capital boulevard

corridor study report

june 2012

as amended august 7, 2012

CB
Capital Boulevard

Planning & Development

RALEIGH
URBAN
DESIGN
CENTER

CONTENT

Acknowledgements page i

1.Executive Summary ..... page 1
Planning Process ..... page 2
Vision Themes ..... page 2
Specific Projects ..... page 3
Making it real ..... page 3

2.Introduction ..... Page 5
Purpose and Scope ..... page 5
Overview of Study Area ..... page 6

3.What We Found ..... page 7
Issues, Opportunities, and Contraints ..... page 7
Public Meetings ..... Page 9

4.The Vision for the Boulevard ..... Page 11
Happy Motoring ..... Page 12
Transitioning to Transit ..... Page 14
Moving without Fosil Fuels ..... Page 16
Greening the Infrastructure ..... Page 18
At Home on Capital Boulevards ..... Page 20
Business and Industry ..... Page 22
A Gateway Transformed ..... Page 24

5.Specific Recommendations ..... page 27
Roadway Improvements ..... page 27
Greenways, Trails and Open Spaces ..... page 38
Transit Services ..... page 44
Bicycle and Pedestrian Facilities ..... page 45
Green Infrastructure ..... page 45
Land Use and Economic Development ..... page 46
Future Land Use ..... page 47
Zoning ..... page 47

6.Capital Plan and Phasing ..... page 49
Downtown Express ..... page 50
Valley ..... page 50
North Boulevard ..... page 50
Other Projects ..... page 50
Capital Cost Estimates ..... page 51

Appendix A: Paying for it ..... page 53
Value Capture Mechanisms ..... page 53
Government Resources Review ..... page 55
Transportation + Infrastructure ..... page 56
Parks + Greenspace ..... page 58
Water Resources Management ..... page 60

Appendix B: Pedestrian Bridge Analysis ..... page 63
Option 1: Connect Seaboard Station/Peace College to Devereux Meadows property page 64
Option 2: Connect Mordecai/Pilot Mill Community to Five Points Community ..... page 66
Option 3: Connect Five Points Community to Capital Boulevard Corridor ..... page 75
Option 4: Connect Mordecai/Pilot Mill Community to Capital Boulevard Corridor ..... page 77
Summary of Options ..... page 83
Potential pedestrian bridge design styles ..... page 85

Appendix C: Traffic Impact Analysis of Peace Street Bridge Alternatives ..... page 93

ACKNOWLEDGEMENTS

CITY COUNCIL

- Nancy McFarlane, City of Raleigh Mayor
- Russ Stephenson, Mayor Pro Tem
- Mary Ann Baldwin, Council Member At Large
- Randall Stagner, Council Member, District A
- John Odom, Council Member, District B
- Eugene Weeks, Council Member, District C
- Thomas Crowder, Council Member, District D
- Bonner Gaylord, Council Member, District E

CITY MANAGER

- J. Russell Allen

DEPARTMENT OF CITY PLANNING

- Mitchell Silver, Chief Planning and Development Officer & Director

CITY OF RALEIGH PROJECT TEAM

- Kenneth Bowers AICP, Project Director
- Trisha Hasch, Project Manager

LAND USE, TRANSIT, & TRANSPORTATION

- Martin Stankus, AICP
- Roberta Fox, AIA
- Eric Lamb, PE
- Mike Kennon, PE
- David Eatman
- Fleming El-Amin, AICP
- Bowman Kelly, PE, PTOE
- Jennifer Baldwin
- Oriane LaFargue, Intern

PLANNING + URBAN DESIGN

- Grant Meacci RLA, LEED AP
- Trisha Hasch
- Elizabeth Alley
- Rachel Stark, Associate ASLA
- Dhanya Sandeep

GIS SUPPORT

- Carter Pettibone, AICP
- Stan Wingo

COMMUNICATIONS

- Sharon Felton
- Jorge Gao
- Rhonda Hayes
- Aaron Sheppard

URBAN FORESTRY

- Sally Thigpen

PARKS AND GREENWAYS

- Vic Lebsock
- Ivan Dickey

STORMWATER MANAGEMENT

- Mark Senior, PE
- Scott Bryant, PE

PUBLIC WORKS

- Susan Locklear, PE

PUBLIC UTILITIES

- Robert Massengill

POLICE DEPARTMENT

- Captain Andy Lull
- Detective R.J.Pike
- James Kryskowiak
- M.O. K.A. Kratzer

WAKE COUNTY PLANNING

- Sharon Peterson
- Bryan Coates

SPECIAL THANKS TO PRO BONO CONSULTANT SERVICES:

- Brenan Buckley, PE, BCEE, CDM
- Graham Smith, RLA, ASLA, CLARB, LEED AP, DHM Design
- Richard Adams, PE, Kimley-Horn Associates, Inc.
- Sal Musarra, PE, Kimley-Horn Associates, Inc.
- Larry Zucchino, RLA, ASLA, LEED AP, JDavis Architects (Peace Street Study)

SPECIAL THANKS TO:

- Raleigh City Council
- Raleigh Public Affairs and RTN
- Raleigh Arts Commission
- Raleigh Historic Districts Commission
- North Carolina Department of Environment and Natural Resources
- North Carolina Department of Transportation
- North Carolina State Archives
- North Carolina Department of Administration
- North Carolina Department of Corrections
- North Carolina Department of Water Quality
- North Carolina Capital Area MPO
- Triangle Transit
- Bobby Murray Chevrolet
- Greg Hatem, Empire Properties
- Bobby Poole, retired General Real Estate Manager, North Carolina State Property Office
- Mack Paul, Partner, K&L Gates, LLC
- Citizen Advisory Councils
- Mordacai CAC
- East CAC
- North Central CAC
- Five Points CAC
- Business Owners
- Property Owners
- All citizen activists, participants, and public workshop attendees

EXECUTIVE SUMMARY

The Capital Boulevard Corridor Study presents an ambitious yet realistic vision for transforming the most-travelled and least-loved gateway into downtown Raleigh into a showcase for multimodal transportation and green infrastructure. The final report focuses on capital projects, in recognition that significant changes to the physical infrastructure of the corridor, not just new land use policies, are necessary to achieve meaningful change. It is also a vision plan, in that these project ideas, while tested for feasibility, will require future design and engineering studies to nail down the details. Yet in spite of its visionary nature, implementation of the study recommendations can begin almost immediately, by shaping pending capital investments in the corridor that are in the planning stage at the time of writing.

PLANNING PROCESS

The Capital Boulevard Corridor Study has been conducted with Raleigh's Department of City Planning serving as lead agency, assisted by an internal working group consisting of representatives from the Parks and Recreation department; the Stormwater Division of the Public Works department; and the Office of Transportation Planning. Regular meetings were also held with key County and State agencies, including North Carolina Department of Transportation (NCDOT) and the North Carolina Department of Environment and Natural Resources (NCDENR). .

City staff was assisted throughout the process by a team of pro bono consulting firms: Kimley Horn Associates for transportation planning and engineering; CDM for stormwater and water quality engineering; and DHM Design for landscape design and pedestrian planning. These firms graciously donated time and expertise to the effort, and were essential to developing and testing the design and engineering feasibility of the plan concepts:

The public process included three major public meetings: (1) a kickoff workshop to introduce the project and refine the scope of work; (2) a design workshop to brainstorm concepts for the corridor; and (3) an open house to present the draft plan. The initial kick-off meeting attracted 250 attendees. All subsequent meetings were well attended. Major themes that emerged from the public process included the need to put water quality and amenity at the center of the plan; provide multimodal transportation options in the corridor; and create public amenities to set the stage for significant reinvestment in the adjacent land uses. Also noted was the need for a vision commensurate with scope of the problem, yet still realistic.

VISION THEMES

The plan for Capital Boulevard is organized around seven vision themes, which are described briefly below. Each specific recommendation and project in the plan implements one or more of these themes.

1. **Happy Motoring**: Improving the capacity, safety, function, and aesthetics of Capital Boulevard as a major automotive route into and out of Downtown. Elements of this vision include improved access management, modernized interchanges, median improvements, and a consistent six-lane configuration for the roadway.

2. **Transitioning to Transit**: Improving transit access within the corridor, by providing new routes for bus services, improving the pedestrian realm, and capitalizing on future rail investments.

3. **Moving without Fossil Fuels**: Creating a new network of greenways and parallel 'complete streets' to facilitate bicycle and pedestrian movements in the corridor, providing new and better multimodal connections between existing neighborhoods and Downtown.

4. **Greening the Infrastructure**: Implementing multiple projects along the Pigeon House Branch to convert this degraded and forgotten urban drainage way into a resource for both recreation and wildlife, making a significant contribution to meeting the City's environmental goals and mandates. Floodplain areas will be cleared of development and converted into linear open space amenities. New greenway trails will connect the growing Downtown with the popular Crabtree Creek trails.

5. **At Home on Capital Boulevard**: New parks and transit services will set the stage for portions of the corridor to make the transition from commercial to residential use, which will create new neighborhoods and knit together and improve existing neighborhoods.

6. **Business and Industry**: Building on the corridor's industrial past by allowing a wide variety of commercial land uses to continue to grow and develop along the corridor, with an emphasis on unique and flexible spaces.

7. **A Gateway Transformed**: Leaving its past days as an eyesore behind, the new Capital Boulevard will be emblematic of a 21st century city. The character, function and image of Capital Boulevard will be completely transformed through a dramatic reordering and improvement of the physical and natural infrastructure.

SPECIFIC PROJECTS

The projects that implement the vision are all designed to work together and achieve multiple aims, regardless of whether they are considered in isolation as roadway, transit, or park projects. For example, all the roadway projects are also intended to facilitate multimodal transportation in addition to improved traffic flow, and the park projects also implement water quality goals. The major projects include:

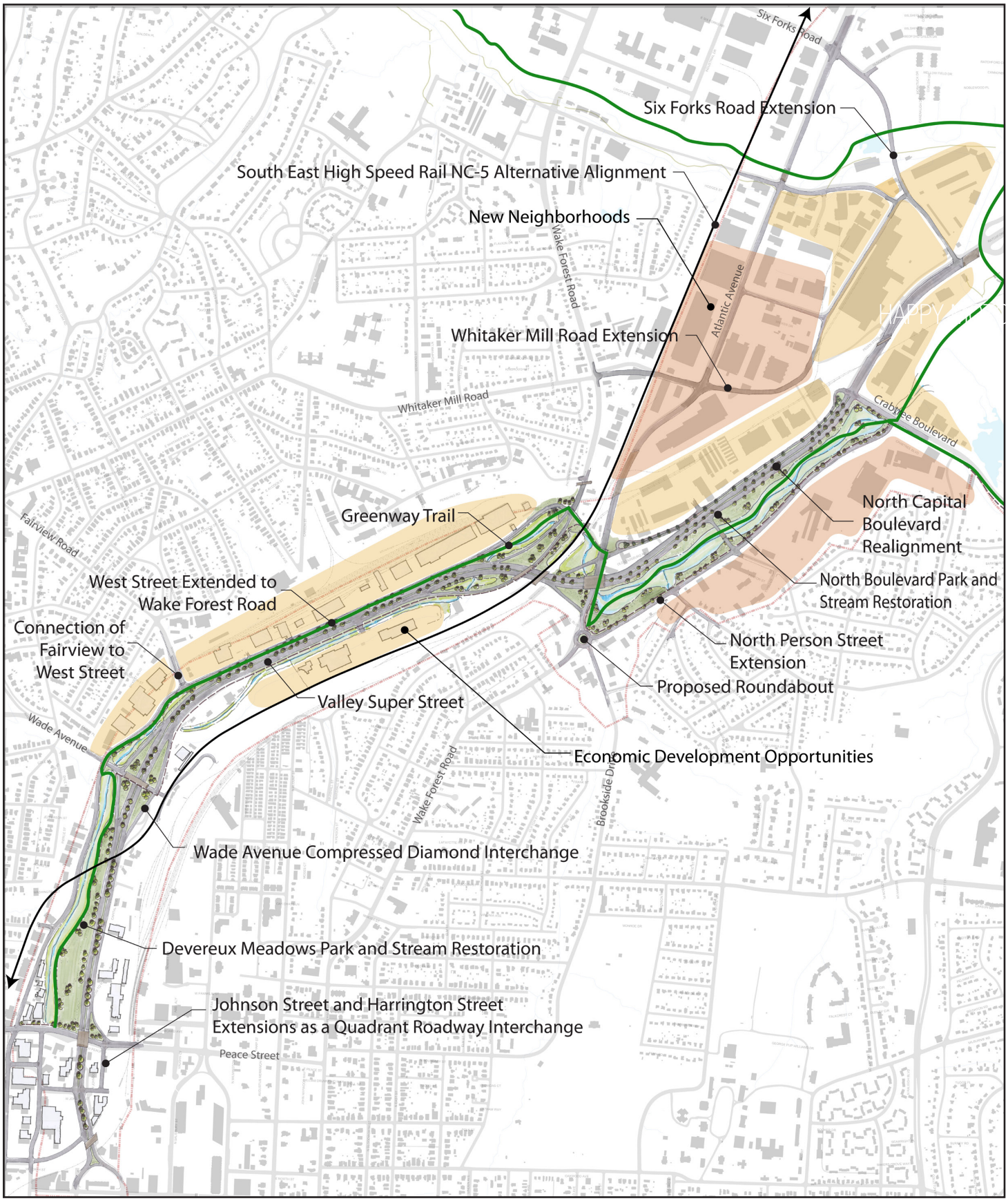
- Redesigning the Peace Street interchange to integrate with the urban grid by extending Johnson and Harrington Streets as a quadrant roadway interchange
- Redesigning the Wade Avenue interchange to improve safety and increase access to the rail yards by creating a compressed diamond interchange
- Adding a landscaped median to Capital Boulevard south of Wade Avenue
- Creating a new park and greenway trail straddling a restored Pigeon House Branch at Devereux Meadows between Wade and Peace
- Extending West Street north to Wake Forest Road to create a local access street with bicycle and pedestrian facilities
- Replacing the interchange at Fairview Road with a connection to the extended West Street, providing the Five Points neighborhoods with a pedestrian and bicycle-friendly connection to Downtown
- Installing a super street intersection midway between Wade Avenue and Wake Forest Road to improve access to adjacent land uses.
- Undertaking a stream bank restoration and flood bench along the Pigeon House Branch between Wade and Wake Forest
- Creating a second linear park and greenway trail in the Pigeon House floodplain between Atlantic Avenue and Crabtree Boulevard
- Realigning and consolidating Capital Boulevard in this same area into a six lane highway, with Automotive Way extended to Crabtree Boulevard to form a parallel access road on the east side, rebranded as North Person Street

MAKING IT REAL

The projects outlined above are expensive, totaling about $60 million in preliminary cost estimates. However, because these projects further so many important objectives, they can draw from many different sources of funding at the local, state and federal level, including:

- Federal Highway Administration bridge replacement funds to carry much of the cost of the interchange reconstruction
- Water quality and ecosystem enhancement funds for stream restoration
- FEMA funds, the City's stormwater fund, and future parks bonds for floodplain acquisition and restoration
- Public-private partnerships to create some of the amenities and new street connections in conjunction with private reinvestment in the corridor

While implementation of the Capital Boulevard plan is daunting and complex, the benefits far outweigh the challenges. Through coordinated effort, effective partnerships, and creativity, Capital Boulevard can have a future which is far greener, cleaner, and more economically productive than it is today, creating value that will spread beyond the confines of the study area to the adjacent neighborhoods and the City's rapidly transforming Downtown.


Six Forks Road
Six Forks Road Extension
South East High Speed Rail NC-5 Alternative Alignment
New Neighborhoods
Wake Forest Road
Atlantic Avenue
Whitaker Mill Road Extension
Whitaker Mill Road
Crabtree Boulevard
North Capital Boulevard Realignment
Greenway Trail
Fairview Road
West Street Extended to Wake Forest Road
North Boulevard Park and Stream Restoration
Connection of Fairview to West Street
North Person Street Extension
Proposed Roundabout
Valley Super Street
Wade Avenue
Economic Development Opportunities
Wake Forest Road
Brookside Dr
Wade Avenue Compressed Diamond Interchange
Devereux Meadows Park and Stream Restoration
Johnson Street and Harrington Street Extensions as a Quadrant Roadway Interchange
Peace Street

1. INTRODUCTION

PURPOSE AND SCOPE

Capital Boulevard, from the I-440 Beltline to Downtown, is one of the most visible and important transportation corridors in Raleigh. Not only is it the primary gateway to the city's core, but it offers compelling opportunities for reinvestment, environmental restoration, open space creation, and mobility enhancement. By connecting Downtown with an expanding "midtown" growth center, the successful re-imagining of Capital Boulevard could catalyze millions of dollars in new development and associated tax revenue, support job creation, offer a variety of housing options accessible by transit, and create unique destinations for the city and region. Capital Boulevard is a premier location to advance the City's Comprehensive Plan and create a vibrant mixed-use corridor reflecting the direction of a 21st century city.

The Capital Boulevard Corridor Study has been an in-house effort by the City of Raleigh to craft a vision and strategy for the revitalization, redevelopment, and renewal of Capital Boulevard from Downtown to the I-440 Beltline. The lead agency for the study has been the Department of City Planning. An intergovernmental working group was formed with representatives from Wake County and the State agencies with jurisdiction and land ownership in the Corridor, and an extensive outreach effort ensured meaningful input from business interests, property owners, neighbors, and other interested citizens.

City staff has been assisted throughout the process by a team of pro bono consulting firms: Kimley-Horn Associates for transportation planning and engineering; CDM Smith for stormwater and water quality engineering; and DHM Design for landscape design and pedestrian planning. These firms have graciously donated time and expertise to the effort and have been essential to developing and testing the design and engineering feasibility of the plan concepts.

The scope of work has followed a traditional planning trajectory: inventory and analysis, public outreach and visioning, plan preparation and refinement, and adoption. However, it also included the following modifications:

- The public and property owners were consulted up front to define the study area, identify key questions, and refine the scope.
- The process and interim work products drew an explicit link between the magnitude of the public investments contemplated, and the potential for private investment along the corridor.
- The plan contents work backwards from implementation to ensure that the recommendations can realistically be carried forward.
- The workshop-driven public outreach effort was matched by an intergovernmental "in-reach" strategy involving multiple meetings with stakeholders in City, County and State government.

OVERVIEW OF STUDY AREA

The study area extends from Downtown Raleigh to the I-440 Beltline. Capital Boulevard is part of the US 401 corridor along with the McDowell Dawson one-way pair in Downtown, and South Saunders Street south of Downtown. This corridor is classified as a Principal Arterial in the Raleigh 2030 Comprehensive Plan and is the only corridor inside the Beltline with this designation. Issues considered relevant to the study area included traffic, access management, transit, Southeast High Speed Rail (SEHSR), pedestrians and bicyclists, water quality, flooding, public sites, greenways, and private investment. Specifically:

- Of the four major gateway corridors into Downtown Raleigh, Capital Boulevard is both the most heavily traveled and the most complex in terms of its design and function.
- The corridor is flanked by two active rail corridors—the Norfolk Southern Secondary and CSX S-Line—complicating access and cross-town connectivity.
- Existing land-use patterns and bridge configurations provide significant barriers to right-of-way expansion.
- Poor access to adjacent land uses and a substandard image have kept away the type of retail, service, office, and multifamily developments that are typically attracted to high-volume arterial roadways.
- Pedestrian and bicycle accommodations, as well as transit amenities, are mostly substandard or non-existent.
- North of Atlantic Avenue, a significant amount of land along Capital Boulevard is located within the 100-year floodplain. This includes all the property located in the wide median north of Atlantic Avenue, as well as property located in the vicinity of Crabtree Creek. Flooding has been an issue in both areas recently.
- Covered over with multiple culverts and surrounded by acres of development and pavement with minimal stormwater control, the Pigeon House Branch has the most impaired water quality of any waterway in Raleigh.
- Current physical conditions both within the right-of-way and adjoining private and publicly-owned property are not conducive to realizing the latent value that resides within the corridor.

2. WHAT WE FOUND

ISSUES, OPPORTUNITIES, AND CONSTRAINTS

The Issues, Opportunities, and Constraints Report is the result of a detailed inventory and analysis conducted by City staff and State and County stakeholders. The report was informed by input gathered at a public workshop held in June 2010. Additional sources for the inventory included existing maps, plans and studies; interviews with officials at NCDOT and elsewhere; and Wake County property records.

Inventory and analysis activities included the following: general physical elements on the corridor and associated issues related to transportation; environmental conditions; utility infrastructure; land use; economic conditions; urban design and public realm conditions; and historic and cultural resources. Following is an abbreviated summary of conclusions expounded on in the Issues, Opportunities, and Constraints Report:

ISSUES

- The speed and design of the road makes it difficult to identify or safely access businesses, greenways, or other assets adjacent to the roadway, in spite of a proliferation of curb cuts in some sections. Existing access roads form an incomplete and disconnected system.
- Buildings are not located adjacent to the street but are separated from the street by extensive parking lots and/or swales, contributing to a placeless character.
- There are no public parks within the study boundary. A portion of the greenway is located on the corridor.
- The public realm is hostile to pedestrians and there is limited sidewalk infrastructure. Unprotected bus stops are located within a few feet of the traffic corridor and typically lack benches, shelters, or paved sidewalk connections.
- Neighborhoods on either side of the study area are disconnected from each other and from uses within the corridor. South of Atlantic Avenue, there are few places for cars to cross the corridor, and fewer still for bicyclists and pedestrians.
- The vast areas of impervious surfaces close to streams and tributaries have been built without modern stormwater controls, promoting erosion and flash flooding, and degrading water quality. Natural streams historically have been culverted underground or converted to urban stormwater conveyance channels. Pigeon House Branch, Crabtree Creek, and Cemetery Branch are considered impaired by the NC Division of Water Quality (DWQ), and there is frequent flooding in the study area.
- Invasive plant species are prevalent in the corridor and require labor-intensive hand removal to eradicate.
- Overhead utility wires have stunted natural growth of large maturing trees.
- Many sewer mains are aging and corroded and in need of replacement.
- There are many underutilized or obsolete properties, high vacancy rates, and subpar leasing rates.
- The pervasive heavy industrial zoning no longer reflects the preferred use pattern along the corridor and is in conflict with the Land Use element of the 2030 Comprehensive Plan.

OPPORTUNITIES

- There is space to install a highly diverse and sustainable urban landscape with a goal of providing the resources necessary for large maturing trees to thrive for 30 years or more.
- The City is in the process of repairing much of the watershed, particularly the western portion of Pigeon House Branch. Opportunities exist to enhance buffers and revisit landscape classifications in order to protect and rebuild the waterways. Adequate riparian buffers would improve water quality and control stormwater runoff, while providing space for new greenway trails.
- There is an opportunity to modify and even relocate portions of these two streams provided the existing stream segments are considered degraded by regulatory authorities and further provided that any alterations would result in ecological improvement to the stream and adjacent riparian buffers. Such modifications might be integrated into proposed realignments of roadway corridors or other proposed improvements within the study area.
- While expensive, numerous smaller stormwater controls installed throughout the watershed would cumulatively work to improve water quality. The water quality retrofit projects currently underway in the city on public and private property on the corridor can be expanded.
- The new Unified Development Ordinance (UDO), once adopted, will provide a new set of zoning tools for implementing the land use recommendations of the 2030 Comprehensive Plan, as potentially amended as a result of this corridor study.
- Key sites within the study area are underutilized and many have been privately assembled, setting the stage for private-sector led redevelopment and reinvestment.
- The combination of zoning, transit investment, and public realm improvements can help set the stage for new mixed-use development in appropriate locations.
- Continued residential growth citywide and in the surrounding neighborhoods provides the opportunity for a share of that growth to be captured within the study area.
- The corridor planning process provides the venue to work with local, State, and Federal entities to take advantage of funding opportunities and technical assistance to holistically approach economic and environmental revitalization and restoration. The wide variety of issues within the study area means that multiple public benefits can be obtained from projects and multiple funding sources can be tapped.
- Pending bridge replacement projects provide the opportunity to redesign existing interchanges to connect both sides of the corridor, facilitate bicycle and pedestrian access, and improve traffic safety and functionality.
- The Federal Emergency Management Agency (FEMA) provides funding for the public acquisition of floodplain lands. This is not only the most direct way to deal with flood prone properties, but also is a means of creating new open spaces and amenities in the corridor.
- The City has a Cost Share program that provides 75 percent of the cost of approved stormwater projects.
- Brownfield assessment and cleanup can jump start revitalization and redevelopment. There are several available local, State, and Federal tools and incentives.
- Relocating or undergrounding utilities would increase the available frontage for large street tree plantings.
- National Historic Landmark designations for buildings along the corridor provide access to rehabilitation incentives for adaptive reuse. This is an opportunity to emphasize the historic and cultural resources that give a community a unique identity and sense of place. Historic preservation also is a sustainable form of redevelopment.

CONSTRAINTS

- Efforts to improve multi-modal accommodations in the corridor must keep in mind existing traffic volumes and projections for significant future growth in traffic.
- There are no easy or cost effective short-term solutions to flooding issues in the study area. Federal and State stream protections prohibit construction of regional stormwater controls. Uses that remain in the floodplain can anticipate damage from future flood events.
- The rail lines and yards create hard edges along the corridor that are difficult and expensive to cross.
- Southeast High Speed Rail (SEHSR) requires a sealed corridor. Current at-grade crossings, where vehicular and train traffic intersect, must be replaced by grade-separated crossings (e.g. bridge or underpass) or road closures.
- There is both perceived and probable contamination along the rail lines and on private properties, complicating redevelopment.
- Right-of-way is limited in the southern portion of the corridor. Access lanes would require additional right-of-way acquisition.
- As "Waters of the US" (i.e., waters protected under the federal Clean Water Act), all perennial and some intermittent streams and wetlands fall under State and Federal jurisdiction.
- The Division of Water Quality regulates 50 foot buffers along all "Waters of the State," which complicates greenway planning and urban development.
- The significant amount of retail competition nearby likely impacts the potential for significant retail development in the study area.

PUBLIC MEETINGS

FIRST PUBLIC MEETING

The first public meeting for the Capital Boulevard Corridor Study—a community workshop—was held on June 24, 2010, and attracted over 250 stakeholders. The workshop's purpose was both to confirm the direction for the study, as well as to gain initial input as to the issues and opportunities that the study should cover.

Participants were asked to provide their opinions as to whether the study area boundaries were appropriately drawn, and whether the specific work tasks in the scope made sense and were sufficiently comprehensive. Generally, all agreed that the scope was logical and comprehensive. Suggestions included a phasing plan, and addressing funding and incentives for reinvestment. Several topics for inclusion were suggested including habitat and ecology; crime and public safety; and sustainability. It also was suggested that adjacent neighborhoods be included. A complete summary report on the workshop results is available on the project website in a separate report.

The following list represents a distillation of the major themes that emerged from the analysis of the public input. The list is by no means exhaustive, but it captures the most important points that the project team needed to keep in mind as the project moved forward.

- CONNECT THE NEIGHBORHOODS
- BRIDGE THE CANYON
- IMPROVE THE INTERCHANGES
- PUT WATER AT THE CENTER
- DEAL WITH FLOODING
- COMPLETE A GREENWAY
- EMPHASIZE MULTIMODAL TRANSPORTATION
- ATTRACT NEW USES
- HELP EXISTING BUSINESS AND PROPERTY OWNERS
- BE VISIONARY
- BE REALISTIC

SECOND PUBLIC MEETING

The second public meeting for the Capital Boulevard Corridor Study—the Public Design Workshop—was held all day on October 30, 2010. Approximately 50 people participated in the event.

The Issues, Opportunities, and Constraints Report laid the foundation for the workshop during which participants had the opportunity to discuss and map ideas for the corridor. A presentation kicked off the design workshop and a question and answer session followed. Two sessions of small-group design and mapping exercises filled the remainder of the day during which participants discussed potential improvements and solutions for the corridor and synthesized ideas into conceptual plans that incorporated the groups' best ideas. At the conclusion of each session, individual groups reported their recommendations to the group-at-large.

The morning small-group design and mapping exercise focused on a range of topics that included transportation, ecology, development, and urban design. The afternoon small-group design and mapping exercise focused on developing holistic plans for the corridor. Each group produced a map that incorporated transportation, ecology, development, and urban design. Big ideas generated at the public design workshop encompassed street and interchange design, green space, historic restoration, and economic development. Specific ideas follow:

- REPLACE THE PEACE STREET INTERCHANGE; INTEGRATE IT INTO URBAN GRID.
- CREATE ROOM FOR A REAL MEDIAN BETWEEN PEACE STREET AND WADE AVENUE.
- RESTORE STREAM AND PARKLAND AT DEVEREUX MEADOWS.
- REDESIGN THE WADE AVENUE INTERCHANGE.
- EXTEND WEST STREET TO OLD WAKE FOREST ROAD AS A BICYCLE AND PEDESTRIAN-FRIENDLY CORRIDOR.
- TERMINATE FAIRVIEW ROAD AT WEST STREET.
- ESTABLISH A SUPER STREET AT-GRADE INTERSECTION BETWEEN WADE AND ATLANTIC AVENUES.
- ACQUIRE FLOOD-PRONE PROPERTY NORTH OF ATLANTIC AVENUE AND CREATE A LINEAR OPEN SPACE.
- CREATE A GREENWAY TRAIL FROM CRABTREE CREEK TO THE NEW WEST STREET EXTENSION.
- CREATE A STREETSCAPE PLAN.
- EXTEND PERSON STREET ALONG WAKE FOREST ROAD AND AUTOMOTIVE WAY TO CONNECT TO CRABTREE BOULEVARD.

Following the public design workshop, an internal work session was held to fine-tune design ideas and map a set of conceptual solutions.

THIRD PUBLIC MEETING

A third public meeting for the Capital Boulevard Corridor Study was held on September 29, 2011 and attracted approximately 125 people. Held at the Progress Energy Center for the Performing Arts, the meeting's purpose was to present the draft plan of the Capital Boulevard Corridor Study. The meeting was held jointly with NCDOT staff and consultants, who provided information regarding the planned bridge replacement projects at Peace Street and Wade Avenue. The meeting included both an open house format and a formal presentation followed by a question and answer session. For the open house portion, City Planning staff manned stations devoted to each Vision Theme in the plan. NCDOT staff had separate stations for the bridge replacement projects, and there was also a station presenting the results of a parallel visioning effort for Peace Street. There was broad acceptance of the recommendations of the Capital Boulevard Corridor Study, with the only controversy being some disagreement regarding the removal of the interchange ramps at Fairview Road.

3. THE VISION FOR THE BOULEVARD

This chapter lays out the broad vision for the future of Capital Boulevard, using illustrations and evocative language. It is the role of the next chapter to give the technocratic version of the specific recommendations that will implement this vision. The vision starts with the chance to improve what the Boulevard already is—a heavily travelled highway. It closes with a vision of a gateway transformed into a multi-modal corridor featuring linear green spaces and new land use patterns. The vision themes are:

- HAPPY MOTORING
- TRANSITIONING TO TRANSIT
- MOVING WITHOUT FOSSIL FUELS
- GREENING THE INFRASTRUCTURE
- AT HOME ON CAPITAL BOULEVARD
- BUSINESS AND INDUSTRY
- A GATEWAY TRANSFORMED

HAPPY MOTORING

In 1974, when Wake County had less than a third the population it has today, Capital Boulevard carried the heaviest traffic load in its history—64,000 cars between Wade Avenue and Peace Street. Since that time, the Boulevard has stepped down from its pinnacle as the city's busiest roadway, but it continues to carry most of the traffic into and out of Downtown from the north. Moreover, it is the conclusion of this plan that it should continue to do so. The alternative routes—Wake Forest Road and Glenwood Avenue—are also residential streets. To avoid overburdening the Mordecei and Glenwood/Brooklyn neighborhoods, Capital Boulevard can and should continue to do the heavy lifting with regards to traffic.

