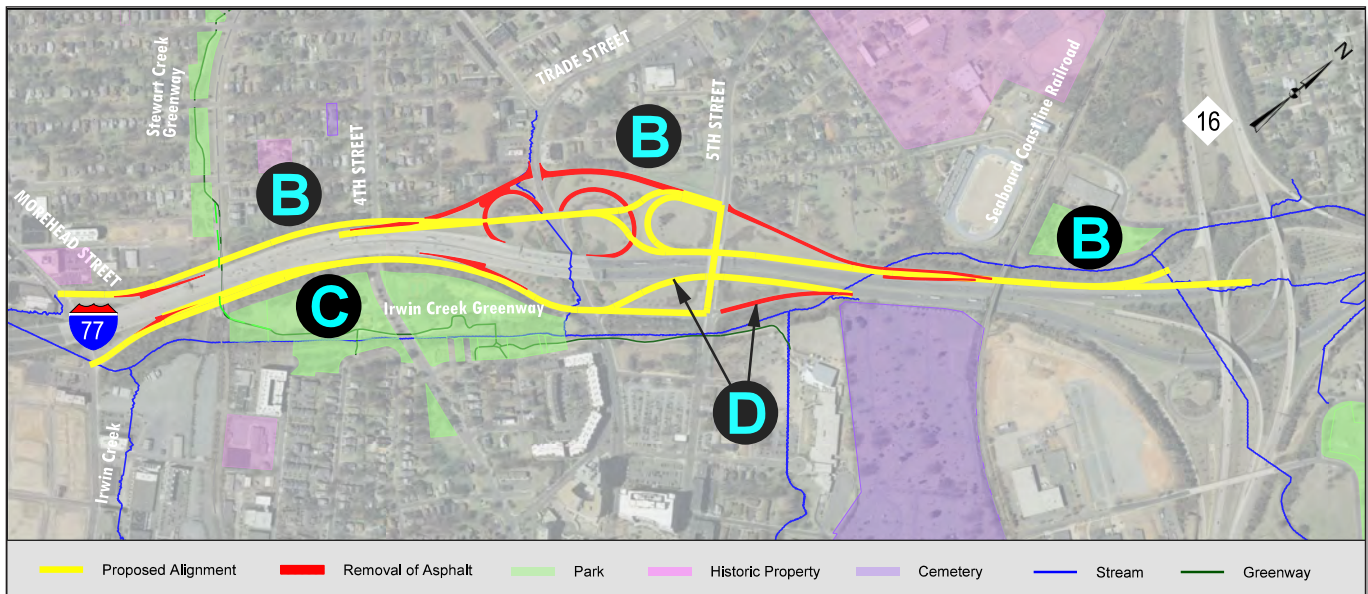
*Table 4-1  
Roadway Ranking Score - Concept A*

RANKING CRITERIA	CONCEPT SCORING
Congestion	4
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	1
Impacts on Natural Environment	0
Improves Accessibility to Center City	4
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>17</b>



**Potential Concepts B, C, and D: Reconstruction of I-77 between John Belk Freeway and Brookshire Freeway**

The proposed reconstruction of the I-77 interchange at Morehead Street, Trade Street, and 5th Street is included in Potential Concepts B, C and D. These concepts include the consolidation of the number of exit/entrance ramps along this section from nine to four. The specific elements for each of these three concepts are described on the following pages. Graphic 4-2 and Figure 4-2 depict Potential Concepts B, C and D.



Graphic 4-2  
Potential Concepts B, C and D





### Potential Concept B – Specific Elements

- C-D road added along I-77 southbound, between I-277 (Brookshire Freeway)/ NC 16 and Morehead Street.
- Provides access from I-77 southbound to 5th Street, Trade Street, and Morehead Street.
- Provides access from NC 16, 5th Street, and Trade Street to I-77 southbound.

### Potential Concept B Scoring

This potential concept ranks relatively high in relieving congestion and improving accessibility through the implementation of the C-D road. Safety also ranks relatively high with the reduction and separation of traffic movements. As the concept would reduce the footprint of the interchange, the ranking of support to local land use plans and quality of life is slightly positive. Transit parking/drop off, the natural environment, and low income and minority communities would not be impacted. Accessibility to Center City ranks relatively high due to the improved traffic conditions for traffic to/from Center City. The benefit-cost ratio for Potential Concept B is relatively high. The table below depicts the scoring by criteria for Potential Concept B.

*Table 4-2  
Roadway Ranking Score - Concept B*

RANKING CRITERIA	CONCEPT SCORE
Congestion	3
Safety	3
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	1
Impacts on Natural Environment	0
Improves Accessibility to Center City	3
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	3
<b>TOTAL POINTS</b>	<b>13</b>



**Potential Concept C – Specific Elements**

- C-D road added along I-77 northbound, between Morehead Street and 5th Street.
- Provides access to Trade Street and 5th Street from I-77 northbound.

**Potential Concept C Scoring**

With a similar configuration to Potential Concept B, this concept ranks relatively high in relieving congestion and improving accessibility through the implementation of the C-D road. Safety also ranks relatively high with the reduction and separation of traffic movements. The assessment of the concept on support of local land use plans and quality of life results in a slightly negative score due to potential impacts on nearby parks. Transit parking/drop off, the natural environment, and low income and minority communities would not be impacted. Accessibility to Center City ranks relatively high due to the improved traffic conditions. The benefit-cost ratio also ranks relatively high. The table below depicts the scoring by criteria for Potential Concept C.

*Table 4-3  
Roadway Ranking Score - Concept C*

RANKING CRITERIA	CONCEPT SCORE
Congestion	3
Safety	3
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	-1
Impacts on Natural Environment	0
Improves Accessibility to Center City	3
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	3
<b>TOTAL POINTS</b>	<b>11</b>



### Potential Concept D - Specific Elements

- Relocation of the I-77 northbound on-ramp from 5th Street to Trade Street.
- Increase the weaving distance between the Trade Street ramp and I-277 off-ramp at Brookshire Freeway.

### Potential Concept D Scoring

This potential concept ranks relatively high in relieving congestion and improving accessibility through the ramp relocation. Safety also ranks relatively high with the increased weaving distance between the ramps. The assessment of the concept on support of local land use plans and quality of life resulted in a slightly negative score due to potential impacts on nearby parks. Transit parking/drop off, the natural environment, and low income and minority communities would not be impacted. Accessibility to Center City ranks relatively high due to the improved traffic conditions. While the benefit-cost ratio is not as high as that in Potential Concepts B and C, the ratio for this concept ranks moderately high. The table below depicts the scoring by criteria for Potential Concept D.

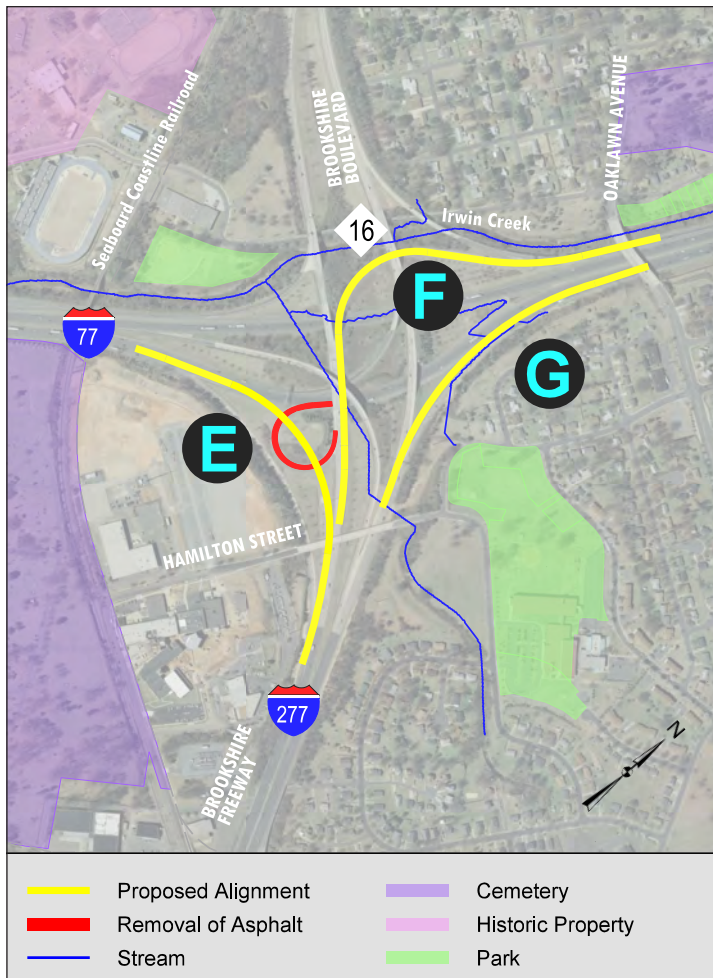
*Table 4-4  
Roadway Ranking Score - Concept D*

RANKING CRITERIA	CONCEPT SCORE
Congestion	3
Safety	3
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	-1
Impacts on Natural Environment	0
Improves Accessibility to Center City	3
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	2
<b>TOTAL POINTS</b>	<b>10</b>



**Potential Concepts E, F, and G: I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange Improvements**

Currently, NCDOT is performing a study, “I-77 North Managed Lanes”, to include managed lanes along I-77 from Brookshire Freeway north into Iredell County. For the purposes of this Study, managed lanes refer to high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes. Once built, these managed lanes would provide direct ramps connecting Brookshire Freeway (I-277) and I-77 to the north. However, the exact locations and design of these direct ramps and any other related improvements to this interchange are yet to be finalized. Due to the uncertainty of the Managed Lanes Study recommendations, this I-277/I-77 Loop Study has identified limited improvements to this interchange and these improvements are included in Potential Concepts E, F, and G. These concepts are shown in Graphic 4-3 and Figure 4-3 and the elements of each are described on the pages that follow. Once the NCDOT’s Managed Lanes Study is finalized, this interchange should be re-examined to identify any additional improvements needed.



Graphic 4-3  
Potential Concepts E, F and G



### Potential Concept E - Specific Elements

- Relocation of the single-lane off-ramp from I-77 northbound to I-277 (Brookshire Freeway) eastbound, increasing the distance from the 5th Street on-ramp and therefore increasing the weaving distance.
  - Traffic would merge onto I-277 eastbound rather than continue as a free-flow lane onto I-277.
- Removal of the NC 16 eastbound loop to I-77 northbound movement.

### Potential Concept E Scoring

This potential concept would result in a moderate improvement to congestion because the proposed ramp relocation provides additional weaving distance along I-77. The historic crash data indicates that the area in the vicinity of this interchange experienced a crash rate of over three times the statewide average. With this concept, safety ranks high due to the removal of one ramp movement and the increase in weaving distances. There would be no impacts to the support of local land use plans and quality of life, transit parking/drop off, natural environment, low income and minority communities, or accessibility to Center City. The benefit-cost ratio ranks relatively high. The table below depicts the scoring by criteria for Potential Concept E.

*Table 4-5  
Roadway Ranking Score - Concept E*

RANKING CRITERIA	CONCEPT SCORE
Congestion	2
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	0
Impacts on Natural Environment	0
Improves Accessibility to Center City	0
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	3
<b>TOTAL POINTS</b>	<b>9</b>



**Potential Concept F - Specific Elements**

- Widen existing I-77 southbound to I-277 eastbound ramp to two lanes.
- Maintain two lanes on I-277 eastbound by converting the free-flow movement from northbound I-77 to merging movements.

**Potential Concept F Scoring**

Currently, traffic demand along this single lane ramp results in significant backups. The proposed widening would improve traffic operations along this ramp as well as on I-77 southbound, so this potential concept ranks high in congestion relief. The improvement in the operations would also provide significant improvements in the safety conditions. There would be no impacts on the support of local land use plans and quality of life, transit parking/drop off, low income and minority communities, or the natural environment. The concept ranks relatively high in accessibility to the Center City since access to I-277 would be improved. The benefit-cost ratio also ranks high. The table below depicts the scoring by criteria for Potential Concept F.

*Table 4-6  
Roadway Ranking Score - Concept F*

RANKING CRITERIA	CONCEPT SCORE
Congestion	4
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	0
Impacts on Natural Environment	0
Improves Accessibility to Center City	3
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>15</b>



**Potential Concept G – Specific Elements**

- Improve the I-277 westbound to I-77 northbound ramp in two phases:
  - Phase 1 (Potential Concept G-1)
    - Reduce the number of through lanes along I-77 from four to three lanes.
    - Extend the I-277 westbound on-ramp lane as a continuous lane until the I-85 exit ramp.
  - Phase 2 (Potential Concept G-2)
    - Include Phase 1 improvements.
    - Widen the I-277 westbound to I-77 northbound on-ramp with an additional acceleration lane of approximately 1,500 feet.

**Potential Concept G Scoring**

The traffic demand of the current configuration of this single lane ramp results in significant backups along I-77 northbound and I-277 westbound. This potential concept would improve traffic operations on the ramp, which in turn, would result in improved traffic flow on I-77. The improved operational benefits would also result in improved safety conditions. Therefore, this concept ranks high in both congestion relief and safety. There would be no impacts on local land use plans and quality of life, transit parking/drop off, low income and minority communities, or the natural environment. The concept ranks high in accessibility to Center City with the reduction in congestion and additional capacity on this primary connector from Center City. The benefit-cost ratio also ranks high. Phase 1 is a short-term improvement that requires no construction and results in lower implementation costs. Phase 2 requires moderate construction that will provide long term benefits. The table on the next page depicts the scoring by criteria for potential Concept G.



Table 4-7  
Roadway Ranking Score - Concept G

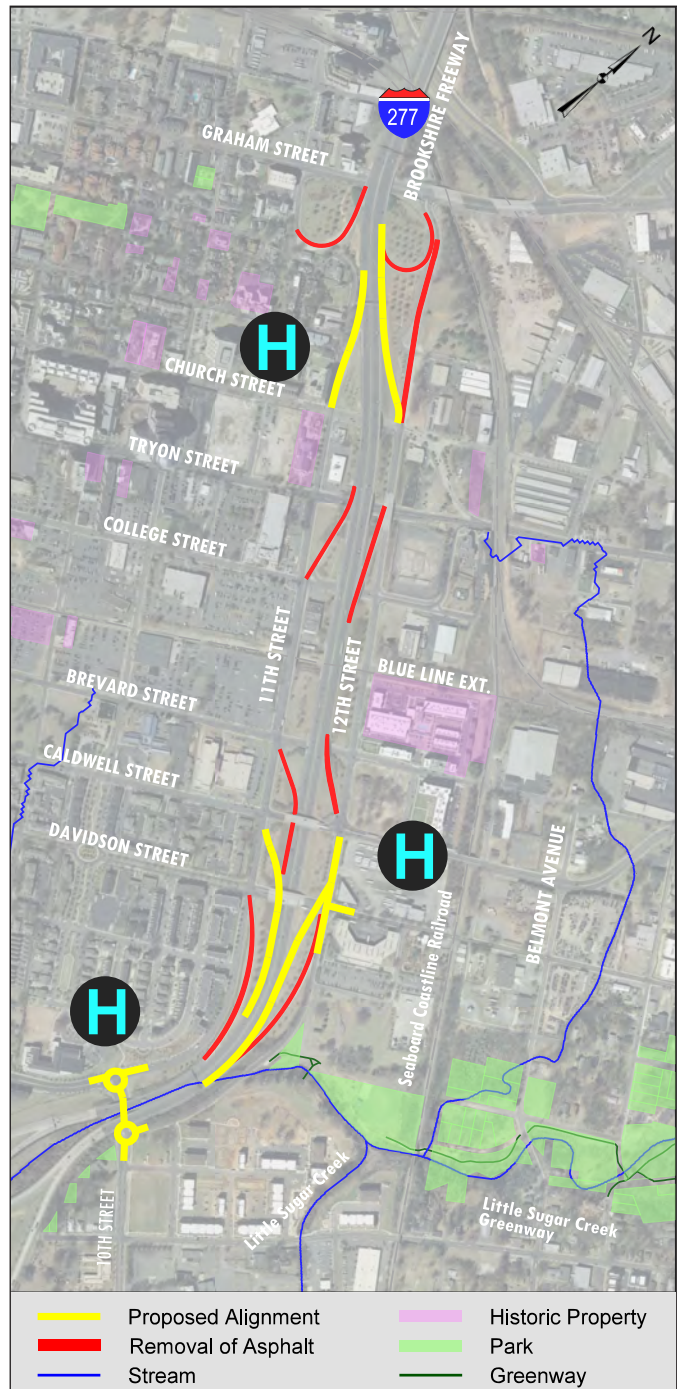
RANKING CRITERIA	CONCEPT SCORE
Congestion	4
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	0
Impacts on Natural Environment	0
Improves Accessibility to Center City	4
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>16</b>





**Potential Concept H: I-277 (Brookshire Freeway) between I-77 and US 74 (Independence Boulevard)**

Potential Concept H proposes to improve Brookshire Freeway by reducing the number of exit/entrance ramps from ten to four. Ramps extending to Caldwell Street would serve the traffic to/from I-277 to the east, and ramps to Church Street would serve the traffic to/from I-277 to the west. Access to/from Brookshire Freeway would be limited to Caldwell Street and Church Street with new ramps. All other exit/entrance ramps to/from Davidson Street, Brevard Street, and College Street would be eliminated. Existing 11th Street and 12th Street would function as one-way service roads providing access for traffic to/from the surface streets for each direction of I-277. This concept also would include roundabouts at the intersections of 10th Street/11th Street and 10th Street/12th Street. This potential concept is shown in Graphic 4-4 and Figure 4-4.



Graphic 4-4  
Potential Concept H

### Potential Concept H Scoring

Currently, this segment experiences significant congestion, which led to an historic crash rate higher than the statewide average crash rate. However, a significant portion of this congestion is caused by the poor traffic operations at the existing I-77/I-277 (Brookshire Freeway) interchange. With the consolidation and reconfiguration of the ramps, traffic operations and safety conditions would improve along Brookshire Freeway. Therefore, this potential concept ranks relatively high in congestion relief and safety. The support of local land use plans and quality of life ranks moderately high, as does the accessibility to Center City. With the consolidation of the ramps to only two streets, other surface streets in the area are anticipated to become more bicycle and pedestrian friendly and increase the multimodal connectivity between the communities on either side of I-277. Impacts to transit parking/drop off, the natural environment, and low income and minority communities would be minimal. The benefit-cost ratio ranks relatively high. The table below depicts the scoring by criteria for Potential Concept H.

*Table 4-8  
Roadway Ranking Score - Concept H*

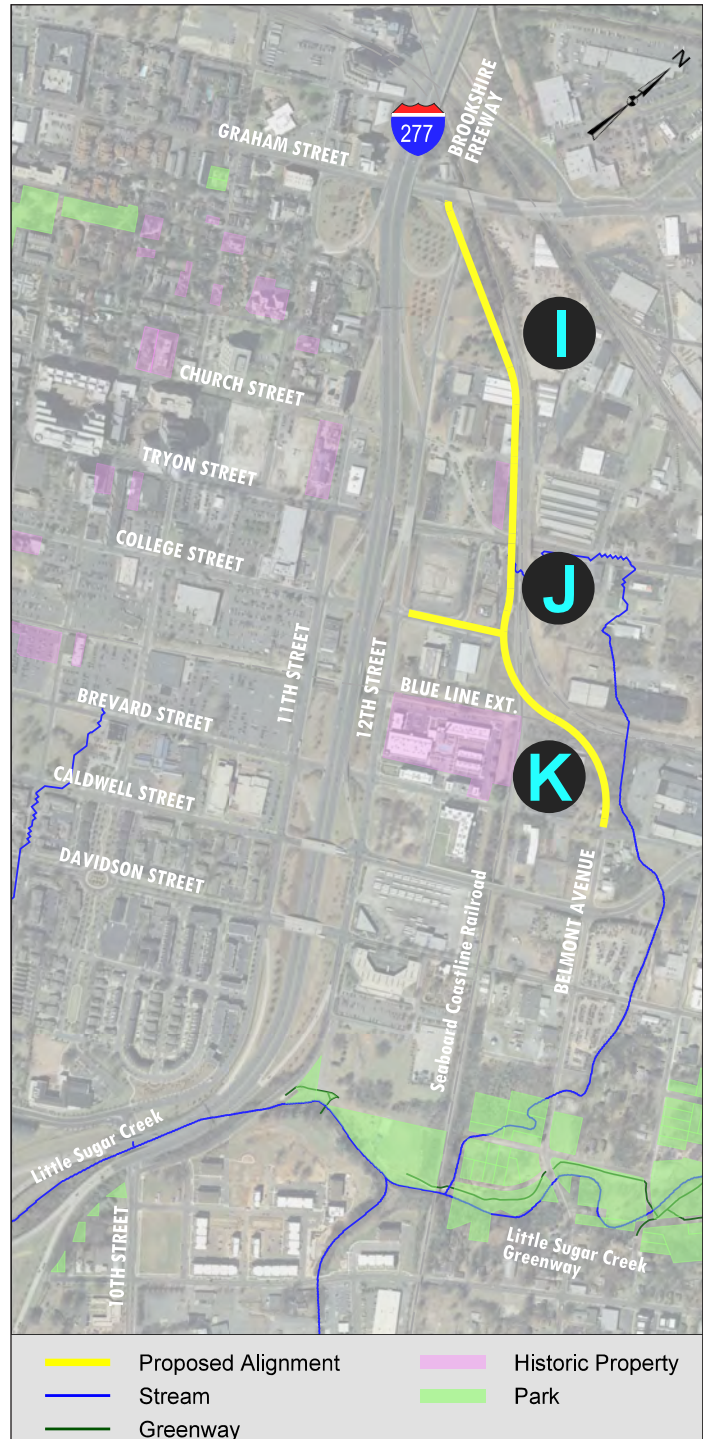
RANKING CRITERIA	CONCEPT SCORE
Congestion	3
Safety	3
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	2
Impacts on Natural Environment	0
Improves Accessibility to Center City	0
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	3
<b>TOTAL POINTS</b>	<b>11</b>



**Potential Concept I, J, and K: New Connector between Graham Street and Belmont Avenue**

Potential concepts I, J, and K together propose a new roadway connecting Graham Street and Belmont Avenue. The primary purpose of these concepts is to provide an alternate route between I-277 and Graham Street, while improving the connectivity within the adjacent neighborhoods through an extension to Belmont Avenue.

Between Graham Street and College Street, this new roadway would run parallel to the CSX Railroad. East of College Street, this roadway would cross the proposed LYNX Blue Line Extension, the CSX Railroad, and the Norfolk-Southern Railroad. These concepts are depicted in Graphic 4-5 and Figure 4-5 and the individual elements of each concept are described on the pages that follow.



Graphic 4-5  
Potential Concepts I, J and K



### Potential Concept I - Specific Elements

- New connector roadway between Graham Street and Church Street.

### Potential Concept I Scoring

This potential concept ranks moderately high in congestion relief with the improved connection between I-277 and Graham Street/NC Music Factory Boulevard. In addition, there would be slightly positive impacts on the safety conditions, due to the improved traffic flow conditions. There would be no impact on transit parking/drop off or the natural environment. With the new connection, the concept would be supportive of local land use plans, quality of life and improve the accessibility to Center City. There would be no impacts on low income and minority communities. With a relatively low construction cost, the benefit-cost ratio is relatively high. The table below depicts the scoring by criteria for Potential Concept I.

*Table 4-9  
Roadway Ranking Score - Concept I*

RANKING CRITERIA	CONCEPT SCORE
Congestion	2
Safety	1
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	2
Impacts on Natural Environment	0
Improves Accessibility to Center City	2
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	3
<b>TOTAL POINTS</b>	<b>10</b>



### Potential Concept J - Specific Elements

- New connector roadway between Church Street and College Street.
- Access to Brookshire Freeway with longer acceleration lane and safer merge.

### Potential Concept J Scoring

This potential concept would have no impacts on congestion or safety. There would also be no impacts on transit parking/drop off or the natural environment. With the improved connectivity, the concept supports land use planning and quality of life and the accessibility to Center City rank moderately high. In addition, the improved connectivity would have a minimal positive impact on low income and minority communities. The construction cost is relatively high for this concept, resulting in a low benefit-cost ratio. The table below depicts the scoring by criteria for Potential Concept J.

*Table 4-10  
Roadway Ranking Score - Concept J*

RANKING CRITERIA	CONCEPT SCORE
Congestion	0
Safety	0
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	2
Impacts on Natural Environment	0
Improves Accessibility to Center City	2
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	1
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>6</b>



**Potential Concept K - Specific Elements**

- New connector roadway between College Street and Brevard Street.

**Potential Concept K Scoring**

This potential concept, similar to Potential Concept J, would have no impacts on congestion, safety, transit parking/drop off, or the natural environment. The concept supports the existing land use plans and quality of life, and the additional connectivity would positively affect the accessibility to Center City. The impact on low income and minority communities would be moderately positive. With major structures over the railroad, the construction cost would be relatively high. The minimal positive impacts and high cost, results in a low benefit-cost ratio. The table below depicts the scoring by criteria for Potential Concept K.

*Table 4-11  
Roadway Ranking Score - Concept K*

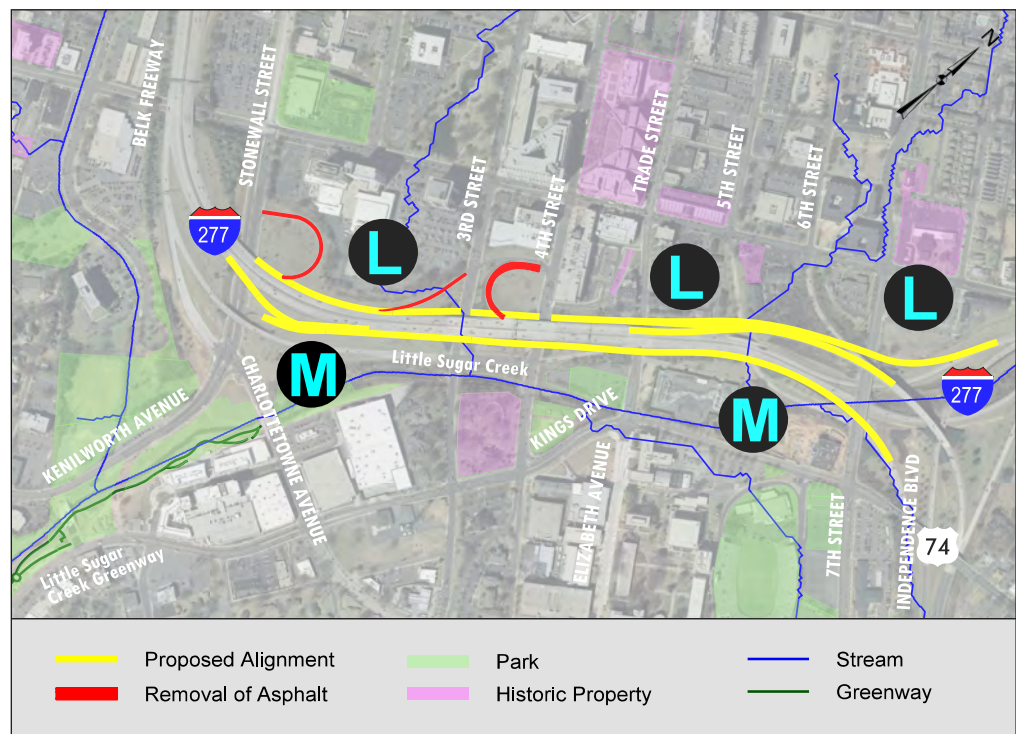
RANKING CRITERIA	CONCEPT SCORE
Congestion	0
Safety	0
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	2
Impacts on Natural Environment	0
Improves Accessibility to Center City	2
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	2
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>7</b>



**Potential Concepts L, M, ML-1 and ML-2: I-277/US 74 (Independence Boulevard) Interchange Improvements**

Potential Concepts L, M, ML-1, and ML-2 propose improving John Belk Freeway between Kenilworth Avenue and Independence Boulevard, including its interchanges with 3rd Street, 4th Street, and Independence Boulevard. These potential concepts are shown in Graphics 4-6 and 4-7 and Figures 4-6 and 4-7 and the specific elements for each concept are described below.

Potential Concepts L and M would occur together if no managed lanes are recommended. Potential Concepts ML-1 and ML-2 are similar to Potential Concepts L and M, with additional changes incorporated to accommodate future managed lanes between I-277 and Independence Boulevard. Potential Concept ML-1 would include the improvements to L and M with the ability to utilize managed lanes in the future. Concept ML-2 is the implementation of the managed lanes after the improvements of Concept ML-1 are in place. Currently, CDOT is working with NCDOT to perform a separate feasibility study to incorporate managed lanes along Independence Boulevard. Once the feasibility study is complete, Potential Concepts ML-1 and ML-2 will be further revised.



Graphic 4-6  
Potential Concepts L and M



### Potential Concept L – Specific Elements

- Rebuild on- and off-ramps along I-277 westbound at Independence Boulevard, and the 3rd Street/4th Street interchanges.
- Reconfigure the I-277 westbound to 3rd Street/4th Street ramp to minimize weaving maneuvers.
- Reconfigure the loop at 4th Street and diagonal ramp at 3rd Street, compressing the interchange footprint.
- Eliminate the existing loop at Stonewall Street to I-277 westbound to extend the acceleration lane for 3rd Street on-ramp.
- Divert traffic using the Stonewall Street ramp to other interchanges in the area.
- Ensure consideration of the City's Uptown Cycle Track Study which includes options for multi-use pathways within or adjacent to the NCDOT right of way between 3rd and 4th Street. This proposed cycle track is intended to connect Little Sugar Creek Greenway to Irwin Creek Greenway through Uptown.

### Potential Concept L Scoring

Currently, there is major congestion at the I-277/US 74 (Independence Boulevard) interchange resulting from significant grade differences and associated sight distance issues, short weaving distances, and short acceleration/deceleration-lanes. Potential Concept L ranks high in congestion improvements. The historic three year average crash rate at this interchange is over two times higher than the statewide average. Safety conditions would be improved with the minimization of weaving maneuvers, the improvement in ramp acceleration lanes, and the diversion of traffic to other interchanges. With the reduction in the interchange footprint, the support to local land use plans and quality of life ranking is slightly positive. Accessibility to Center City ranks very high with the improved connections on Independence Boulevard, 6th Street, 3rd Street, and 4th Street. There would be no impacts to the natural environment, transit parking/drop off, or low income and minority communities. With the improvements in congestion, safety, and accessibility, and a moderate project cost, the benefit-cost ratio is high. The table below depicts the scoring by criteria for Potential Concept L.





# Chapter 4

## Potential Concepts and Ranking

Table 4-12  
Roadway Ranking Score - Concept L

RANKING CRITERIA	CONCEPT SCORE
Congestion	4
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	1
Impacts on Natural Environment	0
Improves Accessibility to Center City	4
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>17</b>



**Potential Concept M - Specific Elements**

- Relocate I-277 eastbound to Independence Boulevard eastbound ramp by braiding it over the I-277 on-ramps at Kenilworth Avenue and 4th Street.
- Rework the interchange so that John Belk Freeway traffic to eastbound Independence Boulevard exits before the Kenilworth Avenue on-ramp.

**Potential Concept M Scoring**

Similar to Potential Concept L, this potential concept ranks high in congestion and safety with the reconfiguration of the ramp movements and the increased acceleration and deceleration lengths. The operational improvements would result in improved safety conditions. The support to local land use plans and quality of life ranking is slightly negative due to the potential impacts to the Little Sugar Creek Greenway. Accessibility to Center City ranks very high with the improved connections and the congestion mitigation. There would be no impacts on the natural environment, transit parking/drop off, or low income and minority communities. With the improvements in congestion, safety, and accessibility, and a moderate project cost, the benefit-cost ratio is high. The table below depicts the scoring by criteria for Potential Concept M.

