

ALTERNATIVES + STRATEGY REPORT

CORRIDOR PLANNING & CONCEPT DEVELOPMENT STUDY
SR 520 FROM US-1 TO EAST CITY LIMITS (INDIAN RIVER)

MARCH 2016



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Introduction

The Florida Department of Transportation, in partnership with the City of Cocoa and the Space Coast Transportation Planning Organization, is conducting a planning and concept development study for SR 520 within the city limits of Cocoa.

Study Area

The corridor is a one-mile long section of SR 520 that extends from US 1 on the west to the Indian River on the east. It connects the Atlantic Ocean beachfront communities and Merritt Island with inland Brevard County and the Orlando region, as well as provides regional access to downtown Cocoa. The study area encompasses the area within one-quarter mile of the corridor and is approximately 0.4 square miles in size.



Figure 1: Study Area

The corridor is made up of two one-way arterials - King Street in an eastbound direction and Willard Street in a westbound direction – separated by one street block approximately 150-foot wide. This block is traversed by six north-south streets along the corridor. There are signalized intersections at three of the cross streets, as well as at US 1.

The study area is characterized by single- and multi-family residential uses, commercial and professional business uses, civic sites and recreational areas. It is influenced by both the adjacent Indian River and area attractions such as the Atlantic Ocean beaches, Port Canaveral and Cape Canaveral.

Project

This study has been requested by the City of Cocoa to coordinate the development of a future vision for the SR 520 corridor that establishes a multimodal approach to providing for future transportation needs. It will develop potential solutions that create a more walkable urban environment, improve pedestrian and bicycle safety and address roadway capacity. The study will involve an evaluation to determine how best to meet the needs of current and future users, and establish a long-term plan to guide evolution of the corridor and balance land use and planning efforts.

Process

The project will be community-driven and engage local agencies, business and civic leaders and other stakeholders in consensus-building and shared decision-making. The planning process will include the following general steps:

- Setting context / understanding values and issues
- Imagining outcomes / exploring options
- Defining vision / creating concepts and alternatives
- Setting priorities / developing implementation strategies

Context

The *Existing Conditions* report, June 2015, (can be found at www.cflroads.com/project/435628-1/SR_520_Corridor_Study_in_Brevard_County) provides a detailed look at current conditions in the study area. The following information culled from that report provides important data that should be considered as concepts are being formulated.

Community

Cocoa is a picturesque riverside destination and historic town hidden beneath hundred-year-old majestic oak trees. The current population of the study area is estimated to be 811 persons. Prime empty-nesters and retirement age groups make up almost half of the population and the median age is 54.3 years. There are 468 businesses in the study area – spread among retail, professional, scientific, technical and maintenance – that employ approximately 1837 people. The majority of businesses are concentrated on the south side of the corridor in the “Cocoa Village” area.

Other Plans and Projects

A master plan has been adopted by the City for the Downtown Redevelopment Area (RDA), known as the Cocoa Waterfront Master Plan (2008). While the initial focus of the Plan was to improve the activity and connectivity in and around the waterfront, it evolved into a more comprehensive discussion of the community's vision for the entire downtown area. However, it lacked the detailed transportation assessment needed to implement mobility alternatives. Critical points established by the Plan include:

- Connecting the Indian River to the City
- Enhancing and connecting open spaces
- Creating a livable approach to streets and traffic

Land Use

The Waterfront Master Plan originally organized the RDA into seven character areas. Subsequent planning led to the adoption of the Cocoa Waterfront Overlay district (2013) that adjusted the sub-area boundaries to establish eight design districts that address the land use, design, scale, and appearance of development within the RDA. Six of the eight districts cover some of the land contained within this project's study area.