However, while Capital Boulevard moves a lot of cars, it is not a very good highway from a motorist's point of view:

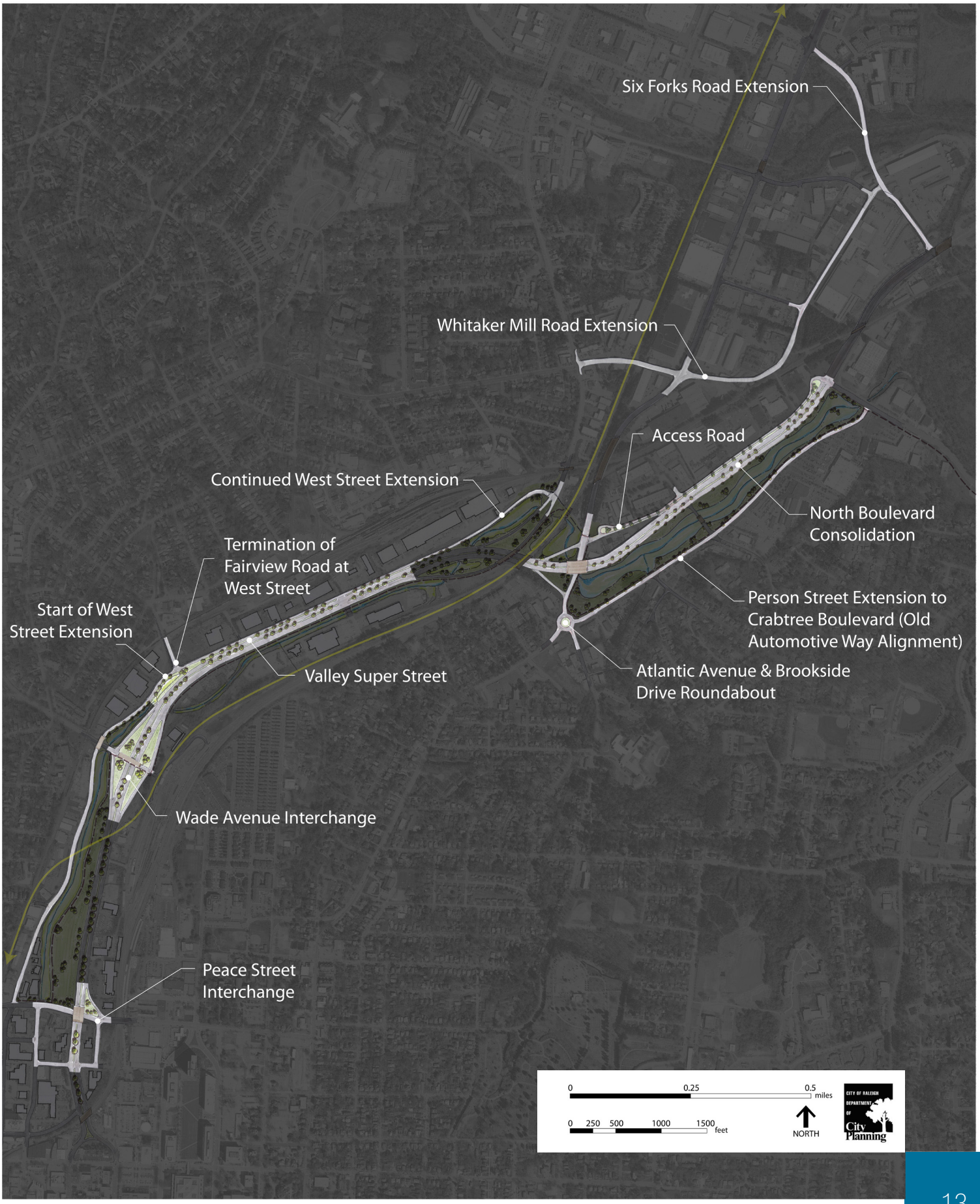
- It has substandard lane widths.
- All the interchanges feature obsolete geometry, with Peace Street and Wade Avenue being the worst.
- There is a proliferation of driveways and curb cuts, often with an unsafe relationship to interchange ramps.
- While there is too much individual access to adjacent land uses in some segments of the corridor, in other places there is inadequate access, particularly between Fairview and Wake Forest Roads.
- Sight distances are poor in some locations, particularly near the Fairview Road ramp.

The Capital Boulevard Corridor Study proposes to resolve all these issues through a combination of capital improvements that will help traffic move smoothly and safely along the corridor (see Figure 3.1-Happy Motoring.). These improvements include:

- Additional right-of-way for the most constrained part of the Boulevard, normalizing lane widths and replacing a Jersey barrier with a landscaped median.
- Redesigns for the major interchanges that will improve vehicular, bicycle and pedestrian access and safety, as well as aesthetics.
- Consolidation of access along the stretch between Fairview and Wake Forest Roads into a single access point allowing northbound and southbound access and return.
- Creation of a local access street to take local traffic off of Capital Boulevard and increase access to land uses.
- Consolidation of Capital Boulevard north of Atlantic Avenue, eliminating the separated one-way pair.

HAPPY MOTORING MAP

FIGURE 3.1



TRANSITIONING TO TRANSIT

Major regional transit investments are programmed for the Capital Boulevard corridor, with transit stops to be located within the corridor. Consistent with the latest drafts of the Triangle Regional Transit Program Alternatives Analysis, rail transit stops and associated TOD opportunities will be located at Whitaker Mill Road and Six Forks Road, adjacent to Atlantic Avenue. A potential stop is also being explored for Peace Street, just outside the south end of the study area. The goal of this plan is to fill in and connect these regional facilities with new opportunities for local transit service up and down the corridor and into Downtown.

Bus service is not available within the corridor south of Atlantic Avenue, due to the freeway condition of the corridor and lack of places for a bus to stop and for passengers to walk. The northern portion of the study area has bus service, but the pedestrian and passenger facilities are poor to nonexistent. The Corridor Study proposes that this problem can be solved by utilizing the new parallel facilities—West Street and the Person Street extension—as transit routes that accommodate sidewalks and passenger amenities. In the near term, CAT Routes 1 and 2 can use these streets. In the future, with the development of transit-supportive land use, dedicated services might be provided. (See Figure 3.2-Transitioning to Transit.)

FIGURE 3.2

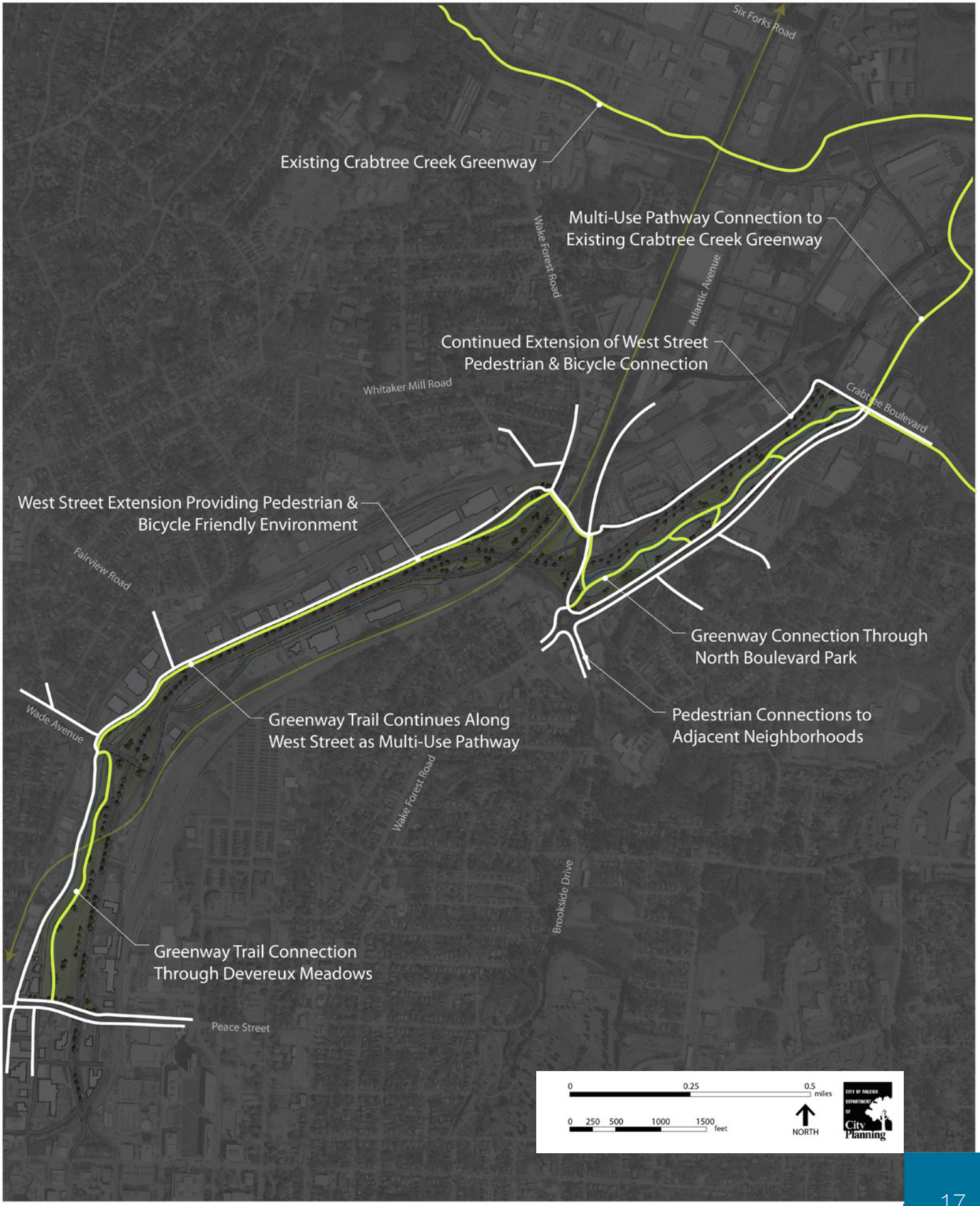
Proposed Six Forks
Light Rail Station
& Quarter Mile Radius
South East High Speed Rail
NC-5 Alternative Alignment
Proposed Whitaker Mill
Light Rail Station
& Quarter Mile Radius
Six Forks Road Extension
Atlantic Avenue
Whitaker Mill Road
Crabtree Boulevard
Whitaker Mill
Road Extension
Continued West Street Extension
Potential CAT 2 Bus Route
Termination of Fairview
Road at West Street
Fairview Road
Start of West
Street Extension
Person Street Extension to
Crabtree Boulevard (Old
Automotive Way Alignment)
Wade Avenue
Potential CAT 1 Bus Route
Wake Forest Road
Brookside Drive
Adopted Light Rail Alignment
Proposed Peace Street
Light Rail Station
& Quarter Mile Radius
Peace Street
Proposed Harrington
Light Rail Station
& Quarter Mile Radius
0
0.25
0.5
miles
0
250
500
1000
1500
feet
NORTH
CITY OF RALEIGH
DEPARTMENT
OF
City
Planning

MOVING WITHOUT FOSSIL FUELS

Non-motorized travel modes such as bicycling and walking have no place along Capital Boulevard today. As with transit, this problem can be effectively solved through the use of the new parallel local access roadways and the proposed greenway connections, discussed below. A combination of generous sidewalks, multi-purpose paths, and greenway trails will provide the opportunity to bicycle and walk the length of the corridor for business or pleasure.

The Five Points area and neighborhoods such as Georgetown particularly stand to benefit by the proposed connection of Fairview Road to the extended West Street. Whereas the freeway-style ramps that exist today only serve motorists, this new connection will provide safe, convenient and direct automotive, bicycle and pedestrian access into Downtown and the Glenwood South area. (See Figure 3.3-Moving Without Fossil Fuels.)

FIGURE 3.3

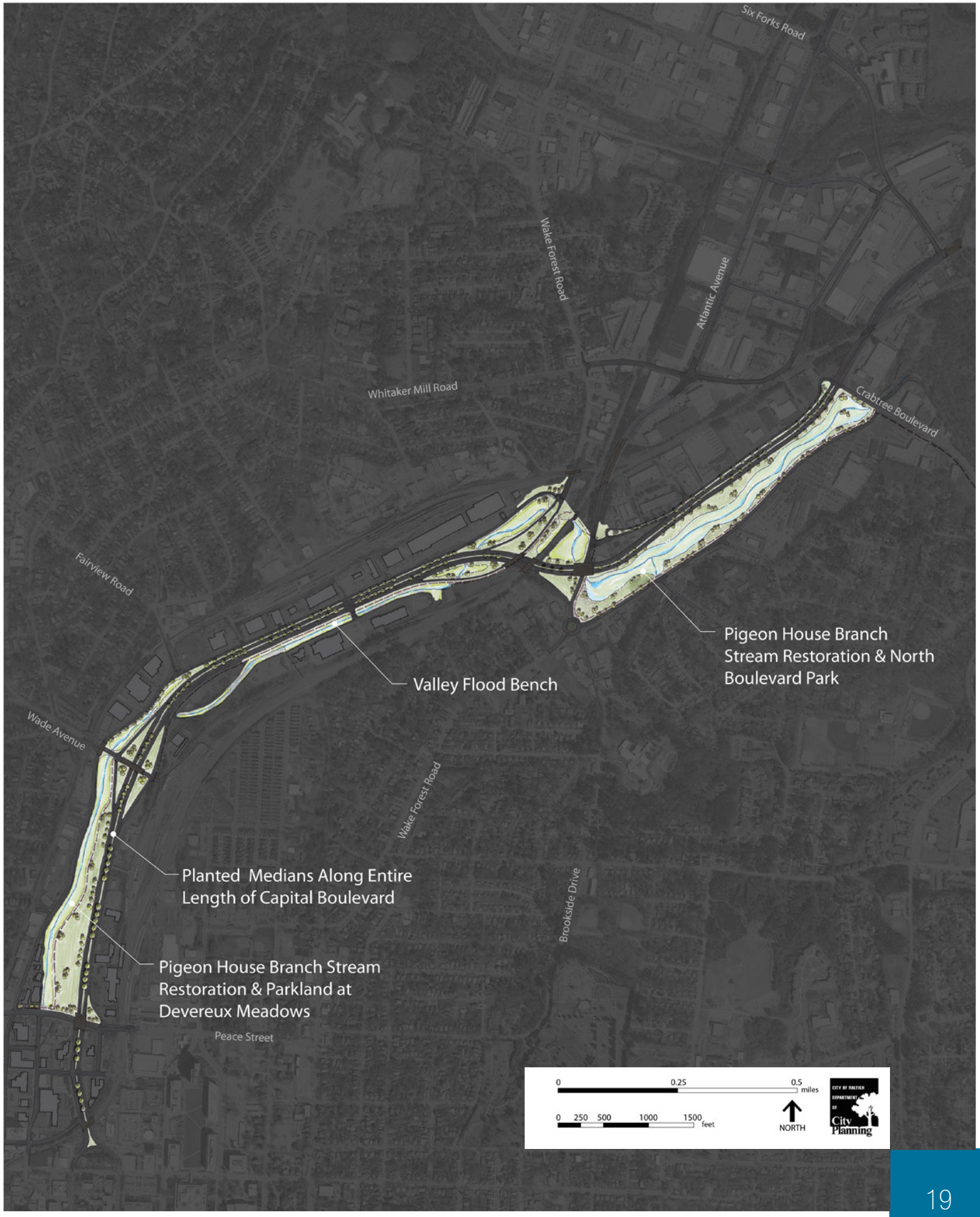

Six Forks Road
Existing Crabtree Creek Greenway
Multi-Use Pathway Connection to
Existing Crabtree Creek Greenway
Wake Forest Road
Atlantic Avenue
Continued Extension of West Street
Pedestrian & Bicycle Connection
Whitaker Mill Road
Crabtree Boulevard
West Street Extension Providing Pedestrian &
Bicycle Friendly Environment
Fairview Road
Greenway Connection Through
North Boulevard Park
Wade Avenue
Greenway Trail Continues Along
West Street as Multi-Use Pathway
Pedestrian Connections to
Adjacent Neighborhoods
Wake Forest Road
Brookside Drive
Greenway Trail Connection
Through Devereux Meadows
Peace Street
0
0.25
0.5
miles
0 250 500 1000 1500
feet
NORTH
CITY OF RALEIGH
DEPARTMENT
OF
City
Planning

GREENING THE INFRASTRUCTURE

While there is a surprising amount of greenspace in the corridor today, it is fragmented and disconnected. The existing greenspaces do not work to address the major environmental problems within the corridor, which are centered on the Pigeon House Branch.

The Capital Boulevard Corridor Study proposes to take a "landscape infrastructure" approach to the problems posed by stormwater runoff and flash flooding, relocating flood prone uses out of the floodplain to create a network of linear greenspaces that will improve water quality, provide a place for floodwaters to go, and provide active and passive recreation opportunities. Key reaches of the Pigeon House Branch will be transformed from a drainage ditch to a natural, recreational and aesthetic amenity. (See Figure 3.4-Greening the Infrastructure.)

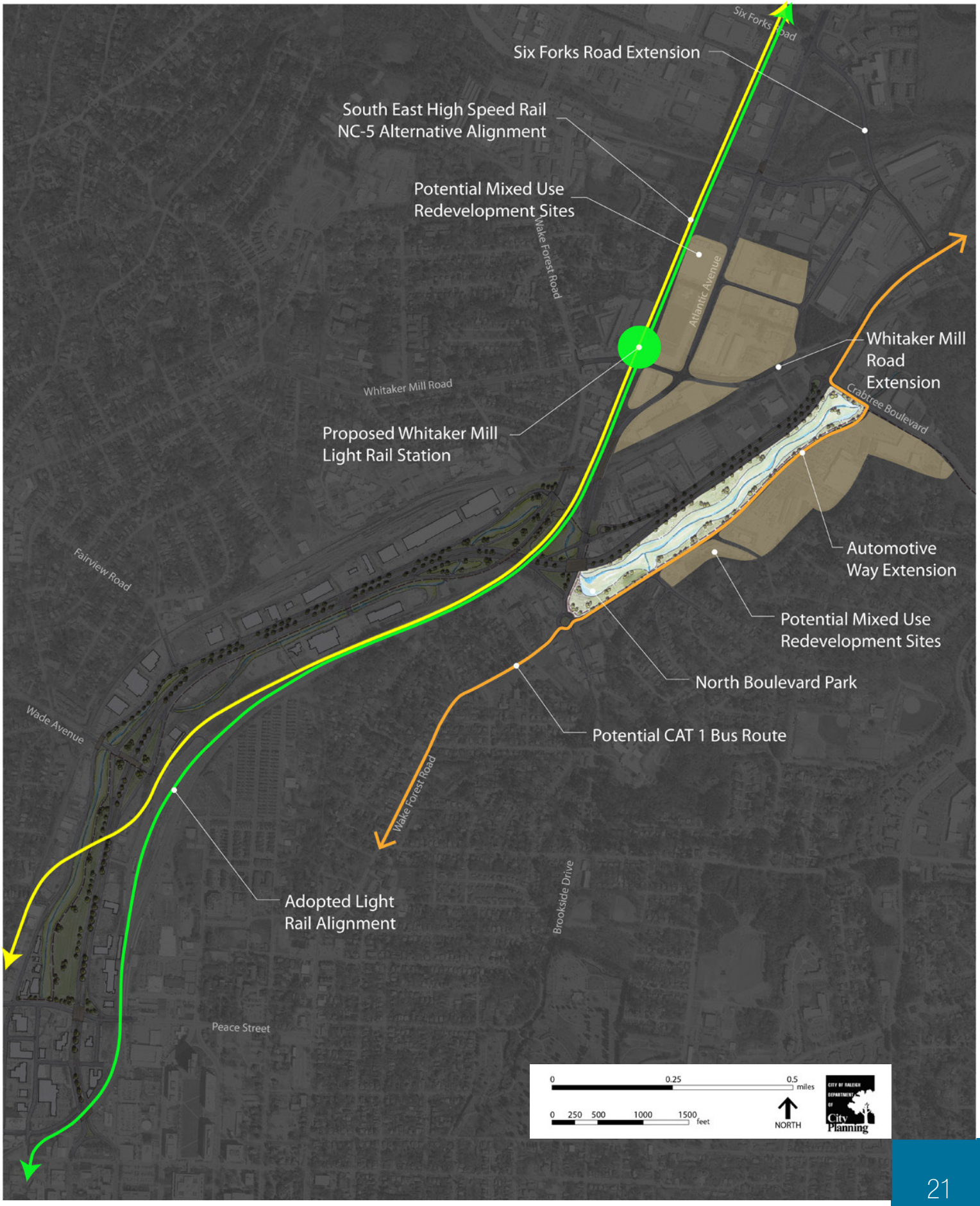
FIGURE 3.4


Six Forks Road
Wake Forest Road
Atlantic Avenue
Whitaker Mill Road
Crabtree Boulevard
Fairview Road
Pigeon House Branch Stream Restoration & North Boulevard Park
Valley Flood Bench
Wade Avenue
Wake Forest Road
Planted Medians Along Entire Length of Capital Boulevard
Brookside Drive
Pigeon House Branch Stream Restoration & Parkland at Devereux Meadows
Peace Street
0
0.25
0.5
miles
0 250 500 1000 1500
feet
NORTH
CITY OF RALEIGH DEPARTMENT OF City Planning

AT HOME ON CAPITAL BOULEVARD

Capital Boulevard is no one's idea of a prime residential address today, and this will likely remain true for at least a significant portion of the corridor in the future. However, where new parkland can provide a green buffer between the highway and adjacent land uses, the opportunity for residential development becomes much more appealing. This study identifies three locations where future residential development is likely: alongside the new North Boulevard Park between Crabtree Boulevard and Atlantic Avenue; near the proposed rail transit stop at Whitaker Mill Road, and near the proposed rail transit stop near Six Forks Road, where a significant amount of multifamily housing has been built recently, and where plans or approvals are in place for more. (See Figure 3.5-At Home on Capital Boulevard.)

FIGURE 3.5

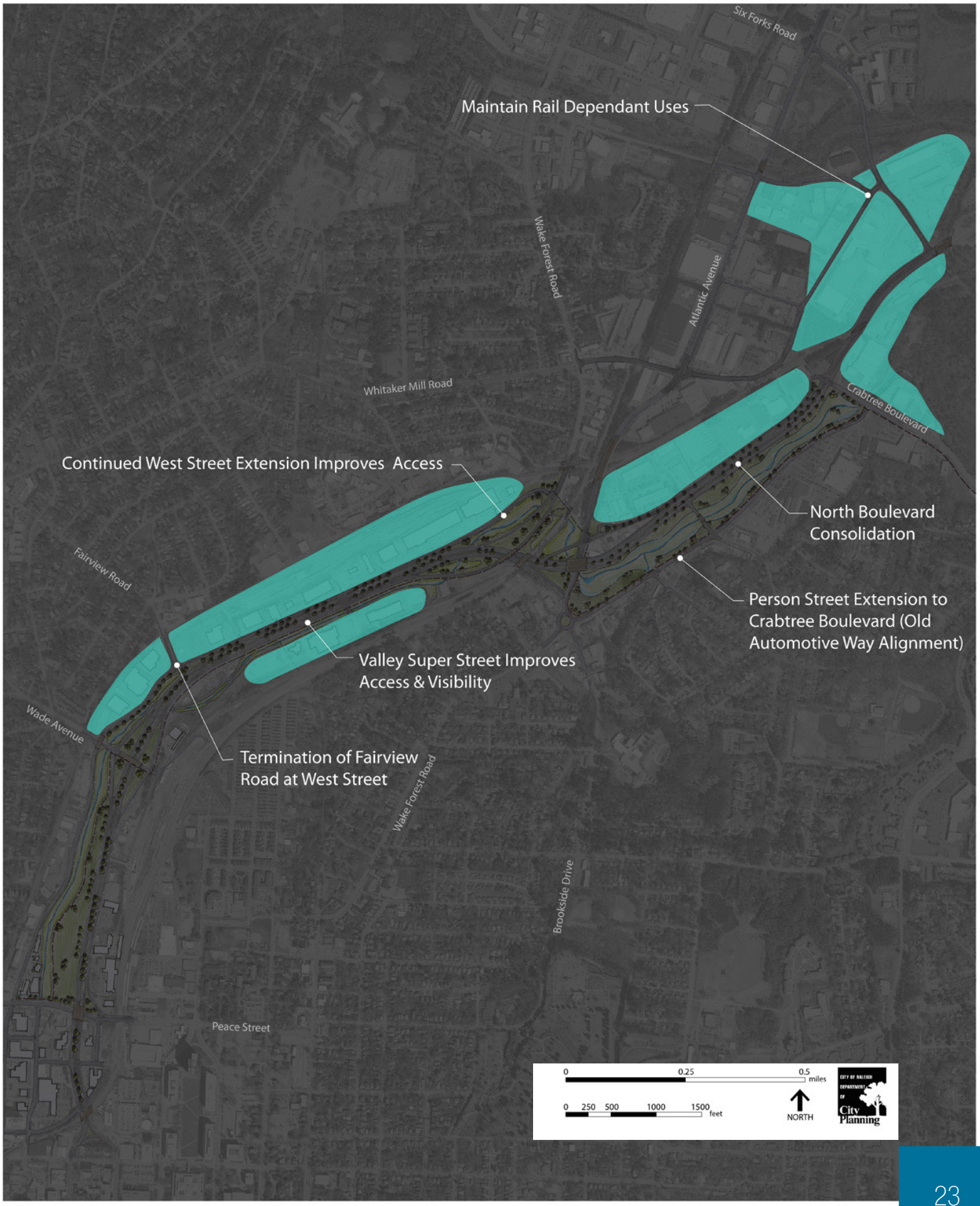

Six Forks Road
Six Forks Road Extension
South East High Speed Rail
NC-5 Alternative Alignment
Potential Mixed Use
Redevelopment Sites
Wake Forest Road
Atlantic Avenue
Whitaker Mill Road
Whitaker Mill
Road
Extension
Crabtree Boulevard
Proposed Whitaker Mill
Light Rail Station
Fairview Road
Automotive
Way Extension
Potential Mixed Use
Redevelopment Sites
North Boulevard Park
Wade Avenue
Potential CAT 1 Bus Route
Wake Forest Road
Brookside Drive
Adopted Light
Rail Alignment
Peace Street
0
0.25
0.5
miles
0
250
500
1000
1500
feet
NORTH
City Planning

BUSINESS AND INDUSTRY

Historically, Capital Boulevard has been an industrial corridor, and the North Boulevard area was an early location for highway retail and services. Today, the corridor is no longer a prime industrial or retail location, yet it remains home to an eclectic mix of businesses including manufacturing, distribution, wholesaling, and auto-related services. Many of these uses occupy the flat land of the Crabtree Creek floodplain. The Capital Boulevard Corridor Study posits that such uses should continue to be welcome in the study area so long as they remain viable, and therefore proposes a laissez-faire approach to the bulk of the industrial property. Existing industrial and commercial zoning and land use classifications can remain in place for much of this land, but the City should be also be open to revisiting the preferred land use pattern should market conditions change. Unique use combinations, including live-work arrangements, are also encouraged.

The poor performance of retail in the study area is related partly to nearby competition, but also largely due to the poor image of the corridor and the difficulty in accessing both north- and south-bound traffic streams from a single location. This issue will be solved through the introduction of new access lanes, a superstreet between Fairview and Wake Forest Roads, and the consolidation of the north and southbound lanes in the North Boulevard areas (see Figure 3.6-Business and Industry.)

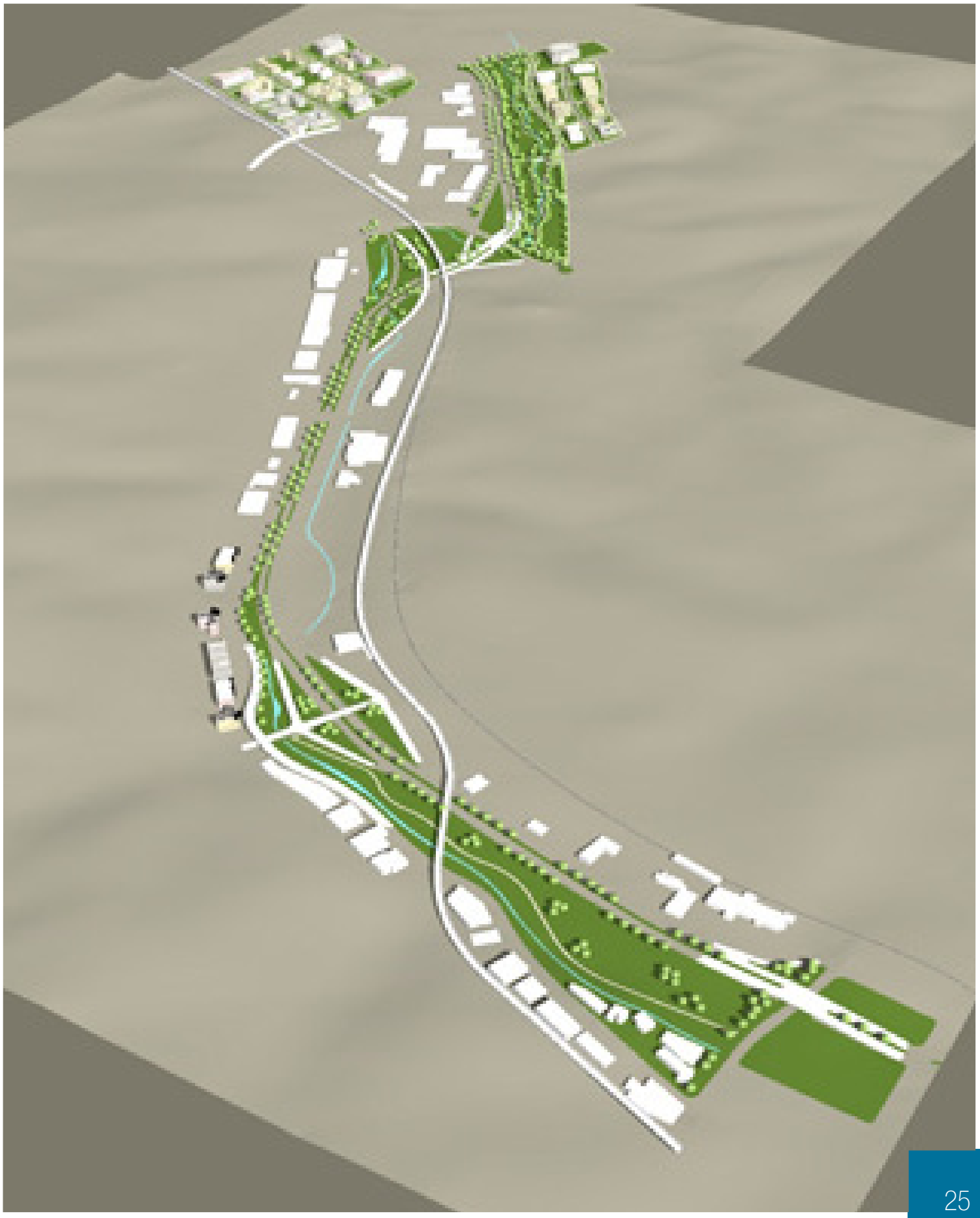
FIGURE 3.6


Six Forks Road
Maintain Rail Dependant Uses
Wake Forest Road
Atlantic Avenue
Whitaker Mill Road
Crabtree Boulevard
Continued West Street Extension Improves Access
North Boulevard Consolidation
Fairview Road
Person Street Extension to Crabtree Boulevard (Old Automotive Way Alignment)
Valley Super Street Improves Access & Visibility
Wade Avenue
Termination of Fairview Road at West Street
Wake Forest Road
Brookside Drive
Peace Street
0
0.25
0.5
miles
0 250 500 1000 1500
feet
NORTH
City Planning

A GATEWAY TRANSFORMED

On a typical workday in the future, residents of neighborhoods such as Georgetown and Woodcrest may start the day with a transit or bicycle commute to Downtown on the new local streets. Looking to the left or right, they can see thousands of cars streaming south into Downtown on Capital Boulevard as they cruise by wooded floodplain areas and landscaped medians. At lunchtime, State workers stroll down the broad sidewalks of Peace Street to dine outside with a view of the restored Pigeon House Branch. Hearing a sudden sound, they turn to watch the 12:35 Acela train from Washington DC swoosh over Peace Street enroute to Raleigh Union Station. Later that evening, runners and walkers head to Crabtree Creek through the North Boulevard Park greenway trail as the evening commute heads north out of town. As night falls, people gather at edgy nightclubs and galleries located in old industrial buildings near the tracks. Electronic dance beats mix with the sound of rail cars coupling in the nearby freight yards. As the last revelers head home, the sound of frogs can be heard along the banks of the Pigeon House Branch (see Figure 3.7-A Gateway Transformed)

FIGURE 3.7



4. SPECIFIC RECOMMENDATIONS

The prior chapter laid out the vision for Capital Boulevard through a set of six vision themes, including a general description of the capital projects and public actions necessary to implement each theme. This chapter provides a more detailed description of the specific recommendations that implement the vision, organized by traditional functional topic areas such as roadways and transit. The topic areas covered are:

- ROADWAY IMPROVEMENTS
- GREENWAYS AND OPEN SPACES
- TRANSIT SERVICES
- BICYCLE AND PEDESTRIAN FACILITIES
- GREEN INFRASTRUCTURE
- LAND USE AND ECONOMIC DEVELOPMENT

ROADWAY IMPROVEMENTS

Proposed roadway improvements include changes in alignment to Capital Boulevard, redesigned interchanges and bridges, and roadway extensions to create new parallel local access streets. In keeping with the broad scope of this plan, these roadway projects are designed not just to improve vehicular flow and safety, but also to improve multi-modal accessibility and provide better opportunities for new residential and economic development.

