Experiencing redevelopment of Capital Boulevard through the Sustainability Prism:
Approaching redevelopment through economic, social, environmental, and livability perspectives

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Table of Contents:

Background: ........................................................................................................................................................................... 4
Introduction: ........................................................................................................................................................................... 5
Section 1: The Benefits of Corridor Planning ......................................................................................................................... 6
  Why create a corridor (i.e. small area) plan? .......................................................................................................................... 6
  What are the benefits of a greenway corridor redevelopment plan? ...................................................................................... 6
  Literature review: ................................................................................................................................................................. 7
  Recreation and Health Benefits: ............................................................................................................................................ 8
  Environment Benefits: ............................................................................................................................................................. 9
  Transportation Benefits: .......................................................................................................................................................... 9
  Economic Benefits: ............................................................................................................................................................... 10
Section 2: Describing the State of the Small Area ....................................................................................................................... 11
  Environmental Setting: .......................................................................................................................................................... 11
  Location and Context: ............................................................................................................................................................ 11
  Topography: ............................................................................................................................................................................ 12
  Hydrology: ................................................................................................................................................................................ 14
  Water Quality: .......................................................................................................................................................................... 16
  The built environment: ........................................................................................................................................................... 16
  Transportation: ......................................................................................................................................................................... 17
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoning:</td>
<td>22</td>
</tr>
<tr>
<td>Property Values:</td>
<td>24</td>
</tr>
<tr>
<td>The Planning Framework:</td>
<td>25</td>
</tr>
<tr>
<td>Urban Form:</td>
<td>25</td>
</tr>
<tr>
<td>Parks and Recreation:</td>
<td>26</td>
</tr>
<tr>
<td>Part 3: Comparable Corridor Case Studies</td>
<td>28</td>
</tr>
<tr>
<td>Case Study 1: Tallahassee, FL - Capital Cascade Greenway Project</td>
<td>29</td>
</tr>
<tr>
<td>Case study 2: Charlotte, NC - Little Sugar Creek Greenway</td>
<td>31</td>
</tr>
<tr>
<td>Case Study 3: Minneapolis, MN - Midtown Greenway Land Use Development Plan</td>
<td>35</td>
</tr>
<tr>
<td>Multimodal Boulevard Examples:</td>
<td>38</td>
</tr>
<tr>
<td>Ocean Parkway, Brooklyn New York (Jacobs, MacDonald, and Rofe 2002)</td>
<td>38</td>
</tr>
<tr>
<td>The Esplanade, Chico California (Jacobs, MacDonald, and Rofe 2002)</td>
<td>39</td>
</tr>
<tr>
<td>Part 4: Redevelopment Strategies</td>
<td>40</td>
</tr>
<tr>
<td>Potential Objectives:</td>
<td>40</td>
</tr>
<tr>
<td>Threats and Opportunities:</td>
<td>40</td>
</tr>
<tr>
<td>Potential Redevelopment Options:</td>
<td>41</td>
</tr>
<tr>
<td>Recommendations:</td>
<td>47</td>
</tr>
<tr>
<td>Summary:</td>
<td>48</td>
</tr>
</tbody>
</table>
Background:

Capital Boulevard has posed a major planning challenge to the City of Raleigh. In 1960’s the Boulevard lived down its name and up its reputation as it was voted one of the ugliest corridors in the country.

In 1986, the Appearance Commission initiated an effort to clean up Raleigh’s famous corridor. The commission felt that redevelopment of the boulevard could be a landmark opportunity to create a positive statement about Raleigh’s future development. As Raleigh’s 1992 bicentennial present to itself, the appearance commission recommended that the city take on the redevelopment of the corridor.

In June of 1987, the city held a design charrette with over 60 professionals. The recommendations from this charrette were the basis for the 5 year implementation plan to truly impact the character of the boulevard by the 1992 bicentennial.

During this time period and subsequent years, many noticeable changes have reshaped the appearance of the boulevard. The bicentennial plan brought about notable streetscape improvements, including numerous tree plantings and the removal of many unsightly billboards. Still the vision of the bicentennial plan has never been fully realized.

The corridor continues to face safety, environmental, aesthetic, and economic issues. In March of 2007, the News and Observer ran an article documenting the safety concerns of the boulevard, describing it as one of the most unsafe streets in the city with over 27 pedestrian injuries since 2002 (Lagrone). The built environment surrounding the corridor is outdated with large impervious parking area. The remaining industrial uses are a harsh transition to the surrounding neighborhoods. The Pigeon House Branch, which parallels the boulevard, is one of the state’s most polluted streams and continues to not meet water quality standards. Thus despite progress, many improvements remain in order for the boulevard to be transformed into a landmark entranceway to the city.
Introduction:

The Capital Boulevard area is an industrial corridor that bounds US 1, the major roadway that shuttles traffic between downtown and Northeast Raleigh. This road slices stable neighborhoods and prevents easy east/west access. The corridor has very limited pedestrian and or bicycle connections. Old industrial uses occupy most of the boulevard and despite its proximity to downtown and other stable neighborhoods, the area has seen very little real estate development.

The boulevard is paralleled by the Pigeon House Branch, an impaired urban stream, which feeds into Crabtree Creek and the Neuse River. In the northern section, the boulevard crosses Crabtree creek and its adjacent greenway. The Crabtree Creek greenway is part of a larger long term 20 mile urban loop that will circle the city. In its current state, the greenway loop has no connections to the downtown area. The capital Boulevard area could serve as a vital downtown greenway connection. Additionally greenway development could help mitigate the flood vulnerability of the area. The area is about 95% developed and has numerous properties located in the flood plain. Consequently, redevelopment could prove to be a valuable tool in lowering the flood risk in this area.

My master’s project will explore potential greenway / boulevard redevelopment strategies in order to build a strong base for a comprehensive corridor plan for the Capital Boulevard area. The first section of the paper will address the need and intent of creating a corridor plan. The second section examines the current land use, transportation, and environmental issues associated with the capital boulevard area. The third section of the paper will present comparable corridor redevelopment case studies. The final section will draw from these case studies as well as the contextual area to present greenway development scenarios.
Section 1: The Benefits of Corridor Planning

This section of the report details the functions and benefits of small area/greenway plans. A few of these benefits are highlighted below.

Why create a corridor (i.e. small area) plan?

- Small area plans are a means to implement community wide plans by translating their polices into specific physical designs and action.
- Small area plans provide a means to address issues particularly critical or unique to a small area and its stakeholders.
- Small area plans highlight existing and emerging conditions, threats and opportunities, and the strengths and weaknesses of an area.

What are the benefits of a greenway corridor redevelopment plan?

Greenway Corridors

- are a significant factor in raising citizen’s physical activity level.
- promote recreation as the most commonly reported place for physical activity is on streets or roads.
- can help promote environmental health.
- can help improve the water quality of urban streams.
- can help mitigate flood impacts.
- can provide alternative commuting options.
- can help alleviate the congestion caused by short trips.
- can provide economic benefits by increasing real estate values of adjacent land.
Literature review:

This literature review will first summarize the key themes in small area planning. The review will also explore the benefits of greenway development, as this small area plan is more specifically a greenway corridor development plan. In particular, I will review literature related to environmental quality, transportation, and economic benefits of greenway corridors.

Small area plans play a crucial role in bridging the gap between larger comprehensive area wide plans and distinct geographic areas within a city. In *Urban Land Use Planning*, Berke et al. suggest two major roles of small area plans (Berke, Godschalk, Kaiser, & Rodriguez, 2006). One, small area plans are a means to implement community wide plans by “translating their polices into specific physical designs and action”. Two, small area plans provide a means to address issues particularly critical or unique to a small area and its stakeholders. To further refine these roles, the authors recommend that small area plans are undertaken with the larger framework of plans for the area, for example the comprehensive plan, economic development, capital improvement, community facility, and transportation plans (Berke et al., 2006).

*Urban Land Use Planning* lists several types of small area plans. Of importance to this master project are the transportation corridor plan and a redevelopment area plan. Transportation corridor plans may vary in scale from a district oriented plan to a commercial activity center. Redevelopment plans apply to areas suffering economic losses, deterioration, environmental degradation, and or underutilized resources.

At its basic level, small area plans should incorporate background information, major issues, a vision, existing and emerging conditions, threats and opportunities, strengths and weaknesses, as well as a development plan (Berke et al., 2006). Berke et al. describe four main steps to creating a small area plan.

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**Four main steps for creating a small area plan:**

1. *Establish a proper framework*
2. *Describing the site of the small area plan*
3. *Refining the direction setting framework*
4. *Formulating a proposal and coordinating it into a plan*

---

First, a proper framework for the plan making process must be established. This step includes establishing an organization for plan making, designing an appropriate participatory process, defining the scope, and identifying the main purpose of the plan. The second main step is describing the site of the small area plan, including a land use survey, transportation circulation, demographic and economic analysis. The third step is to refine the
direction setting framework. During this step, the information gathered in the first two steps is used to clarify the vision, goals, objectives, and general strategies. The fourth and final step is formulating a proposal and coordinating it into a plan.

