



CHARLESTON, SOUTH CAROLINA
Citywide Transportation Plan
July 2018



Stantec



“The reality about transportation is that it's future-oriented. If we're planning for what we have, we're behind the curve.”

—Anthony Foxx, former US Secretary of Transportation

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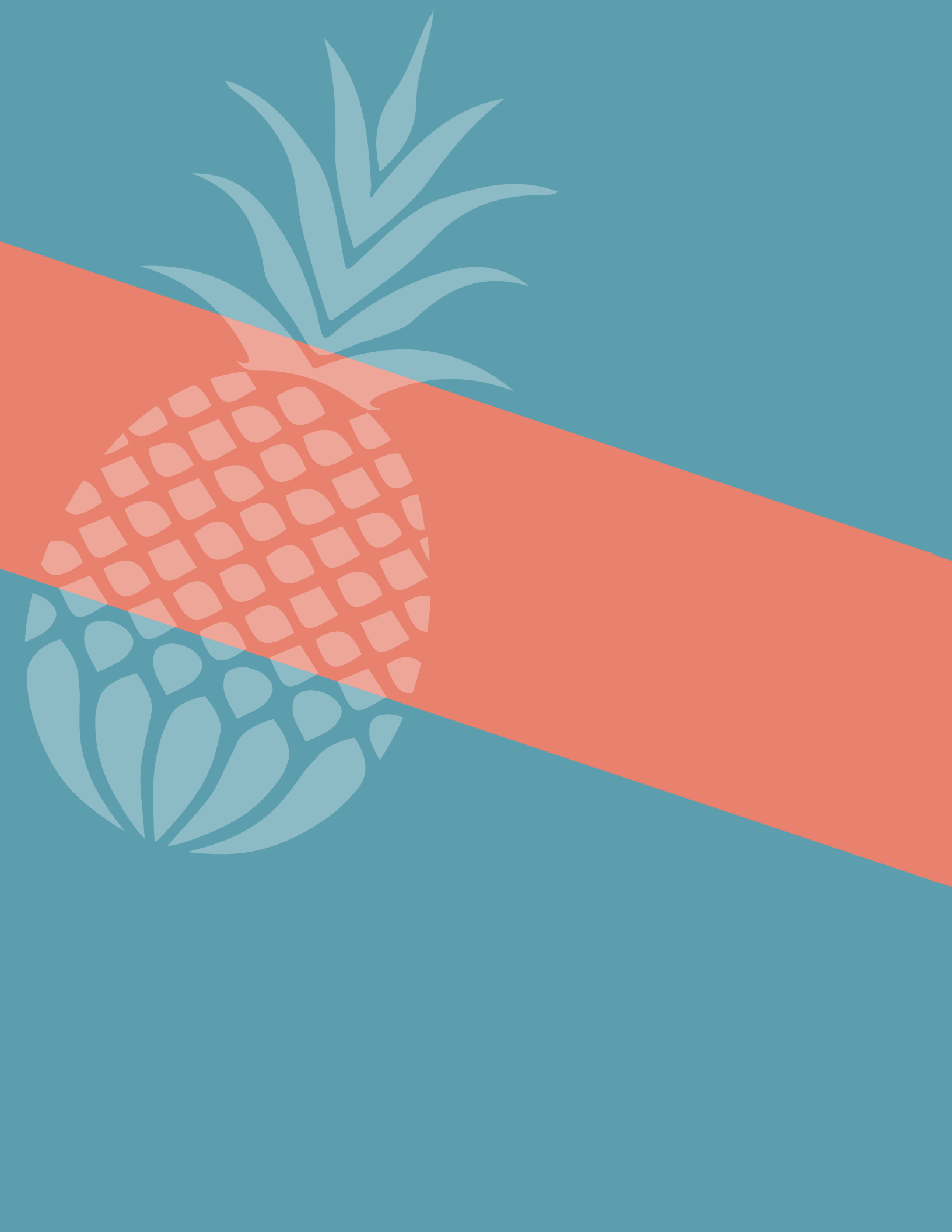
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Introduction & Vision

A stylized map of Charleston, South Carolina, serves as the background. The map is divided into several colored regions: a large yellow area on the left, a red area on the right, a dark purple area at the bottom, and a grey area at the top right. A light blue river winds through the map, separating the yellow and red areas. The text is overlaid on the yellow region.

“Close collaboration between and among citizens and jurisdictions is going to be key to solving our traffic problems in the years ahead -- and we as a city are committed to doing our part to make it work.”

-Charleston Mayor
John Tecklenburg

With Charleston's beautiful cobblestone streets, colorful historic homes, countless world-class restaurants, and access to some of the State's most serene beaches, there's no wonder why Charleston continues to grow and attract millions of tourists and new permanent residents each year. According to U.S. Census data, Charleston is growing 3 times faster than the national average -- with 34 new residents moving in every day. Which makes sense, as the labor force has grown 4 times faster than the national average from 2010-2016.

(Sources: Charleston Regional Development Alliance, U.S. Census Bureau, and U.S. Bureau of Labor Statistics)

In preparation for the continuous influx of people and businesses, the City of Charleston has developed an update to their Citywide Transportation Plan that will provide solutions as well as a long-range vision for Charleston's transportation system aimed at improving mobility, mitigating traffic congestion, improving safety for pedestrians and vehicular traffic, and enhancement of transportation corridors.

This transportation plan will begin to address the multitude of issues affecting the city's transportation. One purpose of this plan is to review and consolidate select previous plans and efforts related to city mobility. The West Ashley Area combined with James Island has the



▲ King Street, Charleston, circa 1910
(http://www.shorpy.com/node/9220?size=_original)

▼ Charleston City Market
(http://www.thecharlestoncitymarket.com/warehouse/fm/images/Gallery%20New/CharlestonCityMarket_Gallery31.jpg)



most transportation corridors, with the highest volumes of traffic and higher needs for redevelopment. The communities in Johns Island are weighing the need for better connectivity verses preserving their historic tree canopy and wanting planning options that achieve both of these goals. Additionally, Daniel Island is facing tremendous new growth as well and already looking to improve connections to rest of the city through its main artery, Clement's Ferry Road. The Lower Peninsula, the historic, urban core of the City, is facing both new residential and commercial growth, and making more effort to serve the multimodal needs for tourists and residents alike.

While there are areas that may need more attention and planning than others, this plan looks at the entire transportation system to find the best solutions for the residents and tourists who frequently travel through Charleston. Lastly, this plan focuses on thirteen key barriers including select intersections and corridors. The product of this effort are detailed design concepts for multi-modal improvements.

The City's goal was to develop a comprehensive plan with a consultant that relied heavily on community input. In partnership with Charleston's leaders and policy-makers, we hope to present a plan that is easily understood and addresses the concerns of the public regarding key transportation issues that affect the city.

Community & History

From Founding to Emancipation

Charleston was settled in 1670 by English colonists and in honoring their king, dubbed the land "Charles Town". The English were determined to avoid the narrow and winding roads that spread across Europe. Instead, they opted for a more classical continental street plan. Charles Town was the first city in America to lay out and construct its streets in a grid pattern. Access to its many wharves along the peninsula allowed Charles Town to become a busy seaport.



▲ History Survey of Charles Town in 1704. (Perry-Castañeda Library Map Collection, University of Texas Libraries, University of Texas at Austin)



▲ Engraving of a slave sale in Charleston, published in 1856. National Maritime Museum, Greenwich, London, Michael Graham Stewart Slavery Collection)

Charleston was the nation's capital of the slave trade. Over 40 percent of the African slaves reaching the British colonies before the American Revolution passed through the Charleston port. "Black Ivory" or Africans alongside European artisans were used to build most of historic Charleston. Many of the slaves worked as sawyers, cabinet makers, carpenters, iron workers, plasterers, stone masons and brick masons. The slanted porches, blue ceilings, red roof tops, and the fingerprints left in sundried bricks were byproducts of free labor.

During the Revolutionary War, the British finally took control of the Colony in 1780 after multiple failed attempts. Charles Town was reborn as Charleston in 1783. The College of Charleston was started by the General Assembly in 1785, making it the oldest college in the South Carolina.

In 1808, the City built a bridge crossing the Ashley River. The bridge was large enough to support two carriage lanes and a lane for pedestrians. Charleston continued to prosper from imports and rich agricultural land until the start of the Civil War.

The Civil War left a lot of Charleston's infrastructure in ruins. To prevent enemies from crossing, the first bridge across the Ashley River was burned. After the war, Charleston began to rely less on plantation labor and focused on rebuilding their economy through trade and industry. Industrial and Port activities increased greatly during the following few decades. By 1860, with 400,000 slaves in the state of South Carolina, African-Americans, enslaved and free, made up 57 percent of the state's population. In 1865, the 13th Amendment to the Constitution officially abolished slavery in the reconstructed United States, changing the culture and economy in the South.



▲ Damage from the earthquake of 1886 (http://www.eas.slu.edu/eqc/eqc_photos/1886EQ/sldjpgs/SLD19.html)

▼ Early automobile congestion in Charleston (<http://charlestondaily.net/charleston-history-believe-it-or-not-a-photographic-story/>)



Devastation and Infrastructure

In August of 1886, a devastating earthquake struck Charleston. Most Americans east of the Rockies have reported feeling the strong shock waves. The earthquake was estimated to register at a magnitude of over 7 in today's seismographic standards. The quake destroyed Charleston rail and telegraph systems. The town's people lived in the streets as two-thirds of the city had to be rebuilt. This was the largest earthquake ever to occur in the Southeast.

In 1931, Charleston adopted the first Historical Zoning Ordinance in the country. The citizens saw the value of maintaining and protecting the historical homes that housed the original merchants and settlers on the peninsula. The beautifully restored homes known as "Rainbow Row" can still be seen along East Bay Street.



▲ Rainbow Row in Charleston, 2015 (<http://www.exploration-online.com/wp-content/uploads/2015/05/rainbowrow-davidscheffler.jpg>)



In 1989 Charleston was hit by Hurricane Hugo. Hugo destroyed three-quarters of the historical district in downtown Charleston. Mayor Joe Riley was a major advocate focusing on the revitalization of Charleston's economic and cultural traditions. Today, this region flourishes as an economic and cultural center in the city.

A key to Charleston's success was due to the great strides it took in setting up proper infrastructure to reach the peninsula. Grace Memorial Bridge opened in 1929 and The Pearman Memorial Bridge opened in 1966. Both bridges ran parallel to each other across the Cooper River. As the bridges aged and required more maintenance, the need for a new and more sound structure grew.



▲ Hurricane Hugo damage
(<http://charlestondailyphoto.blogspot.com/2009/09/hurricane-hugo-twenty-years-later.html>)



▼ Silas N. Permen and John P. Grace Memorial Bridges in 1967
(SCDOT Twitter)

In the mid-1990's Arthur Ravenel Jr. led a group of federal, state, and county legislators to raise the funds necessary to build a structure to replace both bridges. This landmark structure is known as the Ravenel Bridge. Opened in 2005, the Ravenel bridge replaced two parallel bridges that had become obsolete by modern automobiles standards. Built to withstand the historic 1886 earthquake and a storm far stronger than Hurricane Hugo, the bridge is predicted to have a lifespan of 100 years.

The Ravenel bridge features a unique protected pedestrian and bicycle path along the entirety of the bridge. The inclusion of this feature came after months of public input through grassroots efforts from community groups. Through their efforts, and in memoriam of U.S. Navy ensign and Olympic hopeful Garrett Wonders, the 12-foot-wide, separated side path Wonders' Way was included in the design. Wonders' Way continues the 40 year tradition of the annual Cooper River Bridge Run. It also shows that local communities can have a major and lasting impact on the public realm when they unite for an important cause. Wonders' Way is the legacy of every individual who fought for its inclusion.



▲ Arthur Ravenel Jr. Bridge in 2005 before completion
(TheState.com, Erik Campos)

Esau Jenkins

The cobblestone streets of Charleston hold many rich stories of its history. One man used these streets to transform the African American community in Johns Island and Charleston. Esau Jenkins was known as a civil rights hero and leader in the South. He believed in the power of education and citizenship for African Americans in his community.

In 1945, Esau purchased an old Volkswagen bus to transport children to Charleston where schools promised a better education. He also drove the bus from Johns Island to Charleston dropping off adults at their jobs. His bus was a special place for local residents. As he drove passengers, he would teach the state constitution and voting laws to those who wanted to register to vote. This bus and its passengers became known collectively as The Progressive Club.



▲ Jenkins, center, in front of one of his buses
(College of Charleston archives)

Esau was joined by others and together they helped establish Citizenship Schools throughout the city. These schools produced an exponential increase in registered voters on Johns Island. After participating in local elections, these newly registered voters saw their community transform as new roads were built and schools were improved. Esau and his bus would forever be a beacon of education and reformation in Charleston.

Equity Statement

Equity is the intentional elimination of disparities disproportionately impacting marginalized people in a community. It is the joining together to take proactive steps in embracing the complexity of experiences, elevating the potency of inclusion, exposing the creativity in every community, demanding honesty in calling out racism and oppression both overt and systematic and striving to co-empower citizens to implement goals. Equity is achieved when no one is blocked from reaching their full potential due to their race, gender, sex, disability, economic position or other socio-economic determinants.

In Charleston, discrimination and racialized segregation played a major role in creating significant economic, housing and transportation disparities that still have reverberating affects today. Acknowledging that low-income Americans are more likely to use transit, bike and walk in urban areas, it is imperative that the new vision in Charleston does not perpetuate inequities by treating livable communities for these populations as optional or inaccessible. It is important to recognize not only the opportunities to envision a new community building effort for all citizens, but also the need to face the challenges that presently exist for all Charlestonians.





Process

The Charleston Citywide Transportation Plan will guide decision making for the future by recommending improvements for all modes of transportation, including walking, cycling, and vehicles. The City seeks to embrace the concept of “complete streets” by providing strategies and policies to improve mobility and equity. Roadways should become public spaces for multi-modal travel meeting current and future mobility needs. The results of this project are a series of recommendations to help the City address transportation problems that will help the area grow to become a more livable and sustainable community.

The process is designed to include input from local citizens, business owners, City and County staff, and local officials. In the Spring of 2017, City officials developed a scope for the project that outlined the process of developing the plan with a steering committee to help lead the project and a time-line for the project.

The Project Study Team worked one-on-one with stakeholders, managed a project website, conducted surveys, and assessed technical data to produce a more complete picture of Charleston’s transportation system. Based on this assessment as well as the review of prior, adopted plans and policies described in the preceding section, a number of directions for the Charleston Citywide Transportation Plan emerged.

Planning Process

- 1 PROJECT INITIATION**
Data Collection, Review of Existing Plans & Studies, Area Tour
- 2 CITY ASSESSMENT**
Assessment of Current and Emerging Conditions, Identification of Issues & Opportunities
- 3 PLAN DEVELOPMENT**
Evaluation of Current Policies and Testing of Alternatives to Define a New Direction to Better Achieve Stated Goals

- 4 POLICY RECOMMENDATIONS & IMPLEMENTATION STRATEGIES**
Policies and Action Steps to Realize the Desired Transportation Options
- 5 PLAN DOCUMENTATION**
Citywide Transportation Plan Document



PUBLIC WORKSHOP

Calling all people who walk, ride,
bike, and drive in the City of Charleston:

We want **YOU** to join us in planning the future of how we move
through our city! Come to the first public workshop for the
Charleston Comprehensive Transportation Plan
and be a part of the movement!

WHEN: Wednesday, October 25, 2017
6 pm - 8 pm

WHERE: BoomTown!
1505 King St
Charleston, SC 29403
(Refreshments will be provided)

For more information reach us by
email: CTP@charleston-sc.gov
tel: 843-720-1993
or visit
www.transportcharleston.com

TALLER PÚBLICO

Hacemos un llamado a toda la gente
que se transporta, pasea, camina, viaja en
bicicleta o maneja en la ciudad de Charleston:

¡Queremos que **USTED** se una a nosotros en la planificación
del futuro sobre cómo nos moveremos por nuestra ciudad!

¡Venga al primer taller público para **el Plan de
Transporte Integral de Charleston**
y participe del movimiento!

Public & Equitable Outreach

An important part of the planning work that shaped the Citywide Transportation Plan was reaching out to people that have to travel, work, and play in Charleston.

A project Advisory Committee, consisting primarily of business owners, residents, City staff, and property owners in the area, was developed to guide the process of the project. Also included on the committee were representatives from local governing agencies. Regular meetings of this group throughout the process were held to set goals, provide feedback, and advise the project team on plan concepts and recommendations.

The project team conducted a multi-day charrette to define identify issues in the area throughout the City and develop a list of recommendations to address transportation issues concerns. The charrette was held during the week of October 25, 2017 at Boomtown, the aptly-named incubation and shared-work center that itself embodies one of the trending economic directions being experienced in the city. Leaders from the City and various agencies attending the function were encouraged to share views on growth and needs for Charleston. The public was invited to an Open House event on the first evening of the charrette. The box on the following page provides the results of an anonymous polling exercise conducted by over 65 people that attended the workshop.

“Nobody knows how to use public transport, better advertising?? I’d love to use it if I knew more.”

— Survey Commenter addressing issues with transit in and around the City of Charleston

- ◀ Opposite: Workshop flier (in English and Spanish) distributed both physically and online to the community in the weeks ahead of the meeting



▲ Various focus and student groups meeting during the three day charrette

Participants had little trouble “connecting the dots” between affordable housing; misaligned pace between development and infrastructure investments; and the effects that major trends like a predilection for walking to meet transportation needs or technology are going to have on different areas of Charleston. All of these variables individually and collectively play a major role in the premier issues facing the Charleston traveler today: vehicular congestion, inadequate travel choices, and a concern for personal safety.



▲ Public Workshop hosted at BoomTown! October 25, 2017. Top: - Director of the Department of Traffic and Transportation, Keith Benjamin opening the discussion; Bottom left: Mayor John Tecklenburg meeting with the project manager; Bottom right: participants discussing problem areas around the Lower Peninsula



SUMMARY OF PUBLIC WORKSHOP POLL

10.25.2017



infrastructure isn't aligned with growth (37%)

The pace of development of our transportation system elements isn't nearly as fast as the successful attraction of jobs and residents.

#1 Transportation Concern

Biggest impact on the future of Charleston transportation

shift to walkable areas and lifestyles (39%)

As more people wait longer to get driver's licenses and look for places where they can walk or bike to work, shop, and play, the economies of many cities are changing dramatically.

Which local feature makes transportation here most challenging

lack of affordable housing (41%)

When housing prices rise faster than wages, residents have to move further away from job centers. This action creates longer and more frequent trips, almost always by car.



most important issues to address in...

- west ashley
- peninsula
- john/james
- daniel

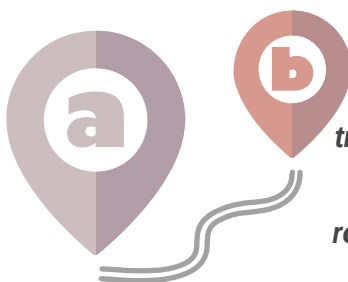
Figure 1-1

To supplement the information gathered during community meetings, a project website (www.transportcharleston.com) was created so residents, property owners, business owners and other stakeholders could access information and provide input throughout the process. Within the website, participants were able to click links to take a questionnaire regarding transportation in Charleston. Some of the responses are shown here.

Primary mode of travel for respondents:



When asked to choose the most pressing improvement needed for 16 different major roadways in Charleston, the top two choices were **Bike Facilities** and **Transit Routes & Stops**.



When asked, “What prevents you from choosing an alternative mode of transportation?” over 20% of respondents agreed that their routes were too far to travel without a car.

“Traffic is going to keep getting worse unless we make infrastructure improvement that encourage people to bike and walk. I live 2 miles from my job at Roper hospital, but I frequently drive because I so often feel unsafe on my bike.”

— Commenter at the Public Workshop on October 25, 2017



▲ Group mapping and dot exercises at the Public Workshop



To complement the electronic survey, a web-based crowdsourcing and mapping tool (Wikimaps) was tailored to the Charleston area to gather and collaborate public knowledge on improved and additional transportation infrastructure. Users accessed the tool through the project website and pinpointed where problem areas and/or desired routes are located. The data received aided the prioritization process and identified places where bicycle and pedestrian improvements were needed.

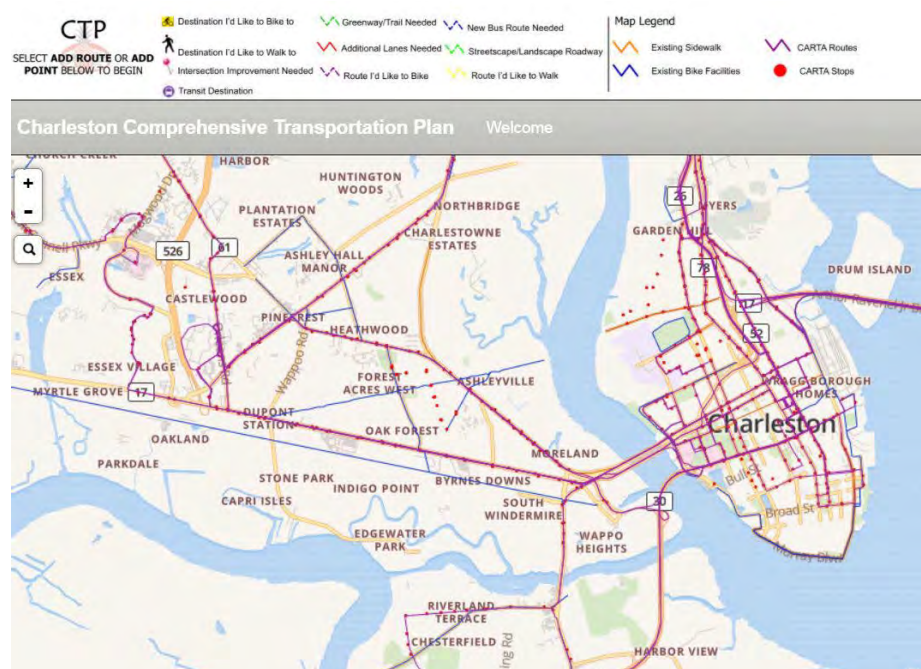
The feedback takes the form of comments on other ideas; point locations or routes traveled (or desired to be traveled) for improving vehicle, transit bicycle and pedestrian access and connectivity throughout the City of Charleston. Over 140 individual comments were provided by the public on the Citywide Transportation Plan mapping site.

“On Savannah Highway, the traffic lights aren’t synced up properly so it stalls and backs up the commute and there are no alt routes around it. The traffic lights are a big problem.”

— Survey Commenter discussing an important issue to address in West Ashley

Each point or line type was created with its own question that people could quickly answer to identify more information about the point or line that they were creating.

The images here show the web interface (Fig. 1-2) and the resulting map (Fig. 1-3).



▲ Screenshot of the Interactive Map found online

Figure 1-2

Interactive Map Results

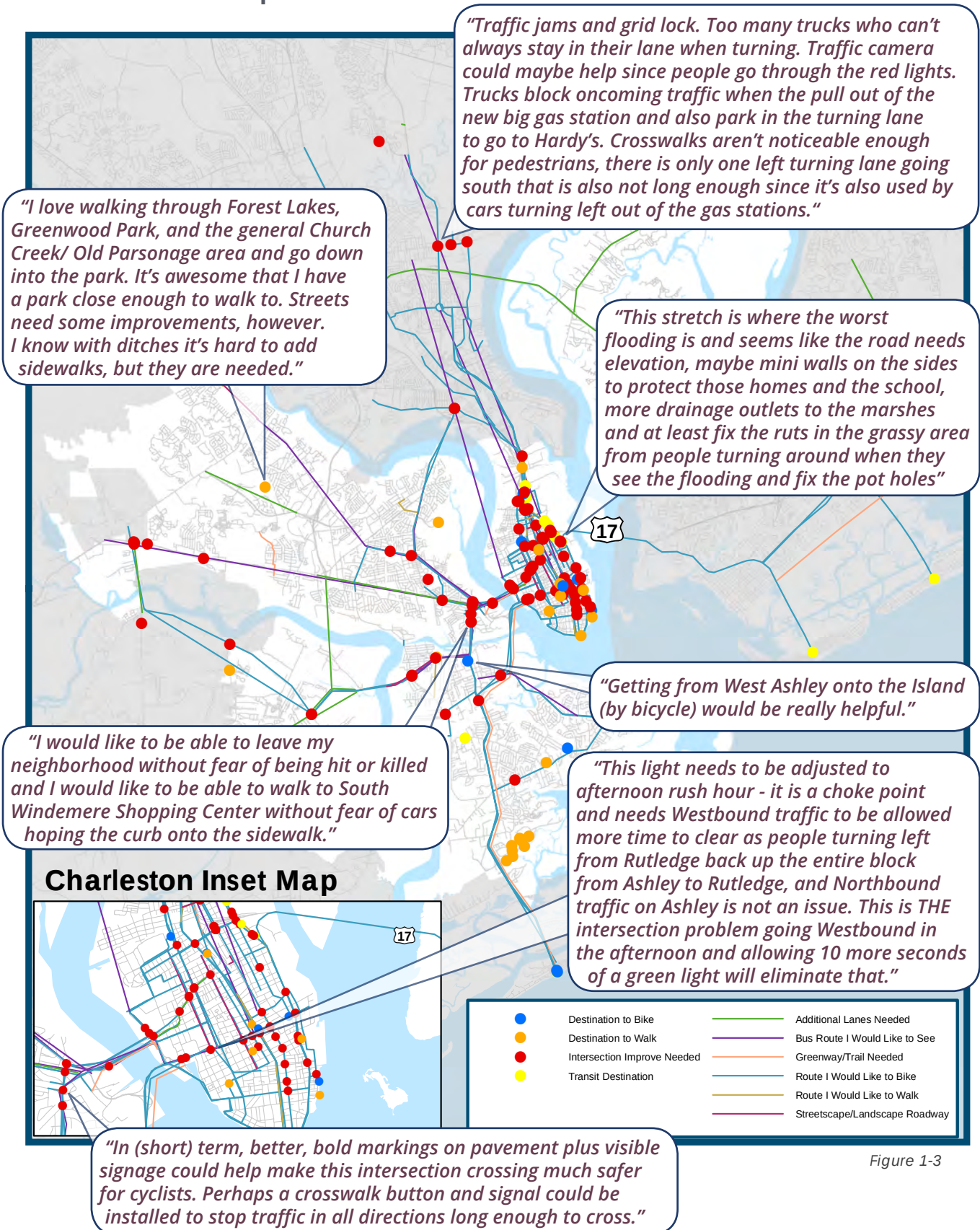


Figure 1-3



Guiding Principles

As previously mentioned, the City of Charleston has rightfully attracted enormous growth over the years, and only continues to spread across the districts and islands that shape it. The development has caught up to the old infrastructure and thus it is vital to the future of the city that eventual plans and transportation projects, starting with those recommended in this report, fit into a set of guiding principles that together specify the values and goals most important to Charleston and the people who call it home.

The guiding principles come from discussions between the consultant and the steering committee, the public input received from traveling roadshows, the project symposium, the project charrette, and all of the data received through the website, the online map, and the online survey. All of this information has been distilled into tangible projects and recommendations, detailed later in this report, and framed the guiding principles.

The following list dictates the 5 key guiding principles for the Citywide Transportation Plan:

1 *Community Engaged; Community First*

Charleston is more than the sum of its parts; the city's DNA is the people who live and work here every day. No plan for the city should ever forget that. The needs of the community must come first. Those needs vary in importance across neighborhood boundaries so it is essential that representation must be present for everyone so no one group, community, or demographic is left out. The best plans are the ones made with everyone's input, and through thorough and thoughtful engagement, this plan will lead to better solutions.

2 *Connecting 'Cross Charleston*

With a city divided by waterways, strong connections are critical in the movement of people, goods, and services. Emergency services need to reach every corner of the city, commuters need to arrive safely and timely to work and school daily, and shipments need to depart and arrive to their destinations on time. The combination of aging infrastructure and increasing demand will tear the fabric of the city if left unchecked. Improving the existing connection points and strategically recommending new crossings can greatly improve travel conditions and improve the livability and accessibility of each of the five main regions of Charleston.



3 *Better Routes for All Modes*

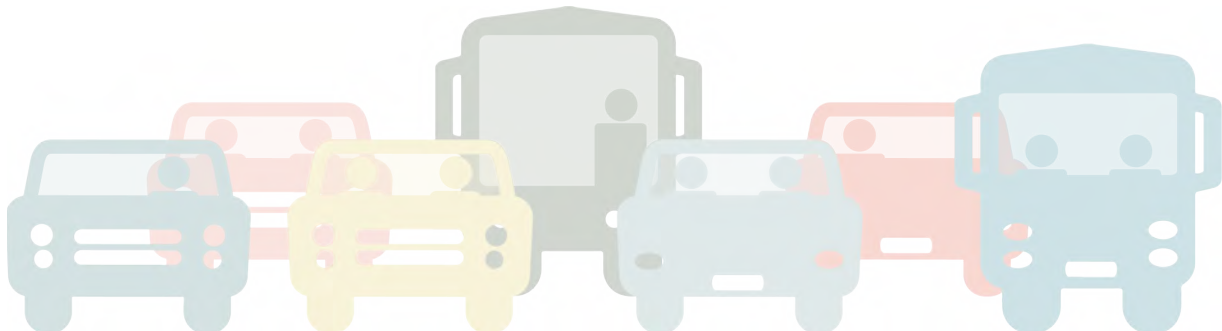
No matter the zip code, ability level, or socioeconomic status, everyone deserves access to fresh air, fresh food, school, and work. Having a personal vehicle should not determine whether or not any person can get to their destination. By filling gaps in bicycle, pedestrian, and transit infrastructure, mobility is increased. In expanding these networks and improving their overall quality and safety, Charleston can increase the number of individuals who commute using active and environmentally friendly means of transportation and better serve those who can not operate or access a vehicle but want to retain their independence and mobility.

4 *Ensuring Reliability and Ease*

A transportation network, like a vascular system, works best without clogs, bottlenecks, dead ends, and broken connections. The system should make sense and work together, so when one way is blocked, other routes are readily available. In creating more connections, access points need to be strategic to ensure better function and lack of confusion. Sometimes the best solution is a closure that makes sense if there are other ways through off the main route. Managing access coupled with clear signs and wayfinding make the whole system easier to navigate.

5 *Protecting Investments; Best Practices and Policies*

To ensure the recommendations proposed here better serve the future of Charleston, the best decisions need to be made during the design and construction phases and the policies supporting this plan must be clear and adaptable without losing their teeth. This plan will make recommendations for policy and practices, but recommendations can only go so far when they are not acted upon. To make these recommendations meaningful for Charleston, a plan for implementation will be addressed in this report.





Previous Planning Efforts

Previous planning efforts in the Charleston area are summarized below. In many cases, previous planning efforts will affect the development of the Citywide Transportation Plan.

Century V City Plan, 2010 Comprehensive Plan Update

The Century V City Plan serves as the principle guiding document for all development and redevelopment within the City of Charleston for the next 10 to 15 years. This plan outlines all future goals related to natural and cultural resources, economic development, public safety and services, land use and preservation, transportation options, and planning coordination.

Some of these core goals include establishing land use regulations that encourage compact development; providing a wide range of housing, workplace, and transit options; and ensuring the equal distribution of municipal services to new and existing customers. Building upon the visions of the 2000 Century V Plan update, the 2010 Comprehensive Plan is divided into seven sections: Population & Housing, Economic Development, Cultural Resources, Natural Resources, Land Use, Mobility, and Community Services.

While all sections covered in the Century V Plan will influence Charleston's Citywide Transportation Plan, the Century V Mobility goals and recommendations will serve as a foundation for establishing the vision for the . These two plans together will provide the basis for all City of Charleston transportation decisions. The primary mobility goal is to offer as many mobility choices as possible from more interconnected and improved routes to expanded multi-modal options including walking, biking, and water transportation. There is a strong focus on "walkability" and improving streetscapes by adopting new street design standards with an emphasis on Complete Streets.



➤ Available Data

Information in the Century V Plan will be very helpful in summarizing the primary transportation and mobility goals for the City of Charleston. In particular, the Plan lists all Charleston roadway improvement projects that are planned or under construction, as well as many bicycle & pedestrian projects.

➤ Potential for Refinement

While the Century V Comprehensive Plan outlines the principle transportation and mobility goals for the City, the Citywide Transportation Plan provides a unique opportunity to further explore these goals and detail a systematic guide to achieving them.

➤ Recommendations in Need of Close Coordination

All of the transportation recommendations in the Century V Plan will be evaluated and incorporated into the development of the . It is important to include recommendations such as greater connectivity across all of Charleston through modes and routes and increased focus on complete street design and streetscape to create a welcoming atmosphere for walkers, bikers, and motorists.

➤ Joint Funding Opportunities

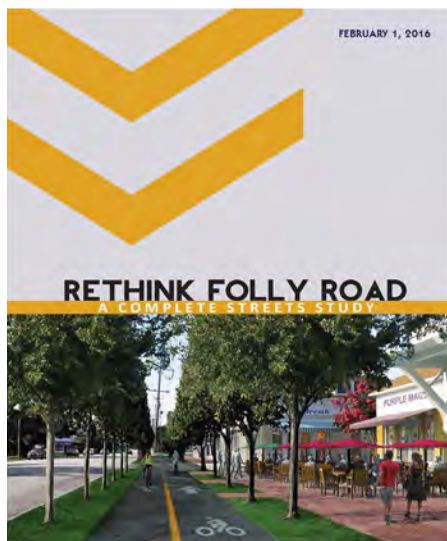
Many of the priority projects listed in the Century V Plan that may also be included in the will require close coordination between SCDOT, CHATS, and Charleston and Berkeley counties. These will provide various opportunities for joint funding.

Folly Road Corridor Study, 2016

The 2016 Folly Road Corridor Study identifies potential opportunities and outlines recommendations to transform the Folly Road corridor into a thriving, multi-modal corridor. This major thoroughfare leading onto James Island, connects the West Ashley area to the north with the City of Folly Beach to the south. Today, Folly Road suffers from excessive traffic, inadequate infrastructure, minimal landscaping, disconnected bike lanes and sidewalks, and aging strip malls that line the corridor.

Following the five guideposts of safe, connected, green, valuable, and synced, the Folly Road Corridor Study provides a framework to design a “complete street” that would balance all modes of travel including walking, biking, and public transit with a strong emphasis on streetscape. By transitioning the area away from an auto-centered design to a more holistic approach, the Folly Road corridor can help re-invigorate business and better establish a sense of community and personality for the gateway to Folly Beach.

This Complete Streets study would set the standard for new development and could serve as the precedent for creating more sustainable and aesthetically-pleasing roadways for the Charleston Region.



Existing Conditions



Initial Improvements



Long-term Improvements

➤ Past Public Comment

The Folly Road Corridor Study provides an in-depth analysis of public comments received via a number of sources, including community information sessions, a public Design Charrette, email, and surveys. Many of the opinions and desires voiced by the public are not only applicable to the Folly Road Corridor but rather reflect more generalized requests for improved walkability, alternate transportation options, and improved aesthetics that apply to many locations throughout the Charleston area.

➤ Recommendations in Need of Close Coordination

The recommendations of the Folly Road Corridor Study will be reflected in the Charleston Citywide Transportation Plan. The transformation of Folly Road provides a great opportunity to serve as one of the leading projects to embody the vision and goals that will be outlined in the Citywide Transportation Plan.

The Walk Bike BCD Plan is the guiding document for development of a connected network of walking and biking routes within the Berkeley-Charleston-Dorchester region. Investing in walking and biking promotes regional goals of improved health, safety, economic development, and quality of life. Among the key recommendations of Walk Bike BCD are identifying potential locations to create expanded connectivity between neighborhoods and communities for walkers and bikers, providing a long-term vision for investment and collaboration for increased accessibility and safety, providing programs and policies that enable residents and visitors of the tri-county region to incorporate active transportation into their daily lives, and adopting agency design guidelines that provide the foundation for high-quality pedestrian and bicycle facilities.