Based on the findings that traffic volumes within the corridor have shown no growth since 1974, this plan proposes to keep Capital Boulevard to a consistent six-lane section throughout the study area, maintaining capacity while improving flow and safety through improved geometry and access management.

AREA 1: DOWNTOWN EXPRESS

Four major and inter-related projects are proposed in the area stretching south from Fairview Road, which is the oldest and most heavily used part of the corridor. Two of the projects are necessary due to the pending replacements of the Peace Street and Wade Avenue bridges. All should be seen as part of a package of improvements that need to be undertaken together in order to function properly. All improvements are illustrated on Figure 4.1-Roadway Improvements Map.

PROJECT 1: PEACE STREET INTERCHANGE

The existing interchange at Peace Street is geometrically substandard. The design of the interchange is unfriendly to both bicyclists and pedestrians using Peace Street to travel east and west. One of the heaviest vehicular movements, from southbound Capital Boulevard onto eastbound Peace Street, takes place through an unsignalized left turn. The resulting traffic pattern and parcelization of the surrounding land is not conducive to redevelopment.

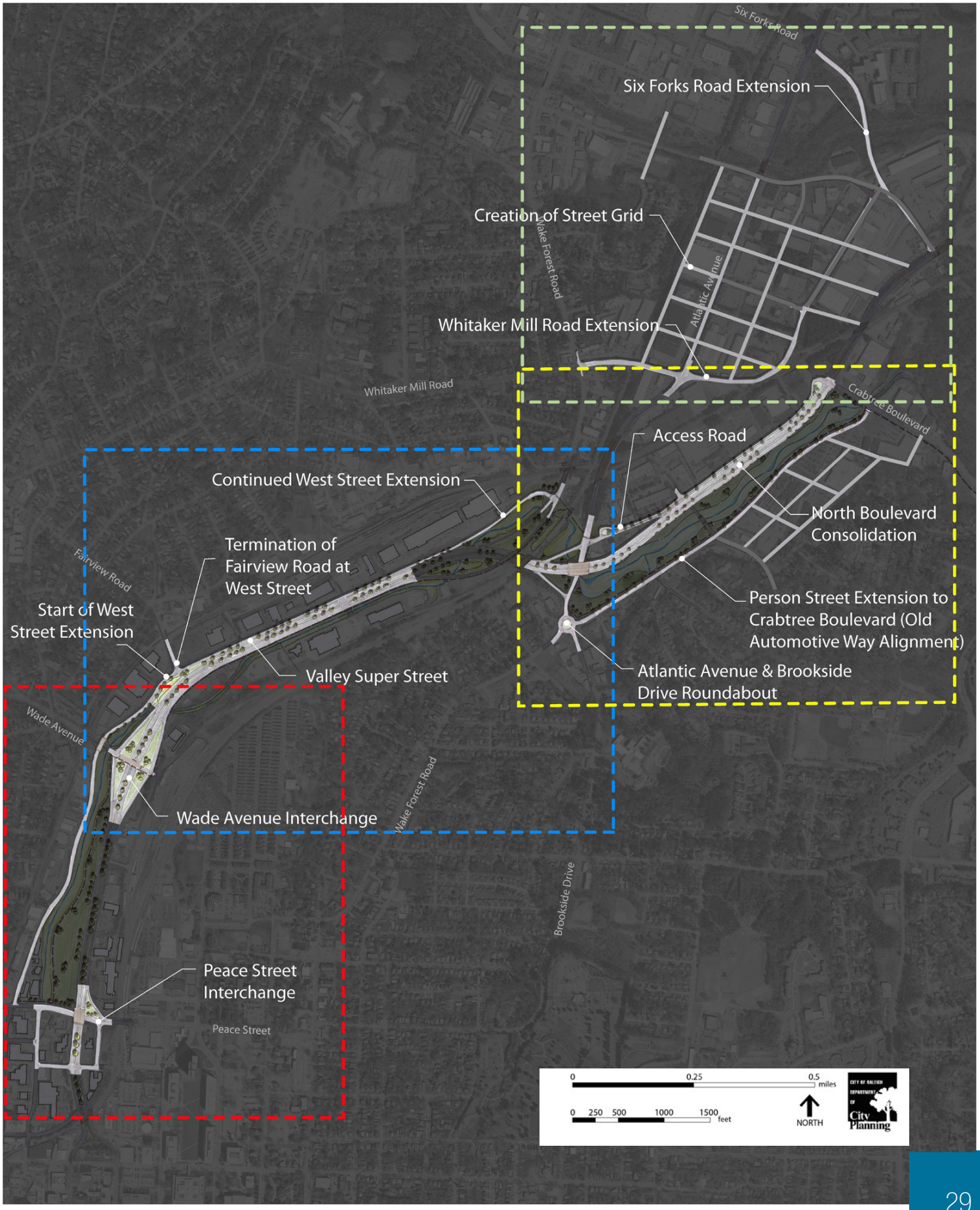
One idea, proposed as part of the Peace Street Vision Plan prepared by JDavis Architects, is to terminate the ramps at an elongated "dog bone" roundabout, eliminating left turn issues. The ramps would remain on the north side, and bicycles would be accommodated on a two-way cycle track on the south side of Peace Street (see Figure 4.2-Peace Street to Wade Avenue). The biggest appeal of this concept is the ability to take advantage of the fact that the south side of Peace Street is uninterrupted by a street intersection all the way from West Street to Salisbury Street, providing plenty of opportunity for the cycle track and/or multipurpose path.

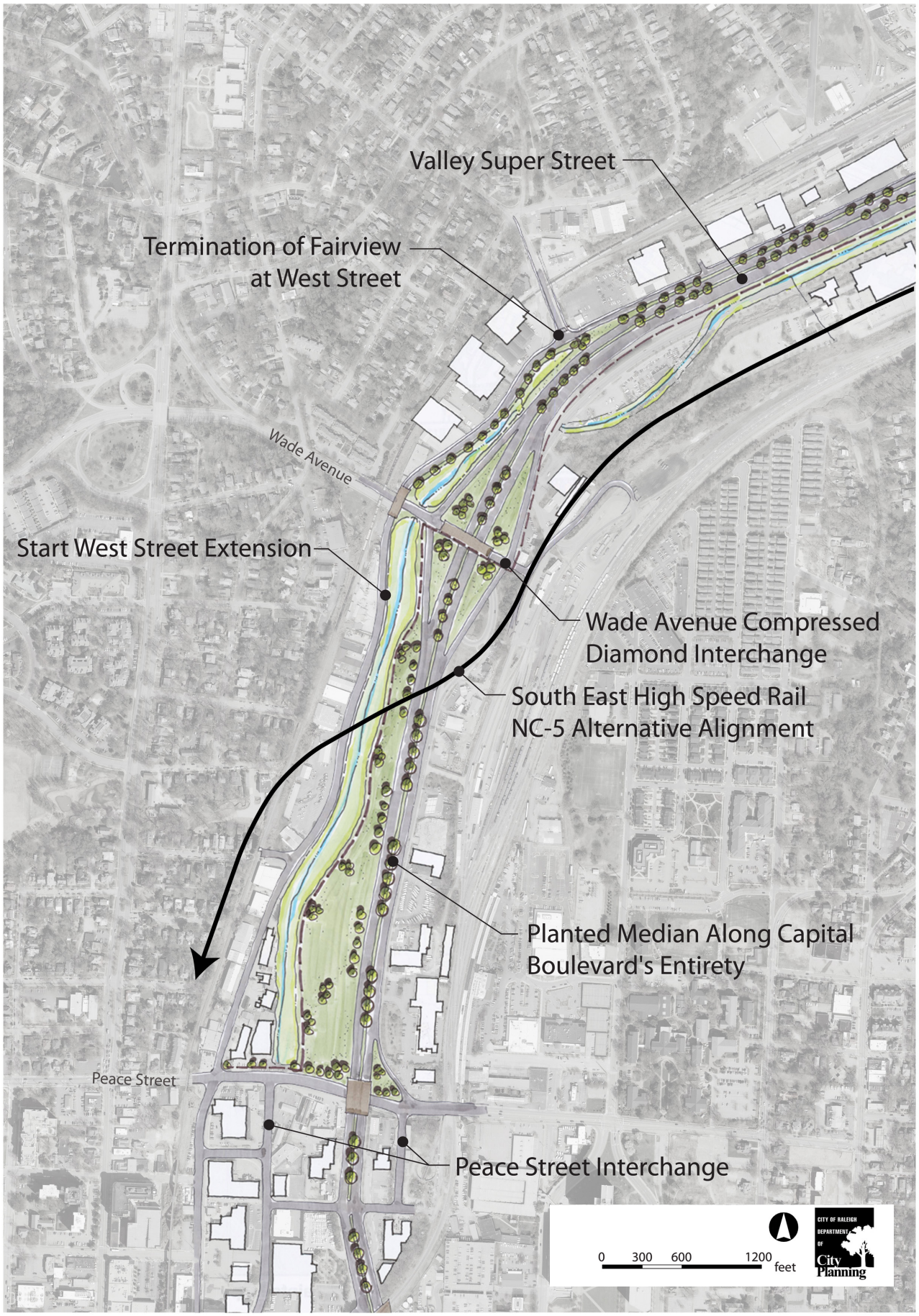
An alternative proposal is a pair of "square loops" located south of Peace Street, integrating the interchange infrastructure with the urban street grid. The exit points would be located at the existing location of Johnson Street. Southbound traffic exiting for Peace Street would make a series of right turns, reaching Peace via an extension of Harrington Street that completes the street grid. People exiting northbound Capital for Peace would do so south of Peace Street, providing enhanced access for the land uses in this location. A ramp from westbound Peace Street onto northbound Capital Boulevard would be maintained to accommodate this heavy PM peak hour movement. The geometry of the loops would naturally slow traffic and the use of right-angle signalized intersections would improve pedestrian and bicycle safety. Under both alternatives, Peace Street would be given a "road diet," removing an extra lane under the Capital Boulevard and CSX rail bridges to provide additional space for pedestrians and bicyclists.

To provide for a pleasant pedestrian experience befitting a downtown location and set the stage for new residential and mixed-use development in the area, the Capital Boulevard bridge needs to be as attractive as possible, and should not look like a typical highway bridge. Fourteen foot sidewalks, vertical abutments, the use of retaining walls rather than slopes, and architectural cladding are among the recommendations to improve the aesthetics of the bridge and minimize its footprint.

While both options have merit and greatly improve upon the existing condition, this report recommends the simpler square loop option, as it provides better access to a critical mass of redevelopment opportunities in the West and Harrington Street areas, adjacent to the already thriving Glenwood South district. One disadvantage is the property impact associated with the Harrington Street extension. However, either option will have significant property impacts both during the construction phase and for right of way acquisition. The land that remains in the square loop

FIGURE 4.1


Six Forks Road
Six Forks Road Extension
Creation of Street Grid
Wake Forest Road
Atlantic Avenue
Whitaker Mill Road Extension
Whitaker Mill Road
Crabtree Boulevard
Access Road
Continued West Street Extension
North Boulevard Consolidation
Fairview Road
Termination of Fairview Road at West Street
Start of West Street Extension
Person Street Extension to Crabtree Boulevard (Old Automotive Way Alignment)
Valley Super Street
Atlantic Avenue & Brookside Drive Roundabout
Wade Avenue
Wade Avenue Interchange
Wake Forest Road
Brookside Drive
Peace Street Interchange
Peace Street
0
0.25
0.5
miles
0
250
500
1000
1500
feet
NORTH
City Planning


Valley Super Street
Termination of Fairview at West Street
Wade Avenue
Start West Street Extension
Wade Avenue Compressed Diamond Interchange
South East High Speed Rail NC-5 Alternative Alignment
Planted Median Along Capital Boulevard's Entirety
Peace Street
Peace Street Interchange
0 300 600 1200 feet
CITY OF RALEIGH DEPARTMENT OF City Planning

option will consist of regularly shaped blocks suitable for mixed-use redevelopment. Further, by aligning the eastern leg of the square loop with the driveway into the Jersey Mike's shopping plaza, access into and out of the Cotton Mill condominiums can be greatly improved.

A detailed traffic study of the square loop option is included as Appendix C of this report. The study indicates that the square loops provide a significantly better level of service than the existing interchange, operating at level of service "B" or better at all times. This study also evaluated the option of replacing the interchange with an at-grade intersection, which was rejected due to creating level of service "F" conditions during the morning and evening peak hours.

PROJECT 2: WADE AVENUE DIAMOND

The Wade Avenue bridge is also scheduled for replacement, providing a fortunate opportunity to redesign an interchange with significant geometric and access management issues. A number of alternative designs have been proposed by NCDOT. This report recommends a simple, signalized compact diamond interchange incorporating sidewalks on both sides of Wade Avenue. This may be a conventional diamond, or a diverging diamond, with the choice to be determined by future engineering studies (see Figure 4.3-Wade Avenue to Atlantic Avenue). The primary downside of the diamond interchange is that what are now free-flowing movements are subject to signal control, increasing motorist delay. However, the benefits are numerous:

- Wade Avenue can be extended to provide access to the NCDOT rail yard and CSX's yard and TransFlow freight operation. Both facilities will gain access to both north- and south-bound Capital Boulevard that they currently lack.
- Once such access is provided, the existing and dangerously-located entry points on the northbound merge onto Capital Boulevard can be eliminated.
- The diamond interchange allows for pedestrians to cross Capital Boulevard on the Wade Avenue bridge and gain access to land uses both north and south of Wade Avenue.
- The overall footprint of the interchange is reduced, providing more room for development and/or green infrastructure.
- The existing culverts that route the Pigeon House Branch through the interchange can be replaced with a bridge structure which will better convey flood waters and restore some measure of floodplain and ecological function.

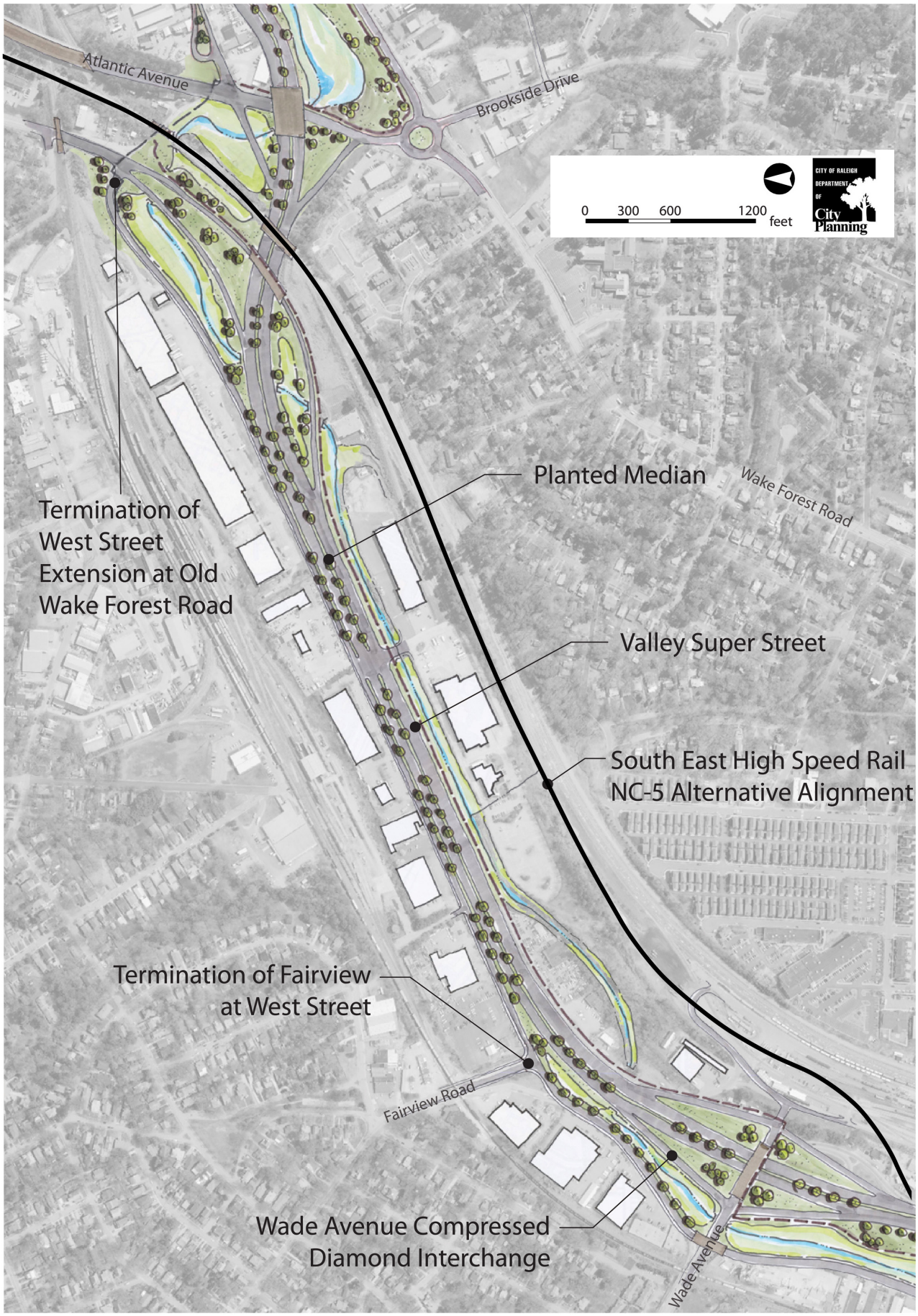
The alternative to the diamond interchange is to rebuild the existing "trumpet" interchange, which would leave the existing access issues unsolved for another generation. It is, however, cheaper and feasible, meaning the City may have to contribute the cost difference to make the improved interchange a reality.

PROJECT 3: WEST STREET EXTENSION & FAIRVIEW ROAD INTERCHANGE REMOVAL

These two items are listed together because they should be viewed as one project: West Street cannot be extended so long as the Fairview Road ramps are in the way, and the ramps should not be removed unless West Street can be extended to preserve a route into downtown and Union Station from the neighborhoods along Fairview Road, thereby avoiding traffic impacts on Glenwood Avenue.

A variety of options have been explored for carrying West Street north of Wade Avenue, including an at-grade intersection, a bridge, and a bridge with a limited interchange. The option that appears to provide the best combination of cost, constructability and traffic movement is a bridge that carries West Street over Wade Avenue without providing any connectivity between the two.

For topographic reasons, the bridge would need to be located near the Norfolk Southern railroad bridge, resulting in a jog in the roadway. The property impacts of this are minor north of Wade Avenue, but south of Wade Avenue a concrete batching plant would be impacted. This plant


Atlantic Avenue
Brookside Drive
0 300 600 1200 feet
CITY OF RALEIGH DEPARTMENT OF City Planning
Termination of West Street Extension at Old Wake Forest Road
Planted Median
Wake Forest Road
Valley Super Street
South East High Speed Rail NC-5 Alternative Alignment
Termination of Fairview at West Street
Fairview Road
Wade Avenue Compressed Diamond Interchange
Wade Avenue

is one of two concrete plants just north of Downtown, both served by rail spurs that allow heavy cement and aggregate to be delivered to these facilities by rail rather than by truck, a significant benefit for the environment. Further, having such plants adjacent to Downtown likely lowers the cost of construction for all manner of buildings and infrastructure that make use of concrete. For these reasons, significant efforts should be made to find a solution for bridging West Street that does not dislocate this plant.

With this extension, Fairview Road can be terminated at West Street, and the existing ramps onto Capital Boulevard removed. This will significantly improve access for the Five Points area in a number of ways while providing other benefits:

- The existing ramps are useless for bicycles and pedestrians, but West Street will be designed as a complete street accommodating all users.
- The ramps only provide access onto southbound, and from northbound, Capital Boulevard, but West Street will provide all modes with access both south into Downtown and north to Wake Forest Road.
- Local traffic headed Downtown will not need to mix with the heavy through traffic.
- Sightlines will be improved along Capital Boulevard and the existing curves straightened, improving traffic safety.
- The prominence and visibility of the Time+Light tower will be greatly improved. The City of Raleigh Arts Commission will be consulted on the future of this artwork in relationship to this project.
- An expensive piece of infrastructure that serves only 2,200 cars a day at last count will not have to be replaced, and can be removed from NCDOT's maintenance schedule.

PROJECT 4: CAPITAL BOULEVARD MEDIAN

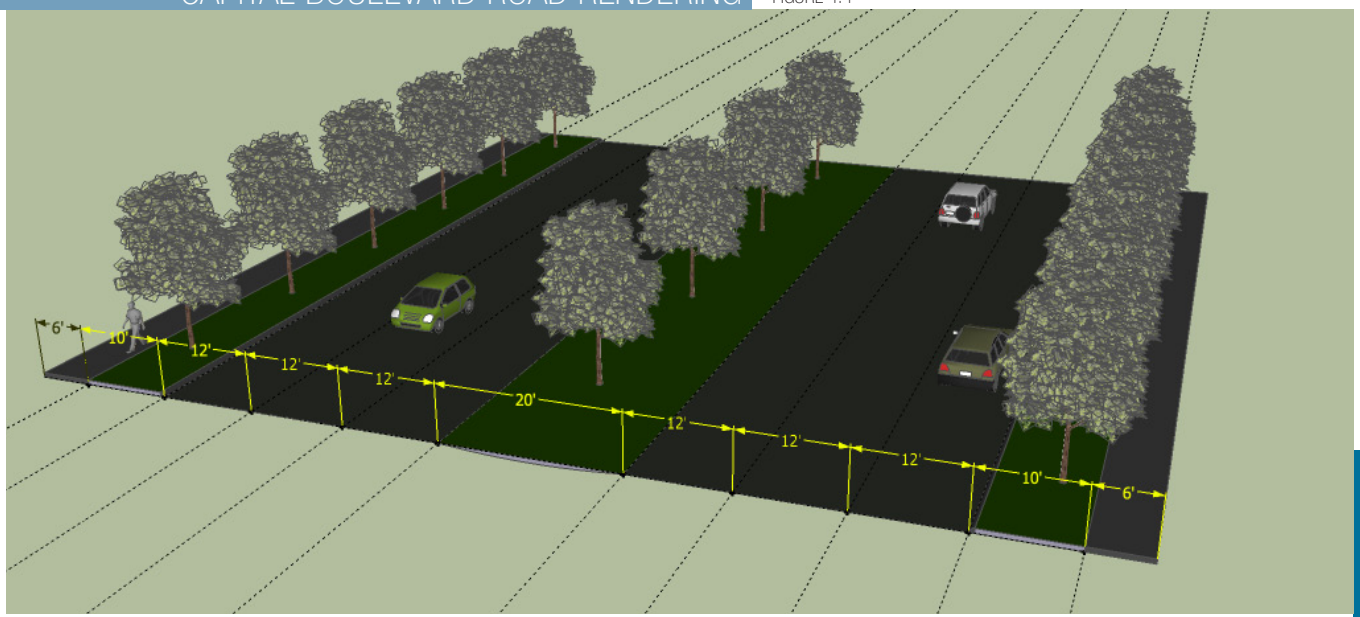
South of Wade Avenue, the right-of-way for Capital Boulevard is so constrained that the median has been shrunk to a narrow Jersey barrier to accommodate six lanes of traffic. This roadway cross section may be fine for New Jersey, but it is not appropriate for the City of Oaks.

The replacement of the Peace Street bridge, redesign of the interchange, and relocation of City facilities at Devereux Meadows provide the opportunity to repurpose existing right-of-way and acquire new right-of-way to provide a more gracious entry into the capital city. Existing land uses preclude the widening of Capital Boulevard to the east. Additional right-of-way acquired from the west side can be used to create a landscaped median from Wade Avenue south to the Dawson/McDowell split (see Figure 4.4-Capital Boulevard Road Rendering).

SECTION 2: THE VALLEY

This area stretches north from Fairview Road to Wake Forest Road and Atlantic Avenue. Capital Boulevard in this

CAPITAL BOULEVARD ROAD RENDERING FIGURE 4.4



area is wide, straight, and flat. Only one roadway project is proposed for this area, the bulk of the investment being oriented towards stormwater and greenways.

PROJECT 5: WEST STREET IMPROVEMENTS & VALLEY SUPER STREET

The extended West Street will tie into the existing service road on the west side of Capital Boulevard. This roadway will be improved as a complete street with bicycle and pedestrian infrastructure. There are five openings providing access to and from Capital Boulevard. All but one, located parallel with an existing bridge over the Pigeon House Branch at the approximate midpoint of the area, are proposed to be closed to improve access management and minimize points of conflict with bicycle and pedestrian movement.

The existing service road terminates at the Raleigh Bonded Warehouse property. In order to extend West Street to Wake Forest Road, West Street will need to traverse this property. A variety of alignments are possible, and the decision regarding the preferred alignment should be made with input from the owner to ensure that the extended street works with the future development of the property.

A major concern of property owners in this area is the lack of full movement access from Capital Boulevard. Their suggested solution is a signalized intersection at the midpoint. However, this has significant traffic flow implications. As an alternative, a "super street" intersection is proposed to provide full movement access while avoiding traditional left turn movements and maintaining traffic progression through the area (see Figure 4.5 for an example of a super street). A super street is akin to an elongated roundabout that converts left turns into right turns. Super streets can be designed to accommodate pedestrian movement, providing a new crossing of Capital Boulevard where none exists today. This could improve the transit accessibility of land uses on the east side of Capital, such as Wake Urban Ministries (see the Bus Transit recommendations).

SECTION 3: NORTH BOULEVARD

This segment of Capital Boulevard stretches north from Atlantic Avenue to the I-440 Beltline. The most unusual

SUPER STREET ON OCEAN HIGHWAY IN LELAND, NC

FIGURE 4.5

Source info:

NCSU News Room, Matt Shipman
Jan. 2001 Press Release

'No Left Turn: 'Superstreet' Traffic Design Improves Travel Time, Safety'

http://news.ncsu.edu/releases/wmshummersuperstreets/

feature of this area is the stretch south of Crabtree Boulevard where Capital consists of a one-way pair with development located east, west, and in the middle of the roadway. The median area is mostly located within a floodplain area and is subjected to frequent flash flooding. While some of the projects in this area could stand alone as transportation improvements, most of them have been conceived as complements to a long-term vision of converting this floodprone area into a linear park running from Atlantic Avenue to Crabtree Boulevard.

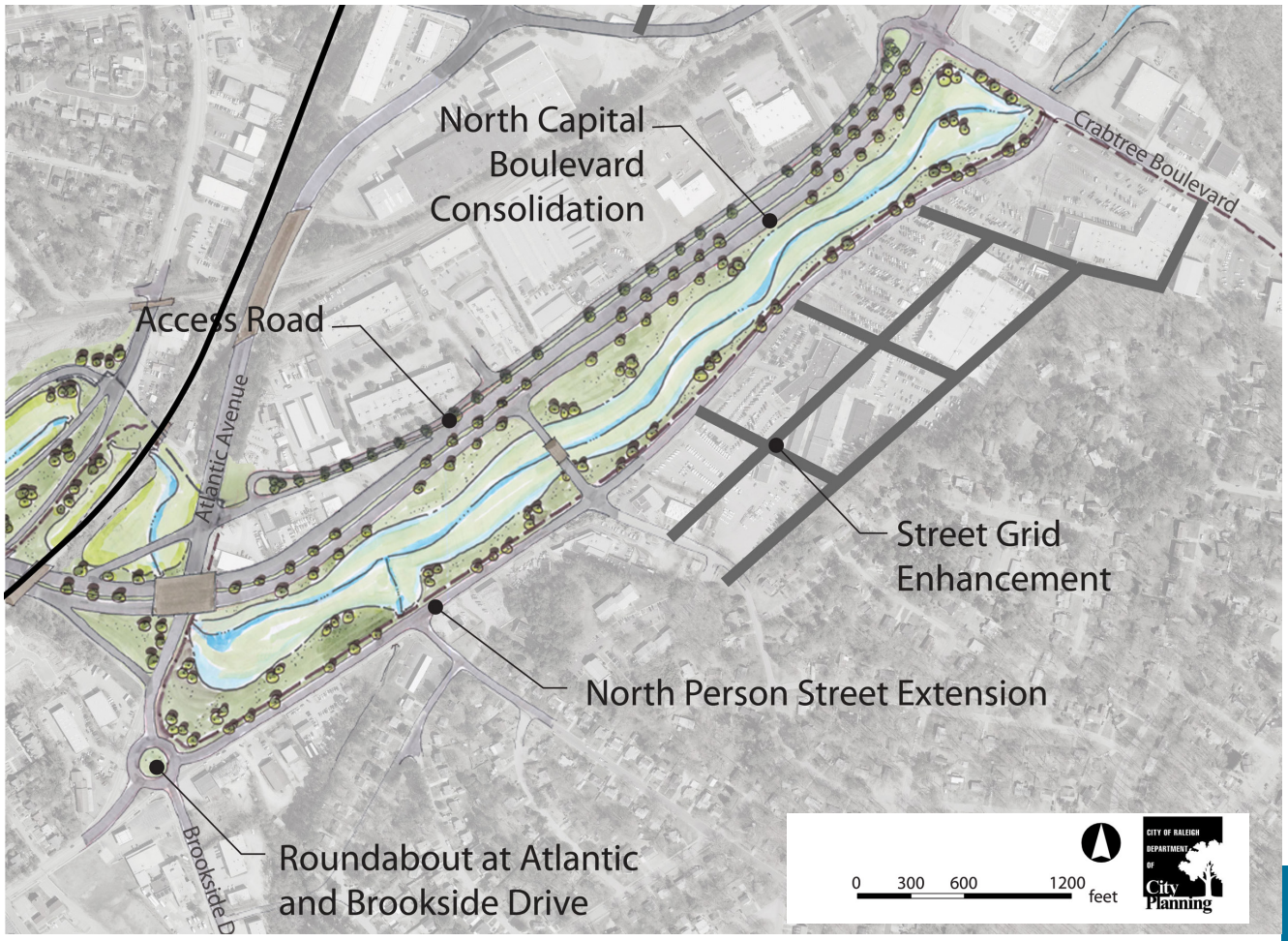
PROJECT 6: ATLANTIC AVENUE/ BROOKSIDE ROUNDABOUT

The intersection of Wake Forest Road, Atlantic Avenue, Brookside Avenue, and Automotive Way (which serves at the on-ramp to northbound Capital Boulevard from Wake Forest Road) is an ungainly and land-intensive muddle with multiple vehicular conflict points and poor pedestrian accessibility. A four-legged roundabout in this location would rationalize the intersection and provide an attractive urban design element that would be supportive of investment in adjacent properties. No right-of-way acquisition would be necessary for this improvement, which could be undertaken with or without any of the other projects in this area (see Figure 4.6-Atlantic Avenue to Crabtree Boulevard).

PROJECT 7: NORTH BOULEVARD CONSOLIDATION

ATLANTIC AVENUE TO CRABTREE BOULEVARD

FIGURE 4.6



The project would consolidate the north- and south-bound lanes of Capital Boulevard into the right-of -way currently occupied by the southbound lanes. If a four-lane section were used, this would likely fit within the existing right-of-way. Six lanes, as proposed, would require right-of-way acquisition. However, the same properties are required for the North Boulevard Park, and since there is no significant traffic benefit of this project, it would only be undertaken in conjunction with the park improvement. An opportune time to undertake this realignment would be whenever the two bridges over Atlantic Avenue are up for replacement, which should be within the next 10 to 15 years.