*Table 4-13  
Roadway Ranking Score - Concept M*

RANKING CRITERIA	CONCEPT SCORE
Congestion	4
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	-1
Impacts on Natural Environment	0
Improves Accessibility to Center City	4
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>15</b>

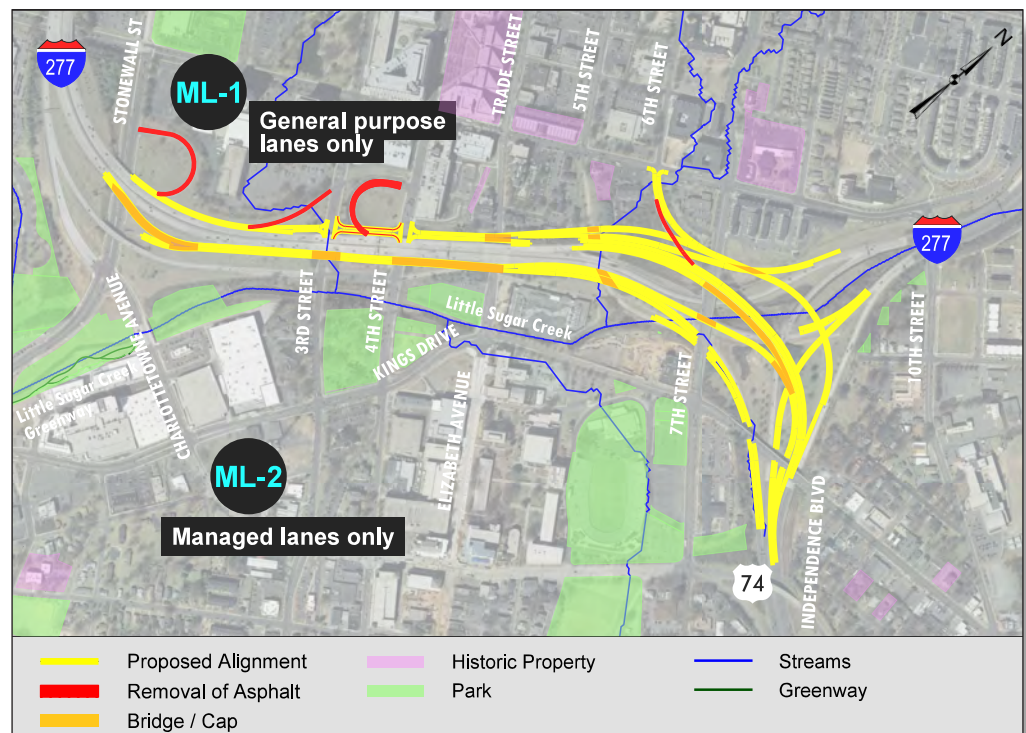


### Potential Concept ML-1 Specific Elements

- Include all L and M improvements.
- Incorporate additional general purpose lanes, with the option to become managed lanes (HOV/HOT) in the future, at I-277 and Independence Boulevard.

### Potential Concept ML-1 Scoring

Similar to Potential Concept L and M, this concept ranks high in congestion and safety with the reconfiguration of the ramp movements, which addresses the deficient sight distances and weaving issues, and increases the acceleration and deceleration lengths. The improved operational conditions would result in safety enhancements. The support to local land use plans and quality of life ranking is slightly negative with potential impacts to the Little Sugar Creek Greenway. Accessibility to Center City ranks very high with the improved connections and the congestion mitigation. There would be no impacts on the natural environment, transit parking/drop off, or low income and minority communities. With the improvements in congestion, safety, and accessibility, and a moderate project cost, the benefit-cost ratio is high. Table 4-14 depicts the scoring by criteria for Potential Concept ML-1.



Graphic 4-7  
Potential Concepts ML-1 and ML-2



Table 4-14  
Roadway Ranking Score - Concept ML-1

RANKING CRITERIA	CONCEPT SCORE
Congestion	4
Safety	4
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	-1
Impacts on Natural Environment	0
Improves Accessibility to Center City	4
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>15</b>



### Potential Concept ML-2 – Specific Elements

- Include all L and M improvements.
- Incorporate additional managed lanes (HOV/HOT) at I-277 and Independence Boulevard, utilizing the general purpose lanes provided in Potential Concept ML-1.

### Potential Concept ML-2 Scoring

Similar to Potential Concept ML-1, this potential concept ranks high in addressing congestion, however only moderately high in safety. With direct connections via managed lanes from Independence Boulevard to I-277, vehicular traffic in these lanes would realize significant benefit. While the three year historic crash data at this interchange is significantly high, the managed lanes would provide only moderate safety improvements to the overall interchange. The support to local land use plans and quality of life would be negligible; accessibility to Center City ranks very high with the improved connections on Independence Boulevard, 6th Street, 3rd Street and 4th Street. There would be no impacts on the natural environment, transit parking/drop off, or low income and minority communities. The proposed direct connections would incur high construction costs. The benefit-cost ratio is moderately high for this concept. The table below depicts the scoring by criteria for Potential Concept ML-2.

*Table 4-15  
Roadway Ranking Score - Concept ML-2*

RANKING CRITERIA	CONCEPT SCORE
Congestion	4
Safety	2
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	-1
Impacts on Natural Environment	0
Improves Accessibility to Center City	4
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	4
<b>TOTAL POINTS</b>	<b>13</b>

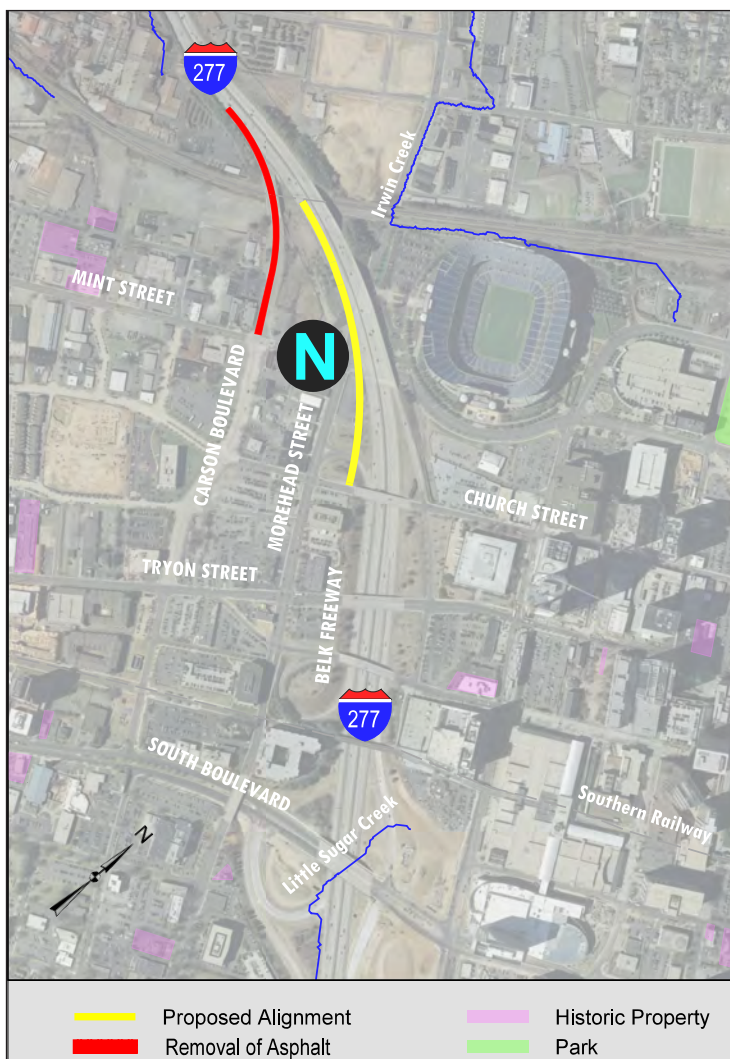


**Potential Concept N: Relocation of I-277/Carson Boulevard Ramp**

Potential Concept N proposes the relocation of the I-277 eastbound (John Belk Freeway) off-ramp from Carson Boulevard to Church Street. This would increase the weaving distance along John Belk Freeway between the I-77 ramps and this off-ramp. Potential Concept N is shown in Graphic 4-8 and Figure 4-8.

**Potential Concept N Scoring**

Potential Concept N would moderately improve congestion and have a slightly positive impact on safety. With the proposed improvements at the I-77/I-277 (John Belk Freeway) interchange, traffic operations in the vicinity of the Carson Boulevard ramp would improve irrespective of the ramp relocation; however, with the relocation of the ramp, traffic operations along I-277 (John Belk Freeway) would also improve slightly. There would be no impacts on transit parking/drop off, natural environment, accessibility to Center City, or low income and minority



Graphic 4-8  
Potential Concept N



communities. In addition, there would be no impacts to supporting the local land use plans and quality of life. With these minimal improvements, the benefit-cost ratio is low. The table below depicts the scoring by criteria for Potential Concept N.

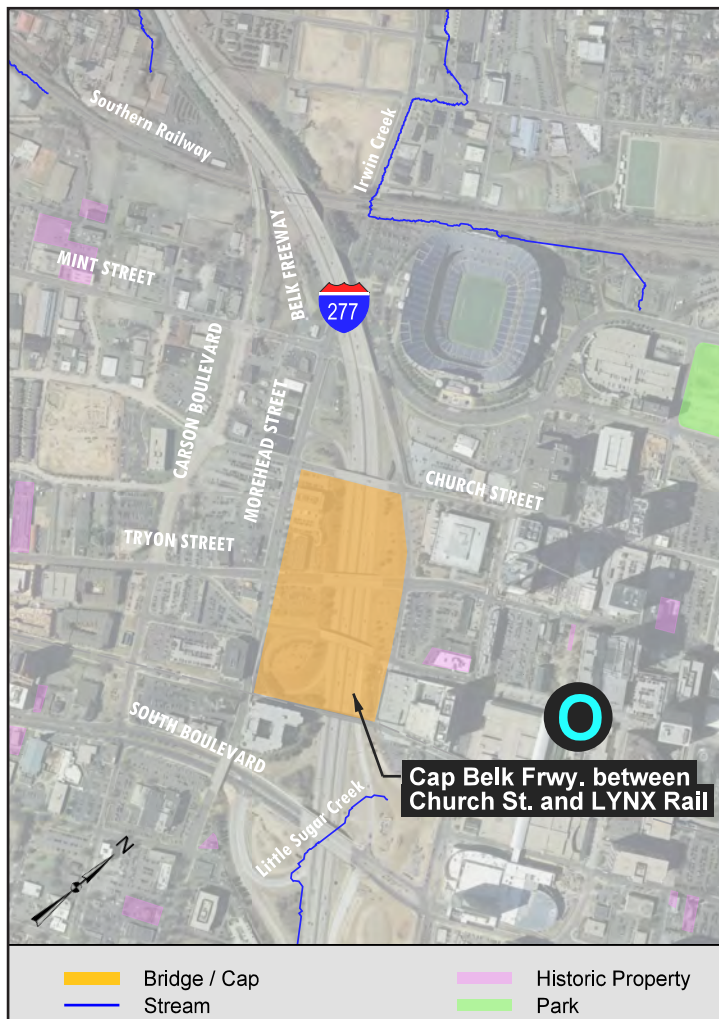
*Table 4-16  
Roadway Ranking Score - Concept N*

RANKING CRITERIA	CONCEPT SCORE
Congestion	2
Safety	1
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	0
Impacts on Natural Environment	0
Improves Accessibility to Center City	0
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>4</b>



**Potential Concept O: John Belk Freeway Cap Park**

Concept O proposes the construction of a new cap park over John Belk Freeway between Church Street and the LYNX Blue Line. This cap park, recommended in both the 2010 Charlotte Center City Vision Plan and the 2020 Charlotte Center City Vision Plan, would incorporate a civic gathering space, and restore some of the connectivity lost due to the construction of I-277 between the Second Ward, Third Ward, Dilworth, and Wilmore communities and Uptown. In addition to a civic gathering space, the cap park would also be a gateway to Center City that could spur private development/redevelopment in the area. The cap park would also enhance and facilitate bicycle and pedestrian connections between these communities and Center City. This concept is an economic development type project and not proposed for typical transportation benefits. This potential concept is shown in Graphic 4-9 and Figure 4-9.



Graphic 4-9  
Potential Concept O





### Potential Concept O Scoring

Potential Concept O would not improve congestion or safety. There would be moderate improvements on transit parking/drop off as the proposed cap park would be adjacent to a LYNX Blue Line station. The concept ranks very high in support of local land use plans and quality of life, with the multimodal improvements, pedestrian and bicycle connectivity enhancements, and land use benefits. There would be no impacts on the natural environment, accessibility to Center City, or low income and minority communities. With the relatively high project cost and minimal improvements or benefits to the transportation network, the benefit-cost ratio is low. The table below depicts the scoring by criteria for Potential Concept O.

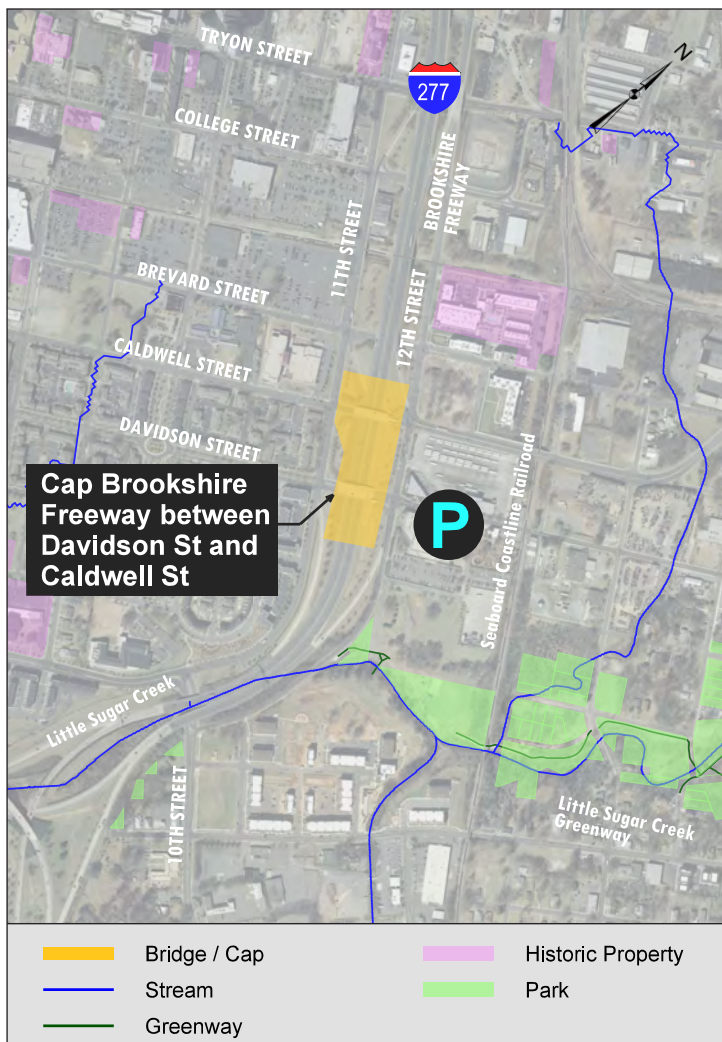
*Table 4-17  
Roadway Ranking Score - Concept O*

RANKING CRITERIA	CONCEPT SCORE
Congestion	0
Safety	0
Transit Parking/Drop Off	2
Supports Local Land Use Plans and Quality of Life	5
Impacts on Natural Environment	0
Improves Accessibility to Center City	0
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	0
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>8</b>



**Potential Concept P: Brookshire Freeway Cap Park**

Potential Concept P proposes the construction of a new cap park over Brookshire Freeway from east of Davidson Street to west of Caldwell Street. Similar to Potential Concept O, this concept would help improve the connectivity between the communities adjacent to Brookshire Freeway. The freeway cap park would provide a civic gathering space, enhance and restore community connectivity, facilitate bicycle and pedestrian movements, and could become a major gateway to Center City. These enhancements could result in additional private development/redevelopment investments in the surrounding areas. This concept is an economic development type project and not proposed for typical transportation benefits. The concept is shown in Graphic 4-10 and Figure 4-10.



Graphic 4-10  
Potential Concept P



### Potential Concept P Scoring

Similar to Potential Concept O, Potential Concept P would not improve congestion or safety. There would be no resulting improvements with this concept on transit parking/drop off. As with the John Belk Freeway Cap Park, this concept ranks very high in support of local land use plans and quality of life, with multimodal improvements, connectivity enhancements, and land use benefits. There would be no impacts on the natural environment or accessibility to Center City. There are moderately positive impacts on low income and minority communities through the increased connectivity to Uptown and the enhancement for alternative modes of transportation. With the relatively high project cost and the minimal benefits to the transportation network, the benefit-cost ratio is low. The table below depicts the scoring by criteria for Potential Concept P.

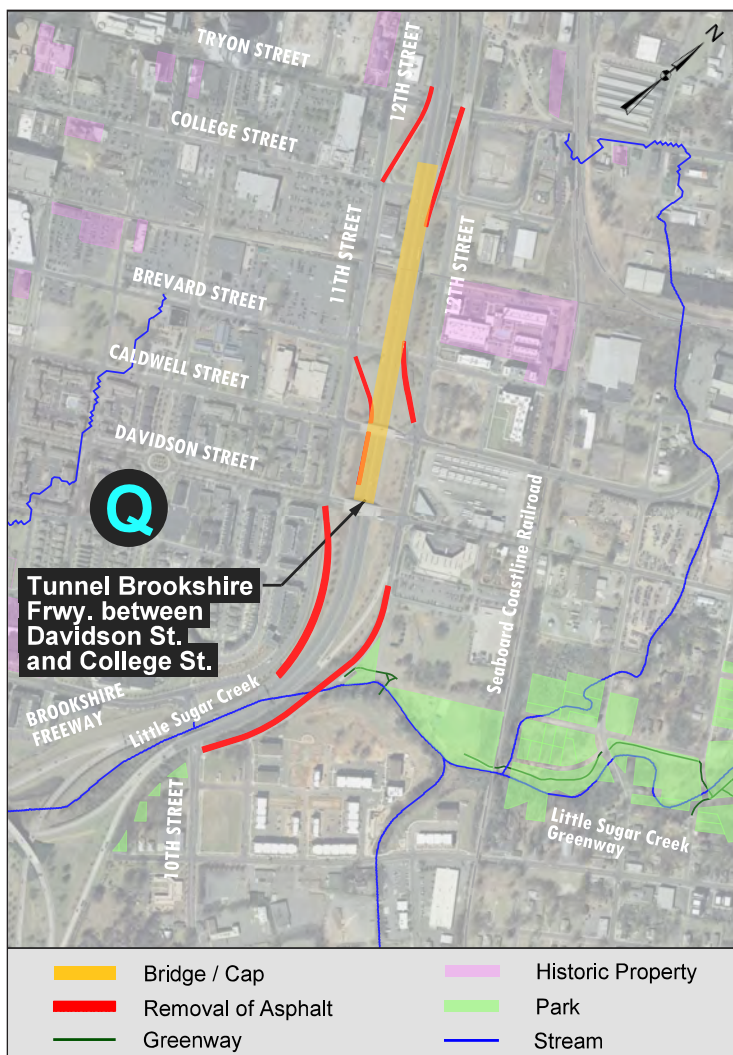
*Table 4-18  
Roadway Ranking Score - Concept P*

RANKING CRITERIA	CONCEPT SCORE
Congestion	0
Safety	0
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	5
Impacts on Natural Environment	0
Improves Accessibility to Center City	0
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	2
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>8</b>



**Potential Concept Q – Brookshire Freeway Tunnel**

Potential Concept Q proposes to build a new six-lane tunnel between Davidson Street and College Street, which would accommodate the Brookshire Freeway through movements. All cross-streets would be connected to one another at the surface level and the land between these streets could be zoned for commercial, residential, and community developments. With the relocation of the Brookshire Freeway underground, the surface street connectivity would be enhanced, providing the opportunity for increased public and private investment in the area and along these facilities. Access to/from the tunneled Brookshire Freeway would be limited to Caldwell Street and Church Street, which is also the configuration proposed in Potential Concept H. This concept is an economic development type project and not proposed for typical transportation benefits, though it would result in improved connectivity among surface streets. The potential concept is shown in Graphic 4-11 and Figure 4-11.



Graphic 4-11  
Potential Concept Q



### Potential Concept Q Scoring

Potential Concept Q, unlike Potential Concepts O and P, does rank relatively high in relieving congestion. The proposed tunnel would consolidate the on/off-ramps along Brookshire Freeway. The proposed concept would have little to no impact on safety. There would be no resulting improvements with this concept on transit parking/drop off. As with the freeway cap parks, this concept ranks very high in support of local land use plans and quality of life, through the restored surface street connectivity, enhanced multimodal connectivity, and land use benefits, with the potential for spurring economic investments in the area. There would be no impacts on natural environment or accessibility to Center City. There would be moderately positive impacts on low income and minority communities through the increased connectivity with Uptown and the enhancement of alternative transportation options. With the relatively high project cost and limited benefits to the transportation network, the benefit-cost ratio is low. The table below depicts the scoring by criteria for Potential Concept Q.

*Table 4-19  
Roadway Ranking Score - Concept Q*

RANKING CRITERIA	CONCEPT SCORE
Congestion	3
Safety	0
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	5
Impacts on Natural Environment	0
Improves Accessibility to Center City	0
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	2
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>11</b>



**Potential Concept R – Brookshire Freeway Boulevard**

Potential Concept R proposes converting the existing Brookshire Freeway between Davidson Street and Graham Street into an eight-lane to ten-lane boulevard. All existing cross-streets would form new signalized intersections with Brookshire Freeway, which would serve both local traffic, as well as the traffic heading to/from US 74 and I-77. Existing 11th Street and 12th Street, which currently serve local traffic, would be utilized to provide more access/egress for any new developments. Even with the boulevard configuration, minimal improvements to the bicycle and pedestrian environment would result due to the resulting high number of travel lanes and the very large intersection crossings. Graphic 4-12 and Figure 4-12 depicts this potential concept.



Graphic 4-12  
Potential Concept R



### Potential Concept R Scoring

Potential Concept R ranks very low in congestion and safety, with the implementation of a surface street and signalized intersection configuration. By converting Brookshire Freeway into a boulevard, the traffic demand would shift to several Center City streets, which would result in increased congestion. The safety conditions would worsen with the signalization of such a high traffic demand roadway. This concept would result in improvements to the transit parking/drop off with additional connections to the proposed LYNX Blue Line Extension stations. There would be no impacts to supporting local land use plans and quality of life or the natural environment. Accessibility to Center City would be negatively affected due to the increased congestion. There would also be slightly negative impacts on the adjacent low income and minority communities with the increased congestion and the resulting unfriendly bicycle and pedestrian environment. With these negative impacts, the benefit-cost ratio is low. The table below depicts the scoring by criteria for Potential Concept R.

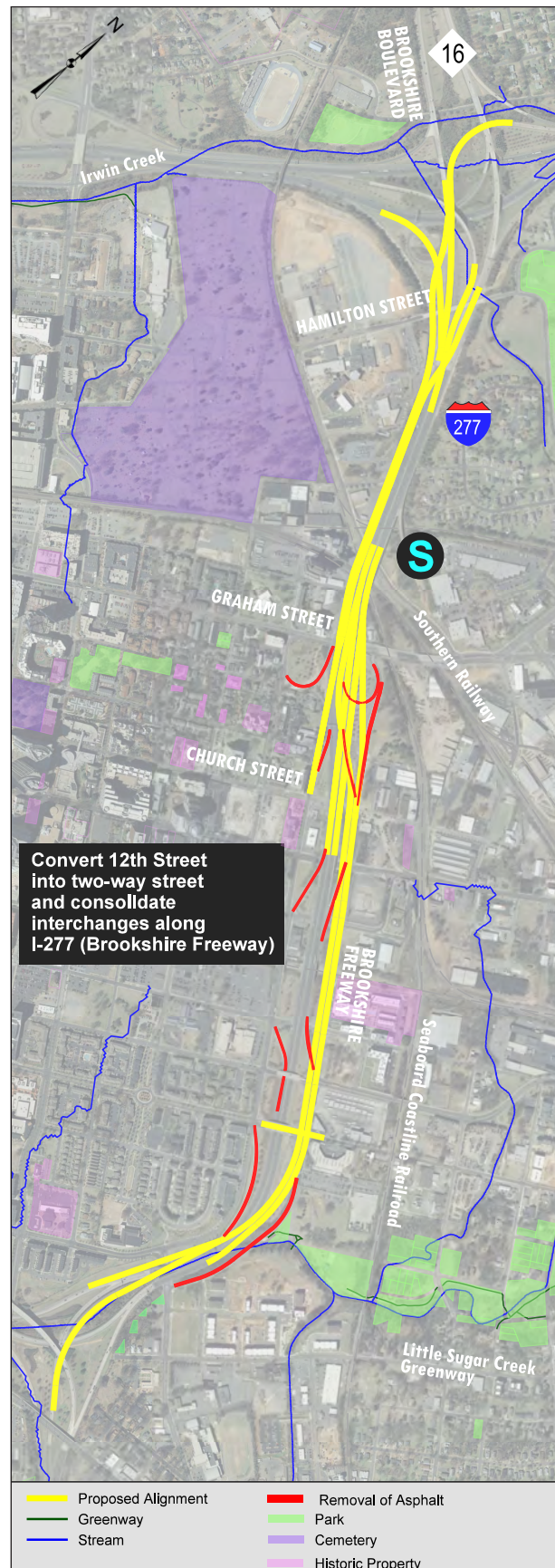
*Table 4-20  
Roadway Ranking Score - Concept R*

RANKING CRITERIA	CONCEPT SCORE
Congestion	-3
Safety	-3
Transit Parking/Drop Off	2
Supports Local Land Use Plans and Quality of Life	0
Impacts on Natural Environment	0
Improves Accessibility to Center City	-1
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	-1
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>-5</b>



**Potential Concept S – Two-way 12th Street**

Potential Concept S proposes converting the existing 12th Street into a six-lane to eight-lane major thoroughfare, which would be connected to I-277 at Church Street and Davidson Street. There would be no other ramps to/from I-277 (Brookshire Freeway) between Independence Boulevard and I-77 in both directions. This concept would also add a new two-lane roadway parallel to I-277 on the southern side between I-77 and Church Street, which would provide access for Graham Street traffic. Existing 11th Street would be converted to a two-way local street and provide additional access to any new developments. Similar to Potential Concept R, the high number of travel lanes included in the configuration and the resulting large intersection crossings are not conducive to bicycle and pedestrian use. Potential Concept S is shown in Graphic 4-13 and Figure 4-13.



*Graphic 4-13  
Potential Concept S*



### Potential Concept S Scoring

Potential Concept S ranks relatively high in improving congestion. Safety would be moderately improved with the proposed concept. There would be no impacts to transit parking/drop off or the natural environment. The concept ranks moderately high on supporting local land use plans and quality of life, and would slightly improve accessibility to Center City. There would also be slightly positive impacts on the adjacent low income and minority communities. The benefit-cost ratio is slightly positive. The table below depicts the scoring by criteria for Potential Concept S.

*Table 4-21  
Roadway Ranking Score - Concept S*

RANKING CRITERIA	CONCEPT SCORE
Congestion	3
Safety	2
Transit Parking/Drop Off	0
Supports Local Land Use Plans and Quality of Life	3
Impacts on Natural Environment	0
Improves Accessibility to Center City	1
Increased Accessibility to Other Employment Centers	N/A
Impacts on Air Quality	N/A
Supports Low Income and Minority Communities	1
Promotes Intermodal Connectivity	N/A
Provides Benefits that Outweigh Costs	1
<b>TOTAL POINTS</b>	<b>11</b>



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# Chapter 4

## Potential Concepts and Ranking

### List of Figures – Chapter 4

4-1	Potential Concept A
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4-10	Potential Concept P
4-11	Potential Concept Q
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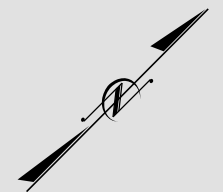
Figure 4-1:

Potential Concept A



**Legend**

- Proposed Alignment
- Removal of Asphalt
- Historical Property
- Park
- Stream



Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan

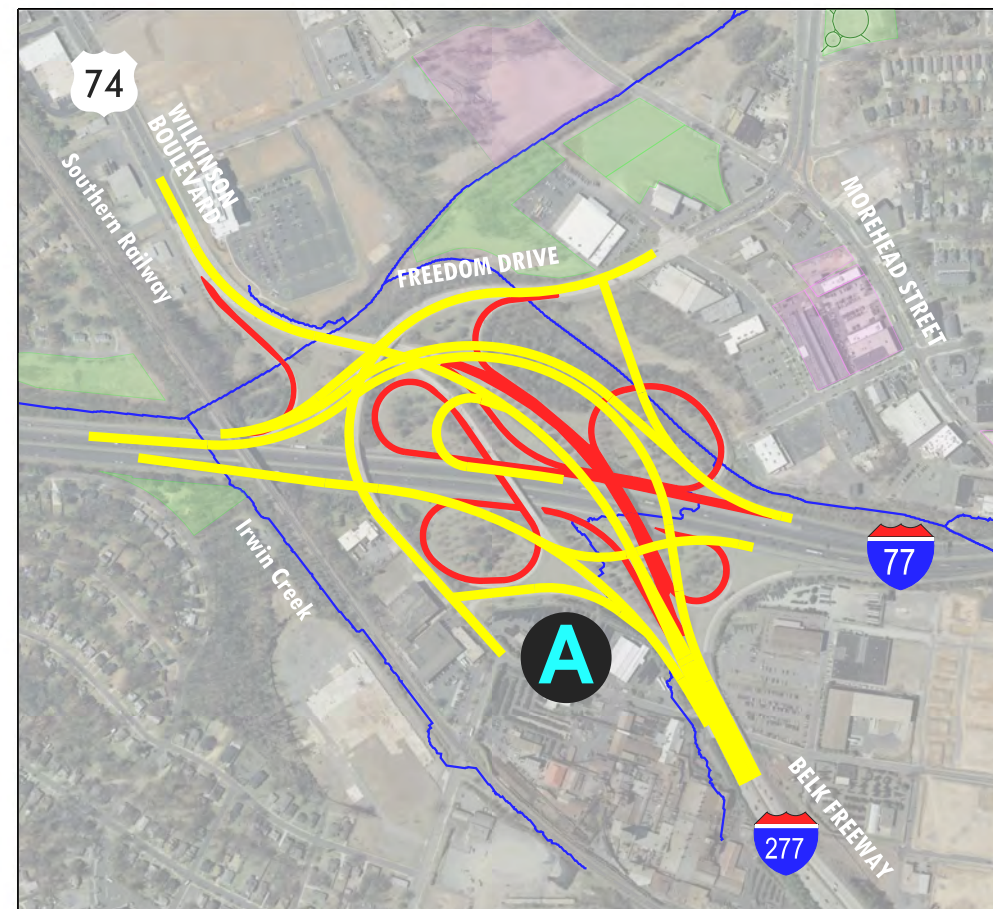


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**Existing Configuration**



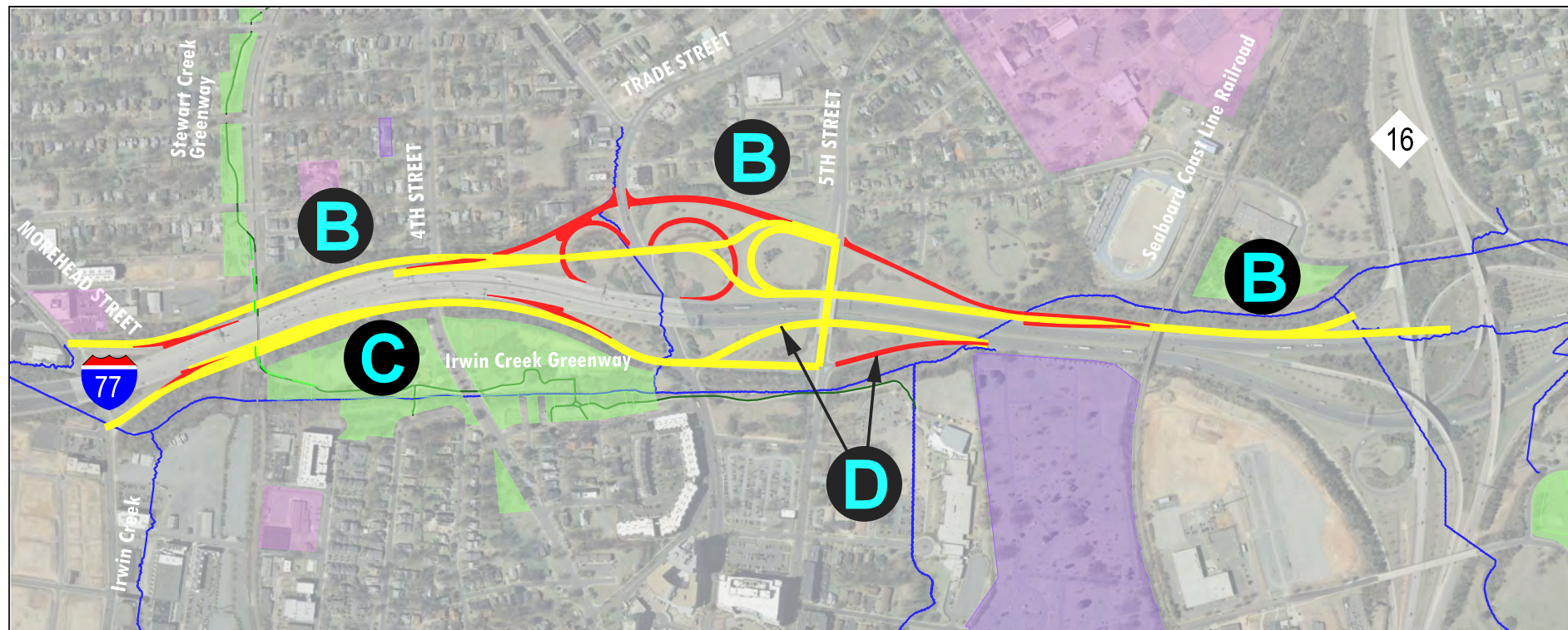
**Proposed Configuration**



### Existing Configuration



### Proposed Configuration

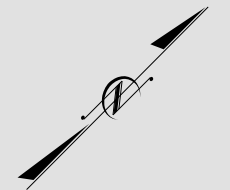


**Figure 4-2:**  
Potential Concepts B, C, & D



### Legend

- Proposed Alignment
- Removal of Asphalt
- Historic Property
- Park
- Cemetery
- Stream
- Greenway



Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan



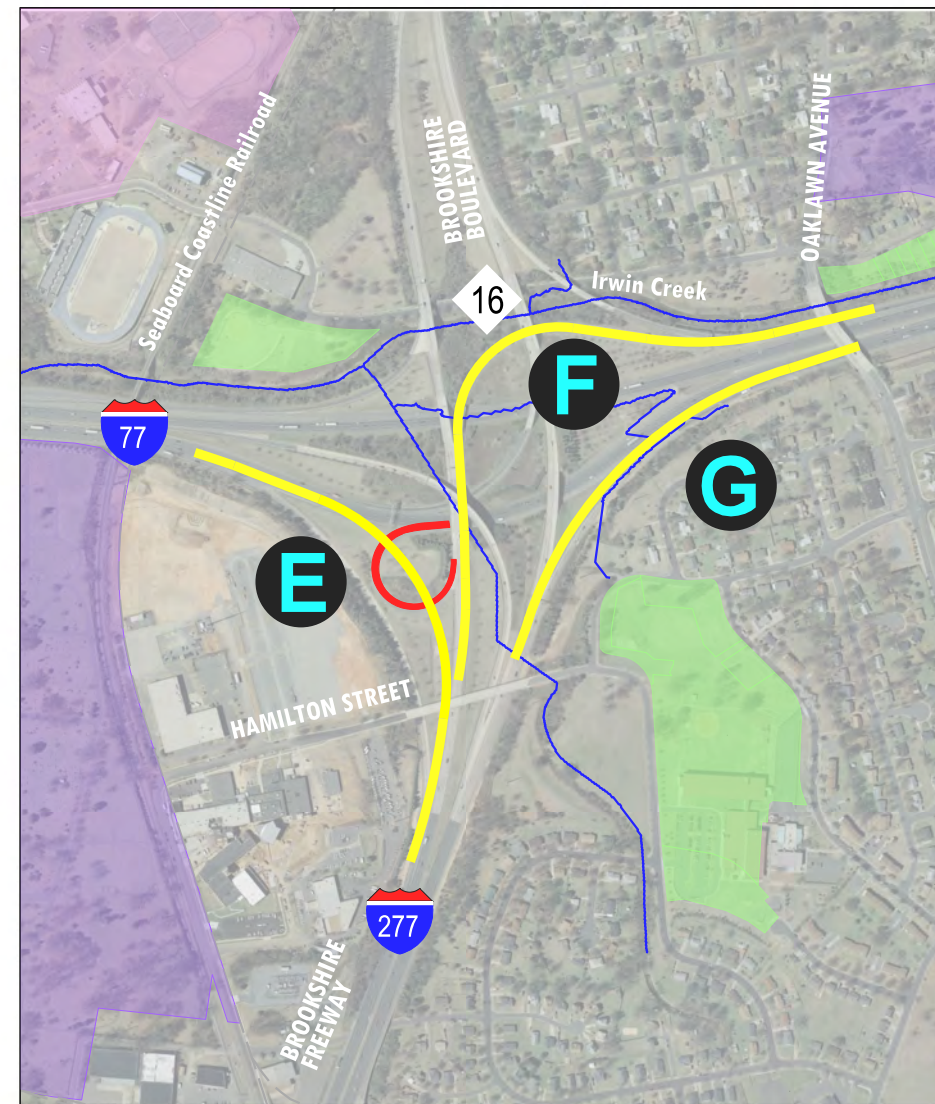
June 2013

**Figure 4-3:**  
Potential Concepts E, F, & G

**Existing Configuration**

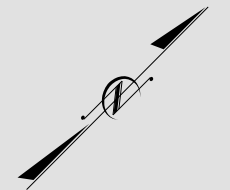


**Proposed Configuration**



**Legend**

- Proposed Alignment
- Removal of Asphalt
- Historic Property
- Park
- Cemetery
- Stream



Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan



June 2013

### Existing Configuration



### Proposed Configuration

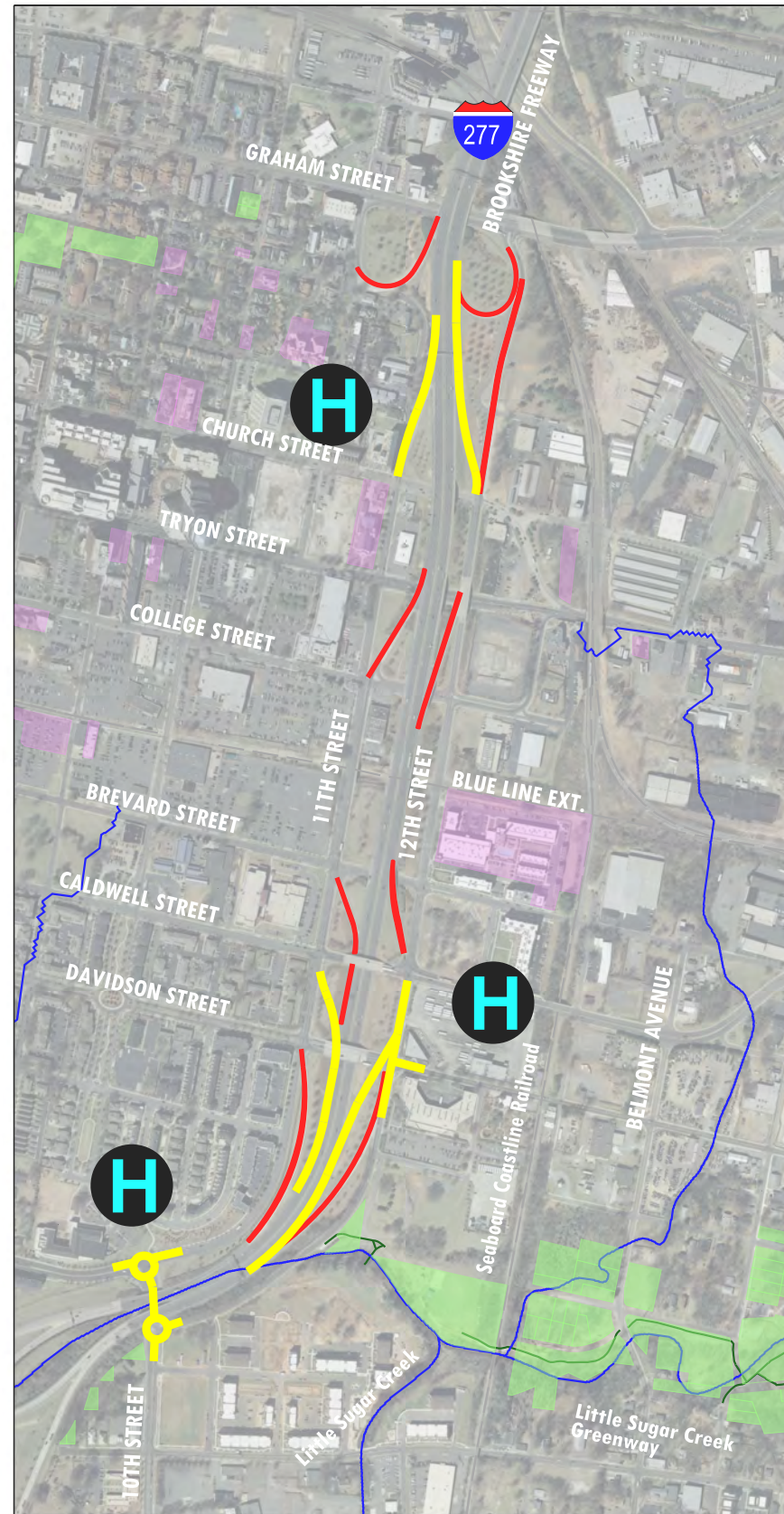
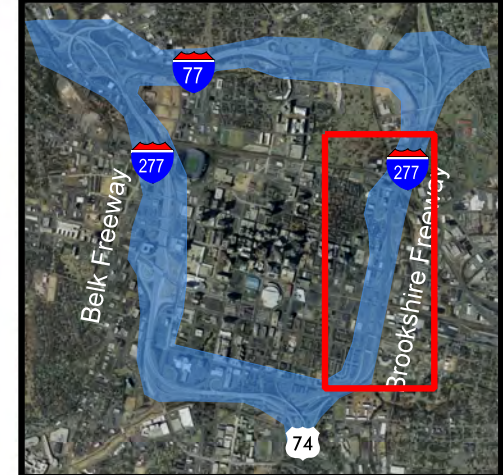
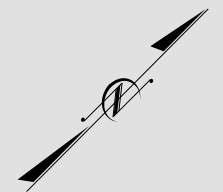


Figure 4-4:  
Potential Concept H



#### Legend

- Proposed Alignment
- Removal of Asphalt
- Historic Property
- Park
- Stream
- Greenway



Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan



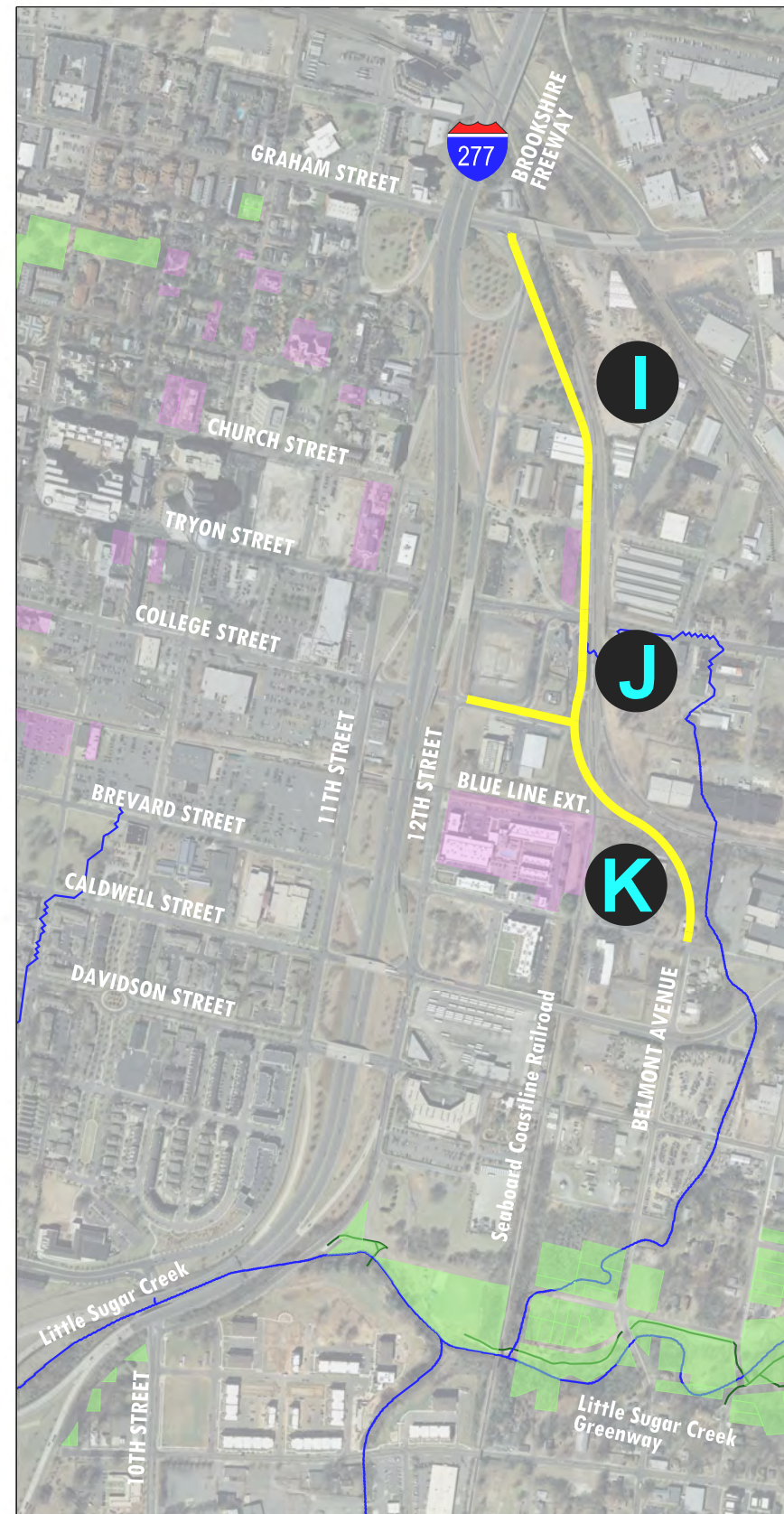
June 2013



### Existing Configuration



### Proposed Configuration



**Figure 4-5:**  
Potential Concepts I, J, & K



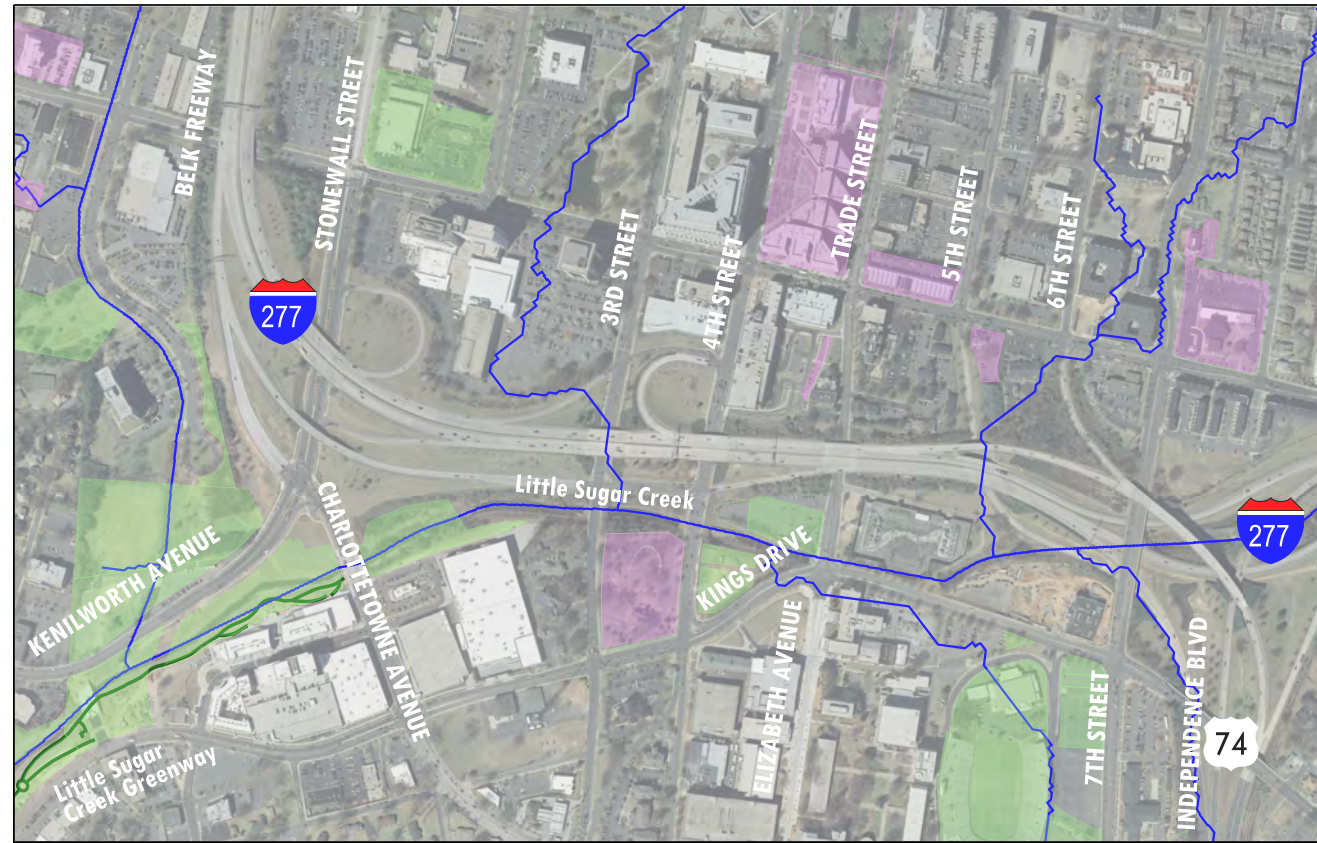
**Legend**

- Proposed Alignment
- Historic Property
- Park
- Stream
- Greenway

Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan

### Existing Configuration



### Proposed Configuration

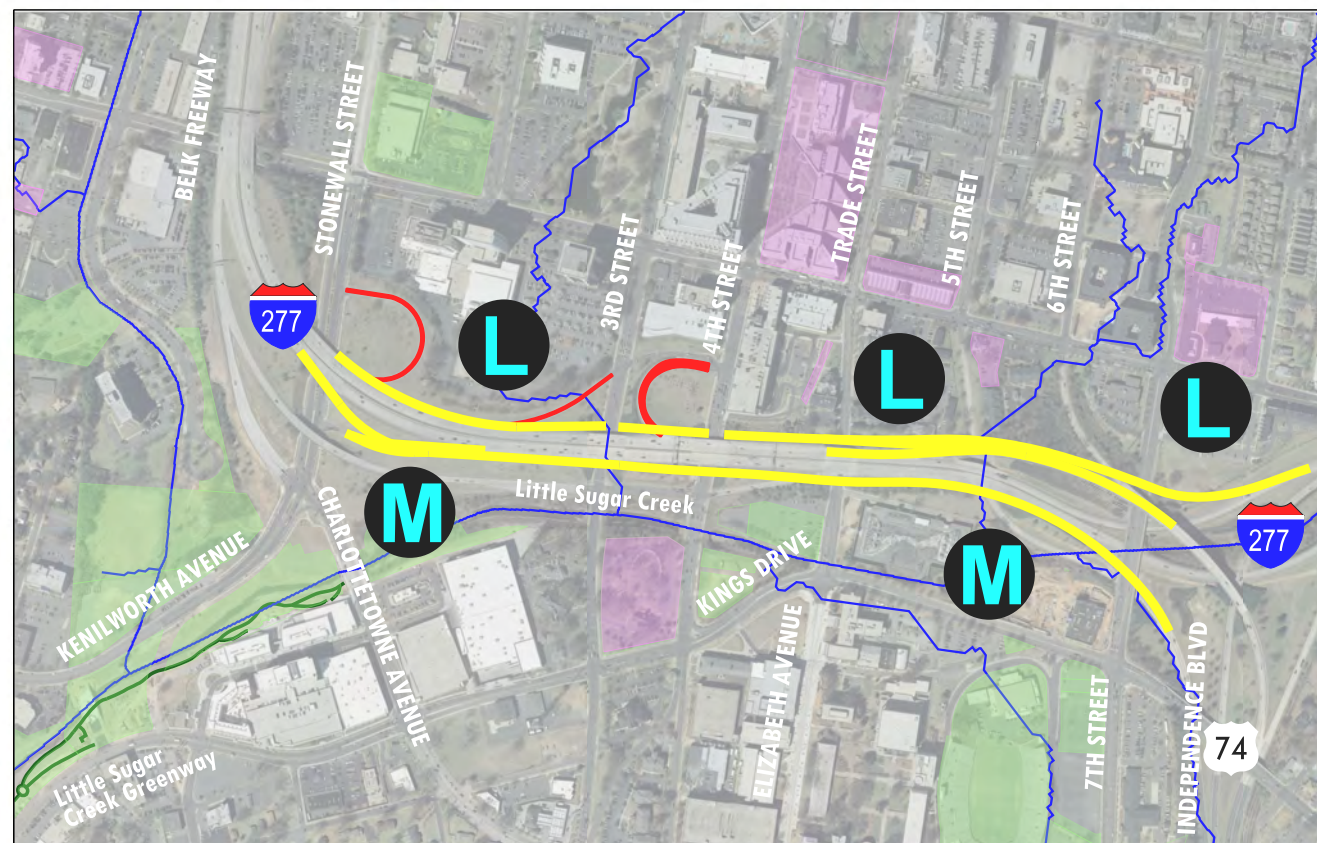
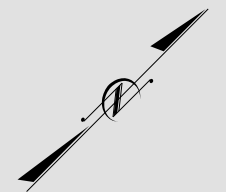


Figure 4-6:  
Potential Concepts L & M



### Legend

- Proposed Alignment
- Removal of Asphalt
- Historic Property
- Park
- Stream
- Greenway



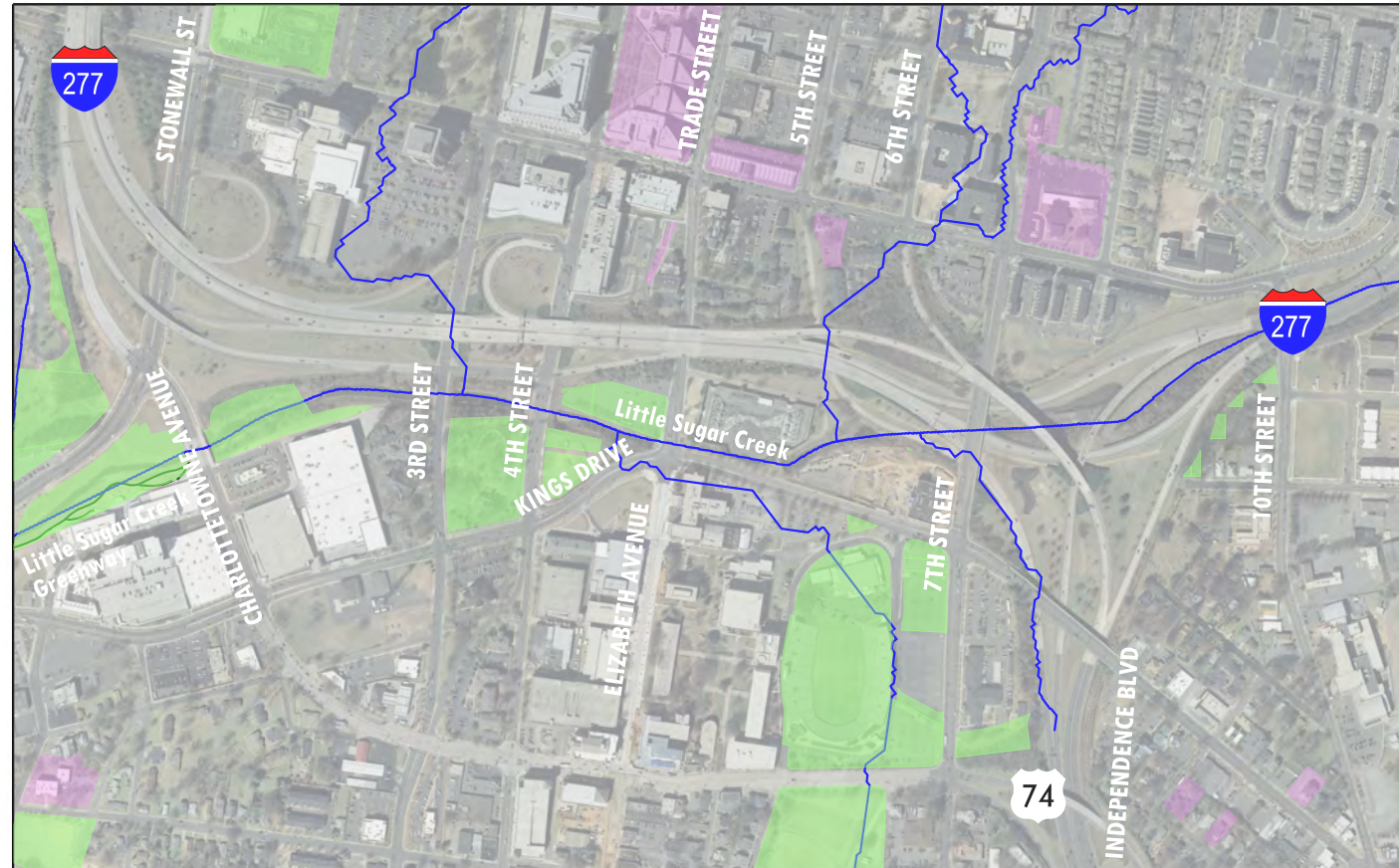
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I-277 / I-77 Loop Strategic Plan

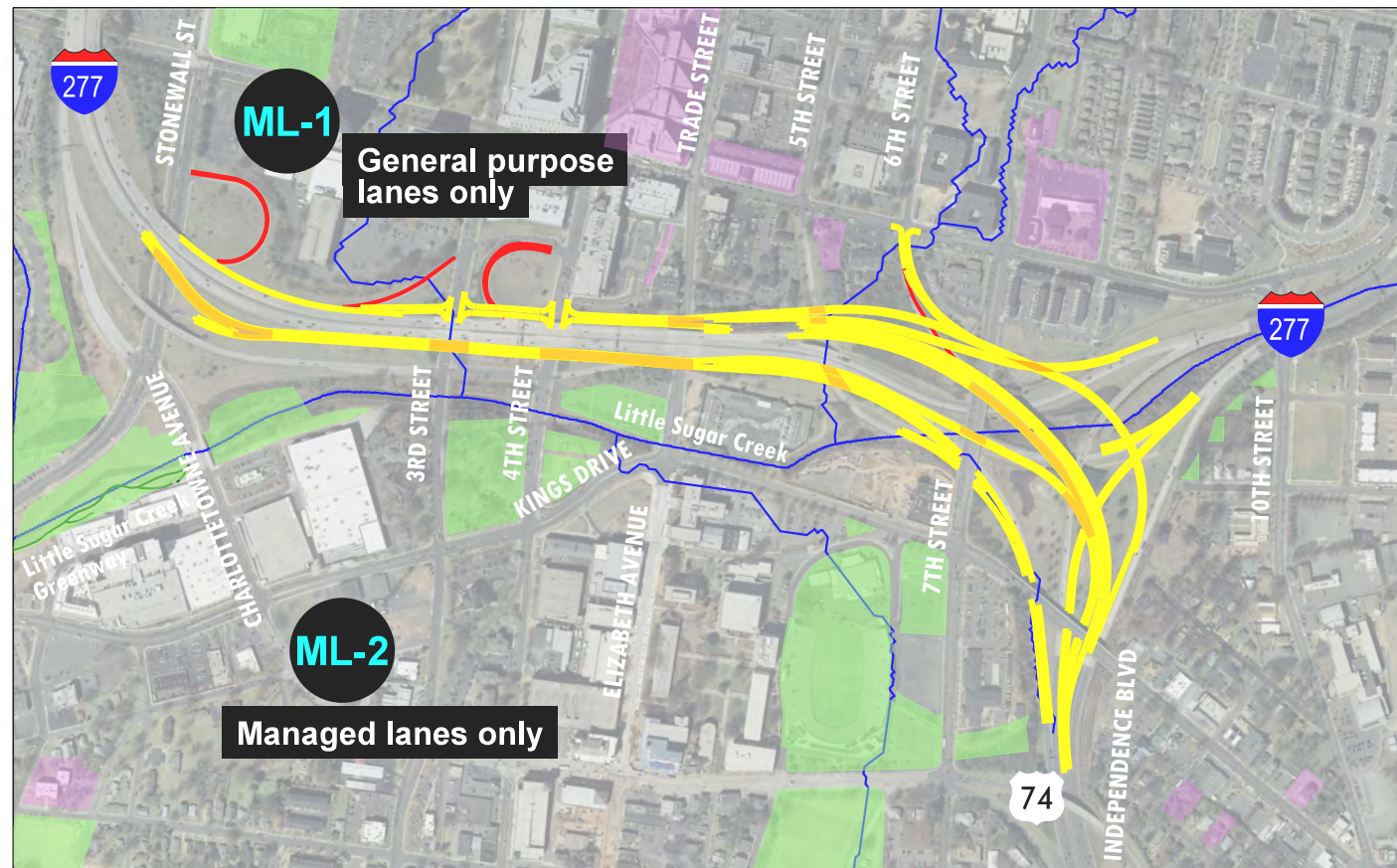


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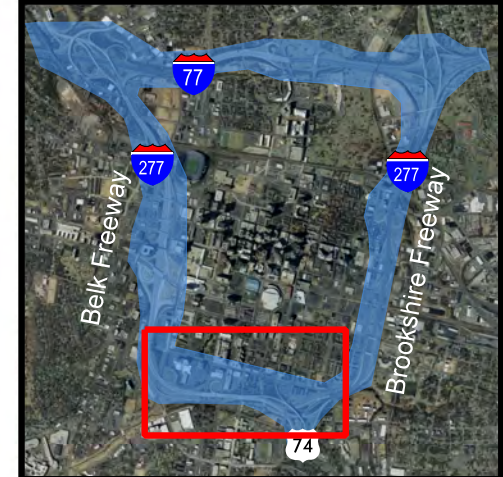
### Existing Configuration



### Proposed Configuration

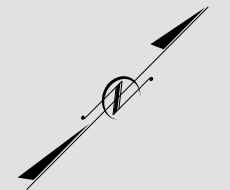


**Figure 4-7:  
Potential Concepts  
ML-1 & ML-2**



### Legend

- Proposed Alignment
- Removal of Asphalt
- Bridge / Cap
- Historic Property
- Park
- Stream
- Greenway



Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan



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### Existing Configuration



### Proposed Configuration

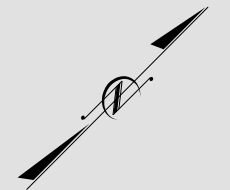


**Figure 4-8:**  
Potential Concept N



### Legend

- Proposed Alignment
- Removal of Asphalt
- Historic Property
- Park
- Stream



Scale: 1" = 800'