The BCD COG Walk-Bike Plan provides an in-depth analysis of public comments received via a number of sources, including community information sessions, pop-up public meetings, and online surveys sent to BCD COG residents. The primary concerns voiced by the BCD residents included improved safety and ability to reach their favorite destinations through walking and biking. These improvements would include such elements as improving crosswalks, more greenways and sidewalks, adding paved shoulders for bike lanes, and greater education for increased driver awareness.

No pedestrian and bicycle count data is consistently being collected for the region.

The goals and recommendations outlined in the BCD Walk-Bike Plan will be integrated into the CTP/LRTP. The bike and pedestrian network established by Walk Bike BCD should be included in the CTP/LRTP. A collaborative approach to funding and implementation will ensure the strategic growth of the bike and pedestrian network across the BCD region.

People Pedal CHS Plan, 2017

The 2017 People Pedal Charleston is a collaboration between Charleston Moves, the City of Charleston, and the Civic Design Division to establish a connected network of bike lanes on the peninsula. The fundamental goal of the People Pedal Plan is to dramatically increase the rate of bicycling trips on the Charleston peninsula. The Plan calls for a robust bikeway network, including corridor and intersection improvements, to achieve this vision.

Network recommendations were developed based on extensive community surveys, project team field work, and best practices. At the core of the network development approach is the concept of identifying infrastructure needs on unsafe corridors that disrupt discrete pockets of streets that are already safe to bike on. This plan was reviewed and adopted by the City of Charleston's Bike and Pedestrian Advisory Committee.



➤ Recommendations in Need of Close Coordination

The phased recommendations outline first improving existing facilities and piggybacking on planned improvements, then establishing a “Minimum Grid” of corridors essential to mobility for people on bikes, and then filling out the network with long-term improvements. This can easily be incorporated into the Charleston Citywide Transportation Plan.



BCDCOG Park & Ride Study, 2017

In December 2016, the Berkeley-Charleston-Dorchester Council of Governments released a request for qualifications from qualified consultants to assist in the development of the BCDCOG Regional Park & Ride Study. This Park & Ride Study will serve as the base document for all park & ride facility plans. The study will establish guidelines to identify current and future needs for park & ride facilities, develop site selection criteria to locate potential park & ride sites, and develop an implementation strategy to invest in those facilities.



➤ Recommendations in Need of Close Coordination

The demand for greater commuter services and mobility options is drastically increasing with the growing population in the BCD area. Expanding public transit options including park & ride facilities will be an important component of Charleston Citywide Transportation Plan. The recommendations from the Park & Ride Study will be incorporated into the Citywide Transportation Plan.

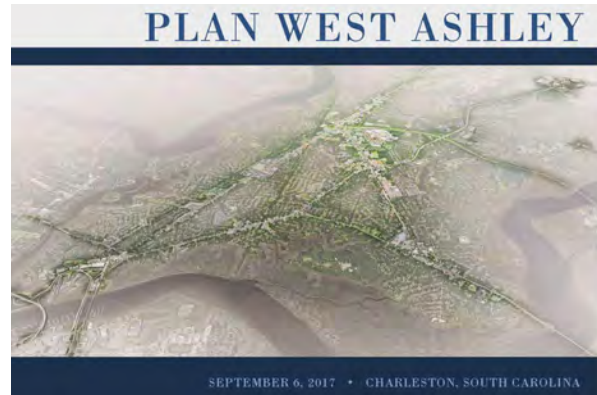
➤ Joint Funding Opportunities

As regional multimodal projects develop, there may be joint funding opportunities between the BCDCOG Park & Ride Study and the Citywide Transportation Plan.

Plan West Ashley, September 6, 2017

Plan West Ashley will serve as the overarching planning document for shaping future development in the West Ashley area that enhances the quality of life and protects the area's historic, cultural, and natural environment. The Plan sets policies and identifies specific public and private actions aimed at accomplishing the five key goals established by the plan which include upgraded community design and land use, connected transportation, resilient infrastructure and sustainability, affordable housing, and focused economic development.

Plan West Ashley recommends a holistic approach to transportation planning in order to create a West Ashley that is more connected, not only within the West Ashley neighborhoods but also with the greater Charleston area. Plan West Ashley establishes methods to provide connections through meaningful transportation options and land-use development that supports mobility, walkability, livability, and sustainability. With the growing population and expanded residential development, traffic congestion is a primary concern for the West Ashley area. Key transportation goals include providing greater vehicular capacity and safety improvements in targeted locations, providing better pedestrian and bike safety, expanding greenways and bike lanes, investing in public transit enhancements and expansion, and creating more efficient connections across the Ashley River.



➤ Past Public Comment

Plan West Ashley provides an in-depth analysis of public comments received via a number of sources, including community input workshops, a public design charrette, email, and social media. Citizens of West Ashley voiced strong desires for better pedestrian and bike safety, expanded bikeway and greenway networks, and improved streetscape aesthetics.

➤ Available Data

Much of the same data from Plan West Ashley will be used in the CTP/LRTP including GIS data, traffic models, and demographic data.

➤ Recommendations in Need of Close Coordination

Much of the Plan West Ashley recommendations, in particular the transportation and mobility goals, will be included in the Citywide Transportation Plan. Many of the desired goals for the West Ashley area are reflective of the overall vision for the greater Charleston region.



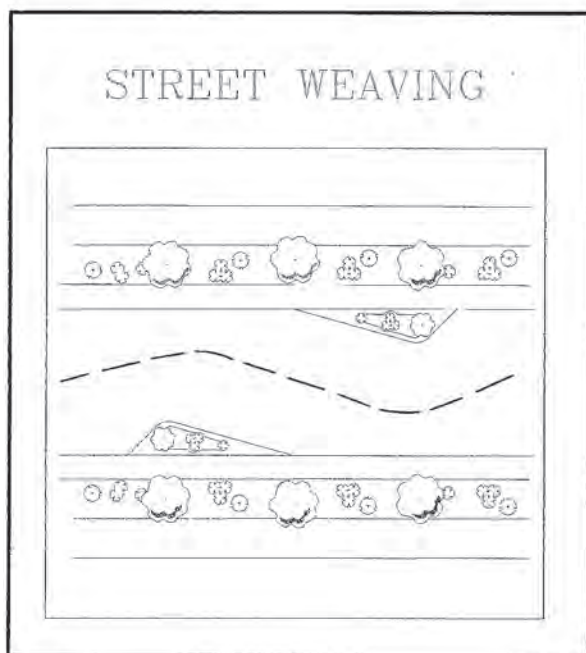
Neighborhood Traffic Calming Program, 2000

The City of Charleston Department of Traffic and Transportation release the Neighborhood Traffic Calming Program in the wake of a dialogue started by several City neighborhood associations.

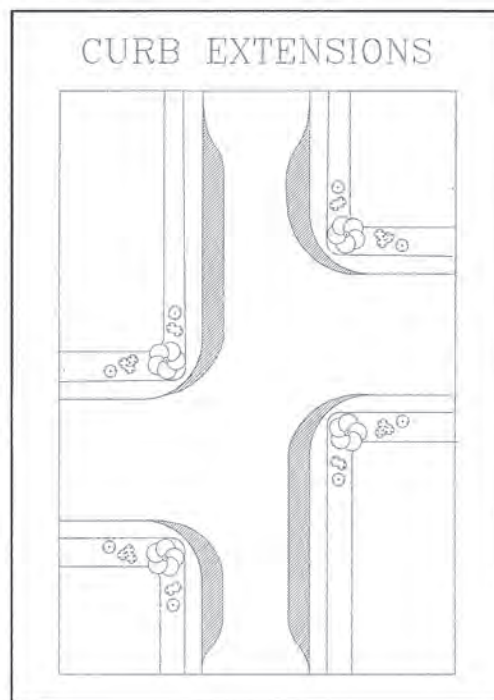
In 1996, these associations approached the City to discuss the negative impact vehicular traffic was having on their neighborhood streets. Common concerns were speeding, cut-through traffic, excessive vehicular volumes, and noise that were impacting physical and perceived safety and the overall quality of life for residents. The result of these discussions led to City Council voting to reducing to the neighborhood street speeds from 30 mph to 25 mph citywide.

From these efforts, the Department developed the Neighborhood Traffic Calming Program. The four objectives laid out are to improve neighborhood livability, to promote safe and pleasant conditions for non-motorized users, to encourage citizen involvement for all phases, and to use City resources by prioritizing traffic calming projects.

NEIGHBORHOOD TRAFFIC CALMING PROGRAM / NTCP
Department of Traffic & Transportation
City of Charleston



NEIGHBORHOOD TRAFFIC CALMING PROGRAM / NTCP
Department of Traffic & Transportation
City of Charleston



► Recommendations in Need of Close Coordination

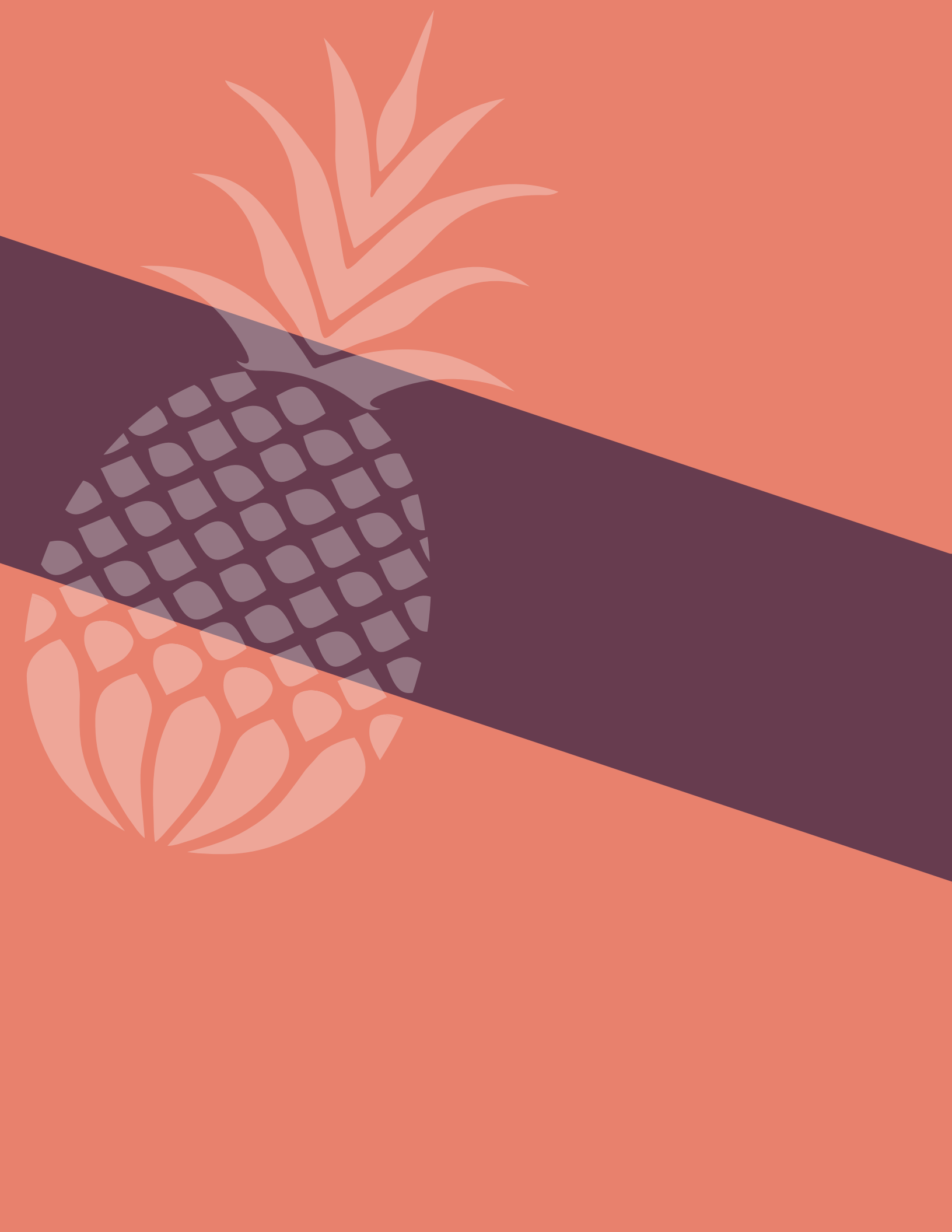
The program is dedicated to using traffic calming devices only on local residential streets within a defined neighborhood. As such, the non-residential traffic should be directed to collector streets and arterials that service the region. The Charleston Citywide Transportation Plan aims to unify efforts to improve connectivity for the City in all districts. With main and major thoroughfares being improved and becoming better routes for all modes of motorized and non-motorized travel, cut-through traffic can be reduced. Through coordination, neighborhood streets can use traffic calming alongside suggest corridor and intersection improvements and implemented bicycle and pedestrian connections, and the overall transportation system in the city can be improved.



Additional Plans within the Holy City

Plan Name	Date	Recommends			Summary & Significance	Relevance to Charleston Citywide Transportation Plan
		Project	Policy	Other		
James Island Connector Bicycle Safety Analysis	Oct 2015	X			James Island and the Peninsula are separated by the Ashley River and the Connector is a 4-lane divided limited access highway that bridges three distinct areas of Charleston together, and as of the beginning of the report, bicycles were prohibited on this major crossing. The study was to review the feasibility of allowing bicycles along this major connection as cycling has grown increasingly important.	The study found the best solution to open the full length of the connector to cyclists, but restricting certain on- and off-bound ramps and providing alternate access points in combination with coordinated safety improvements.
Peninsula Mobility Report	Nov 2014			X	The Peninsula Mobility Report was drafted to examine the current conditions of transportation in Charleston and hypothesize the changes as alternative modes of transportation grow in popularity.	The report makes recommendations for the next 2-10 years, including bringing back the trolley system, adding tourist center, placing parking decks in key locations to access other transportation modes, and making a number of pedestrian and bicycle improvements.
Sam Rittenberg Corridor Report	Oct 2014	X		X	The City of Charleston Design Division in the Planning Department produced a report studying several sites in the city and proposing design based solutions to benefit the city and the community around the sites. The Sam Rittenberg corridor in West Ashley can potentially be reduced to a 3-lane road from 5- and 7-lane sections, leading the City to explore how the road can change in form through this reduction.	The study proposes a separated cycle track, fitting into the existing bike network in the area, and redesigning intersections for safe bike crossings, as well as widening sidewalks and including more tree plantings. Such changes would support redevelopment of retail areas along the corridor.
Citadel Mall Report	Oct 2014	X		X	The City of Charleston Design Division in the Planning Department produced a report studying several sites in the city and proposing design based solutions to benefit the city and the community around the sites. This includes a long term redevelopment and revitalization plan for Citadel Mall in West Ashley.	The Citadel Mall sits where Sam Rittenberg Blvd and I-526 meet Highway 17, three high volume roadways in West Ashley.
The Upper Peninsula Planning Study	Sept 2014		X		The City of Charleston Design Division in the Planning Department produced a report studying several sites in the city and proposing design based solutions to benefit the city and the community around the sites. The Upper Peninsula was primarily light industrial use, and as the population of Charleston grows and industries shift, the City has the opportunity to revitalize a large swath of area.	The report recommends complete streets in the redeveloped Upper Peninsula, with sidewalks, cycle tracks, on street parking, and pedestrian islands for safe crossings. With the level of mixed use redevelopment proposed to support multimodal, the plan promises for a vibrant, walkable future of this area.
John Island Community Greenway Plan	Oct 2010	X			The City recognizes the growth coming to Johns Island and sought out to accommodate this growth with setting forth the infrastructure for cyclist, providing the opportunity for bike commuting and recreation for the existing and incoming community.	The Community Greenway Plan proposes a network of pedestrian connectivity along roads, through communities, and connects existing trails and destinations.
Calhoun St E/Cooper River Waterfront Plan	Feb 2010	X		X	The Calhoun Street corridor leads to the Cooper River Waterfront, making for a prime area for development and aesthetic improvements, akin to some of Charleston more scenic areas. This area plan envisions a quality public space that supports multimodal transportation among its goals.	The plan proposes pedestrian oriented streets with bicycle accommodations and offers redesigns for many of the intersections in the area to support these goals.
John Island Community Plan	Nov 2007	X			The Johns Island Community Plan was developed to preserve the community's character in the face of unprecedented growth to the region in an effort to guide development appropriately. The plan explores the different planning and development patterns and methods.	The plan notes recommendations for Maybank Highway such as the potential I-526 Interchange, building a parallel roadway to preserve tree canopy, and configure the land use in 'town' and 'country' nodes.

Table 1-1





Existing Conditions



Just as the public and stakeholders in the planning process can tell us about their transportation issues and needs, the data can also refine an understanding of current conditions. In the Charleston Citywide Transportation Plan, both the numbers and the views of the city's people create a picture of current issues and where the future of transportation should go.

“Numbers have an important story to tell. They rely on you to give them a clear and convincing voice.”

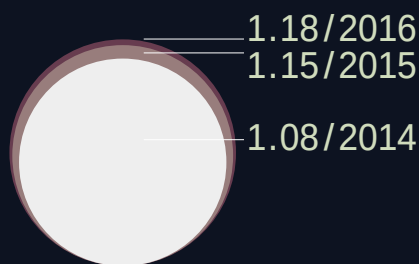
—Stephen Few, Author

Traffic & Accident Review

Crashes create a tremendous burden on the people involved in the crash, their families, and on society in general, with impacts radiating outward to health care, workplace productivity, insurance, and emergency response systems. Not all cities and places are equally subject to crashes. Influences include the following, some of which are directly under the control of city officials and designers, and some of which are not.

Crash Factor	City Control?
Design (geometry)	✓
Vehicular Speed	✓
Condition of Driver	✗
Population Age	✗
Climate / Weather	✗

Crashes per 100 Million VMT/Year



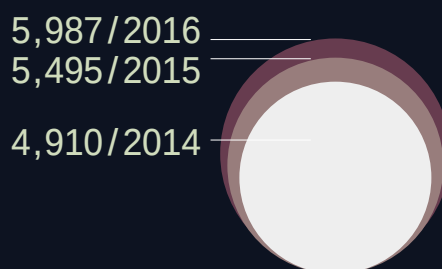
Nationwide, crash rates per 100 million vehicle miles of travel (VMT) have risen by over 9% in three years, representing a reversal from prior trends. The number of crashes that occurred between 2014 and 2015 was the highest one-year increase since 1963-1964.

A key consideration is that the population of drivers is aging rapidly. Between 2006 and 2015 the number of drivers aged 65 and over rose by nearly 34%. Older drivers are more prone to physical limitations that increase the likelihood of causing or being in a crash.

Of even greater concern is the trend in pedestrian crashes from drunk drivers: up nearly 22% from 2014 to 2016. Pedestrian crashes are becoming more deadly, too: pedestrian fatalities are up 23.5%.

Nationally, fatal pedestrian and bicyclist crashes are at their highest levels since 1990 and 1991, respectively.

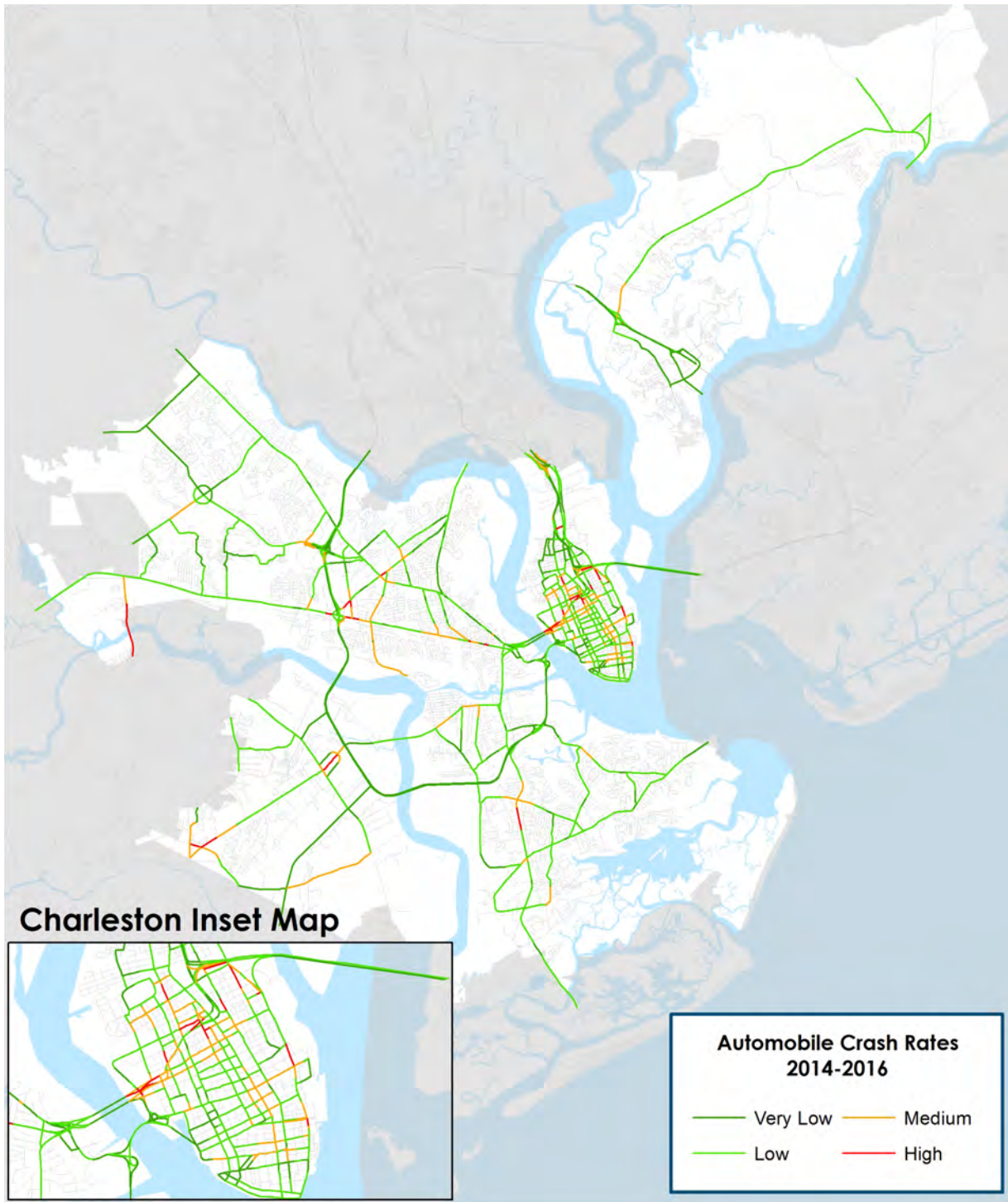
Pedestrian Fatalities / Year



**CRASH TRENDS:
Not Getting Better**

Source: NHTSA's National Center for Statistics and Analysis

Figure 2-1



Crash rates in Charleston present a better picture of dangerous locations than just number of crashes, since they account for the number of travelers.

Some locations in the Peninsula do stand out in this analysis, but so do some

roadways in John's Island and West Ashley.

Crashes involving pedestrians or cyclists (Fig. 2-3) indicate a predominance of crashes occurring along major arterials, such as US 17.

Source: SCDOT Department of Motor Vehicles, Charleston Police Department

Figure 2-2



▼ Pedestrian and Bicycle Crash Map

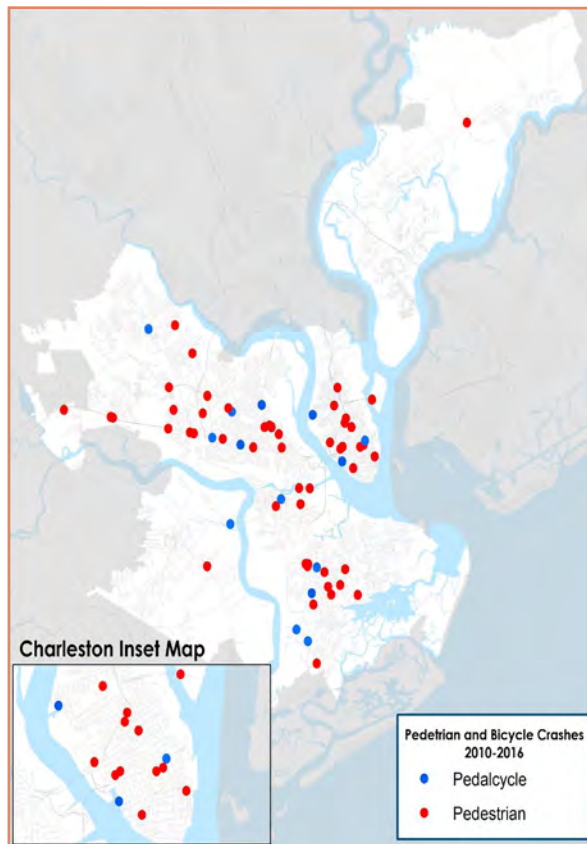


Figure 2-3

The relationship between traffic crashes and traffic volumes is not straightforward. While the number of crashes tend to increase as more people, cars, and trucks use a particular roadway, the number of fatalities and severity tend to decline since the travel speeds decrease. However, it is noted that Charleston County has repeatedly led the state in bicycle and pedestrian deaths and injuries in recent years.

Repeatedly, the project study team heard about the pace of increase in traffic congestion, the lengthening periods of weekdays that are considered “peak,” and the resulting threats to local, regional, and freight-based economies. The data do not necessarily agree with all of the local perceptions: commute times (2015) are still around 19 minutes on average, compared to 28 minutes for the typical commuter in South Carolina (commutes in other S.C. cities including Columbia, Greenville, and Spartanburg

are also between 19 and 20 minutes). However, commutes from Daniel Island (25 minutes) are a lot different than those on the Peninsula (15 minutes).

As businesses and residents seek affordable land further away, commute times are expected to increase faster. The City’s strong reliance on tourism needs workers that increasingly will have to travel further each day to work. In fact, 45% of service workers have to commute into Charleston every day.

70,722

workers commuted to jobs
inside of Charleston

28,991

workers both lived and
worked in Charleston

34,560

workers commuted to
jobs outside of Charleston

▼ EXISTING MODELED V/C

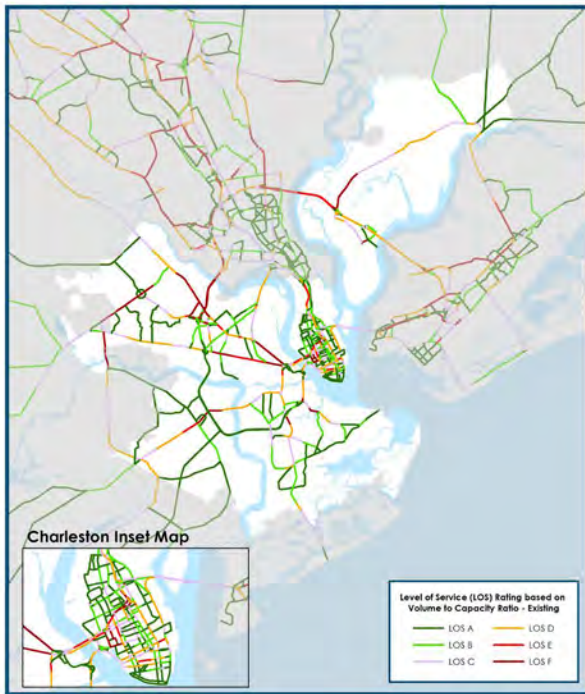


Figure 2-4

▼ 2040 MODELED V/C

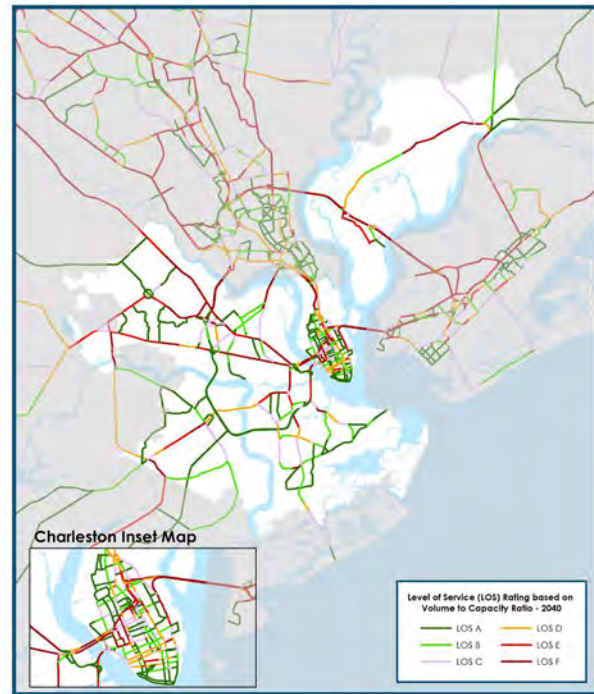


Figure 2-5

The volume-to-capacity maps (Fig. 2-4,5,6) simply indicate the (modeled) number of cars on major roadways compared to the capacity of those roads to carry them. “Hotter” colors indicate roads that are estimated to be carrying more traffic than their comfortable capacity (a V/C ratio of 1.0 indicates a road operating at its maximum capacity).

The existing conditions map (Fig. 2-4) shows 52 miles of roadway having at least moderate congestion (V/C greater than 0.8). Figures 2-5 and 2-6 show projected V/C ratios for 2040. Fig. 2-6 indicates that, even with planned improvements from the previous long-range plan, there are still 85 miles of congested roadway, as indicated by the amount of red seen on the map..

Source: BCDCOG Regional Travel Demand Model

▼ 2040 CTP MODELED V/C

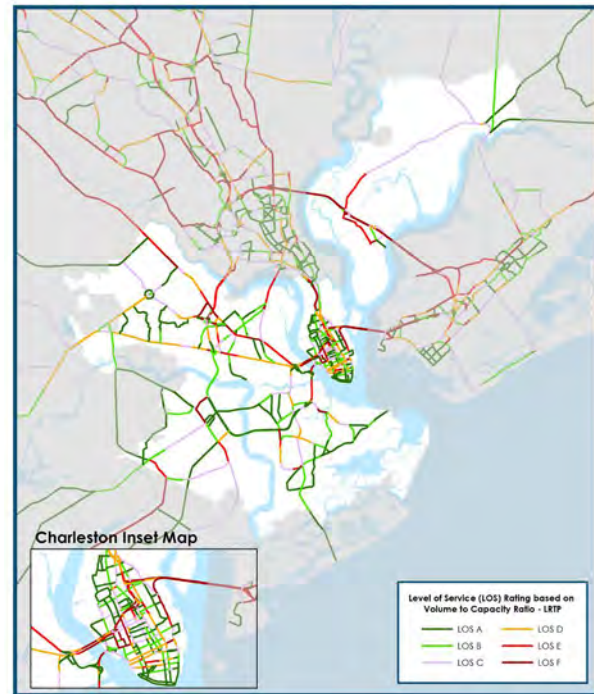


Figure 2-6

Demographics & Trends

The increasing tendency of people and employers to seek lower-price options off the Peninsula, and to satellite suburbs and towns, is one factor that will increase the number of trips being made by automobile, and also increase the length of those trips. Deliveries and services to these areas, including emergency response, utility repairs, and new infrastructure, will all be made more costly to overcome greater distance. A dispersed development pattern exacerbates issues associated with a rapid rate of population and employment growth in Charleston and the surrounding region.

“In addition to eight rate increases already approved under the Base Load Review Act, SCE&G has adjusted its electric rates another 13 times since 2009 resulting in an additional \$6.30 net increase to residential customers’ monthly bills, according to the state’s Office of Regulatory Staff.

All told, the average monthly residential electric bill will have increased from \$114.20 at the start of 2009 to \$148.11 if the new rate increase is approved — a 30 percent increase....”

— David Wren, “Rate hike request SCE&G’s largest yet,” *The Post and Courier*, June 27, 2016



20,005

Households paying 30% or more of income in housing

\$478 million

Total Spent Annually in Charleston on Personal Transportation

\$7,800

Total Spent per Person on Personal Transportation



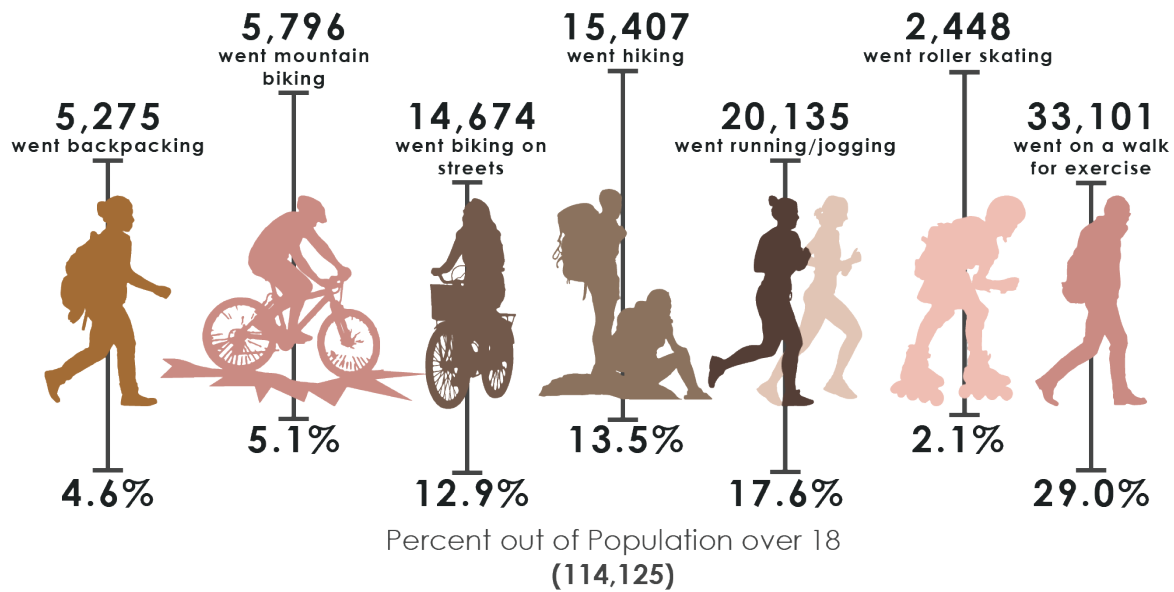
▲ Percent Commute to Work, by Travel Mode
Source: US Census Bureau

People pay a lot for their transportation in Charleston - nearly 40% of households are paying one-third of their income for it.

The increasing congestion and expense are having one positive side effect: more people are exploring other travel options like walking and working from home.



In the Last Twelve Months



over 73 miles
of trails have been built in the City of Charleston to date



4,980
Households
with No Vehicle
Available





Needs for Charleston

The preceding discussions focused on input received from the public as well as technical assessments of transportation issues in and needs of the City of Charleston. Based on this discussion, a number of concepts are readily put forward to help direct the goals and mix of project and policy recommendations contained in the remainder of this report.

Pleasant findings along the way:

- **The City captures a large part of the historic growth.** The City has held its own in terms of capturing both new residents and new jobs coming into the three-county region. The percent of employment in Charleston compared to the entire MSA for example, hasn't shifted much from about 18% since 2000 to 2014.

(source: US Business Census)

- **Charleston's transit system has been improving - a lot.** The transit systems in other southeastern cities - which often struggle to create new services or even maintain existing service levels in the face of declining ridership - need to take note of Charleston. The per-rider costs have fallen 16% since 2008, from \$4.56 per rider to \$3.81 even as the number of CARTA's riders has risen by 39%.

(source: National Transit Database)

- **Charleston is a city that is thriving on a diversity of people, cultures, and economies.** Charleston's resident workers, as well as the workers coming in from outside the City, continue to be employed across diverse sectors including health care and education. Similar racial diversity to the State and \$8,000 more in annual household income on average, coupled with lower unemployment, are remarkable.

(source: US Business Census)



5.3

New Residents

People | Still Love Us

Between 2005 and 2015, over five new residents arrived every single day in Charleston.



10.2

New Employees

Jobs | Still Love Us, Too

Between 2005 and 2015, an average of more than 10 new employees started work every day in Charleston.