PROJECT 8: NORTH PERSON STREET EXTENSION

If Capital Boulevard is consolidated as per Project 7, and a linear park created in the floodplain, the land uses lining the east side of northbound Capital Boulevard will still require roadway access. These upland properties represent some of the best redevelopment sites within the study area, and this is the only location where an existing neighborhood street grid meets the corridor.

Leftover right-of-way from Automotive Way and northbound Capital Boulevard would be repurposed to create a new local access street running parallel to Capital Boulevard and adjacent to the North Boulevard Park. To connect with Crabtree Valley Avenue, right-of-way acquisition or dedication would be required in front of the Flea Market Mall properties. (See Figure 4.7-North Person Redevelopment Rendering.)

This new street would need a name. Automotive Way does not fit with image of this new parkside street. Nor can this street be considered part of Wake Forest Road. Rather, it is suggested that this street and all of Wake Forest Road north of Delway Street be renamed North Person Street, to strengthen the connection with this historic downtown street. This is sure to be controversial, as it requires an address change for many residential and non-residential properties, but is worth exploring with the public.

SIX FORKS ROAD EXTENSION

The extension of Six Forks Road to Capital Boulevard over Crabtree Creek using portions of the existing alignment of Hodges Street has been on the City's Thoroughfare Plan for some time. This connection will provide new cross town connectivity and takes on extra importance in light of revised regional rail plans placing a station at Six Forks Road and Atlantic Avenue. Six Forks Road should be designed to provide bicycle, pedestrian, and bus transit access to this station.

STREET GRID ENHANCEMENTS

A conceptual street grid has been developed for the area near the proposed Whitaker Mill Road regional rail station. A new grid of streets in this location is essential to realizing the full benefits transit-oriented development (TOD) in this location, as a well-connected street grid is the most important design feature of walkable mixed-use developments. The proposed street grid connects the TOD area with Six Forks Road extension, but avoids new railroad crossings due to the practical difficulties and expense associated attempting such connections in this area. This street grid would not be implemented directly by the City through right-of-way acquisition or eminent domain, but rather should be created through the development process as property in this area redevelops. (See Figure 4.8-Northern Road Extensions and Street Grid Enhancements.)

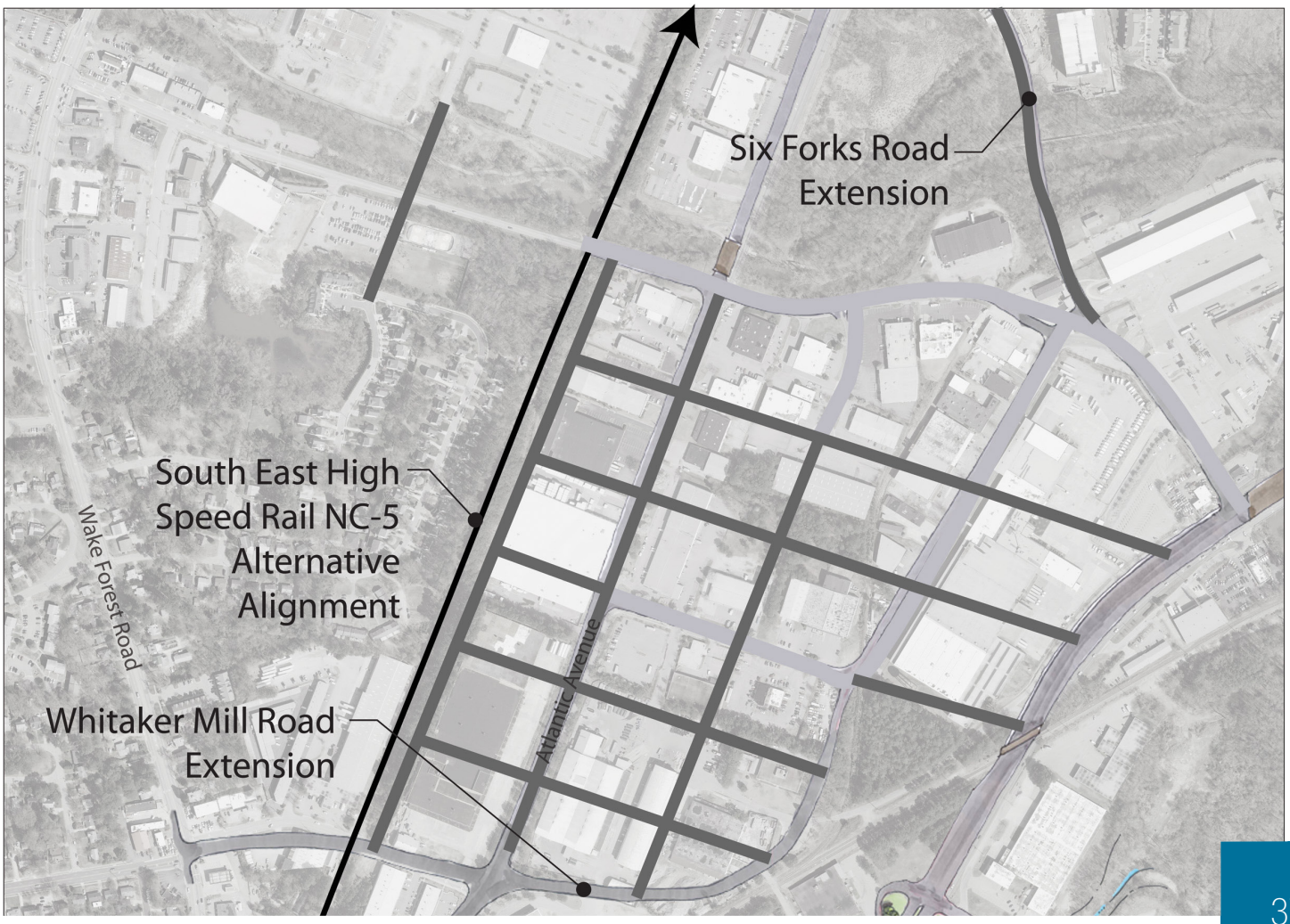
GREENWAYS, TRAILS

NORTH PERSON REDEVELOPMENT RENDERING

FIGURE 4.7

NORTHERN ROAD EXTENSIONS AND STREET GRID ENHANCEMENTS

FIGURE 4.8



AND OPEN SPACES

Raleigh's greenway plan has long called for a new greenway trail paralleling the Pigeon House Branch connecting Downtown to Crabtree Creek. However, a feasible alignment for this greenway trail has never been proposed, and the concept exists only as a dotted line on a map. This plan presents a specific recommendation for how this connection might be achieved by threading a trail through two new linear greenway open spaces in the northern and southern ends of the study area, connected via a multi-purpose path and on-road bicycle lanes in the middle section. The resulting greenway trail is unconventional but provides a pedestrian and bicycle route connecting Crabtree Creek to Peace Street on the northern end of Downtown.

CRABTREE CREEK TO CRABTREE BOULEVARD

There are a couple of ways to get from Crabtree Boulevard north to the Crabtree Creek greenway trail. The City owns a small strip of land along the Pigeon House Branch. North of this strip is a large privately-owned property, only the front portion of which is developed, and all of which is either floodplain or floodway. The City could look to acquire an easement across the property and then bridge across the creek to access the trail on the north side. If this is not feasible, a multi-purpose path on Crabtree Boulevard could be used to connect with the existing trail entrances north and south of Crabtree Creek on Raleigh Boulevard. This would be the easiest and least costly way to make a connection. (See Figure 4.9-Greenway and Open Space Rendering.)

NORTH BOULEVARD PARK

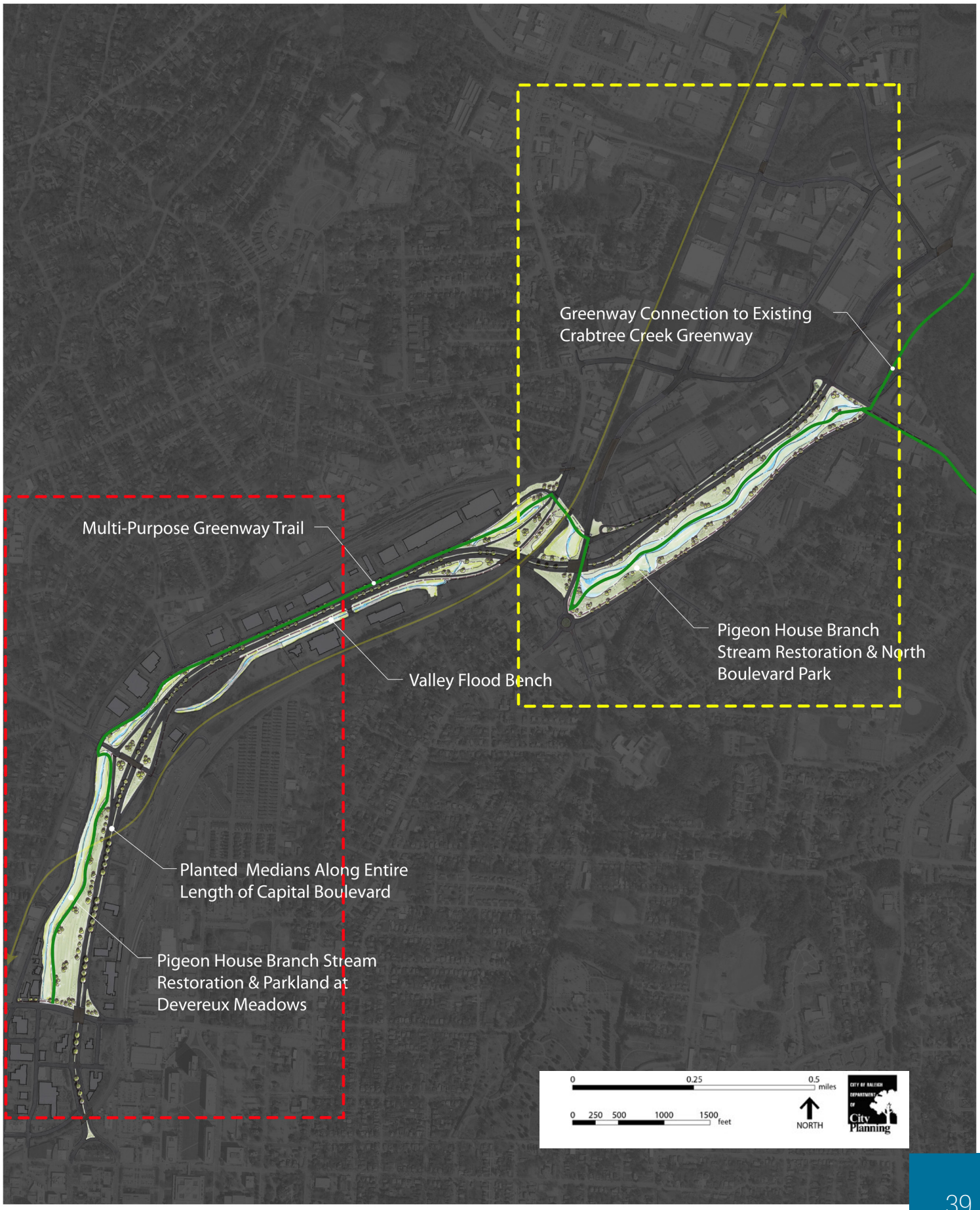
A signature long-term project proposed in this plan is the acquisition and demolition of the flood prone properties located along the Pigeon House Branch between the northbound and southbound legs of Capital Boulevard and the creation a new open space nestled between the consolidated Capital Boulevard and new local access street tentatively named North Person Street (See Projects 7 and 8 in the prior section). All the land within this new park would be part of the greenway system. While emphasis would be given to restoring the creek and natural floodplain functions, a paved greenway trail should be provided in this area. The trail would run parallel to the Pigeon House Branch and terminate at the foot of Atlantic Avenue. (See Figure 4.10-North Boulevard Park.)

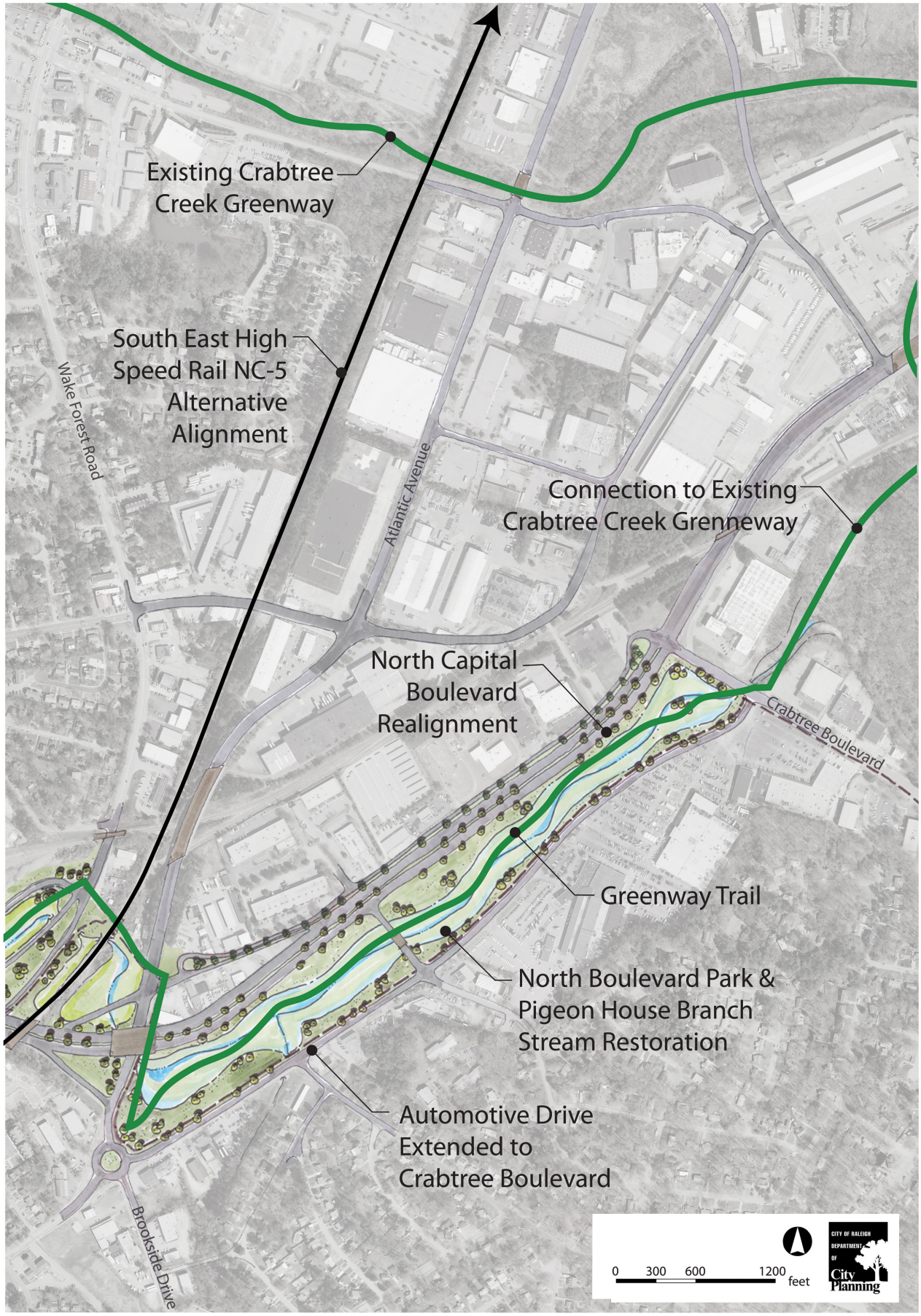
There are many active businesses located within the proposed park area. Some own the property they occupy, and others lease. To avoid the disruptive displacement of these uses, the City should acquire the bulk of the land in this area from willing sellers as property becomes available.

NORTH BOULEVARD TO DEVEREUX MEADOWS PARK: VALLEY MULTI-PURPOSE TRAIL

GREENWAY AND OPEN SPACE RENDERING

FIGURE 4.9




Existing Crabtree Creek Greenway
South East High Speed Rail NC-5 Alternative Alignment
Wake Forest Road
Atlantic Avenue
Connection to Existing Crabtree Creek Grenneway
North Capital Boulevard Realignment
Crabtree Boulevard
Greenway Trail
North Boulevard Park & Pigeon House Branch Stream Restoration
Automotive Drive Extended to Crabtree Boulevard
Brookside Drive
0 300 600 1200 feet
CITY OF RALEIGH DEPARTMENT OF City Planning

Connecting these two park resources requires that the greenway trail negotiate several highway interchanges and cross railroads as it follows the Pigeon House Branch southward. The ability to follow the creek is complicated by the fact that it swaps sides of Capital Boulevard twice between Wake Forest Road and Wade Avenue. Moreover, there is very limited space on the east side of Capital Boulevard to locate a trail without property acquisition. Therefore, this plan recommends that the bulk of the connection be accomplished on the west side of Capital Boulevard, using the extension of West Street to accommodate bicycle and pedestrian movement. (See Figure 4.11-West Street Multi-purpose Trail Rendering.)

How best to negotiate the tangled web of rail, roadways and ramps that stand between the east side of Atlantic Avenue and the Raleigh Bonded Warehouses area is a problem that will require further study. From the North Boulevard Park, the greenway would use on-street facilities to cross Atlantic Avenue and proceed under the two Capital Boulevard Bridges. New right-of way would need to be acquired to route the greenway under the old Seaboard Railroad bridge (right-of-way between Atlantic Avenue and the railroad, once part of Wake Forest Road and US 1, was given away some time ago, and now public funds will be necessary to buy it back). The path will have to cross the southern end of Wake Forest Road, either at grade or via a bridge, in order to follow the Pigeon House Branch across the front of the Raleigh Bonded Warehouse property.

Once south of the Wake Forest Road ramps, the trail would then continue along West Street, either as a multi-purpose path or as on-street bike lanes and a pedestrian sidewalk, as space allows. In these configurations, bicyclists and pedestrians could follow West Street all the way south to the Devereux Meadows Park and onward to Peace Street.

DEVEREUX MEADOWS PARK

Most of the land between West Street and Capital Boulevard, Wade Avenue and Peace Street, is City-owned

WEST STREET MULTI-PURPOSE TRAIL RENDERING FIGURE 4.11

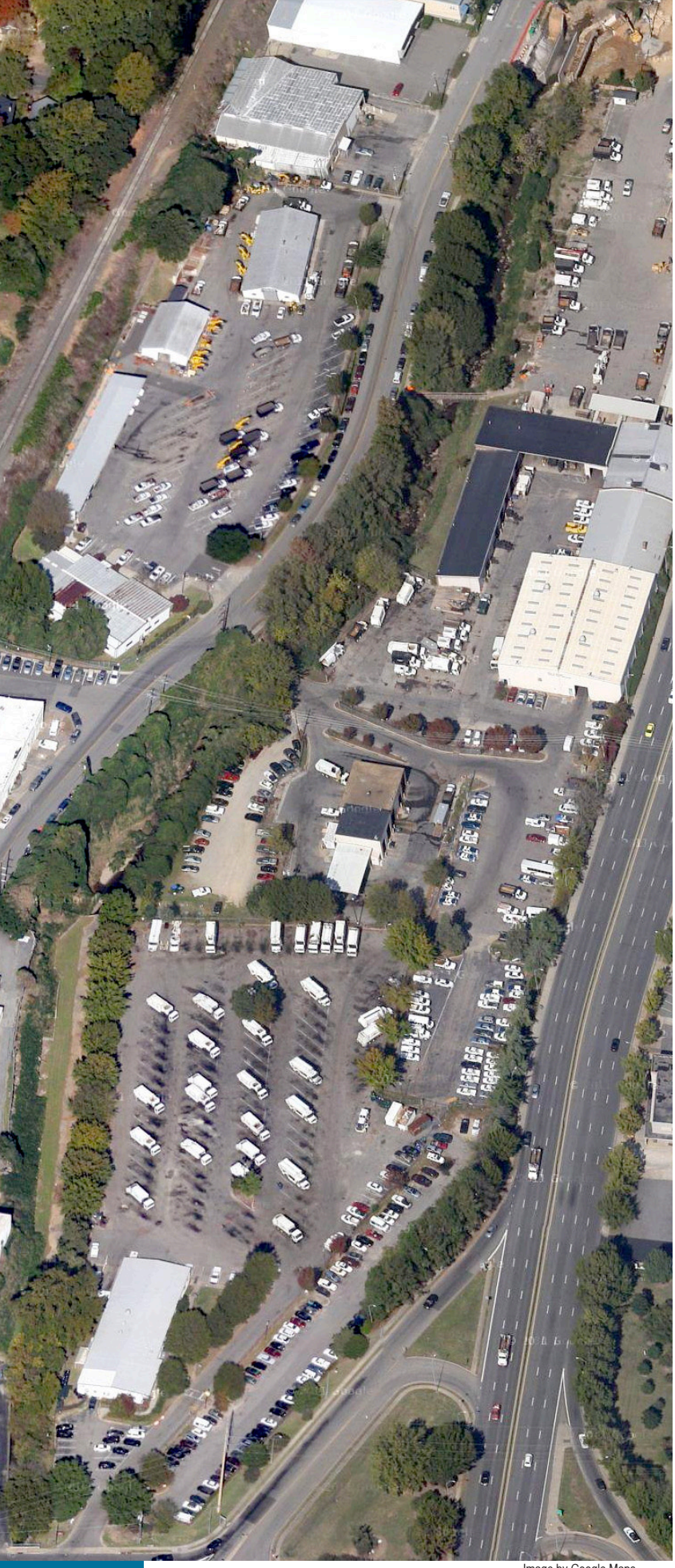


Image by Google Maps

and used by Solid Waste Services and Vehicle Fleet Services for vehicle storage and service. These uses will eventually be relocated to the new Remote Operations Facilities just outside the I-440 Beltline. Much of this land is in the floodplain of the Pigeon House Branch. Bridge replacements at Wade Avenue and Peace Street, and the creation of a normal median for Capital Boulevard, will result in the narrowing of this strip of land. The resulting lack of depth, combined with the environmental constraints, make this area most appropriate not for development, but for a linear open space combining stream restoration and a greenway. (See Figure 4.12-Devereux Meadows Park.)

While bike and pedestrian facilities should continue along West Street, the new park will provide an opportunity to provide a true greenway trail along the Pigeon House Branch, subject to potential restrictions regarding improvements within the stream buffer that will need to be negotiated with the Division of Water Quality at the North Carolina Department of Natural Resources.

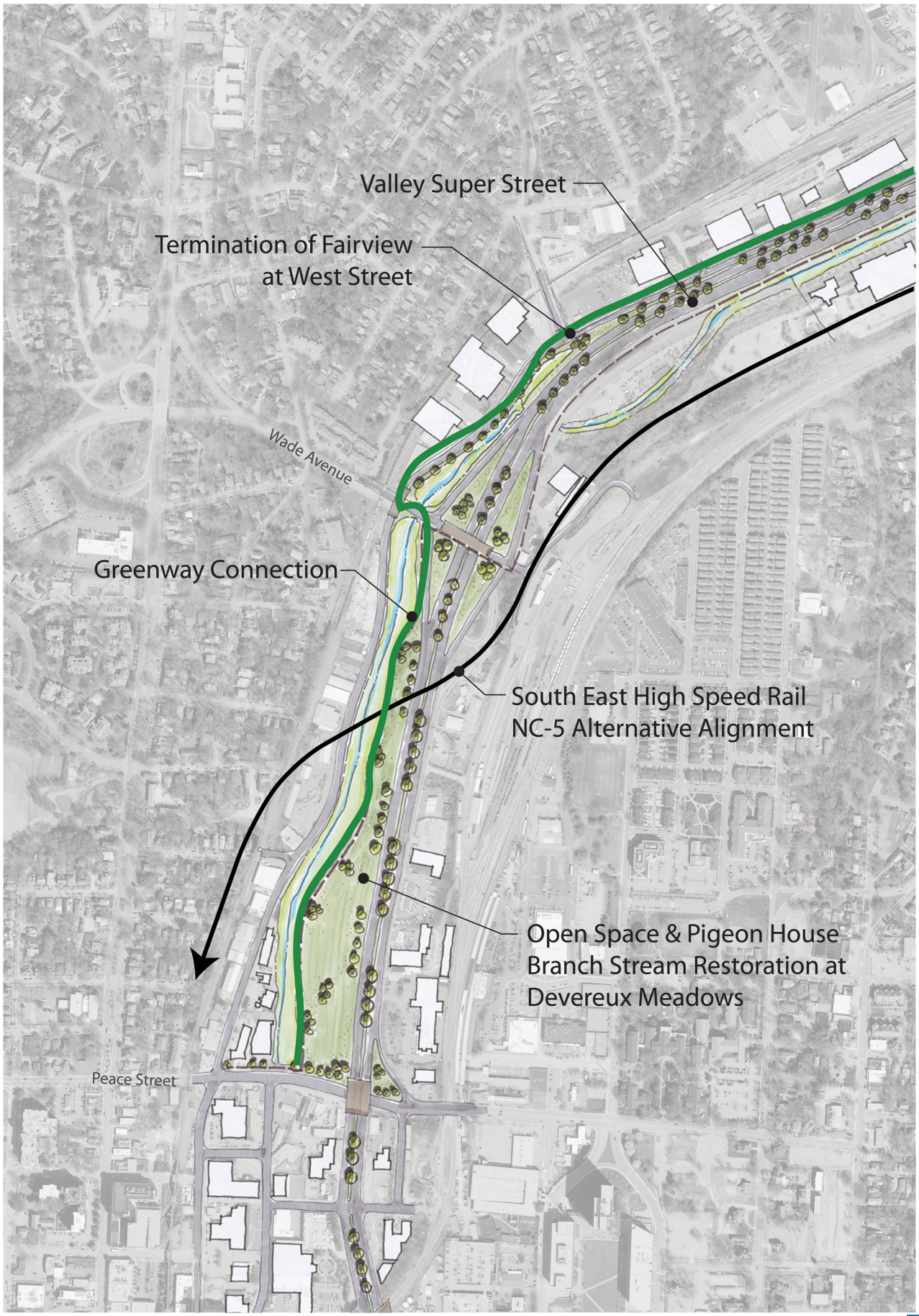
TRANSIT SERVICES

RAIL TRANSIT

The two major rail investments proposed for the study area—Southeast High Speed Rail (SEHSR) and regional light rail—are the subject of two independent study efforts. SEHSR is currently nearing the end of a Tier II Environmental Impact Statement (EIS) process under the National Environmental Policy Act (NEPA) that will hopefully end with a recommended alternative and Record of Decision sometime in 2012. Regional rail is the subject of an Alternatives Analysis being conducted by Triangle Transit as the lead agency.

At the time of writing, NCDOT has released a new "avoidance alternative" for bringing SEHSR into Downtown Raleigh that calls for two bridges over Capital Boulevard. The northern bridge will be relatively short and will run parallel and between existing bridges for the CSX railroad and the northbound exit ramp onto Wake Forest Road. The second bridge will be long and will cut diagonally across Capital Boulevard and the Devereux Meadows Park. This bridge

FIGURE 4.12


Valley Super Street
Termination of Fairview at West Street
Wade Avenue
Greenway Connection
South East High Speed Rail NC-5 Alternative Alignment
Open Space & Pigeon House Branch Stream Restoration at Devereux Meadows
Peace Street

will be a major new visual impact in the study area, and will introduce an elevated structure into the proposed park. It is therefore important that a high-quality and attractive viaduct structure be designed to serve this purpose. Properly designed, this piece of infrastructure could serve as a new gateway element into Downtown Raleigh.

The regional light rail recommended in the recently completed Alternative Analysis calls for a corridor parallel to the existing CSX right of way. Stations in or near the study area include Peace Street, Whitaker Mill Road, and Six Forks Road. Development at transit-supportive intensities is encouraged in all three areas, and is reflected in the land use recommendations. Further, the street network in the station areas should support multi-modal access to the station, including pedestrian, bicycle, and bus.

Although not included in the latest regional transit plans, the concept of an infill light rail station located between Peace and Whitaker Mill has been explored. A logical location is in the vicinity of N. Blount/Marshall Streets, where a pedetrian tunnel under the rail line could be built (See Appendix B). While current land uses do not support such a station, it may be worth considering if a critical mass of redevelopment occurs in this portion of the corridor.

BUS TRANSIT

The two major north-south CAT services within the study area are Routes 1 and 2, both of which are among the most-used routes in the CAT system. Route 1 makes stops along Capital Boulevard north of Atlantic Avenue, where pedestrian facilities are mostly substandard or non-existent. Route 2 runs briefly along Capital Boulevard from Peace Street to Wade Avenue but does not make stops. There is no bus service on Capital Boulevard south of Atlantic Avenue.

Two route modifications are suggested to respond to the new local access streets proposed as part of this plan. The first and easiest would be to route the Route 1 bus along North Person Street, cutting back over to Capital Boulevard at Crabtree Boulevard. This would allow for better pedestrian access to the bus stops. The second would be to route the Route 2 bus up the new West Street extension. This recommendation is consistent with the latest draft of Raleigh's Short Range Transit Plan, which calls for rerouting Route 2 up Capital to Wake Forest Road, and serving Whitaker Mill Road with a new cross-town service by 2015,

Longer term, new or reconfigured bus service on Six Forks Road could be used to better connect the bus system with the regional rail line. This bus might reach Six Forks Road from Downtown via Capital Boulevard and the planned Six Forks Road extension.

BICYCLE AND PEDESTRIAN FACILITIES

Bicyclists and pedestrians are largely absent or poorly served within the study area today. Capital Boulevard was designed as a highway with only automobiles in mind, and few to no provisions were made for any other type of user, making it a prototypically "incomplete street." This plan proposes to solve this problem through a set of road improvements that provide the location for new pedestrian and bicycle facilities. This approach completes the corridor while still preserving the highway function.

The recommended pedestrian facilities, in addition to the greenways described in a prior section, include the following:

- Sidewalks on all sides of Capital Boulevard north of Atlantic Avenue and between Downtown and Wade Avenue.
- Sidewalks running the length of West Street and the North Person Street extension.
- Sidewalks on both sides of Atlantic Avenue within the study area.
- Sidewalks along both sides of the Wade Avenue bridge.
- Sidewalks along both sides of the proposed "square loops" at Peace Street.
- Improved sidewalks and pedestrian crossings along Peace Street within the study area.

Bicycles will be accommodated primarily on greenway trails as well as on-street bike lanes on West Street extension and North Person Street extension. Bicycle lanes are recommended along Atlantic Avenue in the Bicycle Transportation Plan, but depend upon a future road widening due to lack of room.

During the public process, the idea of pedestrian bridges spanning the corridor was repeatedly raised. Appendix B of this report provides a detailed analysis of this topic. While such bridges are physically feasible, they would be large and expensive structures. Given the uncertainty over travel demand, no specific recommendations for pedestrian bridges have been made in this study. Bridges should be considered in conjuction with major redevelopment projects in the corridor

GREEN INFRASTRUCTURE

Three major green infrastructure projects are proposed in this plan:

1. Stream restoration of the Pigeon House Branch between Peace Street and Wade Avenue in the Devereux Meadows Park.
2. Stream restoration of the Pigeon House Branch between Atlantic Avenue and Crabtree Boulevard as part of the North Boulevard Park.
3. A flood bench along Pigeon House Branch as it runs the east side of Capital Boulevard between Wade Avenue and the Wake Forest Road ramps.

In addition to these three headline projects, a number of smaller enhancements should be pursued within the study area. These include:

- Innovative stormwater management incorporated into all the interchange reconfigurations.
- Incorporating stormwater best practices into existing and proposed median areas to manage and treat stormwater leaving the roadways and adjacent development.

- Encouraging new development and redevelopment within the study area to incorporate low-impact design techniques into site and building plans.