In practice, clarifying the specific outputs of the small area plan can add cohesion to the mosaic of plans in a geographic area. For example, the state of California sets out regulatory minimum standards for specific plans. Specific plans are small area plans that are part of the large plan framework and include implementation measures. Following is a list of standards that all specific plans must include:

1. The distribution, location, and extent of the uses of land, including open space, within the area covered by the plan.
2. The proposed distribution, location, and extent and intensity of major components of public and private transportation, sewage, water, drainage, solid waste disposal, energy, and other essential facilities proposed to be located within the area covered by the plan and needed to support the land uses described in the plan.
3. Standards and criteria by which development will proceed, and standards for the conservation, development, and utilization of natural resources, where applicable.
4. (a) program of implementation measures including regulations, programs, public works projects, and financing measures necessary to carry out paragraphs (1), (2), and (3). (b) The specific plan shall include a statement of the relationship of the specific plan to the general plan. (California Government Code, 2006)

These requirements demonstrate the importance of laying out the logistical requirements, especially the infrastructure and financial components. One of the first key logistical requirements as mentioned in both the California requirement and Urban Land Use Planning is defining the small plan’s scope. The Conservation Fund’s greenway guide offers the following criteria for selecting a greenway corridor area: choose an area large enough to allow for flexibility, define a point of origin and destination that makes logical sense, and keep a broad greenway concept in mind when defining the width of your study area (Flink, Schwarz, Searns, & Conservation Fund, 1993).

Once an area is chosen it should be examined through multiple perspectives, for example, recreation, environment, transportation, and economic development. The following section will address the literature relating to these perspectives.

Recreation and Health Benefits:

Greenway corridors can provide opportunities for various types of recreation. Multi modal paths can accommodate walkers, joggers, bikers, and commuters. Literature has shown that greenway corridors are a significant factor in raising citizen’s physical activity level. According to a study (Sara L. Huston, Kelly R. Evenson, Philip Bors, & Ziya Gizlice, 2003) of six North Carolina Counties...
Examing sustainable redevelopment of Capital Boulevard (including Wake County) on Urban Design and Physical activity, having access to neighborhood trails significantly increases the likelihood of citizens to participate in physical activity. This study also found that of those citizens that did participate in physical activity, the most commonly reported place for activity was on streets or roads (including sidewalks).

“The most commonly reported place for physical activity is on streets, sidewalks, or roads.”

Environment Benefits:

Greenway trails can provide important conservation, water, and air quality environmental benefits. The American Trails Association (American Trails Association, 2006) offers six potential ways that greenways can help promote environmental health:

- as habitat for plant and animal communities
- as a conduit for plants, animals, water, sediment, and chemicals;
- as a barrier preventing movement;
- as a filter allowing some things to pass while inhibiting others;
- as a source for animals or seeds which move to other parts of the landscape; and
- as a sink for trapping sediment, toxins, or nutrients

These benefits and others have been documented in various studies and cases around the country. A few studies have also shown that urban greenways can experience edge effects that limit their conservation value. For example, a study of urban greenways in the Southeastern United States (Schiller A. & Horn S.P., 1997) showed that greenway design plays a critical role in its conservation value. Surrounding landscape, noise, water quality, and vegetation are distinct factors in determined the ability of a greenway to support wildlife. From a restoration standpoint, greenway corridors can help improve the water quality of urban streams. Additionally, linear parks along greenways and or riparian buffers can help mitigate flood impacts.

Transportation Benefits:

Greenways can help provide alternative commuting options. Many utilitarian trips are taken in the 3-5 mile range; a connected greenway network can help alleviate the congestion caused by these short trips. In a report for the 2004 Transportation Research Board annual meeting, Hugh Morris (Morris, 2004) stated that 2000 Census journey-to-work data suggests that trails in urban areas may induce bike commuting by people who live in close proximity to the trail. In the Chicago area, a study by the Northern Illinois Planning commission showed that census zones with linear trails averaged 15.6 percent of commuter trips by bicycle, compared to only one percent.
for the region as a whole during the summer season (U.S. Department of Interior, 1995).

Economic Benefits:

Several studies have shown that access to greenway corridors is preferred by consumers and that greenways can provide economic benefits by increasing real estate values of adjacent land. From a market standpoint, surveys have shown that trails are a priority amenity. A 2002 consumer survey by the National Association of Home Builders and the National Association of Realtors (National Association of Realtors, 2006) ranked jogging and biking trails as the second most important amenity in a list of 18 choices (access to highways was the top priority and sidewalks came in third), 44 percent of respondents ranked trails as important or very important.

A few studies have shown direct economic benefits of trails and open space. An analysis of the economic impacts on the Indianapolis trail system showed that property values within ½ mile of the Monon trail had a significant positive effect accounting for 15% of the average sales price. A study in Portland Oregon indicated that properties located within 1500 feet of a public park accounted for 1-3% of the home values (Nicholls, 2004). A study by Katherine Henderson indicated that an average home in Wake County would be worth approximately $3,971 more if it was located within 1500 feet of a public open space (Henderson, 2006). Overall, trails tend to be an amenity that can add value to home and business and consequently create a positive feedback for tax revenues.

An average home in Wake County would be worth approximately $3,971 more if it was located within 1500 feet of a public open space.

These are just a few of the highlighted benefits associated with small area plans and greenway corridor development. The location and environmental assets of the Capital Boulevard area make it a prime location to capitalize on the benefits of a comprehensive greenway corridor redevelopment plan. This project aims to lay the foundations for the creation of such a plan.
Section 2: Describing the State of the Small Area

The following section is a description of the study area’s site characteristics. The description is based on 1987 Bicentennial Boulevard Project report, the 1994 Storm Water Management Study, and 2006 Raleigh GIS Data.

Environmental Setting:

Location and Context:
The study area (shown in red) is located in the central part of the City of Raleigh, just north of the downtown. The study area which encompasses the boulevard and the adjacent land within a ¼ mile of the Boulevard was chosen based on Conservation Fund Criteria and walkability (Transportation literature suggest a quarter mile as the average distance citizens are willing to walk to a destination) The area has two logical ending points of destination; downtown and the Crabtree greenway crossing. The study area leaves room to approach the corridor from multiple perspectives.

Figure 2: Study Area Location
**Topography:**

Capital Boulevard rests in a 3.5 mile valley sloping south to north paralleled by two ridges (see Figure 3 and ). The boulevard is also paralleled by the two freight railroad lines, Norfolk Southern Railway and CXS, which sit about 30’ above the road on each side (see inset in figure 3). The topography rises dramatically near the downtown creating a vista from the Peace Street interchange. Another major site line is created as one follows the site line from N Blount St through to Carson St to the County Health Services Building.

*Figure 3: Topography (derived from NC floodplain 2006 bare earth points)*
Examining sustainable redevelopment of Capital Boulevard

Figure 4: Topographic contours
**Hydrology:**

**Drainage Patterns:** The study area lies within the Pigeon House Branch Drainage Basin which is approximately 3000 acres in size and includes much of the northern portion of downtown Raleigh (see figure 5).

- In 1994, the average imperviousness of the drainage area was approximately 53% (Camp Dresser and McKee)
- Intense development within the drainage basin has altered the natural vegetative floodplain has led to bank erosion and higher flood elevations.
- The branch has also been channelized, realigned, and confined in culverts resulting in an increase in the velocity of the stream and a decrease in its natural ability to handle intense rain storms

![Figure 5: Drainage area and hydrology (Raleigh GIS 2007)](image-url)
Flooding:

In the ¼ mile area adjacent to Capital Boulevard running from W Jones Street to I 440, there is approximately 230 acres of 100-year floodplain (see Figure 6). Several properties are located within this floodplain particularly in the southern section near the Peace Street intersection (see Appendix - Figure 1) and in the northern section northeast of Atlantic Avenue where the boulevard splits (see Appendix - Figure 2).

The properties in the southern section have an approximate property tax value of $11 million and the properties in the northern section have an approximate tax values of about $15 million (see Appendix - Table 1 and Appendix - Table 2 for specific property details). A few of these properties have filed repetitive loss claims under the Federal Flood Insurance Program. Federal and state grant money is available for purchasing of flood prone properties.

Figure 6: Portion of study area in floodplain (Raleigh GIS 2007)
Water Quality:

Pigeon House Branch is listed on the state’s 303(d) list. This listing means that the stream is not meeting water quality standards or has impaired uses. Consequently the stream is subject to a TMDL and management strategies to improve the water quality must be implemented. The State Division of Environmental Management monitors the water quality of Pigeon House Branch and has found the stream stressed by toxic metals, organics, and sedimentation. State Water Samples indicated that the Branch has particularly high levels of copper, zinc, nickel, total nitrogen, and Fecal Coliform (Water Resources Commission 2006).

Overall, the stream channel has become straighter, shallower and steeper causing higher stream velocities and increased sediments loads as well as an overall decreased ability to support aquatic life.
The Built Environment:

Transportation:
Capital Boulevard is one of the busiest corridors in NC with approximately 80,000 car trips a day during heaviest used days, according to 2005 DOT estimates. The first mile of the road coming from downtown is an undivided 6 lane road with limited access to adjacent properties (see Figure 7). This section is approximately 80 feet wide and has sidewalks adjacent to the roadway. After Capital passes under Wade, the boulevard is divided with a narrow grassy median. From Fairview on, Capital Boulevard has a wider median and a frontage road on the western side to access adjacent commercial properties. After Wake Forest Road, the Boulevard splits with about a 450 feet wide median which accommodates several commercial and retail uses, many of which are in the 100 year floodplain. The road comes back together at Crabtree where the road has its first stop light and moderately safe crossing for pedestrians. Here the boulevard has access roads on both sides until it reaches the 440 exit.

Figure 7: Road configuration and right of way (Raleigh GIS 2006)
From the pedestrian safety standpoint, the boulevard ranks as one of the worst in the Raleigh area. Since 2002, 27 pedestrian accidents have occurred on the boulevard, with eight of those accidents ending in fatality (Lagrone 2007). The city has added some sidewalks to the area, yet the long block length and large road widths cause serious safety problems.