7%

Live & Work Here

Working | Away

Between 2005 and 2015 the percent of those who lived *and* worked in the City dropped by 7% compared to those that commuted into and/or out of the City each day.



A Confined Working Space

Charleston is Unique, and Ordinary Won't Work

Rivers, historic districts, buildings and trees abutting existing roads - all make road widening and better connections problematic. What might work elsewhere has limited applicability here, so innovation, technology, and alternative modes have to rise to meet the challenge.



A Great Place to Be

Whatever the Problems, People are Still Arriving

The City of Charleston has absorbed its fair share of population and employment gains compared to three surrounding counties -between 2000 and 2016, the share of population in Charleston compared to Berkeley, Charleston, and Dorchester counties stayed around 18%. People will keep coming to, and driving in, Charleston.



Good Day for a Walk

More People are Walking, Riding, and Busing

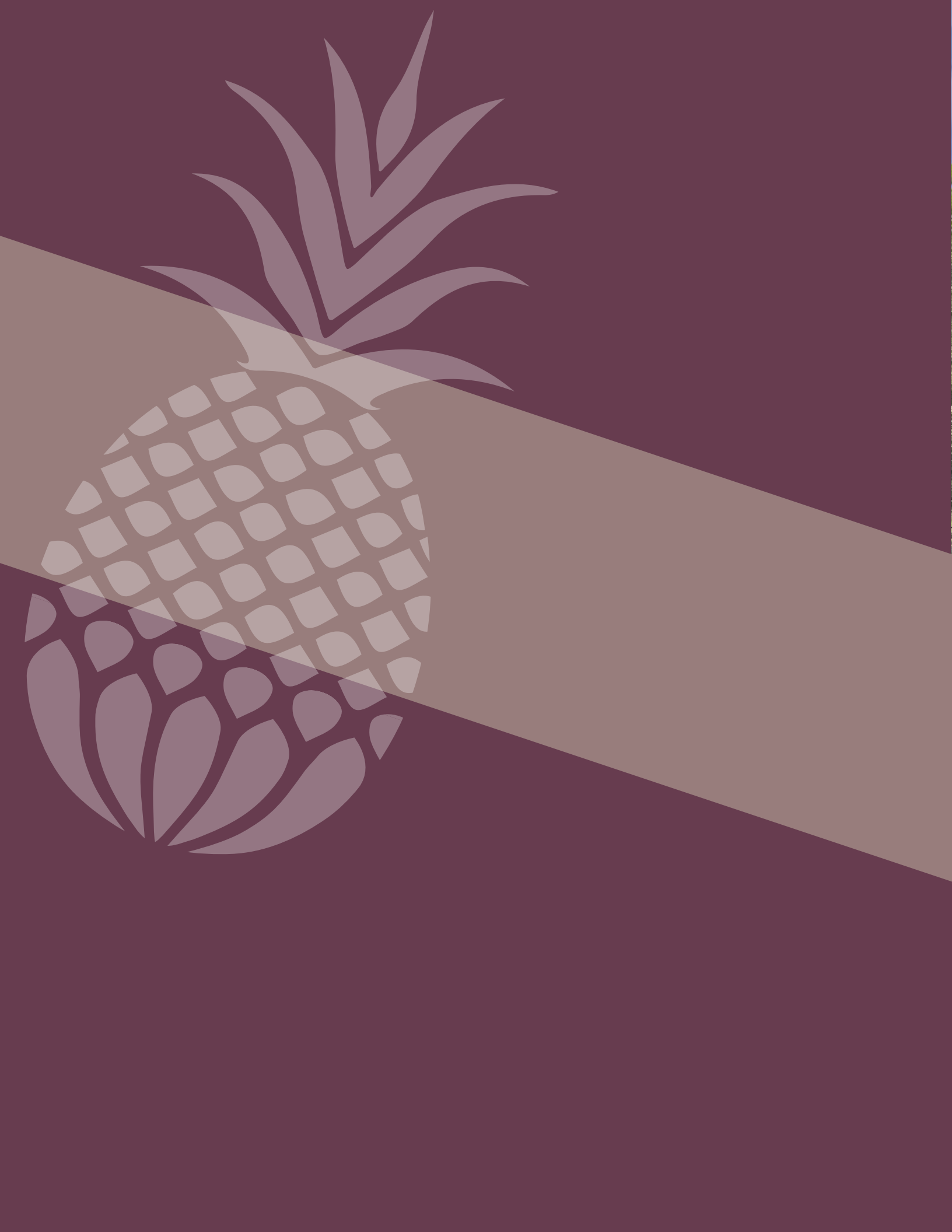
Transit ridership on CARTA, the primary public transportation provider, has soared. Over 4.5 times as many riders took CARTA in 2015 than in 2005 (increase of 361%). Over 8% of people walked or biked to work in 2016, well above the national rate.



Safety is Paramount

A VisionZero Policy will Require a Different Vision

Charleston had the 11th-highest pedestrian fatalities per 100,000 population in 2016 (Smart Growth America), an ill omen for a place where walking is preferred or a necessity for many people. Few streets have bicycle facilities, but making room in limited rights-of-way will require a very different mindset that de-prioritizes vehicular throughput.





Recommendations



Overview

This section of the Charleston Citywide Transportation Plan will be the one that people turn to the most going forward. After this CTP is finished, the real work begins for the staff, South Carolina Department of Transportation, and their many partners and advocacy agencies.

There are some significant challenges that Charleston and its surrounding region – and the two cannot be entirely spoken of separately since they exist in an increasingly symbiotic state – that these and other transportation providers have to acknowledge to be successful.

The following is a brief overview of those challenges and where they have been supported in this study and through other sources. The recommendations in this plan provide the response to those challenges.

“If you plan cities for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places.”

—Fred Kent, Project for Public Spaces

Financing the Solutions.

The current era, and most likely the situation for the foreseeable future, is that the large funding streams coming from state and federal governments have been flat or diminishing, especially compared relative to population increases in the greater Charleston Region. The federal gas tax, for example, has stayed at 18.4 cents for over two decades and is not pegged to inflationary or other, transportation-specific cost increases (Fixing the Highway Trust Fund and/or Re-evaluating the Federal Role, University of Denver Transportation Institute). The appetite for tax increases to return the funding formula to that earlier state is notably lacking. However, South Carolinians have shown a willingness to finance project-oriented bonds managed by its counties. This Plan acknowledges that practical orientation by identifying 13 specific projects to undertake.

Land Use and Transportation Linkages.

Repeatedly, concerns were expressed by residents about the need to better account for how new land developments may influence transportation performance. This linkage has a more complicated relationship to the people of Charleston than just roadway levels-of-service. Serious issues of social equity to lower-income, minority, youthful, and elderly populations; creating intensive, walk- and bike-oriented neighborhoods; and sustaining local business efforts are at least as important to many Charlestonians as traffic congestion. In fact, 72% of those surveyed (sample size is 185) agreed that the misalignment of land use and transportation is the most important issue facing their city.

Complete Streets.

In that same survey, respondents noted that maintenance (43%), bicycle facilities on Rutledge, King, and Folly (between 28% and 48%), and additional travel lanes on US 17 and Ashley River Road were the most important issues to them. Overall, while 27% of respondents noted that traffic/congestion was the single most-important issue facing transportation in Charleston, providing for all modes of transportation and connectivity were close second-place concerns to focus upon. The idea of complete streets matches this range of concerns: vehicular mobility, walking, bicycling and public transit need to work with land development, design and other factors to meet the needs of everyone that wants to go from one place to another. One-size-fits-all approaches don't work in Charleston, since the city consists of diverse areas like West Ashley, Kiawah, and the "Neck" that have varying design, history, and community contexts. The projects and recommendations contained in this plan respect that diversity. The policy recommendations that support this effort are noted in the Implementation and Policy Chapter of this plan.



Existing Bicycle and Pedestrian Infrastructure Map

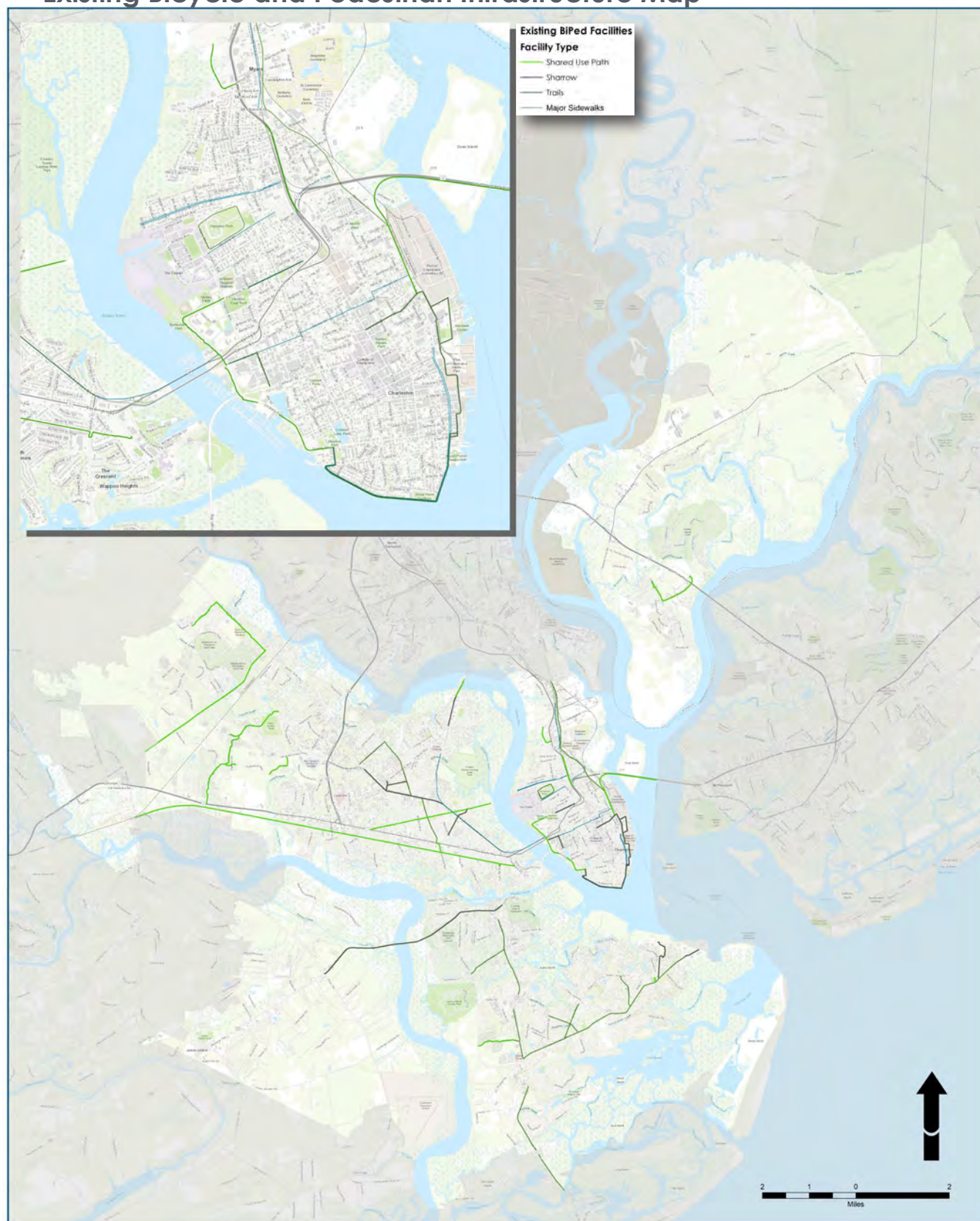


Figure 3-1: Existing Bike and Pedestrian Infrastructure Map

Bicycle & Pedestrian Mobility

In a city that is keenly aware of its history and the role that history plays in the present, the fact that the first streets in America were paved to smooth the way for bicyclists riding metal-rimmed “boneshakers” should be appreciated. The small city blocks, often less than 400 feet from corner to corner, are prevalent in the Peninsula “Neck,” but some of that small block feel was retained in the more recent, off-neck areas of West Ashley and John’s, Daniel, and James’ Islands (although block lengths are sometimes 750’ or more). The benefit of these small blocks is apparent both in the density and diversity of land uses that results when shorter walking and biking distances are put into place. Driving is more difficult, comparatively, simply because the driver must continually slow and consider side friction from streets and driveways. Walking and biking have important roles in Charleston for other reasons:

- Active modes of transportation provide a great way to exercise and reduce the propensity for being overweight or obese, which in turn reduces several types of chronic disease and improves mental health;
- The economy of Charleston depends in large part on hotel, food, service, and related industries that support the many tourists that come to the City to walk and bike through its neighborhoods, patronize its businesses, and enjoy recreation from the Battery to the beaches; and
- The narrow, well-connected street system, sidewalks, and growing trail and transit systems create alternatives to owning a private car for basic travel needs – an important aspect of congestion reduction and travel reliability as well as providing an equitable system of travel to those that may be unable to afford private transportation.

The projects outlined in this section focus on strengthening these benefits, while addressing some of the concerns that survey respondents and meeting participants suggested during the planning process. These areas of improvement included bolstering safety, creating important safety improvements, and upgrading maintenance and enhancing the appearance of streetscapes. The issue of safety is a consistent concern throughout many communities, but in South Carolina, which had the nation’s fourth-highest per-capita fatality rate for pedestrians in 2016 (Charleston City also ranked 41st in the most dangerous cities for pedestrians of the 104 cities studied in Smart Growth America’s Dangerous by Design 2016). Equity concerns are also important in explaining patterns of pedestrian crashes in Charleston and South Carolina, with African-Americans disproportionately representing people who walk, take transit, and are injured in pedestrian crashes.





The recommendations for bicycle and pedestrian physical improvements (Fig. 3-2) were derived from several sources. Public surveys and meetings; crash data; local staff input; the project Steering Committee; and previous planning exercises such as People Pedal Charleston and the Walk Bike BCD plans played significant roles in defining locations and recommended improvements. While the overarching ideas as related to bicycle and pedestrian mobility will be discussed here, the details of these recommendations can be found in those documents, including a list of recommended projects.

Following the Recommendations Map Table 3-1 provides some insights on some of the common cycling and pedestrian accommodations and insights on which should be considered for various types of roadways. Note that in some cases of high-volume arterials with many driveways and street intersections, on-road facilities should be abandoned for parallel side paths or greenways.

Future Bicycle and Pedestrian Projects Map

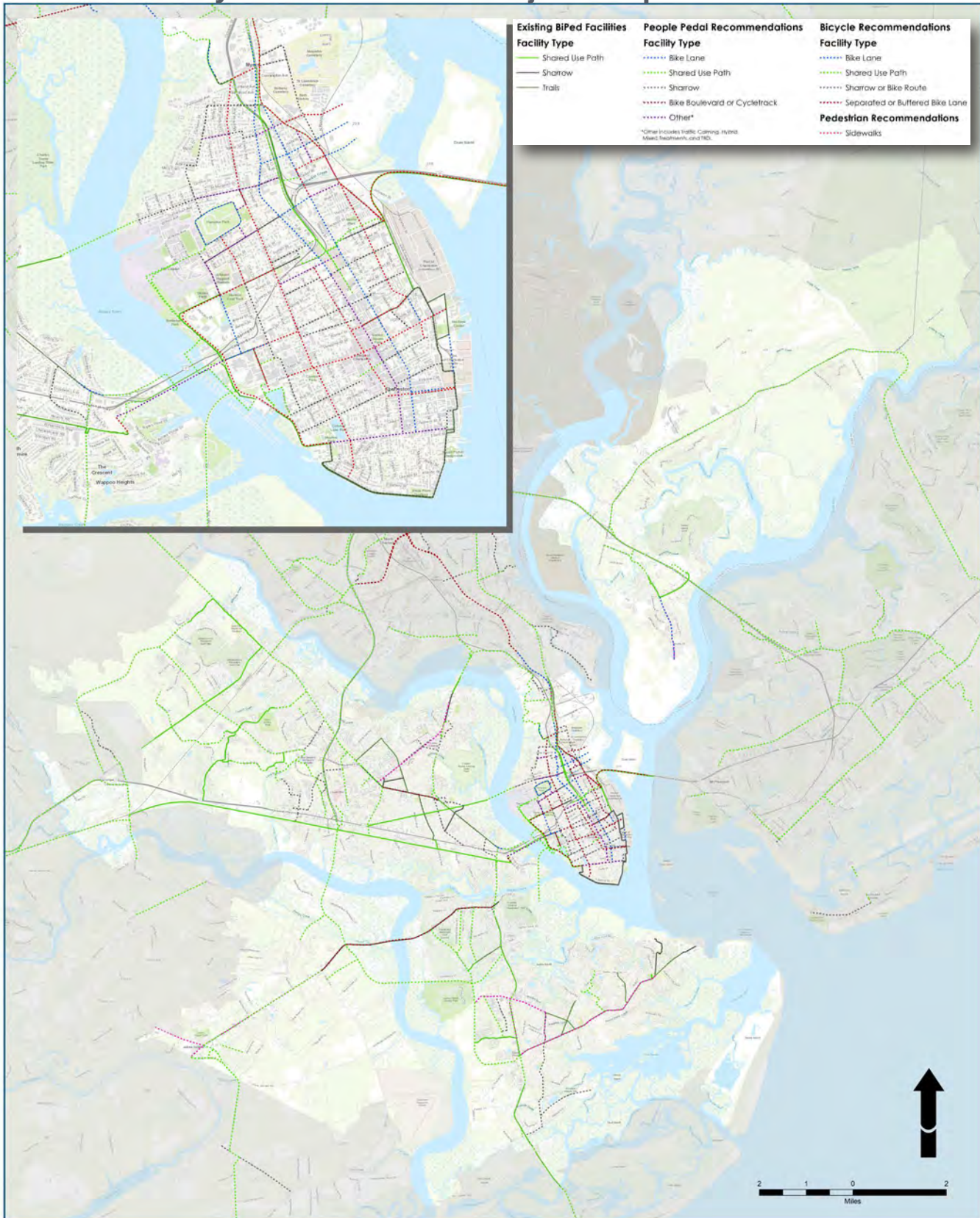


Figure 3-2: Future Bicycle and Pedestrian Projects Map



Bicycle and Pedestrian Facility Types

Facility Type	Type	Width	Surface	Treatment	Function
 Bike Lane	On-Street	4'-6'	Asphalt (same as street surface)	On-street lane striped and signed to SCDOT standards; design should ensure a limited number of commercial driveways and turning movements	For bicyclists on roadways
 Buffered Bike Lanes	On-Street	6'-8'	Asphalt	Same as typical bike lane, but buffered by 1'-2' wide painted stripe or "armadillo" speed bump dividers	For bicyclists on roadways
 Separated Bikes Lanes	On-Street	Varies	Asphalt or concrete	Same as typical bike lane, but lanes are protected by a barrier; i.e. bollards, a short concrete wall, a planted strip, or a raised paved median	For bicyclists on roadways
 Two-way Cycle Track	On-Street	8'-12'	Asphalt or concrete	Similar to a bike lane that is typically one way, a cycle track has two lanes going in opposite directions; can be buffered or separated	For bicyclists on roadways
 Signed Shared Roadway	On-Street	Varies	Asphalt	May either be a low-volume roadway with traffic calming and signage to create a safe shared use environment, OR a higher volume roadway with wide (14' - 16') outside lanes	Used for designated bicycle routes; can include signage and pavement markings, including "sharrows"
 Bicycle Boulevard	On-Street	Varies	Asphalt	Multiple traffic calming treatments combined with bike lanes and or signed shared roadways to create priority streets for bicyclists	Provides a continuous facility on streets with varying widths, volumes and speeds
 Shared Curb Lane/ Sharrow	On-Street	9'-12'	Asphalt	Common facility type in low-speed and low-volume street types; can include signage and treatment markings, including sharrows	Utilitarian cycling on streets which are not otherwise designated as elements of the bicycle network

Bicycle and Pedestrian Facility Types (cont.)

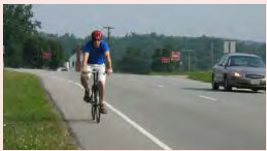
Facility Type	Type	Width	Surface	Treatment	Function
 Wide Curb Lane	On-Street	12'-14'	Asphalt	Smooth pavement, bicycle compatible storm grates; can include signage and treatment markings, including sharrowes	For skilled bicyclists who are capable of sharing the road with motor vehicles
 Paved Shoulders/ Wide Striped Shoulders	On-Street	Varies (min. 2')	Asphalt	The outside lane (in each direction of travel) is widened behind the white edge delineator stripe	For utilitarian bicyclists depending on condition, width, speed of adjacent traffic, and frequency of driveways
 Sidewalk	On-Street	Varies (min. 5')	Concrete	Width and design depends on the street context pedestrian demand; should meet ADA requirements and provide a comfortable space for pedestrians to walk side-by-side	For pedestrians along roadways
 Shared Use/ Multiuse Sidepath	On-Street	8'-14'	Asphalt, concrete or other smooth firm surface	Designed to SCDOT standards. Separated from roadway by planting strip or vertical curbing	Typical application for regional trail and some community pathways and bikeways. Accommodates bicycles, pedestrians, and wheelchairs. Minimizes potential trail crossing conflicts with autos
 Shared Use/ Multiuse Trail or Greenway	Off-Street	10'-14'	Asphalt, concrete or other smooth firm surface	Designed to SCDOT standards. Typically found in or around parks or constructed along old utility lines, like decommissioned railways	Typical application for regional trail and some community pathways and bikeways. Accommodates bicycles, pedestrians, and wheelchairs. Minimizes potential trail crossing conflicts with autos
 Single Track Trail	Off-Street	3'-8'	Natural Surface	Designed to meet International Mountain Biking Association (IMBA) guidelines	Designed for mountain bicyclists; can include a variety of off-road bicycling trail types

Table 3-1: Bicycle and Pedestrian Facility Types



Roadway & Connectivity

In terms of public commentary and observations analysis, it became evident that transportation issues within the City of Charleston was divided between the problems within the Neck of Charleston and those outside. Within the Neck, issues related to poor bicycle and pedestrian mobility and intersection safety treatments were most prevalent. However, within the surrounding fringe of Charleston (i.e., West Ashley, John's Island, Daniel Island, James Island, etc.) issues relative to lack of connectivity, poor access management and peak hour congestion were dominant issues. In both cases, lack of proper maintenance seemed to be consistent across all of Charleston proper.

Other roadways that the public noted as needing improvement included the following:

- Savannah Highway
- Folly Road
- Maybank Highway
- Clements Ferry Road
- Ashley River
- Sam Rittenberg Boulevard

To address the most common concerns brought up by the public - traffic congestion and safety, as well as better connections for biking, walking, transit, and automobiles - several overarching strategies are proposed. These strategies work much better when they are implemented together: each tends to reinforce the others in a “virtuous circle” of improvements.



Increase Capacity: “Build the Road”

It seems obvious: if freight and travelers encounter congestion, then simply expand the capacity of the road(s) to accommodate them. In isolation, such as the case with limited-access freeways and Interstates, this approach makes a lot of sense (although it is often breathtakingly costly to implement). However, in real-world communities, the advantages of bigger roads have to be weighed against needs beyond short-term (and it is short-term in a growing region) congestion relief: right-of-way / private property acquisitions, disruption due to construction, damage to streams, and the costs to appearance

and aesthetics. While this last category of impact is less tangible, it’s impact is felt keenly in communities that have lost, or given away, a sense of place, gentrification, economic vitality, and historic character in exchange for temporary traffic relief. Adding more lanes to a road or intersection as well as building new roads fall into this category. Special considerations for freight are necessary on major truck routes, including intersection design and pavement depth and width, as well as accommodating pedestrians, cyclists, and transit patrons to create complete streets.



▲ Savannah Highway in West Ashley.
Source: Post and Courier



Walk, Bike & Bus Connections: *"Complete the Street"*

Biking, walking, and public transportation are somewhat challenging options in Charleston because of relatively long distances, natural and man-made barriers (bridges, railroads, etc.) and lack of infrastructure. Promoting connectivity through street extensions, streetscaping, and better, safer intersection and street design will continue to improve on critical options to offer relief (and health) to more people in Charleston. A bonus is that more people and businesses are favoring "walkable" communities - as are older populations.



▲ Photosim illustrating a symbiotic relationship between various modes of transportation

Manage Access: “Preserving Precious Road Capacity”

Regardless of how many new roads are built, the benefits don't last long if access to them isn't managed. Driveway spacing standards, left-turn controls (e.g., with medians), and cross-access requirements are key elements of an access management policy. Generally, no roadway should be constructed without strong access management controls in place. This practice can, if implemented consistently and fairly, preserve accessibility to existing businesses, accommodate traffic from future businesses, and grow fiscal revenues without incurring downstream costs for major roadway improvements.



▲ An existing 4-lane divided highway with commercial driveway access along both sides

- ▶ Controlling driveway access can be as simple as adding a sidewalk and connecting existing parking lots, as shown here in this photo-simulation





Collector Streets

Within the peninsula of Charleston, street connectivity is one of the true assets of the community. Street connectivity provides travelers, whether by car, bicycle or by foot, opportunities for trip-making through multiple route options. It provides better opportunities for emergency response vehicles as well as evacuation routing. However, street connectivity within the surrounding districts of Charleston is inadequate due to natural and man-made barriers. That is why it is very important to seize an opportunity for a new street connection when the opportunity presents itself.

Some projects listed herein are already under development; others would be financed by either or both public and private sector sources. For example, the connector streets shown on the map are likely to be under developer requirements. However, these connector streets are intentionally narrow (two lanes), curvaceous (to self-enforce slower speeds), and indirect (to accomplish movement of all types within an area) to reduce cut-through traffic volumes while promoting walking, biking, and low-speed automobile travel.



▲ An example Collector Street

Roadway Projects Recommendations Table

The Roadway Projects listed below are all within Charleston's city limits, including projects that are active or. The first column, Map ID corresponds to a unique number given to each project and can be found on the maps (Fig. 3-X, Y and Z). From there, the project name, limits, length, and type are listed. More details on the projects can be found in the Action Plan Tables in the Implementation section.

The projects are color coded in the table, indicating the source of that recommendation. Projects that extend beyond the Charleston Urban Growth Boundary are noted.

	CTP: This project is being recommended in this plan.
	L RTP: This project has been recommended in the Long Range Transportation Plan that services the region.
	Plan Review: This project has been recommended in a recent plan adopted by the City.
	Visionary: This project has been planned but is either unfunded or not as pressing, so it has been pushed back.
	Committed: This project has already been planned and construction is either underway or forthcoming.

Map ID	Roadway Project Name	Project Limits	Length (mi.)	Type
1	Ashley River Road	Richmond St to Davidson Ave	2.81	Access Management
--	Belvedere Road Ext.	Belvedere Road to River Road (outside of UGB)	1.90	New Location
2	Bohicket Road	Maybank Hwy to River Road (South) (partially in UGB)	7.31	Widening
3	Broad Street	Lockwood Dr to East Bay St	1.18	Access Management
4	Calhoun Street	King St to Concord St	0.61	Access Management
5	Chisolm Street	Broad Street to Tradd Street	0.14	Access Management
6	Clements Ferry Road/St Thomas Island Drive	I-526 ramp - Harvest Time Pl	0.45	Widening
7	Clements Ferry Road	I-526 to Jack Primus Road	3.80	Widening
8	Clements Ferry Road	Jack Primus Road to SC-41	1.01	Widening
9	Colonel Harrison Drive Ext.	Johnson Scott Lane to Colonel Harrison Drive	0.46	New Location
10	Coming Street	US-17/I-26 to Beaufain Street	0.93	Access Management
11	Cosgrove Avenue Bridge	Cosgrove Avenue to Sam Rittenberg Boulevard (partially in UGB)	1.42	Access Management
12	Daniel Island Drive	Fairchild St to Barfield St	0.67	Access Management
--	Doctor Whaley Road Ext.	Doctor Whaley Rd to Old Pond Road (outside of UGB)	0.41	New Location
13	E Battery Street	Murray Blvd to Water St	0.24	Access Management
14	East Bay Street	Water St to Washington St	0.72	Access Management
15	East Bay Street - Washington Street	Intersection	--	Access Management
16	Folly Road	Brantley Dr to Tides End Rd	4.58	Access Management
17	Folly Road	SC-30 Off-Ramp to Highland Avenue	0.64	Access Management
18	Folly Road	Maybank Highway to Johnson Road	0.95	Access Management



Roadway Projects Recommendations Table

Map ID	Roadway Project Name	Project Limits	Length (mi.)	Type
19	Glenn McConnell Pkwy.	Bees Ferry Road to Rutherford Way	0.43	Widening
20	Glenn McConnell Pkwy. Ext..	Bees Ferry Road to Westbridge Connector Road	2.26	New Facility
21	Glenn McConnell Pkwy. Ext.	New Roadway (partially in UGB)	6.99	New Location
22	Goodwill Way Ext.	Goodwill Way to Pinehurst Avenue	0.70	New Location
23	Grove Street	10th Avenue to Rutledge Avenue	0.34	Access Management
24	Grove Street	Rutledge Ave to end of Grove St	0.32	Access Management
25	Hagwood Avenue	Moultrie St to Fishburne St	0.64	Access Management
26	Harbor View Road	North Shore Drive to Mikell Drive	1.86	Widening
27	Hudson Lane Ext.	Hudson Lane to Cape Romain Road	0.37	New Facility
28	I-26 - Port Access Road Exchange Ramp	Interchange (Part of Port Access Road projected)	0.28	New Location
29	I-26 - Spruill Avenue Exchange Ramp	Interchange (Part of Port Access Road projected)	0.13	Removal
30	I-526/Mark Clark Expy	Rivers Ave X'change to Paul Cantrell X'change (partially in UGB)	4.79	Widening
31	I-526/Mark Clark Expy	Bowman Rd X'change to Rivers Ave X'change (partially in UGB)	10.94	Widening
32	I-526/Mark Clark Expy - Paul Cantrell Boulevard Exchange Ramp	Interchange	0.26	Redesign
33	King Street	Columbus Street to Calhoun Street	0.69	Access Management
34	King Street	Calhoun Street to Broad Street	0.70	Access Management
--	Kitford Road Ext.	Kitford Road to Glaze Street (outside of UGB)	0.44	New Location
35	Lemon Lane Ext.	Lemon Lane to Beech Hill Drive	1.05	New Location
36	Mark Clark Expy - US-17 Exchange Ramp	Mark Clark Expy at US-17/Savannah Highway	0.52	New Facility
37	Mark Clark Expy (New Connector Road)	Mark Clark Expy and River Road (North)	0.81	New Facility
38	Mark Clark Expy (New Connector Road)	Mark Clark Expy and River Road (South)	0.67	New Facility
39	Main Road	River Road (North) to Maybank Hwy (partially in UGB)	4.85	Widening
40	Main Road	Interchange (Main Road Phase I)	0.28	New Location
41	Main Road	Interchange (Main Road Phase I)	0.09	Removal
42	Main Road	Bees Ferry Road to River Rd (North) (Main Road Phase I) (partially in UGB)	1.20	Widening
43	Main Road - US-17 Exchange Ramp	Interchange (Main Road Phase I)	0.09	New Location
44	Mark Clark Expy	US-17 to Folly Road	16.19	New Facility
45	Maybank Hwy Pitchfork	River Rd to River Rd	0.51	New Location
46	Maybank Hwy	Stono River Bridge to Main Road	4.84	Widening

Map ID	Roadway Project Name	Project Limits	Length (mi.)	Type
47	Maybank Hwy - Main Road	Intersection	--	Access Management
48	Michaux Pkwy. Ext.	Michaux Pkwy to Ashley River Boulevard (partially in UGB)	1.51	Widening / New Facility
49	Moonbeam Dr Ext.	Moonbeam Drive to River Road	0.26	New Location
50	Murray Boulevard	E Battery St to Chisolm St	0.97	Access Management
51	New Road	Tallent Lane to Reva Ridge Drive	0.50	New Location
52	New Road	Mitnick Lane to Split Hickory Court	0.49	New Location
53	New Road	Clements Ferry Rd to Royal Assembly Dr	0.22	New Location
54	New Road	Beresford Run to Joyner Lane	0.69	New Location
55	Old Towne Road	Sam Rittenberg Blvd to Gunn Ave	1.63	Access Management
56	Rutledge Avenue	Peachtree St to Sumter St	0.97	Access Management
57	Sam Rittenberg Boulevard	Manor Blvd to Cosgrove Ave Bridge	1.40	Access Management
58	Sanders Road Ext.	Sanders Road to Wildcat Boulevard	0.47	New Location
59	Savannah Hwy / US-17	I-26 to Betsy Road	3.49	Access Management
60	SC-61 / Ashley River Road	Raoul Wallenberg Blvd. to Bees Ferry Road	3.18	Access Management
61	SC-61 / Ashley River Road	Bees Ferry Road to County Line (partially in UGB)	7.00	Access Management
62	SC-61 / St. Andrews Boulevard	Wesley Drive to Old Towne Road	1.60	Access Management
63	Sea Island Pkwy.	River Road to Betsy Kerrison Parkway (partially in UGB)	9.39	New Facility
64	Shadetree Boulevard	Cane Slash Road to Sea Island Parkway	0.87	New Location
65	Shoreline Drive Ext.	Shoreline Drive to Colonel Harrison Drive	0.18	New Location
66	Springbok Lane Ext.	Springbok Lane to Monica Court	0.25	New Facility
67	St. Johns Church Road Ext.	St. Johns Church Rd to Charleston Regional Pkwy	0.42	New Location
68	Towne Street Ext.	Towne Street to Jadabell Lane	0.16	New Location
--	Trinkets Loop Ext.	Trinkets Loop to Old Pond Drive (outside of UGB)	0.49	New Location
69	Updyke Drive Ext.	Updyke Drive to River Road	0.77	New Location
70	US-17	Hagood Ave to Coming St	1.64	Access Management
71	West Bridge Connector Road	SC-61 to Glenn McConnell Parkway Extension	1.54	New Facility
72	Zelasko Drive Ext.	Cane Slash Road to Shadetree Blvd	0.29	New Location