LAND USE AND ECONOMIC DEVELOPMENT

Land use within the study area today is a muddle. There is little synergy between the existing uses, and the corridor does not have a definable land use identity. In the past, the dominant land uses were highway commercial, light industrial, and warehousing and distribution. However, the corridor is no longer ideally suited to any of these uses. Existing sites lack the size, depth and access demanded by modern warehousing and large-format retailing. While some demand remains for light industrial uses, it is not sufficient to fill up the many large footprint buildings in the study area. Reinvestment within the corridor requires that different land uses become viable.

The proposed park, greenway, and complete street improvements, when implemented, will make Capital Boulevard a much more livable place, and therefore should increase its ability to support mixed-use development, including residential. Already, a significant amount of new multi-family housing has been built in the vicinity of Six Forks Road and Atlantic Avenue. A light rail stop at Six Forks Road will increase the desirability of the location for residential development and should support the eventual build-out of this area.

There are two other obvious locations for mixed-use development. One is the area surrounding the Whitaker Mill light rail station. Some industrial properties in this location are

vacant. Others are leased by shorter-term tenants. Parcels are large, and much of the land is in the hands of a few property owners. In short, the area presents few barriers to assembly and redevelopment save for brownfield issues.

The second area is the property fronting on North Person Street and the North Boulevard Park. The park will provide an outstanding amenity and a substantial buffer between the development sites and the busy highway. Like the Whitaker Mill station area, the most significant parcels are large, and the owners few. This area is also adjacent to an established residential neighborhood. Significant residential density should be successful here

The land use future for the remainder of the study area is less clear. Sites sandwiched between a busy highway and an active rail yard do not obviously lend themselves to residential, office, or hotel use. The ability to do significant redevelopment in such locations may require the acceptance of taller buildings that can effectively insulate themselves from this noisy and smelly environment.

In the meantime, this report recommends a laissez-faire approach to the land use in much of the remainder of the study area. The existing stock of older buildings, offering unique spaces and cheap rents, lend themselves to unique companies: wholesaling, boutique manufacturing, the sale of bulk goods and materials, and artist galleries and studios to mention a few. A wide variety of uses should be accommodated here, while the land use market sorts itself out.

FUTURE LAND USE

The Future Land Use Map lays out the 20-year vision for land use in the corridor study area. Based on the results of the public process, only a few changes are needed to the future land uses designated for the area in the Comprehensive Plan. Areas appropriate for mixed-use redevelopment are already so designated, while the remaining light industrial areas are mapped Business and Commercial Services. One proposed adjustment is to remap an existing area of Neighborhood Mixed Use at Six Forks Road and Atlantic Avenue to Community Mixed Use to better respond to the latest transit plans that call for a station in this location. Another is to expand the amount of Business and Commercial Services along the corridor, to be consistent with the new IX mixed-use zoning district proposed in Raleigh's Unified Development Ordinance. (See Figure 4.13-Future Land Use Map.)

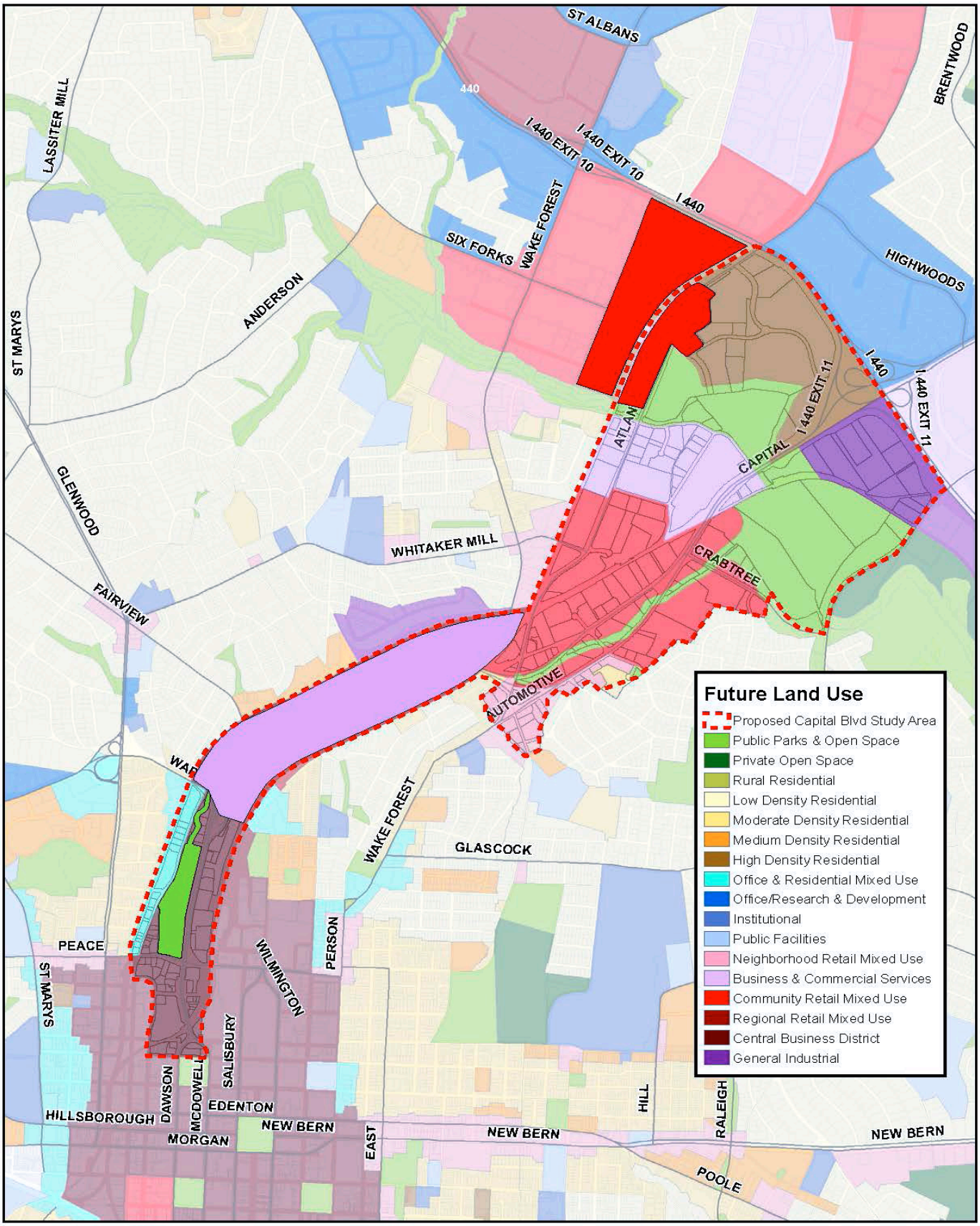
ZONING

Most of the study area is zoned IND-2 Heavy Industrial. When the UDO is adopted, this zoning will need to be translated into new UDO districts. A mix of IH, IX and CX is recommended, along with appropriate height and frontage standards.

- IX zoning is recommended for most of the land fronting on Capital Boulevard between Peace Street and Wake Forest Road. IX zoning concentrates on light industrial, office and retail uses, but does allow residential in the context of a mixed-use building.
- IX zoning should also be applied to the light industrial and distribution areas between Capital Boulevard and Atlantic Avenue.
- The area east of Capital Boulevard and north of the Atlantic Avenue interchange should be given CX zoning. While this plan envisions that the eventual redevelopment of this area will most likely be residential, CX zoning provides the option of a more mixed-use approach should the market support it.

- IH zoning should be used for the rail yards and associated heavy industrial uses.
- DX zoning should be applied south of Peace Street.
- The emerging multi-family residential area north of Six Forks Road and east of Atlantic Avenue is currently a hodgepodge of conditional use zoning districts, including Shopping Center, Office and Institutional, and Residential-20. While the zoning conditions may need to be preserved, a more uniform set of base districts, mostly RX with some CX for the commercial and mixed-use areas, should be used.

The mixed-use zoning districts will need to specify a permitted height. In general, most land uses in the corridor are buffered from nearby neighborhoods by transportation infrastructure, so taller buildings should not have an adverse impact on character. Taller buildings help buffer upper floor occupants from traffic and railway noise and help amortize the cost of noise-proof construction. Recommended heights in the study are range from three stories at the neighborhood edge, to up to twelve stories in areas well separated from neighborhoods. Finally, frontages should be used in targeted areas to promote good urban form and a pedestrian-friendly approach to development. At this time, frontages are not recommended for the IX areas, but should be used in the DX areas and CX and RX areas. Where major public improvements are planned, such as in the vicinity of rail transit stops or new parkside property, an urban frontage approach is recommended.


ST ALBANS
BRENTWOOD
LASSITER MILL
440
I 440 EXIT 10
I 440 EXIT 10
I 440
WAKE FOREST
SIX FORKS
HIGHWOODS
ANDERSON
ST MARYS
I 440
I 440 EXIT 11
I 440 EXIT 11
ATLAN
CAPITAL
GLENWOOD
WHITAKER MILL
CRABTREE
FAIRVIEW
AUTOMOTIVE
WAKE FOREST
GLASCOCK
PEACE
PERSON
WILMINGTON
ST MARYS
SALISBURY
DAWSON
MCDOWELL
EDENTON
HILLSBOROUGH
NEW BERN
MORGAN
EAST
NEW BERN
HILL
RALEIGH
NEW BERN
POOLE
Future Land Use
Proposed Capital Blvd Study Area
Public Parks & Open Space
Private Open Space
Rural Residential
Low Density Residential
Moderate Density Residential
Medium Density Residential
High Density Residential
Office & Residential Mixed Use
Office/Research & Development
Institutional
Public Facilities
Neighborhood Retail Mixed Use
Business & Commercial Services
Community Retail Mixed Use
Regional Retail Mixed Use
Central Business District
General Industrial

5. CAPITAL PLAN AND PHASING

The Capital Boulevard Corridor Plan is primarily a plan for capital projects within the study area. The projects are ambitious in scope and will need many years to be designed, funded, and implemented. Some are likely to be completed within a few years from now; others will be many years further out; and, frankly, some may never be implemented. This chapter provides rough cost estimates for capital components of the plan, organized by phases.

The phases should be thought of less as a set of sequential steps, and more as clusters of related actions that should be coordinated simultaneously so as to take advantage of opportunities to aggregate funding sources, minimize costs and physical disruptions, and maximize synergies. Rather than being numbered or lettered, which implies a set order, the phases are named to reinforce the fact that the timing of implementation will be opportunistic rather than predetermined. However, given the pending NCDOT project in the southern end of the study area, it is very likely that the first cluster of projects will be the phase which is aptly named "Downtown Express."

TABLE 5.1: CAPITAL PROJECT LIST AND PHASE

	PHASE		
PROJECT	Downtown Express	Valley	North Boulevard
TRANSPORTATION			
1. Peace Street Interchange	X		
2. Wade Avenue Diamond	X		
3. West Street Extension and Fairview Interchange Removal	X		
4. Capital Boulevard Median	X		
5. West Street Improvements and Valley Superstreet		X	
6. Atlantic/Brookside Roundabout		N/A	
7. North Boulevard Consolidation			X
8. North Person Street Extension			X
9. Six Forks Road Extension		N/A	
10. Street Grid Enhancements		N/A	
GREENWAY AND PARK			
1. Crabtree Creek to Boulevard			X
2. North Boulevard Park			X
3. Valley Multi-purpose Trail		X	
4. Devereux Meadows Park	X		
GREEN INFRASTRUCTURE			
1. North Boulevard Stream Restoration			X
2. Valley Flood Bench		X	
3. Devereux Meadows Stream Restoration	X		

DOWNTOWN EXPRESS

This phase includes the two NCDOT bridge replacement projects at Peace Street and Wade Avenue, plus all the associated projects necessary to maximize the benefits of these roadway system investments. The removal of the Fairview Road ramps, extension of West Street to connect with Fairview Road, and improvements to the southern portion of Capital Boulevard are all included in this bundle. Also included are the Devereaux Meadows Park, and greenway and stream restoration. The right-of-way impacts of the new Wade Avenue Diamond and Capital Boulevard Median will require the acquisition of the private property within the proposed park area, and will also force the relocation of the City's sanitation and vehicle maintenance facilities, making it a great time to undertake the park and stream projects.

VALLEY

Moving up the corridor, there is a smaller number of lower-cost projects planned for the area between Fairview and Wake Forest roads. These include the improvements to the existing service road which aligns with the extended West Street, the closing of median access points to this road in conjunction with the superstreet projects, and the median-based multipurpose trail. The one green infrastructure project proposed for this area is the excavation of a flood bench for the straight section of the Pigeon House Branch, with stabilization of the stream banks. The primary opportunity for capital project coordination is to time the improvements to the service road with the installation of new utility lines under the street.

NORTH BOULEVARD

The most ambitious and expensive part of the Capital Boulevard Corridor Plan is the remaking of the northern part of the study area as a boulevard running adjacent to a linear park. Ideally, implementation in the form of land acquisition and banking for the park would begin as soon as money is available (FEMA funds are already being pursued for the acquisition of repetitive loss structures). Consolidating the one-way segments of Capital Boulevard should be coordinated with the eventual replacement of bridges over Atlantic Avenue, which is still a decade or more out on NCDOT's schedule. Full implementation of this portion of the plan is therefore likely at least a decade or more in the future.

OTHER PROJECTS

There are three projects which are not included in any of the above phases, because they could be undertaken independently and/or would likely be funded separately from the other projects:

- A roundabout is proposed to replace the convoluted intersection at Atlantic, Wake Forest, and Brookside. This might be an eligible project for CMAQ funding (Congestion, Mitigation and Air Quality).
- The Six Forks Road extension pre-dates this plan, and is already a listed project in the Transportation Improvement Program.
- The proposed Street Grid Enhancements near the Whitaker Mill Road light rail station are intended to be implemented through the development process as this area redevelops. Adoption of this grid, either through a small area plan or as part of the Thoroughfare Map, will be necessary to achieve this outcome.

CAPITAL COST ESTIMATES

City staff has prepared order-of-magnitude cost estimates for the capital projects recommended in this study. Acquisition costs are based on the 2008 values determined by the Wake County assessor. Items such as building demolition, road construction, park improvements, and stream restoration are based on staff experience with similar projects. Projects with committed outside funds, such as the pending bridge replacement, are not included. As none of these projects have been designed or engineered, the estimates should only be considered a rough guide to the actual costs. All costs are presented in 2011 dollars (Chart 5.1-Total Costs by Project Type).

The total cost of the Capital Boulevard projects is roughly $60 million, the bulk of which is split evenly between roadway and transportation projects. The other major share is park and greenway improvements, with environmental projects such as stream restoration accounting for about $5 million of the total (Chart 5.2-Total Costs by Project Phase).

In terms of project phase, the North Boulevard improvements are well over half the total, due to the need for extensive property acquisition, demolition, roadway realignments, and park improvements. The second most expensive phase are the Downtown Express improvements, which include bridging and extending West Street north to Wake Forest Road, and creating the Devereux Meadows Park. Were the NCDOT-borne costs of the two bridge replacement projects included, the cost of this phase would be similar to the North Boulevard phase (Detailed cost accounting is provided in Table 5.1)

CHART 5.1: TOTAL COSTS BY PROJECT TYPE

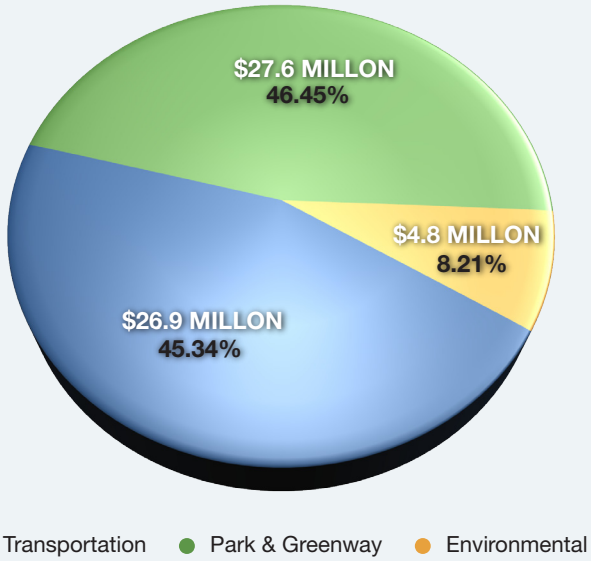


CHART 5.2: TOTAL COSTS BY PROJECT PHASE

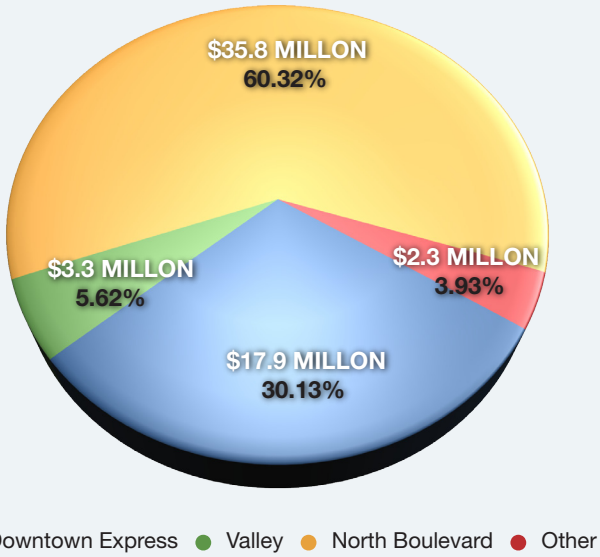


TABLE 5.1: COST ESTIMATE DETAIL

	DESIGN	PROPERTY ACQUISITION	DEMOLITION	CONSTRUCTION	TOTAL
DOWNTOWN EXPRESS					
Peace Street Interchange	(1)	(1)	(1)	(1)	$0
Wade Avenue Diamond	(1)	(1)	(1)	(1)	$0
West Street Extension and Fairview Interchange Removal	$895,000	$3,970,000	$0	$5,970,000	$10,835,000
Capital Boulevard Median	(1)	(1)	(1)	(1)	$0
Devereux Meadows Park	(2)	$0	$750,000	$4,500,000	$5,250,000
Devereux Meadows Stream Restoration	(2)	$0	$0	$1,800,000	$1,800,000
Subtotal	**$895,000**	**$3,970,000**	**$750,000**	**$12,270,000**	**$17,885,000**
VALLEY					
Valley Superstreet	(2)	$0	$0	$1,200,000	$1,200,000
Valley Multi-Purpose Trail	(2)	$0	$0	$1,000,000	$1,000,000
Valley Flood Bench	(2)	$0	$0	$1,138,000	$1,138,000
Subtotal	**$0**	**$0**	**$0**	**$3,338,000**	**$3,338,000**
NORTH BOULEVARD					
North Boulevard Consolidation	$897,000	$564,000	$0	$5,980,000	$7,441,000
North Person Street Extension	$345,000	$2,460,000	$0	$2,300,000	$5,105,000
Crabtree Creek to Boulevard Greenway	(2)	$0	$0	$1,000,000	$1,000,000
North Boulevard Park	(2)	$10,715,000	$1,500,000	$8,100,000	$20,315,000
North Boulevard Stream Restoration	(2)	$0	$0	$1,938,000	$1,938,000
Subtotal	**$1,242,000**	**$13,739,000**	**$1,500,000**	**$19,318,000**	**$35,799,000**
OTHER					
Atlantic/Brookside Roundabout	$304,000	$0	$0	$2,030,000	$2,334,000
GRAND TOTAL	**$2,441,000**	**$17,709,000**	**$2,250,000**	**$36,956,000**	**$59,356,000**

(1) Funding through federal Bridge Replacement funds under NCDOT project B-5121 and B-5317 is assumed.

(2) Included in construction cost estimate

APPENDIX A: PAYING FOR IT

The foregoing chapter set forth the capital plan and preliminary cost estimate. This chapter gives an indication of what types of funds may be available to pay for the proposed projects.

CITY OF RALEIGH GO BONDS

In recent years, the City of Raleigh has put before the voters General Obligation (GO) bond packages for parks and greenways, transportation, and affordable housing, all of which have been approved. The most recently package of parks bonds passed in 2007, and the latest transportation and housing bonds passed in 2011. GO bond financing, which is backed by the full faith and credit of the City's taxing power, is the lowest-cost form of financing available. At the time of writing, the City can incur GO debt at about four percent interest.

The projects in this plan were not known at the time these bonds passed, and were therefore not included as part of the project lists that went to the voters along the with the bond authorization. However, it is likely that components of this plan will be eligible for both parks and transportation bond financing as part of future bond packages. In particular, a greenway from Downtown to the Crabtree Creek has been a long standing part of the City's greenway plan, and this plan provides a feasible means of making this long sought-after connection.

VALUE CAPTURE MECHANISMS

'Value capture' is a term used to describe public-private partnership arrangements whereby the increase in real estate value attributable to a public project is used to pay all or part of the cost of the public project. The most common forms of value capture are Tax Increment Financing (TIF), Special Assessment Districts, and joint development agreements.

TAX INCREMENT FINANCING

Tax Increment Financing or TIF (known as Project Development Financing in the North Carolina General Statutes) is a financing mechanism by which a portion of tax revenues associated with new development within a designated district is diverted from the general fund and dedicated to servicing bonds for capital improvements within the TIF district. Using TIF bonds does not result in greater revenues or lesser costs than undertaking the same activities with an alternative financing mechanism. Rather, it differs from more traditional bond financing in that the security for the bonds consists of future revenues generated by the TIF district, and the full faith and credit of the local government's taxing power is not pledged.

The power of TIF to finance public infrastructure in Raleigh should not be overestimated. With a combined City-County tax rate of less than one percent, and assuming a debt-coverage ratio of at least 1.5 or better, a private investment of $15 to $20 is necessary to support one dollar of public debt. Therefore, the public infrastructure costs to be underwritten by a TIF district can be no more than five-to-seven percent of the total project costs . A $5 million public project would need to catalyze $100 million in new investment to fully pay for itself using TIF bonds. As a result, TIF financing cannot fund the large projects, such as new parks, but could fund smaller supportive investments, such as streetscapes.

SPECIAL ASSESSMENT DISTRICTS

While TIF arrangements redirect tax receipts otherwise destined for the general fund to fund infrastructure investments in a specific area, Special Assessment Districts (SAD) generate new revenue by imposing an additional assessment on top of the normal property tax.

Under North Carolina law , formation of a SAD requires a petition of a majority of property owners within the proposed district, representing at least 66 percent of the total assessed value within the district. The petition must include a description of the project to be financed, estimated project cost, and an estimate of the portion of the project cost to be financed through the SAD.

Compared to TIF, a SAD could theoretically finance a larger proportion of the total project costs. The assessment applies to the total project value, not just the increment, with the upper limit determined by the size of the assessment the petitioning property owners are willing to accept. The assessment can be used to secure general revenue bonds or used as additional security for Project Development Financing (TIF) bonds. In this way, a SAD can be combined with TIF to provide additional public financing. The combination of TIF and a SAD may make the use of TIF more politically acceptable by reducing the revenue forgone by the general fund and giving the benefiting property owners more "skin in the game."

From the standpoint of a developer, shifting a portion of project costs onto a SAD carries two major benefits: (1) the cost of capital is lower, as municipal revenue bonds will carry a lower rate than private loans; and (2) the assessment runs with the land, meaning that if the project is sold before the debt is retired, the new owner assumes the assessment payments. This reduces the risks involved with refinancing 10-year debt (such as higher interest rates).

VALUE CAPTURE IN THE NORTH BOULEVARD PARK AREA

The upland acreage fronting on the eastern edge of the park totals about 30 developable acres. If this land were to be redeveloped for five-story apartments at a net density of 50 units per acre (lower than many comparable developments), it would produce around 1,500 units worth a total of $225 million (assuming a conservative value of $150,000 per unit). The increment over the existing taxable value of about $15 million totals $210 million dollars.

Wake County's current tax rate is 0.91 percent. The tax increment would therefore generate $2 million in new tax revenue annually. Applying a debt service coverage ratio of 1.5 and assuming an interest rate of 4.5 percent, this increment could support $17 million in bonds for capital projects.

Adding a special assessment of 0.10 percent would provide an additional $2.6 million in bonding capacity using the same term and interest rate assumptions above. Additional bonding capacity would require a significant rise in the overall tax rate. Property owners might agree to this if the infrastructure thus financed provided a significant financial benefit, and certainly the ability to create $225 million worth of development where only $10 million in value exists today is such a benefit.

However, taxes come straight out of a rental property's Net Operating Income (NOI), and so the cost of the recurring tax burden can be capitalized using the same Cap Rate used to determine value, which for apartments at the present time is about 6 percent . Each dollar of tax paid therefore reduces project value by about $17. The willingness of a property owner to agree to a special assessment would theoretically be based upon an assessment of whether the publically-financed infrastructure generates sufficient value to offset this value impact.

JOINT DEVELOPMENT

A joint development agreement is generally defined as a real estate development project that involves coordination among multiple parties to develop a site, usually on

publicly-owned land. A joint development agreement typically involves the financing and development of a project that incorporates both public infrastructure and amenities and private development. Such an agreement could include a cost-sharing agreement to pay for infrastructure, a revenue-sharing agreement to divide profits from increased real estate values, or a combination of the two. Cost-sharing agreements usually involve cooperation to pay for infrastructure that supports surrounding development. Revenue-sharing agreements distribute the revenues that result from development among joint development partners. Examples of revenue-sharing agreements include ground lease revenues, air rights payments or, in some cases, direct participation in rents or other revenues from development.

Similar to TIFs and SADs, joint development agreements provide another value capture mechanism to fund transit without requiring a direct outlay of government funding. However, joint development agreements are more flexible than the other tools and can be tailored to a particular situation. 4 Per HDR Consulting

GOVERNMENT RESOURCES REVIEW

The government resource pool is broad. In addition to those mentioned above, federal and state agencies offer funding opportunities. While not exhaustive, the following listing reviews several standard year-to-year government grant programs. The listed grant opportunities include an overview, eligibility requirements, and typical amounts that have been allocated previously or are currently available.

The following table provides an at-a-glance summary of government resources, including primary government funders.

RESOURCE	FEDERAL GOVERNMENT	STATE GOVERNMENT	LOCAL GOVERNMENT
TRANSPORTATION + INFRASTRUCTURE			
Build America Bonds	X		
North Carolina Department of Transportation Enhancement Program		X	
Federal Highway Administration, Transportation, Community, and System Preservation Program Federal Highway Administration, Office of Planning, Environment & Realty, Congestion Mitigation and Air Quality (CMAQ) Improvement Program	X		X
Federal Department of Transportation, TIGER Grants	X		
PARKS + GREENSPACE			
North Carolina Department of Natural Resources Ecosystem Enhancement Program (EEP)		X	
Federal Land and Water Conservation Fund (LWCF)	X	X	X
The Parks and Recreation Trust Fund (PARTF)		X	X
North Carolina Trails Program		X	
WATER RESOURCES MANAGEMENT			
U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA) Grants	X	X	X
North Carolina Department of Environment and Natural Resources, Division of Water Resources	X	X	
North Carolina Department of Environment and Natural Resources, Cleanwater Management Trust Fund	X	X	

TRANSPORTATION + INFRASTRUCTURE

BUILD AMERICA BONDS

http://www.treasury.gov/initiatives/recovery/Pages/babs.aspx

OVERVIEW: The existing tax-exempt bond market has faced significant challenges over the past two years. Build America Bonds (BABs) address that by providing state and local governments with a new, direct federal payment subsidy for a portion of their borrowing costs on taxable bonds. BABs provide a deeper federal subsidy to state and local governments (equal to 35 percent of the taxable borrowing cost) than traditional tax-exempt bonds which leads to lower net borrowing costs for state and local governments. This feature also makes Build America Bonds attractive to a broader group of investors than typically invest in more traditional state and local tax-exempt bonds.

ELIGIBILITY: The capital projects these bonds fund include work on public buildings, courthouses, schools, transportation infrastructure, government hospitals, public safety facilities and equipment, water and sewer projects, environmental projects, energy projects, government housing projects and public utilities.

TYPICAL FUNDING: Among the Triangle-area issuers are the University of North Carolina at Chapel Hill, $113 million for various improvements and the refinancing of prior bond issues; the North Carolina Municipal Power Agency, $69 million for nuclear power plants; the North Carolina Turnpike Authority, $353 million for highway projects; and North Carolina State University, $60 million for various improvements.

FEDERAL HIGHWAY ADMINISTRATION TRANSPORTATION, COMMUNITY, AND SYSTEM PRESERVATION PROGRAM

http://www.fhwa.dot.gov/discretionary/tcsp2012selc.htm

OVERVIEW: The Transportation, Community, and System Preservation Program provides funding for a comprehensive initiative including planning grants, implementation grants, and research to investigate and address the relationships among transportation, community, and system preservation plans and practices and identify private-sector-based initiatives to improve those relationships. Grants may be used to plan and implement strategies that improve the efficiency of the transportation system; reduce environmental impacts of transportation; reduce the need for costly future public infrastructure investments; ensure efficient access to jobs, services, and centers of trade; and examine development patterns and identify strategies to encourage private sector development patterns that achieve these goals.

ELIGIBILITY: Eligibility is broadly defined as a project eligible for assistance under Title 23 or Chapter 53 of Title 49, or any other activity the Secretary determines to be appropriate to implement transit-oriented development plans, traffic calming measures, or other coordinated TCSP practices.

TYPICAL FUNDING: As of this writing, $29 million is available in grant funding. The federal share generally is 80 percent.

FEDERAL DEPARTMENT OF TRANSPORTATION, TIGER GRANTS

http://www.dot.gov/tiger/index.html

OVERVIEW: The Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grant program, provides a unique opportunity for the U.S. Department of Transportation to invest in road, rail, transit and port projects that promise to achieve critical national objectives. Congress dedicated $1.5 billion for TIGER I and $600 million for TIGER II to fund projects that have a significant impact on the Nation, a region or a metropolitan area. TIGER's

highly competitive process, galvanized by tremendous applicant interest, allowed DOT to fund 51 innovative capital projects in TIGER I, and an additional 42 capital projects in TIGER II. TIGER II also featured a new Planning Grant category and 33 planning projects were also funded through TIGER II. Each project is multi-modal, multi-jurisdictional or otherwise challenging to fund through existing programs. The TIGER program enables DOT to use a rigorous process to select projects with exceptional benefits, explore ways to deliver projects faster and save on construction costs, and make investments in our Nation's infrastructure that make communities more livable and sustainable.

ELIGIBILITY: TIGER grants are awarded to transportation projects that have a significant national or regional impact. Projects are chosen for their ability to contribute to the long-term economic competitiveness of the nation, improve the condition of existing transportation facilities and systems, increase energy efficiency and reducing greenhouse gas emissions, improve the safety of U.S. transportation facilities and enhance the quality of living and working environments of communities through increased transportation choices and connections. The Department also gives priority to projects that are expected to create and preserve jobs quickly and stimulate increases in economic activity.

TYPICAL FUNDING: In 2009 and 2010, the Department received a total of 2,400 applications requesting $76 billion; greatly exceeding the $2.1 billion available in the TIGER I and TIGER II grant programs. In the previous two rounds, the TIGER program awarded grants to 126 freight, highway, transit, port and bicycle/pedestrian projects in all 50 states and the District of Columbia.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ENHANCEMENT (TE) PROGRAM

http://www.ncdot.org/programs/enhancement/

OVERVIEW: Federal Transportation Enhancement funding is administered by the Enhancement Unit and serves to strengthen the cultural, aesthetic, and environmental aspects of the Nation's intermodal transportation system. Transportation Enhancement (TE) activities are awarded through the North Carolina Call for Projects process.

ELIGIBILITY: Transportation Enhancement (TE) activities must benefit the traveling public and help communities increase transportation choices and access, enhance the built or natural environment, and create a sense of place. All TE projects must meet the following TWO federal requirements: (1) have a relationship to surface transportation and (2) be one of twelve qualifying activities. Factors for determination include the project's proximity to a highway or a pedestrian/bicycle corridor; whether the project enhances the aesthetic, cultural, or historic aspects of the travel experience; and whether the proposed project serves a current or past transportation purpose.