Transportation System

The transportation network along the study corridor is comprised of several systems that are interconnected to provide a variety of movement choices to the different destinations and activities in the area:

- **Pedestrian:** Most streets within the study area have sidewalks on both sides of the roadway. There are some streets where sidewalks are only present on one side and there are gaps where sidewalks or ADA features are absent. Signalized intersections have crosswalks with continental style markings.
- **Bicycle:** There is a lot of bicycle traffic along and across SR 520; however, there are no bicycle lanes or pavement markings. "Share the Road" signs are present on SR 520.
- **Street:** King Street, the eastbound SR 520 one-way roadway, has three lanes of traffic. Willard Street, the westbound SR 520 one-way roadway, has two lanes of traffic from the Indian River Bridge to Brevard Street and three lanes of traffic from Brevard Street to US 1. The roadway is characterized by wide travel lanes that often create higher vehicle speeds, although the speed limit is posted at 35 mph.
- **Transit:** The study area is served by Space Coast Area Transit Route 4 (520 Connector), which connects US 1 to SR A1A. Route 1 (Melbourne/Titusville) and Route 6 (Cocoa/Rockledge) have stops within ½ mile walking distance from Cocoa Village and provide additional accessibility.

Safety Conditions

For the five-year period between 2010 and 2015, there were 579 crashes in the corridor involving vehicles. There were 263 injuries and no fatalities. There were 15 crashes involving bicycles and pedestrians. Patterns indicate an even location distribution across the study area, but that crash types vary by intersection, indicating that safety improvement strategies will need to differ. The frequency of crashes increases at midday hours and peaks during the hour between 3pm and 4pm.



Figure 2: Crash Map

Generally, the types of observed crashes will provide some indication of the causing traffic situation. The crash data within the study corridor reflects the collected speed data, field observations, and public comments. Figures 3 and 4, illustrate the total crashes and types for the major signalized intersections of King and Willard Street respectively.

Traveling west to east on King Street, the crash totals are generally consistent, between 22 and 32, at the signalized intersections. The crash type summaries indicate a transition from head on and sideswipe to angle and rear end crashes. This indicates traffic issues relating to intersection geometry at Forest Avenue and weaving or lane changes combined with high speeds at Brevard Delannoy Avenues.

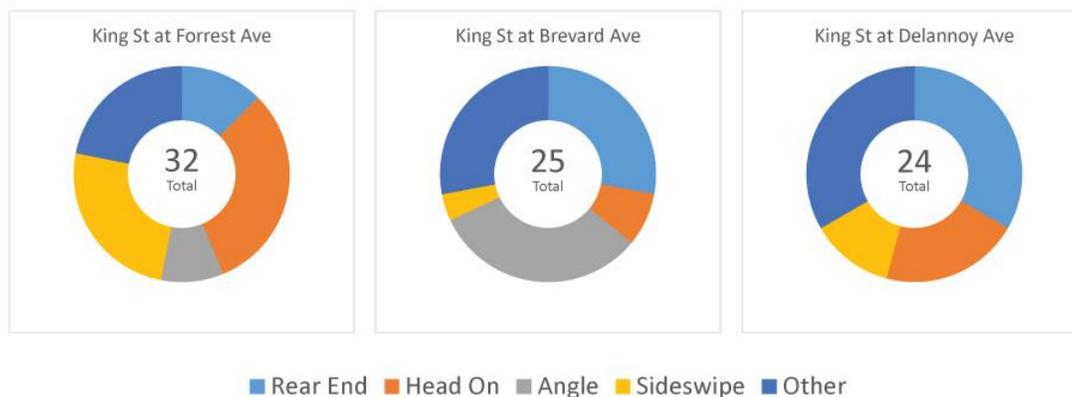


Figure 3: Crash types on King Street

Traveling east to west on Willard Street, the crash totals are also consistent, between 19 and 29, at the major intersections. The high rate of speed coming off the bridge results in over half of the crashes at Delannoy Avenue being rear ends. Crash types at Brevard Avenue transition to an even mix of head on, angle, and rear end. The large percentage of head on crashes at Forrest Avenue indicates intersection geometry issues.