Table 3-2: Recommended Roadway Projects



Roadway Projects Recommendations Map

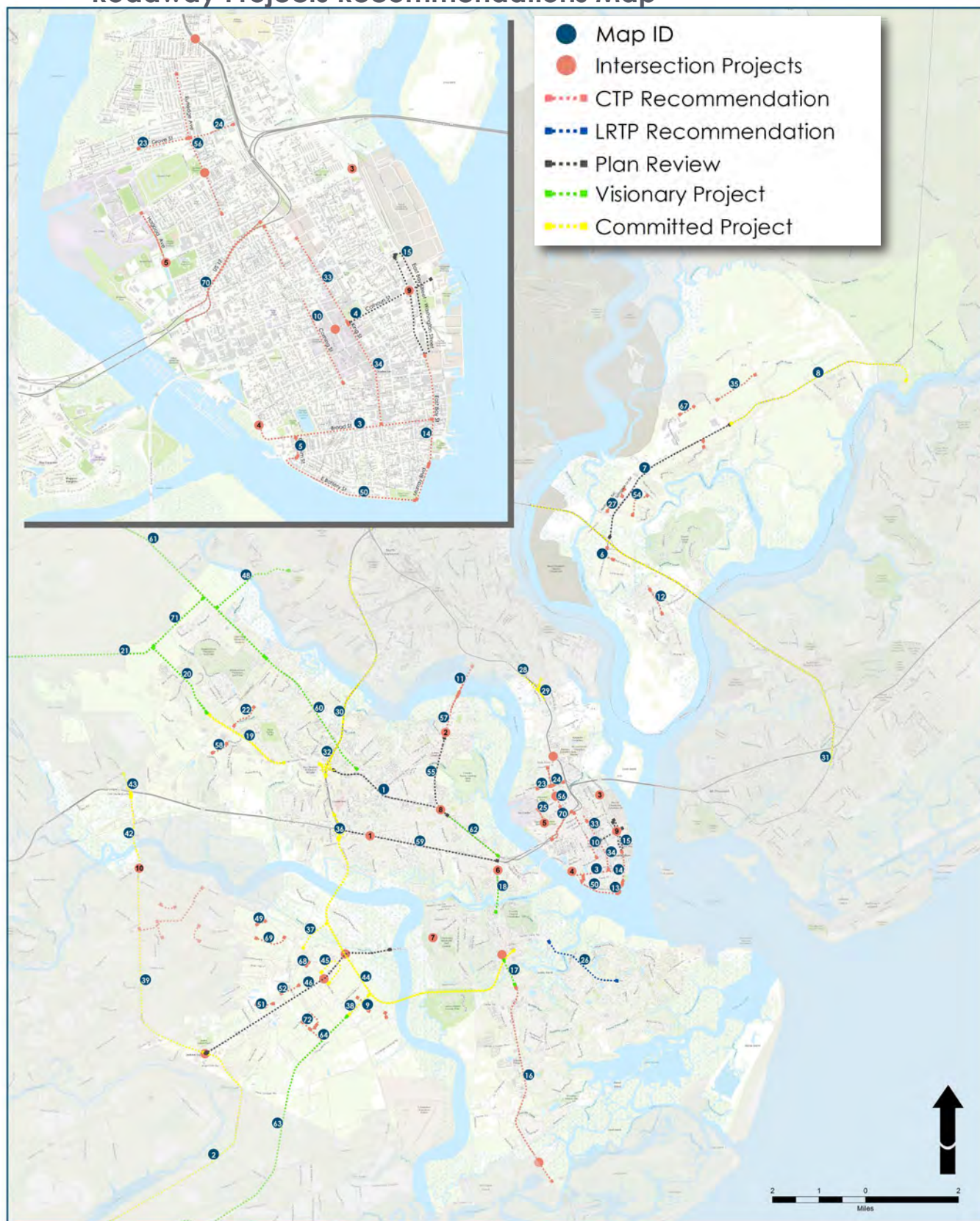


Figure 3-3:: Recommended Roadway Project Maps

Roadway Projects Type Map

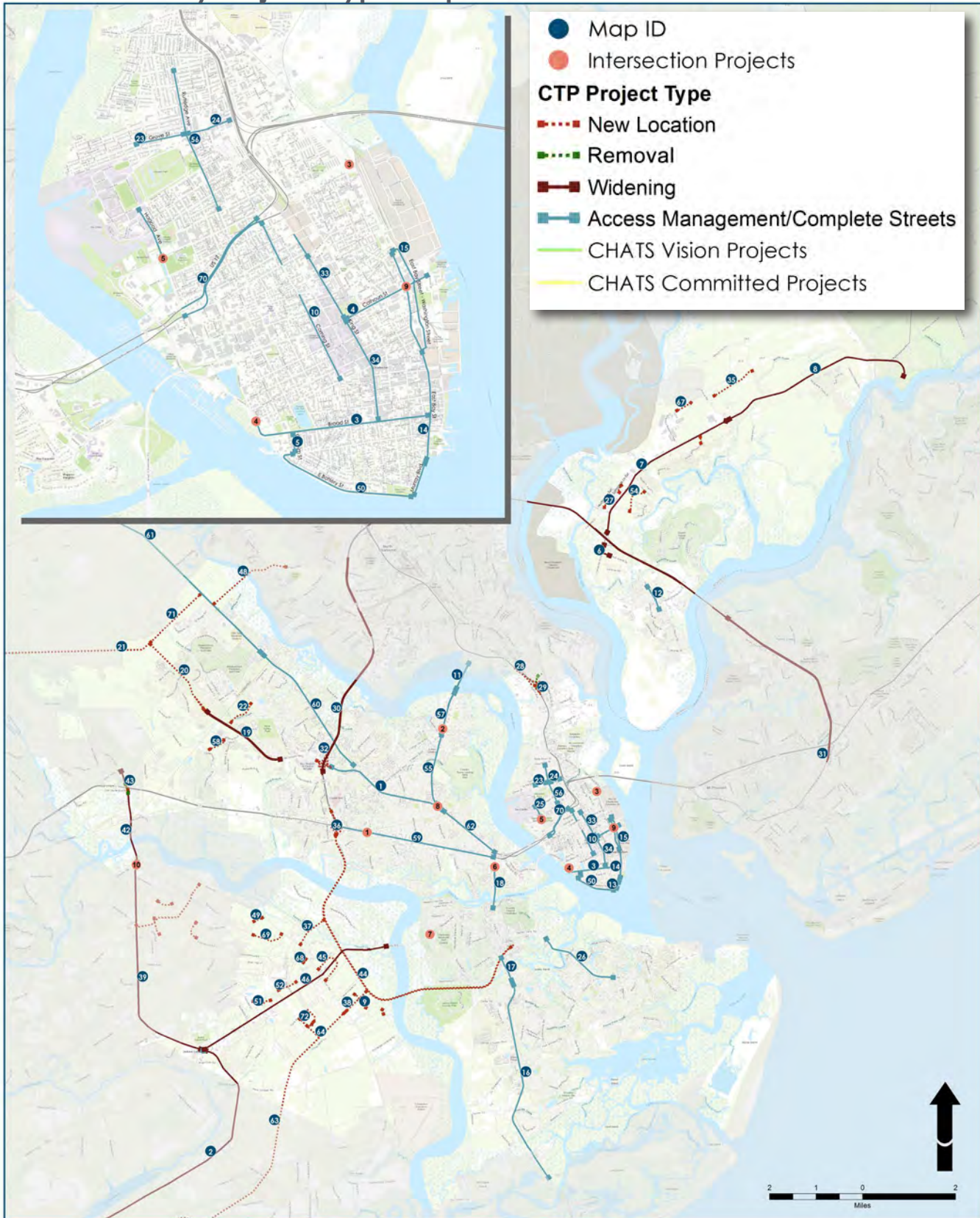


Figure 3-4: Recommended Roadway Projects Type Map



Recommended Cross-Sections

Figure 3-5 presents the typical cross sections as well as the laneage for the roadways proposed for improvements in Charleston. In determining the recommended cross-sections for each roadway, not only roadway recommendations, but also pedestrian and bicycle recommendations were considered. The recommended cross-sections are color-coded to correspond directly to the laneage illustrated on the Roadway Recommendations Laneage Map (Fig. 3-6), with violet indicating a 6-lane section, green indicating 4-lane sections, and red denoting either 2- or 3-lane section.

For the 2-, 3-, and 4-lane sections, multiple cross sections are presented to indicate possible pedestrian and bicycle improvements that may accompany the roadway. (Fig. 3-7 to 16) Final design will determine the ultimate cross-section of the roadway. The total right-of-way widths along with an example facility are listed with each cross-section.

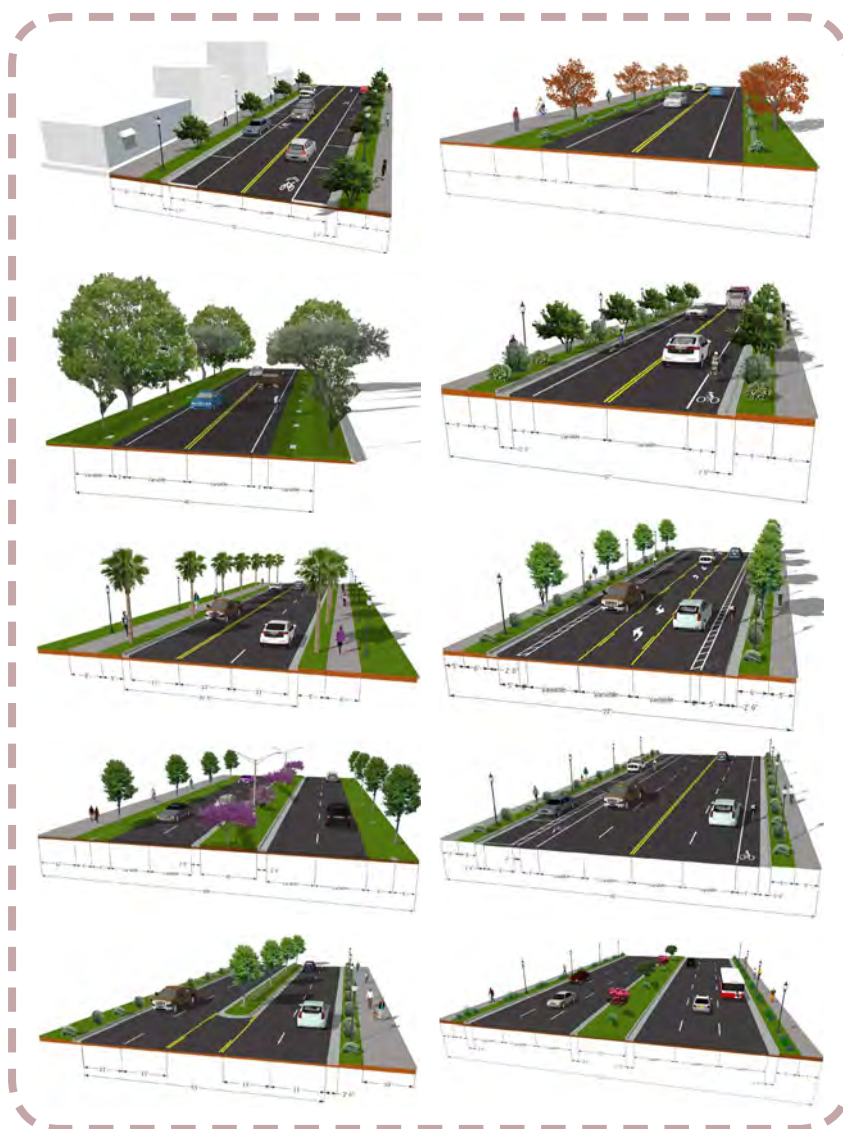


Figure 3-5: Recommended cross sections for Charleston

Roadway Recommendations Laneage Map

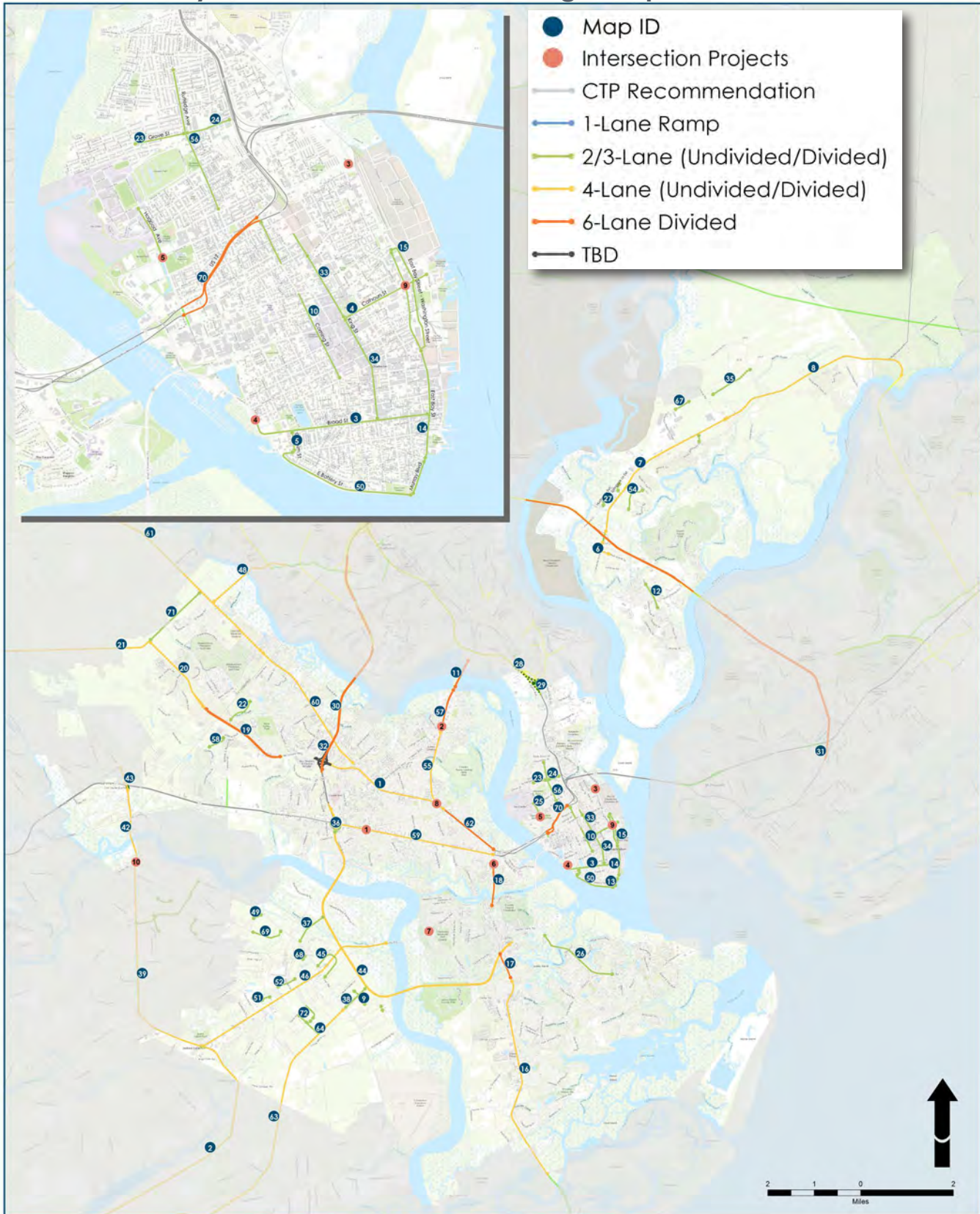


Figure 3-6: Project Laneage Map



2-Lane Cross Sections



- ▲ 2-lane, undivided roadway with sharrow markings, parallel on-street parking, gutters, curbs, planted strip, and sidewalks on both sides, with a wider sidewalk in front of commercial storefronts

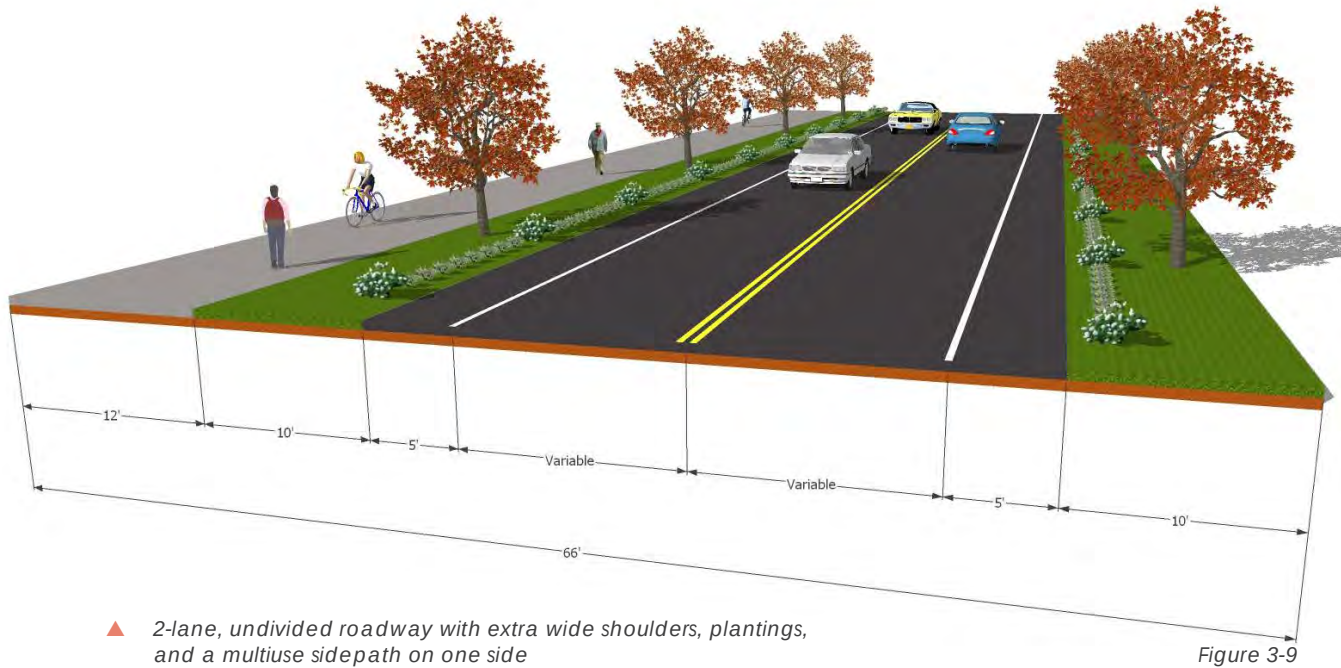
Figure 3-7



- ▲ 2-lane, undivided roadway with bicycle lanes, curbs, gutters, and sidewalks on both sides

Figure 3-8

2-Lane Cross Sections (cont.)



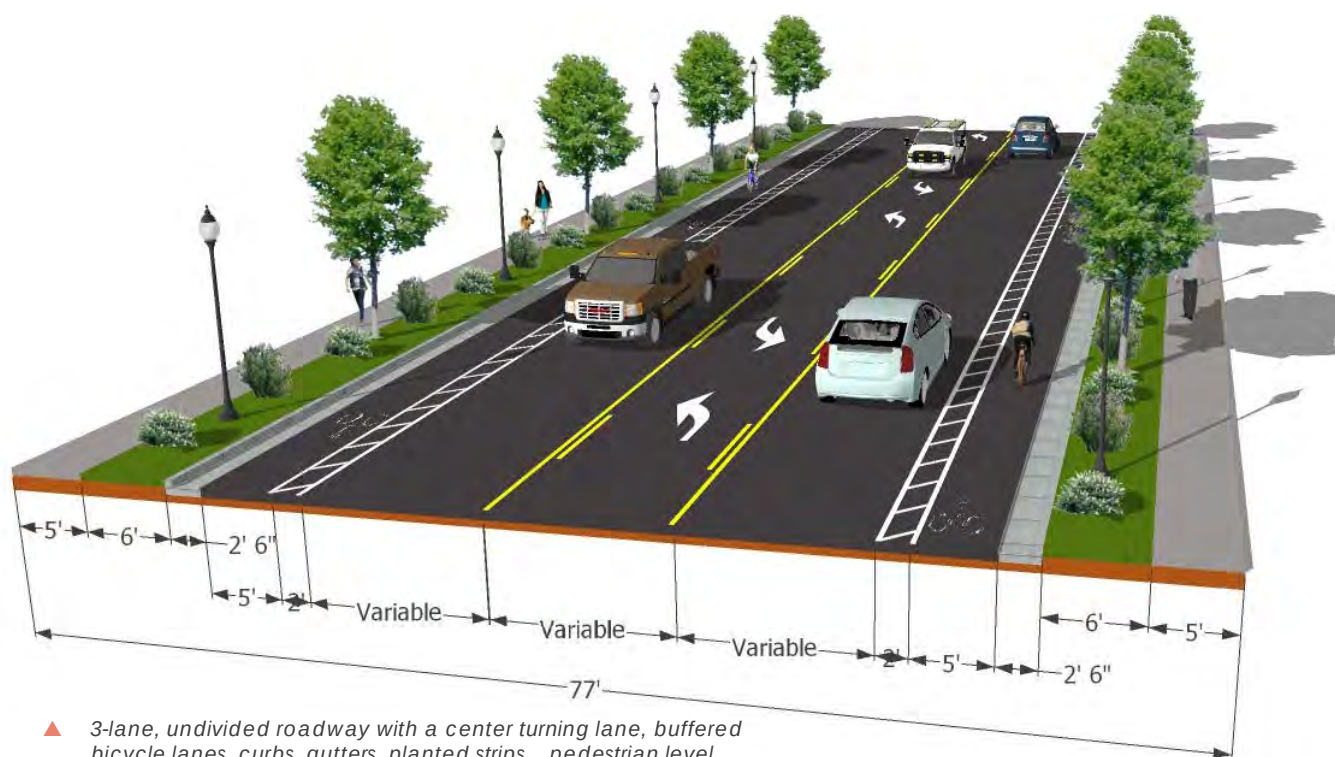


3-Lane Cross Sections



- ▲ 3-lane, undivided roadway with gutters, curbs, planted strip, and pedestrian level lighting on both sides, and a sidewalk and a multiuse sidepath on opposite sides

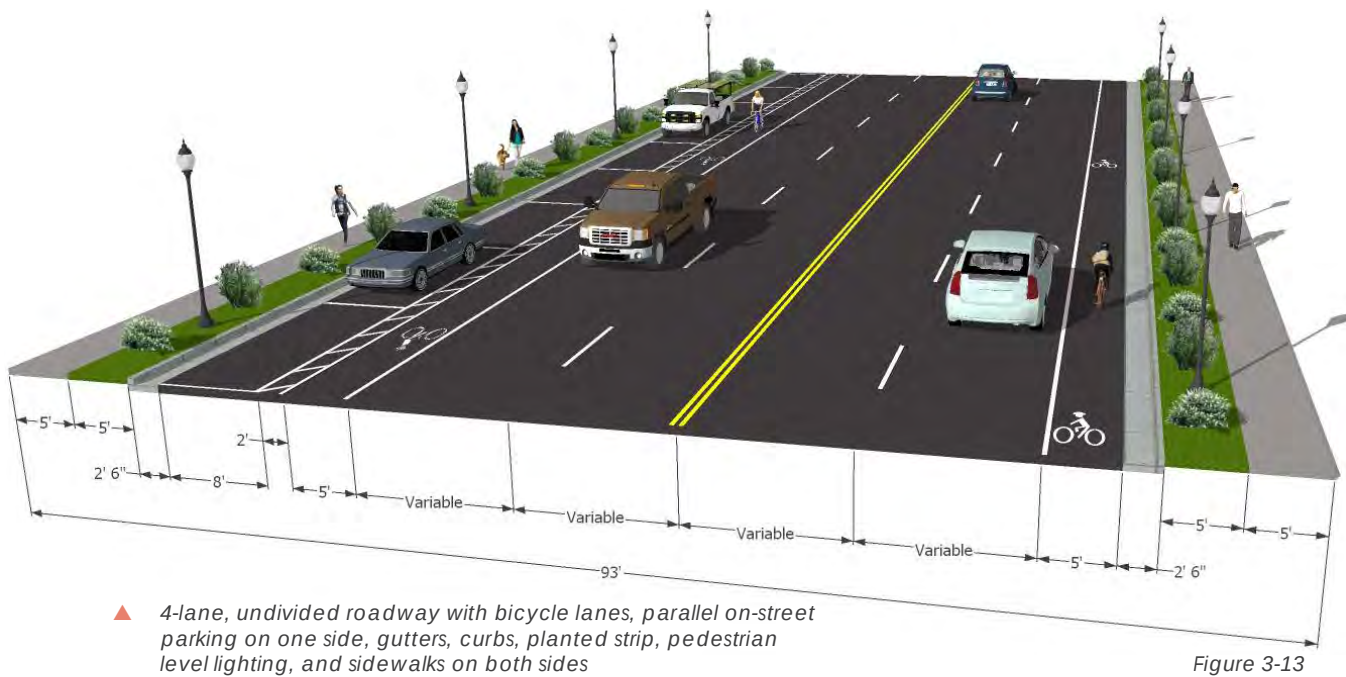
Figure 3-11



- ▲ 3-lane, undivided roadway with a center turning lane, buffered bicycle lanes, curbs, gutters, planted strips, , pedestrian level lighting and sidewalks on both sides

Figure 3-12

4-Lane Cross Sections





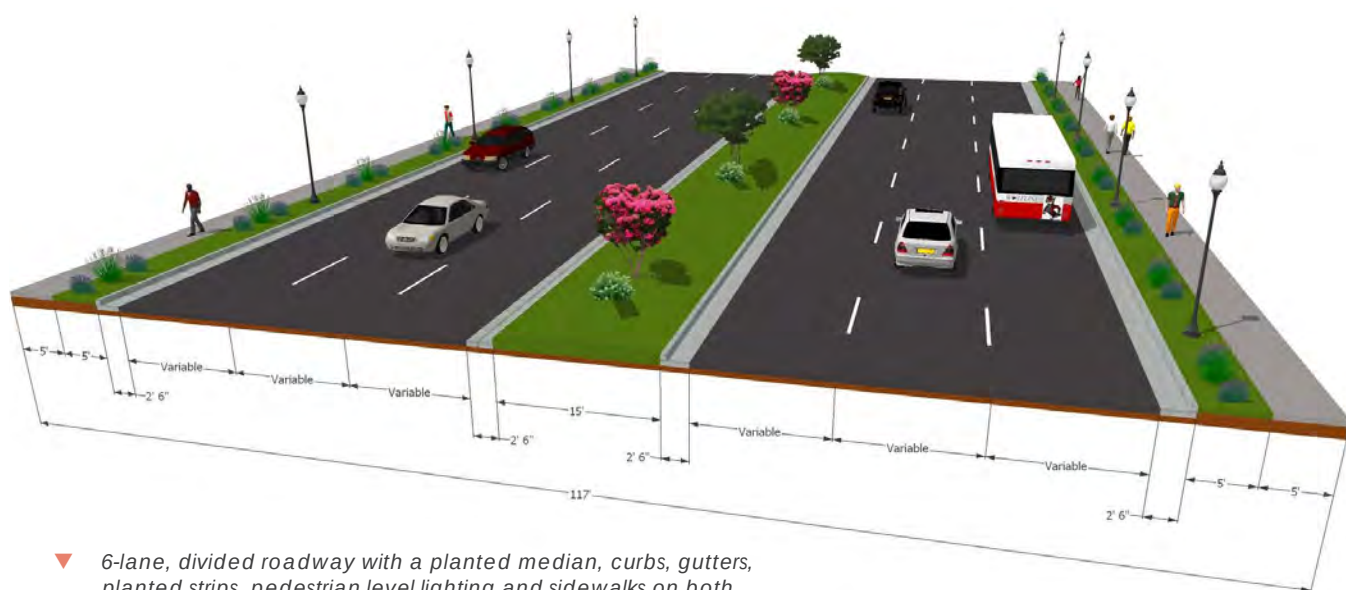
4-Lane Cross Sections (cont.)



- ▲ 4-lane, divided roadway with planted median islands to break up turning lane, gutters, curbs, planted strip on both sides and pedestrian level lighting and sidewalk on one side

Figure 3-15

6-Lane Cross Section



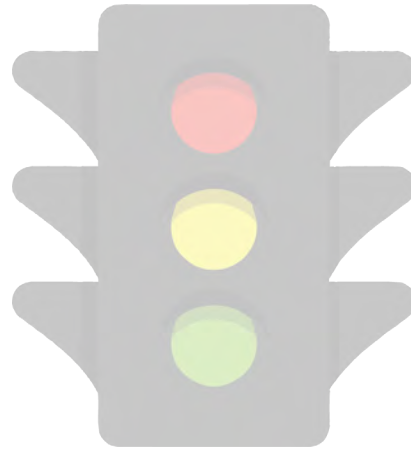
- ▼ 6-lane, divided roadway with a planted median, curbs, gutters, planted strips, pedestrian level lighting and sidewalks on both sides

Figure 3-16

Hot Spot & Corridor Concepts

Thirteen safety hot spots and corridor improvements located throughout the Charleston area have been identified, and short term improvements are recommended in the following section. Hot spot locations were identified through research and analysis of congestion and traffic accident patterns throughout the city. Focusing this preliminary research, the study team engaged with stakeholders including city leaders, community groups, and citizens who provided responses during meetings, workshops, and an online survey and interactive map. This crucial input was utilized to refine the selection of hot spot areas and desired improvements.

Recommendations have been developed for each improvement area, and address issues such as spot safety, congestion, and multimodal limitations and problem areas. These proposed solutions focus on access management, streetscape design, bicycle and pedestrian accommodations, and laneage improvements. Recommendations are tailored to each location based on its unique characteristics, including traffic volume, surrounding land uses, aesthetics, and multimodal potential. The following hot spot concepts also emphasize cost-effective treatments that minimize curb displacement and right-of-way takings.



Key



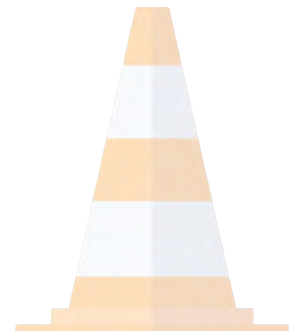
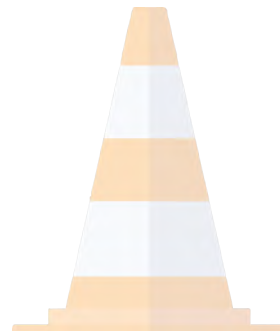
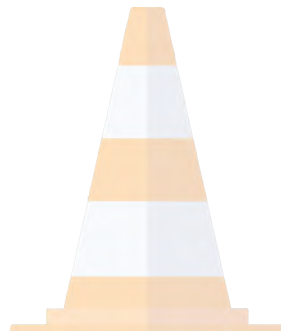
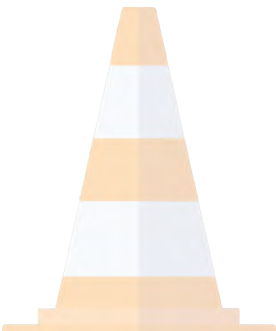
Existing Pavement Removed



Planted Area



Brick Pavers or Stamped Pavement



Rutledge Avenue

THE PENINSULA/FROM PEACHTREE STREET TO SUMTER STREET
PICTURED: GROVE ST TO MOULTRIE ST

LENGTH: 1 MILE

Problem Statement: Along this stretch, the road switches from 1-way to 2-way. Surrounding neighborhood residents prefer the street to return to it's original neighborhood feel. Speeding here has been an issue which is particular dangerous so close to several schools and parks. The area features many small blocks, but few lights and fewer crosswalks.

Design Considerations:

- Residents and students need safe crossing to schools and parks
- Needs traffic calming
- Cut through traffic needs to be deterred

Recommendations:

- Signalize key intersections like Moultrie Street and add 4-way stop signs at Cleveland Street
- Add curb bump outs and painted curbs to define on-street parking and shorten crossing distance
- Add high-visibility cross walks at Maverick and Francis streets
- Optional: close Cleveland Street at the park and create a pedestrian street park entrance

Probable Construction Cost: TBD





Clements Ferry Road

DANIELS ISLAND/FROM INTERSTATE 526 TO JOYNER LANE

LENGTH: 1.4 MILES

Problem Statement: This region is expected to grow tremendously and requires more improvements than what is currently planned by the city and developers. In addition, it lacks interconnectivity and relies on this road alone to enter and exit. While some communities are constructed with bike/ped amenities, there are no accommodations in place to connect them with the rest of the region, or the city.

Design Considerations:

- Incoming growth translates to greater travel demands for daily commute as well as emergency access
- Driveway and neighborhood access must be maintained
- Connectivity along this corridor needs to be improved across all modes of transportation

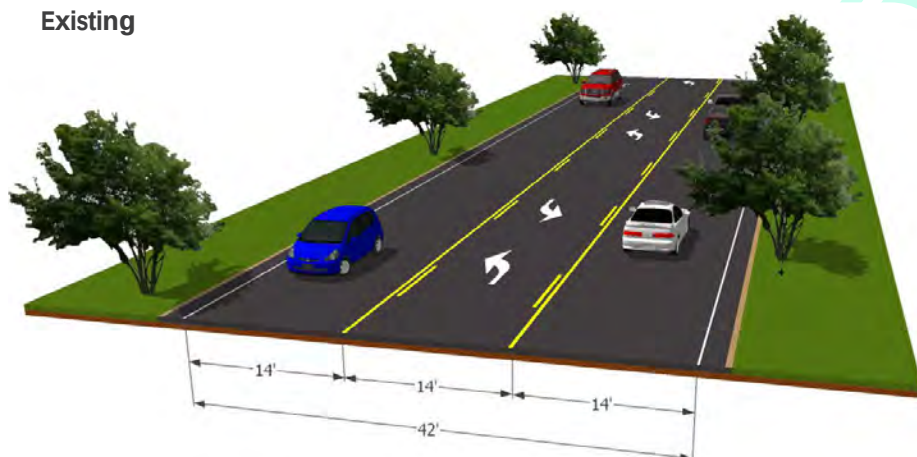
Recommendations:

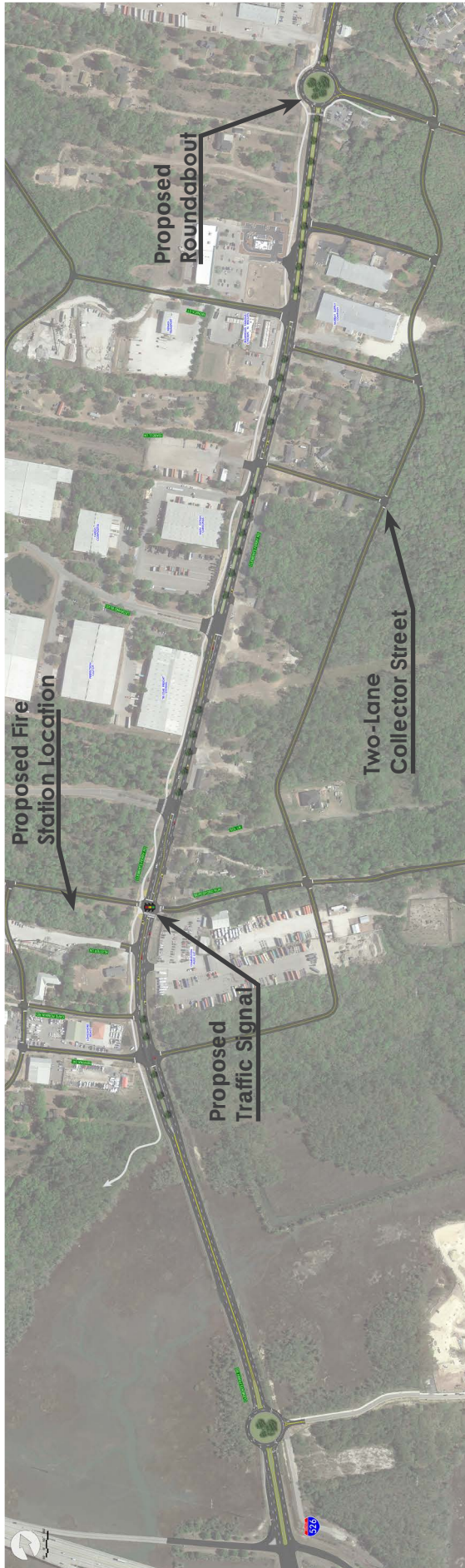
- Widening Clements Ferry from 3 Lanes to 4 Lanes with a planted median and turning lanes
- 2 Lane roundabouts to calm new traffic patterns
- 10' multiuse path along corridor to improve bike and pedestrian mobility

Probable Construction Cost: TBD



Existing





Proposed





Maybank Highway

JOHNS ISLAND/FROM RIVER ROAD TO SOUTHWICK DRIVE
PICTURED: SAILFISH RD TO TOWNE ST

LENGTH: 1.8 MILES

Problem Statement: Congestion is a major concern as more residential and commercial growth comes to the islands. The main highway through needs to grow to meet the new demand. The community has been advocating for the protection of the mature tree canopy as well as increased multimodal connectivity.

Design Considerations:

- Roadway must be widened to meet increased travel demand
- Residences, businesses, and neighborhoods must retain driveway access
- Connectivity along and around the corridor needs to be improved

Recommendations:

- Roadway widened to 4-Lane divided with planted medians
- Multiuse path added along northside of the corridor with high-visibility crosswalks at intersections
- Connect future and existing neighborhoods with 2-Lane collector streets
- Use turning lanes selectively between medians

Probable Construction Cost: TBD







Savannah Highway & Wappoo Road

WEST ASHLEY

Problem Statement: High volume intersection with traffic coming from both directions leading in and out of downtown and residential neighborhoods. Intersection marks the end of the West Ashley Bikeway and lacks safe and visible pedestrian and bike facilities. Problematic free-flow right turn traffic from Southbound Wappoo headed west.