Figure 8: Pedestrians Crossing Capital Boulevard (News and Observer)
**Existing Land Use:**
The following section describes the major land uses in the study area (see Figure 9). The acreage for each land use is shown in Table 1 and the general characteristics of the land uses are described.

**Figure 9:** Existing Land Use in the study area (based on 2006 Raleigh GIS data)
Examining sustainable redevelopment of Capital Boulevard

Table 1: Land Use Acreage

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acres</th>
<th>% of study Area</th>
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<tr>
<td>Single family</td>
<td>163.43</td>
<td>19%</td>
</tr>
<tr>
<td>Townhouse, Multiplex Residential</td>
<td>19.72</td>
<td>2%</td>
</tr>
<tr>
<td>Apartment, Condominium Residential</td>
<td>18.39</td>
<td>2%</td>
</tr>
<tr>
<td>Retail</td>
<td>192.08</td>
<td>23%</td>
</tr>
<tr>
<td>Office</td>
<td>70.83</td>
<td>8%</td>
</tr>
<tr>
<td>Institutional</td>
<td>66.22</td>
<td>8%</td>
</tr>
<tr>
<td>Parks, Greenways, Open Space, Golf Courses</td>
<td>20.05</td>
<td>2%</td>
</tr>
<tr>
<td>Industrial</td>
<td>162.74</td>
<td>19%</td>
</tr>
<tr>
<td>Infrastructure and Transportation</td>
<td>35.63</td>
<td>4%</td>
</tr>
<tr>
<td>Vacant</td>
<td>98.83</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>847.93</td>
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**Residential:**
Residential land uses represent about 23% of the land in the study area. This residential land use is comprised of single family homes (19%) on lots averaging about ¼ acres in size. The majority of residential uses exist on the periphery of the study area, as there is very little residential development adjacent to Capital Boulevard. Key neighborhoods in the study area vicinity include Five Points, Georgetown, Mordecai, and Oakwood. Although most of these residential neighborhoods are not adjacent to Capital Boulevard, many abut industrial, retail, or railroad infrastructure (see Figure 10).

**Retail:**
Retail land uses make up approximately 23% of the land in the study area and are concentrated along Capital Boulevard. These retail uses tend to have a more regional appeal with specific uses such as an antique outlet, motels, hotels, restaurants, furniture stores, and truck rentals. Most of the retail development is quite dated with relatively few new buildings. Figure 11 shows the frequency distribution of the construction dates of the retail properties. Many of the retail uses were built in the
early 60’s. These buildings are typically one story with an expansive amount of surface parking.

![Frequency Distribution](image)

**Figure 11: Building dates of retail property**

**Industrial:**
Industrial land uses make up approximately 19% of the land in the study area. The industrial sites are scattered throughout the study area and generally are in close proximity to Capital Boulevard or the rail lines. Specific industrial uses range from warehousing and storage to brickyards to metal manufacturing plants.

**Other uses:**
In addition to the above mentioned land uses, the study area contains several institutional and office sites. Some key sites in these categories include the city’s service yards, the county’s attorney’s office, and the old state farmer’s market site.

![The city service yards are adjacent to the Capital Blvd. This property was originally a baseball park](image)
**Zoning:**
Figure 13 shows the zoning for the study area.

**Figure 13: Study area zoning**
To obtain a clearer picture of regulatory patterns, property zoning was aggregated into similar zoning categories. Then these patterns were compared for the study area and the city as a whole.

The two graphs to the right (see Figure 15 and Figure 14) depict the zoning conditions for the study area and the city as a whole. As one can see, the Capital Boulevard Study area contains a much higher percentage of industrial zoning compared to the city as a whole. This is most likely a remnant of the area’s industrial rail operations. It is important to note however, that the city uses a semi cumulative form of zoning. Consequently, even though a majority of the area is zoned industrial, the industrial zoning categories still allow retail and office uses. Residential uses are the only use not permitted in most of the industrial zoning categories. Appendix - Table 3 contains a more detailed report of the zoning breakdown.
**Property Values:**
Figure 16 depicts the value per an acre of the parcels in the Capital Boulevard area. These values are based on the total land and building values for each parcel in Raleigh's GIS database. Outliers were excluded from the data set to give a clearer picture of the existing property values. One can see from this map, that overall, the properties adjacent to Capital Boulevard have significantly lower property values than other properties in the area. Numerically, properties within a tenth of a mile of the boulevard have a mean value of approximately $511,000 / acre whereas properties within 1 mile of the boulevard have a mean property value of approximately $1,046,700/acre. Consequently, the industrial/commercial oriented land uses adjacent to the boulevard are contributing relatively little to the tax base compared to other areas of the city.

**Figure 16: Property Values ($/acre)**
The Planning Framework:
The following section summarizes Raleigh’s Comprehensive Plan and Parks and Recreation Plan existing goals and policies for Capital Boulevard study area.

Urban Form:
The comprehensive plan sets a vision for citywide development through its recommended urban form map. Figure 17 shows the comprehensive plan’s recommended urban form for the study area.

Leaving downtown, the first 1.5 miles of Capital Boulevard fall within the regional center boundary. Across the city, Raleigh has three regional centers. The centers are of significance to the entire region and should be developed at the greatest intensity. According to the comprehensive plan, this development should incorporate a mixture of uses and should be highly visible and accessible. The periphery Urban Form for this section is designated as residential suburban. The residential suburban classification calls for low density residential development (6 units or less per acre).

The comprehensive plan designates the northern 1.5 miles of the boulevard as a gateway corridor. It is one of the 3 main corridors leading into the city. Raleigh’s gateway corridors are along major roadways where access is not limited. These roadways connect Raleigh to other cities and have a variety of intense land uses. According to the

Figure 17: Urban form of the study area (from Raleigh’s Comprehensive Plan 2005)
comprehensive plan, appearance, traffic, and access considerations are very important in these areas.

This section also has 3 retail area designations. Retail areas are located in employment areas or gateway corridors and are meant to attract customers from a large market area.

The periphery of this area is designated as an employment area. Employment areas contain the workplaces for a large number of jobs, for example, industries, warehousing or office parks. At least 70% of the land area in an employment area should be devoted to employment intensive uses. Retail service jobs or facilities are discouraged in these areas. Amenities for workers such as transportation access, open space, greenways, and recreational facilities are encouraged in this area.

**Parks and Recreation:**
Figure 18 shows the capital area greenway system. The city has approximately 54 miles of trails. In the long term the city plans on creating a continuous loop than encircles the city. The greenways paralleling Crabtree Creek would make up the northern section of this loop. The parks and recreation master plan also calls for a greenway corridor connector paralleling Capital Boulevard and the Pigeon House Branch stream (Figure 19).

**Figure 18: Capital area Greenway System (Raleigh’s comprehensive Plan 2004)**
In Summary:

From a site analysis viewpoint, the study area faces many opportunities and challenges. Redevelopment could highlight the unique topography and hydrology of the study area, alleviate some of the urban pressures on the Pigeon House Branch, and capitalize on the stream as a unique landscaping feature. Pedestrian improvements could increase safety and connectivity to the surrounding neighborhoods. The adjacent land uses could be redeveloped to make better economic use of urban land. However, these same opportunities also pose redevelopment challenges. The commercial and industrial uses could be difficult to relocate. The railroads and topography present infrastructure constraints in connecting the eastern and western sides of the development. Additionally, the degraded ecosystem and pedestrian environment will require major infrastructure (hence financial) commitments to improve conditions.

Figure 19: Greenway Corridor Connection from Crabtree Greenway to downtown
Part 3: Comparable Corridor Case Studies

This section presents three Greenway redevelopment case studies and two examples of multimodal boulevards. Lesson from these case studies could be incorporated into redevelopment of the Capital Boulevard Study Area. The projects were chosen due to their similarities to Capital Boulevard as far as urban context and environmental issues. Additionally the greenway projects were chosen as they represent three different stages in the planning process.

The first case study, the Capital Cascade greenway in Tallahassee FL, represents the initial planning stage. The master plan has been created for the project and the greenway area is currently in the design stage. The second case study, the Little Sugar Creek Greenway in Charlotte NC, is in the middle stages of development. Financing has been secured and two sections of the Greenway have already been completed. The final case study, the Midtown Greenway in Minneapolis MN, is a completed urban greenway which is in the process of redeveloping the surrounding area.

For each case study the relevancy to the study area is described. Then a summary and maps of each project are presented as well as the key implementation tools, the progress to date, and funding sources. At the end of each case study, the key lessons learned form the project our outlined. A more detailed description of the each case study’s goals and physical design is included in the appendix.

In addition to the greenway case studies, two multimodal boulevard examples have been included, Ocean City Parkway in Brooklyn, NY and the Esplanade in Chico, CA. These examples differ from the case studies in that they are not in the process of being redeveloped but rather are examples of existing high capacity pedestrian oriented roadways.
Case Study 1: Tallahassee, FL - Capital Cascade Greenway Project

Relevancy to study area: The project is a major urban greenway development project which addresses urban stormwater issues, greenspace, and auto transportation improvements.

Length: 6-mile corridor, extends from the downtown (Leon High School) to the Southern Portion of the City (Lake Munsen)

Traits: Major urban project addressing bicycle, pedestrian, and auto transportation improvements; the signature project of the Blueprint 2000 plan; Centerpiece of an integrated stormwater management program, linear urban greenway and park system

Goals: Economic Development, Gateway to the University and downtown, Ecological and Historical Tourism, Access to nature for urban dwellers, Alternative Transportation options, Compliment to the Gaines Street Revitalization Plan (Trust for Public Land 2007)

Total Cost: $180 million

For details see appendix pg. 56

Figure 20: Capital Cascade Greenway, Tallahassee, FL
Implementation Strategies:
An overlay zone was created for the study area to encourage redevelopment. The overlay zone relaxed the environmental regulatory framework by limited the amount of open space required on adjacent parcels. The zone also provided:
- concurrency relief
- density bonuses
- redevelopment funding
Additionally, existing zoning and Comprehensive Plan regulations were modified in order to facilitate denser development along the greenway.