I-277 / I-77 Loop Strategic Plan



June 2013

### Existing Configuration



### Proposed Configuration

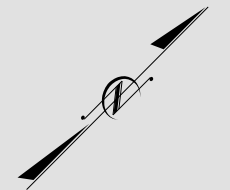


**Figure 4-9:  
Potential Concept O**



### Legend

- Bridge / Cap
- Historic Property
- Park
- Stream



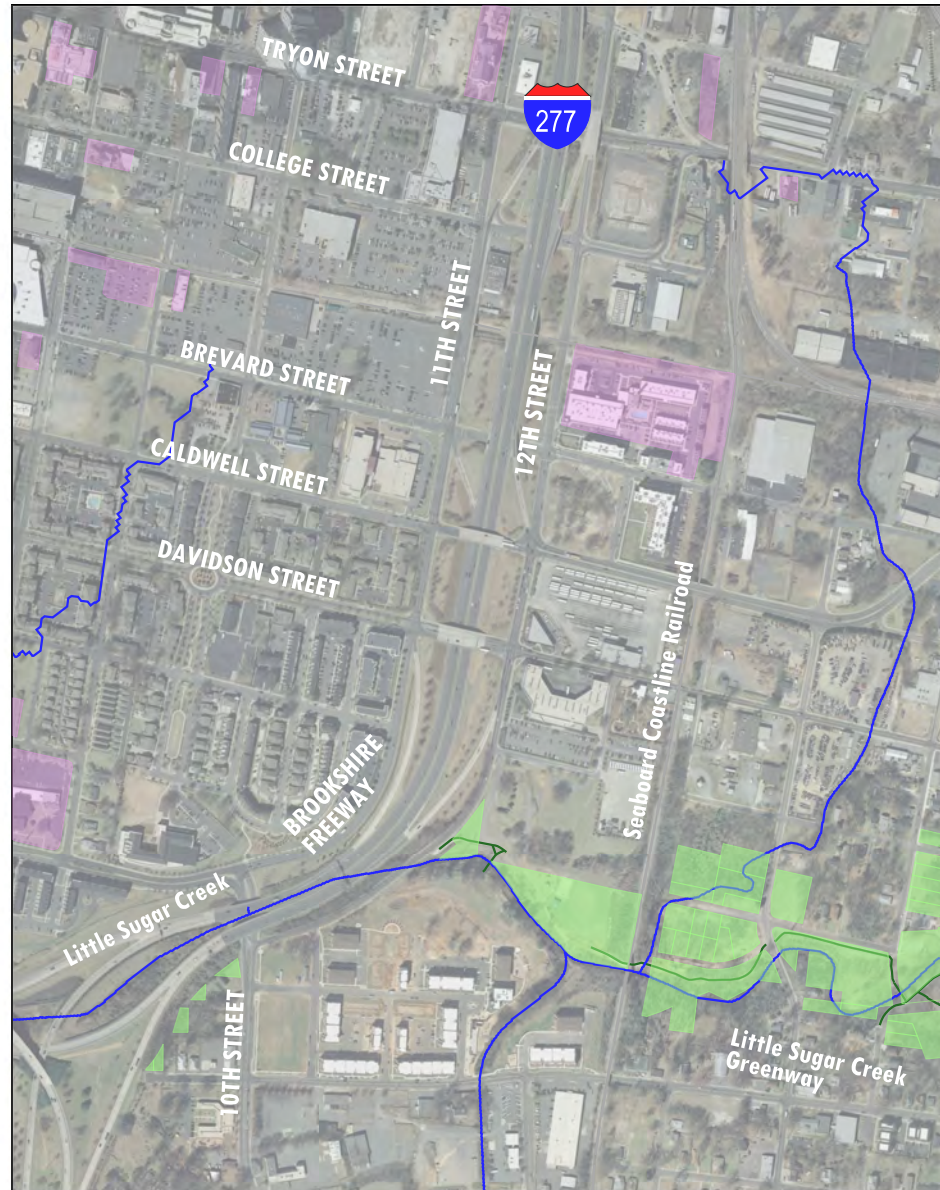
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I-277 / I-77 Loop Strategic Plan



June 2013

### Existing Configuration



### Proposed Configuration

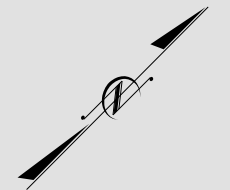


**Figure 4-10:  
Potential Concept P**



### Legend

- Bridge / Cap
- Historic Property
- Park
- Stream
- Greenway



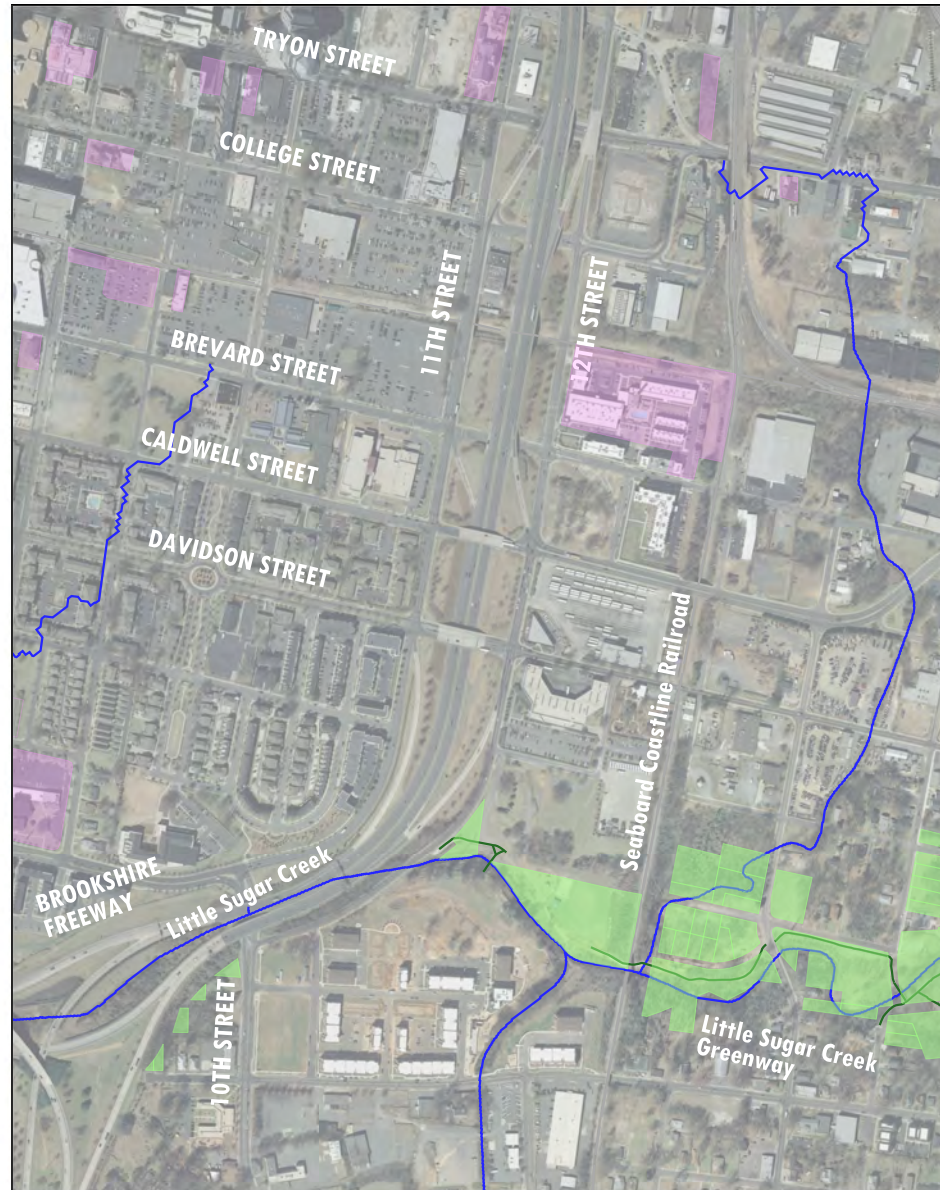
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I-277 / I-77 Loop Strategic Plan

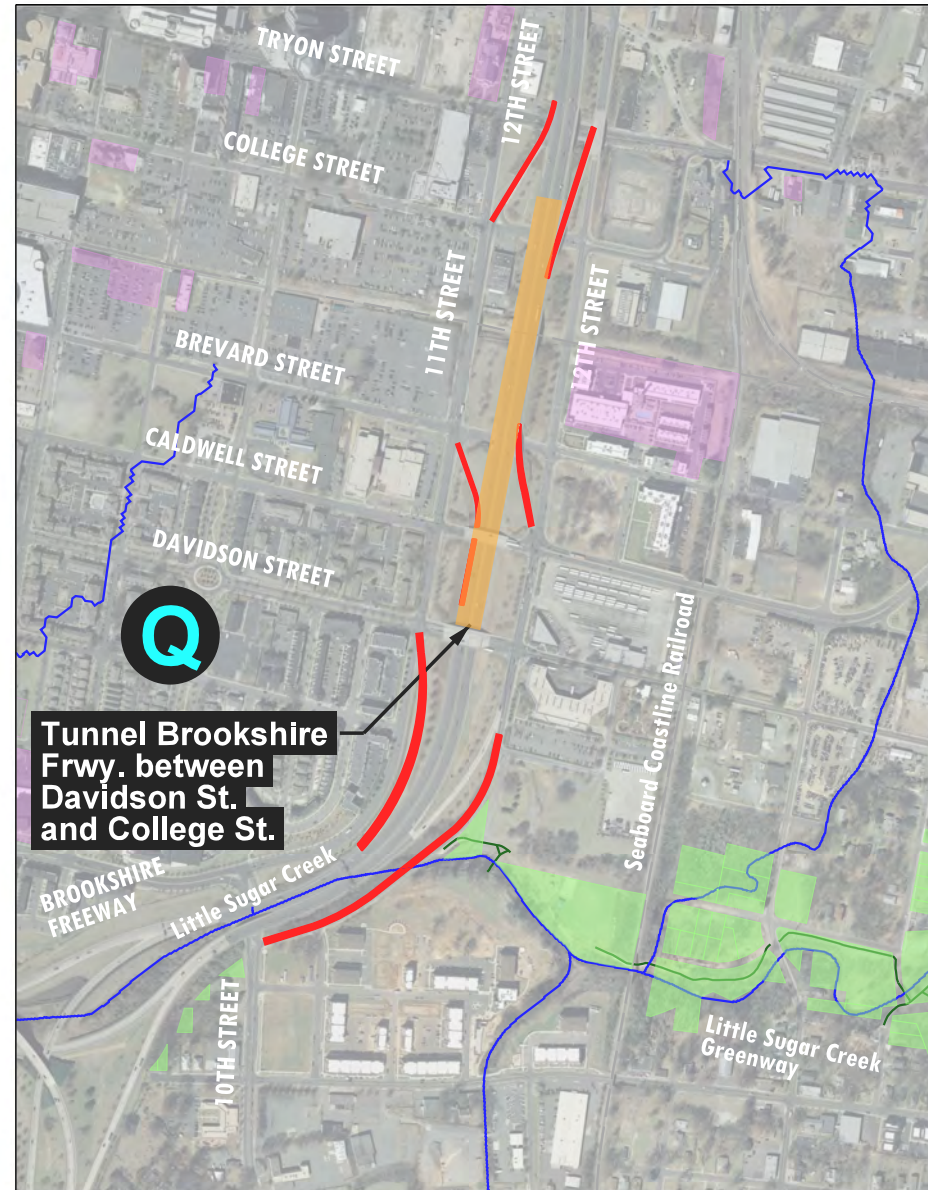


June 2013

### Existing Configuration



### Proposed Configuration

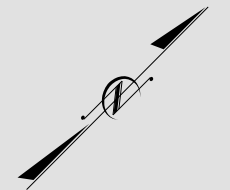


**Figure 4-11:**  
**Potential Concept Q**



### Legend

- Bridge / Cap
- Removal of Asphalt
- Historic Property
- Park
- Stream
- Greenway



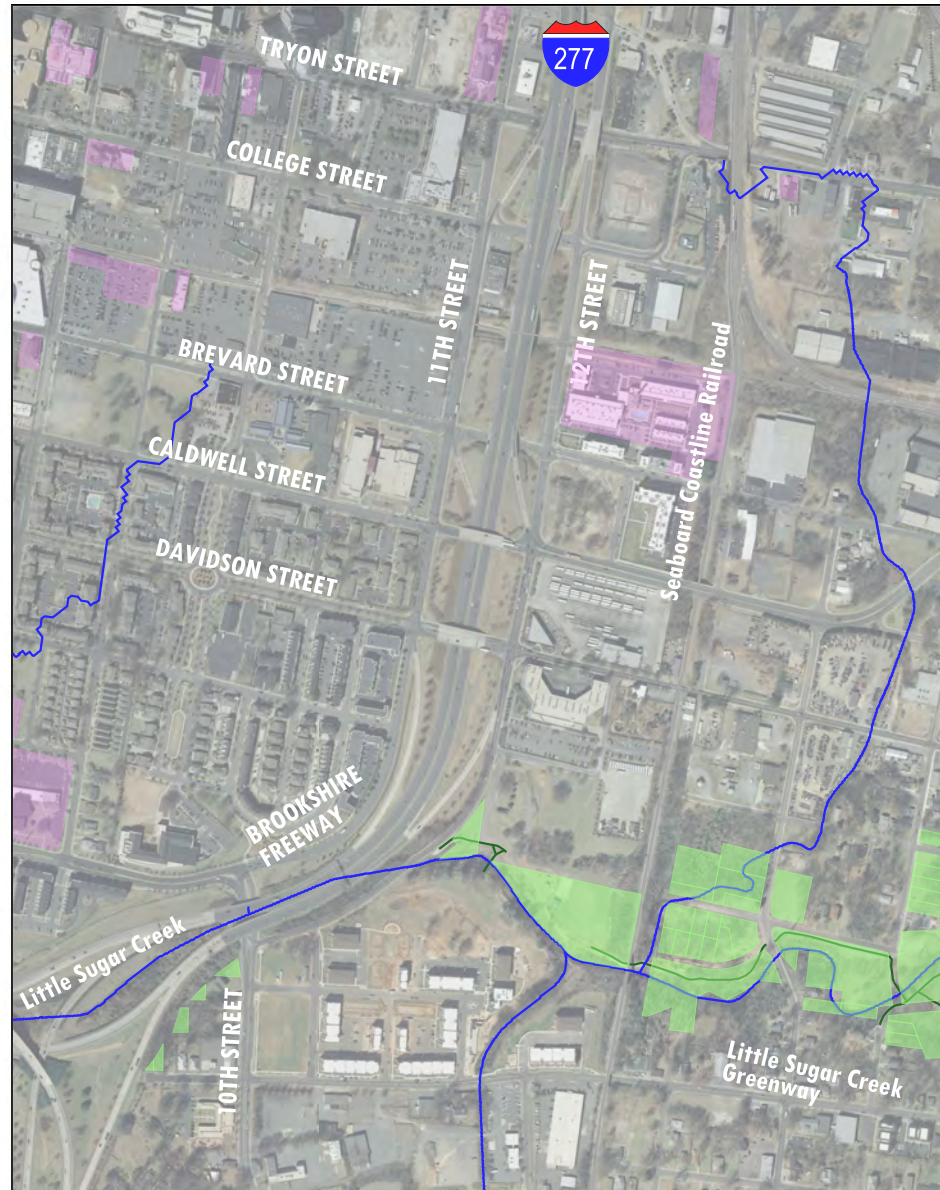
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I-277 / I-77 Loop Strategic Plan

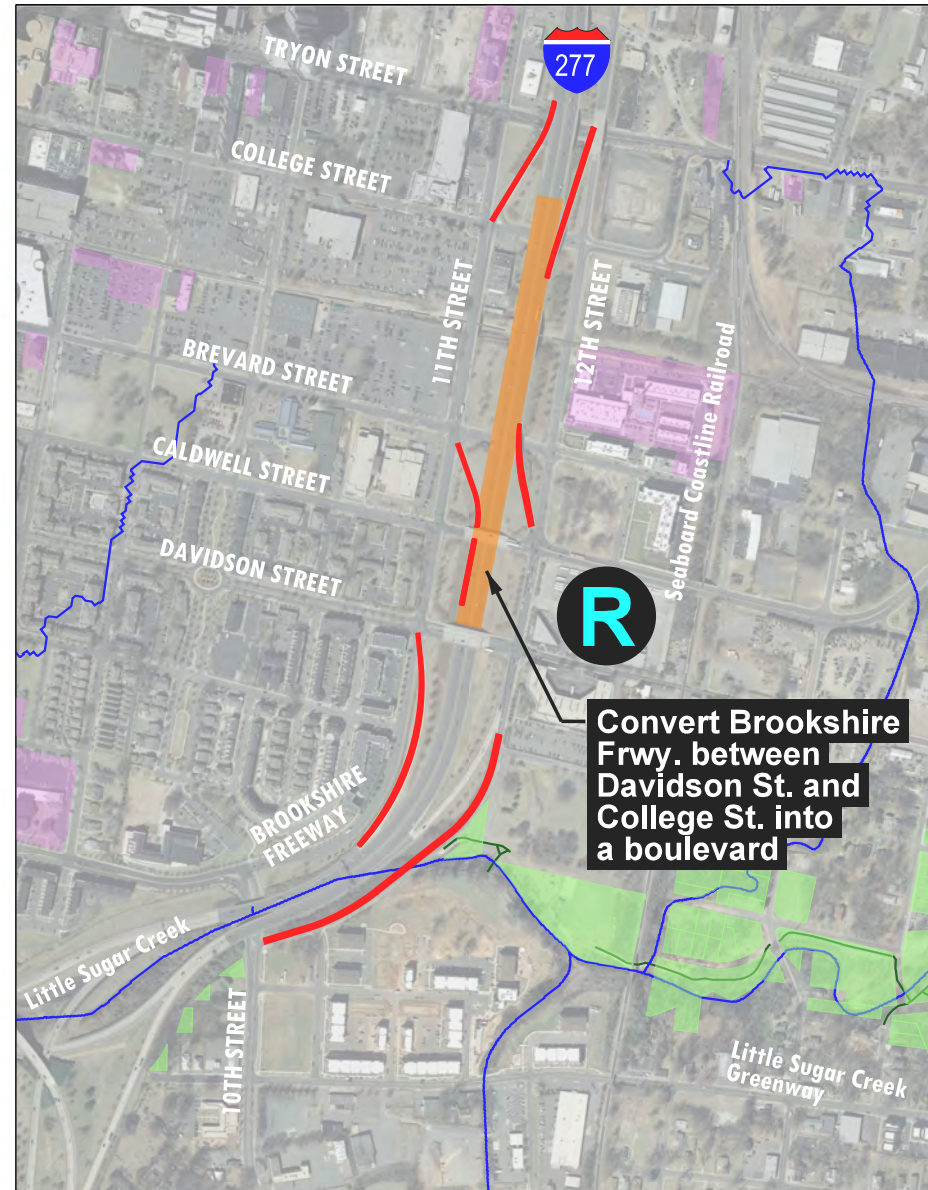


June 2013

### Existing Configuration



### Proposed Configuration

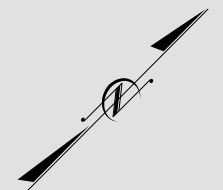


**Figure 4-12:**  
**Potential Concept R**



#### Legend

- Bridge / Cap
- Removal of Asphalt
- Historic Property
- Park
- Stream
- Greenway



Scale: 1" = 800'

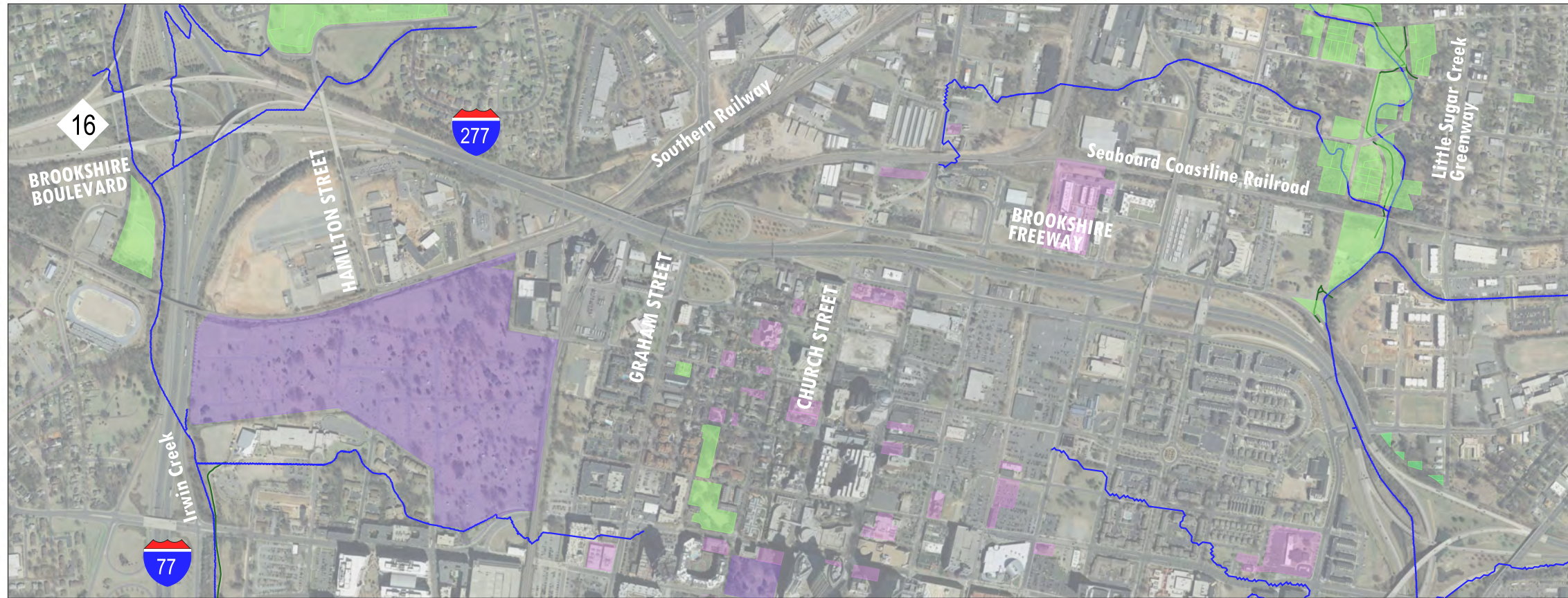
I-277 / I-77 Loop Strategic Plan



June 2013



## Existing Configuration



## Proposed Configuration

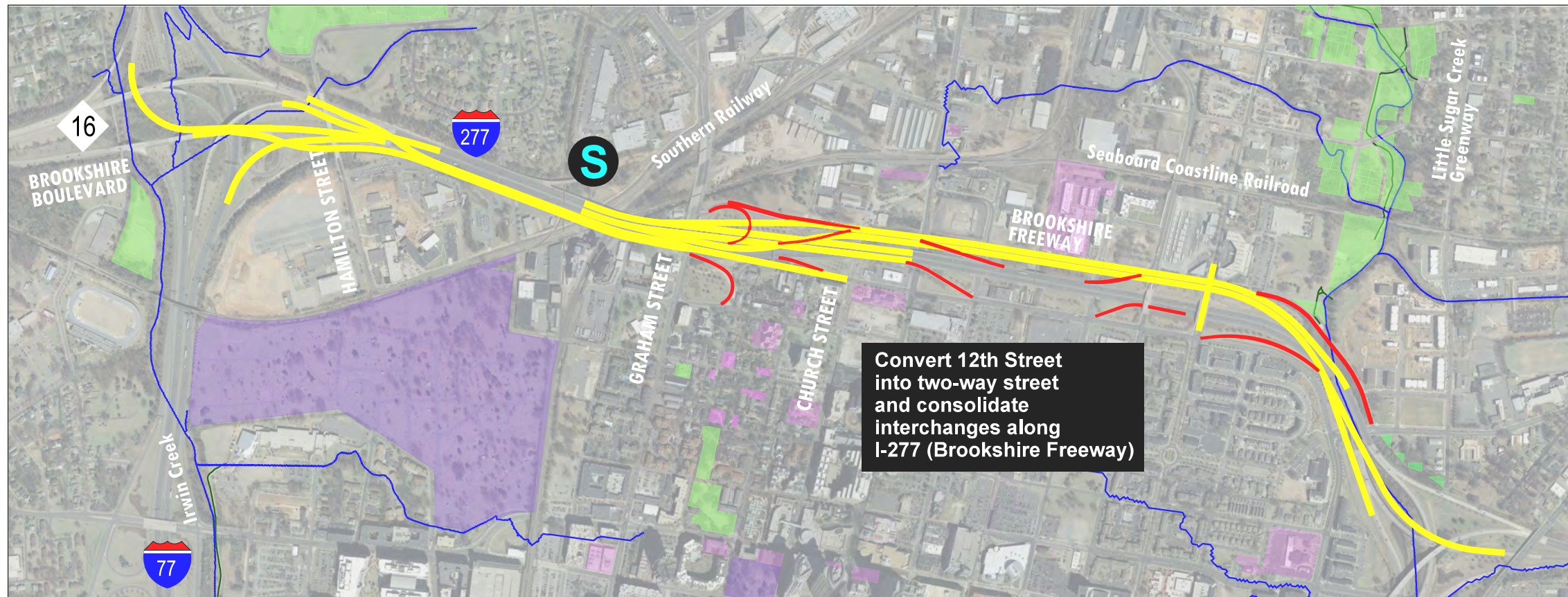
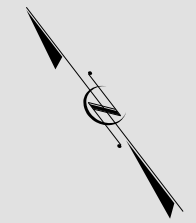


Figure 4-13:  
Potential Concept S



### Legend

- Proposed Alignment
- Removal of Asphalt
- Historic Property
- Park
- Cemetery
- Stream
- Greenway



Scale: 1" = 1000'

I-277 / I-77 Loop Strategic Plan



June 2013

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# Chapter 5 Recommendations



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## Recommendations

The ultimate goal of the I-277/I-77 Loop Study is to implement the Study's recommendations to effectively and efficiently address the congestion and safety issues on I-277 and I-77, while supporting the overall community vision. The recommendations for each of the potential concepts based on the analyses and scoring described previously are presented below.

### *Concept Descriptions and Recommendations*

#### **Potential Concept A: I-77/I-277 (John Belk Freeway) Interchange Reconstruction**

The major components of Concept A include:

- Rebuild the interchange as a new two-level interchange.
- New interchange connects I-277, Wilkinson Boulevard, Freedom Drive and I-77.
  - System interchange movements accommodated by flyovers, free flow ramps or loops.
  - Movements between Wilkinson Boulevard and I-77 accommodated by signalization.
- Provides direct access between I-277 and I-77 south.
- Maintains as many existing connections as possible.
- Functions as a service interchange to adjacent streets.
- Concept Score – 17 points

*Recommendation: This concept is included in the I-277/I-77 Strategic Plan and has been submitted to the MUMPO for inclusion in the 2040 LRTP.*



**Potential Concept B: Reconstruction of I-77 between John Belk Freeway and Brookshire Freeway**

The major components of Concept B include:

- C-D road along I-77 southbound, between I-277 (Brookshire Freeway)/NC 16 and Morehead Street.
- Provides access from I-77 southbound to 5th Street, Trade Street, and Morehead Street.
- Provides access from NC 16, 5th Street, and Trade Street to I-77 southbound.
- Concept Score – 13 points

**Potential Concept C: Reconstruction of I-77 between John Belk Freeway and Brookshire Freeway**

The major components of Concept C include:

- C-D road along I-77 northbound, between Morehead Street and 5th Street.
- Provides access to Trade Street and 5th Street from I-77 northbound.
- Concept Score – 11 points

**Potential Concept D: Reconstruction of I-77 between John Belk Freeway and Brookshire Freeway**

The major components of Concept D include:

- Relocation of the I-77 northbound on-ramp from 5th Street to Trade Street.
- Increase the weaving distance between the Trade Street ramp and I-277 off-ramp at Brookshire Freeway.
- Concept Score – 10 points

*Recommendation: Concepts B, C, and D together are included in the I-277/I-77 Strategic Plan and have been submitted to MUMPO for inclusion in the 2040 LRTP.*



### **Potential Concept E: I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange Improvements**

The major components of Concept E include:

- Relocation of the single-lane off-ramp from I-77 northbound to I-277 (Brookshire Freeway) eastbound, increasing the distance from the 5th Street on-ramp and therefore increasing the weaving distance.
  - Traffic would merge onto I-277 eastbound rather than continue as a free-flow lane onto I-277.
  - Removal of the NC 16 eastbound loop to I-77 northbound movement.
- Concept Score – 9 points

*Recommendation: Concept E is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO at this time. Future efforts will focus on implementation as the opportunities arise.*

### **Potential Concept F: I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange Improvements**

The major components of Concept F include:

- Widen existing I-77 southbound to I-277 eastbound ramp to two lanes.
- Maintain two lanes on I-277 eastbound by converting the free-flow movement from northbound I-77 to merging movements.
- Concept Score – 15 points

*Recommendation: Concept F is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO at this time. Future efforts will focus on implementation as the opportunities arise.*



### Potential Concept G: I-77 at I-277 (Brookshire Freeway)/NC 16 Interchange Improvements

The major components of Concept G include:

- Improve the I-277 westbound to I-77 northbound ramp in two phases:
  - Phase 1 (Potential Concept G-1)
    - Reduce the number of through lanes along I-77 from four to three lanes.
    - Extend the I-277 westbound on-ramp lane as a continuous lane until the I-85 exit ramp.
  - Phase 2 (Potential Concept G-2)
    - Include Phase 1 improvements.
    - Widen the I-277 westbound to I-77 northbound on-ramp with an additional acceleration lane of approximately 1,500 feet.
- Concept Score – 16 points

*Recommendation: The first phase, G-1, has been submitted to NCDOT for short term implementation. The second phase, G-2, is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO at this time.*

### Potential Concept H: I-277 (Brookshire Freeway) between I-77 and US 74 (Independence Boulevard)

The major components of Concept H include:

- Consolidation of exit/entrance ramps from ten to four.
- Ramps extend to Caldwell Street serve traffic to/from I-277 to the east.
- Ramps to Church Street serve traffic to/from I-277 to the west.
- Access to Brookshire Freeway limited to Caldwell Street and Church Street ramps.
- Ramps to/from Davidson Street, Brevard Street and College Street eliminated.
- Existing 11th Street and 12th Street function as one-way service roads.
- Concept Score – 11 points

*Recommendation: Concept H needs to be studied further and developed in concert with recommendations from the managed lanes studies currently underway by NCDOT. This concept is included in the I-277/I-77 Strategic Plan, and has been submitted to MUMPO for inclusion in the 2040 LRTP.*





### **Potential Concept I: New Connector between Graham Street and Belmont Avenue**

The major component of Concept I includes:

- New connector roadway between Graham Street and Church Street.
- Concept Score – 10 points

*Recommendation: Concepts H and I will be combined, along with Concept S, described on page 5-9, into one project. These concepts are included in the I-277/I-77 Strategic Plan, and have been submitted to MUMPO for inclusion in the 2040 LRTP.*

### **Potential Concept J: New Connector between Graham Street and Belmont Avenue**

The major component of Concept J includes:

- New connector roadway between Church Street and College Street.
- Access to Brookshire Freeway with longer acceleration lane and safer merging.
- Concept Score – 6 points

*Recommendation: Concept J is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO at this time. Future efforts will focus on implementation as opportunities arise.*

### **Potential Concept K: New Connector between Graham Street and Belmont Avenue**

The major component of Concept K includes:

- New connector roadway between College Street and Brevard Street.
- Concept Score – 7 points

*Recommendation: Concept K is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO at this time. Future efforts will focus on implementation as opportunities arise.*



**Potential Concepts L, M, ML-1 and ML-2: I-277/US 74 (Independence Boulevard) Interchange Improvements**

Concepts L, M, ML-1, and ML-2 propose improving John Belk Freeway between Kenilworth Avenue and Independence Boulevard, including its interchanges with 3rd Street, 4th Street, and Independence Boulevard.