Design Considerations:

- Immediate area is prime for redevelopment
- Free-flow right is extremely dangerous to pedestrians
- Sight angles are adequate
- The DuPont/Wappoo Community Plan recommendations for this intersection

Recommendations:

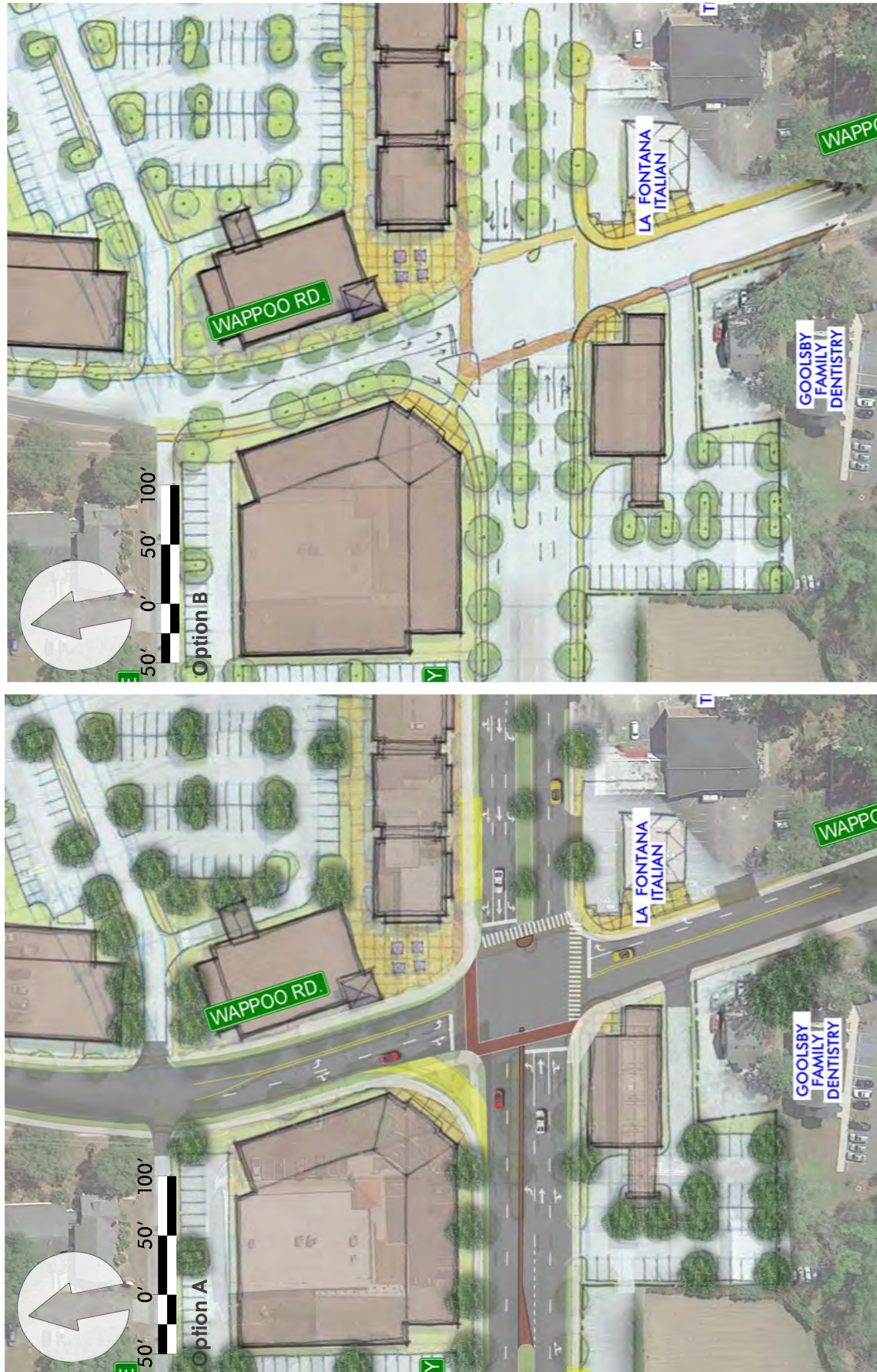
- Brick paver or stamped crosswalks
- High-visibility crosswalks and pedestrian countdowns
- Remove free-flow right turn while leaving the corner wide enough to accommodate right turn movements of a tractor trailer (Option A)
- Improve access management and driveway consolidation

Probable Construction Cost: \$650K





Savannah Highway & Wappoo Road





Sam Rittenberg Boulevard & Orange Grove Road

WEST ASHLEY

Problem Statement: Orange Grove Road has free-flow turns on both approaches to the intersection, making it extremely dangerous for pedestrians to cross. The gas station on the southwest corner has three driveway entries, two very close to the free-flow right turn. Sharp angle of the intersection creates sight line problems, particularly when combined with the free-flow right turns.

Design Considerations:

- Sam Rittenberg is a wide, heavily traveled road surrounded by neighborhoods and bordered by retail and office
- Pedestrians and cyclist should be able to safely cross and travel through this intersection

Recommendations:

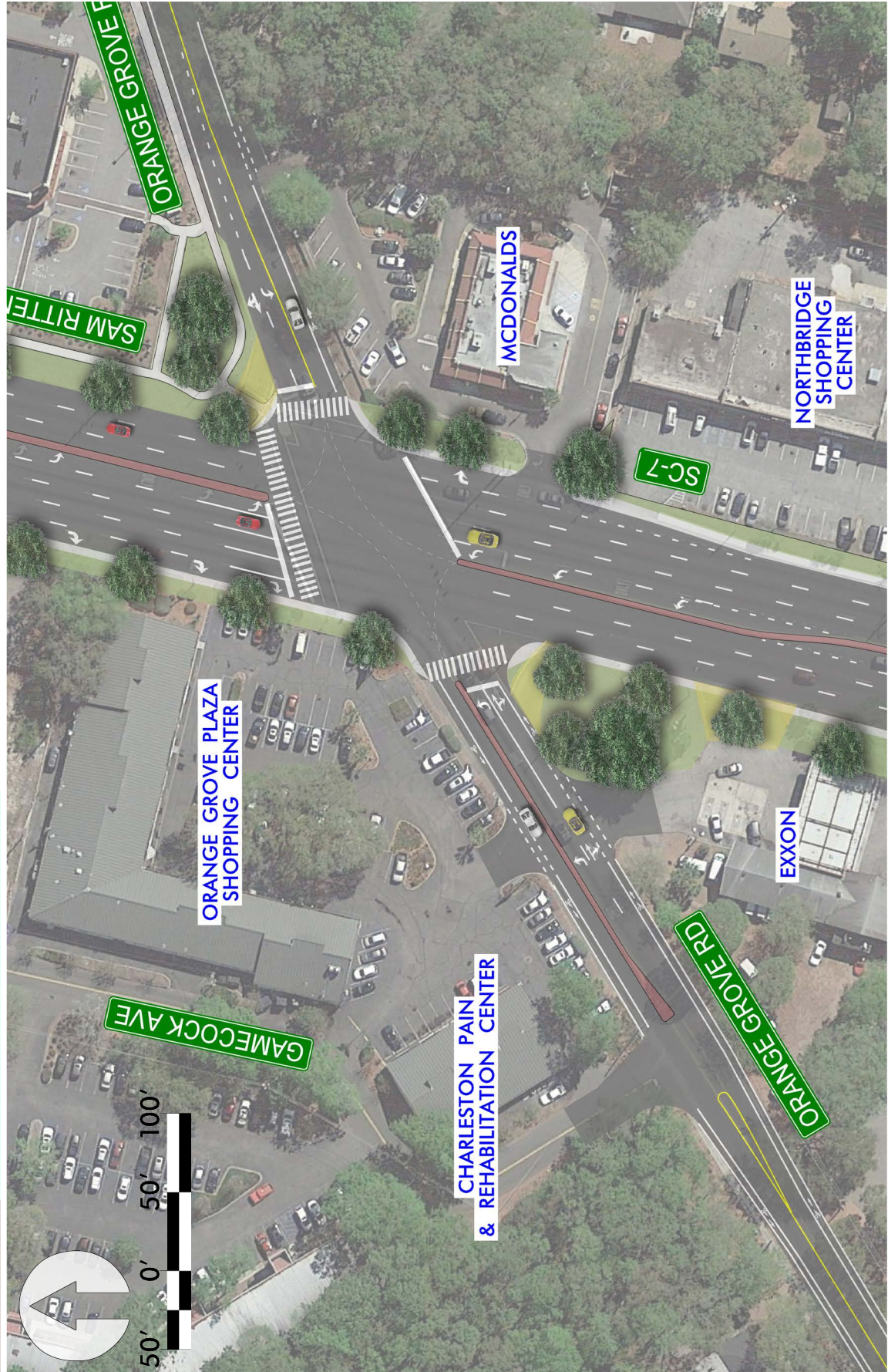
- Close the free-flow turns and shorten the length of roadway for pedestrians to cross
- Design corners to accommodate right turn movements of tractor trailers
- Add bike lane striping to Orange Grove on both sides of intersection
- Add paved median to Orange Grove and close excess driveway for gas station
- Potentially add painted bike lanes through intersections

Probable Construction Cost: \$350K





Sam Rittenberg Boulevard & Orange Grove Road





Morrison Drive, Cooper Street, & Lee Street

THE PENINSULA

Problem Statement: Vital intersection for entering and exiting the Lower Peninsula. East Bay Street becomes the on-ramp to the Ravenel Bridge. A 10 ft multiuse path borders East Bay. Adjacent blocks are used primarily for parking and exit/entry of side streets make traffic flow and pedestrian crossing hazardous.

Design Considerations:

- Major bike/ped amenity is inaccessible -- one crossing
- Vital pump station at the north corner of Lee Street at Morrison
- Immediate area is prime for redevelopment and park space
- Site borders the Cooper River Bridge Project
- Needs traffic calming
- Better drainage to prevent flooding in the roadway
- The Cooper Street Bike Plan and Cooper River Bridge Redevelopment

Recommendations:

- Raise Morrison Drive to higher elevation to address stormwater issues
- High-visibility crosswalks for pedestrians and cyclists
- Remove turning lane on southbound Morrison to improve bicycle safety and provide drainage space
- Add sharrow markings and buffered contra-flow bike lane on Cooper Street, removing parallel parking on onside
- Replace parking with angle-in parking

Probable Construction Cost: \$600K





Morrison Drive, Cooper Street, & Lee Street

hot spot concept 3





Lockwood Drive & Beaufain Street

THE PENINSULA

Problem Statement: Traffic from the James Island Expressway enters at high speeds onto Lockwood. On the north end, Lockwood has a sidewalk to the east and multiuse path to the west. Beaufain sidewalk turns the corner without allowing for safe crossing movements. Major pedestrian and bicycle amenities has few safe access points while cars speed by undeterred

Design Considerations:

- Scenic view of the river and West Ashley
- Borders dense historic fabric and leads into historic town center
- Pedestrian and cyclist corridor potential
- Needs safe bike/ped crossing

Recommendations:

- High-visibility crosswalks
- Planted median with pedestrian refuge
- Pedestrian countdown signal and crossing sign
- Dedicated left turn onto Beaufain
- Lockwood reduced to one lane
- No displacement of curb and gutter

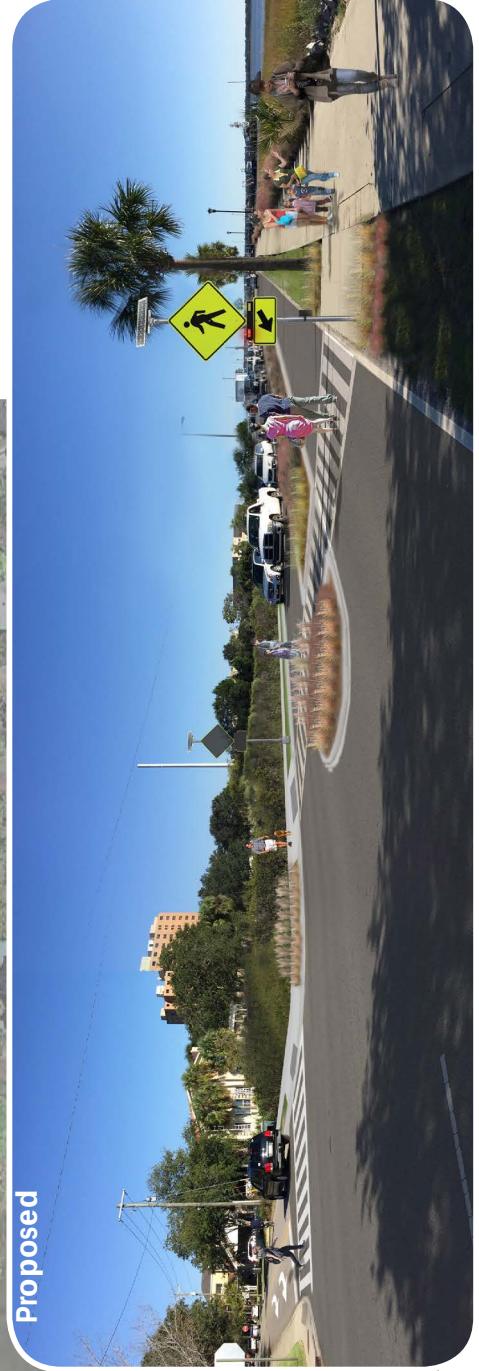
Probable Construction Cost: \$290K





hot spot concept 4

Lockwood Drive & Beaufain Street





Fishburne Street & Hagood Avenue

THE PENINSULA

Problem Statement: North of this intersection is the Citadel. Directly adjacent are older and low-income neighborhoods, parking lots, and areas prime for redevelopment. Area floods often with water left standing in the road for days after heavy rains. Pedestrian traffic here is often families, children, and students walking to school and community center

Design Considerations:

- The City's Urban Design Center has released proposed stormwater drainage solutions for this area
- Area is flanked with schools, a community center, the Citadel, and the Riverdogs Ballpark
- Creating better connectivity to the WestEdge project

Recommendations:

- High-visibility crosswalks
- Potential new roundabout
- Utilizing the Hagood Green Street plan
- Planted medians

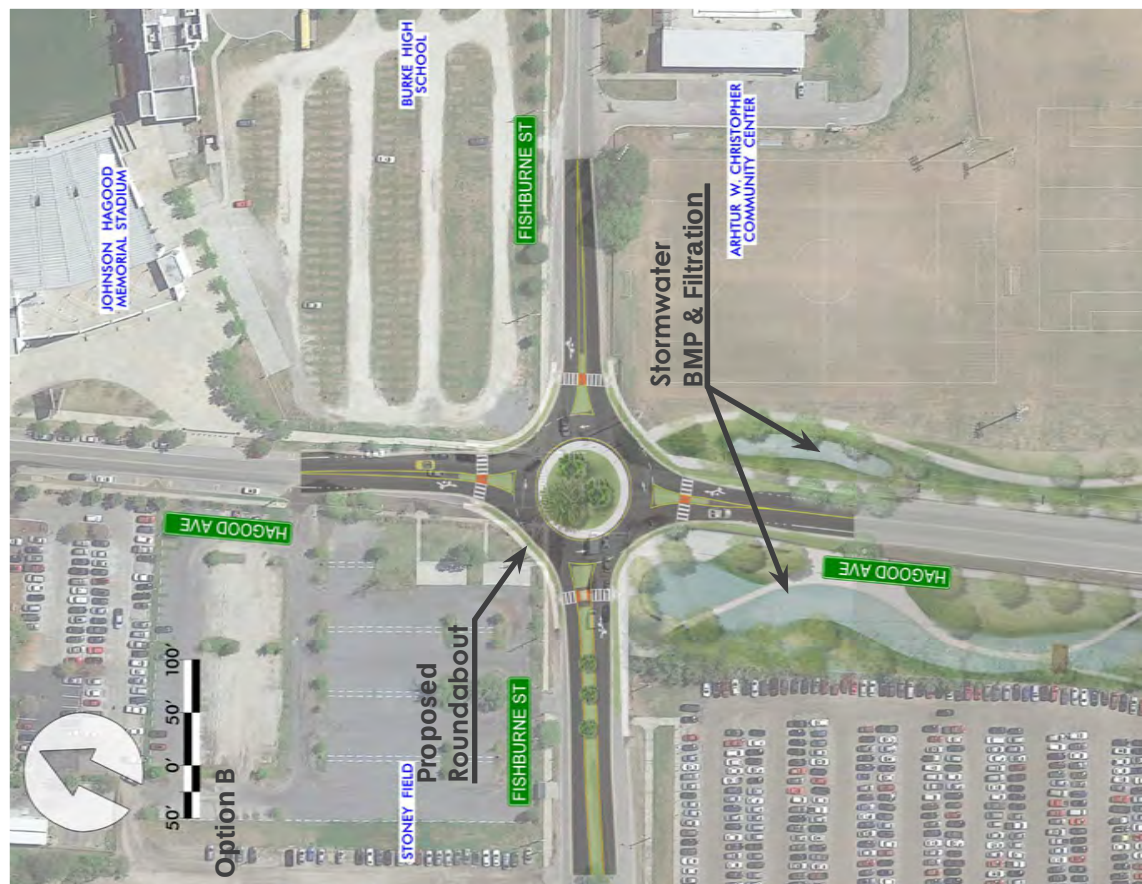
Probable Construction Cost: \$350K (Stop light Intersection), \$600K (Roundabout)





Fishburne Street & Hagood Avenue

hot spot concept 5





Folly Road Blvd, Wesley Drive, & West Ashley Greenway

WEST ASHLEY

Problem Statement: The West Ashley Greenway crosses Folly Road at a problematic intersection. Wesley Drive and Folly Road merge together at a sharp angle before reaching the South Windermere Center. The only place for pedestrians to safely cross is at the Windermere intersection.

Design Considerations:

- The Greenway is a popular amenity with cyclists and pedestrians
- This intersection interrupts the greenway more so than at other crossings
- Neighborhood is very walkable with sidewalks and retail available
- Safer crossings are needed

Recommendations:

- Closing the free-flow right turn lane on Southbound Folly Road as well as along Northbound Folly Road
- High-visibility crosswalks with pedestrian countdowns closer to the Greenway

Probable Construction Cost:

\$400K

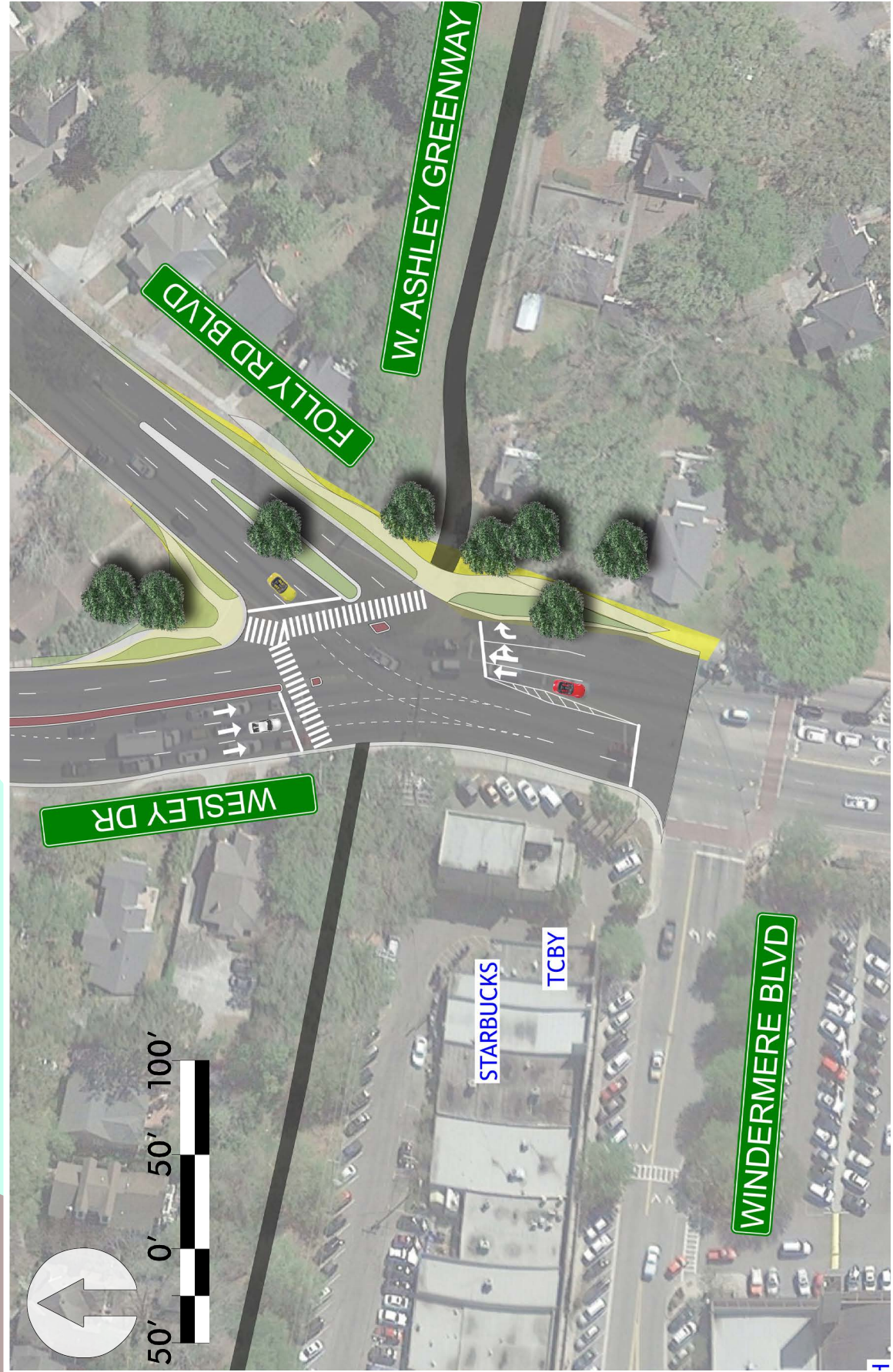
Note: An in depth analysis of this intersection is required to determine feasibility of closing free-flow right turn headed northbound on Folly Road Boulevard





Folly Road Boulevard, Wesley Drive, & West Ashley Greenway

hot spot concept 6





Maybank Highway & Riverland Drive

JAMES ISLAND

Problem Statement: Maybank Highway is the connecting thread between Johns Island, James Island, and West Ashley. Maybank and Riverland Drive meet in a large golf course and provide a direct connection to residential neighborhoods. Residents in this area have no safe way to travel as pedestrians or cyclists.

Design Considerations:

- Providing pedestrian amenities to promote active transportation
- Creating gateways into adjacent neighborhoods
- Significant and healthy trees along Maybank Highway
- Stormwater drainage at the intersection

Recommendations:

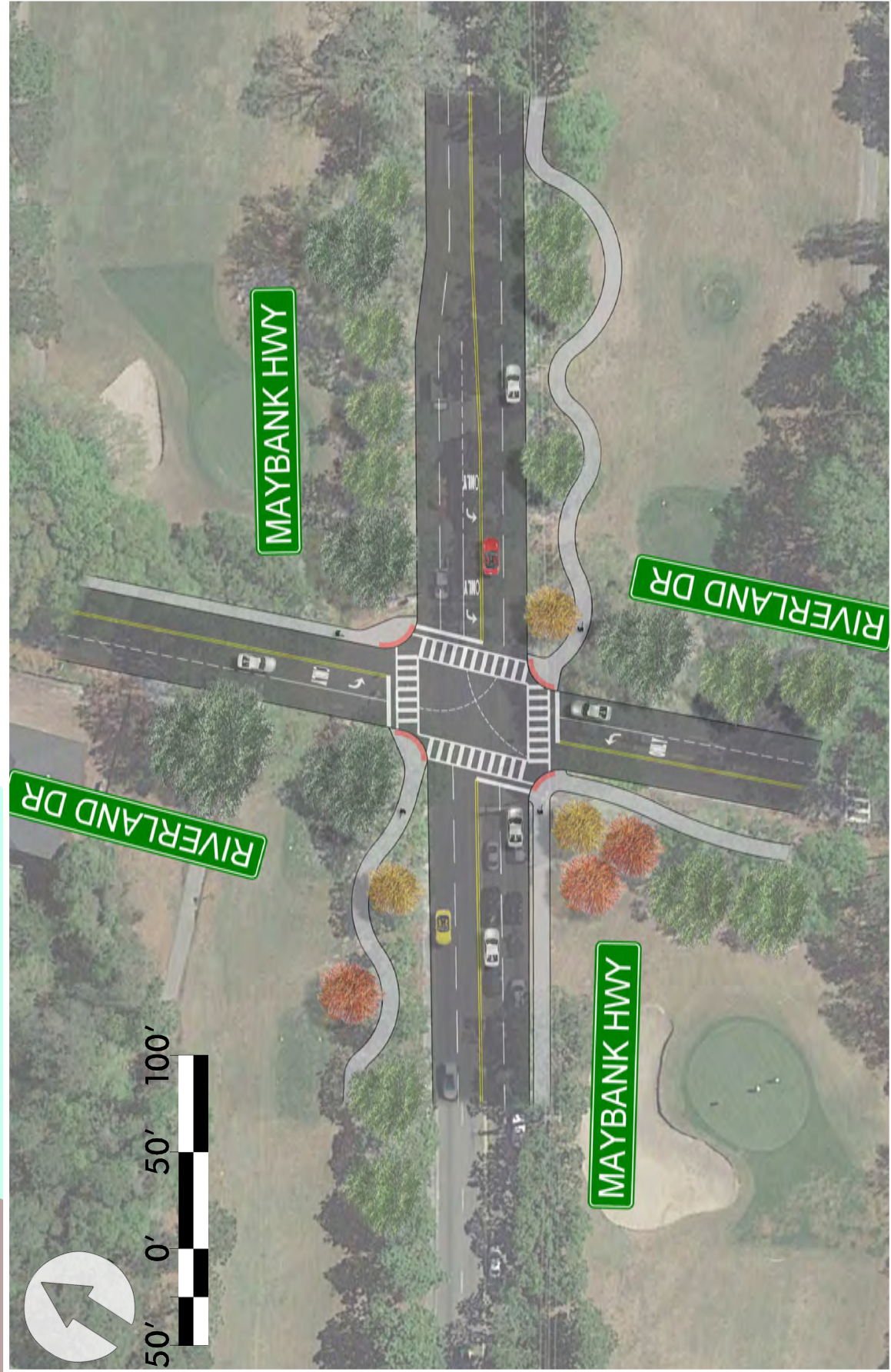
- Assumes 10'/11' lane widths.
- Left turn lane on westbound approach requires 150' - 200' length of widening to the north side of Maybank Hwy approximately 6'-7' of additional width
- Context sensitive widening to avoid impacts to mature trees, avoiding the need for additional ROW High-visibility crosswalks with pedestrian countdowns
- Adding a meandering multiuse path behind the treeline and sidewalks to connect the neighborhoods
- Improved pedestrian level lighting

Probable Construction Cost: \$350K





Maybank Highway & Riverland Drive





St. Andrews Blvd, Old Towne Road, & Ashley River Road

WEST ASHLEY

Problem Statement: Ashley River and Old Towne merge into St. Andrews Boulevard, weaving together 8 lanes of traffic into 5 lanes with painted bike lanes on either side. This intersection is designed as an at-grade freeway which caters to vehicles and high speeds. Bike lanes disappear at the intersection. Three streets intersect at this intersection, creating a dangerous place for cars, pedestrians, and cyclists attempting to cross or travel through this intersection.

Design Considerations:

- This intersection and St. Andrews Boulevard are superimposed onto and disrupts the original street network of this area
- Bike lanes disappear forcing cyclist to either ride the sidewalk or share the densely traveled road

Recommendations:

- Consolidate the intersection to meet at a right angle, Options A and B show different configurations of the same idea
- High-visibility crosswalks with pedestrian countdowns at new intersection
- Add multiuse path to the west side of St Andrews/Old Towne to move bikes off the street at the intersection
- Use planted medians and access management to guide left turns

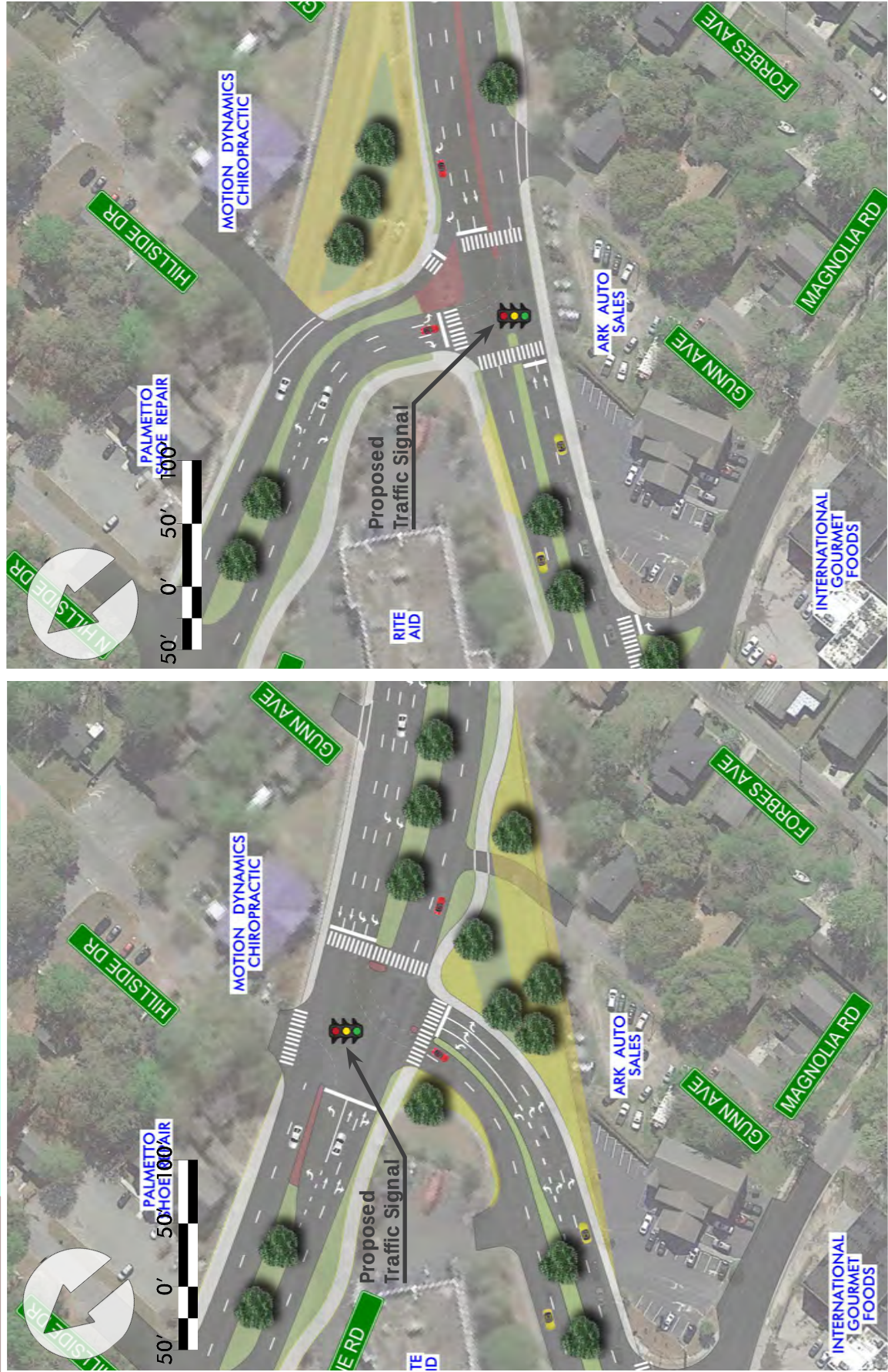
Probable Construction Cost: \$800K





hot spot concept 8

St. Andrews Road, Old Towne Road, & Ashley River Road





Calhoun Street & East Bay Street

THE PENINSULA

Problem Statement: A key intersection and corridor in the historic district of downtown Charleston for vehicular and bicycle/pedestrian traffic. Connects into major biking corridor that leads to and crosses the Ravenel Bridge. Sidewalks connections are inconsistent in this area and amenities need to be equally accessible for tourists and nearby lower income residents who commute through this area every day.

Design Considerations:

- Two major biking corridors intersect here, with bike share stations located in each direction
- Many destination points nearby that require access to parking or alternative transportation accommodations

Recommendations:

- High visibility crosswalks with dedicated, painted bike lane crossings
- Realign Washington Street, fixing offset for increased visibility and creating a new plaza
- Two lane cycle track on Calhoun and Rails-to-Trials multiuse path on Washington

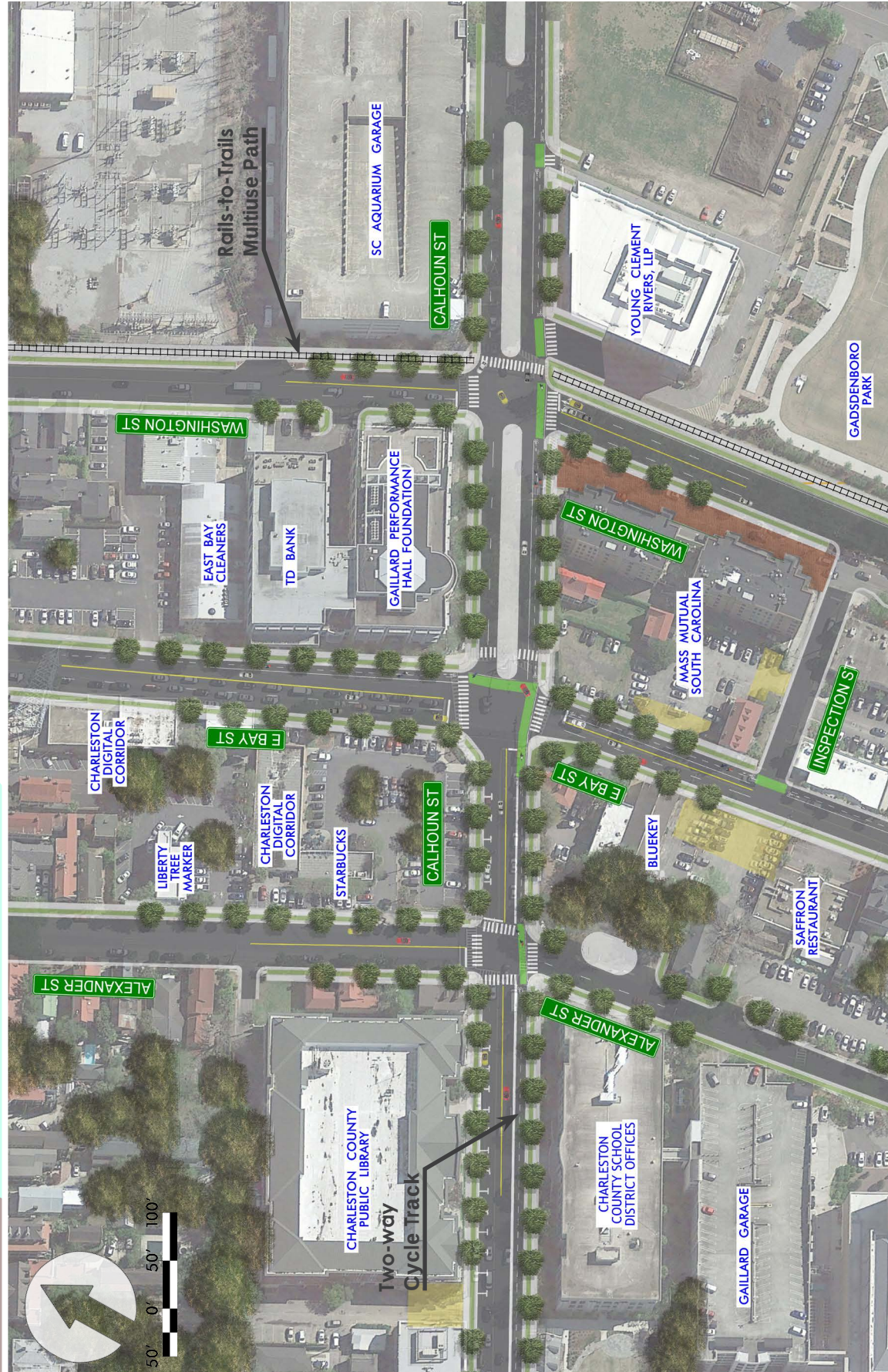
Probable Construction Cost: \$600K





Calhoun Street & East Bay Street

hot spot concept 9





Main Road & River Road

JOHNS' ISLAND

Problem Statement: Johns Island has only two roads onto or off of the Island and Main Road is one of those roads. It is a primary connection to West Ashley and US 17. While technically not in the City limits, this is still a significant problem for city residents in this area. The roads at this existing signalized location intersect at awkward angles causing significant congestion at peak travel times. Massive and historic live oak, the Butcher Tree, is nearly in the intersection, creating sight line issues for travelers accessing Main Road.