Design Highlights:
Cascade Park incorporates a mix of hard and soft engineering techniques to improve stormwater runoff quality. The 25 acre park is designed to flood and retain approximately 100 acre-foot of stormwater during storm events (see appendix pg 57 for design) in order to alleviate flooding on adjacent streets. Additionally, the park includes many unique water features including a play park, waterfall, and mist pool. The city has also incorporated a backyard buffer program in the residential areas adjacent to the stream. This program encourages citizens to plant native vegetation and install cisterns.

Progress: The plan was created in 2003, an interview with Kristen Anderson of the Tallahassee-Leon County Planning Department followed up on the status of these projects (personal interview, March 7, 2007). According to Anderson, the planning phase of the entire project had been completed and most of the projects are now in the design stage. The greenway has not fully been implemented, but they have seen a growth in development in the area, although this may be attributed more to the Urban Services Boundary than the greenway.

Funding: The main source of funding is a Special Option Local Infrastructure Sales Tax of $0.01 (established in 1989 and extended in 2000) to fund Blueprint 2000 and beyond projects. Blueprint 2000 and beyond is a guide created by a broad group of citizens to develop an effective infrastructure and natural resources management program. 80% of the special option sales tax is committed to Blueprint 2000 projects. The conceptual master plan for the greenway was funded by the Trust for Public Land and prepared by Greenways Incorporated (Durham, NC).

Key Lessons Learned:
Greenway plans can meet multiple objectives and spur redevelopment. Incentive based growth management tools are key to encouraging redevelopment along the greenway.
Case study 2: Charlotte, NC- Little Sugar Creek Greenway

Relevancy to study area: This urban greenway focuses on neighborhood connections, flood mitigation, and stream restoration. The project uses a degraded urban stream as its centerpiece and aims to spur economic development along the corridor. Additionally, the projects implements the redevelopment of several city properties located adjacent to the greenway.

Length: 15 miles, Extends from just north of Uptown through the midtown square area to the South Carolina Line, links CPCC, CMS, and the Park Road and Carolina Place shopping area

Traits: Major Urban Greenway Project, 7 main reach sections with distinct character, Creek front retail and restaurants, Connection to major urban parks, Conversion of an unused Mecklenburg Utility Department Property into a trailhead and park, links to area shopping centers, Buyout of flood properties

Goals:
Economic Development, Neighborhood Connectivity, Environmental and Ecological Education, Conservation, Ecological and Historical Tourism, Connectivity, Natural Preservation, Flood Mitigation

Total cost: $34.25 million

For further details see appendix pg. 59

Implementation Strategies:
A comprehensive plan has been developed for the entire greenway corridor. The comprehensive plan describes future land uses for the surrounding areas and site specific redevelopment strategies. In addition to comprehensive planning the parks and recreation department has been actively acquiring land along the corridor. In addition to fee simple acquisition, the department utilizes the subdivision and rezoning process to acquire land and promote trail development. Charlotte Subdivision Ordinance requires developers to reserve land along the identified greenway corridors and provide
a dedicated walkway for access from neighborhoods to
the greenway. If the developer dedicates land instead of
reserving it, they may be allowed to transfer the
development rights to the remainder of the property. In
the rezoning process, the department is often able to
negotiate for land dedication and trail development. Over
60% of the land acquired for greenways throughout
Charlotte has been through the subdivision and rezoning
process.

The difficulty with this implementation method is
that the dedicated land is often the most difficult land to
build on, which can make trail construction difficult.

**Design Highlights:**
Design follows a transect from an urban to rural setting
In Freedom Park the creek was restored by:
  • removing a concrete dam and liner
  • realigning the stream 150 feet
  • adding meanders
In Hidden Valley (the headwaters of the creek)
  • Hazard Mitigation department purchased 20 parcels
    of land in the floodplain and tore down 16 homes that
    had repeatedly flooded
  • restored natural twists and turns of banks
  • created buffers and series of BMPs for stormwater
    quality and quantity improvements
Working with developers to promote greenway oriented
design

![Figure 22: In Hidden Valley, properties bought out for flood mitigation were used to provide land for stream restoration and a series of BMPs](image-url)
Progress:
So far, two major sections of the greenway have been built. Gwen Cook, Charlotte’s greenway planner, stated that the greenway will most likely be completed all the way to the South Carolina State Line in 15 years (personal communication 3/07).

The city has also begun to see major interest from developers in capitalizing on the greenway as a community asset. Papas Properties is building the Metropolitan, a high density mixed use center along Little Sugar Creek (see Figure 23). According to Papas Properties (personal communication, 3/07), the Little Sugar Creek Greenway will be a centerpiece amenity of the project that distinguishes the Metropolitan from other urban developments. The Metropolitan will have 6 acres of greenway frontage, 575,000 square feet of retail/office space and more than 200 condominium residences. The office space will rent for around $27 per rentable square foot. The condominiums range in price from about $200,000 (552 sqft studio) to $1,450,000 (3000 sq ft). Cook mentioned that in addition to the Metropolitan, several other residential and office projects are in the works for the more urban segments of the greenway.

Figure 23: Rendering of the Metropolitan, a high density mixed use project adjacent to Charlotte's Greenways
In addition to the urban aspect of the project, greenway partners have also made major headway in environmental components of the project. LUESA (Land Use and Environmental Services agency) heads up the creek restoration and flood mitigation aspects of the project. The group has received funds to daylight the creek in several areas. Additionally the group has used FEMA Flood Buy out program to purchase land along the greenway and build BMP’s to help with flood mitigation. For example, the wetlands along Little Sugar Creek in the Hidden Valley Ecological Garden help improve water quality and retain excess water, reducing flood risks downstream.

**Funding:**
The major source of funding for the project is a $25 million general obligation bond for planning design and construction of greenways passed by Charlotte citizens in 2004. About $5 million in TIP (Transportation Improvement Project) money has also been designated for the project. Additionally, several properties along the greenway were selected by FEMA for the Pre-Disaster Mitigation Program. For example the county received $5,441,556 for the buyout of the Cavalier Apartments, a 192 unit complex. The land from the complex provided a contiguous section of open space. The total cost of the project is estimated at $7,792,745. The remaining was $2,351,189 provided in matching funds by Mecklenburg County government. In addition to the FEMA grants the project has received additional funding through small grant programs and donations. So far private developers have contributed little to actually fund the greenway project. Developers however are contributing surrounding amenities such as sidewalk and greenway/ pedestrian oriented designed buildings.

**Key Lesson Learned:** Greenway development in Charlotte is achieving multiple goals including urban revitalization, flood mitigation, water quality improvements, neighborhood connections, and providing access to alternative forms of transportation. Urban greenways however, are much more expensive to develop than suburban greenways. These expenses may be offset by contributions from private development. Developers in Charlotte have contributed very little to the actual construction of the greenway but have made investments in adjacent infrastructure and capitalized on the marketability of residential projects adjacent to the greenway.
Case Study 3: Minneapolis, MN-Midtown Greenway Land Use Development Plan

Relevancy to project: This developed greenway provides examples of encouraging greenway oriented design and ensuring safety along a greenways corridor.

Location: Minneapolis, MN

Length: 5.7 miles, mostly complete, a former railroad corridor trench that extends from Lake Calhoun in the west to the Mississippi River to the east.

Traits: National Historic Site, Developed greenway corridor, neighborhood connections, pedestrian bridges and access, possible future mass transit corridor (streetcar), located in a railroad trench which creates safety issues as the greenway can not been seen from surrounding neighborhoods, use of call boxes, patrols, and security cameras to increase safety, lined with community gardens, focus on redeveloping surround commercial areas

Goals: Neighborhood Connectivity, Safety, Public green space, Pedestrian Oriented Design, Compact Mixed Use Development, Greenway oriented development

For further details see appendix pg. 62

Figure 24: Midtown Greenway runs east to west, south of Minneapolis's downtown
Implementation strategies:
To realize the above goals for the surrounding area, the Midtown Greenway includes development guidelines that set standards for form and function. The Land Use Development Plan identifies four case study sites that represent common conditions throughout the corridor in its small area plan. The case studies offer guidance for future Greenway-friendly development in the study area. The first case study is summarized below (the additional 3 case studies are summarized in the appendix). In an interview, Beth Elliot, principal planner for the City of Minneapolis, said that the case studies are meant to exemplify typical issues that need addressed throughout the corridor, such as building orientation, parking, lighting, height, and density. Case studies similar to these could be developed for key properties in the Capital Boulevard Study Area.

Case Study #1: Lake St and Calhoun: Commercial shopping area with commercial frontage on a major thoroughfare and considerable surface parking.

The proposed redevelopment focuses on creating a more intensive mixed use development pattern with lower scale residential buildings that front the greenway and a green space that connects the greenway to the development.

Before:

Figure 25: Existing commercial development along the Midtown Greenway

After:

Figure 26: Proposed mixed use development along the Midtown Greenway
In addition to the case studies the plan also includes a future land use map which depicts desired land uses with nodes for commercial, high density residential and industrial. The plan is used to promote greenways development in rezoning and or redevelopment along the corridor. In the next few years, the city will follow up the land use map with a rezoning study as one of the primary tools for redevelopment. The study will look into possibility of an overlay district for the corridor that addresses height, lighting, parking maximum, and open space requirements.