The specific components of Concept L include:

- Rebuild on- and off-ramps along I-277 westbound at Independence Boulevard, and the 3rd Street/4th Street interchanges.
- Reconfigure the I-277 westbound to 3rd Street/4th Street ramp to minimize weaving maneuvers.
- Reconfigure the loop at 4th Street and diagonal ramp at 3rd Street, compressing the interchange footprint.
- Eliminate the existing loop at Stonewall Street to I-277 westbound to extend the acceleration lane for 3rd Street on-ramp.
- Divert traffic using the Stonewall Street ramp to other interchanges in the area.
- Ensure consideration of the City's Uptown Cycle Track Study, which includes options for multi-use pathways within or adjacent to the NCDOT right of way between 3rd and 4th Street. This proposed cycle track is intended to connect Little Sugar Creek Greenway to Irwin Creek Greenway through Uptown.
- Concept Score – 17 points

The specific components of Concept M include:

- Relocate I-277 eastbound to Independence Boulevard eastbound ramp by braiding it over the I-277 on-ramps at Kenilworth Avenue and 4th Street.
- Rework the interchange so that John Belk Freeway traffic to Independence Boulevard exits before the Kenilworth Avenue on-ramp.
- Concept Score – 15 points



The specific components of Concept ML-1 include:

- Include all L and M improvements.
- Incorporate additional general purpose lanes, with the option to become managed lanes (HOV/HOT) in the future, at I-277 and Independence Boulevard.
- Concept Score – 15 points

The specific components of Concept ML-2 include:

- Include all L and M improvements.
- Incorporate additional managed lanes (HOV/HOT) at I-277 and Independence Boulevard, utilizing the general purpose lanes provided in Concept ML-1.
- Concept Score – 13 points

*Recommendation: Concepts L, M, ML-1 and ML-2 are combined and are included in the I-277/I-77 Strategic Plan. They have been submitted to MUMPO for inclusion in the 2040 LRTP.*

### **Potential Concept N: Relocation of I-277/Carson Boulevard Ramp**

The specific component of Concept N includes:

- Relocation I-277 (John Belk Freeway) off-ramp from Carson Boulevard to Church Street.
- Concept Score – 4 points

*Recommendation: Concept N is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO at this time. Future efforts will focus on implementation as opportunities arise.*

### **Potential Concept O: John Belk Freeway Cap Park**

The specific component of Concept O includes:

- Construction of new cap park over John Belk Freeway between Church Street and the LYNX Light Rail Blue Line.
- Concept Score – 8 points

*Recommendation: Concept O is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO. The concept is primarily an economic development project and should be considered through non-transportation related funding sources. However, any recommended concepts in this area should be built in a way that allows the future implementation of the John Belk Freeway Cap.*



### Potential Concept P: Brookshire Freeway Cap Park

The specific component of Concept P includes:

- Construction of new cap park over Brookshire Freeway from east of Davidson Street to west of Caldwell Street.
- Concept Score – 8 points

*Recommendation: Concept P is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO. The concept is primarily an economic development project and should be considered through non-transportation related funding sources. However, any recommended concepts in this area should be built in a way that allows the future implementation of the Brookshire Freeway Cap.*

### Potential Concept Q – Brookshire Freeway Tunnel

The specific components of Concept Q include:

- Construct new six lane tunnel between Davidson Street and College Street.
- Connection of cross streets at surface level.
- Access to/from tunneled Brookshire Freeway limited to Caldwell Street and Church Street.
- Concept Score – 11 points

*Recommendation: Concept Q is included in the I-277/I-77 Strategic Plan, but will not be submitted to MUMPO. The concept is primarily an economic development project and should be considered through non-transportation related funding sources. However, any recommended concepts in this area should be built in a way that allows the future implementation of the Brookshire Freeway Tunnel.*

### Potential Concept R – Brookshire Freeway Boulevard

The specific components of Concept R include:

- Conversion of existing Brookshire Freeway to eight-lane to ten-lane boulevard between Davidson Street and Graham Street.
- Existing cross streets connected at signalized intersections.
- Existing 11th and 12th Streets utilized to provide access/egress from any new development.
- Concept Score – (-5) points

*Recommendation: Concept R is not included in the I-277/I-77 Strategic Plan, nor will it be included in recommendations for future implementation.*



### Potential Concept S – Two-way 12th Street

The specific components of Concept S include:

- Conversion of existing 12th Street into six-lane to eight-lane major thoroughfare connected to I-277 at Church Street and Davidson Street.
- Addition of new two lane roadway parallel to I-277 on the southern side between I-77 and Church Street.
- Conversion of existing 11th Street to a two-way local street.
- Concept Score – 11 points

*Recommendation: Concept S is combined with Concepts H and I and will be included in the I-277/I-77 Strategic Plan, has been submitted to MUMPO at this time for inclusion in the 2040 LRTP.*

Table 5-1 on the following page summarizes the recommendations for each potential concept.



Table 5-1  
Summary of Recommendations

Potential Concept		Total Points	Approx. Cost	Recommendation	
				Inclusion in the I-277 / I-77 Strategic Plan	Submitted to MUMPO for Inclusion in the 2040 LRTP
A	I-77 at I-277 (John Belk Frwy)	17	\$60M	✓	✓
B	I-77 at Trade St SB C-D Rd	13	\$10M	✓	✓
C	I-77 at Trade St NB C-D Rd	11	\$10M	✓	✓
D	I-77 NB On-Ramp from Trade St / 5th St	10	\$5M	✓	✓
E	I-77 NB Off-Ramp to I-277 EB / Brookshire Frwy	9	\$2M	✓	-
F	I-77 SB Off-Ramp to I-277 EB / Brookshire Frwy	15	\$15M	✓	-
G	I-77 NB On-Ramp from I-277 WB / Brookshire Frwy	16	\$2M	✓	-
H	I-277 (Brookshire Frwy) at Church St / Caldwell St interchange	11	\$11M	✓	✓
I	New Connector Rd - Graham St to Church St	10	\$5M	✓	✓
J	New Connector Rd - Church St to College St	6	\$15M	✓	-
K	New Connector Rd - College St to Brevard St	7	\$21M	✓	-
L	I-277 at Independence Blvd WB C-D Rd	17	\$22M	✓	✓
M	I-277 at Independence Blvd EB C-D Rd	15	\$22M	✓	✓
ML-1	I-277 at Independence Blvd - General Purpose Lanes Only	15	\$60M	✓	✓
ML-2	I-277 at Independence Blvd - Managed Lanes Only	13	\$35M	✓	✓
N	Relocation of I-277/Carson Blvd Ramp	4	\$10M	✓	-
O	Cap John Belk Frwy between Church St and LYNX Rail	8	\$328M*	✓	-
P	Cap Brookshire Frwy between Davidson St and Caldwell St	8	**	✓	-
Q	Tunnel Brookshire Frwy between Davidson St and College St	11	**	✓	-
R	Convert Brookshire Frwy between Davidson St and College St into Boulevard	-5	**	-	-
S	Convert 12th Street into two-way street	11	\$90M	✓	✓

\* Preliminary cost estimates for Concept O were provided by the Charlotte Department of Transportation

Source: HNTB Institute, I-277 Planning Charrette, 2008

\*\* Additional planning and design studies will need to be performed before preliminary cost estimates are prepared for Concepts P, Q, and R.



### Summary of Recommendations

Based on the input from the TOT, ranking results and public input, the following recommendations were developed for the I-277/I-77 Strategic Plan:

- **Potential Concept A:** Reconstruct the interchange at I-77 and I-277 (John Belk Freeway) and I-77 between John Belk Freeway and Brookshire Freeway. This potential concept would involve a long term capital investment and an intensive reconstruction effort.
- **Potential Concepts B, C, and D:** Consolidate and reconstruct interchanges along I-77 between I-277 (John Belk Freeway) and I-277 (Brookshire Freeway). This potential concept would require coordination with the I-77 North Managed Lanes project and I-77 South Feasibility Study.
- **Potential Concepts E, F, and G:** Modify the interchange at I-77 and I-277 (Brookshire Freeway). This potential concept would require coordination with the I-77 North Managed Lanes project, which is being currently studied for a possible public-private partnership project.
- **Potential Concepts H, I, and J:** Modify I-277 (Brookshire Freeway) between Independence Boulevard (US 74) and I-77. This potential concept would require additional study after the I-77 North Managed Lanes are constructed.
- **Potential Concepts L, M, ML-1, and ML-2:** Improve/add connections between I-277 and Independence Boulevard (US 74). This potential concept would involve accommodations for future managed lanes in this area. It should be noted that due to their close proximity, any improvements to the I-277 at Independence Boulevard (US 74) interchange may require improvements to the nearby Kenilworth Avenue/3rd Street/4th Street interchanges as well.
- No potential concepts are recommended for the I-277/I-77 Strategic Plan for I-277 (John Belk Freeway) between Kenilworth Avenue and I-77 as a result of the recent interchange modifications, since it would continue to function within acceptable roadway capacity limits for the next 20 to 30 years.
- Potential concepts to cap over or tunnel under portions of I-277 would have minimal to no impact on the functional operations of the I-277/I-77 Loop. These concepts are primarily economic development projects so they are not reflected as recommendations in the I-277/I-77 Loop Strategic Plan. However, any recommended concepts in these areas should be built in a way that allows for future implementation of the tunnels and caps. The connectivity and economic development benefits of the tunnels and caps would still have merit and should be considered through non-transportation related funding sources.

In the next phases of this Study, each of these recommendations will be further evaluated. Depending on available funding, additional designs will be created in order to implement these recommendations. During future phases, multi-modal and urban design elements will be incorporated.



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# Appendix **A**

## Planning Level Cost Estimates



277 15  
John Belk Frwy  
Brookshire Frwy  
EXIT 2 MILES

Brier Creek  
Bejangles Ctr

EXIT  
244

## Appendix A: Planning Level Cost Estimates

Project		Construction Cost	Right of Way Cost	Environmental Mitigation Cost	Total Project Cost	Rounded to nearest \$1M or \$5M
A	I-77 at I-277 (John Belk Frwy)	\$55,300,000	\$980,000	\$70,000	\$56,350,000	\$60,000,000
B	I-77 at Trade St SB C-D Rd	\$9,000,000	\$0	\$0	\$9,000,000	\$10,000,000
C	I-77 at Trade St NB C-D Rd	\$7,600,000	\$0	\$0	\$7,600,000	\$10,000,000
D	I-77 NB On-Ramp from Trade St / 5th St	\$3,700,000	\$0	\$0	\$3,700,000	\$5,000,000
E	I-77 NB Off-Ramp to I-277 EB / Brookshire Frwy	\$1,950,000	\$0	\$0	\$1,950,000	\$2,000,000
F	I-77 SB Off-Ramp to I-277 EB / Brookshire Frwy	\$14,000,000	\$0	\$0	\$14,000,000	\$15,000,000
G	I-77 NB On-Ramp from I-277 WB / Brookshire Frwy	\$1,740,000	\$0	\$0	\$1,740,000	\$2,000,000
H	I-277 (Brookshire Frwy) at N Church St Slip Ramps	\$2,250,000	\$50,000	\$0	\$2,300,000	\$2,000,000
H	I-277 at Davidson St Slip Ramps	\$8,300,000	\$150,000	\$0	\$8,450,000	\$9,000,000
I	New Connector Rd - Graham St to Church St	\$2,310,000	\$2,540,000	\$0	\$4,850,000	\$5,000,000
J	New Connector Rd - Church St to College St	\$6,850,000	\$6,350,000	\$0	\$13,200,000	\$15,000,000
K	New Connector Rd - College St to Brevard St	\$18,850,000	\$2,150,000	\$0	\$21,000,000	\$21,000,000
L	I-277 at Independence Blvd WB C-D Rd	\$21,000,000	\$400,000	\$0	\$21,400,000	\$22,000,000
M	I-277 at Independence Blvd EB C-D Rd	\$21,425,000	\$25,000	\$0	\$21,450,000	\$22,000,000
ML-1	I-277 at Independence Blvd - General Purpose Lanes Only	\$57,078,000	\$1,100,000	\$22,000	\$58,200,000	\$60,000,000
ML-2	I-277 at Independence Blvd - Managed Lanes Only	\$33,100,000	\$0		\$33,100,000	\$35,000,000
N	Relocation of I-277/Carson Blvd Ramp	\$5,100,000	\$2,300,000	\$0	\$7,400,000	\$10,000,000
O	Cap John Belk Frwy between Church St and LYNX Rail	\$328,000,000	-	-	\$328,000,000	\$328,000,000 *
P	Cap Brookshire Frwy between Davidson St and Caldwell St	-	-	-	-	- **
Q	Tunnel Brookshire Frwy between Davidson St and College St	-	-	-	-	- **
R	Convert Brookshire Frwy between Davidson St and College St into Boulevard	-	-	-	-	- **
S	Convert 12th Street into two-way street	\$81,650,000	\$4,350,000	-	\$86,000,000	\$90,000,000
<b>Total</b>		<b>\$679,203,000</b>	<b>\$20,395,000</b>	<b>\$92,000</b>	<b>\$699,690,000</b>	<b>\$700,000,000</b>

\* Preliminary cost estimates for Concept O are provided by the Charlotte Department of Transportation. Source: HNTB Institute, I-277 Planning Charette, 2008

\*\* Additional planning and design studies will need be performed before preliminary Cost estimates are prepared for Concepts P, Q and R.

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept A  
I-77 at I-277 (John Belk Frwy)

Prepared By: Doug Lane 9/25/12  
Requested By: R. Swayampakala, RS&H 7/24/12  
Jason Talley, PE 9/25/12

<b>CONSTR. COST</b>
<b>\$55,300,000</b>
<b>TOTAL COST</b>
<b>\$56,350,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	34.0	Acre	\$ 15,000.00	\$ 510,000.00
			Earthwork	200,000	CY	\$ 9.00	\$ 1,800,000.00
			Reinforced Bridge Approach Fills	5	Each	\$ 25,000.00	\$ 125,000.00
			Drainage Existing Location	3.20	Miles	\$ 25,000.00	\$ 80,000.00
			Drainage New Location- Open System	0.80	Miles	\$ 120,000.00	\$ 96,000.00
			Fine Grading	50,300	SY	\$ 3.00	\$ 150,900.00
			Pavement Widening	2,850	SY	\$ 70.00	\$ 199,500.00
			New Pavement	47,450	SY	\$ 60.00	\$ 2,847,000.00
			Pavement Resurfacing	25,000	SY	\$ 12.00	\$ 300,000.00
			Subgrade Stabilization	50,300	SY	\$ 6.00	\$ 301,800.00
			1'-6" Concrete Curb and Gutter	0	LF	\$ -	\$ -
			2'-6" Concrete Curb and Gutter	9,100	LF	\$ 15.00	\$ 136,500.00
			4" Concrete Sidewalk	2,000	SY	\$ 25.00	\$ 50,000.00
			5" Monolithic Islands	4,800	SY	\$ 40.00	\$ 192,000.00
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	34.0	Acres	\$ 12,000.00	\$ 408,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Signing for 2 Level Interchange	1.0	Each	\$ 600,000.00	\$ 600,000.00
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	3	Each	\$ 100,000.00	\$ 300,000.00
			Traffic Control Contingency	1	LS	\$ 5,000,000.00	\$ 5,000,000.00
			Traffic Control	3.2	Miles	\$ 400,000.00	\$ 1,280,000.00
			Thermo and Markers	3.2	Miles	\$ 20,000.00	\$ 64,000.00
			<b>Structures</b>				
			Hwy/Railroad 52' x 460'	24,000	SF	\$ 105.00	\$ 2,520,000.00
			Bridge Approach Slabs 2@52'x 25'	2,600	SF	\$ 25.00	\$ 65,000.00
Curved			Wilkinson Blvd Br 80'x 158'	12,655	SF	\$ 125.00	\$ 1,581,875.00
			Bridge Approach Slabs 2@72'x 25'	3,600	SF	\$ 25.00	\$ 90,000.00
Curved			Freedom Dr over ramps & 177 Br 60'x 640'	38,400	SF	\$ 125.00	\$ 4,800,000.00
			Bridge Approach Slabs 2@60'x 25'	3,000	SF	\$ 25.00	\$ 75,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
Curved			Bridge / I-77 83'x 340'	32,230	SF	\$ 125.00	\$ 4,028,750.00
			Bridge Approach Slabs 2@75x 25'	4,350	SF	\$ 25.00	\$ 108,750.00
Curved			Ramp Bridge 36'x 337'	12,130	SF	\$ 125.00	\$ 1,516,250.00
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			Structure Removal	7	EA	\$100,000	\$ 700,000.00
			Retaining Walls	22,500.00	SF	\$ 90.00	\$ 2,025,000.00
			<b>RC Box Culverts</b>				
			Extend culvert on Freedom	140	LF	\$ 2,520.00	\$ 352,800.00
			Ramp	50	LF	\$ 2,520.00	\$ 126,000.00
			<b>Utility Construction</b>				
			Length of Project (Widening)	1	Miles	\$ 1,000,000.00	\$ 1,000,000.00
			Length of Project (New Location)	3	Miles	\$ 500,000.00	\$ 1,600,000.00
			Misc. & Mob (15% Strs & Util)				\$ 3,000,000.00
			Misc. & Mob (55% Functional)				\$ 8,000,000.00

<b>Lgth 3.2Miles</b>	<b>Contract Cost</b> .....	\$ 46,075,125.00
	<b>E. &amp; C. 20%</b> .....	\$ 9,224,875.00
	<b>Construction Cost</b> .....	<b>\$ 55,300,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial	1	Acres	\$ 650,000.00	\$ 650,000.00
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (Average)		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ 650,000.00</b>
			ROW Acquisition Contingency (50%)				\$ 330,000.00
			<b>Right of Way Costs</b> .....				<b>\$ 980,000.00</b>

**Environmental Mitigation**

			Streams Impacted	190	LF	\$ 323.00	\$ 61,370.00
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ 61,370.00</b>
			Environmental Mitigation Contingency (10%)				\$ 8,630.00
			<b>Environmental Mitigation Costs</b> .....				<b>\$ 70,000.00</b>

			Subtotal Construction Cost				\$ 55,300,000.00
			Subtotal Right of Way Cost				\$ 980,000.00
			Subtotal Environmental Mitigation Cost				\$ 70,000.00
			<b>Total Project Cost</b>				<b>\$ 56,350,000.00</b>

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept B  
I-77 at Trade St SB C-D Rd

Prepared By: Doug Lane 9/24/12  
Requested By: R. Swayampakala, RS&H 7/27/12  
Jason Talley, PE 9/24/12

<b>CONSTR. COST</b>
<b>\$9,000,000</b>
<b>TOTAL COST</b>
<b>\$9,000,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	15.0	Acre	\$ 15,000.00	\$ 225,000.00
			Earthwork	140,000	CY	\$ 9.00	\$ 1,260,000.00
			Reinforced Bridge Approach Fills	3	Each	\$ 25,000.00	\$ 75,000.00
			Drainage New Location- Open System	1.30	Miles	\$ 120,000.00	\$ 156,000.00
			Fine Grading	12,900	SY	\$ 3.00	\$ 38,700.00
			Pavement Widening		SY		\$ -
			New Pavement	12,900	SY	\$ 65.00	\$ 838,500.00
			Pavement Resurfacing	15,170	SY	\$ 12.00	\$ 182,040.00
			Subgrade Stabilization	12,900	SY	\$ 6.00	\$ 77,400.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	0	LF		\$ -
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			Conc. Barrier	300	LF	\$ 70.00	\$ 21,000.00
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	15.0	Acres	\$ 12,000.00	\$ 180,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			SB CD Road	1.0	Each	\$ 400,000.00	\$ 400,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	1	Each	\$ 70,000.00	\$ 70,000.00
			Traffic Signal (New)	2	Each	\$ 100,000.00	\$ 200,000.00
			Traffic Control	1.3	Miles	\$ 200,000.00	\$ 260,000.00
			Thermo and Markers	1.3	Miles	\$ 12,000.00	\$ 15,600.00
			<b>Structures</b>				
			Hwy/Greenway (SB) 40' x 134'	5,365	SF	\$ 105.00	\$ 563,325.00
			Bridge Approach Slabs 2@40'x 25'	2,000	SF	\$ 25.00	\$ 50,000.00
			4th st. (SB) bridge 40' x 80'	3,170	SF	\$ 100.00	\$ 317,000.00
			Bridge Approach Slabs 2@40'x 25'	2,000	SF	\$ 25.00	\$ 50,000.00
			Retaining Walls	1,060.00	SF	\$ 90.00	\$ 95,400.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			<b>RC Box Culverts</b>				
			Ex. 3@10x10-50'Extension-3'Fill-90Skew	0	LF		
			<b>Utility Construction</b>				
			Length of Project (Widening)		Miles	\$ 1,000,000.00	
			Length of Project (New Location)	1.3	Miles	\$ 500,000.00	\$ 640,530.30
			Misc. & Mob (15% Strs&Util)				\$ 257,504.70
			Misc. & Mob (55% Functional)				\$ 1,800,000.00

Lgth ___ Miles	<b>Contract Cost</b> .....	\$ 7,773,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 1,227,000.00
	<b>Construction Cost</b> .....	<b>\$ 9,000,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:		Central	
			Commercial		Acres	\$ -
			Industrial		Acres	\$ -
			Office		Acres	\$ -
			Residential		Acres	\$ -
			Other (Average)		Acres	\$ -
			<b>SUBTOTAL</b>			\$ -
			ROW Acquisition Contingency (50%)			\$ -

**Right of Way Costs** ..... \$ -

**Environmental Mitigation**

			Streams Impacted		LF	\$ -
			Wetlands Impacted		Acres	\$ -
			<b>SUBTOTAL</b>			\$ -
			Environmental Mitigation Contingency (10%)			\$ -

**Environmental Mitigation Cost** ..... \$ -

			Subtotal Construction Cost			\$ 9,000,000.00
			Subtotal Right of Way Cost			\$ -
			Subtotal Environmental Mitigation Cost			\$ -

**Total Project Cost** ..... \$ **9,000,000.00**

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept C  
I-77 at Trade St NB C-D Rd

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

7/27/2012  
7/27/2012

<b>CONSTR. COST</b>
<b>\$7,600,000</b>
<b>TOTAL COST</b>
<b>\$7,600,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	8.0	Acre	\$ 20,000.00	\$ 160,000.00
			Earthwork	120,160	CY	\$ 9.00	\$ 1,081,440.00
			Reinforced Bridge Approach Fills	2	Each	\$ 25,000.00	\$ 50,000.00
			Drainage New Location- Open System	0.66	Miles	\$ 120,000.00	\$ 79,200.00
							\$ -
			Fine Grading	12,300	SY	\$ 3.00	\$ 36,900.00
			Pavement Widening	0	SY		\$ -
			New Pavement	12,300	SY	\$ 65.00	\$ 799,500.00
			Pavement Resurfacing	4,300	SY	\$ 12.00	\$ 51,600.00
			Subgrade Stabilization	12,300	SY	\$ 6.00	\$ 73,800.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	0	LF		\$ -
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			Conc. Barrier	200	LF	\$ 70.00	\$ 14,000.00
			<b>Fencing</b>				
			Chain Link	0	LF		\$ -
			Erosion Control	8.0	Acres	\$ 20,000.00	\$ 160,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			NB CD Road C	1.0	Each	\$ 300,000.00	\$ 300,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	2	Each	\$ 70,000.00	\$ 140,000.00
			Traffic Signal (New)	1	Each	\$ 100,000.00	\$ 100,000.00
			Traffic Control	0.66	Miles	\$ 200,000.00	\$ 132,000.00
			Thermo and Markers	0.66	Miles	\$ 12,000.00	\$ 7,920.00
			<b>Structures</b>				
			Hwy/Greenway NB 64'x 206'	13,200	SF	\$ 105.00	\$ 1,386,000.00
			Bridge Approach Slabs 2@64'x 25'	3,200	SF	\$ 25.00	\$ 80,000.00
			4th st. (NB) bridge 40' x 63'	2,510	SF	\$ 100.00	\$ 251,000.00
			Bridge Approach Slabs 2@40'x 25'	2,000	SF	\$ 25.00	\$ 50,000.00
			Retaining Walls	0.00	SF	\$ 50.00	\$ -
			<b>RC Box Culverts</b>				
			Ex. 3@10x10-50'Extension-3'Fill-90Skew	0	LF		

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			<b>Utility Construction</b>				
			Length of Project (Widening)		Miles		
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 265,640.00
			Misc. & Mob (55% Functional)				\$ 1,434,000.00

<b>Lgth 0.8_Miles</b>	<b>Contract Cost</b> .....	\$ 6,653,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 947,000.00
	<b>Construction Cost</b> .....	<b>\$ 7,600,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (Average)		Acres		\$ -
			SUBTOTAL				\$ -
			ROW Acquisition Contingency (50%)	0		0	\$ -

<b>Right of Way Costs</b> .....	<b>\$ -</b>
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**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			SUBTOTAL				\$ -
			Environmental Mitigation Contingency (10%)				\$ -

<b>Environmental Mitigation Cost</b> .....	<b>\$ -</b>
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			Subtotal Construction Cost				\$ 7,600,000.00
			Subtotal Right of Way Cost				\$ -
			Subtotal Environmental Mitigation Cost				\$ -

<b>Total Project Cost</b>	<b>\$ 7,600,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept D  
I-77 NB On-Ramp from Trade St / 5th St

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

<b>CONSTR. COST</b>
<b>\$3,700,000</b>
<b>TOTAL COST</b>
<b>\$3,700,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.0	Acre	\$ 20,000.00	\$ 20,000.00
			Earthwork	5,000	CY	\$ 9.00	\$ 45,000.00
			Reinforced Bridge Approach Fills	1	Each	\$ 25,000.00	\$ 25,000.00
			Drainage New Location- Open System	0.30	Miles	\$ 120,000.00	\$ 36,000.00
							\$ -
			Fine Grading	3,700	SY	\$ 3.00	\$ 11,100.00
			Pavement Widening	0	SY		\$ -
			New Pavement	3,700	SY	\$ 65.00	\$ 240,500.00
			Pavement Resurfacing	0	SY	\$ 12.00	\$ -
			Subgrade Stabilization	3,700	SY	\$ 6.00	\$ 22,200.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	0	LF		\$ -
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			Conc. Barrier	0	LF	\$ 70.00	\$ -
			<b>Fencing</b>				
			Chain Link	0	LF		\$ -
			Erosion Control	1.0	Acres	\$ 20,000.00	\$ 20,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			NB CD Road D	1.0	Each	\$ 100,000.00	\$ 100,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each	\$ 70,000.00	\$ -
			Traffic Signal (New)	0	Each	\$ 100,000.00	\$ -
			Traffic Control	0.3	Miles	\$ 200,000.00	\$ 60,000.00
			Thermo and Markers	0.3	Miles	\$ 12,000.00	\$ 3,600.00
			<b>Structures</b>				
			5th st. bridge 76' x 257'	19,550	SF	\$ 95.00	\$ 1,857,250.00
			Bridge Approach Slabs 2@76'x 25'	3,800.00	SF	\$ 25.00	\$ 95,000.00
			Structure Removal	1	EA	\$100,000	\$ 100,000.00
			Retaining Walls	0.00	SF	\$ 50.00	\$ -
			<b>RC Box Culverts</b>				
			Ex. 3@10x10-50'Extension-3'Fill-90Skew	0	LF		

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			<b>Utility Construction</b>				
			Length of Project (Widening)		Miles		
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 307,350.00
			Misc. & Mob (55% Functional)				\$ 263,000.00

<b>Lgth 0.8_ Miles</b>	<b>Contract Cost</b> .....	\$ 3,206,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 494,000.00
	<b>Construction Cost</b> .....	<b>\$ 3,700,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:		Central		
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (Average)		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			ROW Acquisition Contingency (50%)	0		0	\$ -

**Right of Way Costs** ..... \$ -

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			Environmental Mitigation Contingency (10%)				\$ -

**Environmental Mitigation Cost** ..... \$ -

			Subtotal Construction Cost				\$ 3,700,000.00
			Subtotal Right of Way Cost				\$ -
			Subtotal Environmental Mitigation Cost				\$ -

**Total Project Cost** ..... \$ 3,700,000.00

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept E, F, and G  
I-77 at I-277 (Brookshire Freeway)/NC 16

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

<b>CONSTR. COST</b>	
<b>\$17,690,000</b>	
<b>TOTAL COST</b>	
<b>\$ 17,690,000.00</b>	

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	3.0	Acre	\$ 20,000.00	\$ 60,000.00
			Earthwork	31,000	CY	\$ 13.00	\$ 403,000.00
			Reinforced Bridge Approach Fills	4	Each	\$ 10,000.00	\$ 40,000.00
			Drainage Existing Location - Open System	1.60	Miles	\$ 250,000.00	\$ 400,000.00
							\$ -
			Fine Grading	11,050	SY	\$ 3.00	\$ 33,150.00
			Pavement Widening	5,300	SY	\$ 70.00	\$ 371,000.00
			New Pavement	5,750	SY	\$ 65.00	\$ 373,750.00
			Pavement Resurfacing	16,750	SY	\$ 12.00	\$ 201,000.00
			Subgrade Stabilization	11,050	SY	\$ 6.00	\$ 66,300.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter		LF		\$ -
			4" Concrete Sidewalk		SY		\$ -
			5" Monolithic Islands		SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	5.0	Acres	\$ 20,000.00	\$ 100,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: 2 Directional Ramps, 1 cantilever exit sign	2.0 1.0	Each Each	\$ 120,000.00 \$ 120,000.00	\$ 240,000.00 \$ 120,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	1.6	LS	\$ 1,012,000.00	\$ 1,012,000.00
			Thermo and Markers	1.6	Miles	\$ 12,000.00	\$ 19,200.00
			<b>Structures</b>				
			Bridge 339 Widen 16' x 200'	3,200	SF	\$ 160.00	\$ 512,000.00
			Bridge Approach Slabs 2@16'x 25'	800	SF	\$ 25.00	\$ 20,000.00
			Retaining Walls		SF		\$ -
							\$ -
			Structure removal 314x50 (#345)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 314x50 (#281)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 314x50 (#341)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 314x50 (#340)	1	LS	\$ 100,000.00	\$ 100,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			New Structure 320 x 50, over roads & water	16000	SF	\$ 125.00	\$ 2,000,000.00
			hor and vert curve (replaces 345)				\$ -
			Bridge Approach Slabs 2@50'x 25'	2500	SF	\$ 25.00	\$ 62,500.00
			New Structure 200 x 40, Ramp over I-77	8000	SF	\$ 125.00	\$ 1,000,000.00
			hor and vert curve (replaces 281)				\$ -
			Bridge Approach Slabs 2@40'x 25'	2000	SF	\$ 25.00	\$ 50,000.00
			New Structure 380 x 48, I277 ramp over I77	18240	SF	\$ 125.00	\$ 2,280,000.00
			hor and vert curve (replaces 340)				\$ -
			Bridge Approach Slabs 2@48'x 25'	2400	SF	\$ 25.00	\$ 60,000.00
			New Structure 200 x 46, NC 16 over I77	9200	SF	\$ 125.00	\$ 1,150,000.00
			hor tang and vert curve (replaces 341)				\$ -
			Bridge Approach Slabs 2@46'x 25'	2300	SF	\$ 25.00	\$ 57,500.00
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				\$ -
			<b>Lighting</b>				
			Relocate / New Interchange Lighting	1	LS	\$ 600,000.00	\$ 600,000.00
			<b>Utility Construction</b>				
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 1,229,070.00
			Misc. & Mob (55% Functional)				\$ 1,893,000.00

Lgth 1.6\_Miles

<b>Contract Cost</b> .....	\$ 14,753,470.00
<b>E. &amp; C. 20%</b> .....	\$ 2,936,530.00
<b>Construction Cost</b> .....	<b>\$ 17,690,000.00</b>

**Right of Way**

			Description		Central	
			Select Region for Acreage Costs:			
			Commercial		Acres	\$ -
			Industrial		Acres	\$ -
			Office		Acres	\$ -
			Residential		Acres	\$ -
					Acres	\$ -
			<b>SUBTOTAL</b>			\$ -
			ROW Acquisition Contingency (50%)			\$ -

**Right of Way Costs** ..... **\$ -**

**Environmental Mitigation**

			Streams Impacted		LF	\$ -
			<b>Wetlands Impacted</b>		<b>Acres</b>	<b>\$ -</b>
			<b>SUBTOTAL</b>			<b>\$ -</b>
			Environmental Mitigation Contingency (10%)			\$ -

**Environmental Mitigation Cost** ..... **\$ -**

			Subtotal Construction Cost			\$ 17,690,000.00
			Subtotal Right of Way Cost			\$ -
			Subtotal Environmental Mitigation Cost			\$ -

**Total Project Cost** ..... **\$ 17,690,000.00**

I-277 / I-77 Loop Study

County: Mecklenburg

**Potential Concept E**  
I-77 NB Off-Ramp to I-277 EB / Brookshire Frwy

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>	
<b>\$1,950,000</b>	
<b>TOTAL COST</b>	
<b>\$ 1,950,000.00</b>	