Qualifying activities include:

- BICYCLE AND PEDESTRIAN FACILITIES
- BICYCLE AND PEDESTRIAN SAFETY
- ACQUISITION OF SCENIC EASEMENTS, SCENIC OR HISTORIC SITES
- SCENIC OR HISTORIC HIGHWAY PROGRAMS (INCLUDING TOURIST OR WELCOME CENTERS)
- LANDSCAPING AND OTHER SCENIC BEAUTIFICATION
- HISTORIC PRESERVATION
- REHABILITATION OF HISTORIC TRANSPORTATION FACILITIES
- PRESERVATION OF ABANDONED RAIL CORRIDORS
- CONTROL OF OUTDOOR ADVERTISING
- ARCHAEOLOGICAL PLANNING AND RESEARCH
- ENVIRONMENTAL MITIGATION
- TRANSPORTATION MUSEUMS

TYPICAL FUNDING: Allocation decisions regarding Federal enhancement funding are on hold pending Congressional action on surface transportation program reauthorization.

FEDERAL HIGHWAY ADMINISTRATION, OFFICE OF PLANNING, ENVIRONMENT & REALTY, CONGESTION MITIGATION AND AIR QUALITY (CMAQ) IMPROVEMENT PROGRAM

http://www.fhwa.dot.gov/environment/air_quality/cmaq/

OVERVIEW: The Congestion Mitigation and Air Quality (CMAQ) Improvement Program funds transportation projects to improve air quality and reduce traffic congestion in areas that do not meet air quality standards. Jointly administered by FHWA and the Federal Transit Administration (FTA), the CMAQ program was reauthorized under the Transportation Equity Act for the 21st Century (TEA-21) in 1998, and, most recently in 2005 under the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Under SAFETEA-LU, the program has provided just under $9 billion in authorizations to State DOTs and metropolitan planning organizations, and their project sponsors for a growing variety of transportation-environmental projects, including bicycling and walking.

ELIGIBILITY: Fundable projects must show that they will reduce emissions and be cost effective. Project proposals can be submitted by government and non-government agencies, though rules vary by region. States that have no nonattainment or maintenance areas can still receive a minimum apportionment of CMAQ funding. An apportioned program, each year's CMAQ funding is distributed to the States via a statutory formula based on population and air quality classification.

TYPICAL FUNDING: Funding runs the gamut of amounts, with the grant requiring matching funds of 20, 30, 50 percent depending on the grantee organization and the project.

PARKS + GREENSPACE

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOUCES ECOSYSTEM ENHANCEMENT PROGRAM (EEP)

http://portal.ncdenr.org/web/eep/

OVERVIEW: The NC Ecosystem Enhancement Program's mission is to restore and protect North Carolina's natural resources for future generations while supporting responsible economic development. EEP offers four In-Lieu Fee mitigation programs designed to assist private and public entities comply with state and federal compensatory mitigation for streams, wetlands, riparian buffers, and nutrients. EEP utilizes receipts from the programs to restore streams and wetlands where the need is greatest by working with state and local partners, including willing landowners. The NC Department of Transportation and other developers voluntarily use EEP to move projects forward in a timely and affordable manner.

ELIGIBILITY: EEP offers four voluntary In-Lieu Fee (ILF) mitigation programs to the public and private sectors to satisfy compensatory-mitigation requirements in state and federal laws and regulations. The initiatives offset unavoidable environmental damage from transportation-infrastructure improvements and other economic development, and help to prevent harmful pollutants from endangering water quality in sensitive river basins.

TYPICAL FUNDING: In state Fiscal Year 2009-10, payments to vendors totaled $22,904,012.69. More than 60 percent of payments during the fiscal year were made to private full-delivery firms that worked towards implementing high-quality EEP mitigation projects.

In addition, about 18 percent of payments were made to vendors working on completing restoration designs, and about 20 percent were made to construction contractors implementing mitigation projects. EEP has more than 560 restoration, enhancement and preservation projects in North Carolina.

FEDERAL LAND AND WATER CONSERVATION FUND (LWCF)

http://www.ncparks.gov/About/grants/lwcf_main.php

OVERVIEW: The land and water conservation fund (LWCF) has historically been a primary funding source of the US Department of the Interior for outdoor recreation development and land acquisition by local governments and state agencies. In North Carolina, the program is administered by the Department of Environment and Natural Resources. The National Park Service, U.S. Department of the Interior, administers the program on behalf of the federal government. Authority for the program at the state level is vested in the N.C. Department of Environment and Natural Resources and the State Liaison Officer (SLO) appointed by the Governor.

ELIGIBILITY: To be eligible for LWCF assistance, every state must prepare and regularly update a Statewide Comprehensive Outdoor Recreation Plan (SCORP). The SCORP includes inventories or assessments of current recreation resources (local, state and federal) within a state, identifies needs and new opportunities for outdoor recreation improvements and sets forth a five-year action agenda to meet the goals identified by its citizens and elected leaders.

TYPICAL FUNDING: Historically, North Carolina's LWCF annual allocation has been split 60/40 between local governments and state agencies. In North Carolina alone, the LWCF program has provided more than $75 million in matching grants to protect land and support more than 875 state and local park projects. More than 38,500 acres have been acquired with LWCF assistance to establish a park legacy in North Carolina.

THE PARKS AND RECREATION TRUST FUND (PARTF)

http://www.ncparks.gov/About/grants/partf_main.php

OVERVIEW: The North Carolina General Assembly established the PARTF on July 16, 1994 to fund improvements in the state's park system, to fund grants for local governments, and to increase the public's access to the state's beaches. The Parks and Recreation Authority, a fifteen-member appointed board, was also created to allocate funds from PARTF to the state parks and to the grants program for local governments. PARTF is the primary source of funding to build and renovate facilities in the state parks as well as to buy land for new and existing parks. Recipients use the grants to acquire land and/or to develop parks and recreational projects that serve the general public.

ELIGIBILITY: North Carolina counties and incorporated municipalities are eligible for PARTF grants. Public authorities, as defined by NC General Statute 159-7, are also eligible if they are authorized to acquire land or develop recreational facilities for the general public. A public authority that is considering a PARTF grant should provide its regional consultant with proof of eligibility as soon as possible. Two or more local governments may apply jointly. One government must serve as the primary sponsor. If approved, both parties will be jointly responsible for compliance with all rules pertaining to operation and maintenance of the project. Applicants can buy land to use as recreational projects for the public or to protect the natural or scenic resources of the property. Applicants can also request money to build or renovate recreational and support facilities. A project must be located on a single site. Sports equipment, maintenance equipment, office equipment and indoor furniture cannot be purchased with PARTF grants.

TYPICAL FUNDING: The PARTF provides dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the public. Between 1995-2011 grant amounts have ranged from $7,000 to $400,000 (this does not include the local match which, typically, is 50 percent).

NORTH CAROLINA TRAILS PROGRAM

http://www.ncparks.gov/About/trails_main.php

OVERVIEW: The State Trails Program is a section of the NC Division of Parks and Recreation. The program originated in 1973 with the North Carolina Trails System Act and is dedicated to helping citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking and horseback riding to river trails and off-highway vehicle trails.

The four-person staff of the State Trails Program and the North Carolina Trails Committee work together to enable volunteers, nonprofit organizations, and government agencies to develop trail plans, preserve land and develop and manage trails for all trail users. Staff is working toward a goal of a system of trails across North Carolina by providing technical assistance, offering grant opportunities and developing successful partnerships with local conservation and recreation advocates.

ELIGIBILITY: The North Carolina Division of Parks and Recreation and its State Trails Program offer two (2) grant programs: (1) Adopt-a-trail grant program; and (2) Recreational trails grant program. Governmental agencies and non-profit organizations are encouraged to apply for grants for trail construction and maintenance projects, for trail side facilities, and land acquisition projects.

TYPICAL FUNDING: Grants typically are in the range of $5,000.

WATER RESOURCES MANAGEMENT

U.S. DEPARTMENT OF HOMELAND SECURITY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) GRANT PROGRAM

http://www.fema.gov/government/grant/hma/index.shtm

OVERVIEW: The FEMA grant program exists to remove structures, and therefore people, from floodplain areas through an application process which analyzes the frequency and severity of damages to the structure. Ideally, structures are removed from harm's way and the land is restored to its natural function (green space and open space).

ELIGIBILITY: The property owner must be willing to participate. The project must display a benefit cost analysis ratio of one or greater. The program is voluntary for property owners who can walk away from the program at any time during the process, even after the grant is awarded and the offer is on the table.

TYPICAL FUNDING: There is usually a 75/25 cost share associated with the grant project. The City is required to commit 25 percent of the project cost, which includes not only purchase of the property, but demolition and property restoration costs.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (NCDENR), DIVISION OF WATER RESOURCES

www.ncwater.org/Financial_Assistance/

OVERVIEW: This program is designed to provide cost-share grants and technical assistance to local governments throughout the State. Applications for grants are accepted for seven purposes: General Navigation, Recreational Navigation, Water Management, Stream Restoration, Beach Protection, Land Acquisition and Facility Development for Water-Based Recreation, and Aquatic Weed Control. There are two grant cycles per fiscal year; the application deadlines are July 1st and January 1st.

ELIGIBILITY: Units of local government and local political subdivisions are eligible for assistance. In the case where projects provide broad regional benefits, or where assignment of non-federal responsibilities to local government is not appropriate in the opinion of the department, the department may assume sponsorship on behalf of the state and may pay up to 100 percent of the total (or the non-federal share of the costs) of planning, construction, or operation of said water resources project.

TYPICAL FUNDING: Spring 2011 grant awards ranged from $20,000 to $150,000, totaling $979,000.

NORTH CAROLINA DEPARTMENT

OF ENVIRONMENT AND NATURAL RESOURCES (NCDENR), CLEANWATER MANAGEMENT TRUST FUND (CWMTF)

http://www.cwmtf.net/

OVERVIEW: To carry out the mandate set by legislation, CWMTF provides grant funds for five primary activities: (1) acquisition of Riparian Buffers (fee simple or conservation easements); (2) acquisition of Riparian Greenway Corridors (includes regional trails); (3) restoration and Stormwater projects; (4) Wastewater Infrastructure; (5) planning (for acquisition, greenway, restoration, stormwater, or wastewater infrastructure projects. In addition, CWMTF has several "mini-grant" programs to help recipients plan and prepare for larger projects. Mini-grants do not follow the same application or review process and are awarded as funds are available. There is no deadline for mini-grants.

ELIGIBILITY: A state agency, a local government, or a nonprofit corporation whose primary purpose is the conservation, preservation, and restoration of North Carolina's environmental and natural resources is eligible to apply for a grant.

TYPICAL FUNDING: Overview of CWMTF 2011 Awards: 46 awards made in 26 different counties across the state; CWMTF funds will leverage an overall 65% in matching funds; 76% of wastewater awards made to economically distressed communities; Infrastructure awards focus on projects that are construction ready; 17 awards will help to protect downstream water supplies serving over 1.8 million people in 26 different communities, with 3 communities serving over 250,000 each. The grant provides matching funds between 20 percent and 59 percent.

APPENDIX B: PEDESTRIAN BRIDGE ANALYSIS

GRAHAM SMITH, DHM DESIGN

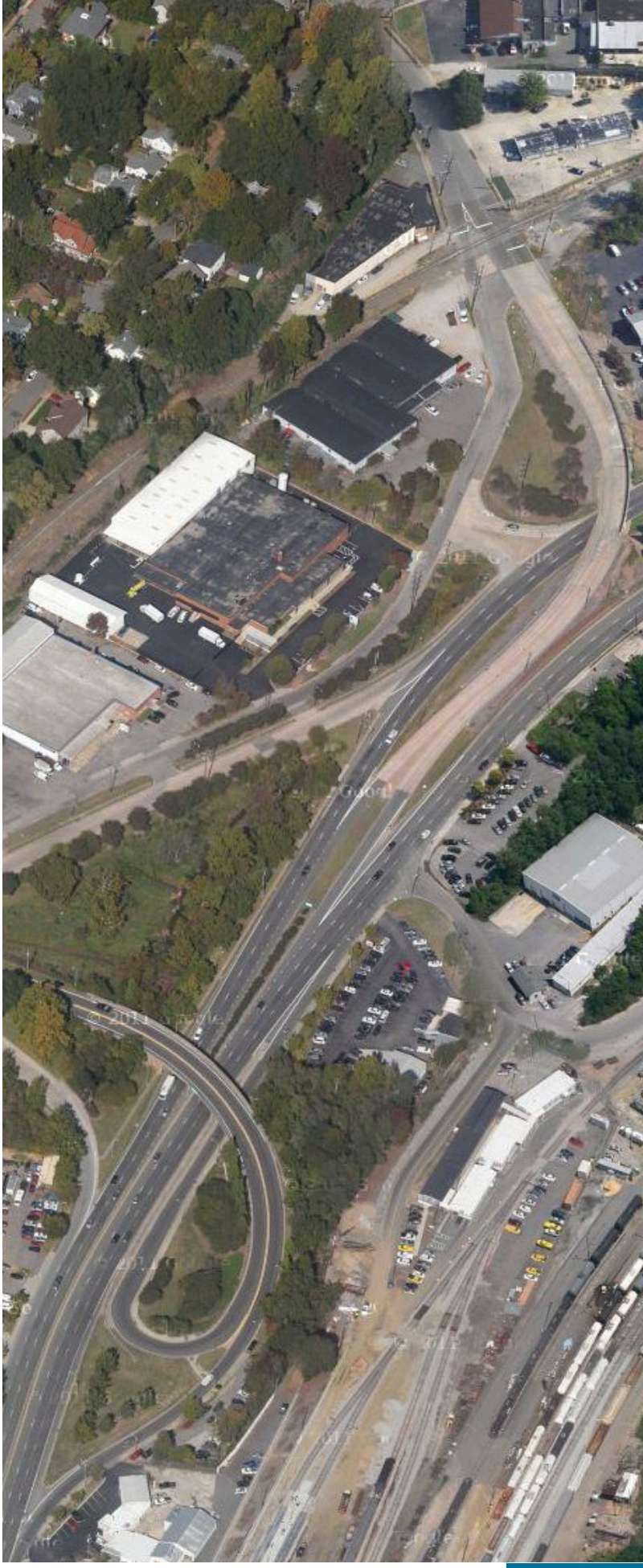
PROBLEM STATEMENT

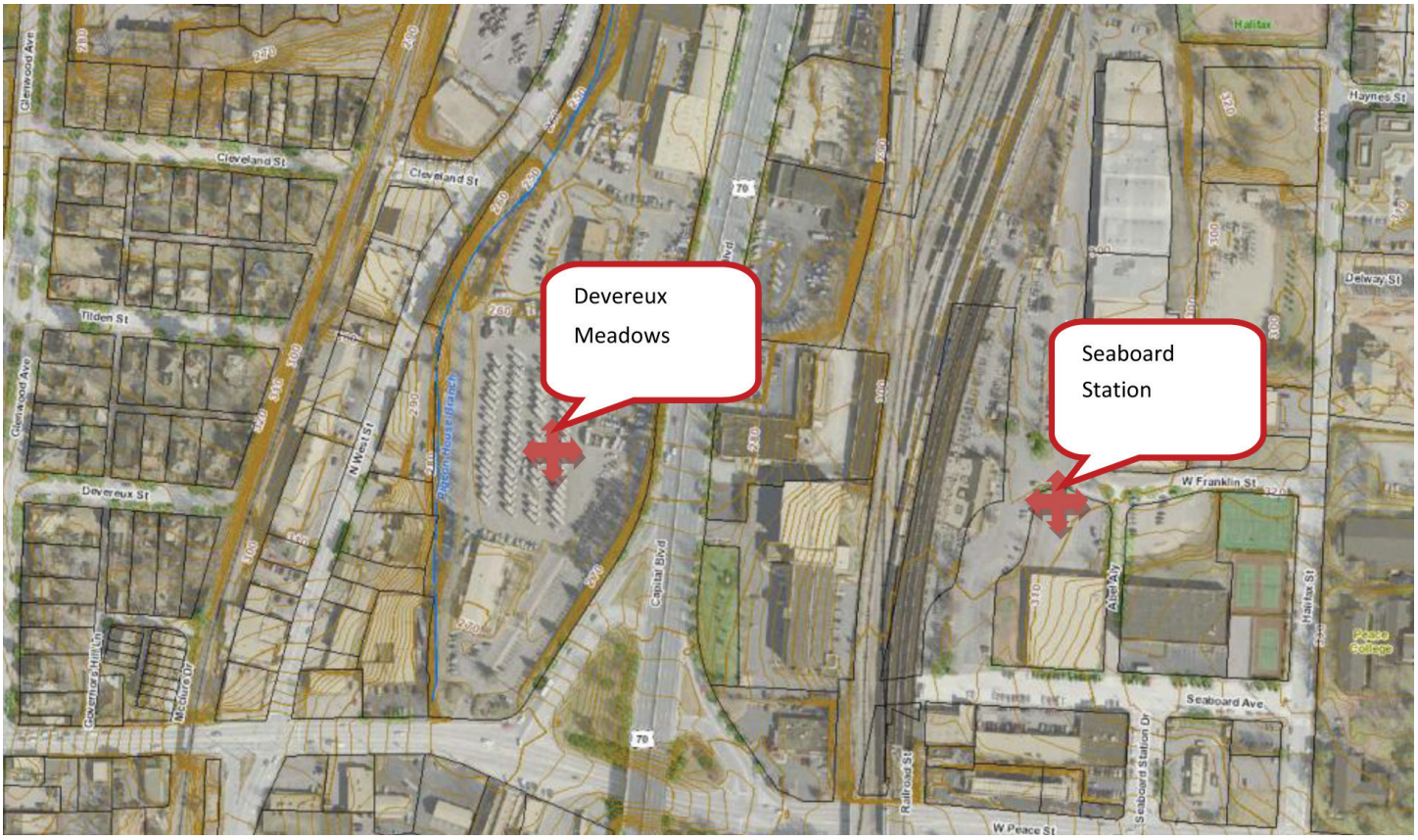
Assess the possibility of pedestrian bridge and/or physical connection to occur across the southern portion of Capital Boulevard Corridor (below Wake Forest Road/Atlantic Avenue)

SCENARIOS STUDIED

- OPTION 1: CONNECT SEABOARD STATION/PEACE COLLEGE TO DEVEREUX MEADOWS PROPERTY
- OPTION 2: CONNECT MORDECAI/PILOT MILL COMMUNITY TO FIVE POINTS COMMUNITY
- OPTION 3: CONNECT FIVE POINTS COMMUNITY TO CAPITAL BOULEVARD CORRIDOR
- OPTION 4: CONNECT MORDECAI/PILOT MILL COMMUNITY TO CAPITAL BOULEVARD CORRIDOR

**** It should be noted that all of these options will require significant approvals from NCDOT Highway Division, NCDOT Rail Division, CSX Railroad, and Norfolk Southern Railroad. Those approval processes have not been evaluated as part of this analysis.





OPTION 1

SEABOARD STATION/PEACE COLLEGE TO DEVEREUX MEADOWS PROPERTY:

EXISTING SITE CONDITIONS

The Seaboard Station area appears to have significant public right of way available – utilizing Semart Drive and West Franklin Street. This will allow for some flexibility for locating a pedestrian access point. The vertical elevation within the area in location is 306'. The immediately adjacent CSX track (west of Logan's Trading Company) has an approximate vertical elevation of 304'. The approximate vertical elevation of Capital Boulevard in this area is 270'. Therefore, we will have to elevate any pedestrian access point significantly within the Seaboard Station site to ensure proper clearance above CSX train tracks and Capital Boulevard. The land within the Devereux Meadows property is significantly lower – with a rough vertical elevation of 260' within the middle of the property. Both the Seaboard Station location and the Devereux Meadows property have ample city-owned property for pedestrian access points.

OPPORTUNITIES

This route is feasible. It will be cheaper than Options 2A, 2B and 2C (described later), all of which are longer and/or have more vertical challenges. The goal of this option is to link the current activity zone of Seaboard Station/Peace College, while planning for its continued redevelopment with the City-owned Devereux Meadows property. This will also potentially act as a significant and very deliberate gateway element as one arrives into Downtown from the north. However, the question still remains about whether a pedestrian bridge here would be redundant with other pedestrian improvements proposed for Peace Street/Capital Boulevard intersection?

In its shown state, the bridge is approximately 1,000 linear

CONNECT SEABOARD STATION/PEACE COLLEGE TO DEVEREUX MEADOWS PROPERTY VIA PEDESTRIAN BRIDGE

OPTION 1

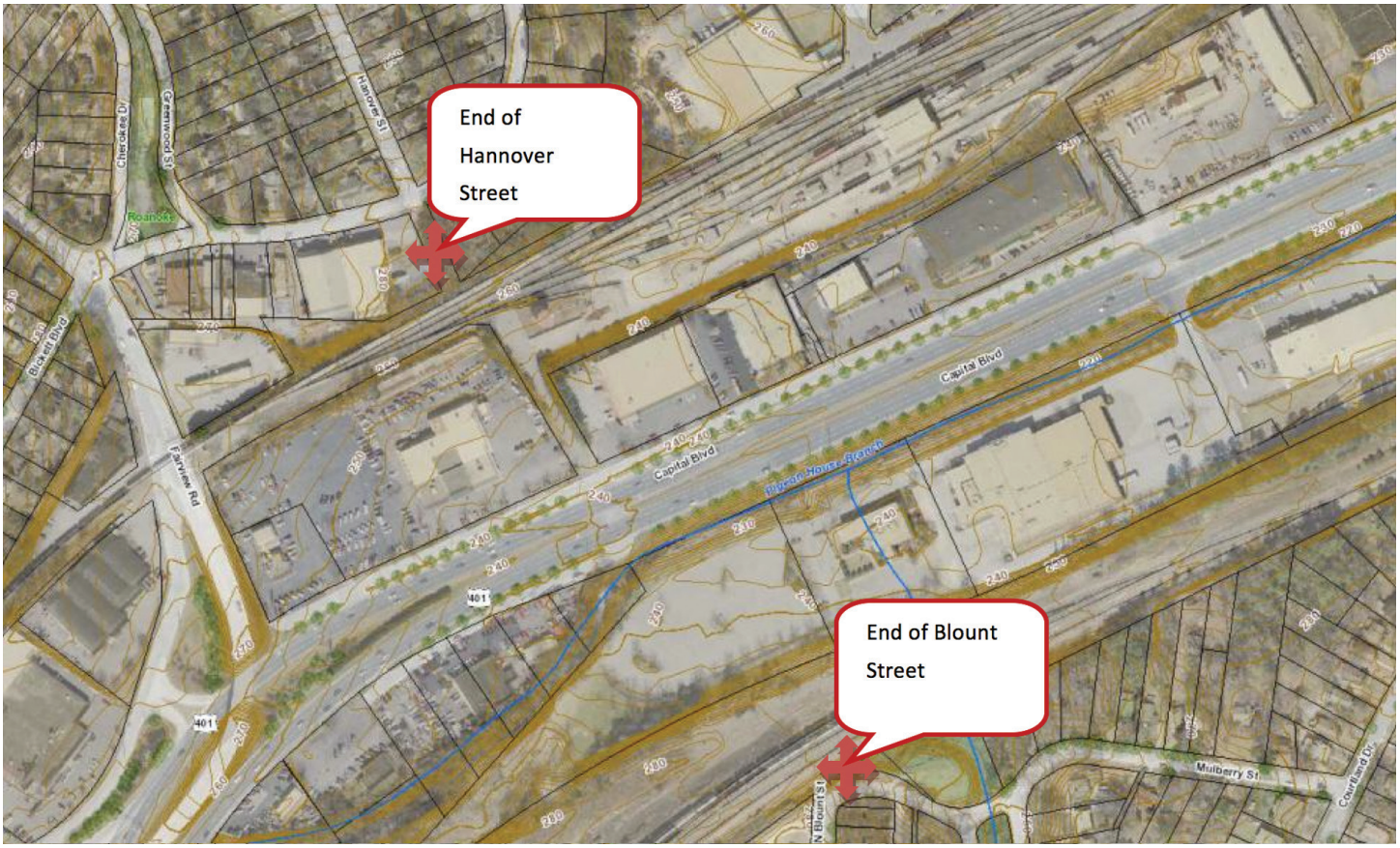
feet. At a rough average pedestrian bridge cost of $3,000 per linear foot, this would equate to an approximate cost of $3,000,000. Unique site specific features or elements may drive the cost significantly higher.

It appears that there will have to be two 'pedestrian access towers' to make this route work and to allow for full pedestrian access to the eastern side of Capital Boulevard and the western side of Capital Boulevard. Multiple structural columns will also be required.

Utilizing existing grades, a tower of up to 25' in height will have to be placed in the Seaboard Station property near the northern end of Logan Trading Company's canopy. This will allow for 23' of clearance over the eastern train tracks. To ensure ADAAG-compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 350' long ramp to connect to existing grades within Seaboard Station.

At the western terminus for this proposed pedestrian route, and located within the City-owned Devereux Meadows property, a much smaller pedestrian access tower of 5'-8' in height from a approximate existing vertical elevation of 260' allows for pedestrian access to this bridge. To ensure ADAAG-compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 70'-110' long ramp to tie into existing grades within the Devereux Meadows property.

This route will have to occur over 2 private properties, along with crossing Capital Boulevard and the CSX train tracks. The pedestrian access points or towers on each end of this route (Seaboard Station and Devereux Meadows) have the possibility to be placed on public property. This will also allow access to both sides of Capital Boulevard. It should be pointed out that the section of the pedestrian bridge from the Devereux Meadows property to the western edge of Capital Boulevard will have to be at 8.3% to ensure clearance over Capital Boulevard. The remainder of the bridge will have to be inclined at least 5% to make the connection to the approximate vertical elevation of 327' within Seaboard Station.



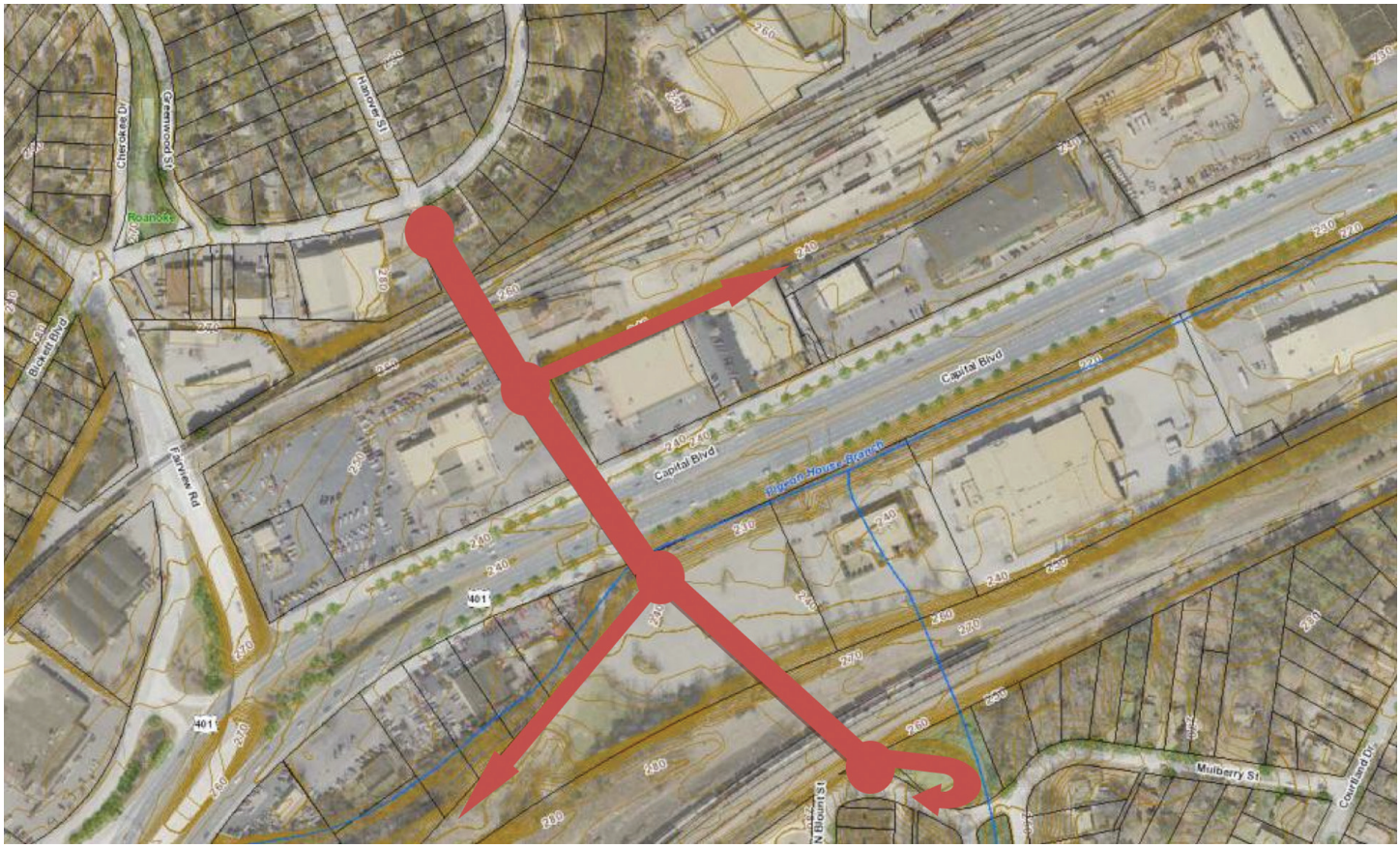
OPTION 2A

CONNECT BLOUNT STREET (PILOT MILL AND MORDECAI COMMUNITIES) TO HANNOVER STREET (FIVE POINTS COMMUNIT) VIA PEDESTRIAN BRIDGE

EXISTING SITE CONDITIONS

The Blount Street right-of-way butts immediately against the Railroad property. This minimizes the space that may be available for creating a pedestrian access point. Also, the vertical elevation of the end of Blount Street is roughly 276' while the immediately adjacent train tracks is at a vertical elevation of roughly 274'. Therefore, we will have to elevate any pedestrian access point significantly to ensure proper clearance above the CSX train tracks. Steeply sloping topography is also present within the immediately adjacent City -owned open space parcel to the northeast of the end of Blount Street and the end of Marshall Street. For reasons of this study, we proceeded with the concept that some type of pedestrian access point could be generated in this 'open space' to accommodate the Pilot Mill and Mordecai neighborhoods.

The end of Hannover Street is well -positioned to have a pedestrian access point. The vertical elevation at this point is roughly 278' while the vertical elevation of the western train tracks in this area is roughly 260'. Therefore with a gentle slope in the 'walkway, we can obtain the preferred clearance over the Norfolk -Southern train tracks.



OPPORTUNITIES

This route is feasible. However the cost will be expensive. It will most likely be cheaper than Options 2B and 2C, both of which are longer and/or have more vertical challenges. The goal of this option is to link the current neighborhoods of Pilot Mill and Mordecai with the Five Points community and their commercial center. This will also potentially act as a significant and very deliberate gateway element as one arrives into Downtown from the north and as one departs Downtown heading north. However, as a visual element, there may be a bit of clutter with the existing Fairview Road interchange, if that were to remain.

In its shown state, the bridge is approximately 1,500 linear feet. At a rough average pedestrian bridge cost of $3,000 per linear foot, this would equate to an approximate cost of $4,500,000. Unique site specific features or elements may drive the cost significantly higher.

It appears that there will have to be four 'pedestrian towers' to make this route work and to allow for full pedestrian access to the eastern/southern side of Capital Boulevard and the western/northern of Capital Boulevard. Multiple structural columns will also be required.