Design Considerations:

- Butcher Tree must be preserved and celebrated
- Access to the gas station is necessary
- Sharp angles on the intersection need to be resolved
- No pedestrian or bicycle amenities are currently available
- Main Road is slated for widening from a 2-Lane to 4-Lane collector

Recommendations:

- Creating more right angles by rerouting Chisolm around the tree and constructing a 2-lane roundabout
- Adding bicycle and pedestrian amenities and connecting them to the Butcher Tree open space
- Obtaining right-of-way from the gas station to move entries and replant roadside with oak trees

Probable Construction Cost: \$900K

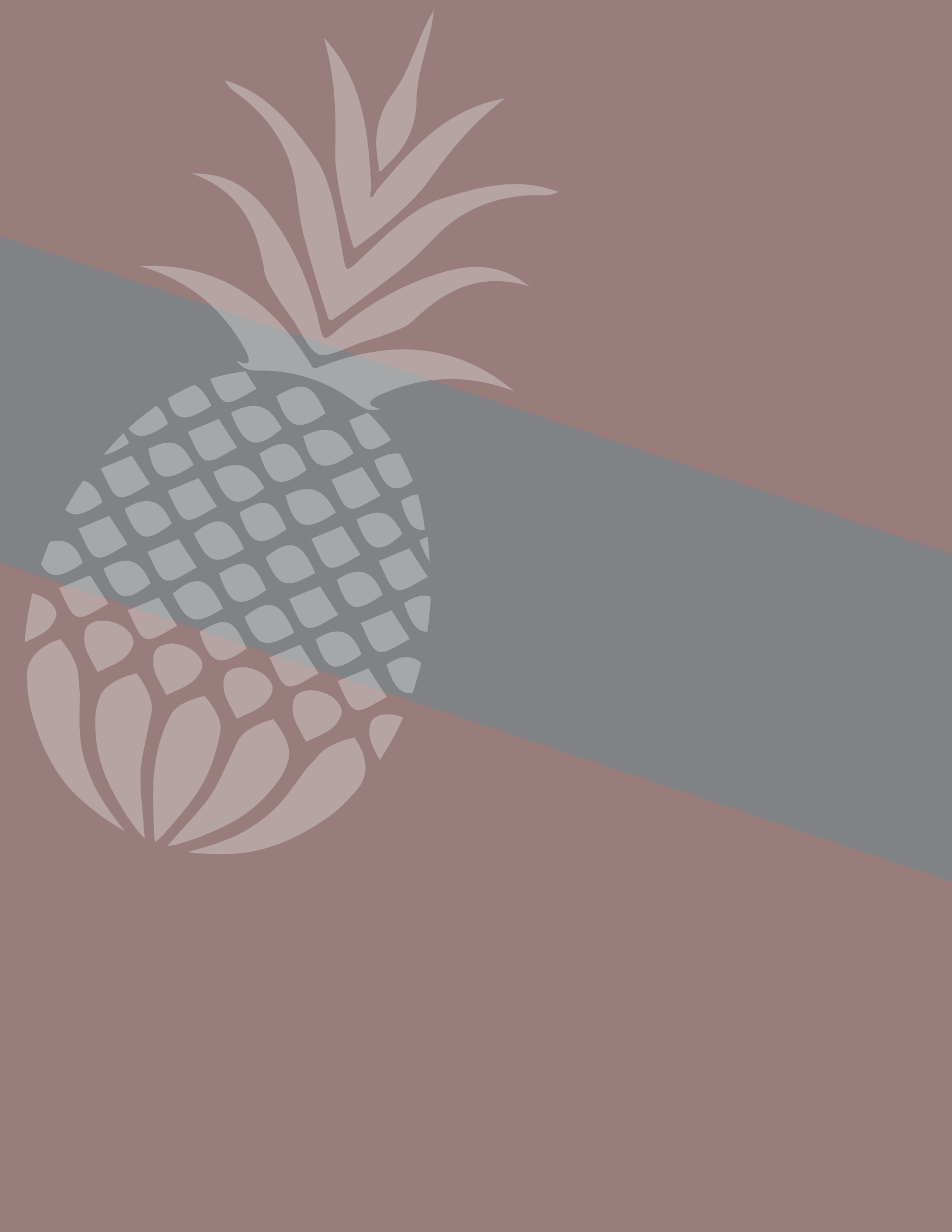


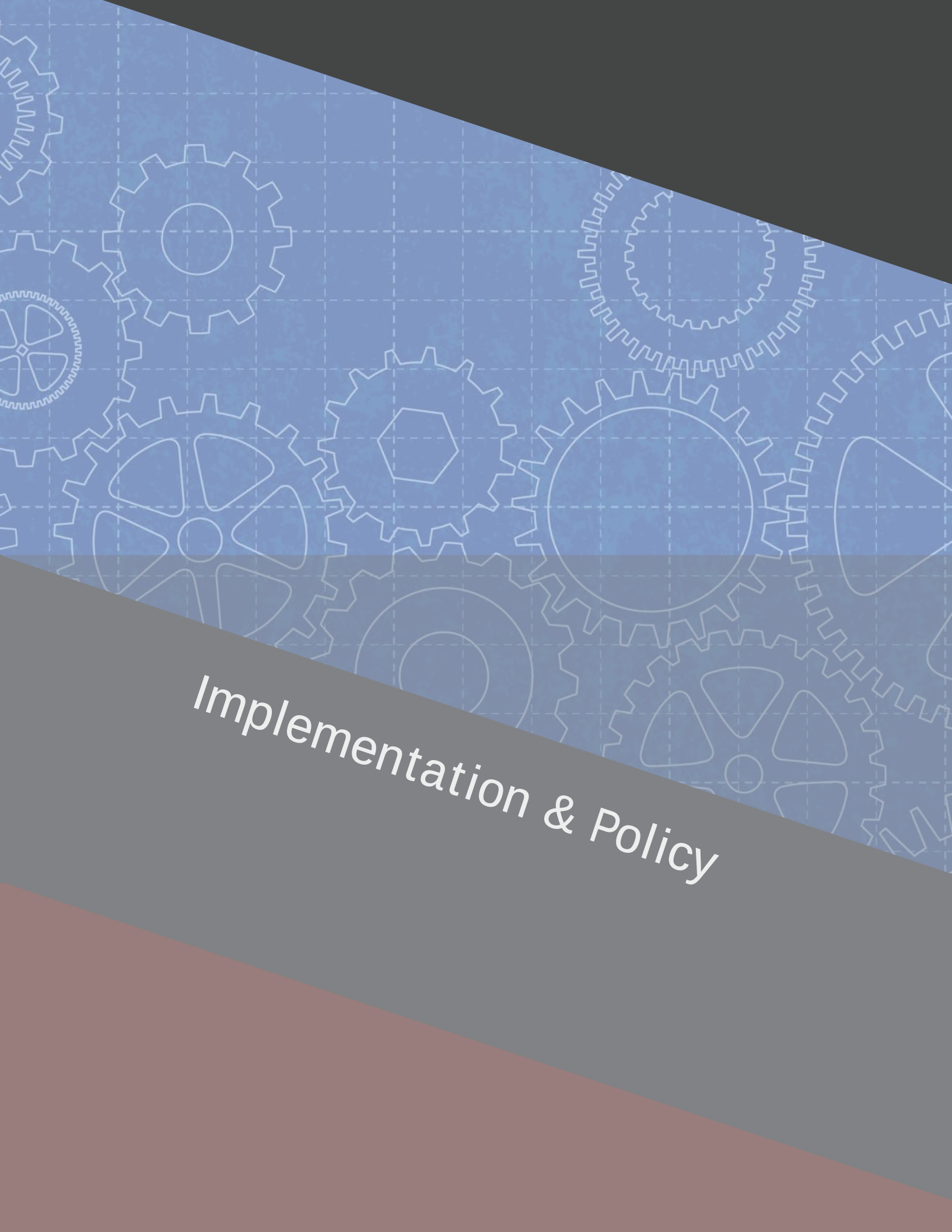


Main Road & River Road

hot spot concept *10*





The background of the slide features a blue area with a white dashed grid. Overlaid on this grid are several white line-art gears of various sizes. Some gears have internal patterns, such as a five-pointed star or a hexagon. The blue area is separated from a dark grey area at the top right by a diagonal line. Below the dark grey area is a brownish-grey area, also separated by a diagonal line.

Implementation & Policy



Overview

The purpose of this document is to provide a context for understanding the implementation issues confronting the City of Charleston; recommendations to resolve those issues; and, in this section, create some insight into the actions that will be required to make the objectives and recommendations from the study a future reality. This section will address the implementation context as it currently exists nationwide and within South Carolina and Charleston; a matrix of action planning steps that include the recommended project and policy initiatives from this report as well as complimentary programmatic and policy actions; and primary and secondary financing opportunities.

*“We should not be waiting
until trains derail,
bridges collapse and
people die to adequately
fund our transportation
infrastructure.”*

—Elizabeth Esty, US Congresswoman,
House of Representatives



Introduction

At the time of this plan's preparation and adoption, a number of factors that have been traditionally counted upon to drive how transportation improvements are selected, financed, and implemented are undergoing tectonic shifts, the most important of which are described below. These changes will substantially influence in the short- and mid-terms how Charleston approaches project prioritization and, perhaps, the roles of local government and the private sector with respect to transportation infrastructure and service provision.

Perhaps the largest overall change in transportation implementation is coming from the state level. First, financing from state and federal (via state allocations) are undergoing monumental shifts from where they have stood for the past two decades. Funding allocations from South Carolina primarily focus on statewide and regional mobility. In effect, these focus areas of spending, coupled with other legal and policy requirements, translate into fewer dollars being eligible for expenditures on local roads – generally any roadway without a federal or state route designation. Second, SCDOT has undergone a significant change in the way that it selects projects for funding, now relying on local inputs, but also based on technical performance areas (e.g., safety, congestion, economics). Much of the “local” input does not come directly from local governments like Charleston, but instead is channeled through SCDOT District offices and metropolitan planning organizations like CHATS.



The federal government, as it has continued to do over the past two decades, is wrestling with the dilemma of shrinking revenues from fuel taxes, as well as how to apportion those revenues fairly among the 50 states. While there is not a set course charted out as yet, discussions of congestion taxes – taxes applied directly to vehicle users rather than through the purchase of fuels for those vehicles – are getting renewed interest, as one example. Declines in expected revenues have forced the federal government to issue rescissions to the states, essentially “taking back” funds already allocated based upon too-optimistic revenue pictures. Besides the major debate on transportation funding, the other two changes in the federal implementation process are (a) an increased reliance on performance-based metrics to identify the best projects for funding; and (b) a consolidation of multiple funding categories into fewer categories.

How do these changes at the state and federal levels influence how we approach implementing transportation projects in Charleston? While we cannot say with certainty how these and other policy changes will influence our thinking, there are a number of concepts that this Plan respected as it was being prepared, and that influence our implementation strategies:

➤ **Local Control.**

South Carolina has made several moves towards pushing responsibility of secondary roads downward to counties and municipalities. This shift will ultimately translate into Charleston desiring to work more closely with SCDOT District offices to accomplish work collaboratively, including (perhaps) municipal funds being used by the State to improve and maintain roadways.

➤ **Bicycle and Pedestrian Travel, Less a Factor at the State Level.**

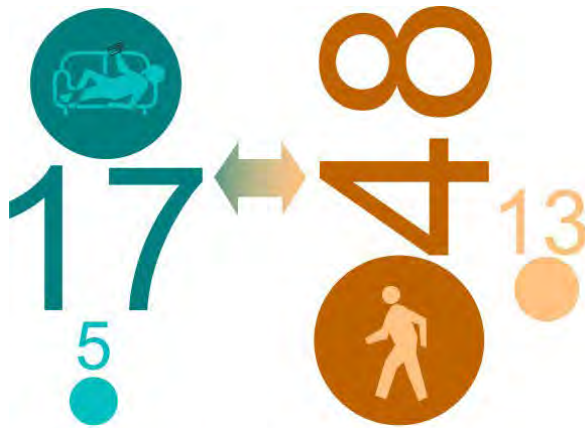
State monies used to fund bicycle and pedestrian projects account for far less of a percentage of the total transportation budget than did 10 years ago. Even more than secondary roadway capacity, new active mode projects will now be required to look elsewhere for funding support. However, public awareness of the health issues that envelope a sedentary lifestyle like those depicted in Figure 4-1 have started to make positive changes in our people: in 2014, for the first time in many years, one age segment of children (aged 2 to 5 years) is not more obese than their predecessors.

➤ **Performance + Collaboration.**

As long as the current performance-based system for project selection continues, Charleston will have to play the same tune as it thinks about backing its own transportation priorities – if it wants to receive state/federal funding for transportation improvements. Any level of “in-kind” support (financially, right-of-way, etc.) for key projects and maintaining a close relationship with both SCDOT and CHATS MPO is highly advisable.

➤ **Local Financing on the Ascendant.**

Whether through general bond issuances, sales taxes (Charleston County), Impact Fees, property taxes or some other means, it is highly likely that the fastest-growing counties and cities in South Carolina will have to continue to come to the table with additional ways of financing transportation projects. The Charleston region has seen great success in self-financing mechanisms.



In the 1970's, 5% of children aged 2-19 were obese. By 2008 that number had triped to 17%. During the same period (1969 to 2009), the percent of children walking to school dropped from 48% to 13%.

Figure 4-1

- ▲ Sources: Center for Disease Control (Childhood Obesity Facts, www.cdc.com); New York Times (Sabrina Tavernise, Obesity Rate for Young Children Plummets 43% in a Decade, February 25, 2014); and Harvard School of Public Health (Child Obesity: Too Many Kids are Too Heavy, Too Young, www.hsph.harvard.edu).



Funding Sources & Opportunities

The core of implementing transportation recommendations is the development of partnerships that will allow Charleston to finance, design, construct, and maintain projects. The following summary of action items is therefore organized around this principle of shared responsibilities for implementation, being broken out into local government (Charleston), regional planning (CHATS Metropolitan Planning Organization),

state government (SCDOT), and private sector responsibilities. The resources and key implementation characteristics of each one are presented. The list of projects contained in prior sections is also reproduced and summarized. The following describe how different funding mechanisms can be considered, particularly considering both current policies and this Plan's recommendations.



State/Federal Funding.

State/Federal Funding. These two sources are frequently “lumped” together since they are both ultimately apportioned through the State. Federal influences are still felt through the state-level apportionment process, perhaps most strongly on public transportation projects. All state and federal funds practically speaking are now subject to the statewide prioritization system, which is updated periodically. Hence, considering which projects have the best scoring potential may be an important consideration as discussions move forward to encompass more detailed planning. Also, the regulatory aspect is important, since everything from driveway permitting to design standards is managed by the State.

Focus Areas: Maintaining a close working relationship with both the Region and District representatives is important to Charleston. For example, understanding repaving schedules and minor improvements (i.e., “Hot Spot” and Safety) can help coordinate accessibility, sidewalk, bicycle, aesthetic, access management, and other priorities on Charleston's major roadways that otherwise could be missed.



Regional Government (CHATS Metropolitan Planning Organization)

The metropolitan planning organization (CHATS MPO) that covers Charleston and surrounding cities and counties provides some funding options for projects in the City, but also serves as a gatekeeper to state and federal funding. The State Transportation Improvement Program (STIP) and Metropolitan Transportation Improvement Program must show the same projects to be compliant with federal requirements. For this reason, the priority recommendations from this Plan have been included in the latest update of the CHATS Long Range Transportation Plan (LRTP). State and federal funding sources and applications are numerous, complex, and sometimes change, as do the project priority mechanisms employed by MPOs. Details should be sought out on the MPO website (www.bcdco.com) or by contacting the BCDCOG staff.

Focus Areas: Attend technical and policy board meetings regularly; schedule one-on-one coordination meetings with CHATS MPO staff at least twice per year; and be aware of the MPO's way of prioritizing projects and planning / funding cycles. Nearly every kind of project, including transit, biking, walking, roadway widenings / new location, demand, and programs can be funded by one or more of these programs.



Local Government Funding.

Although localities do have restrictions on adopting “new” funding tools that aren’t already authorized by South Carolina (or where they have obtained enabling authority from the State in the past), the role of local governments, including counties that have traditionally played a small role in transportation infrastructure investment or maintenance, is on the upswing in South Carolina. Charleston County has had an active role in funding transportation infrastructure through sales tax and impact fees. However, the City of Charleston should proactively look for ways to fund transportation maintenance and infrastructure needs. Discuss City budget here including need for maintenance budget. Independent bond efforts, as well as property and sales taxes, are going to be closely scrutinized as sources that may increase in importance over the life of this Plan.

Focus Areas: The City is lagging behind the maintenance curve for transportation. This is evident based on the state of infrastructure. Additional funding should be allocated directly to maintaining and enhancing the performance of transportation system. Charleston can fund modest improvements, or work with other partners to match funds for larger-scale improvements. Projects include regulation changes, intersection improvements, safety improvements, ADA-compliance measures, repairs/ resurfacing/ striping/ signage, and matching funds for larger, more capital-intensive efforts. Consideration must be given to pursuing alternative funding strategies, including:

- **Property Tax.** As property taxes are dependent on economic conditions a separate tax for transit operations and capital can be administered by voter approval.
- **Wheel Tax.** Wilson County’s rate of \$25/vehicle is low compared to the 59 counties that apply this tax.

- **Development Impact Fees.** Mt. Juliet has both a square footage and per unit impact fee. An impact fee study is expected after the passage of this plan. Raising fees would have to be done carefully and consider impacts to affordable housing.



Private Sector Participation.

Charleston is a desirable place to live, work and play (visitors), as more people move in, demand for new development to accommodate, feed, and employ them will increase. This development creates demand for transportation that the new development should fairly pay for through taxes, fees, wages, and other contributions. In order to better link private actions with public need, we should expect to see a greater reliance on plan reviews that generate impact statements, which in turn can impose requirements or restrictions on private actions that generate traffic. The desire to lure quality private investment – and thus higher property tax revenues – has kept impact fees and contingent development standards in check, but as the need for more and better infrastructure grows without a concurrent increase in federal and state revenues to create more supply, the pressure will increase on the private sector to participate more directly and earlier in the development cycle. Public-private partnerships (PPPs) have become more commonplace in recent years, taking a variety of forms from right-of-way dedications to utility agreements to full-scale construction of intersections and sections of arterial roadway.

Focus Areas: Land development ordinances have to create specific requirements that tie back to the demands that each new development creates. These projects apply mostly to collector streets, sidewalks, intersection improvements, and rights-of-way needs.



With the preceding review of revenue sources, trends and background context in mind, the discussion of prioritizing and implementing the major recommendations contained in this Plan is possible.

Priorities & Action Plan

Given the recommendations contained in this Plan as well as the current and anticipated future policy contexts at the federal, state, and local government levels, the following action plan was developed.

The priority factors listed in the following table (Table 4-1) were used to choose which projects to pursue as top priorities (balanced by cost and constructability).

Roadways	Bicycle	Pedestrian	Public Transportation
<i>Volume-to-Capacity Ratios (Forecasted)</i>	<i>Distance to ES or MS</i>	<i>Distance to ES or MS</i>	<i>Existing Population + Employment Density</i>
<i>Quality-of-Service Assessment</i>	<i>System Connectivity (i.e., People Pedal Plan)</i>	<i>System Connectivity (i.e., People Pedal Plan)</i>	<i>Future Population + Employment Density</i>
<i>Public Input</i>	<i>"Fixable" Crash History</i>	<i>"Fixable" Crash History</i>	<i>System Connectivity / Enhancement (see CHATS Transit Element)</i>
	<i>Vulnerable Populations</i>	<i>Vulnerable Populations</i>	<i>Vulnerable Populations</i>
		<i>Supportive "walkable" Land Use Patterns</i>	<i>Supportive Land Use Patterns</i>

Utilizing these priority factors, many of which are represented in the current version of the CHATS LRTP project priority system as well, the following tables present information on roadway, bicycle and pedestrian facility and program recommendations.

The "Term" in each table describes short-, middle-, and long-term implementation timeframes:



Table 4-1: Transportation Project Priority Factors

- **Short-Term (2018-2025):** Within now and the next seven years (many policy-level actions are possible in this timeframe, as are some small-scale, low capital cost projects)
- **Middle-Term (2026-2035):** These projects could be financed through regional sources (Sales Tax/Impact Fees/Private Partnerships) and State funding
- **Long-Term (2036-2045):** Around 20 or more years, these higher capital cost projects could be financed, particularly through state/federal sources in the Transportation Improvement Program (TIP)

Roadway Projects Recommendations Action Plan Table

Map ID	Roadway Project	Project Limits	Length (mi.)	Type	Cost (1000s)	Funding Source	Time Frame
1	Ashley River Road	Richmond St to Davidson Ave	2.81	Access Management	\$4,211		
--	Belvedere Road Ext.	Belvedere Road to River Road (outside of UGB)	1.90	New Location	n/a		
2	Bohicket Road	Maybank Hwy to River Road (South) (partially in UGB)	7.31	Widening	\$195,000		
3	Broad Street	Lockwood Dr to East Bay St	1.18	Access Management	\$1,770		
4	Calhoun Street	King St to Concord St	0.61	Access Management	\$920		
5	Chisolm Street	Broad Street to Tradd Street	0.14	Access Management	\$309		
6	Clements Ferry Road/ St Thomas Island Drive	I-526 ramp - Harvest Time Pl	0.45	Widening	\$1,086		
7	Clements Ferry Road	I-526 to Jack Primus Road	3.80	Widening	\$44,670		
8	Clements Ferry Road	Jack Primus Road to SC-41	1.01	Widening	\$43,226		
9	Colonel Harrison Drive Ext.	Johnson Scott Lane to Colonel Harrison Drive	0.46	New Location	\$1,898		
10	Coming Street	US-17/I-26 to Beaufain Street	0.93	Access Management	\$1,392		
11	Cosgrove Avenue Bridge	Cosgrove Ave to Sam Rittenberg Bvd (partially in UGB)	1.42	Access Management	\$2,134		
12	Daniel Island Drive	Fairchild St to Barfield St	0.67	Access Management	\$999		
-	Doctor Whaley Road Ext.	Doctor Whaley Rd to Old Pond Road (outside of UGB)	0.41	New Location	n/a		--
13	E Battery Street	Murray Blvd to Water St	0.24	Access Management	\$359		
14	East Bay Street	Water St to Washington St	0.72	Access Management	\$1,083		
15	East Bay Street - Washington Street	Intersection	--	Access Management	\$2,133		
16	Folly Road	Brantley Dr to Tides End Rd	4.58	Access Management	\$6,863		
17	Folly Road	SC-30 Off-Ramp to Highland Avenue	0.64	Access Management	\$952		
18	Folly Road	Maybank Highway to Johnson Road	0.95	Access Management	\$1,414		

Table 4-2



Map ID	Roadway Project	Project Limits	Length (mi.)	Type	Cost (1000s)	Funding Source	Time Frame
19	Glenn McConnell Pkwy.	Bees Ferry Road to Rutherford Way	0.43	Widening	\$25,000		
20	Glenn McConnell Pkwy. Ext..	Bees Ferry Road to Westbridge Connector Road	2.26	New Facility	\$135,117		
21	Glenn McConnell Pkwy. Ext.	New Roadway (partially in UGB)	6.99	New Location	\$161,337		
22	Goodwill Way Ext.	Goodwill Way to Pinehurst Avenue	0.70	New Location	\$2,888		
23	Grove Street	10th Avenue to Rutledge Avenue	0.34	Access Management	\$512		
24	Grove Street	Rutledge Ave to end of Grove St	0.32	Access Management	\$475		
25	Hagood Avenue	Moultrie St to Fishburne St	0.64	Access Management	\$953		
26	Harbor View Road	North Shore Drive to Mikell Drive	1.86	Access Management	\$2,769		
27	Hudson Lane Ext.	Hudson Lane to Cape Romain Road	0.37	New Facility	\$1,526		
28	I-26 - Port Access Road Exchange Ramp	Interchange (Part of Port Access Road projected)	0.28	New Location	\$328,544	/Port	
29	I-26 - Spruill Avenue Exchange Ramp	Interchange (Part of Port Access Road projected)	0.13	Removal	Included in #28	/Port	
30	I-526/Mark Clark Expy	Rivers Ave Inter. to Paul Cantrell Inter. (partially in UGB)	4.79	Widening	\$255,000		
31	I-526/Mark Clark Expy	Bowman Rd Inter. to Rivers Ave Inter. (partially in UGB)	10.94	Widening	\$207,000		
32	I-526/Mark Clark Expy - Paul Cantrell Blvd Ramp	Interchange	0.26	Redesign	Included in #30		
33	King Street	Columbus Street to Calhoun Street	0.69	Access Management	\$1,029		
34	King Street	Calhoun Street to Broad Street	0.70	Access Management	\$1,053		
--	Kitford Road Ext.	Kitford Road to Glaze Street (outside of UGB)	0.44	New Location	n/a		
35	Lemon Lane Ext.	Lemon Lane to Beech Hill Drive	1.05	New Location	\$4,331		
36	Mark Clark Expy - US-17 Exchange Ramp	Mark Clark Expy at US-17/ Savannah Highway	0.52	New Facility	Included in #44		
37	Mark Clark Expy (New Connector Road)	Mark Clark Expy and River Road (North)	0.81	New Facility	Included in #44		

Table 4-3

Roadway Projects Recommendations Action Plan Table (cont.)

Map ID	Roadway Project	Project Limits	Length (mi.)	Type	Cost (1000s)	Funding Source	Time Frame
38	Mark Clark Expy (New Connector Road)	Mark Clark Expy and River Road (South)	0.67	New Facility	Included in #44		
39	Main Road	River Road to Maybank Hwy (partially in UGB)	4.85	Widening	Included in #2		
40	Main Road	Interchange	0.28	New Location	Included in #2		
41	Main Road	Interchange	0.09	Removal	Included in #2		
42	Main Road	Bees Ferry Road to River Rd (partially in UGB)	1.20	Widening	Included in #2		
43	Main Road - US-17 Exchange Ramp	Interchange	0.09	New Location	Included in #2		
44	Mark Clark Expy	US-17 to Folly Road	16.19	New Facility	\$489,122		
45	Maybank Hwy Pitchfork	River Rd to River Rd	0.51	New Location	\$2,018		
46	Maybank Hwy	Stono River Bridge to Main Road	4.84	Widening	\$31,800		
47	Maybank Hwy - Main Road	Intersection	--	Access Management	\$475		
48	Michaux Pkwy. Ext.	Michaux Pkwy to Ashley River Boulevard (partially in UGB)	1.51	Widening / New Location	\$39,646		
49	Moonbeam Dr Ext.	Moonbeam Drive to River Road	0.26	New Location	\$1,073		
50	Murray Boulevard	E Battery St to Chisolm St	0.97	Access Management	\$1,458		
51	New Road	Tallent Lane to Reva Ridge Drive	0.50	New Location	\$2,063		
52	New Road	Mitnick Lane to Split Hickory Court	0.49	New Location	\$2,021		
53	New Road	Clements Ferry Rd to Royal Assembly Dr	0.22	New Location	\$908		
54	New Road	Beresford Run to Joyner Lane	0.69	New Location	\$2,846		
55	Old Towne Road	Sam Rittenberg Blvd to Gunn Ave	1.63	Access Management	\$2,850		
56	Rutledge Avenue	Peachtree St to Sumter St	0.97	Access Management	\$1,453		
57	Sam Rittenberg Boulevard	Manor Blvd to Cosgrove Ave Bridge	1.40	Access Management	\$1,585		

Table 4-4



Map ID	Roadway Project	Project Limits	Length (mi.)	Type	Cost (1000s)	Funding Source	Time Frame
58	Sanders Road Ext.	Sanders Road to Wildcat Boulevard	0.47	New Location	\$1,939		
59	Savannah Hwy / US-17	I-26 to Betsy Road	3.49	Access Management	\$5,239		
60	SC-61 / Ashley River Road	Raoul Wallenberg Blvd. to Bees Ferry Road	3.18	Access Management	\$4,735		
61	SC-61 / Ashley River Road	Bees Ferry Road to county line (partially in UGB)	7.00	Access Management	\$10,423		
62	SC-61 / St. Andrews Boulevard	Wesley Drive to Old Towne Road	1.60	Access Management	\$2,382		
63	Sea Island Pkwy.	River Road to Betsy Kerrison Parkway (partially in UGB)	9.39	New Facility	\$103,442		
64	Shadetree Boulevard	Cane Slash Road to Sea Island Parkway	0.87	New Location	\$3,589		
65	Shoreline Drive Ext.	Shoreline Drive to Colonel Harrison Drive	0.18	New Location	\$743		
66	Springbok Lane Ext.	Springbok Lane to Monica Court	0.25	New Facility	\$1,031		
67	St. Johns Church Road Ext.	St. Johns Church Rd to Charleston Regional Pkwy	0.42	New Location	\$1,733		
68	Towne Street Ext.	Towne Street to Jadabell Lane	0.16	New Location	\$660		
--	Trinkets Loop Ext.	Trinkets Loop to Old Pond Drive (outside of UGB)	0.49	New Location	n/a		
69	Updyke Drive Ext.	Updyke Drive to River Road	0.77	New Location	\$3,176		
70	US-17	Hagood Ave to Coming St	1.64	Access Management	\$2,461		
71	West Bridge Connector Road	SC-61 to Glenn McConnell Parkway Extension	1.54	New Facility	\$31,045		
72	Zelasko Drive Ext.	Cane Slash Road to Shadetree Blvd	0.29	New Location	\$1,196		

Table 4-5

Hot Spots and Corridors Action Plan Table

Map ID	Roadway Project Name	Project Limits	Length (mi.)	Type	Cost (1000s)	Funding Source	Time Frame
A	Rutledge Ave	Peachtree St to Sumter St	0.97	Access Management	\$1,700		
B	Clements Ferry Rd	I-526 to Joyner Ln	1.4	Widening	See #7		
C	Maybank Hwy	River Rd to Southwick Dr	1.8	Widening	See #46		
HS-1	Savannah Hwy - Wappoo Rd	Intersection	N/A	Intersection Redesign	\$650		
HS-2	Sam Rittenberg Blvd & Orange Grove Rd	Intersection	N/A	Intersection Redesign	\$350		
HS-3	Morrison Dr, Cooper St, & Lee St	Intersection	N/A	Intersection Redesign	\$600		
HS-4	Lockwood Dr & Beaufain St	Intersection	N/A	Intersection Redesign	\$290		
HS-5	Fishburne St & Hagood Ave	Intersection	N/A	Intersection Redesign	\$350		
HS-6	Folly Road Blvd, Wesley Dr, & West Ashley Gwy	Intersection	N/A	Intersection Redesign	\$400		
HS-7	Maybank Hwy & Riverland Dr	Intersection	N/A	Intersection Redesign	\$350		
HS-8	St. Andrews Blvd, Old Towne Rd, & Ashley River Rd	Intersection	N/A	Intersection Redesign	\$800		
HS-9	Calhoun St & East Bay St	Intersection	N/A	Intersection Redesign	\$600		
HS-10	Main Rd & River Rd	Intersection	N/A	Intersection Redesign	\$900		

Table 4-6



Policy Actions

Updates of transportation and comprehensive plans occur at infrequent intervals, often five years or longer. In between these major update cycles, agencies can continue building on the recommendations contained in the plan, not only in terms of funding, design, and construction, but working with their many partners to improve local practices that can make an even larger shift towards a healthy, vibrant, and active transportation system and community.

The City of Charleston and its partnering organizations already have many policies describing communication practices, design standards, and other things discussed in this section. However, during the course of the planning process, some places where enhancements could be made are inevitably discussed. The purpose of the policy and practices section is to ensure that the momentum we achieved continues forward after the project is done, and influences decisions in the future. The following are not intended to critique current practices, or supersede them, but instead to enhance practices that would support the physical recommendations contained in this plan.

A few guiding principles were followed to identify and describe the policy topics:

1. Acknowledge what's being done now;
2. Create specific and actionable steps that, even if they aren't followed to the letter, are achievable, get people thinking, and get them excited about their work and their community; and
3. Develop the policy topics consistently, with issues, importance, and strategies for each topic, as well as examples of best practices that can provide insight from other places.

Lastly, linkages between some of the topics, such as communication, performance, and equity engagement, occur frequently. Pursuing and achieving multiple action items on some topics as a "package" will enhance the return on

REGIONAL POLICY NEEDS Priorities for Long-Term Viability

In fast-growing places like Charleston and the surrounding region, few tasks are as important as aligning policy with infrastructure needs. The private sector plays a major, ongoing role in terms of financing improvements through property taxes as well as indirectly through sales, income, and other taxes levied on employees, residents, and workers that support them with everything from lawn care to lending services.

Because of their importance, the project team undertook a survey of the policies in Charleston and neighboring governments, both municipal and county. The findings painted a picture of varying practices even within a fairly narrow geographic range: impact fees, greenway requirements, and site development can all vary across the landscape.

Here are the top policy needs identified by the 13 jurisdictions that were surveyed (three tiers of respondent importance):

- ▶ **Sidewalks**
- ▶ **Complete Streets Policy**
- ▶ **Connectivity**
- ▶ **Greenways/Trails**
- ▶ **Traffic Impact Study Requirement**
- ▶ **Transit**
- ▶ **Parking**
- ▶ **Streetscape**
- ▶ **Roadways**
- ▶ **Driveway / Access Management**
- ▶ **Commercial Development Design**
- ▶ **Corridor Overlay Districts**
- ▶ **Impact Fees**
- ▶ **Setbacks Associated with the CTP**

▶ **Thanks to our respondents!**

Hanahan
James Island
Monck's Corner
Mt. Pleasant
North Charleston
Seabrook Island
Summerville
Sullivan's Island
Berkeley County
Charleston County
Dorchester County
City of Charleston
Folly Beach

Based on the responses received, the following provides an overarching policy response on key issues facing Charleston and the Berkeley-Charleston-Dorchester Region.

Detailed guidance is provided on each topic, especially Complete Streets Policy (which is an overarching policy and approach that covers many other topics). The other top four issues from the survey - sidewalk policy, connectivity, greenway/trail requirements, and traffic impact study requirements are examined as well, albeit in a more focused manner.

It is important to note that while Complete Streets Policy was one of the top needs identified among the 13 jurisdictions, the City of Charleston already has one such policy in place since 2008. The Mayor and the City Council voted to affirm that the City would “ensure accommodation of travel by pedestrians, bicyclists, public transit, and motorized vehicles and their passengers” in the permitting process for any planning, design, and public street maintenance or reconstruction. While this is on the record, it hasn’t been adhered to on a system-wide level in Charleston.

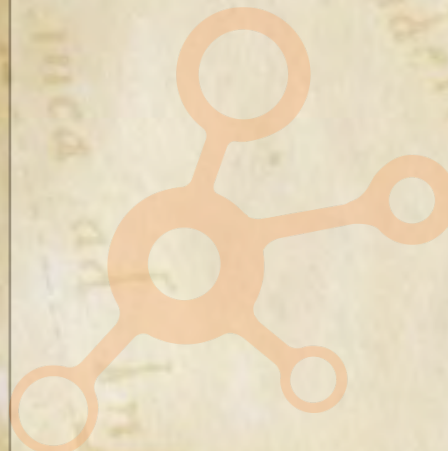
Discussions with staff highlighted the importance of partnerships and equitable public engagement, so these topics were also added to the policy review for the City of Charleston (but they can readily apply to other communities as well). Lastly, the topic of resiliency was added since it is a premier discussion happening across the country, particularly in coastal communities.