**Construction**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.0	Acre	\$ 20,000.00	\$ 20,000.00
			Earthwork	6,000	CY	\$ 13.00	\$ 78,000.00
			Reinforced Bridge Approach Fills	0	Each	\$ 10,000.00	\$ -
			Drainage Existing Location - Open System	0.44	Miles	\$ 250,000.00	\$ 110,000.00
							\$ -
			Fine Grading	5,750	SY	\$ 3.00	\$ 17,250.00
			Pavement Widening	0	SY	\$ 70.00	\$ -
			New Pavement	5,750	SY	\$ 65.00	\$ 373,750.00
			Pavement Resurfacing	0	SY	\$ 12.00	\$ -
			Subgrade Stabilization	5,750	SY	\$ 6.00	\$ 34,500.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter		LF		\$ -
			4" Concrete Sidewalk		SY		\$ -
			5" Monolithic Islands		SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	2.0	Acres	\$ 20,000.00	\$ 40,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Directional Ramp	1.0	Each	\$ 120,000.00	\$ 120,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	0.44	Miles	\$ 300,000.00	\$ 132,000.00
			Thermo and Markers	0.44	Miles	\$ 12,000.00	\$ 5,280.00
			<b>Structures</b>				
			Ramp Bridge Widen 12' x 180'	0	SF	\$ 160.00	\$ -
			Bridge Approach Slabs 2@12'x 25'	0	SF	\$ 25.00	\$ -
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				\$ -
			<b>Lighting</b>				
			Relocate / New Interchange Lighting	1	LS	\$ 150,000.00	\$ 150,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			<b>Utility Construction</b>				
				0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 22,220.00
			Misc. & Mob (55% Functional)				\$ 519,000.00

<b>Lgth 0.44_ Mile:</b>	<b>Contract Cost</b> .....	\$ 1,622,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 328,000.00
	<b>Construction Cost</b> .....	<b>\$ 1,950,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:		Central	
			Commercial		Acres	\$ -
			Industrial		Acres	\$ -
			Office		Acres	\$ -
			Residential		Acres	\$ -
					Acres	\$ -
			SUBTOTAL			\$ -
			ROW Acquisition Contingency (50%)			\$ -

**Right of Way Costs** ..... **\$ -**

**Environmental Mitigation**

			Streams Impacted		LF	\$ -
			Wetlands Impacted		Acres	\$ -
			SUBTOTAL			\$ -
			Environmental Mitigation Contingency (10%)			\$ -

**Environmental Mitigation Cost** ..... **\$ -**

			Subtotal Construction Cost			\$ 1,950,000.00
			Subtotal Right of Way Cost			\$ -
			Subtotal Environmental Mitigation Cost			\$ -

**Total Project Cost** ..... **\$ 1,950,000.00**

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept F

I-77 SB Off-Ramp to I-277 EB / Brookshire Frwy

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

<b>CONSTR. COST</b>	
<b>\$14,000,000</b>	
<b>TOTAL COST</b>	
<b>\$ 14,000,000.00</b>	

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.0	Acre	\$ 20,000.00	\$ 20,000.00
			Earthwork	17,000	CY	\$ 13.00	\$ 221,000.00
			Reinforced Bridge Approach Fills	4	Each	\$ 10,000.00	\$ 40,000.00
			Drainage Existing Location - Open System	0.76	Miles	\$ 250,000.00	\$ 190,000.00
							\$ -
			Fine Grading	1,650	SY	\$ 3.00	\$ 4,950.00
			Pavement Widening	1,650	SY	\$ 70.00	\$ 115,500.00
			New Pavement	0	SY	\$ 65.00	\$ -
			Pavement Resurfacing	14,000	SY	\$ 12.00	\$ 168,000.00
			Subgrade Stabilization	1,650	SY	\$ 6.00	\$ 9,900.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter		LF		\$ -
			4" Concrete Sidewalk		SY		\$ -
			5" Monolithic Islands		SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	1.0	Acres	\$ 20,000.00	\$ 20,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Directional Ramp	1.0	Each	\$ 120,000.00	\$ 120,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	0.76	Miles	\$ 1,000,000.00	\$ 760,000.00
			Thermo and Markers	0.76	Miles	\$ 12,000.00	\$ 9,120.00
			<b>Structures</b>				
			Bridge 339 Widen 16' x 200'	3,200	SF	\$ 160.00	\$ 512,000.00
			Bridge Approach Slabs 2@16'x 25'	800	SF	\$ 25.00	\$ 20,000.00
			Retaining Walls		SF		\$ -
			Structure removal 314x50 (#345)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 314x50 (#281)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 314x50 (#341)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 314x50 (#340)	1	LS	\$ 100,000.00	\$ 100,000.00
			New Structure 320 x 50, over roads & water	16000	SF	\$ 125.00	\$ 2,000,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			hor and vert curve (replaces 345)				
			Bridge Approach Slabs 2@50'x 25'	2500	SF	\$ 25.00	\$ 62,500.00
			New Structure 200 x 40, Ramp over I-77	8000	SF	\$ 125.00	\$ 1,000,000.00
			hor and vert curve (replaces 281)				
			Bridge Approach Slabs 2@40'x 25'	2000	SF	\$ 25.00	\$ 50,000.00
			New Structure 380 x 48, I277 ramp over I77	18240	SF	\$ 125.00	\$ 2,280,000.00
			hor and vert curve (replaces 340)				
			Bridge Approach Slabs 2@48'x 25'	2400	SF	\$ 25.00	\$ 60,000.00
			New Structure 200 x 46, NC 16 over I77	9200	SF	\$ 125.00	\$ 1,150,000.00
			hor tang and vert curve (replaces 341)				
			Bridge Approach Slabs 2@46'x 25'	2300	SF	\$ 25.00	\$ 57,500.00
			<b>RC Box Culverts</b>				\$ -
			<b>Lighting</b>				\$ -
			Relocate / New Interchange Lighting	1	LS	\$ 300,000.00	\$ 300,000.00
			<b>Utility Construction</b>				
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 1,184,000.00
			Misc. & Mob (55% Functional)				\$ 924,000.00

Lgth 0.76 Miles

<b>Contract Cost</b> .....	\$ 11,678,470.00
<b>E. &amp; C. 20%</b> .....	\$ 2,321,530.00
<b>Construction Cost</b> .....	<b>\$ 14,000,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:		Central		
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
					Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			ROW Acquisition Contingency (50%)				\$ -

**Right of Way Costs** ..... **\$ -**

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			<b>Wetlands Impacted</b>		<b>Acres</b>		<b>\$ -</b>
			<b>SUBTOTAL</b>				<b>\$ -</b>
			Environmental Mitigation Contingency (10%)				\$ -

**Environmental Mitigation Cost** ..... **\$ -**

			Subtotal Construction Cost				\$ 14,000,000.00
			Subtotal Right of Way Cost				\$ -
			Subtotal Environmental Mitigation Cost				\$ -

**Total Project Cost** ..... **\$ 14,000,000.00**



I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept G

I-77 NB On-Ramp from I-277 WB / Brookshire Frwy

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

<b>CONSTR. COST</b>	
<b>\$1,740,000</b>	
<b>TOTAL COST</b>	
<b>\$ 1,740,000.00</b>	

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.0	Acre	\$ 20,000.00	\$ 20,000.00
			Earthwork	8,000	CY	\$ 13.00	\$ 104,000.00
			Reinforced Bridge Approach Fills	0	Each	\$ 10,000.00	\$ -
			Drainage Existing Location - Open System	0.40	Miles	\$ 250,000.00	\$ 100,000.00
							\$ -
			Fine Grading	3,650	SY	\$ 3.00	\$ 10,950.00
			Pavement Widening	3,650	SY	\$ 70.00	\$ 255,500.00
			New Pavement	0	SY	\$ 65.00	\$ -
			Pavement Resurfacing	2,750	SY	\$ 12.00	\$ 33,000.00
			Subgrade Stabilization	3,650	SY	\$ 6.00	\$ 21,900.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter		LF		\$ -
			4" Concrete Sidewalk		SY		\$ -
			5" Monolithic Islands		SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	2.0	Acres	\$ 20,000.00	\$ 40,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: cantilever exit sign	1.0	Each	\$ 120,000.00	\$ 120,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	0.4	Miles	\$ 300,000.00	\$ 120,000.00
			Thermo and Markers	0.4	Miles	\$ 12,000.00	\$ 4,800.00
			<b>Structures</b>				
			Ramp Bridge Widen 12' x 180'	0	SF	\$ 160.00	\$ -
			Bridge Approach Slabs 2@12'x 25'	0	SF	\$ 25.00	\$ -
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				\$ -
			<b>Lighting</b>				
			Relocate / New Interchange Signing	1	LS	\$ 150,000.00	\$ 150,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			<b>Utility Construction</b>				
				0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 22,850.00
			Misc. & Mob (55% Functional)				\$ 450,000.00
<b>Lgth 0.40 Miles</b>			<b>Contract Cost</b> .....				\$ 1,453,000.00
			<b>E. &amp; C. 20%</b> .....				\$ 287,000.00
			<b>Construction Cost</b> .....				<b>\$ 1,740,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
					Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			ROW Acquisition Contingency (50%)				\$ -
			<b>Right of Way Costs</b> .....				<b>\$ -</b>

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			Environmental Mitigation Contingency (10%)				\$ -
			<b>Environmental Mitigation Cost</b> .....				<b>\$ -</b>

			Subtotal Construction Cost				\$ 1,740,000.00
			Subtotal Right of Way Cost				\$ -
			Subtotal Environmental Mitigation Cost				\$ -
			<b>Total Project Cost</b>				<b>\$ 1,740,000.00</b>

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept G-1

Prepared By: Doug Lane  
 Requested By: R. Swayampakala, RS&H

9/24/12  
 7/27/12

<b>CONSTR. COST</b>	
<b>\$750,000</b>	
<b>TOTAL COST</b>	
<b>\$</b>	<b>750,000.00</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.0	Acre	\$ 20,000.00	\$ 20,000.00
			Earthwork	1,000	CY	\$ 13.00	\$ 13,000.00
			Reinforced Bridge Approach Fills	0	Each	\$ 10,000.00	\$ -
			Drainage Existing Location - Open System	0.40	Miles	\$ 250,000.00	\$ 100,000.00
							\$ -
			Fine Grading	1,000	SY	\$ 3.00	\$ 3,000.00
			Pavement Widening	1,000	SY	\$ 70.00	\$ 70,000.00
			New Pavement	0	SY	\$ 65.00	\$ -
			Pavement Resurfacing	1,000	SY	\$ 12.00	\$ 12,000.00
			Subgrade Stabilization	1,000	SY	\$ 6.00	\$ 6,000.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter		LF		\$ -
			4" Concrete Sidewalk		SY		\$ -
			5" Monolithic Islands		SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	2.0	Acres	\$ 20,000.00	\$ 40,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: cantilever exit sign	1.0	Each		\$ -
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	0.4	Miles	\$ 300,000.00	\$ 120,000.00
			Thermo and Markers	0.4	Miles	\$ 12,000.00	\$ 4,800.00
			<b>Structures</b>				
			Ramp Bridge Widen 12' x 180'	0	SF	\$ 160.00	\$ -
			Bridge Approach Slabs 2@12'x 25'	0	SF	\$ 25.00	\$ -
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				\$ -
			<b>Lighting</b>				
			Relocate / New Interchange Signing		LS	\$ 150,000.00	\$ -

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			<b>Utility Construction</b>				
				0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ -
			Misc. & Mob (55% Functional)				\$ 215,000.00

<b>Lgth 0.40 Miles</b>	<b>Contract Cost</b> .....	\$ 603,800.00
	<b>E. &amp; C. 20%</b> .....	\$ 146,200.00
	<b>Construction Cost</b> .....	<b>\$ 750,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
					Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			ROW Acquisition Contingency (50%)				\$ -

**Right of Way Costs** ..... **\$ -**

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			Environmental Mitigation Contingency (10%)				\$ -

**Environmental Mitigation Cost** ..... **\$ -**

			Subtotal Construction Cost				\$ 750,000.00
			Subtotal Right of Way Cost				\$ -
			Subtotal Environmental Mitigation Cost				\$ -

**Total Project Cost** ..... **\$ 750,000.00**

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept H  
I-277 (Brookshire Frwy) at N Church St Slip Ramps

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>
<b>\$2,250,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	0.1	Acre	\$ 25,000.00	\$ 2,500.00
			Earthwork	20,000	CY	\$ 8.00	\$ 160,000.00
			Drainage Existing Location - Open System	0.20	Miles	\$ 100,000.00	\$ 20,000.00
							\$ -
			Fine Grading	2,920	SY	\$ 3.00	\$ 8,760.00
			Pavement Widening	2,920	SY	\$ 100.00	\$ 292,000.00
			New Pavement		SY		\$ -
			Pavement Resurfacing	4,450	SY	\$ 12.00	\$ 53,400.00
			Subgrade Stabilization	2,920	SY	\$ 6.00	\$ 17,520.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	300	LF	\$ 16.00	\$ 4,800.00
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	6.0	Acres	\$ 20,000.00	\$ 120,000.00
			<b>Signing Interchanges</b>				
			Diamond	1.0	Each	\$ 340,000.00	\$ 340,000.00
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	2	Each	\$ 70,000.00	\$ 140,000.00
			Traffic Signal (New)		Each		\$ -
			Traffic Control	0.2	Miles	\$ 150,000.00	\$ 30,000.00
			Thermo and Markers	0.2	Miles	\$ 12,000.00	\$ 2,400.00
			<b>Structures</b>				
							\$ -
					SF		\$ -
			<b>RC Box Culverts</b>				
					LF		
			<b>Utility Construction</b>				
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				
			Misc. & Mob (55% Functional)				\$ 655,200.00

Lgth	___ Miles	<b>Contract Cost</b> .....	\$ 1,846,580.00
		<b>E. &amp; C. 20%</b> .....	\$ 403,420.00
		<b>Construction Cost</b> .....	<b>\$ 2,250,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential	0.1	Acres	\$ 340,000.00	\$ 34,000.00
			Other (Average)		Acres		\$ -
			<b>SUBTOTAL</b>				\$ 34,000.00
			<b>ROW Acquisition Contingency (50%)</b>				\$ 16,000.00
			<b>Right of Way Costs</b> .....				<b>\$ 50,000.00</b>

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			<b>Environmental Mitigation Contingency (10%)</b>				\$ -
			<b>Environmental Mitigation Cost</b> .....				<b>\$ -</b>

			Subtotal Construction Cost				\$ 2,250,000.00
			Subtotal Right of Way Cost				\$ 50,000.00
			Subtotal Environmental Mitigation Cost				\$ -
			<b>Total Project Cost</b>				<b>\$ 2,300,000.00</b>

## I-277 / I-77 Loop Study

County: Mecklenburg

**Potential Concept H**  
I-277 at Davidson St Slip Ramps

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>
<b>\$8,300,000</b>

**Construction**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	4.0	Acre	\$ 25,000.00	\$ 100,000.00
			Earthwork	42,740	CY	\$ 8.00	\$ 341,920.00
			Reinforced Bridge Approach Fills	1	Each	\$ 35,000.00	\$ 35,000.00
			Drainage New Location - Closed System	0.30	Miles	\$ 50,000.00	\$ 15,000.00
			Fine Grading	9,540	SY	\$ 3.00	\$ 28,620.00
			Pavement Widening	0	SY		\$ -
			New Pavement	9,540	SY	\$ 90.00	\$ 858,600.00
			Pavement Resurfacing	5,520	SY	\$ 12.00	\$ 66,240.00
			Subgrade Stabilization	9,540	SY	\$ 6.00	\$ 57,240.00
			1'-6" Concrete Curb and Gutter	350	LF	\$ 15.00	\$ 5,250.00
			2'-6" Concrete Curb and Gutter	3,200	LF	\$ 16.00	\$ 51,200.00
			4" Concrete Sidewalk	1,520	SY	\$ 25.00	\$ 38,000.00
			5" Monolithic Islands	400	SY	\$ 40.00	\$ 16,000.00
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	10.0	Acres	\$ 20,000.00	\$ 200,000.00
			<b>Signing Interchanges</b>				
			Diamond	1.0	Each	\$ 340,000.00	\$ 340,000.00
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout	2.0	Each	\$ 35,000.00	\$ 70,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	2	Each	\$ 70,000.00	\$ 140,000.00
			Traffic Signal (New)		Each		\$ -
			Traffic Control	0.3	Miles	\$ 150,000.00	\$ 45,000.00
			Thermo and Markers	0.3	Miles	\$ 12,000.00	\$ 3,600.00
			<b>Structures</b>				
			Structure Removal - Davidson St.	1.00	LS	\$ 100,000.00	\$ 100,000.00
			N Davidson st Bridge 78' x 347'	27,100	SF	\$ 95.00	\$ 2,574,500.00
			Bridge Approach Slabs 2@78'x 25'	3,900.0	SF	\$ 25.00	\$ 97,500.00
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				
			60' Extension-Assumed 2 of 8 x 8		LF		\$ -
			<b>Utility Construction</b>				

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -
			Length of Project (New Location)		Miles		\$ -
			Misc. & Mob (15% Strs&Util)				\$ 415,330.00
			Misc. & Mob (55% Functional)				\$ 1,301,000.00

<b>Lgth 0.2 Miles</b>	<b>Contract Cost</b> .....	\$ 6,900,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 1,400,000.00
	<b>Construction Cost</b> .....	<b>\$ 8,300,000.00</b>

**Right of Way**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Select Region for Acreage Costs:			Central	
			Commercial	0.1	Acres	\$ 615,000.00	\$ 61,500.00
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential	0.1	Acres	\$ 340,000.00	\$ 34,000.00
			Other (Average)		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ 95,500.00</b>
			ROW Acquisition Contingency (50%)				\$ 54,500.00

<b>Right of Way Costs</b> .....	<b>\$ 150,000.00</b>
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**Environmental Mitigation**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ -</b>
			Environmental Mitigation Contingency (10%)				\$ -

<b>Environmental Mitigation Cost</b> .....	<b>\$ -</b>
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			Subtotal Construction Cost				\$ 8,300,000.00
			Subtotal Right of Way Cost				\$ 150,000.00
			Subtotal Environmental Mitigation Cost				\$ -

<b>Total Project Cost</b>	<b>\$ 8,450,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept H Combined

I-277 (Brookshire Freeway) Between I-77 and US 74 (Independence Boulevard)

<b>CONSTR. COST</b>
<b>\$10,550,000</b>

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	4.1	Acre	\$ 25,000.00	\$ 102,500.00
			Earthwork	62,740	CY	\$ 8.00	\$ 501,920.00
			Reinforced Bridge Approach Fills	1	Each	\$ 35,000.00	\$ 35,000.00
			Drainage New Location - Closed System	0.30	Miles	\$ 50,000.00	\$ 15,000.00
			Drainage New Location - Open System	0.20	Miles	\$ 100,000.00	\$ 20,000.00
			Fine Grading	12,460	SY	\$ 3.00	\$ 37,380.00
			Pavement Widening	2,920	SY	\$ 100.00	\$ 292,000.00
			New Pavement	9,540	SY	\$ 90.00	\$ 858,600.00
			Pavement Resurfacing	9,970	SY	\$ 12.00	\$ 119,640.00
			Subgrade Stabilization	12,460	SY	\$ 6.00	\$ 74,760.00
			1'-6" Concrete Curb and Gutter	350	LF	\$ 15.00	\$ 5,250.00
			2'-6" Concrete Curb and Gutter	3,500	LF	\$ 16.00	\$ 56,000.00
			4" Concrete Sidewalk	1,520	SY	\$ 25.00	\$ 38,000.00
			5" Monolithic Islands	400	SY	\$ 40.00	\$ 16,000.00
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	16.0	Acres	\$ 20,000.00	\$ 320,000.00
			<b>Signing Interchanges</b>				
			Diamond	2.0	Each	\$ 340,000.00	\$ 680,000.00
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout	2.0	Each	\$ 35,000.00	\$ 70,000.00
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	4	Each	\$ 70,000.00	\$ 280,000.00
			Traffic Signal (New)		Each		\$ -
			Traffic Control	0.5	Miles	\$ 150,000.00	\$ 75,000.00
			Thermo and Markers	0.5	Miles	\$ 12,000.00	\$ 6,000.00
			<b>Structures</b>				
			Structure Removal - Davidson St.	1.00	LS	\$ 100,000.00	\$ 100,000.00
			N Davidson st Bridge 78' x 347'	27,100	SF	\$ 95.00	\$ 2,574,500.00
			Bridge Approach Slabs 2@78'x 25'	3,900	SF	\$ 25.00	\$ 97,500.00
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				
			60' Extension-Assumed 2 of 8 x 8		LF		\$ -

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
<b>Utility Construction</b>							
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 415,330.00
			Misc. & Mob (55% Functional)				\$ 1,956,200.00
<b>Lgth</b>	<b>0.2 Miles</b>						
			<b>Contract Cost</b>				\$ 8,746,580.00
			<b>E. &amp; C. 20%</b>				\$ 1,803,420.00
			<b>Construction Cost</b>				<b>\$ 10,550,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial	0.1	Acres	\$ 615,000.00	\$ 61,500.00
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential	0.2	Acres	\$ 340,000.00	\$ 68,000.00
			Other (Average)		Acres		\$ -
			<b>SUBTOTAL</b>				\$ 129,500.00
			<b>ROW Acquisition Contingency (50%)</b>				\$ 70,500.00
			<b>Right of Way Costs</b>				<b>\$ 200,000.00</b>

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			<b>Environmental Mitigation Contingency (10%)</b>				\$ -
			<b>Environmental Mitigation Cost</b>				<b>\$ -</b>

			Subtotal Construction Cost				\$ 10,550,000.00
			Subtotal Right of Way Cost				\$ 200,000.00
			Subtotal Environmental Mitigation Cost				\$ -
			<b>Total Project Cost</b>				<b>\$ 10,750,000.00</b>

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept I  
New Connector Rd - Graham St to Church St

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>	
<b>\$2,310,000</b>	
<b>TOTAL COST</b>	
<b>\$ 4,850,000.00</b>	

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	3.3	Acre	\$ 23,000.00	\$ 76,590.00
			Earthwork	19,120	CY	\$ 8.00	\$ 152,960.00
			Drainage - Closed System - New Location	0.33	Miles	\$ 225,000.00	\$ 74,250.00
							\$ -
			Fine Grading	4,040	SY	\$ 3.00	\$ 12,120.00
			Pavement Widening		SY		\$ -
			New Pavement	4,040	SY	\$ 80.00	\$ 323,200.00
			Pavement Resurfacing	510	SY		\$ -
			Subgrade Stabilization	4,040	SY	\$ 6.00	\$ 24,240.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	3,440	LF	\$ 14.00	\$ 48,160.00
			4" Concrete Sidewalk	1,920	SY	\$ 25.00	\$ 48,000.00
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	3.3	Acres	\$ 25,000.00	\$ 82,500.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	1	Each	\$ 70,000.00	\$ 70,000.00
			Traffic Signal (New)	1	Each	\$ 100,000.00	\$ 100,000.00
			Traffic Control	0.33	Miles	\$ 200,000.00	\$ 66,000.00
			Thermo and Markers	0.33	Miles	\$ 12,000.00	\$ 3,960.00
			<b>Structures</b>				
			<b>RC Box Culverts</b>				
			<b>Utility Construction</b>				

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Length of Project (Widening)	0.08	Miles	\$ 1,000,000.00	\$ 80,000.00
			Length of Project (New Location)	0.25	Miles	\$ 500,000.00	\$ 125,000.00
			Misc. & Mob (15% Strs&Util)				\$ 31,020.00
			Misc. & Mob (55% Functional)				\$ 600,000.00
<b>Lgth 0.33 Miles</b>			<b>Contract Cost</b> .....				\$ 1,918,000.00
			<b>E. &amp; C. 20%</b> .....				\$ 392,000.00
			<b>Construction Cost</b> .....				<b>\$ 2,310,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (From Polaris)				\$ 1,691,500.00
			<b>SUBTOTAL</b>				<b>\$ 1,691,500.00</b>
			ROW Acquisition Contingency (50%)				\$ 848,500.00
			<b>Right of Way Costs</b> .....				<b>\$ 2,540,000.00</b>

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ -</b>
			Environmental Mitigation Contingency (10%)				\$ -
			<b>Environmental Mitigation Cost</b> .....				<b>\$ -</b>

			Subtotal Construction Cost				\$ 2,310,000.00
			Subtotal Right of Way Cost				\$ 2,540,000.00
			Subtotal Environmental Mitigation Cost				\$ -
			<b>Total Project Cost</b>				<b>\$ 4,850,000.00</b>

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept J  
New Connector Rd - Church St to College St

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>	
<b>\$6,850,000</b>	
<b>TOTAL COST</b>	
<b>\$ 13,200,000.00</b>	

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	2.7	Acre	\$ 23,000.00	\$ 62,100.00
			Earthwork	79,200	CY	\$ 8.00	\$ 633,600.00
			Drainage - Closed System - New Location	0.27	Miles	\$ 225,000.00	\$ 61,806.82
							\$ -
			Fine Grading	6,270	SY	\$ 3.00	\$ 18,810.00
			Pavement Widening		SY		\$ -
			New Pavement	6,270	SY	\$ 80.00	\$ 501,600.00
			Pavement Resurfacing		SY		\$ -
			Subgrade Stabilization	6,270	SY	\$ 6.00	\$ 37,620.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter	2,900	LF	\$ 14.00	\$ 40,600.00
			4" Concrete Sidewalk	1,620	SY	\$ 25.00	\$ 40,500.00
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	2.7	Acres	\$ 25,000.00	\$ 67,500.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates		Each		\$ -
			Rubber Railroad Crossing		Each		\$ -
			Upgrade Traffic Signal		Each	\$ 70,000.00	\$ -
			Traffic Signal (New)	2	Each	\$ 100,000.00	\$ 200,000.00
			Traffic Control	0.27	Miles	\$ 200,000.00	\$ 54,939.39
			Thermo and Markers	0.27	Miles	\$ 12,000.00	\$ 3,296.36
			<b>Structures</b>				
			Retaining Walls	26,600	SF	\$ 90.00	\$ 2,394,000.00
			<b>RC Box Culverts</b>				
			<b>Utility Construction</b>				

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Length of Project (Widening)	0.09	Miles	\$ 1,000,000.00	\$ 94,696.97
			Length of Project (New Location)	0.18	Miles	\$ 500,000.00	\$ 90,000.00
			Misc. & Mob (15% Strs&Util)				\$ 386,930.45
			Misc. & Mob (55% Functional)				\$ 1,000,000.00

<b>Lgth 0.18 Miles</b>	<b>Contract Cost</b> .....	\$ 5,688,000.00
.09 Miles (Side St)	<b>E. &amp; C. 20%</b> .....	\$ 1,162,000.00
	<b>Construction Cost</b> .....	<b>\$ 6,850,000.00</b>

**Right of Way**

			Description	Quantity	Unit	Price	Amount
			Select Region for Acreage Costs:		Central		
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (From Polaris)				\$ 4,222,000.00
			<b>SUBTOTAL</b>				<b>\$ 4,222,000.00</b>
			ROW Acquisition Contingency (50%)				\$ 2,128,000.00

<b>Right of Way Costs</b> .....	<b>\$ 6,350,000.00</b>
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**Environmental Mitigation**

			Description	Quantity	Unit	Price	Amount
			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ -</b>
			Environmental Mitigation Contingency (10%)				\$ -

<b>Environmental Mitigation Cost</b> .....	<b>\$ -</b>
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			Subtotal Construction Cost				\$ 6,850,000.00
			Subtotal Right of Way Cost				\$ 6,350,000.00
			Subtotal Environmental Mitigation Cost				\$ -

<b>Total Project Cost</b>	<b>\$ 13,200,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept K  
New Connector Rd - College St to Brevard St

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>
<b>\$18,850,000</b>
<b>TOTAL COST</b>
<b>\$ 21,000,000.00</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	1.5	Acre	\$ 23,000.00	\$ 34,500.00
			Earthwork	37,040	CY	\$ 8.00	\$ 296,320.00
			Reinforced Bridge Approach Fills	1	LS	\$ 40,000.00	\$ 40,000.00
			Drainage - Closed System - New Location	0.23	Miles	\$ 225,000.00	\$ 51,750.00
			Fine Grading	1,340	SY	\$ 3.00	\$ 4,020.00
			Pavement Widening		SY		\$ -
			New Pavement	1,340	SY	\$ 80.00	\$ 107,200.00
			Pavement Resurfacing		SY		\$ -
			Subgrade Stabilization	1,340	SY	\$ 6.00	\$ 8,040.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	1,000	LF	\$ 14.00	\$ 14,000.00
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	1.5	Acres	\$ 25,000.00	\$ 37,500.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates		Each		\$ -
			Rubber Railroad Crossing		Each		\$ -
			Upgrade Traffic Signal		Each	\$ 70,000.00	\$ -
			Traffic Signal (New)	1	Each	\$ 100,000.00	\$ 100,000.00
			Traffic Control	0.23	Miles	\$ 200,000.00	\$ 46,000.00
			Thermo and Markers	0.23	Miles	\$ 12,000.00	\$ 2,760.00
			<b>Structures</b>				
			Hwy / RR - BLE 48'x 720'	34,900	SF	\$ 125.00	\$ 4,362,500.00
			Bridge Approach Slabs 2@48'x 25'	2,400	SF	\$ 25.00	\$ 60,000.00
			Retaining Walls	8,000	SF	\$ 90.00	\$ 720,000.00
			<b>RC Box Culverts</b>				
					LF		
			<b>Utility Construction</b>				

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Length of Project (Widening)		Miles		
			Length of Project (New Location)	0.23	Miles	\$ 500,000.00	\$ 115,000.00
			Misc. & Mob (15% Strs&Util)				\$ 788,410.00
			Misc. & Mob (55% Functional)				\$ 384,000.00

<b>Lgth 0.23 Miles</b>	<b>Contract Cost</b> .....	\$ 7,172,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 1,678,000.00
	<b>Contingency for Railroad and Utility</b> .....	\$ 10,000,000.00
	<b>Construction Cost</b> .....	<b>\$ 18,850,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:		Central		
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (From Polaris)				\$ 1,423,200.00
			SUBTOTAL				\$ 1,423,200.00
			ROW Acquisition Contingency (50%)				\$ 726,800.00

<b>Right of Way Costs</b> .....	<b>\$ 2,150,000.00</b>
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**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			SUBTOTAL				\$ -
			Environmental Mitigation Contingency (10%)				\$ -

<b>Environmental Mitigation Cost</b> .....	<b>\$ -</b>
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			Subtotal Construction Cost				\$ 18,850,000.00
			Subtotal Right of Way Cost				\$ 2,150,000.00
			Subtotal Environmental Mitigation Cost				\$ -

<b>Total Project Cost</b>	<b>\$ 21,000,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept L  
I-277 at Independence Blvd WB C-D Rd

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

<b>CONSTR. COST</b>
<b>\$21,000,000</b>
<b>TOTAL COST</b>
<b>\$21,400,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	11.2	Acre	\$ 17,000.00	\$ 190,400.00
			Earthwork	106,000	CY	\$ 8.00	\$ 848,000.00
			Reinforced Bridge Approach Fills	5	Each	\$ 25,000.00	\$ 125,000.00
			Drainage New Location - Closed System	0.90	Miles	\$ 120,000.00	\$ 108,000.00
							\$ -
			Fine Grading	20,000	SY	\$ 3.00	\$ 60,000.00
			Pavement Widening	0	SY		\$ -
			New Pavement	20,000	SY	\$ 59.00	\$ 1,180,000.00
			Pavement Resurfacing		SY		\$ -
			Subgrade Stabilization	20,000	SY	\$ 6.00	\$ 120,000.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	2,100	LF	\$ 15.00	\$ 31,500.00
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link	1,200	LF	\$ 10.00	\$ 12,000.00
			Erosion Control	11.2	Acres	\$ 20,000.00	\$ 224,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			WB CD Road	1.0	LS	\$ 300,000.00	\$ 300,000.00
			New RR Signal with Gates		Each		\$ -
			Rubber Railroad Crossing		Each		\$ -
			Upgrade Traffic Signal		Each		\$ -
			Traffic Signal (New)	2	Each	\$ 100,000.00	\$ 200,000.00
			Traffic Control	0.9	Miles	\$ 200,000.00	\$ 180,000.00
			Thermo and Markers	0.9	Miles	\$ 12,000.00	\$ 10,800.00
			<b>Structures</b>				
			7th St Bridge 42' x 93'	3,906	SF	\$ 100.00	\$ 390,600.00
			Bridge Approach Slabs 2@42'x 25'	2,100	SF	\$ 25.00	\$ 52,500.00
			6th st Ramp 50' x 85'	4,250	SF	\$ 100.00	\$ 425,000.00
			Bridge Approach Slabs 2@50'x 25'	2,500	SF	\$ 25.00	\$ 62,500.00
			5th St Bridge 30' x 70'	2,100	SF	\$ 100.00	\$ 210,000.00
			Bridge Approach Slabs 2@30'x 25'	1,500	SF	\$ 25.00	\$ 37,500.00
			5th St Bridge widening	2,400	SF	\$ 140.00	\$ 336,000.00
			Bridge Approach Slabs 2@15'x 25'	750	SF	\$ 25.00	\$ 18,750.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Trade St Bridge 44' x 148' (SB)	6,520	SF	\$ 100.00	\$ 652,000.00
			Bridge Approach Slabs 2@44'x 25'	2,200	SF	\$ 25.00	\$ 55,000.00
			Structure Removal		EA		\$ -
			Retaining Walls	85,600	SF	\$ 90.00	\$ 7,704,000.00
			<b>RC Box Culverts</b>				
					LF		\$ -
			<b>Utility Construction</b>				
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 1,491,450.00
			Misc. & Mob (55% Functional)				\$ 1,975,000.00