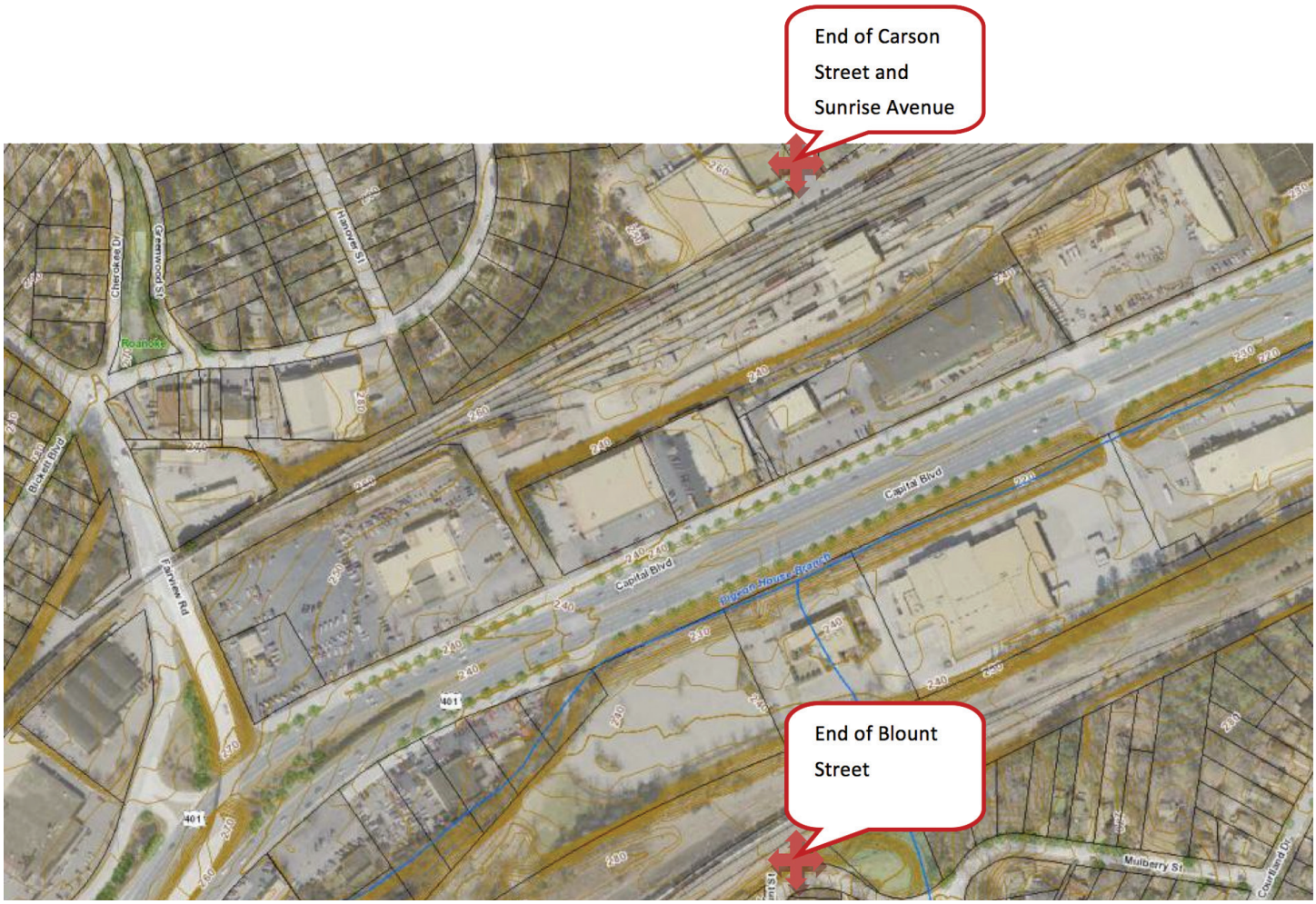
Utilizing existing grades, a tower of up to 25' in height will have to be placed in the City's open space near the end of Blount Street and Marshall Street. This will allow for 23' of clearance over the CSX train tracks. To ensure ADAAG -compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 350' long ramp to existing grades at Blount Street or Marshall Street.

Utilizing existing grades, a second tower of up to 33' in height will have to be placed in between Capital Boulevard and the eastern train tracks. This will allow 23' of clearance over the CSX train tracks and 20' clearance over Capital Boulevard. To ensure ADAAG -compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 500' long ramp to existing grade.

Utilizing existing grades, a third tower of up to 33' in height will have to be placed in between Capital Boulevard and the western train tracks. This will allow 23' of clearance over the Norfolk -Southern train tracks and 20' clearance over Capital Boulevard. To ensure ADAAG -compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 500' long ramp to existing grade.

At Hannover Street, there is very little vertical elevation needed to make a pedestrian connection at the end of Hannover Street. A pedestrian bridge could take off at a vertical elevation of 278' and could ramp up per ADAAG guidelines to 283' effectively to appropriately provide the 23' of clearance for the western train tracks.

This route will have to occur over 2 -3 private properties, along with crossing Capital Boulevard, and the Norfolk Southern train tracks, and the CSX train tracks. The pedestrian access points or towers on each end of this route (Blount Street and Hannover Street) have the possibility to be placed on public property, however with Blount Street being significantly constrained. The internal towers will have to placed on property that is currently privately owned.



OPTION 2B

CONNECT BLOUNT STREET (PILOT MILL AND MORDECAI COMMUNITIES) TO CARSON STREET AND SUNRISE AVENUE (FIVE POINTS COMMUNITY) VIA PEDESTRIAN BRIDGE

EXISTING SITE CONDITIONS

The Blount Street right -of -way butts immediately against the Railroad property. This minimizes the space that may be available for creating a pedestrian access point. Also, the vertical elevation of the end of Blount Street is roughly 276' while the immediately adjacent train tracks is at a vertical elevation of roughly 274'. Therefore, we will have to elevate any pedestrian access point significantly to ensure proper clearance above the CSX train tracks. Steeply sloping topography is also present within the immediately adjacent City -owned open space parcel to the northeast of the end of Blount Street and the end of Marshall Street. For reasons of this study, we proceeded with the concept that some type of pedestrian access point could be generated in this 'open space' to accommodate the Pilot Mill and Mordecai neighborhoods.

The end of Carson Street and Sunrise Avenue will be difficult to connect for pedestrian access because of limited space between the existing right -of -way and the western boundary of the Norfolk Southern train tracks. The vertical elevation at this point is roughly 256' and the immediately adjacent train tracks End of Blount Street End of Carson Street and Sunrise Avenue are at a vertical elevation of roughly 254'. Therefore, we will have to elevate any

pedestrian access point significantly to ensure proper clearance above Norfolk Southern train tracks.

OPPORTUNITIES

This route is feasible. However the cost will be expensive. It will most likely be cheaper than Option 2C, but more expensive than Option 2A. Due to the tower required at Carson Street/Sunrise Avenue, it will have more vertical challenges than Option 2A. The goal of this option is to link the current neighborhoods of Pilot Mill and Mordecai with the Five Points community and their commercial center. This will also potentially act as a significant and very deliberate gateway element as one arrives into Downtown from the north and as one departs Downtown heading north.

In its shown state, the bridge is approximately 1,600 linear feet. Using a rough average pedestrian bridge cost of $3,000 per linear foot, this would equate to an approximate cost of $4,800,000. Unique site specific features or elements may drive the cost significantly higher.

It appears that there will have to be four 'pedestrian access towers' to make this route work and to allow for full pedestrian access to the east/southern side of Capital Boulevard and the west/north of Capital Boulevard. Multiple structural columns will also be required, per the final bridge design.

Utilizing existing grades, a tower of up to 25' in height will have to be placed in the City's open space near the end of Blount Street and Marshall Street. This will allow for 23' of clearance over the CSX train tracks. To ensure ADAAG-compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 350' long ramp to existing grades at Blount Street or Marshall Street.

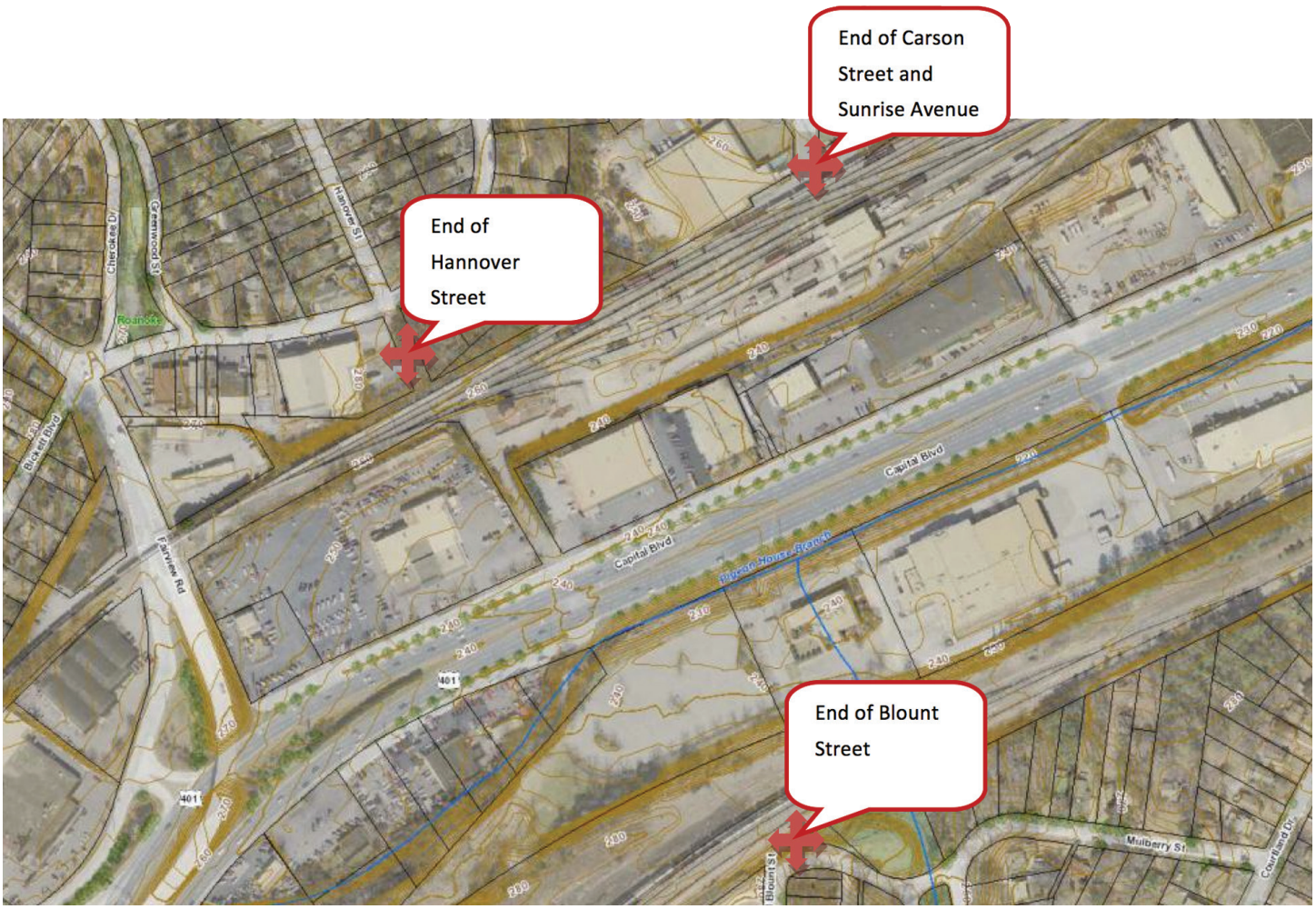
Utilizing existing grades, a second tower of up to 35' in height will have to be placed in between Capital Boulevard and the CSX train tracks. This will allow 23' of clearance over the CSX train tracks and 20' clearance over Capital Boulevard. To ensure ADAAG-compliant pedestrian access to this area, if an elevator combined with steps is not

provided, there would have to be a 550' long ramp to existing grade.

Utilizing existing grades, a third tower of up to 37' in height will have to be placed in between Capital Boulevard and the Norfolk Southern train tracks. This will allow 23' of clearance over the Norfolk Southern train tracks and 20' clearance over Capital Boulevard. To ensure ADAAG-compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 600' long ramp to existing grade.

At Carson Street/Sunrise Avenue, utilizing existing grades, there will need to be another pedestrian access tower up to 21' in height. This will allow 23' in clearance over the Norfolk Southern train tracks. To ensure ADAAG-compliant pedestrian access to this area, if an elevator combined with steps is not provided, there would have to be a 300' long ramp to existing grade.

This route will have to occur over 2-3 private properties, along with crossing Capital Boulevard, and the Norfolk Southern train tracks, and the CSX train tracks. The pedestrian access points or towers on each end of this route (Blount Street and Carson Street/Sunrise Avenue) have the possibility to be placed on public property, however each location is somewhat constrained. The internal towers will have to placed on property that is currently privately owned.

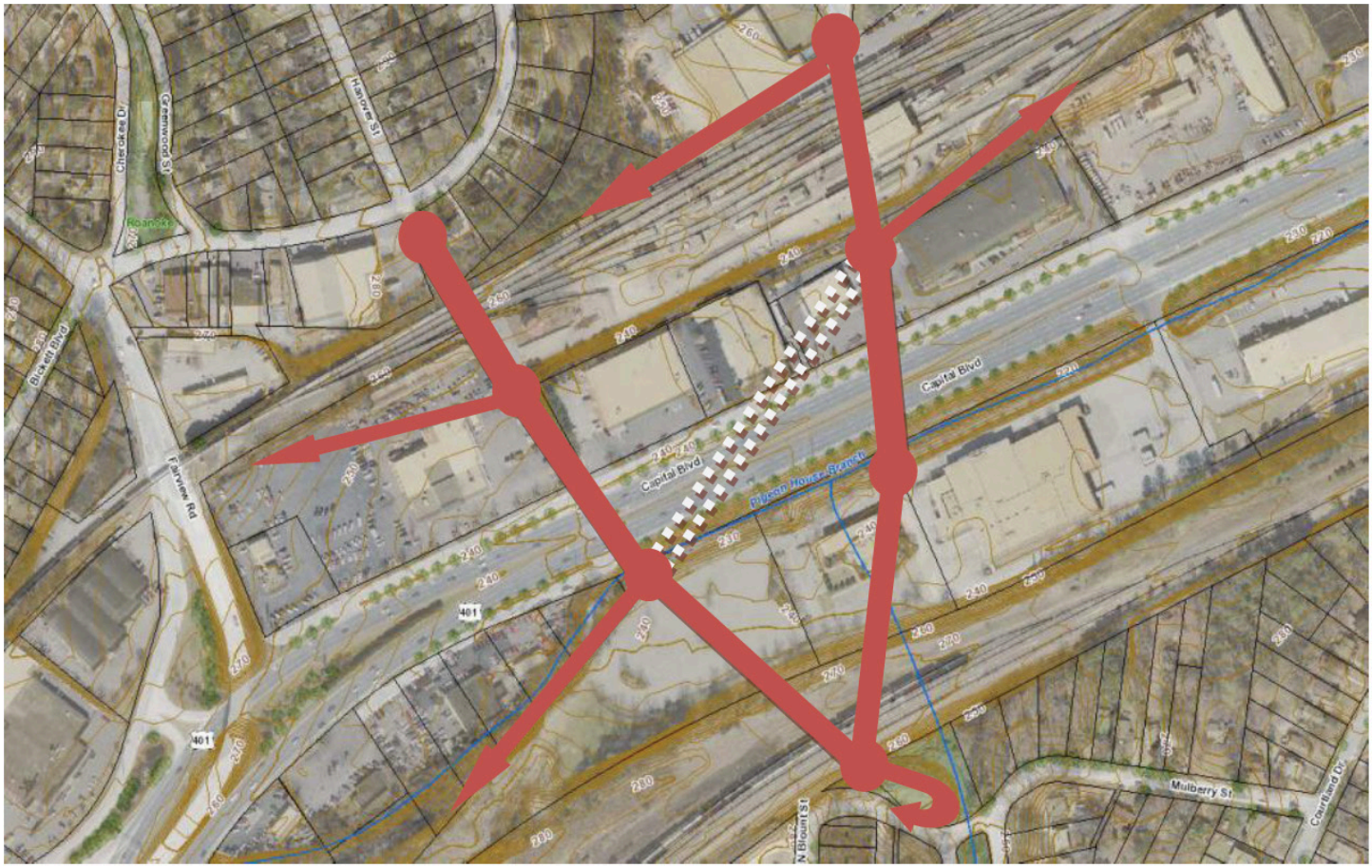


OPTION 2C

CONNECT BLOUNT STREET (PILOT MILL AND MORDECAI COMMUNITIES) TO HANNOVER STREET AND CARSON STREET/SUNRISE AVENUE (FIVE POINTS COMMUNITY) VIA PEDESTRIAN BRIDGE

EXISTING SITE CONDITIONS

The Blount Street right-of-way butts immediately against the Railroad property. This minimizes the space that may be available for creating a pedestrian access point. Also, the vertical elevation of the end of Blount Street is roughly 276' while the immediately adjacent train tracks is at a vertical elevation of roughly 274'. Therefore, we will have to elevate any pedestrian access point significantly to ensure proper clearance above CSX train tracks. Steeply sloping topography is also present within the immediately adjacent City-owned parcel to the northeast of the end of Blount Street and the end of Marshall Street. For reasons of this study, we proceeded with the concept that some type of pedestrian



access point could be generated in this 'open space' to accommodate the Pilot Mill and Mordecai neighborhoods.

The end of Hannover Street is well-positioned to have a pedestrian access point. The vertical elevation at this point is roughly 278' while the vertical elevation of the Norfolk Southern train tracks in this area is roughly 260'. Therefore with a gentle slope in the 'walkway, we can obtain the preferred clearance over the Norfolk Southern train tracks.

The end of Carson Street and Sunrise Avenue will be difficult to connect for pedestrian access because of limited space between the existing right-of-way and the western boundary of the Norfolk Southern train tracks. The vertical elevation at this point is roughly 256' and the immediately adjacent train tracks are at a vertical elevation of roughly 254'. Therefore, we will have to elevate any pedestrian access point significantly to ensure proper clearance above Norfolk Southern train tracks.

OPPORTUNITIES

There is the possibility to combine both options. This could be done with 6 or 7 'pedestrian access towers', depending on the design/layout. This is more expensive by combining both routes. However, it truly connects the communities with the potential spaces within the corridor. The goal of this option is to link the current neighborhoods of Pilot Mill and Mordecai with the Five Points community and their commercial center. This will also potentially act as a significant and very deliberate gateway element as one arrives into Downtown from the north and as one departs Downtown heading north.

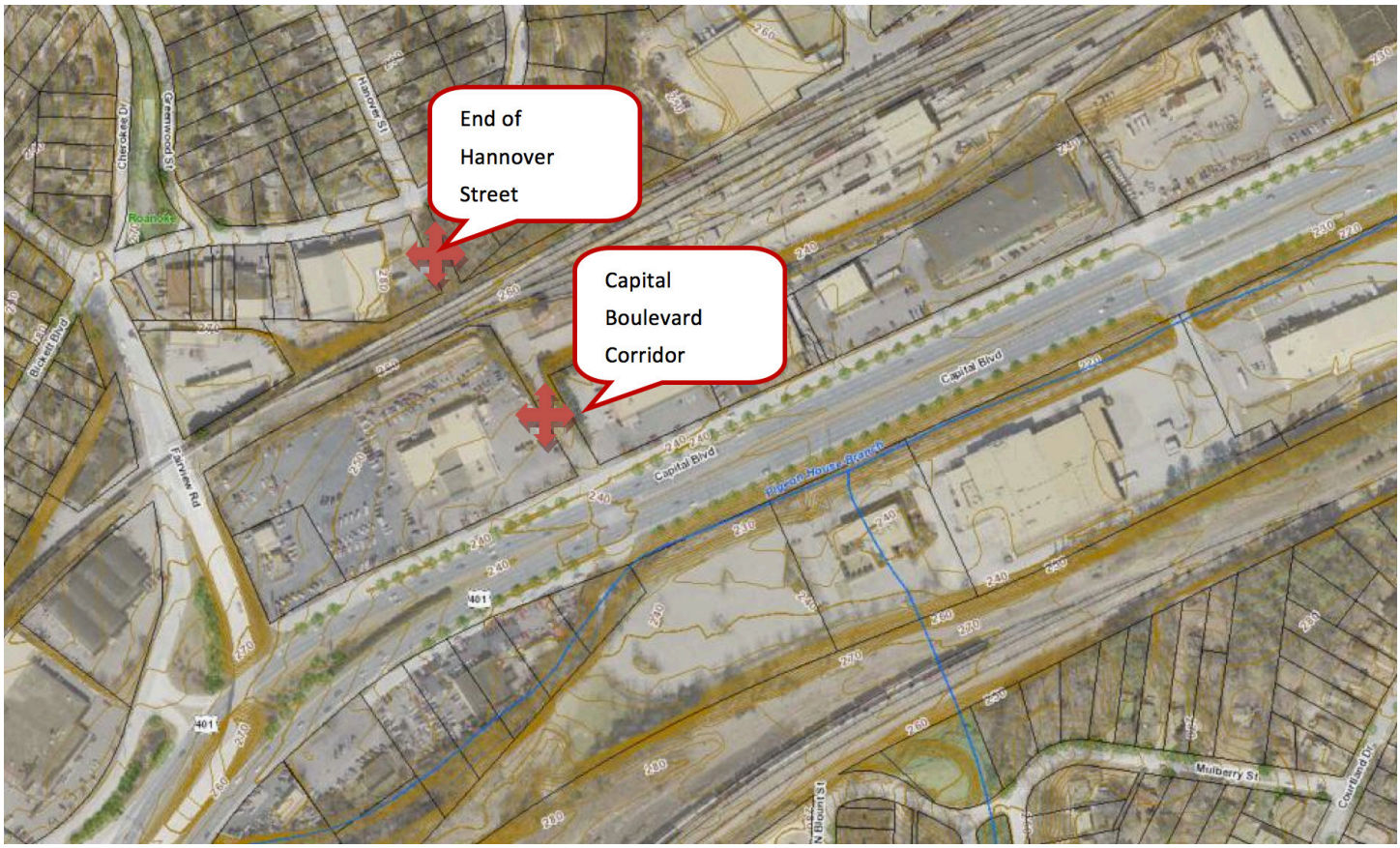
In its shown state, the bridge is approximately 1,600 linear feet and 1,500 linear feet. Using a rough average pedestrian bridge cost of $3,000 per linear foot, this would equate to an approximate cost of $9,300,000. Unique site specific features or elements may drive the cost significantly higher. If the alternate (dashed route) was chosen as a link between

the two bridges and the southern portion of Option 2B were eliminated, there could be a savings of approximately $1,000,000.

It appears that there will have to be six (if alternate - dashed route is chosen) or seven 'pedestrian access towers' to make this route work and to allow for full pedestrian access to the east/ southern side of Capital Boulevard and the west/north of Capital Boulevard. Multiple structural columns will also be required, per the final bridge design.

All previously noted 'pedestrian access towers' in Options 2A and 2B will have to be developed for this combined concept to work. The second tower in Option 2B would be eliminated if the alternate (dashed route) would be chosen.

These routes will have to occur over 5 private properties, along with crossing Capital Boulevard, and the Norfolk Southern train tracks, and the CSX train tracks. The pedestrian access points or towers on each end of these routes (Blount Street, Hannover Street, Carson Street/Sunrise Avenue) have the possibility to be placed on public property, however each location is somewhat constrained. The internal towers will have to placed on property that is currently privately owned.

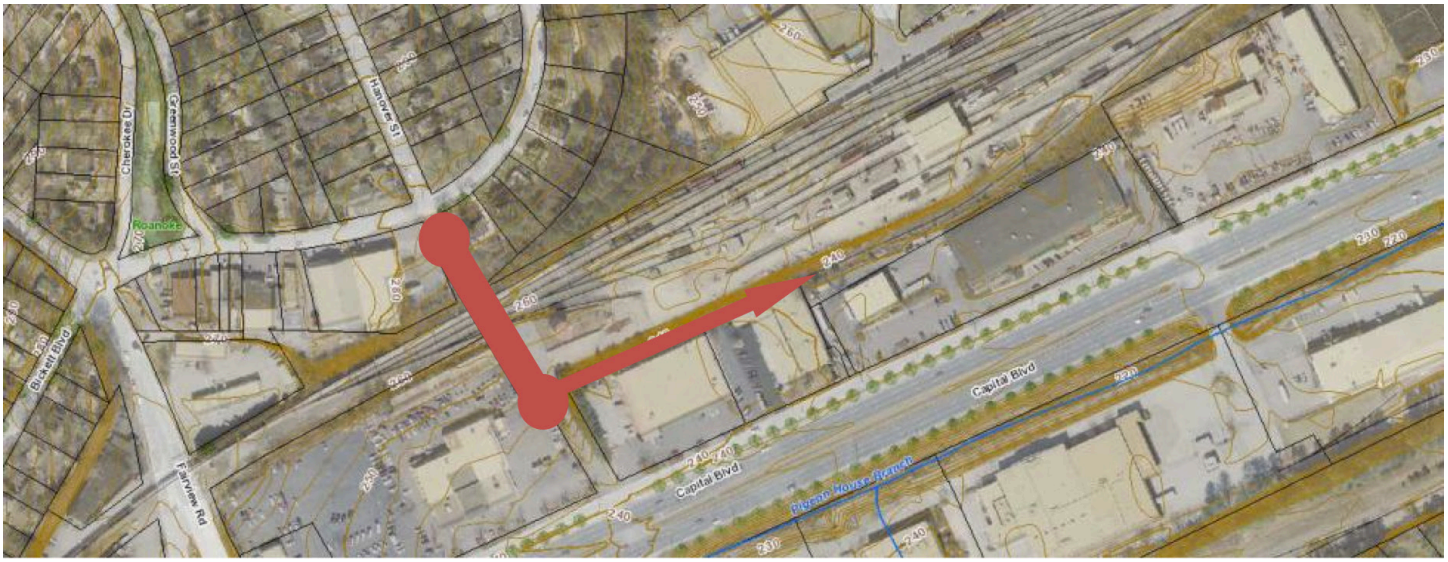


OPTION 3

CONNECT HANNOVER STREET (FIVE POINTS COMMUNITY) TO CAPITAL BOULEVARD CORRIDOR VIA PEDESTRIAN BRIDGE

EXISTING SITE CONDITIONS

The end of Hannover Street is well-positioned to have a pedestrian access point. The vertical elevation at this point is roughly 278' while the vertical elevation of the western train tracks in this area is roughly 260'. Therefore with a gentle slope in the 'walkway, we can obtain the preferred clearance over the Norfolk-Southern train tracks. The topography within the Capital Boulevard corridor is fairly flat, with a shown existing vertical elevation around 250'. The end of Hannover Street is well -positioned to have a pedestrian access point. The vertical elevation at this point is roughly 278' while the vertical elevation of the Norfolk Southern train tracks in this area is roughly 260'. Therefore with a gentle slope in the 'walkway, we can obtain the preferred clearance over the Norfolk Southern train tracks.



OPPORTUNITIES

This route is feasible. It will be cheapest of all proposed alternatives. Options 1, 2A, 2B and 2C all are longer and/or have more vertical challenges. The goal of this option is to link the current neighborhoods of the Five Points community with any potential redevelopment that may occur within the Capital Boulevard Corridor. It will ensure safe pedestrian passage over the Norfolk-Southern train tracks.

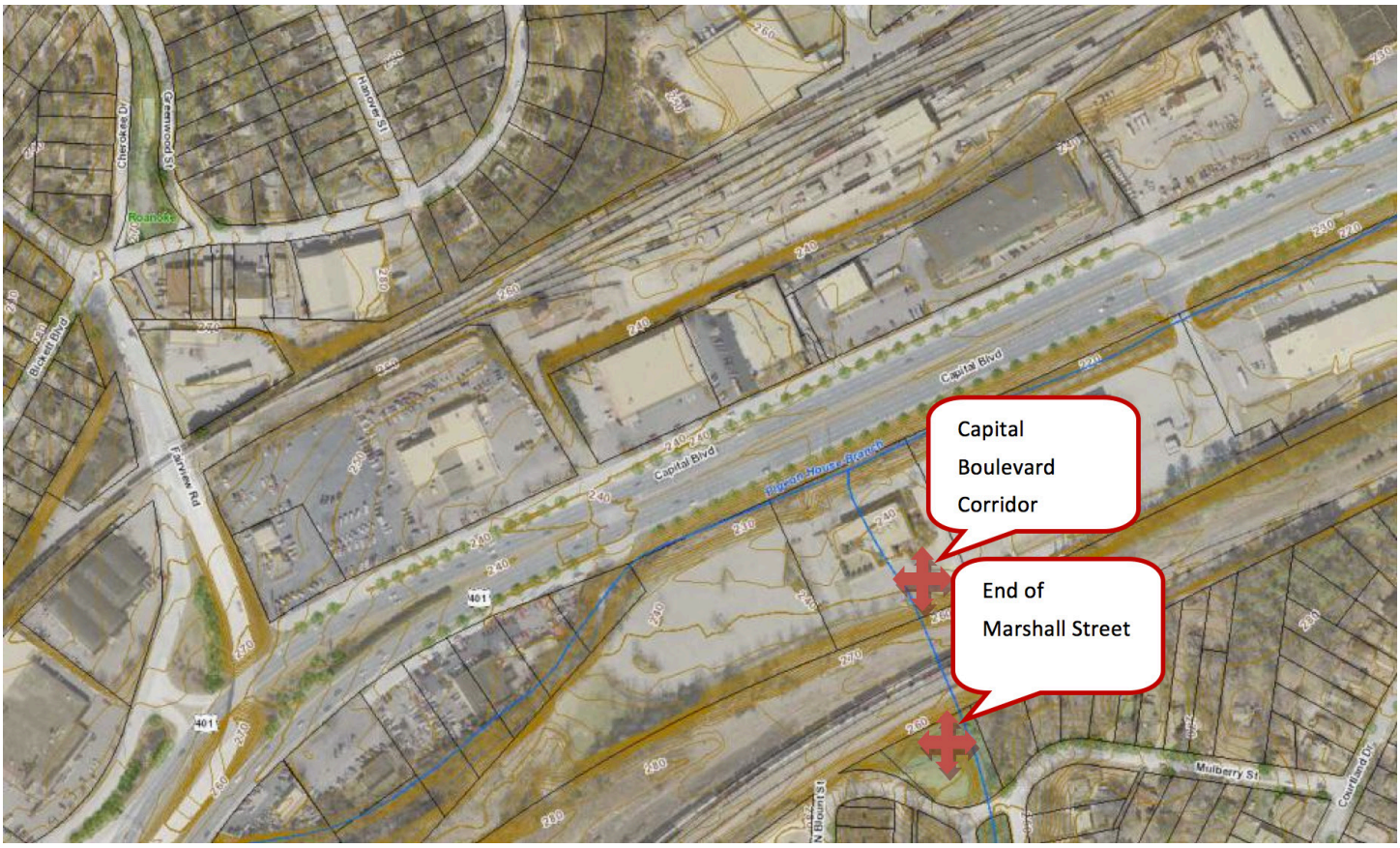
In its shown state, the bridge is approximately 450 linear feet, depending on tower locations. At a rough average pedestrian bridge cost of $3,000 per linear foot, this would equate to an approximate cost of $1,350,000. Unique site specific features or elements may drive the cost significantly higher.

It appears that there will have to be two 'pedestrian towers' to make this route work and to allow for full pedestrian access from Five Points Community to the western/northern of Capital Boulevard. Several structural columns will also be required.

At Hannover Street, there is very little vertical elevation needed to make a pedestrian connection at the end of Hannover Street. A pedestrian bridge could take off at a vertical elevation of 278' and could ramp up per ADAAG guidelines to 283' effectively to appropriately provide the 23' of clearance for the western train tracks.

Utilizing existing grades, a second tower of up to 33' in height will have to be placed in between Capital Boulevard and the western train tracks. This will allow 23' of clearance over the Norfolk-Southern train tracks. To ensure ADAAG-compliant pedestrian access to this area of the Capital Boulevard Corridor, if an elevator combined with steps is not provided, there would have to be a 500' long ramp to existing grade.

This route will have to cross the Norfolk Southern train tracks. However, the pedestrian access points or towers on each end of this route (Hannover Street and within the Capital Boulevard Corridor) have the possibility to be placed on public property. There is some confusion about who owns the right-of-way between the Norfolk-Southern train tracks and Capital Boulevard. If the City owns it, it will make this project more simple to complete. If not, there is still the possibility of placing this tower on private property in the same general area.



OPTION 4A
(MARSHALL STREET/MULBERRY STREET TO CAPITAL BOULEVARD CORRIDOR): **COMBINED PEDESTRIAN AND VEHICULAR TUNNE**

EXISTING SITE CONDITIONS

The Blount Street right-of-way butts immediately against the Railroad property. This minimizes the space that may be available for creating a pedestrian access point. Also, the vertical elevation of the end of Blount Street is roughly 276' while the immediately adjacent train tracks is at a vertical elevation of roughly 274'. Steeply sloping topography is also present within the immediately adjacent City-owned open space parcel to the northeast of the end of Blount Street and the end of Marshall Street. However, this does present a great opportunity for exploring an underground tunnel option as the low point and rough vertical elevation of the stream/culvert under the train tracks within this open space is 244'. With the train tracks at a vertical elevation of 270', this is a 26' vertical difference.