A comprehensive study on each topic is not warranted or possible, but specific, actionable practices are suggested as well as examples of where good practices are already being applied.

Connections among these policy topics abound: it makes more sense to have sidewalks when blocks are shorter, which improves connectivity, which creates better environments for complete streets

“Yet no matter how good it may be, a plan by itself cannot bring about immediate transformation. Almost always, it is a spark that sets off a current that begins to spread.”

—Jaime Lerner, Author, *Urban Acupuncture: Celebrating Pinpricks of Change that Enrich City Life*





Sidewalks and Implementation

Why It's Important

Perhaps no other piece of infrastructure is as observable as the ubiquitous sidewalk. But sidewalks are not created equally, or cheaply. Here are some concepts and practices to consider as the role of the pedestrian waxes on the urban landscape.

Issues and Barriers to Success

In the Century V Plan produced a few years back, the importance of sidewalks and complete streets was highlighted in detail. Three of the 11 points laid out there include that the City should work towards the goal that every residence is with a half mile or 10 minute walk of a bicycle or pedestrian facility, identify the streets with the greatest volumes and prioritize those for bicycle and pedestrian improvements, and seek funding to support the other recommendations detailed. Finding new places where sidewalks are needed is rarely a problem, funding is a different story. In order to accomplish any of these recommendations, funding must be allocated and the City must prioritize it's non-motorized travelers.

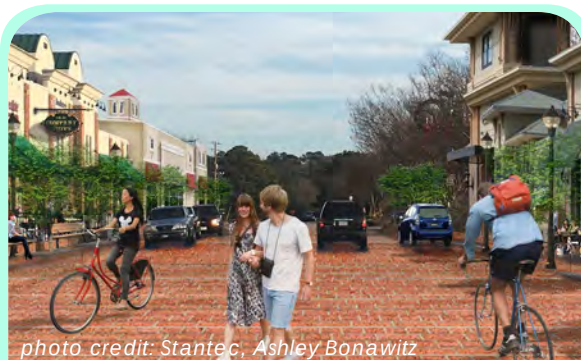
In Charleston and all communities, there are barriers that increase cost and decrease constructibility.

- ▶ **Narrow Streets or Limited Rights-of-Way.** Although narrow streets are capable of slowing cars, narrow rights-of-way make land acquisition for sidewalks expensive, especially if buildings and parking lots are in the way.
- ▶ **Utility Relocation.** If powerlines or stormdrain inlets have to be relocated, costs for construction go up - fast.
- ▶ **More Pavement = More Stormwater Runoff.** Alternative pavement technologies or allocating space to allow rainwater to infiltrate work, but will change initial and life cycle costs.
- ▶ **Desire may be Lacking.** If adjacent property owners don't want them, sidewalks usually don't happen.

Strategies for Improvement

There are several ways to be considered for developing sidewalks that work:

1. The sidewalk width and choice of material should be flexible to meet the needs of the environment; 12' and wider sidewalks in commercial and high-traffic areas are appropriate; brick pavers and integrated streetscaping can fit into historical environmental contexts.
2. Sidewalks should be required to be constructed by new development on both sides of the street, every time except in very low-density (e.g., less than two units per acre) residential communities.
3. No room for sidewalks? Consider a shared street instead. Shared streets balance cars, pedestrians, and cyclists in primarily residential and highly mixed-use communities.
4. Accessibility is key to an aging population, so installing curb ramps and pedestrian signals - even during routine utility construction - is important.
5. Work with SCDOT on repaving work (in advance) to ensure that sidewalk construction efforts are coordinated with the plan.
6. Dedicating funds to implementing, prioritizing, and constructing any backlog of proposed sidewalk projects.



Where to Start Walking?

Shared Streets: <https://nacto.org/publication/urban-street-design-guide/streets/residential-shared-street>

Sidewalk Standards: www.planning.org/pas/reports/report95.htm

Economic Impacts: <https://americas.uli.org/report/active-transportation-real-estate-next-frontier>

Traffic Impact Studies

Why It's Important

Most communities in the Charleston Region use a traffic impact study (TIS) to assess the potential impacts of a new or expanded development. These tools can be made better or worse in terms of how well they support system improvements, and not just for cars.

Issues and Barriers to Success

Traffic studies are nothing new, and are expected by developers of private properties over a certain size (or trips that are expected to be generated). However, the analysis and thresholds should be context-sensitive: a Level-of-Service-only standard won't be desirable, or even possible, in a downtown area. Further, all TIS documents and processes should contemplate all modes of travel, including transit access/stops, connectivity by sidewalks, and requirements for connecting on-site pedestrian networks to the nearest intersection, even if that connection requires going off-site (off-site signal and intersection improvements are commonplace requirements).

Strategies for Improvement

1. **Start off right** by requiring the site location map to extend to the nearest intersections, and display both existing and planned future transit routes/stops, historic / overlay districts, pedestrian facilities (including greenways), and bicycle accommodations - crucial particularly for major (over 100 units) residential developments.
2. **Conduct a scoping meeting** with the developer and their engineer to be certain that the TIS study area, intersections, phasing of development, growth/peak hour factors, and thresholds are established.
3. **List the performance measures** by area and/or by street and mode to ensure that service standards respond to the needs of individual communities. Also make sure that connectivity and design standards for transit facilities, biking connections, and other provisions tied to historic preservation districts, zoning, land use plans, and this transportation plan are understood and enforced. Don't forget about accommodating all users during construction with signs and detours.



TIS Better to Give...

Fort Collins, CO



Chapter 4 of the Urban Area Street Standards (well worth reviewing in general) addresses TIS guidance and requirements. Unlike most, Fort Collins emphasizes multimodal impacts and assessment.

Fort Collins, Co: www.larimer.org/sites/default/files/ch04_2016.pdf

Calgary TIS Guidelines: www.tccs.act.gov.au/_data/assets/pdf_file/0009/991989/Transport-Impact-Assessment-Guidelines.pdf

Practice (Book): ITE, Transportation Impact Analyses for Site Development. 2010.

SCDOT: www.scdot.org/doing/technicalPDFs/publicationsManuals/trafficEngineering/ARMS_2008.pdf

In Depth: https://nacto.org/docs/usdg/nchrp_rpt_616_dowling.pdf

Easy Tool to Calculate Multimodal LOS: www.fdot.gov/planning/systems/programs/sm/los



Greenways & Trails

Why It's Important

People always say they prefer to bike and walk away from traffic - always. In a place like the Charleston Region, greenways allow for connections between neighboring communities *and* resiliency through stormwater management.

Issues and Barriers to Success

As with connecting streets, connecting greenways and off-road trails can be daunting through existing neighborhoods and across streets, so it's better to plan ahead and map out the network in an adopted greenway, comprehensive, or transportation plan. The "corridor of crime" argument is still there, even if there is little justification for it. If push comes to shove, enforcing eminent domain across private property requires careful thought and preparation.

Strategies for Improvement

1. **Honor the "green" in greenway** by remembering that the term was intended to connect islands of green space and parks together for habitat conservation - an important consideration in a rapidly developing area. Mapping out key conservation areas is a crucial first step to preserving and connecting them as part of a regional conservation plan.
2. **Incorporating greenways** into private developments by allowing 1:1 or even 2:1 area counting towards open space requirements (or other incentives like density bonuses) can help smooth the policy pathway for private sector greenway construction and connections.
3. **Go small, then large.** One of this plan's authors worked with a local high school to clear a "soft trail" behind the school to delineate a three-foot-wide clear space for a future hard surface trail to be funded later. Local engineering companies helped provide expertise on stream crossing permits and pedestrian bridge design - which was built and moved by the high school's shop class. Nature conservation areas, public trail art, and butterfly or rain gardens can - and should - be done in concert with the community to get their support and help.



photo credit: Scott Lane

A Trail, Softly:

Wake Forest, NC



The Town of Wake Forest worked with Heritage High School to clear a narrow "soft trail" through the wooded property behind the school to a major intersection, a distance of about 0.8 miles. Students were shown safety tips on using tools first, then led out in a group to work together on the trail. The school's shop class built a pedestrian bridge over a creek with permit and design help donated by a local engineering firm.

Wake Forest's Soft Trail Site: www.wakeforestnc.gov/heritage-high-soft-trail.aspx

Book: Randolph T. Hester, Design for Ecological Democracy. 2006.

Book: Hellmund and Smith, Designing Greenways: Sustainable Landscapes for Nature and People. 2006.

Connectivity

Why It's Important

The pace of growth in Charleston and the surrounding region requires more than wider arterial roads. The alternatives, as well as trip lengths and number, depend on a well-connected system.

Issues and Barriers to Success

It's much easier to create connectivity in a greenfield (not developed) situation than to connect existing neighborhoods to each other or commercial areas. Fears of "cut-thru" traffic are real, although they can be mitigated by better, slower street design. Ensuring that local policies require one or more "stub-out" connections to the edges of property lines helps make future connections possible - but not inevitable: people will still have vocal concerns about connections to neighborhoods or uses that they perceive as driving traffic into and through their neighborhood, even on public streets.

Strategies for Improvement

1. **The number of stub-outs** required by new development should be scaled to the number of units or square footage being constructed at full build out (e.g., all phases.)
2. **Stub-out connections** have to be signed (prominently) and noted on plats and deeds.
3. **Real estate agents are required by law to disclose features of properties** that they sell. Conduct an annual meeting of invited real estate agents (or have a "traveling road show" that can be conducted for real estate agencies periodically) to impart information about future road connections.
4. **Great connectivity doesn't happen by accident.** A secondary street plan, sometimes called a collector street plan, shows where road connections have to be made as a prerequisite of new private development or future public investment. These plans should show cross-sections, streetscaping, and traffic calming (including required frequency of curves and small curb radii standards) tied to residential and commercial properties.
5. **Shorter block faces** - less than 500' - help slow traffic and promote walking and transit use.

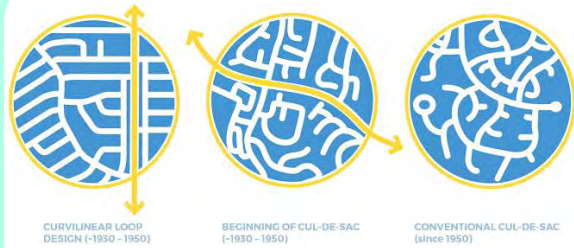


photo credit: CNU

The Benefits of Making Connections

- ▶ Street systems with greater degrees of connectivity offer greater resiliency and possibilities for rerouting traffic during an emergency
- ▶ Higher degrees of connectivity imply a more robust transportation system, one that is able to provide users with greater degrees of freedom in making travel choices during periods of heavy traffic and accommodating trip chaining (making brief stops at different places during a trip) in areas with lower-income populations
- ▶ Greater connectivity typically equates to a greater capacity for moving and distributing traffic, thereby reducing congestion levels
- ▶ Areas with greater connectivity have better land access to local businesses, with implications for the diversity and intensity of potential developments in those areas



Way to Go Ohio:

OKI Regional Council of Governments

Regional bodies can promote connectivity by creating standards and policies for their member agencies to follow. The OKI version talks benefits, model code, and block lengths.

<http://rpf.oki.org/wp-content/uploads/2016/08/OKI-Street-Connectivity.pdf>

CNU: www.cnu.org/our-projects/street-networks/street-networks-101



Activating Partnerships: Slicing the Silos

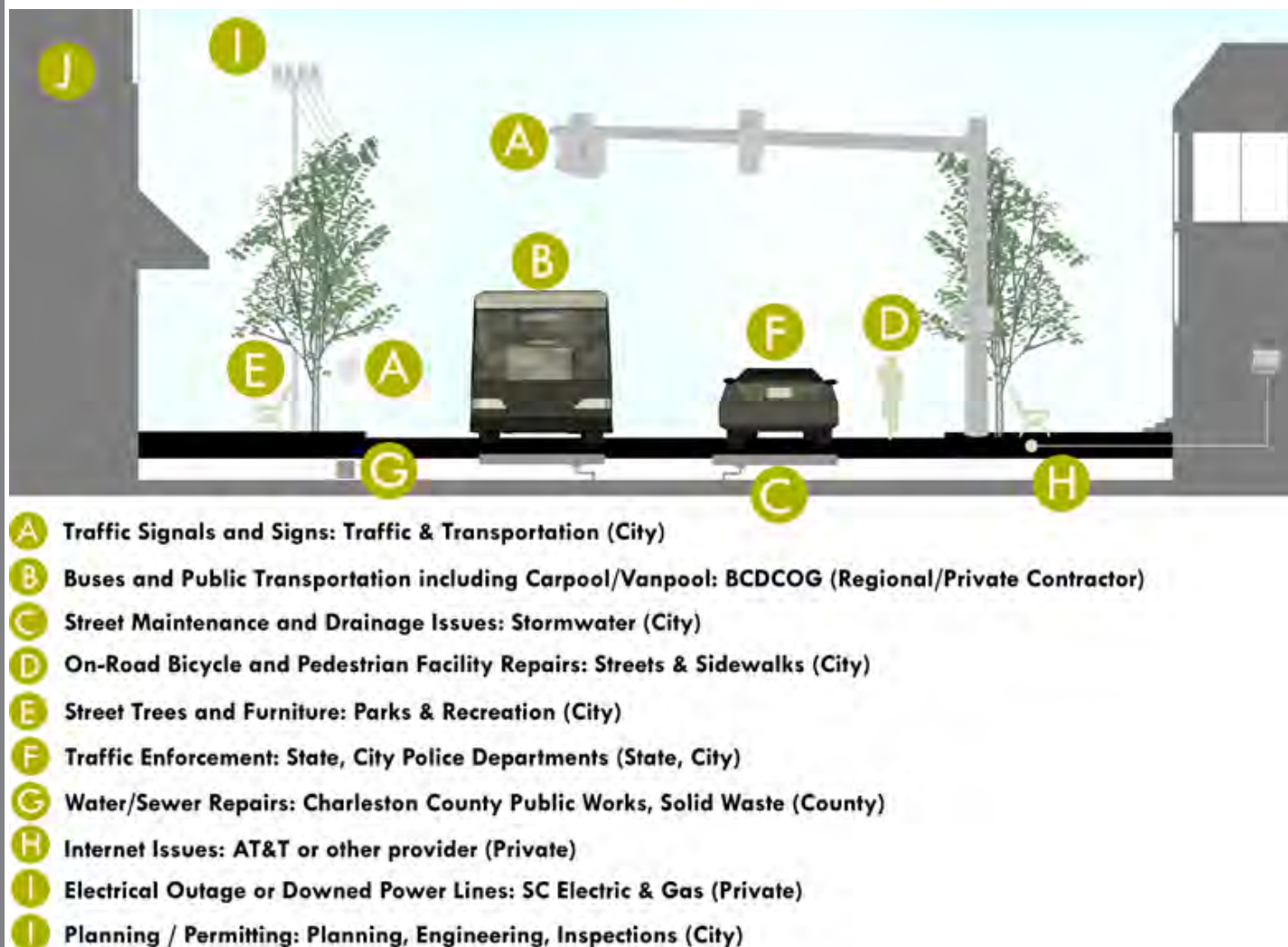
Why It's Important:

The City of Charleston is a large, diverse organization that must work cooperatively and effectively with other large, diverse organizations to plan, implement, and maintain transportation projects and services.

Issues and Barriers to Success:

The City's various departments are busy agencies working toward internal objectives, some of which represent core missions. It's easy to misunderstand, lose track of, and delay projects that require cross-collaboration among the staff of different departments. Similarly, the City's Transportation Department has a mission that depends on close cooperation with the County of Charleston, SC Department of Transportation, and the Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) for short- and long-range planning, design/

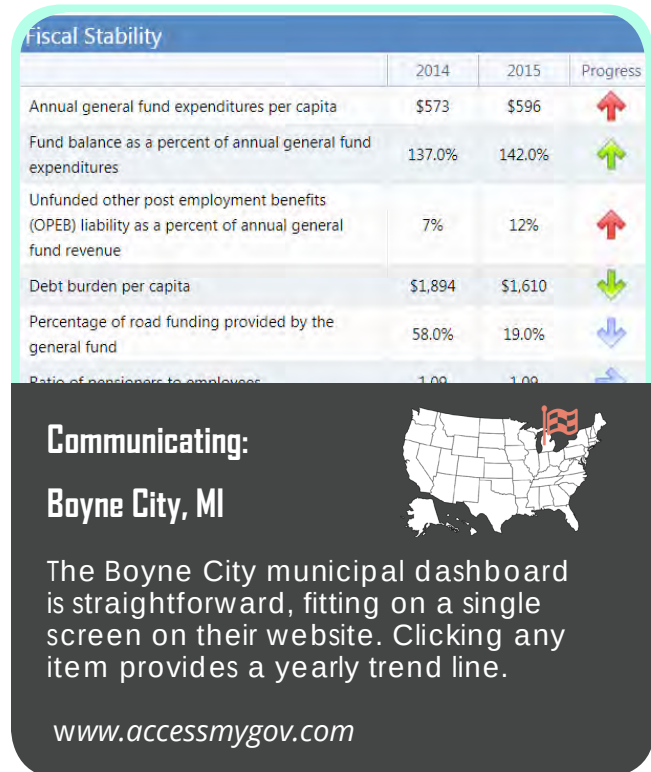
construction, and maintenance of the City's core transportation infrastructure. Discussing these issues, much less doing the things necessary to make improvements, require time from busy professionals. Further, change in these organizations and their staff members can be challenging, not least because any "improvement" may have to acknowledge "fault" on the part of an agency, department, or even individual. The purpose is not to cast blame for the past, but to create a more efficient delivery of services to the community in the future. Few people realize how many agencies and departments are required to deliver common public services. The figure below illustrates how many entities are potentially engaged in providing typical services and emergency responses in a street corridor.



Strategies for Improvement

No one likes meetings, since most meetings don't do work they make work – or at the very least take time away from work that's already underway. The following are a few ideas for working collaboratively across city departments and between organizations that work with the City.

1. **Foster a performance-based atmosphere.** The more an organization focuses on performance, the more its people realize the need for effective and efficient collaboration. An era of top-down, "cascade" goal-setting is being replaced by transparency and performance-based planning. Leaders work with their staffs to collectively identify objectives, how to reach them, and measure progress (performance measures). While beyond the scope of this study, this process should be ongoing, with clear metrics related to performance readily available to a broad audience. Measures like number of issues resolved, time taken from reporting to closing out the issue, and various costs are commonplace measurements. Ultimately, performance gets tied to merit increases and other actions to celebrate excellence. Bonus: the public can access this information (see box) and realize that the city is doing a lot more for them than they realized.
2. **A quarter for your thoughts.** Tight staffing budgets and burning issues tend to dominate the business practices, and it takes a special effort to carve out space to solve systemic issues. Create a quarterly meeting where team leaders spend a half-day discussing one or two common and cross-cutting (at least two departments or divisions are involved) issues and steps to take to resolve or at least improve the situation – and report the next quarter on what seems to be working or not.



3. **Let the outside in.** Site plan review committees, emergency response personnel, and other collaborations are common areas where cities, states, counties, and other agencies have to work together to be successful. The project team notes that in every city where they've worked, people from different entities that come together in focus groups invariably exchange valuable information that they would not have been likely to do otherwise. If internal groups meet quarterly, then action-oriented groups with external partners should happen at least twice each year, with the same standards for coordination and follow-up as the quarterly internal meetings.



Resiliency: The Link with Transportation

Why It's Important:

The very thing that has created the Charleston of today also presents a very real threat in the future: a choice location seaside, plus an active earthquake zone, create the need for addressing resiliency in transportation planning, design, and construction.

Issues and Barriers to Success:

During the preparation of the plan, on July 19, 2017 shortly after 5:00pm, a tarp used for controlling paint spray broke loose from its moorings and drifted down on the Don Holt Bridge, the only bridge connecting Charleston with Mt. Pleasant and Daniel Island. All lanes were closed to traffic during rush hour, and remained closed until the following day. Reminders of the vulnerability and frailty of the transportation system are not uncommon, precipitated by heavy rains.

Barriers to moving forward on resiliency measures and policies typically center around the trade-offs between the short-term and tangible impacts of compliance to businesses or public sector projects, and the long-term, largely invisible prospects for a serious disaster affecting thousands of people.

Strategies for Improvement

Stronger, more coordinated, and mutually supportive policies are generally necessary to strengthen the redundancy and reliability of the transportation network. The following describe actions that will strengthen one or more aspects of the Disaster Management Cycle: Mitigation, Preparedness, Response, Recovery.

1. Think Big: conduct a region-wide emergency management plan.

Currently, the counties of Dorchester, Charleston, and Berkeley have individual plans that describe how they would deal with an emergency such as a catastrophic storm. While generally similar in content, the alignment isn't exact and may not contain similar detail on emergency action planning. The three counties are inextricably linked together, however, and have overlapping resources, transportation networks, and partners. The process should include modeling of the impacts of specific conditions (e.g., bridge failure), and tie that information back to emergency response planning and actions.

2. Make the tent even bigger. "Resiliency" is often too restricted to environmental catastrophe, but individuals and communities need to contemplate how they can grow their economies, combat poverty, reduce crime, and acknowledge the realities of aging infrastructure and affordable housing. In an era of fiscal conservatism, addressing each problem in isolation is not an affordable proposition. These issues are best tackled collectively through broad dialogue and expanding the concept of what a comprehensive plan really could mean and how it might provide specific actions and measures that could create mutually reinforcing, "virtuous circle" dynamics across many areas.



▲ Ranking near the bottom of most-desirable sights on the commute home (source: N. Charleston Police Department)



▲ Disaster Mitigation Cycle

3. Include resilience as a specific factor in transportation project prioritization.

The current planning processes and state prioritization models emphasize (appropriately) congestion, safety, economics, and other factors with some mention of resiliency in the form of evacuation routes. A stronger role for resiliency that incorporates a vulnerability assessment could greatly improve the standing of projects that provide increased network redundancy, for example.

4. Land use location and design counts.

Certain soils, poor transportation accessibility to emergency services, and flood-prone areas create places that are highly problematic for new or more intensive development. New development that contemplates containing storm water on-site or tying land use types and restrictions on developments would limit future populations to unnecessary exposure to disaster. This process is often controversial, and deserves a group approach that includes property owners, private developers, real estate professionals, emergency service personnel, and experts on land policy to help come up with a strategic plan.



Get in the Game:

Resources

Resilient Cities Report 2015
www.usgbc.org/resources/2015-resilient-cities-summit-report

ICLEI Resilient Cities
<http://resilient-cities.iclei.org/>

Urban Land Institute
<http://americas.uli.org/uli-connect/tools-resiliency-planning-age-extreme-weather/>



Complete Streets: Preserving Mobility and Reducing Tax Burden

Why It's Important:

A great thing about Charleston and the downtowns of many of its smaller neighbors is that you don't have to go anywhere to see how an interconnected, multi-modal, and beautiful transportation system that supports every type of user can work. Young, old, zero-car, and disabled/mobility-challenged users should still move around, go shopping, go to work, and go home again.

Issues and Barriers to Success:

While the cost of providing transit services, sidewalks, bicycle facilities, greenways, and safety countermeasures is real, often the biggest challenge is internal. Successfully developing a mindset in the people that have to execute plans, designs, and construction is crucial. The Complete Street resolution the City passed underlines that desire. It is important to also note that the South Carolina Department of Transportation passed an similar resolution in 2003 to empower counties and municipalities to "make bicycling and pedestrian improvements an integral part of their transportation planning" when state or federal funding is used.

Strategies for Improvement

Fortunately, there are good examples of both policies (refer to the National Complete Streets Coalition, cited on the next page, for example) and standards, such as those published by NACTO (National Association of City Transportation Officials) that Charleston can use to develop its own complete streets program and build on its 2008 resolution to support complete streets. The following are some additional "next steps."

1. **Create, adopt, and implement a complete streets planning and design process.** When evaluating a potential street project, approaching it from the perspective of the community, travelers, economics, community resource enhancement, and other angles besides traffic level-of-service standards is crucial. The chapter in this plan devoted to complete streets policy and standards provides sample language for such a process approach that the City could adopt.

2. **Get trained.** The National Complete Streets Coalition (<https://smartgrowthamerica.org/program/national-complete-streets-coalition>) offers both resources and training for cities that want to take their game to another level. But that training won't help if the decisions that stem from more multi-modal and user perspectives aren't supported by elected officials and top staff. These decisions often involve trade-offs that don't optimize, and may even hurt, vehicular traffic mobility. The decision-making process depends on a sound relationship with the communities and state partners such as SCDOT to recognize that other factors have to compete with speed and volume. Annual reviews need to include introspective, performance measure-driven reviews of accomplishments and progress towards enacting complete streets objectives.



Safer Streets, Stronger Economies:

Smart Growth America & National Complete Streets Coalition

This 2015 study lays out a whopping 37 precedent projects that show complete street policies being put into action and positively impacting local economies. A must read for any advocate and policy maker.

<https://www.smartgrowthamerica.org/app/legacy/documents/safer-streets-stronger-economies.pdf>

Policy Development: Complete Streets Policy Development

The creation of a complete streets policy could be explored initially during a detailed process, preferably as an individual effort focused on complete streets and related policies.

The effort ideally requires the inputs of citizens, technical staff, elected/appointed officials, business interests, real estate developers, and other members of the community to ensure a policy tailored to the specific interests and needs of the community. A “study team” comprised of municipal staff and (possibly) private consulting staff is assumed to be present and technically competent to perform the necessary work that the policy implies. Note also that, since complete streets are part of an overall design objective that includes land use and other elements of the public and realms the study team should represent public works, planning/zoning, law enforcement, and other departments within the city.

The following is a suggested starting point, and one that is borrowed from established, proven resources such as the Charlotte, NC Complete Streets Policy and National Complete Streets Coalition. The latter is the best starting point for staff to undertake development of their own policy, as well as identifying training, samples of complete streets policies from around the country, and other resources to help communities understand the importance, development, and effects of a complete streets policy.

The National Complete Streets Coalition (a subsidiary of Smart Growth America) notes that the following are ten vital components of a policy framework to ensure that streets are designed for everyone, at every age, at every level of physical ability:

1. **Vision:** The policy establishes a motivating vision for why the community wants Complete Streets: to improve safety, promote better health, make overall travel more efficient, improve the convenience of choices, or for other reasons.
2. **All users and modes:** The policy specifies that “all modes” includes walking, bicycling, riding public transportation, driving trucks, buses and automobiles and “all users” includes people of all ages and abilities.
3. **All projects and phases:** All types of transportation projects are subject to the policy, including design, planning, construction, maintenance, and operations of new and existing streets and facilities.
4. **Clear, accountable exceptions:** Any exceptions to the policy are specified and approved by a high-level official.
5. **Network:** The policy recognizes the need to create a comprehensive, integrated and connected network for all modes and encourages street connectivity.
6. **Jurisdiction:** All other agencies that govern transportation activities can clearly understand the policy’s application and may be involved in the process as appropriate.
7. **Design:** The policy recommends use of the latest and best design criteria and guidelines, while recognizing the need for design flexibility to balance user needs in context.
8. **Context sensitivity:** The current and planned context—buildings, land use, transportation, and community needs—is considered in when planning and designing transportation solutions.
9. **Performance measures:** The policy includes performance standards with measurable outcomes.
10. **Implementation steps:** Specific next steps for implementing the policy are described.



Sample Process Guidance

(refer also to existing documents published by *Charlotte, NC; Nashville, TN; and the National Complete Streets Coalition*):

“This Complete Streets Policy shall direct the [Town/City] to develop and provide a safe and accessible, well-connected, and visually attractive surface transportation network that balances the needs of all users, including: motorists, pedestrians, bicyclists, public transportation riders and driver, emergency vehicles, freight carriers, agricultural vehicles and land uses and promote a more livable community for people of all ages and abilities, including children, youth, families, older adults and individuals with disabilities.”

Sample Vision Statement
(Park Forest, IL):

The purpose of the following steps is to ensure that planning, design, and other processes contemplate all users and all modes of travel. This process will reflect the ten concepts identified previously, and is intentionally condensed to make it as simple and as broadly applicable as possible.

Step 1.0: Technical Inventory of the Street and Surroundings. The study team will develop a description of the project area/corridor that includes at a minimum the building types, densities, character, setbacks, and historic properties on adjacent lands as well as nearby and connected sidestreets. The subject corridor will be described in terms of geometry (lane widths, speed limits, design speed, cross-section(s), volumes of users by mode, signalization, crossing treatments, accommodations / demand for public transportation, walking, and bicycle users), crash histories from the most recent 3-to-5-year period, and a conditions analysis that includes safety/security, mobility/performance, and maintenance elements. A brief synopsis of the demographics of workers and residents in the corridor that includes comparisons to the larger geography (e.g., municipality or county) will also be included, mentioning age, race/ethnicity, language spoken at home, and income levels, at a minimum.

Technical Products: Crash mapping; aerial photography underplaying labeled buildings/structures; zoning / land use map; transit stop locations; multimodal level-of-service analysis using accepted methods such as MUTCD and Florida DOT Quality/Level-of-Service. Future demand and automobile performance measures may also be available through travel demand model outputs. A summary of the existing conditions, including adopted plans, policies, and “pipeline” actions, will complete this step but remain internal to the study team pending completion of Step 2.0.

Step 2.0: Community Context. The study team will work with representatives of the community, preferably in a collaborative process (e.g., workshop or charrette) to enhance the understanding of the corridor and its strengths, challenges, and opportunities. The output of this public exercise will include the following:

1. Barriers, including poor access, lighting, inadequate street crossings, dangerous conditions, and lack of capacity for users such as transit stops, turning lanes, and pedestrian crossing distances greater than 1,000' apart;
2. Opportunities and Resources, such as parks, schools, office complexes, shopping centers, underutilized spaces, and underutilized parking areas; and
3. Aesthetics, especially elements that support alternative modes of travel as well as businesses/customers, such as streetscaping, street furniture, pedestrian-scale lighting, wayfinding.

The public forum will also work to identify and weight community objectives that reflect the importance of answering concerns about mobility, access, safety, security, environment, economics, and other impact areas that the street may directly or indirectly influence through its design.

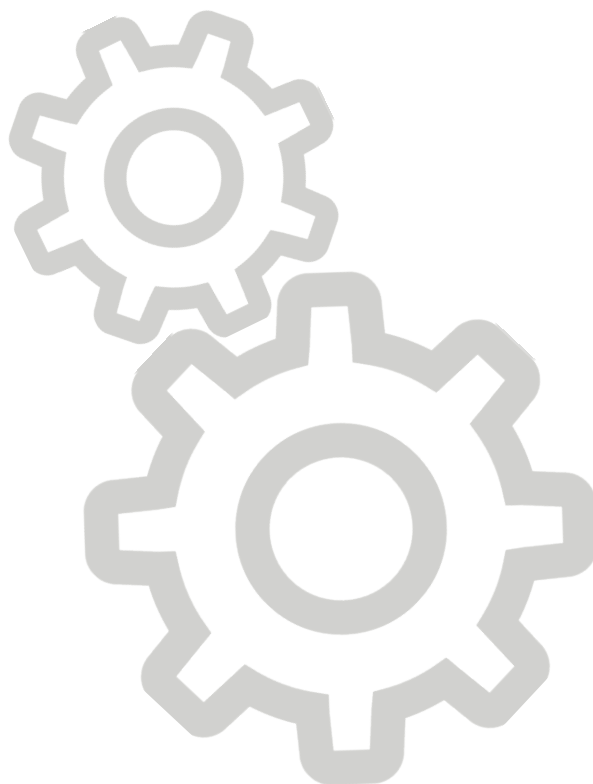
Technical Products: SWOT (Strength, Weakness, Opportunity, Threat) mapping generated by the public stakeholders; and a set of technical performance metrics that specifically address those issues. Examples include: car/bus travel time ratio; travel time/average speeds; intersection delays crossing the street; auto/pedestrian/bicycle/transit Q/LOS values (see Step 1.0); economic return-on-investment; vacancy rates; ADAAG / PROWAG (mobility-challenged user requirements) accessibility issues; maintenance concerns per 1,000'; crash / injury rate compared to comparable streets elsewhere; conflict points per 1,000'; estimated emissions; mode shares; ratings by residents and business owners on satisfaction with street characteristics (e.g., freight/delivery, bike/walk access, aesthetics, parking, etc., incidence of violent and non-violent crimes, ratio of sidewalks to street centerline miles (2.0 maximum). Other performance metrics are described here, and in many other places. The final product of this step is a draft Existing Conditions+Directions Report summarizing both the technical assessment (Step 1.0) and public-driven assessment (Step 2.0); the final section should contain specific "directions" for the remainder of the project, including design criteria, performance measures/targets, and specific preservation, enhancement, and avoidance goals. Ideally, this entire "report" is less than five pages in length, including 1-2 maps and written in clear, accessible language (translations to languages other than English may be warranted depending on the demographics of those residing and working in the corridor).

**Step 3.0: Selection of a Preferred Option.**

Unlike other practices narrowly defined by the street itself, the preferred option in a complete street study should (1) include actions outside the street right-of-way, including development, zoning, and other policy actions; and (2) clearly identify options that were considered and why they were not chosen based on performance measures, alignment with current plan/policy, and/or alignment with public/stakeholder input from Step 2.0. At a minimum, documentation describing the selection process should answer the following questions:

1. How does the preferred option compare to other considered options in terms of the performance measures selected for the project and public inputs?
2. What were the public comments on the preferred option, and how did the study team respond to each of the main categories of commentary? How did the comments change the design, policy, or other recommendations contained in the project plan? [In order to answer this question a public forum has to be held specifically to review the preferred option, effectively and inclusively getting public input from the affected communities.]
3. A conceptual corridor map should be created on an aerial map (1"=200') describing the structures, design features, resources, aesthetic/streetscape improvements, and multimodal treatments throughout the corridor. A separate map and accompanying text may contain descriptions of cross-access between properties and other access management treatments; suggested land use/design recommendations/policies; wayfinding/gateway treatments, and other suggestions that support identified economic and community goals.
4. Any changes to adopted plans, policies, ordinances, or other existing documentation to bring them into compliance with the recommendations should also be briefly identified.

Technical Products: The total report, building on the Existing Conditions+Directions report from Step 2.0, will be as brief as possible without sacrificing a thorough response to the above elements; no more than 10-20 pages in length is suggested. Additional details that may lengthen the final report include the following: (1) The most important aspects of the report are contained in an explicit set of design criteria that will be carried forward into final design and construction bid documentation to ensure that the major elements of the study that are important to the community are fairly reflected in the ultimate product; and (2) Specific design elements, such as crossing treatments, on-road bicycle facilities, signal improvements, intersection improvements, ADAAG/PROWAAG-related improvements, cross-access / access management features, and the like have to be clearly identified so that they can be implemented during private development actions as well as during street reconstruction, maintenance, and utility actions taken by the local and state governments.



Courting Every Customer: Engaging the Public Equitably and Effectively

Why It's Important:

A city affords opportunity, and creating a place where resources are distributed where they are needed the most regardless of the demographics is vitally important to maintaining a participatory and supportive community. Equity also means Economy in Charleston: One out of seven businesses are minority-owned and operated; 40% of all Charleston businesses are woman-owned (2012 U.S. Bureau of the Census).

Issues and Barriers to Success:

If it isn't measured, it doesn't count. The biggest problem with public engagement is that it sometimes doesn't translate to actions and achievements – or when it does, the public agency doesn't take time to celebrate accomplishments. Organizations are sometimes fearful of acknowledging past oversights, and are therefore hesitant to confront their public (who are all-too-ready to see signs of neglect). Finally, it's easy to offer opportunities for engagement that aren't easily accessible to some groups, which limits their success and wastes time and money.