Lgth 0.9 Miles

<b>Contract Cost</b> .....	\$ 17,000,000.00
<b>E. &amp; C. 20%</b> .....	\$ 4,000,000.00
<b>Construction Cost</b> .....	<b>\$ 21,000,000.00</b>

**Right of Way**

			Description	Quantity	Unit	Price	Amount
			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential	0.8	Acres	\$ 340,000.00	\$ 272,000.00
			Other (Average)		Acres		\$ -
			<b>SUBTOTAL</b>				\$ 272,000.00
			<b>ROW Acquisition Contingency (50%)</b>				\$ 128,000.00

**Right of Way Costs** ..... **\$ 400,000.00**

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			<b>Environmental Mitigation Contingency (10%)</b>				\$ -

**Environmental Mitigation Cost** ..... **\$ -**

			Subtotal Construction Cost				\$ 21,000,000.00
			Subtotal Right of Way Cost				\$ 400,000.00
			Subtotal Environmental Mitigation Cost				\$ -

**Total Project Cost** ..... **\$ 21,400,000.00**

I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept M

I-277 at Independence Blvd EB C-D Rd

<b>CONSTR. COST</b>
<b>\$21,425,000</b>

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	9.0	Acre	\$ 20,000.00	\$ 180,000.00
			Earthwork	43,510	CY	\$ 8.00	\$ 348,080.00
			Reinforced Bridge Approach Fills	4	Each	\$ 25,000.00	\$ 100,000.00
			Drainage New Location - Closed System	0.80	Miles	\$ 120,000.00	\$ 96,000.00
			Breaking of Existing Asphalt Pavement	0.00	SY		\$ -
			Fine Grading	10,290	SY	\$ 3.00	\$ 30,870.00
			Pavement Widening		SY		\$ -
			New Pavement	10,290	SY	\$ 58.00	\$ 596,820.00
			Pavement Resurfacing	1,060	SY	\$ 12.00	\$ 12,720.00
			Subgrade Stabilization	10,290	SY	\$ 6.00	\$ 61,740.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	0	LF		\$ -
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link	200	LF	\$ 12.00	\$ 2,400.00
			Erosion Control	9.0	Acres	\$ 20,000.00	\$ 180,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover		Each		\$ -
			Other: Roundabout		Each		\$ -
			EB CD Road	1.0	LS	\$ 300,000.00	\$ 300,000.00
			New RR Signal with Gates		Each		\$ -
			Rubber Railroad Crossing		Each		\$ -
			Upgrade Traffic Signal		Each		\$ -
			Traffic Signal (New)		Each		\$ -
			Traffic Control	0.9	Miles	\$ 200,000.00	\$ 180,000.00
			Thermo and Markers	0.9	Miles	\$ 12,000.00	\$ 10,800.00
			<b>Structures</b>				
			Independence Ramp Widening (EB)	7,040	SF	\$ 160.00	\$ 1,126,400.00
			Bridge Approach Slabs 2@ 42'x 25'	2,100	SF	\$ 25.00	\$ 52,500.00
			Trade St 42' x 670' (NB)	28,140	SF	\$ 100.00	\$ 2,814,000.00
			Bridge Approach Slabs 2@42'x 25'	1,050	SF	\$ 25.00	\$ 26,250.00
			3rd st Bridge 42' x 163'	6,900	SF	\$ 100.00	\$ 690,000.00
			Bridge Approach Slabs 2@42'x 25'	2,100.0	SF	\$ 25.00	\$ 52,500.00
			Stonewall St Bridge 42' x 660'	28,300	SF	\$ 130.00	\$ 3,679,000.00
			Bridge Approach Slabs 2@42'x 25'	2,100	SF	\$ 25.00	\$ 52,500.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Structure Removal		EA		\$ -
			Retaining Walls	44,000	SF	\$ 90.00	\$ 3,960,000.00
			<b>RC Box Culverts</b>				
			60' Extension-Assumed 2 at 8 x 8	60	LF	\$ 2,520.00	\$ 151,200.00
			<b>Utility Construction</b>				
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 1,890,220.00
			Misc. & Mob (55% Functional)				\$ 1,145,000.00

<b>Lgth .9 Miles</b>	<b>Contract Cost</b> .....	\$ 17,739,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 3,686,000.00
	<b>Construction Cost</b> .....	<b>\$ 21,425,000.00</b>

**Right of Way**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Select Region for Acreage Costs:			Central	
			Commercial		Acres		\$ -
			Industrial	0.1	Acres	\$ 145,000.00	\$ 14,500.00
			Office		Acres		\$ -
			Residential		Acres		\$ -
			Other (Average)		Acres		\$ -
			SUBTOTAL				\$ 14,500.00
			ROW Acquisition Contingency (50%)				\$ 10,500.00

<b>Right of Way Costs</b> .....	<b>\$ 25,000.00</b>
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**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			SUBTOTAL				\$ -
			Environmental Mitigation Contingency (10%)				\$ -

<b>Environmental Mitigation Cost</b> .....	<b>\$ -</b>
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			Subtotal Construction Cost				\$ 21,425,000.00
			Subtotal Right of Way Cost				\$ 25,000.00
			Subtotal Environmental Mitigation Cost				\$ -

<b>Total Project Cost</b>	<b>\$ 21,450,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept ML-1

I-277 at Independence Blvd - General Purpose Lanes Only

Prepared By: Doug Lane

9/24/12

9/11/2012

<b>CONSTR. COST</b>
<b>\$57,078,000</b>

Requested By: R. Swayampakala, RS&H

9/11/12

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	4.0	Acre	\$ 30,000.00	\$ 120,000.00
			Earthwork	271,000	CY	\$ 8.00	\$ 2,168,000.00
			Reinforce Bridge Approach Fills	8	EA	\$ 25,000.00	\$ 200,000.00
			Drainage New Location Closed System	6.20	Miles	\$ 120,000.00	\$ 744,000.00
			Fine Grading	51,200	SY	\$ 3.00	\$ 153,600.00
			Pavement Widening	12,400	SY	\$ 70.00	\$ 868,000.00
			New Pavement	38,800	SY	\$ 59.00	\$ 2,289,200.00
			Pavement Resurfacing	17,400	SY	\$ 12.00	\$ 208,800.00
			Subgrade Stabilization	51,200	SY	\$ 6.00	\$ 307,200.00
			1'-6" Concrete Curb and Gutter		LF		\$ -
			2'-6" Concrete Curb and Gutter	1,400	LF	\$ 15.00	\$ 21,000.00
			4" Concrete Sidewalk		SY		\$ -
			5" Monolithic Islands		SY		\$ -
			Conc. Barrier	9,150	LF	\$ 80.00	\$ 732,000.00
			<b>Fencing</b>				
			Chain Link	7,000	LF	\$ 10.00	\$ 70,000.00
			Erosion Control	51.0	Acres	\$ 12,000.00	\$ 612,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover	3.0	Each	\$ 150,000.00	\$ 450,000.00
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates		Each		\$ -
			Rubber Railroad Crossing		Each		\$ -
			Upgrade Traffic Signal	2	Each	\$ 70,000.00	\$ 140,000.00
			Traffic Signal (New)	2	Each	\$ 100,000.00	\$ 200,000.00
			Traffic Control	6.2	Miles	\$ 200,000.00	\$ 1,240,000.00
			Thermo and Markers	6.2	Miles	\$ 12,000.00	\$ 74,400.00
			<b>Structures</b>				
			EB over Stonewall St.	11,670.00	SF	\$ 100.00	\$ 1,167,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			EB over 3rd Street	6,130.00	SF	\$ 100.00	\$ 613,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			EB Roadway over 4th/Trade	31,000.00	SF	\$ 100.00	\$ 3,100,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			EB Roadway over 5th Street	6,100.00	SF	\$ 100.00	\$ 610,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			WB Roadway over Trade	5,100.00	SF	\$ 100.00	\$ 510,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			WB Roadway over 5th Street (2 bridges)	4,670.00	SF	\$ 100.00	\$ 467,000.00
			Bridge Approach Slabs 4@30'x 25'	3,000	SF	\$ 25.00	\$ 75,000.00
			7th Street Bridge	6,900.00	SF	\$ 100.00	\$ 690,000.00
			Bridge Approach Slabs 2@59'x 25'	2,950	SF	\$ 25.00	\$ 73,750.00
			WB Roadway over I-277	28,500.00	SF	\$ 100.00	\$ 2,850,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800	SF	\$ 25.00	\$ 45,000.00
			Retaining Walls	#####	SF	\$ 90.00	\$ 16,461,000.00
			<b>RC Box Culverts</b>				
			60' Extension-Assumed 2 of 8 x 8	60	LF	\$ 2,520.00	\$ 151,200.00
			<b>Utility Construction</b>				
			Length of Project (Widening)	0.0	Miles	\$ 1,000,000.00	\$ -
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 4,055,850.00
			Misc. & Mob (55% Functional)				\$ 5,829,000.00

<b>Lgth</b>	<b>Contract Cost</b> .....	\$ 47,521,000.00
	<b>E. &amp; C. 20%</b> .....	\$ 9,557,000.00
	<b>Construction Cost</b> .....	<b>\$ 57,078,000.00</b>

**Right of Way**

					Central		
			Select Region for Acreage Costs:				
			Commercial	0.6	Acres	\$ 615,000.00	\$ 369,000.00
			Industrial	0.0	Acres		\$ -
			Office	0.2	Acres	\$ 300,000.00	\$ 60,000.00
			Residential	0.8	Acres	\$ 340,000.00	\$ 272,000.00
							\$ -
			<b>SUBTOTAL</b>	<b>2</b>	<b>Acres</b>		<b>\$ 701,000.00</b>
			<b>ROW Acquisition Contingency (50%)</b>				<b>\$ 399,000.00</b>

<b>Right of Way Costs</b> .....	<b>\$ 1,100,000.00</b>
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**Environmental Mitigation**

			Streams Impacted	60	LF	\$ 323.00	\$ 19,380.00
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ 19,380.00</b>
			<b>Environmental Mitigation Contingency (10%)</b>				<b>\$ 2,620.00</b>

<b>Environmental Mitigation Cost</b> .....	<b>\$ 22,000.00</b>
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			Subtotal Construction Cost				\$ 57,078,000.00
			Subtotal Right of Way Cost				\$ 1,100,000.00
			Subtotal Environmental Mitigation Cost				\$ 22,000.00

<b>Total Project Cost</b>	<b>\$ 58,200,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

Potential Concept ML-2

I-277 at Independence Blvd - Managed Lanes Only

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

9/12/12

<b>CONSTR. COST</b>
<b>\$33,100,000</b>

Construction

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	6.5	Acre	\$ 30,000.00	\$ 195,000.00
			Earthwork	132,000	CY	\$ 10.00	\$ 1,320,000.00
			Reinforce Bridge Approach Fills	5	EA	\$ 25,000.00	\$ 125,000.00
			Drainage New Location Closed System	1.80	Miles	\$ 150,000.00	\$ 270,000.00
			Fine Grading	15,739	SY	\$ 3.00	\$ 47,217.00
			Pavement Widening	4,650	SY	\$ 100.00	\$ 465,000.00
			New Pavement	11,089	SY	\$ 59.00	\$ 654,251.00
			Pavement Resurfacing	8,315	SY	\$ 12.00	\$ 99,780.00
			Subgrade Stabilization	15,739	SY	\$ 6.00	\$ 94,434.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	0	LF		\$ -
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			Concrete Barrier	8,520	LF	\$ 80.00	\$ 681,600.00
			<b>Fencing</b>				
			Chain Link		LF		\$ -
			Erosion Control	16.0	Acres	\$ 12,000.00	\$ 192,000.00
			<b>Signing Interchanges</b>				
			Diamond		Each		\$ -
			Half Clover		Each		\$ -
			Flyover	4.0	Each	\$ 150,000.00	\$ 600,000.00
			Other: Roundabout		Each		\$ -
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	1	Each	\$ 70,000.00	\$ 70,000.00
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	1.8	Miles	\$ 200,000.00	\$ 360,000.00
			Thermo and Markers	1.8	Miles	\$ 12,000.00	\$ 21,600.00
			<b>Structures</b>				
			WB Flyover to I-277	53,800.00	SF	\$ 100.00	\$ 5,380,000.00
			Bridge Approach Slabs 2@30'x 25'	1,500.00	SF	\$ 25.00	\$ 37,500.00
			Bridge Approach Slabs 1@36'x 25'	900.00	SF	\$ 25.00	\$ 22,500.00
			Bridge for Ramp Under I-277 WB Ramp	4,620.00	SF	\$ 100.00	\$ 462,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800.00	SF	\$ 25.00	\$ 45,000.00
			EB Ramp Bridge over 5th	4,750.00	SF	\$ 100.00	\$ 475,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800.00	SF	\$ 25.00	\$ 45,000.00
			WB Ramp Bridge over 5th	4,750.00	SF	\$ 100.00	\$ 475,000.00
			Bridge Approach Slabs 2@36'x 25'	1,800.00	SF	\$ 25.00	\$ 45,000.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			EB Ramp Bridge over Trade	2,040.00	SF	\$ 100.00	\$ 204,000.00
			Bridge Approach Slabs 1@33'x 25'	750.00	SF	\$ 25.00	\$ 18,750.00
			Retaining Walls	97,250.00	SF	\$ 90.00	\$ 8,752,500.00
			<b>RC Box Culverts</b>				
			Ex. 3@10x10-50'Extension-3'Fill-90Skew		LF		
			<b>Utility Construction</b>				
			Length of Project (Widening)		Miles		
	?		Length of Project (New Location)	1.8	Miles	\$ 500,000.00	\$ 900,000.00
			Misc. & Mob (15% Strs&Util)				\$ 2,529,868.00
			Misc. & Mob (55% Functional)				\$ 3,000,000.00

Lgth 1.8 Miles

<b>Contract Cost</b> .....	\$ 27,588,000.00
<b>E. &amp; C. 20%</b> .....	\$ 5,512,000.00
<b>Construction Cost</b> .....	<b>\$ 33,100,000.00</b>

**Right of Way**

			Description	Quantity	Unit	Price	Amount
			Select Region for Acreage Costs:			Central	
			Commercial	0.0	Acres		\$ -
			Industrial	0.0	Acres		\$ -
			Office	0.0	Acres		\$ -
			Residential	0.0	Acres		\$ -
			City/State/cpcc owned? (Power & Cats)	0.0	Acres		\$ -
			<b>SUBTOTAL</b>	<b>0</b>	<b>Acres</b>		<b>\$ -</b>
			ROW Acquisition Contingency (50%)				\$ -

**Right of Way Costs** ..... **\$ -**

**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				<b>\$ -</b>
			Environmental Mitigation Contingency (10%)				\$ -

**Environmental Mitigation Cost** ..... **\$ -**

			Subtotal Construction Cost				\$ 33,100,000.00
			Subtotal Right of Way Cost				\$ -
			Subtotal Environmental Mitigation Cost				\$ -

**Total Project Cost** ..... **\$ 33,100,000.00**



I-277 / I-77 Loop Study

County: Mecklenburg

**Potential Concept N**  
Relocation of I-277/Carson Blvd Ramp

Prepared By: Doug Lane

9/24/12

Requested By: R. Swayampakala, RS&H

7/27/12

<b>CONSTR. COST</b>
<b>\$5,100,000</b>
<b>TOTAL COST</b>
<b>\$7,400,000</b>

**Construction**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	2.5	Acre	\$ 30,000.00	\$ 75,000.00
			Earthwork	12,500	CY	\$ 13.00	\$ 162,500.00
			Reinforced Bridge Approach Fills	1	Each	\$ 25,000.00	\$ 25,000.00
			Drainage New Location Closed System	0.30	Miles	\$ 50,000.00	\$ 15,000.00
							\$ -
			Fine Grading	1,460	SY	\$ 4.00	\$ 5,840.00
			Pavement Widening	1,070	SY	\$ 110.00	\$ 117,700.00
			New Pavement	390	SY	\$ 110.00	\$ 42,900.00
			Pavement Resurfacing	0	SY		\$ -
			Subgrade Stabilization	1,460	SY	\$ 6.00	\$ 8,760.00
			1'-6" Concrete Curb and Gutter	0	LF		\$ -
			2'-6" Concrete Curb and Gutter	0	LF		\$ -
			4" Concrete Sidewalk	0	SY		\$ -
			5" Monolithic Islands	0	SY		\$ -
			<b>Fencing</b>				
			Chain Link	1,000	LF	\$ 10.00	\$ 10,000.00
			Erosion Control	2.5	Acres	\$ 30,000.00	\$ 75,000.00
			<b>Signing Interchanges</b>				
			Diamond	0.0	Each		\$ -
			Half Clover	0.0	Each		\$ -
			Flyover	1.0	Each	\$ 150,000.00	\$ 150,000.00
			Other: Roundabout	0.0	Each		\$ -
			New RR Signal with Gates	0	Each		\$ -
			Rubber Railroad Crossing	0	Each		\$ -
			Upgrade Traffic Signal	0	Each		\$ -
			Traffic Signal (New)	0	Each		\$ -
			Traffic Control	0.3	Miles	\$ 200,000.00	\$ 60,000.00
			Thermo and Markers	0.3	Miles	\$ 12,000.00	\$ 3,600.00
			<b>Structures</b>				
			Road over Road - S. Church St. Ramp	24,900.00	SF	\$ 105.00	\$ 2,614,500.00
			Bridge Approach Slabs 2@42'x 25'	2,100.00	SF	\$ 25.00	\$ 52,500.00
			Structure Removal		EA		\$ -
			Retaining Walls		SF		\$ -
			<b>RC Box Culverts</b>				
			Ex. 3@10x10-50'Extension-3'Fill-90Skew	0	LF		

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
<b>Utility Construction</b>							
			Length of Project (Widening)	0	Miles		
			Length of Project (New Location)	0.0	Miles	\$ 500,000.00	\$ -
			Misc. & Mob (15% Strs&Util)				\$ 400,700.00
			Misc. & Mob (55% Functional)				\$ 413,215.00

<b>Lgth 0.23 Miles</b>	<b>Contract Cost</b> .....	\$ 4,232,215.00
	<b>E. &amp; C. 20%</b> .....	\$ 867,785.00
	<b>Construction Cost</b> .....	<b>\$ 5,100,000.00</b>

**Right of Way**

			Select Region for Acreage Costs:		Central	
			Commercial		Acres	\$ -
			Industrial		Acres	\$ -
			Office		Acres	\$ -
			Residential		Acres	\$ -
			Other (From Polaris)			\$ 1,533,200.00
			SUBTOTAL			\$ 1,533,200.00
			ROW Acquisition Contingency (50%)			\$ 766,800.00

<b>Right of Way Costs</b> .....	<b>\$ 2,300,000.00</b>
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**Environmental Mitigation**

			Streams Impacted		LF	\$ -
			Wetlands Impacted		Acres	\$ -
			SUBTOTAL			\$ -
			Environmental Mitigation Contingency (10%)			\$ -

<b>Environmental Mitigation Cost</b> .....	<b>\$ -</b>
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			Subtotal Construction Cost			\$ 5,100,000.00
			Subtotal Right of Way Cost			\$ 2,300,000.00
			Subtotal Environmental Mitigation Cost			\$ -

<b>Total Project Cost</b>	<b>\$ 7,400,000.00</b>
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I-277 / I-77 Loop Study

County: Mecklenburg

**Potential Concept S**  
Convert 12th Street into two-way street

Prepared By: Doug Lane  
Requested By: R. Swayampakala, RS&H

9/24/12  
7/27/12

<b>CONSTR. COST</b>
<b>\$81,650,000</b>
<b>TOTAL COST</b>
<b>\$ 86,000,000.00</b>

**Construction**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing and Grubbing	2.5	Acre	\$ 20,000.00	\$ 50,000.00
			Earthwork	300,000	CY	\$ 13.00	\$ 3,900,000.00
			Reinforced Bridge Approach Fills	11	Each	\$ 10,000.00	\$ 110,000.00
			Pavement Removal	30,000	SY	\$ 2.50	\$ 75,000.00
			Drainage Existing Location - Open System	0.25	Miles	\$ 250,000.00	\$ 62,500.00
			Drainage Existing Location - Closed System	0.57	Miles	\$ 150,000.00	\$ 85,500.00
			Drainage New location - Closed System	0.57	Miles	\$ 225,000.00	\$ 128,250.00
			Drainage New location - Open/Interstate	1.10	Miles	\$ 120,000.00	\$ 132,000.00
			Fine Grading	50,000	SY	\$ 3.00	\$ 150,000.00
			New Pavement	50,000	SY	\$ 65.00	\$ 3,250,000.00
			Pavement Resurfacing	21,000	SY	\$ 12.00	\$ 252,000.00
			Subgrade Stabilization	50,000	SY	\$ 6.00	\$ 300,000.00
			1'-6" Concrete Curb and Gutter	6,400	LF	\$ 14.00	\$ 89,600.00
			2'-6" Concrete Curb and Gutter	6,400	LF	\$ 15.00	\$ 96,000.00
			4" Concrete Sidewalk	2,500	SY	\$ 25.00	\$ 62,500.00
			5" Monolithic Islands	1,400	SY	\$ 40.00	\$ 56,000.00
			<b>Fencing</b>				
			Erosion Control	7.0	Acres	\$ 20,000.00	\$ 140,000.00
			<b>Signing Interchanges</b>				
			Flyover	2.0	Each	\$ 120,000.00	\$ 240,000.00
			Other: CD Roads	2.0	Each	\$ 350,000.00	\$ 700,000.00
			Upgrade Traffic Signal	6	Each	\$ 70,000.00	\$ 420,000.00
			Traffic Signal (New)	7	Each	\$ 100,000.00	\$ 700,000.00
			Traffic Control	3.00	Miles	\$ 1,000,000.00	\$ 3,000,000.00
			Traffic Control - I-277 contingency	1.00	LS	\$ 3,000,000.00	\$ 3,000,000.00
			Thermo and Markers	3.00	Miles	\$ 12,000.00	\$ 36,000.00
			<b>Structures</b>				
			Structure removal (#332)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal (#330)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal (#328)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal (#404)	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal 12th over Tryon	1	LS	\$ 100,000.00	\$ 100,000.00
			Structure removal Davidson over 277	1	LS	\$ 100,000.00	\$ 100,000.00
			structure: ramp over ramp onto 11th 30x65	1950	SF	\$ 125.00	\$ 243,750.00
			Bridge Approach Slabs 2@30'x 25'	1500	SF	\$ 25.00	\$ 37,500.00

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			structure: 11th over 277	9900	SF	\$ 125.00	\$ 1,237,500.00
			Bridge Approach Slabs 2@32'x 25'	1600	SF	\$ 25.00	\$ 40,000.00
			structure: 277 over rail 132'x430'	56760	SF	\$ 125.00	\$ 7,095,000.00
			Bridge Approach Slabs 2@132'x 25'	6600	SF	\$ 25.00	\$ 165,000.00
			structure: 11th over rail 48'x406'	19488	SF	\$ 125.00	\$ 2,436,000.00
			Bridge Approach Slabs 2@48'x 25'	2400	SF	\$ 25.00	\$ 60,000.00
			structure: I277 over Graham	31800	SF	\$ 125.00	\$ 3,975,000.00
			Bridge Approach Slabs 2@175'x 25'	8750	SF	\$ 25.00	\$ 218,750.00
			structure: I277 ramp over I277 to 12th 40x380	19300	SF	\$ 125.00	\$ 2,412,500.00
			Bridge Approach Slabs 2@40'x 25'	2000	SF	\$ 25.00	\$ 50,000.00
			structure: I277 over Church	16200	SF	\$ 125.00	\$ 2,025,000.00
			Bridge Approach Slabs 2@108'x 25'	5400	SF	\$ 25.00	\$ 135,000.00
			structure: 12th over Tryon	17600	SF	\$ 125.00	\$ 2,200,000.00
			Bridge Approach Slabs 2@92'x 25'	4600	SF	\$ 25.00	\$ 115,000.00
			structure: 12th over Blue Line Ext	21150	SF	\$ 125.00	\$ 2,643,750.00
			Bridge Approach Slabs 2@104'x 25'	5200	SF	\$ 25.00	\$ 130,000.00
			structure: davidson st over I-277 76x200	15200	SF	\$ 125.00	\$ 1,900,000.00
			Bridge Approach Slabs 2@76'x 25'	3800	SF	\$ 25.00	\$ 95,000.00
			str: 12th st over I-277 3rd level y bridge	43000	SF	\$ 125.00	\$ 5,375,000.00
			Bridge Approach Slabs 3@28'x 25'	2100	SF	\$ 25.00	\$ 52,500.00
			<b>Retaining Walls</b>	18,000.00	SF	\$ 90.00	\$ 1,620,000.00
			<b>Utility Construction</b>				
			Length of Project (Widening)	1.0	Miles	\$ 1,000,000.00	\$ 1,000,000.00
			Length of Project (New Location)	0.3	Miles	\$ 500,000.00	\$ 125,000.00
			Misc. & Mob (15% Strs&Util)				\$ 5,400,000.00
			Misc. & Mob (55% Functional)				\$ 9,727,400.00

Lgth 0.76 Miles

<b>Contract Cost</b> .....	\$ 68,150,000.00
<b>E. &amp; C. 20%</b> .....	\$ 13,500,000.00
<b>Construction Cost</b> .....	<b>\$ 81,650,000.00</b>

**Right of Way**

					South		
			Select Region for Acreage Costs:				
			Commercial	4.00	Acres	\$ 615,000.00	\$ 2,460,000.00
			Industrial		Acres		\$ -
			Office		Acres		\$ -
			Residential	1.25	Acres	\$ 340,000.00	\$ 425,000.00
					Acres		\$ -
			<b>SUBTOTAL</b>				\$ 2,885,000.00
			ROW Acquisition Contingency (50%)				\$ 1,465,000.00

**Right of Way Costs** ..... **\$ 4,350,000.00**

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
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**Environmental Mitigation**

			Streams Impacted		LF		\$ -
			Wetlands Impacted		Acres		\$ -
			<b>SUBTOTAL</b>				\$ -
			Environmental Mitigation Contingency (10%)				\$ -
<b>Environmental Mitigation Cost</b>							<b>\$ -</b>

			Subtotal Construction Cost				\$ 81,650,000.00
			Subtotal Right of Way Cost				\$ 4,350,000.00
			Subtotal Environmental Mitigation Cost				\$ -
<b>Total Project Cost</b>							<b>\$ 86,000,000.00</b>

# Appendix **B**

## Public Workshop (June 2012) Comment Cards



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# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



If possible, please return this "Comment Card" before leaving tonight.

Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28209
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment Entrance to from Kingsville to John Belk toward I-77 on R will be widened.

Interchanges Thanks for remembering the 3rd St. U Turn & weave

Surface Streets \_\_\_\_\_

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

Interchanges Must consider Irwin Creek Gully and Little Sugar Creek Greenway - biked bridge 7th & Kings St. as well as existing interchange

Surface Streets at I-277 and I-77 near Morehead St. Consider impact on creek & future greenways throughout



Continued on back....







# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



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### C. I-77

Freeway segment Allow passage for Tatum Creek Greenway  
at culverts to consider bridges.

Interchanges Greenway trail must pass under CSX bridge and  
bypass Elmwood Cemetery to connect  
Ridge Splash Plant to the Music Factory.  
The Hwy 100/Charlotte Road bridge will allow the  
greenway to travel north - it needs to remain

Surface Streets \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): Gwen Cook, Mecklenburg County Park & Rec  
Email Address (Optional): gwen.cook@MecklenburgCountyNC.org  
Address (Optional): 5041 Brookshire Blvd (work)  
Charlotte, NC 28216

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: vcoleman@charlottenc.gov





# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



If possible, please return this "Comment Card" before leaving tonight.

Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28205
- 2) Do you work in Uptown? - SOUTHEND  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No
- 5) Be as specific as possible and identify inadequate conditions in the three following areas: LIMITED TO TRAFFIC

### A. Brookshire Freeway

Freeway Segment FREWAY SHOULD BE EXPLORED AS DOWNGRADED FROM INTERSTATE

Interchanges ~~TRAYON STREET~~  
CONSIDER TRAINS + SURFACE STREETS. TRAYON STREET SHOULD GO OVER TRACKS

Surface Streets REDEVELOPMENT OPPORTUNITIES MISSED. <sup>TRAYON</sup> ~~TRAYON~~ STREET COULD BE POSITIVELY AFFECTED BY MAJOR INFRASTRUCTURE CHANGES - NOT STOWN

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_



Continued on back...





# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



If possible, please return this "Comment Card" before leaving tonight.

### C. I-77

Freeway segment \_\_\_\_\_

Interchanges

REDEVELOPMENT/LANDUSE ALONG TRADE ST SHOULD TAKE  
PRIORITY & ACCESS CONCENTRATED ON 5TH STREET.

Surface Streets \_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

I AM SURPRISED THAT THE STUDY WAS LIMITED TO TRAFFIC FLOW.  
A COMPREHENSIVE PLANNING APPROACH WHICH INCLUDES LANDUSE  
& PEDESTRIAN, BICYCLING, STORMWATER, AIR QUALITY ETC.  
WOULD BE APPROPRIATE @ THIS STAGE

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: vcoleman@charlottenc.gov





# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



If possible, please return this "Comment Card" before leaving tonight.

Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28203
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges Ramp 22 KEEP - W/O Leaving Target /  
Trade Jops - avoid city traffic

Surface Streets DONT GET RID OF THE FREEDOM  
DRIVE OVERPASS IT CONNECTS WILMORE +  
SouthEND TO THE WEST SIDE. WE WILL BE



Continued on back....





# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



If possible, please return this "Comment Card" before leaving tonight.

### C. I-77

Freeway segment DISCONNECTED IF YOU REMOVE

Interchanges Morehead Ramp -

IF YOU GET RID OF MOREHEAD RAMP, FREEDOM +  
MINT EXIT WOULD CUT OFF THE ENTIRE

Surface Streets SOUTH END + WILMORE.

THERE IS NO GOOD WAY TO GET TO SOUTH END  
IF ALL ARE GONE.

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

Please take neighborhood connectivity  
into consideration.

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): Bryan Geers

Email Address (Optional): bryangeers@hotmail.com

Address (Optional): 115 E Park Ave # 404  
Charlotte, NC 28203

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: [vcoleman@charlottenc.gov](mailto:vcoleman@charlottenc.gov)





# I-277/I-77 (Uptown) Loop Study

Public Workshop  
Comment Card  
June 5, 2012



If possible, please return this "Comment Card" before leaving tonight.

Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 2824
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No
- 5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_

ELIMINATE THESE NAMES AND JUST CALL IT I-77 & I-277 W/E OR INNER OR OUTER

• LIKE # 19 & 20

THINK ABOUT HOW WORK HERE COULD ENHANCE GREENWAY CONNECTIONS - COOR W/PARKS & REC

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_

• LIKE ELIMINATION OF LOOPS @ I-77 & TRADE BOWN JCSU & JOHNSON & WALES. ~~THE~~ ADDRESS IMPROVING BIKE & PED TRAFFIC HERE!



Continued on back...





# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment \_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

SOMEWHAT  Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: [vcoleman@charlottenc.gov](mailto:vcoleman@charlottenc.gov)





# I-277/I-77 (Uptown) Loop Study

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Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28102
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment 4TH ST EXIT RAMP IS GOOD  
Need to Repave ~~and~~ Caldwell exit ramp to avoid closure of  
12TH ST OR make 11TH ST 2-WAYS ~~so that~~ all the way to  
Caldwell

Interchanges \_\_\_\_\_

Surface Streets 10TH ST needs to fully connect  
Also make 12th 2-way near Graham St to maintain 277 connection

### B. John Belk Freeway

Freeway Segment Separation of 79 east 277 (#19) is good

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_



Continued on back....







# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment Separation of 277-77 EAST is a good concept

Interchanges 4TH IS A GREAT CONCEPT ALONG WITH THE

Surface Streets 10TH ST needs to fully connect  
Also make 12TH 2 way near Graham to maintain 277 connection  
from Graham

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

Make sure to make Ped/Bike connections better  
not worse. Especially with Freedom Dr.  
Also Little Sugar Creek Greenway & Extension of Basin Creek Greenway

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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- 1) What is the zip code in which you reside? 28202
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons? LIVE UPTOWN  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

I THOUGHT THIS MEETING WAS DEALING WITH THE LOOP DESIGN AS IT RELATES TO THOSE

Interchanges \_\_\_\_\_

NOT IN CARS. THIS IS ALL ABOUT CARS. I THINK WE SHOULD CLOG IT UP MORE

Surface Streets \_\_\_\_\_

TO GET PEOPLE OUT OF THE CAR. AND INTO PUBLIC TRANSIT.

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Interchanges \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Surface Streets \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7) Were the existing conditions explained clearly?  Yes  No

8) Were the future conditions explained clearly?  Yes  No

9) Were the concepts explained clearly?  Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_  
\_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 78708
- 2) Do you work in Uptown? MOREHEAD (VERY CLOSE)  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment GOOD!

Interchanges LOOKS GOOD SO LONG AS CAPACITY IS IMPROVED TO LESSEN BACK-UPS. REMOVAL OF GRAHAM ST. & DAVIDSON RAMPS ARE VERY GOOD CONCEPTS.

Surface Streets WHILE I AGREE WITH RAMP REMOVALS, I'M WORRIED ABOUT THE INCREASED PRESSURE TRAFFIC WITH LESS ACCESS OPTIONS WILL PLACE ON THE GRID AND THROUGHOUT UPTOWN. <sup>← DUE TO SAFETY</sup>

### B. John Belk Freeway

Freeway Segment I BELIEVE JOHN BELK SHOULD BE BOULEYARDED (WITH THE HELP OF PRIVATE SECTOR) TO RESTORE THE GRID AND RECONNECT THE CITY.

Interchanges SHOULD ALL BE REMOVED FOR REDEVELOPMENT THAT CREATES A SIGNATURE URBAN BOULEVARD.

Surface Streets SHOULD BE RECONNECTED. TRAFFIC NOW HAS MULTIPLE OPTIONS TO GET WHERE IT IS GOING. IT DISTRIBUTES THROUGHOUT THE GRID ~~AND~~ INSTEAD OF CONGESTING AT THE ACCESSES. ... BUT IF YOU DON'T BOULEVARDIZE, KEEP THE CARSON ST. OFF-RAMP AND UTILIZE CARSON STREET TO



CHARLOTTE

DISTRIBUTE TRAFFIC BETTER. AT LEAST TO THAT.

Continued on back...



CARSON STREET IS HORRENDOUSLY UNDERUTILIZED.



# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment \_\_\_\_\_  
\_\_\_\_\_

Interchanges PLEASE REMOVE LOOPS (ALL OF THEM). (1) THEY ARE NOT NEEDED (2) LAND IS NEEDED TO CREATE STREETCAR ORIENTED DEVELOPMENT. ALSO MOVE REMAINING RAMPS CLOSER TO THE FREEWAY.

Surface Streets PLEASE DO EMPHASIZE 5TH STREET AS THE FAVORED VEHICULAR ROUTE. MOVE ON-RAMP FROM TRADE ST. TO 5TH STREET IF POSSIBLE.

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

YOU ARE PROPOSING <sup>TO REMOVE</sup> A LOT OF ACCESS POINTS. THEREFORE, TRAFFIC HAS LESS OPTIONS AND MUST NOW REROUTE THROUGH SURFACE STREETS AND <sup>THIS</sup> INCREASES CONGESTION. PLEASE STUDY THE IMPLICATIONS IN DEPTH AT THE NETWORK LEVEL THROUGHOUT THE GRID.

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): ERIC OROZCO

Email Address (Optional): orozco.eric@gmail.com / eric@neighboringconcepts.com

Address (Optional): 723 WALNUT AVENUE  
CHARLOTTE, NC 28208

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# I-277/I-77 (Uptown) Loop Study

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1) What is the zip code in which you reside? 28204

2) Do you work in Uptown?  Yes  No

3) Do you travel to Uptown for other reasons?  Yes  No

4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

**A. Brookshire Freeway**

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

**B. John Belk Freeway**

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_



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# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Interchanges I agree that the mergings and weavings is tight and needs to be fixed, however the Exits that are being eliminated are the ones that I use (on I-77 @ Church St.), so I am a little apprehensive

Surface Streets \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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- 1) What is the zip code in which you reside? 28081
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment Reduce the number of interchanges to reduce weaving.

Interchanges Going from Brookshire Freeway to I-77 north has a lot of congestion and motorists merge into exit ramp late.

Surface Streets \_\_\_\_\_

### B. John Belk Freeway

Freeway Segment Entering I-277 from 4th street has weaving issues with motorists exiting I-277 to get on Independence Blvd.

Interchanges Coming south on I-77 to get on John Belk Freeway has a lot of weaving.

Surface Streets \_\_\_\_\_



Continued on back...







# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

\_\_\_\_\_

\_\_\_\_\_

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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June 5, 2012



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- 1) What is the zip code in which you reside? 28202
- 2) Do you work in Uptown? Y Both  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment ALL GOOD

Interchanges VERY HARD TO GO EAST BOUND ON BROOKSHIRE FROM CRADAM (CRADAM (4th & N/ME) - YOUR SOLUTION NOT ONLY MAKES IT LESS POSSIBLE BUT NOW HARDER TO GO N-BOUND AND COMING FROM

Surface Streets NOT ENOUGH CROSSINGS BETWEEN MC DONALD AND SOUTH (NEED DAVIDSON/WEAVER) AND NOT ENOUGH PEDESTRIAN/BICYCLE FACILITIES ON CROSSINGS YOU MUST RETAIN WEST BOUND SURFACE STREET (10th to Graham

### B. John Belk Freeway

Freeway Segment ALL GOOD

Interchanges LOOP EXITS ARE ANTI-URBAN, USE TOO MUCH LAND I LIKE THE PROPOSAL FOR 4TH/3RD ST EXITS.

Surface Streets NEED TO RETAIN SURFACE ST CONNECTIVITY TO WEST MOREHEAD, CARSON, ETC. REMOVAL SHOULD COINCIDE W/ A REASONABLE NEW ALTERNATIVE



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_

Interchanges RETAIN N-BOUND RAMP FOR 5th which is  
city's workhorse street. I like the reduction of  
loops

Surface Streets need to retain connectivity for freedom  
and Morehead and Carson and Summit

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

I am very dissatisfied w/ the plans to remove  
Graham exits w/o significant ~~changes~~ <sup>improvements to</sup> Graham connectivity  
NLMF and 4W big impacts

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): DAVID BRODERICK

Email Address (Optional): dlb ra @ yahoo.com

Address (Optional): 601 N DINE JH2012

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: vcoleman@charlottenc.gov





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- 1) What is the zip code in which you reside? 28211
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No
- 5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment NEED TO DEAL WITH WEAVE AT DAVIDSON ST  
EXIT OTHER THAN MOVING IT SLIGHTLY NORTH TO  
CARDWELL

Interchanges MORE BIKE/PAD FRIENDLY

Surface Streets \_\_\_\_\_

### B. John Belk Freeway

Freeway Segment LAP TO BUILD CONNECTIVITY

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_

Interchanges

MUST NOT DEAL W/ AN ALTERNATE BIKE CONNECTION THAT IS CURRENTLY SUMMIT TO FREEDOM

Surface Streets

IF SUMMIT FREEDOM GOES AWAY CONVERT WAREHEAD FROM I-77 TO STADIUM TO ACCOMMODATE BIKE TRAFFIC

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

ALONG W/ ELIMINATING MANY OF THE STAMPS

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional):

DICK WINTERS

Email Address (Optional):

dick.winters@carolina2.org

Address (Optional):

4716 MONTECLAIR AV 28211

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1) What is the zip code in which you reside? 28210

2) Do you work in Uptown?  Yes  No

3) Do you travel to Uptown for other reasons?  Yes  No

4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges connecting to N Davidson St needs to be  
improved since it could work as a connector is  
a good solution.

Surface Streets Add bike lanes to N Davidson St bridge

\_\_\_\_\_

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets Improve the connectivity for Peds + Cyclists  
between McDowell + S Tryon to downtown



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment MAINTAIN THE ABILITY TO COME OFF I-77 SOUTH  
+ CONNECT WITH SOUTHEND.

Interchanges ELIMINATE THE WEST TUBE LOOP CONNECTOR IS  
AN EXCELLENT IDEA. IT WILL PROTECT PROJECTIONS + CYCLES  
FROM BEING BUNDLED BY HIGH SPEED ASSIGNABLE TRAFFIC.

Surface Streets YOU MUST MAINTAIN THE CONNECTIVITY  
BETWEEN WILMONT (SOUTH END) + WAXAY HEIGHTS  
ELIMINATING THE FREEDOM DRIVE CONNECTOR WILL ISOLATE THESE  
TWO DYNAMIC NEIGHBORHOODS

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

DELIVER A GREENWAY CONNECTOR FROM CPCC TO  
LITTLE SWAMP CREEK N OF THE INTERCHANGES, STOPPING ON  
THE ROADS + THEIR ASSOCIATED HEAVY TRAFFIC.

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): Henry J. Janssen

Email Address (Optional): Henry.Janssen@ncdot.gov

Address (Optional): 6827 Rosemary Ln  
CLT 28212

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# I-277/I-77 (Uptown) Loop Study

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Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28202 - SALTWATER
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

NEED ACCESS TO & FROM GRANNUM ESTABLISHMENT W/ MUSIC FACTORY & ADJACENT NEIGHBORHOODS -> BUT GET RID OF THE LOOP EXIT

Interchanges I-77 N Exit NEEDS LONGER RAMP FOR MORE LINES

DAWSON ST. EXIT: EXIT PROVIDED IS BETTER, DOES NOT ADDRESS ISSUE OF GETTING AHEAD MORNING INBOUND TRAFFIC AS WELL AS TRUCKS. NOT AWARE OF CLOSING I-77 FOR OFF RAMP? NEED CONCERN

Surface Streets \_\_\_\_\_

### B. John Belk Freeway

Freeway Segment - NEED ACCESS TO KENNESWETH & MIDCAMP, BUT AGREE W/ CLOVER EXIT REMOVAL IF NO ALTERNATIVE IS VIABLE

Interchanges I LIKE OPTION FOR 3RD, 4TH & TRUCK. AGREE W/ MARKED COMMENTS ABOUT BRIDGE GETTING TO HIGH -> THE VIADUCT NEEDS TO

BE "DRESSED" UP -> PEDESTRIAN FRIENDLY TREATMENTS, LIGHTS, ADEQUATE SIDEWALKS

Surface Streets SEE I-77/KENNESWETH BRIDGE & MAKE IT NICER, MAKE IT A GATEWAY



Continued on back...







# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment  Option for Trade & 5th Needs to be evaluated to reflect existing conditions since off on ramps tighten ramps to I-77 & create an urban boulevard

Interchanges MILLENS IS A HEAVILY USED EXIT & THE ONLY CONNECTION TO THE TRIANGLE STATE THROUGH I77/I77  
FREEDOM CONNECTION NEEDS TO REMAIN, LIGHTED INTERSECTIONS OK

Surface Streets \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

CLIQUE LEAFS & LOOP CONNECTORS ARE LAND HOES, ANY EFFORTS TO REMOVE & ORGANIZE I77 IS AN IMPROVEMENT

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): RICHARD BOWEN

Email Address (Optional): rbowen@redline.dg.com

Address (Optional): \_\_\_\_\_  
\_\_\_\_\_

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Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28203
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment I find the lane switching to be problematic and  
some of the proposed changes work to alleviate that

Interchanges ~~\_\_\_\_\_~~  
fan of all ramp removals that are proposed.

Surface Streets Cabwell as a major street in & it makes  
more sense than Davidson St.

### B. John Belk Freeway

Freeway Segment Again, lane switching problematic

Interchanges While I prefer to keep Ramps into  
Southend, I am open to alternatives

Surface Streets Not a fan of Freedom Dr Removal  
of Bridge that connects to Wilmore



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment suggestions proposed seem to be right, would help traffic issues.

Interchanges In favor of removing Trade St. loops at 77 Morehead Street Ramp Removals may present issues though for long term neighborhood plans, I am in favor of Removal.

Surface Streets would need more substantial intersections where traffic would need to move on & off I-77

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

I would like to know how any of the changes would affect pedestrian traffic and if future plans would affect any plans for the southend "Cap" of 277.

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): Megan Baswell

Email Address (Optional): meganbaswell@gmail.com

Address (Optional): \_\_\_\_\_

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: vcoleman@charlottenc.gov





# I-277/I-77 (Uptown) Loop Study

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Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

- 1) What is the zip code in which you reside? 28211
- 2) Do you work in Uptown? - Sometimes. Formerly was uptown daily.  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

Interchanges Reduce ~~Interchange~~ → The spaghetti bowl at 74 - Belk - Brookshire so we can have a true greenway.

Surface Streets More two-way streets, like Caldwell - Brevard, scrap one-way pairs.

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

Make it a Boulevard & tear it down.

Interchanges Well, Fixing 4th / 3rd U-turn is a good idea if you have to keep the damn freeway.

Surface Streets Scrap all the one-way pairs uptown, especially the 3rd → 4th ramp thru EPCC, Move land back on the tax rolls, for development.



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

*It was too focused on keeping the freeway. I-277 is bad for center city. We need more access, more street grid.*

7) Were the existing conditions explained clearly?  Yes  No

8) Were the future conditions explained clearly?  Yes  No

9) Were the concepts explained clearly?  Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

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- 1) What is the zip code in which you reside? 28226
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_



Continued on back...





# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment I-77 from Trade St. to Broadview  
Freeway - I like the idea of moving traffic  
away from Trade St and onto 5th St

Interchanges Concerns w/ merging issues

Surface Streets \_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

Anything to keep merging issues!!

- 7) Were the existing conditions explained clearly?  Yes  No
- 8) Were the future conditions explained clearly?  Yes  No
- 9) Were the concepts explained clearly?  Yes  No
- 10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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Please provide your comments in the space below and return this form to a Project Team Member or place it in the "COMMENT BOX". Thank You!

1) What is the zip code in which you reside? 28173

2) Do you work in Uptown?

Yes  No

3) Do you travel to Uptown for other reasons?

Yes  No

4) Based on your travel on I-277 and I-77, do you agree with our findings?

Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

**A. Brookshire Freeway**

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

**B. John Belk Freeway**

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges INTERCHANGE w/ 77 NEEDS IMPROVEMENT  
& AGREE w/ PROPOSED RAMP CHANGES

Surface Streets \_\_\_\_\_

\_\_\_\_\_



Continued on back...







# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment: \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

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Email: [vcoleman@charlottenc.gov](mailto:vcoleman@charlottenc.gov)





# I-277/I-77 (Uptown) Loop Study

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1) What is the zip code in which you reside? 28202

2) Do you work in Uptown?

Yes  No

3) Do you travel to Uptown for other reasons?

Yes  No

4) Based on your travel on I-277 and I-77, do you agree with our findings?

Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

**A. Brookshire Freeway**

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

**B. John Belk Freeway**

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

\_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

\_\_\_\_\_

\_\_\_\_\_

7) Were the existing conditions explained clearly?  Yes  No

8) Were the future conditions explained clearly?  Yes  No

9) Were the concepts explained clearly?  Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?  Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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1) What is the zip code in which you reside? 28270

2) Do you work in Uptown?

Yes  No

3) Do you travel to Uptown for other reasons?

Yes  No

4) Based on your travel on I-277 and I-77, do you agree with our findings?

Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment I-277 @ Independence Blvd

\_\_\_\_\_

Interchanges 3rd/4th Street Access Rd needed; we should replace U-Turn ramp

Surface Streets \_\_\_\_\_

\_\_\_\_\_

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

\_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_

\_\_\_\_\_



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# I-277/I-77 (Uptown) Loop Study

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## C. I-77

Freeway segment \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Interchanges \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Surface Streets \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

*Should consider improved integration of planned BRT / Light Rail down Independence Blvd*

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional): \_\_\_\_\_

Email Address (Optional): \_\_\_\_\_

Address (Optional): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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# I-277/I-77 (Uptown) Loop Study

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- 1) What is the zip code in which you reside? 28211
- 2) Do you work in Uptown?  Yes  No
- 3) Do you travel to Uptown for other reasons?  Yes  No
- 4) Based on your travel on I-277 and I-77, do you agree with our findings?  Yes  No

5) Be as specific as possible and identify inadequate conditions in the three following areas:

### A. Brookshire Freeway

Freeway Segment Like ideas to handle traffic around Bus barn to Coburn St

Interchanges Like ideas on

Surface Streets \_\_\_\_\_

### B. John Belk Freeway

Freeway Segment \_\_\_\_\_

Interchanges Like the ideas at 4<sup>th</sup> and merge of 277.

Surface Streets \_\_\_\_\_



Continued on back....





# I-277/I-77 (Uptown) Loop Study

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### C. I-77

Freeway segment \_\_\_\_\_

Interchanges \_\_\_\_\_

Surface Streets \_\_\_\_\_

6) Do you have any additional issues or specific ideas that you would like to share concerning the I-77/I-277 Loop Study?

Good ideas, 19, 20, 21, 22

PLEASE connect greenways between CPCC and Charlotte Park

7) Were the existing conditions explained clearly?

Yes  No

8) Were the future conditions explained clearly?

Yes  No

9) Were the concepts explained clearly?

Yes  No

10) Were NCDOT/City of Charlotte representatives understandable, helpful and clear in their explanations?

Yes  No

Name (Optional):

DEAN BRODHAG

Email Address (Optional):

DBC4CBE@gmail.com

Address (Optional):

1025 Regency DR  
CCT, NC 28211

If you are not able to fill this form before you leave tonight, please mail it before **June 15, 2012** to the address below:

Vivian Coleman, Charlotte DOT, 600 East Fourth Street, Charlotte, NC 28202

FAX: 704-541-3081

Email: vcoleman@charlottenc.gov



# Appendix **C** VISSIM Micro-Simulation Methodology





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## Appendix C: VISSIM Micro-Simulation Methodology

### SIMULATION OVERVIEW

Traffic simulation (PTV's VISSIM 5.4) was used to support the I-277/I-77 Loop Study. This methodology was utilized because the basic analytical models, such as those using the Highway Capacity Methodology, may not accurately capture the traffic operations of transportation facilities, especially when analyzing complex or congestion systems. The following sections discuss the simulation development, traffic control devices, traffic volume data, and measures of effectiveness (MOE).

### SIMULATION STUDY AREA

The simulation study area included all of the freeway interchanges of Interstate 77 (I-77) between Remount Street and Interstate 85 (I-85), as well as the interchanges and key intersections along Interstate 277 (I-277) (shown in Figure C-1). The simulation analysis provided numerical data and animation to identify locations that suffered from capacity deficiencies resulting from continued traffic growth within the metropolitan area.

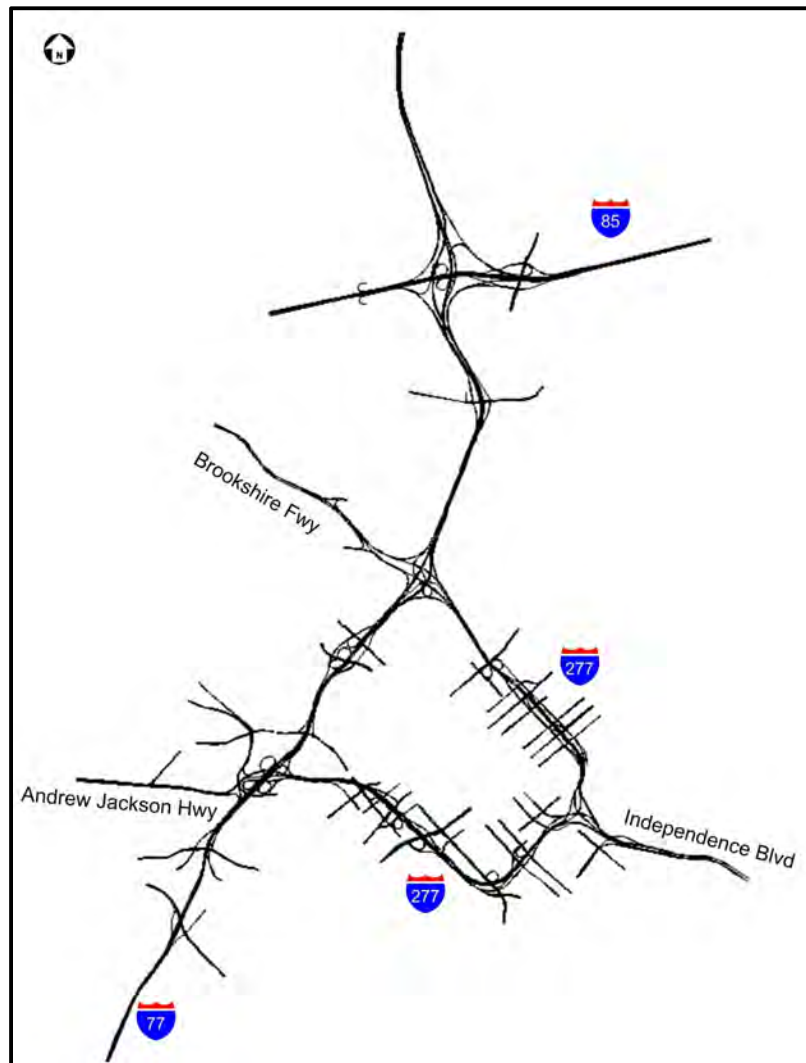


Figure C-1  
Spatial Limits for VISSIM Analyses

### SIMULATION SCENARIOS

Several simulation scenarios were developed for the I-277/I-77 Loop Study. Each scenario was analyzed during the AM and PM peak-hour period and includes the following:

- **2010 Existing Conditions:** Existing roadway geometry and volume
- **2025 Interim Year:** Existing roadway geometry and with a 16% growth in volume from 2010
- **2040 No-Build:** Existing plus committed improvements with 2040 forecasted volume
- **2040 Build:** Proposed improvements (geometric and traffic control) with the 2040 forecasted volume

### SIMULATION DEVELOPMENT

Traffic simulation models are constructed using various types of data. The data can typically be grouped into network geometry, traffic control devices, and traffic volume information. The following sections discuss these components in regards to the I-277/I-77 Loop Study.

#### Network Geometry

The 2010 (Existing Conditions) network was primarily constructed using the Charlotte/Mecklenburg County orthorectified 2009 MrSID files. Field visits were also performed to verify lane geometry and obtain several types of data including speed limit information, signal phasing, and turn restrictions. In addition to the freeway mainline and ramps, the arterial approaches for the ramp terminals were coded into the model. Several network elements were incorporated into this project's VISSIM model, which include the following:

- **Links/Connectors:** Physical geometry of the network
- **Desired Speed Decisions:** Vehicles receive speed distribution information
- **Reduced Speed Areas:** Vehicles receive temporary speed/acceleration information
- **Conflict Areas:** Define yield/priority requirements for intersecting/merging vehicles
- **Stop Signs:** Traffic control (also used for right-turn-on-red movements)
- **Signal Heads:** Traffic control (illustrate phase indications)
- **Detectors:** Vehicle detection for appropriate signal phase
- **Parking Lots:** Define trip origins and destinations for dynamic traffic assignment
- **Nodes:** Define intersections/diverge network sections for determining paths for dynamic traffic assignment.

The 2025 network geometry remained the same as the 2010 network. In addition, the 2040 roadway improvements were coded into VISSIM using concept drawings.

#### Traffic Control Devices

The 2010 Existing Conditions and 2025 Interim simulation networks included 50 intersections. Thirty-seven of the intersections are controlled by traffic signals, while the remaining 13 are unsignalized. The signal timing data for the AM and PM peak periods were provided by the City of Charlotte. In addition, field visits were conducted to determine/verify signal phasing information, such as protected/permitted left-turn operation, right-turn-on-red restrictions, phase

## Appendix C

overlaps, etc. The 2025 and 2040 scenarios modified the signal timings to improve traffic operations (especially for the freeway ramps).

The 2040 Build network included several additional intersections due to the various proposed geometry improvements. Forty-five signalized intersections, an increase of eight from the Existing Conditions, were incorporated into VISSIM to reflect the proposed geometric modifications.

The signalized intersections were modeled using detectors (where applicable), signal heads, stop signs (RTOR), and incorporated using the Ring Barrier Controller (RBC). The timing and phasing information from the Synchro files were imported into VISSIM (Existing Conditions), which created the RBC files. The signal timings of the 2025 and 2040 scenarios were adjusted to improve traffic operations, which primarily focused on minimizing off-ramp congestion.

### Traffic Volume Information

To perform an accurate traffic operations analysis using traffic simulation, peak-hour freeway mainline counts and intersection turning movement counts should be obtained. However, peak-hour traffic count data were not available for the study area. Due to budgetary constraints, it was not feasible to perform the desired peak-hour counts. Therefore, the project team developed and incorporated peak-hour origin and destination (O-D) demands from the Mecklenburg-Union Metropolitan Planning Organization's TRANSCAD regional model.

#### 2010 Existing Conditions Volume

A sub-area network was extracted from the TRANSCAD model which represents this project's study area. Staff from the City of Charlotte refined the ramp volumes (targets) at key intersections to develop more realistic O-D demands by satisfying the target values (which had 73 origins and 73 destinations). To use the O-D demands, VISSIM elements (nodes and parking lots) were coded to match the locations of the TRANSCAD sub-area model. Several iterations were performed to obtain reasonable peak-hour volume.

Due to a disconnect between the TRANSCAD O-D demands and link volumes during the 2010 Existing Conditions volume refinement process, PTV's VISUM was used to develop O-D matrices that reflected the TRANSCAD link volumes. Once the VISSIM network was imported into VISUM, the TFlowFuzzy demand matrix correction procedure was used to produce O-D demands that replicated the link volumes using the initial O-D demands from TRANSCAD and the link volume as target values. The TFlowFuzzy procedure was used to produce adjusted peak-hour O-D demands for the AM and PM periods. These O-D demands were incorporated into .fma files to use in VISSIM. A comparison of the freeway entry volume between the TRANSCAD link volume and the final link volume after using TFlowFuzzy are provided in Table C-1.

## Appendix C

**Table C-1**  
*Comparison of Freeway Entry Volume between TRANSCAD and VISUM*

Location	AM Peak Period			PM Peak Period		
	O-D Volume	TRANSCAD Volumes	% Difference	O-D Volume	TRANSCAD Volumes	% Difference
I-85 WB	21,167	20,924	1%	16,098	16,081	0%
I-85 EB	9,812	9,756	1%	11,690	11,690	0%
I-77 SB	12,879	12,784	1%	9,975	9,975	0%
I-77 NB	11,404	11,404	0%	14,723	14,723	0%
Brookshire Blvd EB	10,585	10,585	0%	4,002	4,002	0%
Independence WB	14,654	14,654	0%	10,530	10,530	0%

Note: The peak-hour volume represents 40% of the peak-period volume.

Dynamic Assignment was used to assign the 2010 O-D demands in VISSIM. An evaluation interval of 7,200 seconds (2 hours) was used to ensure that all of the peak-hour volume (3,600 seconds) would be allowed to complete their trip. This was verified by reviewing the error file and animation. As the level of congestion increases, the evaluation interval may also need to increase. Numerous iterations were performed in VISSIM under light volume (starting at 5% of the demand volume) to allow VISSIM to search for realistic paths for each O-D demand pair. Since this project includes a loop and connector – distributor (C-D) roadways, multiple valid paths may occur between the O-D pairs. Eventually, traffic typically finds the most logical paths; however, a handful of paths did not do so. For example, volume on the mainline exited the freeway and traveled on the C-D road between several interchanges until the C-D road merges back with the freeway. To resolve these issues, route closures and surcharges were incorporated. Once the paths were reviewed and found to be reasonable, the paths were converted to static routes and the simulation duration was changed to 5,400 seconds.

### 2025 Interim Year Volume

The 2025 Interim Year was used to assess potential congestion using continued growth in traffic. Based on estimates in socio-economic data, a growth factor of 1.16 (which was provided by the City of Charlotte) was used to factor up the 2010 volume to 2025 volume. This factor was used for both the AM and PM peak-hour volume.

### 2040 No-Build/Build Volume

The 2040 No-Build/Build peak-hour volume was developed by the City of Charlotte and reviewed by the project team. The 2040 volume was primarily developed by extrapolating from the 2010 and 2035 travel demand model horizons. The initial 2040 O-D demand matrices were revised using the following method:

- Volumes from both the 2010 and 2035 (AM & PM peak periods) travel demand model (TRANSCAD) runs were assigned to the external nodes of the subarea.
- Linear growth between 2035 and 2040 was assumed to get the 2040 “model” marginal (productions & attractions for each external node).
- VISSIM 2010 matrices were used and designated as the 2010 “simulation” marginal.

## Appendix C

- The 2040 “simulation” marginal was calculated using the three marginals using the following equation: (2040 model)/(2010 model) \* (2010 simulation)
- The 2040 marginals were modified slightly (rounded) so that the productions equaled the attractions.
- Using the 2010 simulation matrices and 2040 marginals, the Fratar process was used to get the revised 2040 matrices.
- The revised 2040 matrices were checked for reasonableness.

The resulting 2040 AM and PM matrices produced approximately 33% more total trips than the 2010 matrices. Due to capacity constraints, growth along the freeways was typically less than the 33% growth in the matrix. For the AM and PM peak periods, growth ranges from 11% to 36% and 16% to 34%, respectively (Table C-2).

*Table C-2  
Comparison of Freeway Entry Volume between 2010 and 2040*

Location	AM Peak Period			PM Peak Period		
	2010 O-D Simulation*	2040 O-D Volume	% Difference	2010 O-D Simulation*	2040 O-D Volume	% Difference
I-85 WB	8,361	9,360	12%	6,330	7,580	20%
I-85 EB	3,912	5,310	36%	4,651	5,850	26%
I-77 SB	6,793	7,540	11%	4,087	4,780	17%
I-77 NB	4,555	5,330	17%	5,941	6,890	16%
Brookshire Blvd EB	4,205	4,750	13%	1,683	2,260	34%
Independence WB	5,870	7,390	26%	4,283	5,140	20%

\* Adjusted O-D was from VISUM TFlowFuzzy assignment

### Vehicle Composition

All of the simulation scenarios incorporated a vehicle composition consisting of 95% passenger cars and 5% trucks (50% tractor-trailer trucks and 50% single unit trucks).

### Simulation Duration

The study consisted of a peak-hour simulation for all analysis scenarios. For the 2010 Existing Conditions scenario, the peak-hour traffic represented 40% of the peak period derived from the regional model. The 2025 and 2040 VISSIM models applied growth to the 2010 peak-hour demands. The peak-hour simulations had a duration of 5,400 seconds. The first 1,800 seconds was used to load the network (seed time), and output was collected for the remaining 3,600 seconds.

### MEASURES OF EFFECTIVENESS (MOE)

Several MOEs are available for comparison purposes, such as delay time, travel time, speed, queue length, etc. Common data collection elements of VISSIM include travel time sections, node evaluations, data collection points, link evaluation segments. For this study, the simulation scenarios were evaluated using link evaluation segments and network-wide output. The numerical data for all of the scenarios were based on averaging the data from 10 simulation runs.

## Appendix C

### Link Evaluation

The Link Evaluation output collects user definable data for a given segment length along the roadway links. This study collected volume, speed, and density but focused on the speed output which was based on 100 ft segments. The data were read into VISUM to illustrate the level of congestion and compare various scenarios.

### Network Performance

Network output provides system performance which is beneficial for comparing different simulation scenarios. The following performance measures were used to compare the performance between the No-Build and Build scenarios:

- Total Delay Time (hr)
- Total Travel Time (hr)
- Number of Arrived Vehicles
- Latent Demand Vehicles
- Total Distance Traveled (mi)

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