**Design Highlights:**
Greenway Oriented Design
Residential properties that have front access to the greenway
Reserved space for public transit
Landmark Pedestrian Bridge, 2200 ft long, crosses Hiawatha Ave ($5 million)

**Progress:** In 2006, the greenways itself was completed. According to Beth Elliot of the planning department, the land use development component of the project will be mainly developer driven (personal communication, March 10, 2007). The city will use the plan a guide for redevelopment along the corridor. Over the past two years, the city has seen a lot of interest in redeveloping the area, but this has started to decline with an overall slow down in the city’s real-estate market as a whole. To date a few large residential projects have been developed along the corridor. The greenway has served as a major marketing amenity for the developments. In fact, one project in progress designed residential units that opened directly into the greenway trench. Contrary to market opinion, these were the first to sell out in the development. Elliot remarked that the City plans to continue working with developers to implement the plan.

**Funding:** The greenway itself was funded as a rails to trails project. The city also hopes to incorporate several of the plan’s suggested infrastructure improvements into the capital improvement program. As mentioned though, the redevelopment funding responsibility will mainly fall on private developers.

**Key Lessons Learned:** Overall the project has been successful but slow in implementation. Realization of plans by private developers can fluctuate greatly with the real-estate market. In Minneapolis, planners have seen a rise and fall in greenway redevelopment that echos the overall market fluctuation. Greenways however, are viewed as a positive amenity for residential development and have a strong market appeal. In order to maintain this appeal, the greenways must focus on safety precautions and connection to the surrounding community. Additionally, project partners should facilitate the commuting capacity of the greenways. In Minneapolis case, this meant boosting bicycles facilities, road connections, and planning for future transit along the corridor.
Multimodal Boulevard Examples:

The following two case studies provide examples of existing multimodal boulevards. The design of the boulevards could serve as models for redevelopment of Capital Boulevard.

Ocean Parkway, Brooklyn New York (Jacobs, MacDonald, and Rofe 2002)
Designed by Fredrick Law Olmstead and Calvert Vaux (1876)
Length: Five and a half miles long, it stretches from Prospect Park to Brooklyn’s beaches at Coney Island.
Traits: The parkway is divided according to function and separated by 6 rows of trees. The center lanes are for private vehicles, and were intended for pleasure driving, originally for horse-drawn carriages. Now the lanes function as major arterial streets (70’ wide) and carry an average daily capacity of 60,000 to 75,000 vehicles a day. The center lanes are flanked by two medians, planted with trees and grass, which lend the road a park-like atmosphere. The medians, 30’ wide, accommodate benches, walking and bike paths. Outside of the medians are 25’ frontage roads which are used both for access and parking. The buildings have a uniform 30’ setback from the sidewalks adjacent to these frontage roads (see Figure 27).

According to Allan Jacobs, “the pervasive atmosphere of Ocean Parkways is that of a linear neighborhood meeting place. The wide public spaces provide settings for the public life of the community.” A 1997 study rated the boulevard as more livable than neighboring conventionally designed streets with medium traffic volumes. The boulevard is quite remarkable is its ability to serve both as a vibrant public realm and high capacity arterial.
The Esplanade, Chico California (Jacobs, MacDonald, and Rofe 2002)

The Esplanade was reconfigured as a multiway boulevard in the 1950’s

**Length:** 1.25 mile of multiway Boulevard, runs from downtown to west 11th Avenue, the actual road extends much farther

**Traits:** Central lanes are flanked by wide medians planted with shrubs and trees which buffer the fast moving center lanes. The side access lanes move quite slowly with stop signs at every intersection. The access lanes are 20ft wide, which provides room for one lane of parallel parking and one moving lane. Their slow movement provides complimentary access for bicycles. Buildings are set back 20-30 feet from the access lanes and generally are small residential single family houses or apartments, although there are several institutional and commercial uses along the boulevard. In total the street is lined by 4-5 rows of trees (see Figure 29)

Most of the traffic on the Esplanade uses the center though traffic lanes which has traffic lights about every second block. Vehicles move at approximately 28 miles per hour, which is considerably slower than Ocean Parkway or Capital Boulevard. According to Jacobs, “Traffic movements along the Esplanade are nothing short of amazing and fly in the face of traffic engineering standards and norms.” Theoretically, there are some 41 one points of conflict at a typical intersection (see Figure 30). Yet the boulevard performs just as well and even better than many of its parallel streets with more conventional five lane designs.

![Figure 29: Cross Section of the Esplanade, Chico CA](image)

![Figure 30: Points of conflict](image)
Part 4: Redevelopment Strategies
This section presents potential objectives, threats and opportunities for the study area. The plan also offers strategies for a redevelopment plan. The strategies are based on information gleaned from the case studies and recommendations from various city staff. These strategies are not meant to provide a completed picture of a redevelopment plan for the area, but rather could serve as a jumping off point for public input should the project move forward.

Core Objectives:
- Create an attractive gateway corridor to downtown
- Mitigate flood issues associated with Crabtree Creek and Pigeon House Branch
- Improve Traffic flow and circulation along the corridor
- Enhance the visual character of the Boulevard
- Encourage redevelopment of the industrial corridor
- Provide a downtown connection to the long term greenway loop
- Highlight Pigeon House Branch and its connection to Crabtree Creek and Downtown
- Increase pedestrian safety

Threats and Opportunities:
Threats:
- Cost of implementation
- Crossing/intersecting the railroad right of way, i.e. creating connections between the East and West areas of the Corridor
- Pedestrian/Bicycle navigation through the Atlantic Avenue and Wade Avenue overpasses
- Maintaining the present thoroughfare capacity of the corridor and regional connectivity
- Transitioning between various land uses, i.e. would residential development in the area be compatible with the surrounding industrial and infrastructure related land uses

Opportunities:
- Redevelopment potential (large parcel size, industrial uses, relatively low property values)
- Natural features: Stream day lighting, viewpoints, rock outcrops, Crabtree/ Pigeon Horse intersection
- Site lines
- Proximity to downtown
- Wide right of way
- City owned properties
- Destination sites (downtown and the Crabtree greenway)
- Flood Mitigation
Potential Redevelopment Options:
Below are two possible redevelopment options. The first focuses on an integrated greenway which aims to protect both the Pigeon House Branch and create a greenway connection that parallels the creek and boulevard. The second looks at providing multimodal access through a European style boulevard with frontage roads that can accommodate bikes and pedestrians on each side. For each case study, a summary, goals, objectives, and actions are described.

**Option 1: Pigeon House Branch Greenway**

As shown in the diagram, this option incorporates a greenway that runs from the Crabtree Greenway to downtown. Flood buyout properties (34 acres in the Northern Section and 26 acres in the Southern Section) could be used to create two linear parks along the greenway. These parks could provide opportunities for highlighting and restoring Pigeon House Branch. Additional they may provide an area for BMPs for flood mitigation. One of the most difficult pieces of this project would be the creation of a pedestrian bridge to cross over Capital Boulevard at Wade Ave. and the realignment of Capital Blvd. at the Northern median. The Bridge would provide an east west connection for pedestrians. Realignment of the boulevard would ease traffic flow and provide a more space for the linear park. The larger adjacent properties could provide opportunities for greenway pedestrian oriented design. Potential goals,

![Figure 31: Option 1-Pigeon House Greenway](image-url)
Examining sustainable redevelopment of Capital Boulevard

Goal 1: The Pigeon House Branch greenway provides a critical connection to unique city destinations
   Objective: The city’s greenway system should connect the proposed future greenway loop to the downtown area
   Action:
   • Prepare a greenway plan that creates a connection from the Crabtree greenway to downtown
   • Create linear parks along the trail by purchasing properties in the 100 year flood plain and relocating the city’s service yards

Goals 2: The restored Pigeon House Branch supports a healthy ecosystem and provides opportunities for flood mitigation
   Objective: The city should incorporate strategies that improve the water quantity and quality of the stream
   Actions:
   • Restore the natural morphology of the stream
   • Implement a buffer program that focuses on plantings along the banks to control erosion
   • Buyout the properties in the northern median and convert the area to a linear park with a series of BMPs that filter and retain stormwater (Charlotte’s Hidden Valley could serve as an example design, Figure 22)

Goal 3: Pedestrians can safely cross the boulevard and access surrounding neighborhoods
   Objective: The plan should create a pedestrian crossing that bridges the east and west sides of the study area
   Actions:
   • Evaluate a potential underground or above ground crossing between the Wade and Fairview overpasses
   • Examine the possibility of a signature pedestrian bridge in this area

   Objective: Create connections to surrounding neighborhoods and promote pedestrian safety
   • Continue tree plantings along the boulevard and new trail to protect pedestrians from high speed traffic
   • Provide connections from the greenway to adjoining neighborhoods
   • Create a zoning overlay district for the study area that requires developers to dedicate or reserve land along the proposed greenway and neighborhood connections

Goal 4: The greenway promotes economic development in the underutilized Capital Boulevard area
   Objective: Encourage the greenway’s edge as an impetus for economic development
Actions:
• Provide density bonuses for developers who dedicate or reserve land along the greenway
• Create urban linear parks that provide an amenity for new residential and commercial development
• Encourage developers to provide landscaping and passive recreation amenities that highlight their properties connection to the greenway

Goal 5: The greenway provides a means of alternative transportation into downtown
Objective: Provide facilities that promote commuting

Actions:
• At major destinations along the greenway provide facilities for bike storage such as racks and or lockers
• At the greenways terminus in downtown provide a community center with restrooms and shower facilities for commuters
• At the Crabtree greenway intersection provide a park and ride lot

Goal 6: The greenway provides recreational opportunities that promote citizen health
Objective: The greenway promotes social interaction

Actions:
• Develop parks and plazas along the greenway
• Hold festivals and celebrations along the greenway

Objective: The greenway provides a space for exercise and recreation

Actions:
• Develop fitness trails along the greenway
• Create reward programs for trail users
**Option 2: Multi-way Style Boulevard**

Capital Blvd. could be converted to a multi-way boulevard similar to the two examples described in the case studies. The redesign would maintain the existing high capacity of the boulevard and at the same time create a strong pedestrian realm on the side access roads. Parallel parking on the access roads could help replace some of the extensive surface parking lots adjacent to the road and open up more room for new development. A design similar to Ocean Parkway would probably be the most appropriate in order to meet both motorist and pedestrian needs. The right of way on Capital Blvd. ranges from about 110' at its most narrow point to 550' at its widest point in the Northern Median. Most of the boulevard has a right of way width of about 200' which would be wide enough to accommodate a multi-way boulevard style design with access roads, medians, and central through lanes. The section of Boulevard from the Peace St underpass to the Wade Avenue exit has the most narrow section of right of way which could prove difficult to accommodate access roads and medians.