Strategies for Improvement

- 1. Don't forget to ask.** Charleston does engage their population in meetings and other outreach events, but creating a very simple (and bilingual, using pictures – nearly 7% of Charleston residents speak a language other than English at home) comment card asking if the meeting was easy to reach, timed conveniently to their schedules, and how they arrived can help inform choices for future meeting venues and logistics.



Engaging:

Miami-Dade County, FL



The Quick-Build Program works with ideas submitted by citizens to implement low-cost projects that have tangible results. Eighteen such projects were initially selected to be constructed over 18 months.

<http://quickbuild.greenmobilitynetwork.org>



- 2. Whose city?** If performance measures (see the Communication topic, strategy #1) are used, then map the results to ensure that areas with high proportions of traditionally disadvantaged groups (minority, aged, low-income) are being treated with comparable care as the rest of the city. Ask if the pavement is as well-maintained, the number of streetlights out, and repairs completed in a timely fashion similar everywhere, or are there systematic differences.
- 3. Technology?** Yes, but complement high-tech with high-touch approaches. The Charleston See-Click-Fix web page doesn't appear to be well-maintained, but it is readily accessible for people with access to the Internet. Other approaches should complement on-line services, and obey one of the principle maxims of public engagement: don't assume they will come to you (unless they are really angry). Instead, build relationships with homeowner associations, maintain/grow mailing lists, and stage traveling kiosks that can be quickly deployed with handouts and easy, on-the-spot, hands-on engagement exercises – staff may be tired of putting sticky dots on maps, but the public isn't and they can see patterns quickly.
- 4. No boring meetings.** Innovating in the public sphere is relatively easy, and there are many resources out there to do it. The project team noted that they have used disposable cameras in classroom engagement with students in the past: the results were displayed in the city hall for several weeks with nice acclaim. Active meetings, like walk audits or bicycle tours, are also great ways to get people “out of their heads” and focus on meaningful elements of the streetscape.
- 5. Pilot the project first.** Tactical Urbanism has become a term that embraces both sanctioned and unsanctioned actions to beautify, re-design, or otherwise enhance parts of the public realm. While the unsanctioned variety can be annoying at least and constitute vandalism or dangerous design at worst, tactical urbanism that is worked into city programs can help both work with a community inexpensively and help traffic engineers, maintenance crews, and others understand more about a type of project. Cycle tracks, crossing treatments, traffic control devices, parklets, and other elements that can help a community stand out create involvement in a place, which in turn fosters long-term cooperation and may even help to reduce crime by increasing activity and people.



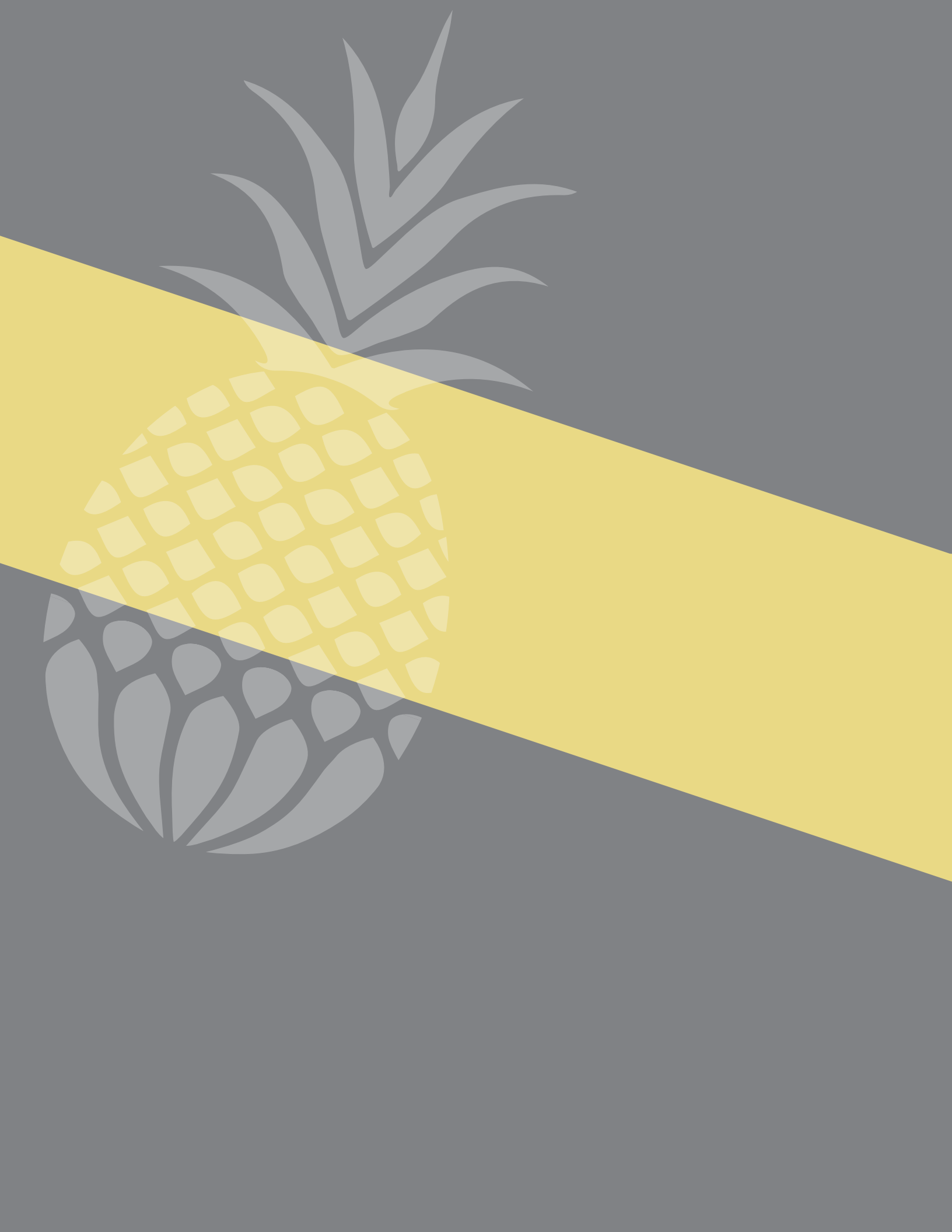
Conclusion

To suggest that the City of Charleston has changed over the past two decades is an understatement. Continued suburban sprawl (West Ashley, John's Island, Daniel Island) and development patterns have placed a growing burden on existing infrastructure (congestion and maintenance) to the point of frustration, impact on economic potential, and lack of a good understanding of community priorities. Relying on true partnerships between municipal, County, BCDCOG (CHATS MPO), and SCDOT will be the key to success, not only to rebuild existing deficient infrastructure, but to work in collaboration with the development community to incorporate better choices (bike, pedestrian and transit) for regional mobility.

To this end, regional communities need to be proactive when addressing needs and issues.

The success of the Charleston Citywide Transportation Plan relies in part on how well local and regional officials and leaders collaborate to make difficult decisions. The highest priority initiatives developed as part of the study are summarized in this chapter along with key projects.

It will be up to local and regional decision-makers to identify the most desirable recommendations for implementation, but it will be the combined efforts over many years of decision-making that creates the sustainable, diverse, vibrant, and economically sound communities where people want to continue to live for generations to come.



What if?

TAKE A LOOK AT THESE EXAMPLES OF ROADWAY CONNECTIVITY AND ACCESS MANAGEMENT
ACROSS THE U.S. WHICH ONES EXCITE YOU?
PLACE YOUR DOTS ON THE IMAGES YOU'D MOST LIKE TO SEE IN CHARLESTON



Design Guidelines



Overview

While the recommendations themselves make up the most essential portion of this plan, the guidelines to pull them forward into reality will be what makes them the most successful. The following shared in this chapter are not a go ahead to begin construction, they are rules and regulations to take into the design build process for any particular project. Options here are laid out generally, with the intent that projects detailed in this plan will be constructed only after they have properly designed to meet City and State standards and designed to support Charleston's Complete Streets Policy and include best management practices in handling stormwater runoff to protect the local ecology.

Complete Streets Guidelines

The number of design guidelines available to the transportation practitioner has greatly increased in recent years. The USDOT (Federal Highway Administration) Manual on Uniform Traffic Control and American Association of Highway and Transportation Officials (**AASHTO**) A Policy on Geometric Design of Highways and Streets have been joined by a plethora of guidance documents prepared by these and other agencies. The following is not a comprehensive listing, but help identify the major guidance for complete street planning and design in common use in North America, and a few that are notable in coastal and urban environments like Charleston.

National Association of City Transportation Officials (NACTO)

- Urban Street Design Guide
- Global Street Design Guide
- Urban Bikeway Design Guide
- Transit Street Design Guide

American Association of Highway and Transportation Officials (AASHTO)

- A Guide for Achieving Flexibility in Highway Design
- Guide for the Development of Bicycle Facilities
- Guide for the Planning, Design, and Operation of Pedestrian Facilities
- Roadway Lighting Design Guide
- Drainage Manual

USDOT (Federal Highway and Federal Transit Administrations)

- Revision of Thirteen Controlling Criteria for Design and Documentation of Design Exceptions
- Mitigation Strategies for Design Exceptions
- AASHTO Roadside Design Guide
- Americans with Disabilities Act (ADA) Accessibility Guidelines and Detectable Warnings
- Designing Sidewalks and Trails for Access, Part II, Best Practices Design Guide
- Manual on Pedestrian and Bicycle Connections to Transit

“A goal without a plan is just a wish.”

—Antoine de Saint-Exupery,
French author and aviator



Additional resources include PedBike.net, National Complete Streets Association, Pedestrian and Bicycle Information Center, National Center for Safe Routes to School, and the book, *Greenways: A Guide To Planning Design And Development.* Security resources often fall under the rubric of Crime Prevention through Environmental Design (**CPTED**), and are available for transit (American Public Transportation Association (**APTA**) recommended practice SS-SIS-RP-007-10) and the book, *Crime Prevention Through Environmental Design,* by C. Ray Jeffries. CPTED also offers a great way to merge the missions of Charleston's transportation and law enforcement (see also: www.charleston-sc.gov/index.aspx?NID=307) staffs in a common goal: making the urban environment more secure. The ideal of making better transportation systems loses much of its value when people are afraid to walk outside, navigate through a dark parking lot, or leave their car in on-street parking to patronize businesses. Finally, accessibility standards for those with impaired personal mobility are provided by Americans with Disability Act Accessibility Guidelines and proposed Public Rights of Way Accessibility Guidelines.

The following pages are provided to help the City and others address some of the more commonplace situations confronting complete street implementation in Charleston, arranged simply by being either "Along the Street" or "Across the Street." It should be obvious that in an environment as fundamentally rich and varied as Charleston that the real way to implement complete streets is through a collaborative and consistent process undertaken led by city staff, accompanied by the strong participation of SCDOT and partnering entities. To this end, there is one final section on special topics that the City can undertake to more generally support complete street development.



Complete Streets Context Overview

The Complete Streets Context Overview presents a high-level overview of the functional considerations of Complete Streets design elements; a strong,

proactive process must also be the foundation for a consistent application of complete streets principles.

Context Zone

- Defined by the overall environment and framework of the corridor and surrounding network of streets and adjacent land uses
- Stresses context-specific treatment for three primary areas:
 - Building form and massing
 - Pedestrian space and design treatments
 - Travelway modal integration (bike, walk, transit, & vehicular)



Travelway Zone

- Defined by the edge of pavement or curb line that traditionally accommodates the travel or parking lanes needed for vehicles in the transportation corridor
- Recommendations focus on modes of travel and medians
- Travelway zone focuses on two objectives:
 - Achieve balance between travel modes sharing the corridor
 - Promote human scale for the street and minimize pedestrian crossing distances and vehicular conflict points / speeds



Pedestrian Zone

- Extends between the outside edge of the sidewalk and the face-of-curb located along the street
- Quality of the pedestrian realm is achieved through four primary channels:
 - Continuous pedestrian facilities (on both sides of the road if possible) to maximize safety and mobility needs
 - High-quality buffers between pedestrians and moving traffic
 - Safe and convenient opportunities to cross the street
 - Consideration for shade, lighting, and amenities



Building Zone

- Define and frame the roadway and its purposes
- Streets should serve these adjacent uses, unless the roadway is primarily used for through travelers (focus on reducing or managing conflict points)
- Building scale and massing focus on two areas:
 - Orientation (setbacks, accessibility, etc.)
 - Design & architectural character (height, wall/void ratio, etc.)
 - Ground floor activities, seating, shops, restaurants



Table 5-1: Complete Streets Context Overview Table

Typical Bike & Ped Treatments to Support Complete Streets

Shown here are typical treatments for both bicycle and pedestrian facilities. These are not all-inclusive, but represent commonplace treatments that align with the issues found in Fayetteville most frequently by the planning team. Images and some descriptive elements are provided by the National Association of City Transportation Officials (NACTO)

published guidelines, which serve as an excellent resources to policymakers, planners, engineers, and the concerned public (<https://nacto.org>). Guidance does not replace engineering discretion, common sense, or a complete street mentality: pedestrians and cyclists win any safety-related argument with vehicular performance.

Residential Sidewalk



- Design for a buffer of equal width to the sidewalk
- Standard is five feet in width
- Use colors or textures to demarcate conflict points, intersections
- Permeable pavements and plantings help mitigate stormwater runoff

Widen Curb / Painted Sidewalk (Temporary)



- NACTO describes an extruded curb to buffer pedestrians
- Painted curblines are used in Fayetteville on local streets, but should be considered temporary and signed or plant gateway curb extensions at each intersection to caution and protect pedestrians and motorists
- Construct a permanent sidewalk as funds allow

Curb Extensions / Extrusions / Bulb-Outs



- On-Street parking should extend 1' to 2' beyond edge of curblines
- Useful as gateways to caution motorists of changing conditions, speeds, or levels of pedestrian activity
- Combine curb extensions with stormwater mitigation measures such as bioswales, raingardens

Figure 5-1: Typical Pedestrian Facilities



Typical Bike & Ped Treatments to Support Complete Streets (cont.)



Buffered Bike Lanes

- More appropriate for Fayetteville's high crash rates
- Helps to mitigate sideswipe crashes - including with other cyclists
- Nearly 9 in 10 cyclists prefer buffered lanes, and these appeal to wider range of cyclists with varying skill levels
- Needs adequate right of way to avoid door opening-related conflicts with on-street, parked vehicles



Intersection Crossings

- On-Street bicycle facilities need specialized intersection treatments
- "Elephant's Feet" markings (shown here) or green paint highlighting conflict points with through and turning vehicles reinforce space sharing
- Increases visibility of cyclists and provides additional assurance to cyclists in the delineated space for their travel



Painted Bike Lanes

- Useful for conflict points such as on-street parking door swing areas, intersection approaches, turning areas, and busy driveways
- Highlights use of space, slows some traffic, discourages illegal parking
- Budget for additional, minor maintenance costs

Figure 5-2: Typical Bicycle Facilities

Along the Street Practices

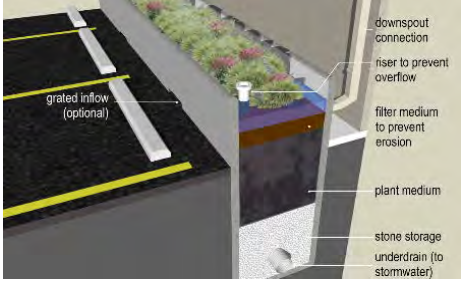
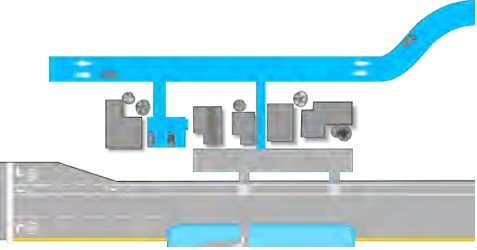
What	Where	How	Figure
Pedestrian and Sidewalk Gaps Infill	Any street with missing or poorly maintained sidewalk	Fill the gap, replace broken or uneven sidewalk	
Why	Gap infill Increases connectivity, and offers an opportunity to improve design if cross-slopes (e.g., more than 2%) if substandard conditions are present – but it requires a dedicated funding pool and proactive identification of problems “bundled” into cost-effective repair and construction contracts. Don’t prioritize, except for doing low-cost projects first.		
Improve Management of Stormwater and Street Flooding	Low-lying areas or streets with historically poor drainage	Storm sewer improvements, raingardens, on-site runoff management, and permeable pavements (note additional maintenance requirements)	
Why	Tree canopy and raingardens provide an excellent buffer for the first ½-inch of rainfall, but also creates the attractive streetscape that favors pedestrians and reduces urban heat island effects. Expect and budget for additional maintenance expense.		
Strong Access Management Policy and Program	High-crash areas where the frequency and design of driveways create many conflict points for drivers, cyclists, and pedestrians	Close secondary driveways, require side-street access and rear parking in walkable commercial areas; be prepared to compensate loss of driveway access	
Why	An ounce of prevention is worth pounds of cure: access management is easier to accomplish in locations where there are no or few developed parcels or existing driveways. Policies that require shared access, backage roads, and full or partial median controls (see graphic) are individually minor but collectively enormous in their impact on safety and reducing traffic congestion (over 25% of traffic delay is caused by crashes in urban areas).		

Table 5-2: Complete Streets Strategies -Along the Street



Across the Street Practices

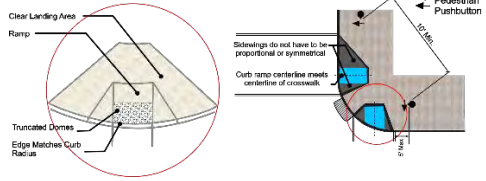
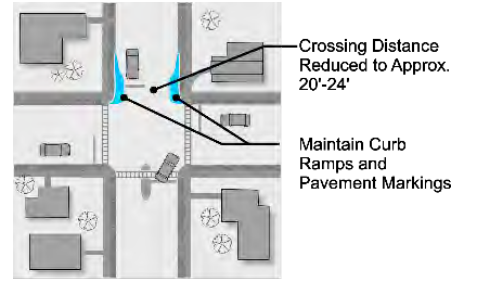
What	Where	How	Figure
Ensure Accessibility	Any street intersection crossing, including freeway ramps	Assess intersections, prioritize improvements, integrate improvements with utility or street maintenance actions	
Why	Cities have proactively turned to creating ADA accessibility evaluations, reports, and programs to help populations that are mobility challenged navigate city intersections. High numbers of tourists, occasional legal actions, and aging populations add to the urgency of improving accessibility for all populations.		
Better Access to Public Transportation	Known high-crash transit stops; any stops with high ridership; stops on busier main streets	Improve lighting, surrounding bike/ped networks, station design elements	 1. Taper (25' – 30') 2. Clearance to Crosswalk (10') 3. Bike Lane to left of bus loading area Source: NACTO
Why	Incomplete networks of sidewalks, unfavorable stop locations relative to crossings, and other design problems pose threats to riders and translate into lower ridership. The issues are especially problematic on multi-lane roadways where multiple and blind threats present several potential obstacles or hazards to safe access.		
Curbs that Support Pedestrians	High-Speed corners in residential areas, schools, or other places where pedestrians often cross	Reduce curb radii to 15'-20' or use curb extrusions (bulb-outs) to shorten crossing distances and reduce speeds of turning vehicles	
Why	Lower speeds at corners translate typically into more rear-end crashes but fewer high-energy turning-type crashes with pedestrians and cyclists. Free-flow right-turn "slip lanes" should be used never or only when necessary to prevent a severe and dangerous queuing condition upstream.		

Table 5-3: Complete Streets Strategies -Across the Street

Across the Street Practices (cont.)

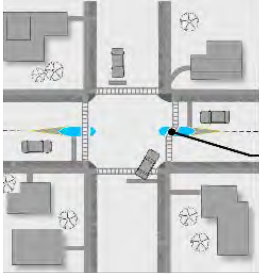
What	Where	How	Figure
Good Intersection Control (choose the right pedestrian crossing option)	Street crossings, including freeway ramps; assign in part by crash types or crash potential suggested by substandard design elements	See below	
Why	Pedestrians are told repeatedly to cross at intersections, so the provisions at these locations need to respect their importance since it is the location where pedestrians and cars interact directly. Consider the following ideal minimum standards for identifying crossing treatments:		
How	Crossing Type	Traffic Volumes	Primary Design Considerations
	Parallel Stripes	Low	Signal or STOP control; low pedestrian volumes
	High-Visibility Ladder	Moderate	Wide, multi-lane crossings; high turn volumes
	Median Refuge (see image)	High	Ideally use with "Z" crossing to improve visibility
	Mid-Block Crossing	Low-Moderate	Seldom, high-pedestrian traffic, off-road paths
	Traffic Signal	High	Meets warrants, improves vehicular traffic operations

Table 5-4: Complete Streets Strategies -Across the Street (cont.)



Specialized Situations - Woonerf

What	Where	How
Woonerf (streets that accommodate cars and people together)	Highly pedestrian-focused streets that still have to serve very low-speed car traffic (less than 15mph).	Pilot project first; consult with other places that have already gone through the process.
 - OUTDOOR SEATING IS ENCOURAGED (ADHERE TO ADA / PROWAG) - WORK WITH PROPERTY OWNERS TO INCLUDE GREENERY - INTEGRATE BICYCLE PARKING INTO STREETSCAPE - TEXTURE, COLOR DELINEATES CAR AND PEOPLE SPACES, NOT VERTICAL SEPARATION - AT TRANSITION POINTS, MAINTAIN SIGN, MARKING, AND DESIGN STANDARDS		
Why	While true woonerf streets are rare in the U.S., the concept of mixing pedestrians and (very low-speed) car traffic, including at “naked” (uncontrolled) intersections has application in open street marketplaces and event spaces.	
Complete Street Design Process and Standards	This program is city-wide, and applicable to every street up to major arterials and freeway classifications.	Additional elements, such as design guidance, should be added after an initial resolution and detailed process have been adopted and put into place.
Why	The physical elements of complete streets are important to understand, but they are generally well-understood. Adherence to consistent planning and design steps is the soul of making headway in maximizing complete streets in Charleston. The City of Charlotte, NC has become renowned for its six-step process and guidance document; this process and many other resources are located on the Complete Streets Coalition section of Smart Growth America (https://smartgrowthamerica.org/program/national-complete-streets-coalition/).	

Table 5-5: Complete Streets Strategies - Specialized Situations

While the City of Charleston does have a Complete Streets Policy on record, the policy should be expanded to include guidelines and developmental ordinances, guaranteeing that neither the city or developers neglect those who benefit the most from such policies, the people of Charleston. For more information on this, please refer Complete Streets Policy section of this plan.

Stormwater BMPs (Best Management Practices)

The City of Charleston is surrounded by natural and manmade barriers, none more prevalent than water. In fact, most of what is now called the Peninsula is actually built on water. With this in mind, stormwater issues prevail throughout the City. During heavy rain storms (hurricanes) mass flooding persists. Even the light rains can create problems without positive flow and drainage relief. The topography of this area provides little relief from one area to the other. In addition to the relatively flat topography, the downstream systems are inadequately sized to handle significant storm events. The result is both roadway and ditch/yard flooding along key corridors and City streets.

Recommendations and Best Practices

An important factor in the design of our streets is the impact that stormwater has on their operations and safety, as well as that of nearby homes and businesses. The Stormwater Best Management Practices (“BMPs”) summarized here provides a collection of generic stormwater BMPs for potential use along flood-prone roadways within the City. The proposed stormwater BMPs address a range of stormwater volume and pollution control tools. Many BMPs have the potential to be scalable to match the discharge volumes, pollutant loads, and anticipated site conditions.

The BMP Infrastructure Plan emphasizes structural BMPs and includes a recommendation for incorporating both Green-Infrastructure (“GI”) and Low-Impact Development (“LID”) techniques. This document could be incorporated within the development document standards for the City, and used by the City/County during private development site plan reviews and municipal capital improvement projects. The BMP Infrastructure Plan should be updated as new regulations and guidelines are implemented and accepted by SCDHEC and the engineering community.



BMP Typologies Table

Best Management Practice Type	Target Pollutants				Applicability							Unit Process				Construction Cost Range
	Nutrients	Bacteria	Metal	TSS Removal	Suitable for Redevelopment	Provides Ground Recharge	Land Requirement	Maintenance Needs	Requires Pretreatment	Soil Requirements	Drainage Area (Acres)	Volume Reduction	Peak Flow Reduction	Sedimentation	Filtration & Absorption	
Bioretention	M	H	H	H	●	●	M	H	●	None	1-2	M	L	H	H	\$5-\$30 per SF
Constructed Stormwater Wetland	M	L	H	H			H	L		None	Varies	L	H	H	M	Varies
Disconnect Impervious Areas	H	L	L	H	●		M	L		None	Varies	H	M	H	M	\$20-\$30 per SF
Dry Stormwater Ponds	L	L	M	M			VH	M		None	Varies	L	H	M	M	Varies
Dry Wells	L	L	L	H	●	●	L	H		Perm.	0-1	H	M	H	M	\$500-\$1K ea.
Enhanced Swales	L	L	M	H	●	●	H	L	●	Perm.	5 Max	L	L	H	L	\$10 per LF
Green Roofs	H	L	L	L	●		N/A	M		None	N/A	H	M	L	L	Varies
Infiltration Basins	H	H	H	H	●	●	M	H	●	Perm.	5 Max	H	M	H	H	Varies
Infiltration Trenches	H	M	M	H	●	●	M	H	●	Perm.	5 Max	H	L	M	M	\$50-\$80 per LF
Manufactured Separator Devices	L	L	L	M	●		L	H		None	N/A	L	L	M	L	\$8K-\$15K ea.
Open Vegetated Conveyance	M	L	M	M	●		M	M		None	5 Max	L	M	L	M	\$10-\$30 per LF
Planter Box	M	H	H	H	●		M	M	●	None	0-1	M	L	M	H	\$24-\$32 per SF
Porous/Permeable Pavement	M	L	H	H	●	●	H	M		Perm.	Varies	H	M	H	M	\$8-\$15 per SF
Sand Fillers	M	M	H	H	●		H	H	●	None	5 Max	L	L	M	H	\$10K-\$50K per Acre
Subsurface Infiltration Systems	L	L	L	H	●	●	M	M	●	Perm.	Varies	H	M	H	M	Varies
Tree Box	H	H	M	H	●		L	M		None	0-1	L	L	M	M	\$50-\$100 per LF
Underground Detention Structures	L	L	L	H	●		L	M	●	None	Varies	L	H	L	L	Varies
Vegetative Filter Strips	L	L	L	M	●		M	L		None	2 Max	M	M	M	M	\$50-\$100 per LF
Wet Stormwater Ponds	H	H	H	H			VH	L		None	Varies	H	H	M	L	Varies

Table 5-6: BMP Typologies Table

Table 5-6 describes a decision matrix used to determine which BMP measure(s) will work best along specific problematic roadways. Listed below are notes to further explain the fields and data shown.

1. Unit Process adopted from The South Carolina DHEC Storm Water Management BMP Field Manual.
2. Construction Cost Ranges are based on construction installation cost. It does not account for cost associated with design or permitting.
3. Maintenance Needs are based on how often it either requires cleaning or refurbishing. It based on Appendix A from South Carolina DHEC Storm Water Management BMP Handbook.
4. Target Pollutant based on pollutant removal efficiencies as stated in Appendix A from South Carolina DHEC Storm Water Management BMP Handbook.

SF - Square Feet

LF - Linear Feet

ea. - Each

Perm. - Permeable

Integrating BMPS into new development and redevelopment begins at the planning level. Careful site planning includes reducing the amount of directly connected impervious areas, fitting the proposed improvements to the site terrain, preserving and using the natural drainage systems, and planning to replicate pre-development hydrology. Developers and contractors can do even more during site construction to help manage quality and volume of stormwater flows. Minimizing site disturbance and compaction; retaining natural vegetation, minimizing parking areas and curb-and-gutter internal drainage controls in favor of vegetated swales, and maintaining natural buffers and drainage ways typically provide as great an impact as post-construction BMPS.



Examples of Common Stormwater Management Measures

The following descriptions and images at left help describe three of the more commonplace categories of BMP measures recommended for City streets.

Dry Stormwater Detention Ponds:

Dry Stormwater Detention Ponds provide temporary storage of stormwater runoff. Dry ponds have an outlet structure that detains runoff inflows and promotes the settlement of pollutants. Unlike wet ponds, dry detention ponds do not have a permanent pool. A dry pond is designed as a multistage facility that provides runoff storage and attenuation for both stormwater quality and quantity. The lower stages of a dry pond are controlled by outlets designed to detain the stormwater runoff for the water quality volume for a minimum duration of 24 hours, which allow sediment particles and associated pollutants to settle out.

The example shown here includes overflow drainage connected to the stormwater system as well as a pipe cleanout box. These areas may be connected to greenways, but visually separated with a berm and signage since the downslope areas are obviously associated with periodic flooding.

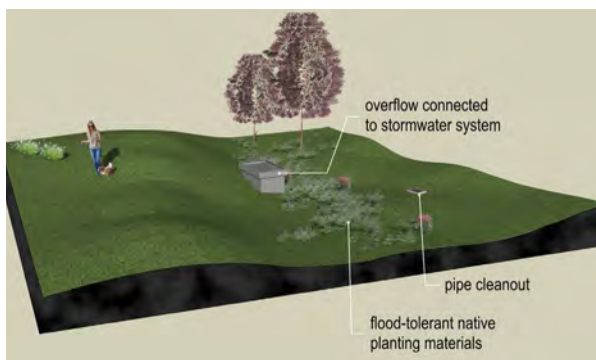


Figure 5-3: Dry Stormwater Detention Ponds

Planter Boxes:

Planter Boxes are bioretention treatment control measures that are completely contained within an impermeable structure with an underdrain (they do not infiltrate). The boxes can be comprised of a variety of materials, such as brick or concrete, and are usually chosen to be the same material as the adjacent building or sidewalk. Planter boxes are filled with gravel on the bottom to house an underdrain system, planting soil media, and vegetation. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, and biodegraded by the soil and plants.

The example shown here includes drainage to the stormwater system as well as inlets from an adjacent parking area and building downspout.

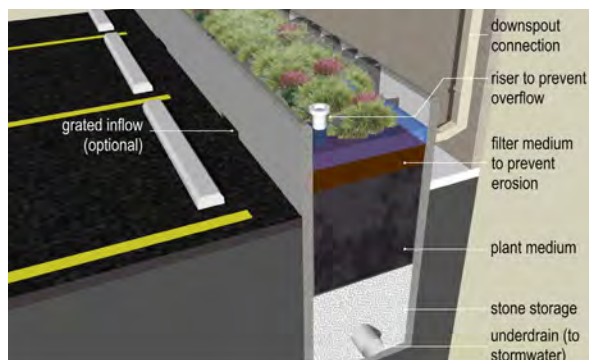


Figure 5-4: Planter Boxes

Subsurface Infiltration Systems:

Subsurface Infiltration Systems are underground systems that capture and infiltrate runoff into the groundwater through highly permeable rock and gravel. It is usually not practical to infiltrate runoff at the same rate that it is generated; therefore, these facilities generally include both a storage component and a drainage component. Typical subsurface infiltration systems that can be installed to enhance groundwater recharge include pre-cast concrete or plastic pits, chambers (manufactured pipes), and perforated pipes.

The example shown at left is linked to impervious surfaces in the form of an adjacent cycletrack as well as wide sidewalks.

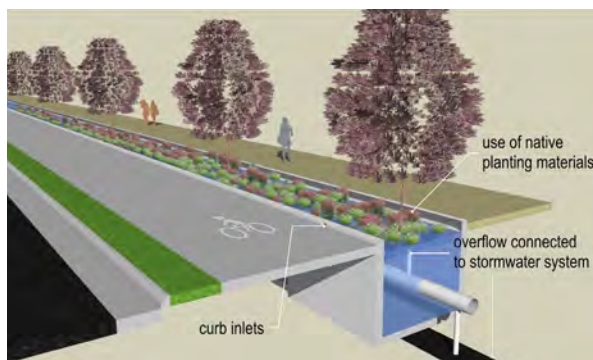
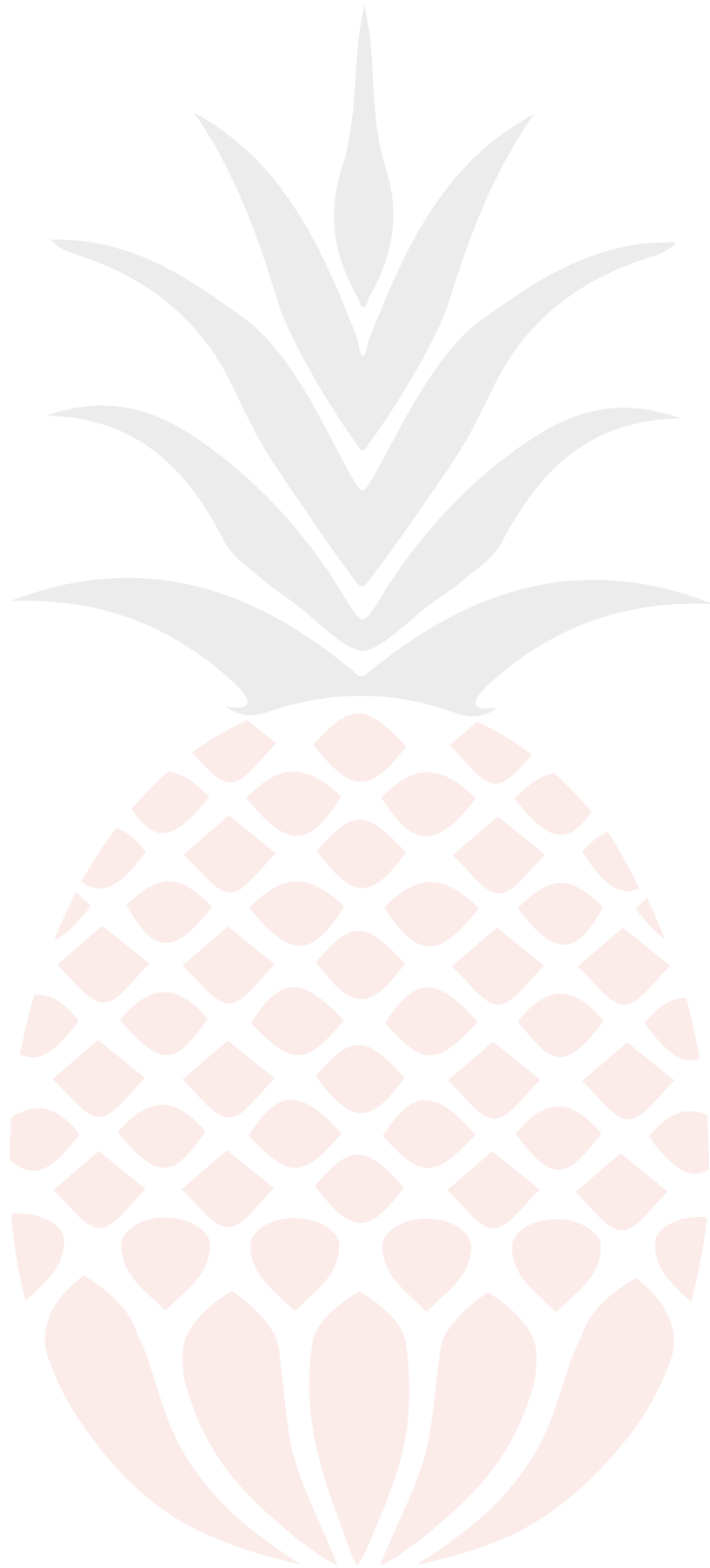


Figure 5-5: Subsurface Infiltration Systems



The success of the Charleston Citywide Transportation Plan relies in part on how well local and regional officials and leaders collaborate to make difficult decisions. The highest priority initiatives developed as part of the study are summarized in this chapter along with key projects.

It will be up to local and regional decision-makers to identify the most desirable recommendations for implementation, but it will be the combined efforts over many years of decision-making that creates the sustainable, diverse, vibrant, and economically sound communities where people want to continue to live for generations to come.





CHARLESTON, SOUTH CAROLINA **Citywide Transportation Plan**



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