This option explores the possibility of a vehicular connection along with the pedestrian connection. We therefore assumed that we could make traffic flow work with a small traffic egg/circle located at the intersections of Mulberry Street and Marshall Street. For reasons of this study, we proceeded with

the concept that some type of vehicular access system could be generated within the existing right-of-ways and the 'open space' to accommodate this request. It does appear possible.

The two properties that are most likely to be where the northwest end of the tunnel would occur are both privately owned. Therefore there may be some complications with this. However, the vertical elevation of those two parcels is roughly 240' which would provide easy access into the tunnel. And it would allow a lot of natural light into the tunnel, thus adding to its safety factor.

CONNECT MARSHALL STREET (PILOT MILL AND MORDECAI COMMUNITIES) TO CAPITAL BOULEVARD CORRIDOR VIA A COMBINED PEDESTRIAN AND VEHICULAR TUNNEL

OPTION 4A

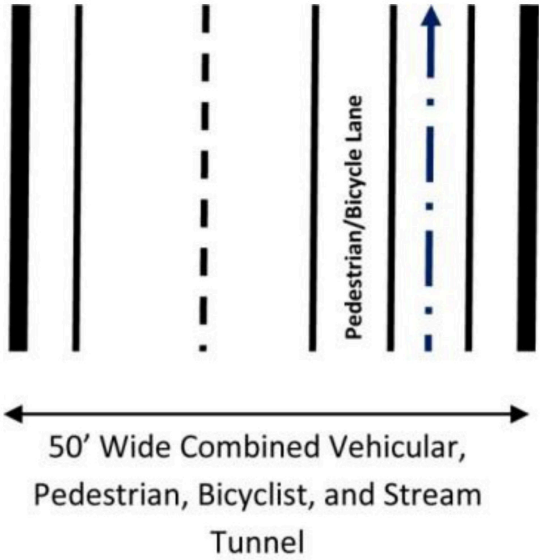
OPPORTUNITIES

This route is feasible. However the cost will be expensive. This option is unique because it will be an underground tunnel that will have to be constructed underneath the existing CSX train tracks. The goal of this option is to link the current neighborhoods of Pilot Mill and Mordecai with the potentially redeveloped area of the Capital Boulevard Corridor via both pedestrian and vehicular movements, along with providing for bicyclists and the existing culvert to be 'daylighted'. There is the potential that the communities of Pilot Mill and Mordecai will not want this vehicular link to occur. However, with this

tunnel being wider than just a pedestrian tunnel, it would be safer and feel more open while also providing a very deliberate connection for this community back to the Capital Boulevard Corridor.

By having the stream daylighted, it will provide an opportunity for educating the public about the benefits of green infrastructure and may be cheaper than putting this culvert back into a pipe. By having the pedestrian/bikeway element going through this tunnel, the Pilot Mill/Mordecai residents will have a direct connection to the forthcoming greenway connecting Crabtree Creek to Downtown, along with any other potential corridor improvements.

Please see below as we have shown a simple diagram of what the tunnel may look like if built as described. In this diagram, we show a 3' shoulder, a 12' road lane, another 12' road lane, a 10' bike/pedestrian lane, a 10' daylighted culver/stream, and another 3' shoulder. This is just a rough organization that can be varied. Another option would be to build a bridge for the train right of way to cross over this and make this a fully operating underpass.

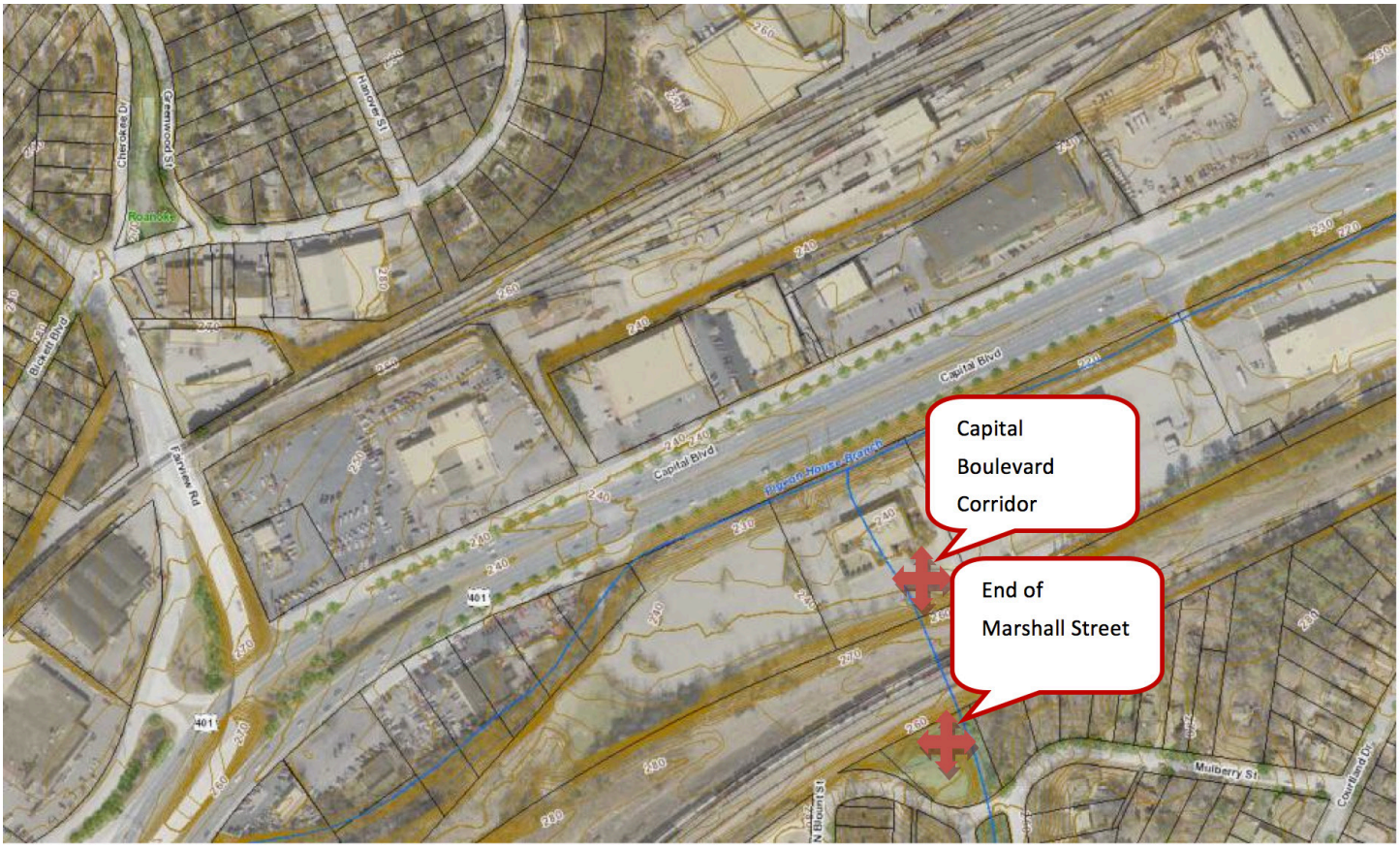


In its shown state, the tunnel is approximately 270 linear feet, although it may range up to 300 linear feet, depending on depth and the angle it takes under the tracks. At a rough average concrete tunnel/road cost of $4,000 per linear foot, this would equate to an approximate cost of $10,800,000.

This seems like a safe estimate, however the City should also plan on accommodating road/site improvement particularly on the east end of the tunnel, probably costing at least $500,000. Unique site specific features or elements may drive the cost significantly higher.Utilizing existing grades (250' at the edge of Mulberry Street/ Marshall Street intersection), the road and pedestrian/ bicycling trail would come down at a slope of 4.5% (ADAAG-compliant) to obtain a bottom vertical elevation of 244'. And then if the tunnel were to be 14' of vertical clearance, then 2' of structural concrete, it would allow for 10' between finish grade and the top of the tunnel structure. This can be modified, however for this study, we looked at utilizing the existing grades.

The tunnel would then proceed at an approximate 2% slope downward to tie to the existing vertical elevation of 240' on the west side of the CSX train tracks and within the Capital Boulevard Corridor.

This route will have to occur onto at least one private property within the Capital Boulevard Corridor along with crossing under the CSX train tracks. The vehicular and pedestrian access point on the eastern end of the tunnel (Marshall Street/Mulberry Street) has the possibility to be placed on public property, however with some traffic reconfigurations being required.



OPTION 4B

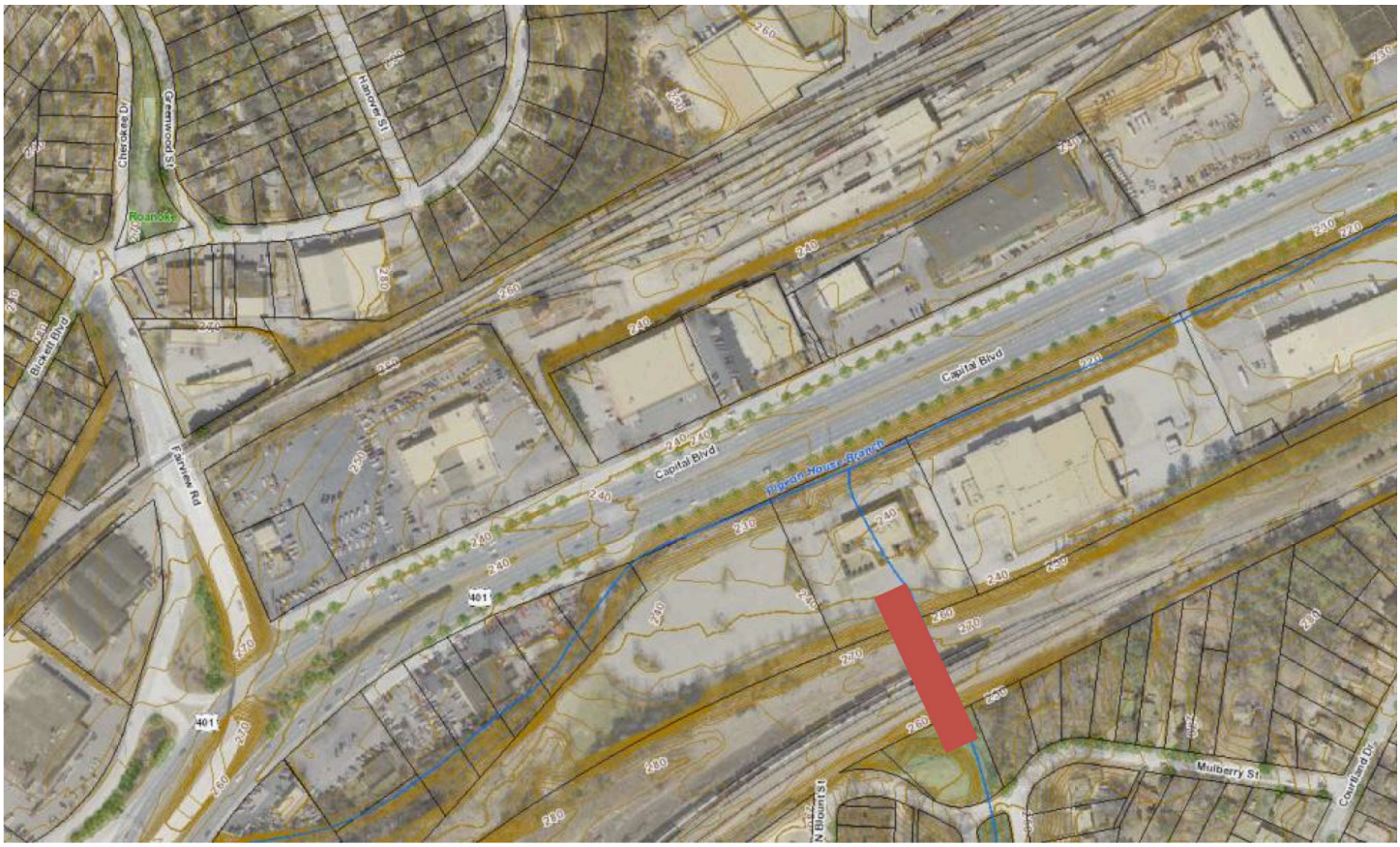
CONNECT MARSHALL STREET (PILOT MILL AND MORDECAI COMMUNITIES) TO CAPITAL BOULEVARD CORRIDOR VIA A PEDESTRIAN TUNNEL

EXISTING SITE CONDITIONS

The Blount Street right-of-way butts immediately against the Railroad property. This minimizes the space that may be available for creating a pedestrian access point. Also, the vertical elevation of the end of Blount Street is roughly 276' while the immediately adjacent train tracks is at a vertical elevation of roughly 274'. Steeply sloping topography is also present within the immediately adjacent City-owned open space parcel to the northeast of the end of Blount Street and the end of Marshall Street. However, this does present a great opportunity for exploring an underground tunnel option as the low point and rough vertical elevation of the stream/culvert under the train tracks within this open space is 244'. With the train tracks at a vertical elevation of 270', this is a 26' vertical difference.

This option explores the possibility of a pedestrian only connection within this area, along with a daylighted stream/culvert.

The two properties that are most likely to be where the northwest end of the tunnel would occur are both privately owned. Therefore there may be some complications with this. However, the vertical elevation of those two parcels is roughly 240' which would provide easy access into the tunnel. And it would allow a lot of natural light into the tunnel, thus adding to its safety factor.



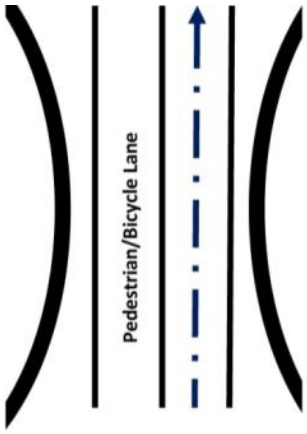
OPPORTUNITIES

This route is feasible. However the cost will be expensive. This option is unique because it will be an underground tunnel that will have to be constructed underneath the existing CSX train tracks. The goal of this option is to link the current neighborhoods of Pilot Mill and Mordecai with the potentially redeveloped area of the Capital Boulevard Corridor via both pedestrian and vehicular movements, along with providing for bicyclists and the existing culvert to be 'daylighted'. There is the potential that the communities of Pilot Mill and Mordecai will not want this vehicular link to occur. However, with this tunnel being wider than just a pedestrian tunnel, it would be safer and feel more open while also providing a very deliberate connection for this community back to the Capital Boulevard Corridor.

By having the stream daylighted, it will provide an opportunity for educating the public about the benefits of green infrastructure and may be cheaper than putting this culvert back into a pipe. By having the pedestrian/bikeway

element going through this tunnel, the Pilot Mill/Mordecai residents will have a direct connection to the forthcoming greenway connecting Crabtree Creek to Downtown, along with any other potential corridor improvements.

Please see below as we have shown a simple diagram of what the tunnel may look like if built as described. In this diagram, we show a 3' shoulder, a 10' bike/pedestrian lane, a 10' daylighted culvert/stream, and another 3' shoulder. This is just a rough organization that can be varied. We also propose that the walls be flared to allow for more natural sunlight to enter the tunnel.



22' Wide Parabolic Combined Pedestrian, Bicyclist, and Stream Tunnel

In its shown state, the tunnel is approximately 270 linear feet, although it may range up to 300 linear feet, depending on depth and the angle it takes under the tracks. At a rough average concrete tunnel/road cost of $1,850 per linear foot, this would equate to an approximate cost of $5,000,000. This seems like a safe estimate, however the City should also plan on accommodating trail and site improvements particularly on the east end of the tunnel, probably costing at least $200,000. Unique site specific features or elements may drive the cost significantly higher.

Utilizing existing grades (250' at the edge of Mulberry Street/ Marshall Street intersection), the pedestrian/bicycling trail would come down at a slope of 4.5% (ADAAG-compliant) to obtain a bottom vertical elevation of 244'. And then if the tunnel were to be 14' of vertical clearance, then 2' of structural concrete, it would allow for 10' between finish grade and the top of the tunnel structure. This can be modified, however for this study, we looked at utilizing the existing grades.

The tunnel would then proceed at an approximate 2% slope downward to tie to the existing vertical elevation of 240' on the west side of the CSX train tracks and within the Capital Boulevard Corridor.

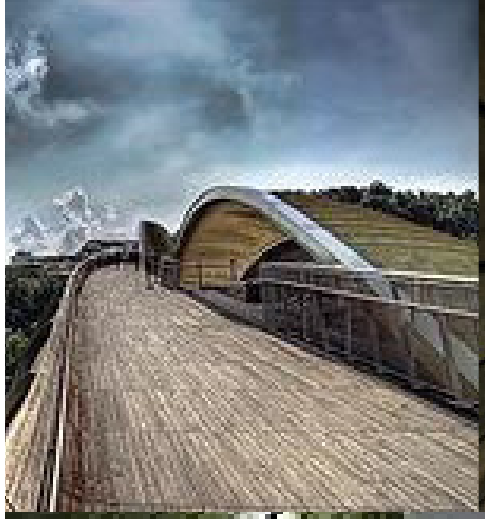
This route will have to occur onto at least one private property within the Capital Boulevard Corridor along with crossing under the CSX train tracks. The vehicular and pedestrian access point on the eastern end of the tunnel (Marshall Street/Mulberry Street) has the possibility to be placed on public property, however with some traffic reconfigurations being required.

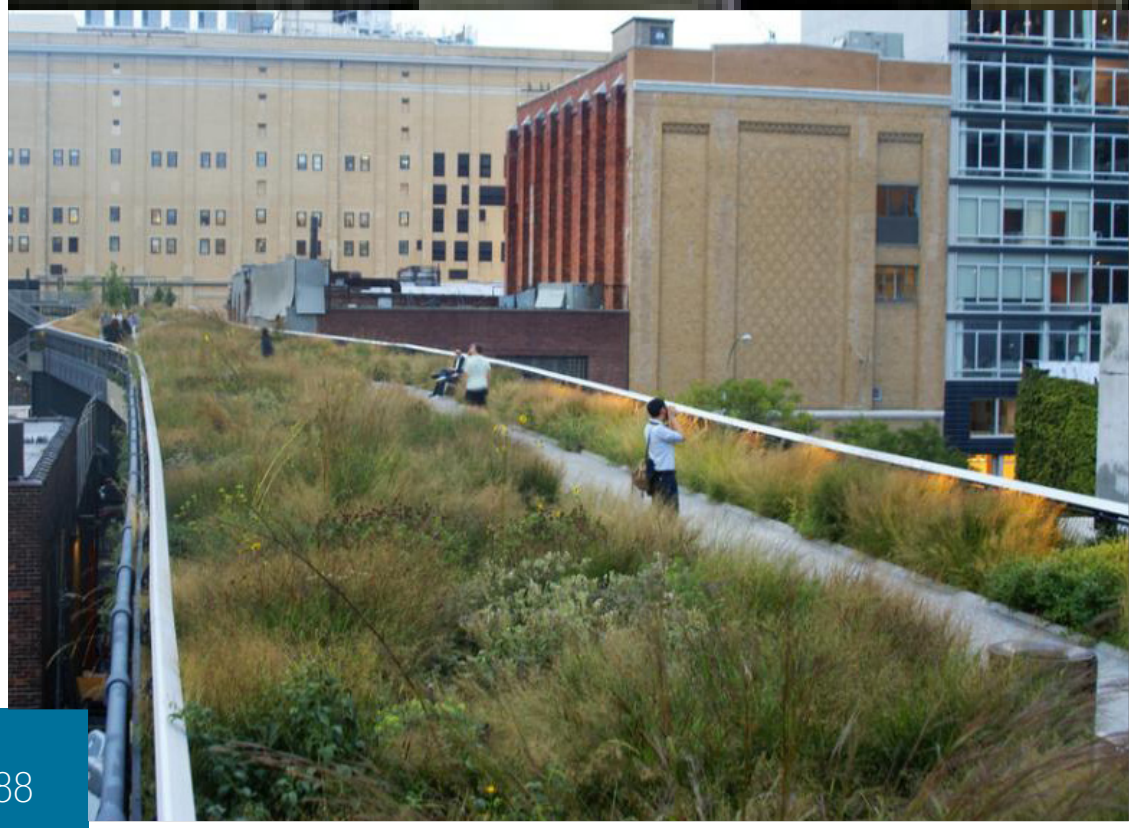
SUMMARY OF OPTIONS

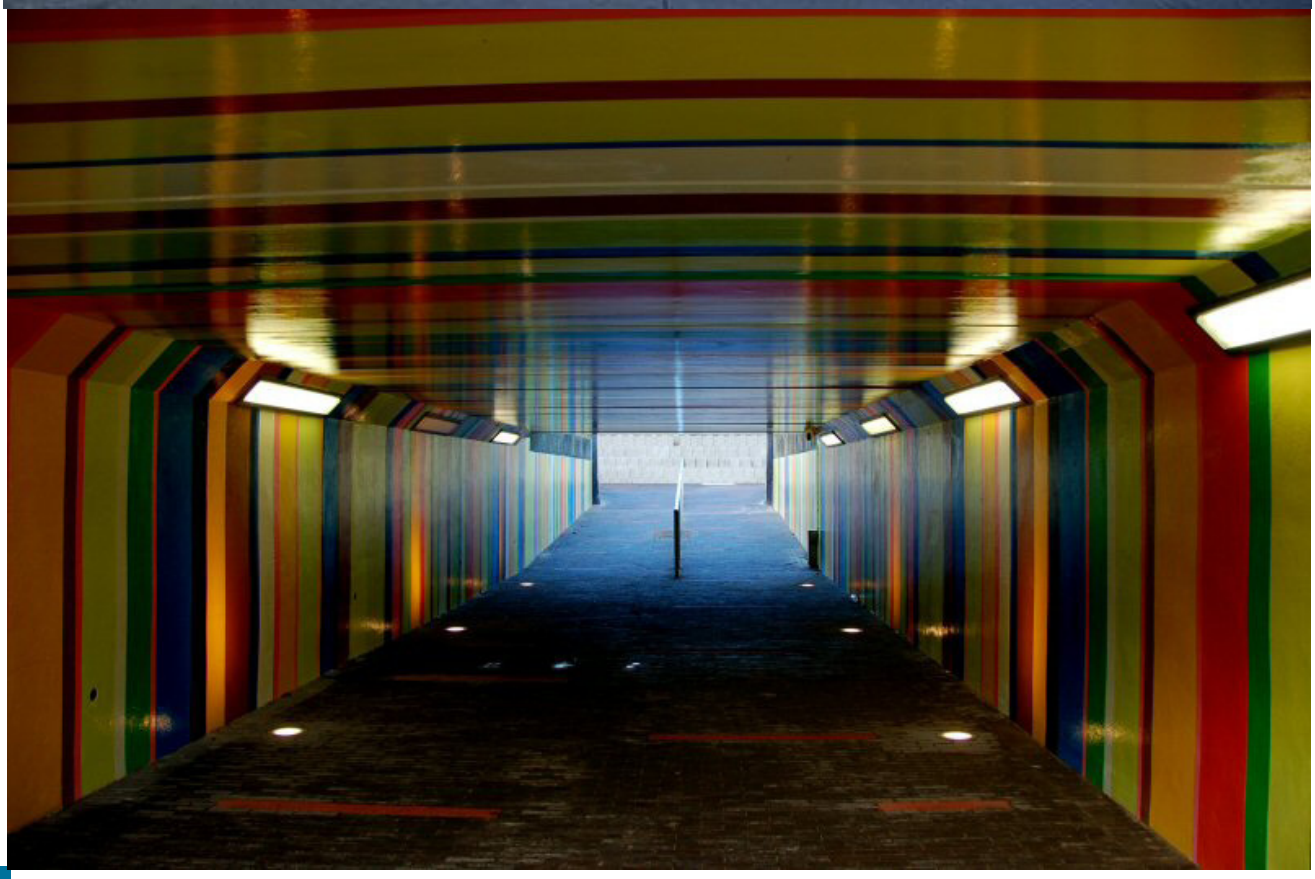
OPTION	BRIEF DESCRIPTION	DIMENSIONS	UNIT COST	ESTIMATED TOTAL COST
1	BRIDGE (PEDESTRIAN): SEABOARD STATION/PEACE COLLEGE TO DEVEREUX MEADOWS PROPERTY	1,000' X 10' WIDE	$3,000/LF	**$3,000,000**
2A	BRIDGE (PEDESTRIAN): BLOUNT STREET (PILOT MILL AND MORDECAI COMMUNITIES) TO HANNOVER STREET (FIVE POINTS COMMUNITY)	1,500' X 10' WIDE	$3,000/LF	**$4,500,000**
2B	BRIDGE (PEDESTRIAN): BLOUNT STREET TO CARSON STREET/SUNRISE AVENUE	1,600' X 10' WIDE	$3,000/LF	**$4,800,000**
2C	BRIDGE (PEDESTRIAN): COMBINED BLOUNT STREET TO HANNOVER STREET AND CARSON STREET/ SUNRISE AVENUE)	3,100' X 10' WIDE	$3,000/LF	**$9,300,000**
3	BRIDGE (PEDESTRIAN): HANNOVER STREET TO CAPITAL BOULEVARD CORRIDOR	450' X 10' WIDE	$3,000/LF	**$1,350,000**
4A	TUNNEL (VEHICLES + PEDESTRIAN + STREAM) : MARSHALL STREET/ MULBERRY STREET TO CAPITAL BOULEVARD CORRIDOR	270' X 50' WIDE	$4,000/LF	**$10,800,000**
4B	TUNNEL (PEDESTRIAN + STREAM): MARSHALL STREET/MULBERRY STREET TO CAPITAL BOULEVARD CORRIDOR	270' X 22' WIDE	$1,850/LF	**$5,000,000**

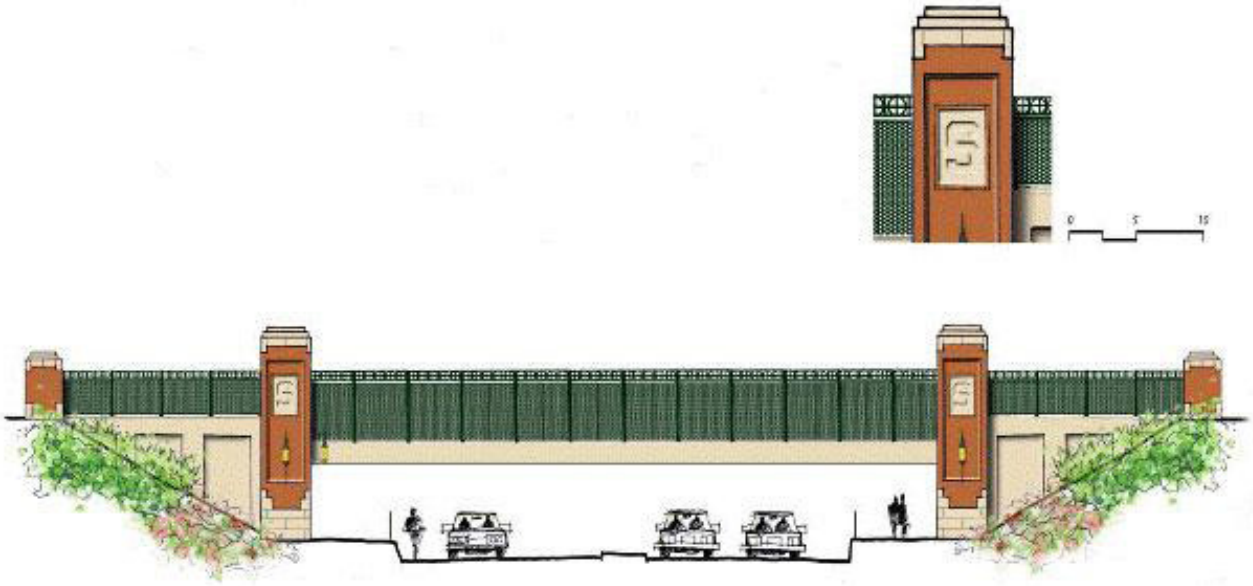
POTENTIAL PEDESTRIAN BRIDGE DESIGN STYLES

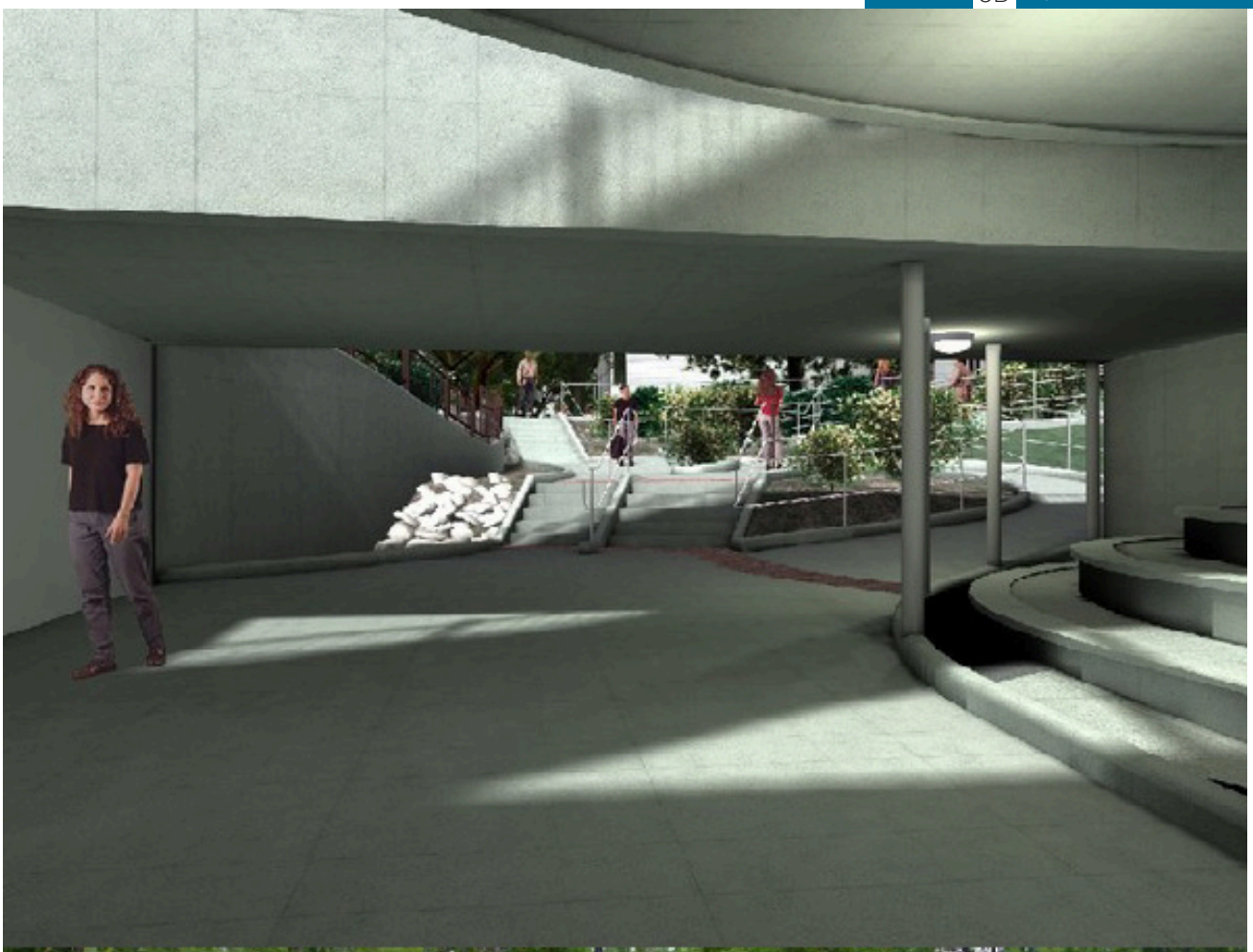
© 2001 SANTIAGO CALATRAVA











CB

Capital Boulevard

Planning & Development

RALEIGH
URBAN
DESIGN
CENTER