The city however, owns a large parcel adjacent to the road on the western side (16.7 acres). This parcel could be used as land to increase the right of way and provide additional room for the access roads and perhaps some form of public space such as a plaza or park. Several places along Capital Blvd. already have access lanes. These areas could connect the entire length enhance connectivity. Like the previous option, the most difficult reconfigurations will involve navigating Atlantic Ave, Wake Forest Rd, and the Wade Avenue intersections.

This option will accomplish many of the same goals as the greenway option including economic development, connectivity, pedestrian/pedestrian safety, and promotion of alternative transportation. The multi-way boulevard however will serve more transportation goals than environmental or recreational goals. Potential goals, objectives, and actions of this option are outlined below.
Goal 1: Capital Blvd. continues to serve as a high capacity commuter corridor that connects the northern section of the city to downtown

Objective: The city should improve the capacity of the boulevard

Actions:
- Limit access to the center through lanes
- Connect side access roads in order to accommodate local traffic
- Use side access roads for local bus traffic
- Plan to eventually dedicate a through lane for bus rapid transit or rail

Goal 2: The Boulevard accommodate multiple means of transportation

Objective: Promote bicycle and pedestrian access along the boulevard

Actions:
- Redevelop the boulevard as a multi-way boulevard described in the summary
- Develop bike lanes and sidewalks along access roads
- Provide bus shelters along the access roads
- Develop a park and ride facility near the 440 exit
Goal 3: Capital Boulevard is an aesthetically pleasing road that serves as a landmark entranceway to the city
Objective: Promote quality and sustainable building design along the boulevard
Actions:
• Create a zoning overlay distinct that regulates building form along the boulevard
• Develop uniform setbacks in order to provide definition to the boulevard
• Implement parking standards that promote on street, side, or rear parking
• Provide incentives to encourage green building design, such as density bonuses

Objective: the city should promote quality landscaping and visual amenities along the boulevard
Actions:
• Create a landscaping plan
• Use trees as buffers between the frontage and through lanes and the sidewalks
• Provide opportunities for public art at major destinations and in the medians

Goal 4: The Boulevard has unique urban spaces
Objective: Encourage the development of urban parks and plazas along the boulevard

Actions:
• Create pocket parks and urban plazas along the boulevard
• Provide the opportunity for recreation and relation along the frontage roads, such as benches and picnic areas

Goal 5: The Boulevard is a stimulus for economic development
Objective: Encourage redevelopment of the properties along the boulevard
Actions:
• Create a zoning overlay district which provides incentives for developers to redevelop adjacent properties, such as density bonuses or reduction of open space requirements
• Create a façade grant program to improve the design of existing buildings adjacent to the boulevard
• Promote transportation and aesthetic benefits for locating near the boulevard
Recommendations:

These two options are a starting point for redeveloping the Capital Boulevard area. Options were chosen based on case study reviews and meetings with city planning staff. Both of these options could serve multiple goals and objectives. The first option would meet more recreational and environmental objectives whereas the second option would meet transportation and aesthetic needs. These designs however are not mutually exclusive. Components of both options could be incorporated to create an aesthetically pleasing corridor that improves and enhances the natural and built environment. For example, the southern and northern sections of the corridor could incorporate a greenway trail oriented design, whereas the central valley section of the boulevard could incorporate a more multi-way boulevard design (see Figure 33). The 26 acre city service yard could be transformed into a linear urban park that includes BMPs which server have aesthetic, recreation, flood mitigation, and water quality benefits. The 34 acres in the northern median could also be converted into a linear park that provides similar benefits.

Design specifics of both of these scenarios or a combination of the two options should be explored in more detail before the city moves forward. Additionally, in order for a project of this caliber to move forward, citizen input and support is vital. The city should facilitate this input by providing opportunities for public input through various methods such as meetings, focus groups, and community surveys. Additionally the major stakeholders of the project including neighboring residents, current property owners, greenway advocates, transportation agencies, and area developers should be targeted for input.

Figure 33: Redevelopment design incorporating greenway and multi-way boulevard approaches
Summary:

The 1987 design charrette brought about many notable and creative ideas for the boulevard. Several of the ideas were implemented; however the vision for the boulevard was never completely realized. Many improvements remain in order to transform Capital Boulevard into a landmark gateway to the city. The corridor faces serious environmental and safety conditions. The boulevard has one of the highest pedestrian injury rates in the city, while Pigeon House Branch is severely impaired. Over $26 million of property along the corridor is located within the 100 year flood plain and financially, the area is contributing relatively little to the City’s tax base.

Currently, the corridor is not considered as one of the more aesthetically pleasing entranceways to the city. The corridor does however have many assets that could be capitalized on to enhance its visual character, including views and environmental features.

Raleigh’s Capital Area Greenway is thought to be the earliest local comprehensive greenway system in the country. The Capital Area Greenway continues to serve as a model for numerous other cities throughout the US. Yet as the city faces major growth, Raleigh needs to consider its greenways as a means to serve not just recreational, but also commuting and economic development needs. The Capital Boulevard Area could provide an important link from Raleigh’s established greenway system to downtown. Capital Boulevard has the potential to become a landmark entranceway that is not only aesthetically pleasing but more importantly contributes to the health and sustainability of the community.
APPENDIX

Appendix - Figure 1: Floodplain properties, Southern Area
Appendix - Figure 2: Floodplain parcels in the Northern Median
Appendix - Table 1: Property values of parcels in the southern floodplain (ID number corresponds to previous maps)

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<td>1.00</td>
<td>$90,693</td>
<td>$217,800</td>
<td>IND-2</td>
<td>1955</td>
<td>Service Garage</td>
</tr>
<tr>
<td>16</td>
<td>BARNEY G JOYNER FAMILY TRUST</td>
<td>0.65</td>
<td>$26,985</td>
<td>$106,177</td>
<td>IND-2</td>
<td>1958</td>
<td>Parking Deck</td>
</tr>
<tr>
<td>17</td>
<td>HUFMEYER, ISABEL CARL E MATTHEWS</td>
<td>1.01</td>
<td>$108,245</td>
<td>$219,980</td>
<td>IND-2</td>
<td>1975</td>
<td>Service Garage</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>total 27 acres</th>
<th>$4,663,813</th>
<th>$6,347,456</th>
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<tbody>
<tr>
<td></td>
<td>total (B+L)</td>
<td></td>
<td>$11,011,269</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>total</th>
<th></th>
<th></th>
</tr>
</thead>
</table>
# Appendix - Table 2: Property values of parcels in northern floodplain

<table>
<thead>
<tr>
<th>OWNER</th>
<th>YEAR BUILT</th>
<th>DEED ACRES</th>
<th>BLDG VAL</th>
<th>LAND VAL</th>
<th>TYPE USE</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 FAITH LUTHERAN SCHOOL</td>
<td>1968</td>
<td>5.37</td>
<td>$2,828,625</td>
<td>$233,917</td>
<td>77</td>
<td>School</td>
</tr>
<tr>
<td>2 TILLETT, HENRY ROBERT, TILLETT, WENDY WADDELL</td>
<td>1959</td>
<td>0.48</td>
<td>$31,799</td>
<td>$117,090</td>
<td>20</td>
<td>Service Garage</td>
</tr>
<tr>
<td>3 AMPLE STORAGE CAPITAL BOULEVARD LLC</td>
<td>1996</td>
<td>3.31</td>
<td>$1,351,024</td>
<td>$432,552</td>
<td>86</td>
<td>Mini Warehouse</td>
</tr>
<tr>
<td>4 CENTER INVESTMENTS INCC/O FIRST CITIZENS BANK BR 090</td>
<td>1961</td>
<td>0.64</td>
<td>$305,230</td>
<td>$139,390</td>
<td>11</td>
<td>Bank</td>
</tr>
<tr>
<td>5 PARKS, MICHAEL T</td>
<td>1968</td>
<td>1.11</td>
<td>$246,245</td>
<td>$217,584</td>
<td>40</td>
<td>Restaurant</td>
</tr>
<tr>
<td>6 REVOCALE FAMILY TRUST OF CLARENCELEE HAWLEY</td>
<td>1997</td>
<td>0.98</td>
<td>$129,096</td>
<td>$298,823</td>
<td>19</td>
<td>Services &amp; Service</td>
</tr>
<tr>
<td>7 AMPLE STORAGE CAPITAL BOULEVARD LLC</td>
<td>2001</td>
<td>0.65</td>
<td>$315,725</td>
<td>$141,570</td>
<td>83</td>
<td>Warehouse</td>
</tr>
<tr>
<td>8 PAUL A TILLERY COMMERCIAL RENTALS</td>
<td>1986</td>
<td>1.75</td>
<td>$848,655</td>
<td>$381,150</td>
<td>85</td>
<td>Flex Warehouse</td>
</tr>
<tr>
<td>9 JONES, SEBY B JRC/O BOWLING WORLDWIDE</td>
<td>1968</td>
<td>2.67</td>
<td>$830,329</td>
<td>$523,372</td>
<td>14</td>
<td>Bowling Alley</td>
</tr>
<tr>
<td>10 MILNER, EARLE RONALD TRUSTEE</td>
<td>1952</td>
<td>3.32</td>
<td>$674,968</td>
<td>$433,857</td>
<td>32</td>
<td>Hotel/Motel</td>
</tr>
<tr>
<td>11 WAKE COUNTY BOARD OF ALCOHOLIC CON</td>
<td>1967</td>
<td>0.68</td>
<td>$124,147</td>
<td>$148,105</td>
<td>47</td>
<td>ABC</td>
</tr>
<tr>
<td>12 NAJAFI, FARID &amp; MARYIN</td>
<td>1969</td>
<td>0.50</td>
<td>$73,391</td>
<td>$87,120</td>
<td>39</td>
<td>Sam Auto</td>
</tr>
<tr>
<td>13 LEE, JAMES W SR</td>
<td>1968</td>
<td>0.18</td>
<td>$20,782</td>
<td>$31,364</td>
<td>47</td>
<td>Jewery Store</td>
</tr>
<tr>
<td>14 THARRINGTON, J HAROLDTHARRINGTON, HARRY W</td>
<td>1956</td>
<td>0.36</td>
<td>$61,620</td>
<td>$78,410</td>
<td>47</td>
<td>single Tenant</td>
</tr>
<tr>
<td>15 GLOBAL ACQUISITIONS LLC</td>
<td>1946</td>
<td>2.44</td>
<td>$886,827</td>
<td>$318,858</td>
<td>32</td>
<td>Motel</td>
</tr>
<tr>
<td>16 SELPH, ELLIS RHONDA</td>
<td>1959</td>
<td>0.74</td>
<td>$26,966</td>
<td>$16,117</td>
<td>42</td>
<td>Store Type building</td>
</tr>
<tr>
<td>17 HARRIS INVESTMENTS</td>
<td>1988</td>
<td>2.04</td>
<td>$271,356</td>
<td>$444,310</td>
<td>83</td>
<td>Warehouse</td>
</tr>
<tr>
<td>18 HARRIS INVESTMENTS</td>
<td>1989</td>
<td>1.10</td>
<td>$81,171</td>
<td>$239,580</td>
<td>83</td>
<td>Warehouse</td>
</tr>
<tr>
<td>19 HARRIS WHOLESALE INC</td>
<td>1995</td>
<td>1.06</td>
<td>$205,501</td>
<td>$147,756</td>
<td>82</td>
<td>Prefab Wrhs</td>
</tr>
<tr>
<td>20 PAYNE, FRANCES S TRUSTEEFRANCES S PAYNE REVOCABLE TRUST</td>
<td>1980</td>
<td>1.41</td>
<td>$94,724</td>
<td>$171,976</td>
<td>20</td>
<td>Service Garage</td>
</tr>
<tr>
<td>21 SHEARON, DAVID P JR &amp; PEGGY JONES</td>
<td>1990</td>
<td>0.66</td>
<td>$111,895</td>
<td>$60,812</td>
<td>47</td>
<td>single Tenant</td>
</tr>
<tr>
<td>22 CANNADY, NATHANIEL A &amp; DIANA BROWLAND, DEWEY H &amp; SHIRLEY M</td>
<td>1985</td>
<td>1.00</td>
<td>$191,065</td>
<td>$103,272</td>
<td>47</td>
<td>single Tenant</td>
</tr>
<tr>
<td>23 ADAMS, W GLENGREGORY, T WARREN</td>
<td>1985</td>
<td>1.93</td>
<td>$403,324</td>
<td>$110,140</td>
<td>85</td>
<td>Flex Warehouse</td>
</tr>
</tbody>
</table>

**Total** | **34.38** | **$10,104,465** | **$4,877,125** | **Total value** | **$14,981,590**
Appendix - Table 3: Study Area zoning

<table>
<thead>
<tr>
<th>ZONE_TYPE</th>
<th>Number of Parcels</th>
<th>Average Size (acres)</th>
<th>Total Acres</th>
<th>% of Study area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP R-6</td>
<td>2</td>
<td>40</td>
<td>80.0</td>
<td>1.0%</td>
</tr>
<tr>
<td>SP R-30</td>
<td>1</td>
<td>62</td>
<td>61.6</td>
<td>0.8%</td>
</tr>
<tr>
<td>R-6</td>
<td>1</td>
<td>291</td>
<td>290.6</td>
<td>3.6%</td>
</tr>
<tr>
<td>R-30</td>
<td>8</td>
<td>1</td>
<td>7.2</td>
<td>0.1%</td>
</tr>
<tr>
<td>R-20</td>
<td>1</td>
<td>2</td>
<td>1.9</td>
<td>0.0%</td>
</tr>
<tr>
<td>R-10</td>
<td>5</td>
<td>474</td>
<td>2372.4</td>
<td>29.2%</td>
</tr>
<tr>
<td>CUD R-30</td>
<td>1</td>
<td>1</td>
<td>0.9</td>
<td>0.0%</td>
</tr>
<tr>
<td>CUD R-20</td>
<td>1</td>
<td>3</td>
<td>3.2</td>
<td>0.0%</td>
</tr>
<tr>
<td>CUD R-15</td>
<td>1</td>
<td>4</td>
<td>4.4</td>
<td>0.1%</td>
</tr>
<tr>
<td>CUD R-10</td>
<td>2</td>
<td>3</td>
<td>5.4</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>2</td>
<td>2</td>
<td>4.4</td>
<td>0.1%</td>
</tr>
<tr>
<td>NB</td>
<td>12</td>
<td>4</td>
<td>44.0</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Industrial</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IND-2</td>
<td>6</td>
<td>224</td>
<td>1344.4</td>
<td>16.5%</td>
</tr>
<tr>
<td>IND-1</td>
<td>2</td>
<td>1777</td>
<td>3553.4</td>
<td>43.7%</td>
</tr>
<tr>
<td>O&amp;I-2</td>
<td>3</td>
<td>41</td>
<td>124.5</td>
<td>1.5%</td>
</tr>
<tr>
<td>O&amp;I-1</td>
<td>6</td>
<td>28</td>
<td>168.2</td>
<td>2.1%</td>
</tr>
<tr>
<td>CUD O&amp;I-2</td>
<td>2</td>
<td>26</td>
<td>52.2</td>
<td>0.6%</td>
</tr>
<tr>
<td>CUD O&amp;I-1</td>
<td>3</td>
<td>2</td>
<td>4.8</td>
<td>0.1%</td>
</tr>
<tr>
<td>CUD NB</td>
<td>1</td>
<td>3</td>
<td>2.9</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>BUS (downtown)</strong></td>
<td>1</td>
<td>9</td>
<td></td>
<td>0.1%</td>
</tr>
</tbody>
</table>

**Total:** 61 8136.0
Appendix - Case study 1

Case Study 1: Capital Cascade Greenway

Overall Themes:

- **Flooding Stormwater Management**: On channel and off channel stormwater ponds, Soft engineering (using native ecosystems and natural features to address water quality and stabilization issues), BMPs (Best Management Practices) designed as active and passive recreation facilities, Acquisition of Flood Prone Properties
- **Public Access**: Improved Access to Park, Institutional Facilities, and Residential Neighborhoods; Important North/South artery for bicycle and pedestrian transportation
- **Economic Development**: serves to make the community more attractive for future private sector investment
- **Compatibility and Adjacent Land Use**: Increases property values, the West Orange Trail in Orlando in Pinellas Trail in Pinellas County have proven the economic benefits to adjacent residents
- **Historical and Cultural Interpretation**: Focus on historic attributes of Cascade park and historic buildings and residential neighborhoods adjacent to the corridor

To realize the above themes, the Capital Cascade Greenway Conceptual Master Plan identifies 4 zones for implementation strategies. The character of each zone is described below as well as key design development recommendations.

**Zone 1**: Extends from Downtown to Cascade Park (a contaminated site), very urbanized with a significant amount of impervious surface

- Bayard buffer program to mitigate flooding impacts
- Reconstruction of Franklin Blvd to effectively convey floodwaters downstream (Box culvert installation to convey stormwater to Cascade Park)
- Location of an urban park, performing arts amphitheater, and stormwater facility in Cascade Park

**Zone 2**: New Gateway to Florida A&M University, dominated by the College Campuses, large presence of other Urban Structures such as residential commercial and industrial uses

- Soft engineering to restore St. Augustine Branch
- Installation of 3 new stormwater retention facilities
- Increased greenway access to the Universities
- Relocation of Stearn-Mosley Neighborhood to higher ground out of floodprone landscapes, conversion of floodprone area to neighborhood park
- Gaines Street Revitalization: conversion of a warehouse/industrial land use oriented 4 lane undivided road to a 4 land road with an
expansive median, on street parking, and wide sidewalks with many opportunities for residential and retail redevelopment

- Design Modification to Lake Elberta (the regional stormwater facility) to support public access and use

Zone 3: Extends from Lake Elberta to Munson Slough
- Extension of the St. Marks Trail into the Florida State University Main Campus
- Stream Restoration of the Central Ditch (an unsightly stormwater channel)
- Relocation of businesses and homes out of the floodplain

Zone 4: Extends from the Black Swamp to Lake Munson; contains several lakes, forested land, large public lands, and low intensity development
- eco-tourism based multi-purpose trail
- Canoe trail system
Cascades Park Concept Plan

1. Relocated and restored Lake Hall School House with New Annex
2. Shaded area for school group orientation
3. Shallow reflecting pool with Island seating area in shade
4. Fish and Wildlife Plaza
5. Tallahassee History Timeline fence
6. Ornamental protective fence
7. Mist Fountain - Snecker Hollow Interpretation - water play area
8. DOT parking area
9. Realigned Gaines Street - Wendell Street connection
10. Gaines Street corridor terminus landmark element
11. Gaines Street discontinuous through park - gateway/bridge designed to allow emergency vehicle height/width
12. Known War Monument (Existing)
13. Restored natural stream
14. Mandarin Plaza with amphitheater stage & infrastructure, space maps, passive elements, shade, seating, interactive elements in plaza
15. Mandarin Plaza south end: map of Florida, natural history, restrooms
17. Historic caselines & regional waterコース
18. Natured, graded amphitheater 2000-4000 capacity
19. Twelve-story water feature
20. Cascading waterfall located at ‘Urban Edge’
21. New Building park structure - Program to include:
22. New building park structure - Program to include:
23. 1200 Park retail, limited food service, park bathrooms, park amphitheater storage, office, community meeting room
24. Restored Electric Building - Park mixed commercial use, restaurant
25. Area to contain interpretation of industrial heritage of area
26. Preserved historic wall with ‘Winds’ cut through to allow view in and out - windows to have ornamental framework interpretation
27. Fall field Parque’s formal gardens - Apalachee to present day sports history area - Gardens to utilize foam leveling plantings
28. Preserved historic tree
29. Iconic Sculpture at Water Outflow "Boca Chica" - Big Mouth
30. Flood control interpretation
31. National History Interpretation
32. Cascading vegetation - sloping retaining structure
33. Grand stair entry up to park and 10-12’ waterfall visible from Monroe Street
34. Custom-designed dog park - fenced, shade for humans, & water for dogs
35. New Landmark bridge
36. Seddon Street discontinuous through park - pathway/bridge designed to allow emergency vehicle height/width
37. Savannah Street extended behind park
Case study 2: Charlotte, NC- Little Sugar Creek Greenway

Overall Themes/ Goals:

Vision Statement:
Promoting community by establishing an exemplary Greenway along Little Sugar Creek connecting people and neighborhoods through culture, history, education, the environment, and recreation.

Goals:
- **Environmental**: Prepare a greenway master plan that protects floodplain lands and encourages the restoration of the natural hydrologic section and biodiversity of the creek to promote improved water quality.
- **Recreational**: Provide a continuous trail system with multiple destinations including multi-modal and regional connections that provide a safe and attractive experience, and create opportunities for social interaction.
- **Neighborhoods and Community Building**: Where possible and desirable, provide connections from the greenway for adjoining neighborhoods and civic areas such as schools, churches, and other community facilities. Reinforce the identity of neighborhoods through greenway design by incorporating public art, recognizing local history, and creating landmark open spaces.
- **Economical**: Encourage the greenway edge as a setting for investment. Existing and newly developing land uses- residential, commercial, and civic should benefit from adjacency to the greenway’s aesthetic, recreational, and cultural benefits.
- **Educational**: Promote the long-term involvement and participation of citizens in the planning, design, implementation, and management of the greenway. Encourage the understanding of natural systems related to the creek, the history, and cultural resources.
- **Implementation**: Implement the greenway master plan within ten years by encouraging public / private partnerships and community participation.

To realize the above goals, the Little Sugar Creek Master Plan identifies seven major reaches, or zones, for implementation strategies. The character of each reach described below as well as key design/ programming recommendations.
Reach 1: Cordelia Park to 10th St: Has largest section of completed greenway, the creek is open and tends to flood, surrounded by older historical residential uses, many residential properties surrounding the area have been bought out through the county’s floodplain buyout program
- Ecological focus
- Ecological and Aesthetic Enhancements
- $1.76 million, 1.2 miles (75% existing)

Reach 2: 10th St to Morehead St: Over half of the creek has been buried in this section, most urban section of the greenway, adjacent to CPCC (Central Piedmont Community College),
- Creek front retail and restaurants
- Residential development
- Plazas and fountains
- Downtown Connections
- $5.27 million, 1.7 miles

Reach 3: Morehead St to Princeton Ave: Adjacent to Freedom Park, Carolina Medical Center and the Nature Museum, the creek has been restored throughout freedom park, major destination
- Freedom Park as major destination point
- Trail enhancements
- Multiple pedestrian bridges
- $953,000, 1.6 miles (75% existing)

Reach 4: Princeton Ave. to Archdale Dr.: The creek has been seriously altered from its natural course in this section, the section contains many structures that have been built in the floodplain, contains several shopping centers and industrial uses, 7 major street crossing
- Removal of structures through the flood plain buyout program
- Street crossing designed to pass under the roads
- Ecosystem restoration and flood mitigation
- Connections to nearby shopping centers
- $6.9 million, 3.0 miles

Reach 5: Archdale to 485: Huntingtowne Farms Park section of the creek has been reconstructed to address flood control, bank stabilization, habitat enhancement, and improved aesthetics. Farther down, the creek has a very broad floodplain with a large area of bottomland hardwoods. This part of the creek has some of the most diverse aquatic habitats found in Mecklenburg County.
- Passive and Active recreation opportunities
- Restoration and enhancement of creek
- $5.17 million, 3.8 miles (15% existing)
Reach 6: 485 to Polk St.: broad floodplain, several wetlands, creek has maintained most of its natural character, but area is dominated by large big box retail uses
- Trails pass underneath major thoroughfares below street level
- Focus on pedestrian connectively in an auto dominated landscape
- $2.98 million, 1.6 miles

Reach 7: Polk St to NC/SC line: most undeveloped portion of the trail, large undisturbed bottom wood hardwood forest
- Focus on connection
- Bi-state greenway welcome center
- Conservation of natural environment
- $4.18 million, 2.1 miles

Case Study 3: Minneapolis, MN-Midtown Greenway Land Use Development Plan

Overall Themes/ Goals: (The following goals are for the areas surrounding the developed greenway)
- Pedestrian Oriented Design: Promote a safe, vibrant and active environment with calmed streets and widened sidewalks. Focus investments toward developing an enlivened, pedestrian-friendly public realm.
- Transit supportive development: Encourage redevelopment projects to be transit-supportive by integrating bicycle and pedestrian amenities as well as accessible and visually appealing transit stops into projects.
- Public Green Space: Promote opportunities for additional public green space, dedicated parks, trail connections and public art along the Greenway edge, especially near transit stops and higher-intensity developments.
- Compact Development: Support compact development and promote mixed use in existing commercial areas. Create a more lively and diverse urban environment. Focus the most intensive development near future transit stops and existing commercial nodes and encourage the provision of open space and active stormwater management in new developments.
- Greenway Oriented Development: Promote development that reinforces appropriate architectural scale and relates to adjacent land uses. Employ development strategies that minimize Greenway shadowing. Use new development, the pedestrian environment and open space to promote an integrated relationship between the Greenway floor and the Greenway edge/rim, fostering a sense of place and community.
- Premier Public Edge: Develop a premier public edge along both sides of the Greenway, including a more pedestrian and bicycle-friendly 29th Street and public promenades.
- Safety: Promote Greenway safety and comfort through environmental design features such as doors located on the street or Greenway as appropriate, windows facing public space and the relocation of service doors away from the public realm.
- **Compatibility**: Promote compatibility of industrial uses with residential areas and the Greenway through landscaping and enhanced urban design.

Case study #2: Lyndale Avenue and 29th St: This site includes a variety of land uses, such as commercial/retail, light industrial and surface parking. The site is unique in that it is located on the southern side of the greenway and in the future is will have a direct transit connection. The site is also located in a major activity center of Minneapolis' comprehensive plan.

**Before:**

**After:**

![Before and After images of Lyndale Avenue and 29th St case study](image)

Case Study #3: North Side of the Greenway Near Midtown  This site is being used for industrial purposes and includes outdoor storage and an airplane parts yard. The industrial site is surrounded by residential uses.

**Before:**

**After:**

![Before and After images of North Side of the Greenway Near Midtown case study](image)
Case Study 4: Industrial at 28th Street and Hiawatha
This large 16.6 acre site is comprised of the Roof Depot (7.7 acres), and a City of Minneapolis Public Works facility (8.9 acres). The site is quite industrial in nature and the redevelopment of this case study examines the transition from heavy industrial uses and residential neighborhoods. It considers how to maintain certain industrial uses along the Greenway in a manner that improves their relationship to neighboring property and the Greenway.
References


Mecklenburg County Parks and Recreation (2007). Little Sugar Creek Greenway. Retrieved on 2/07 from
http://www.charmeck.org/Departments/Park+and+Rec/Greenways/Little+Sugar+Creek+Greenway/Home.htm

http://www.ci.minneapolis.mn.us/planning/docs/Final_draft_with_revisions.pdf


http://h2o.enr.state.nc.us/basinwide/Neuse/Chapter%203.doc