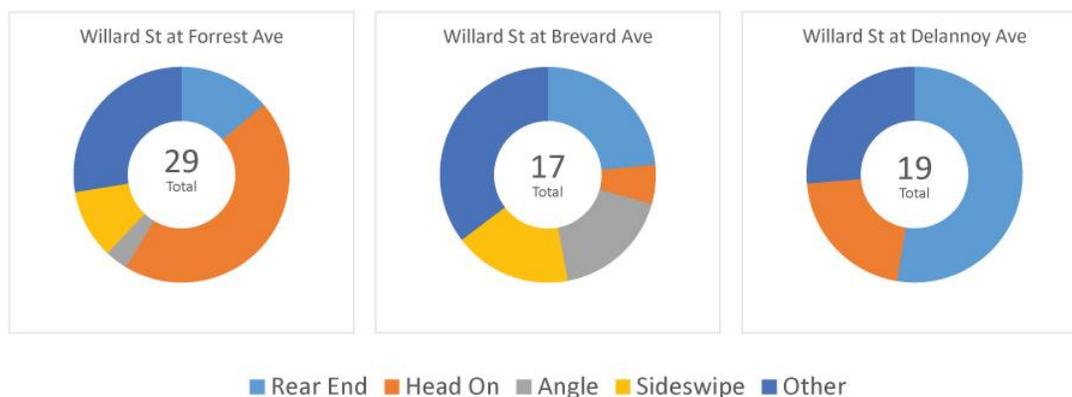


Figure 4: Crash types on Willard Street

Infrastructure

Stormwater in the study area drains through a network of inlets, pipes and ditches directly into the Indian River. The river is classified as an impaired water body by FDEP, meaning that the amount of pollutants the water can absorb and still meet water quality standards that protect human health and aquatic life has been exceeded. Water quality improvements will need to be included as part of any roadway modifications.

Assessment

An initial assessment of existing conditions within the study area helped identify information and influences that may impact subsequent planning concepts and strategies.

Issues and Constraints

Through various forums, stakeholders identified major accessibility and mobility issues in the corridor. Most of these issues were related to safety of users for all travel modes and highlights a need for SR 520 to be better integrated into the mix of uses and activities in the Cocoa village area so that it reinforces a sense of place that is comfortable and welcoming to visitors, residents, workers and others in and around the corridor. Key issues included:

- **Pedestrian**
 - SR 520 creates a physical and mental barrier between the north and south sides of the Village area
 - Speeding vehicles are a pedestrian safety issue
 - Visitor traffic from cruise ship excursions leads to more pedestrians in the area, which exacerbates the safety issues
- **Bicycle**
 - Indian River Drive is a popular bike route, but connectivity for bicycles in the area is difficult
 - There are limited bicycle amenities and signage
- **Street**
 - There needs to be a sense of transition or arrival and/or traffic calming measures to encourage drivers to slow down
 - Drivers often miss seeing red lights because of speeding, transition of slopes and sequencing of traffic signals
 - Drivers often weave into and out of the eastbound right-turn lane in order to get ahead of traffic (stakeholders called it the “slingshot” lane)
 - Large tour buses often have difficulty maneuvering on the narrow streets and tight corners in the Village area and take up large areas of parking while waiting for excursion passengers
- **Transit**
 - The eastbound right-turn lane is needed for bus stops

Project Need

The need for this project is based on the following criteria:

- **Primary Criteria**
 - **Safety** - Enhance safe conditions for all modes of travel: The safety ratio of the corridor is 28.7, meaning that the number of crashes on the roadway exceeds the average for a similar facility by up to 28 times¹.
 - **Access** – Maintain emergency access: SR 520 is part of the emergency evacuation route network designated by the Florida Dept. of Emergency Management and Brevard County. This roadway is critical in facilitating east-west traffic movement and evacuating people from Merritt Island and Cape Canaveral.
- **Secondary Criteria**
 - **Linkages** - Maintain connectivity in the transportation network: One of the goals of this project is to maintain regional connectivity and mobility in the study area by increasing operational efficiency of the roadway. The functionality of SR 520 will be measured primarily by speed and travel time.
 - **Social Demand** – Foster a more livable environment in downtown Cocoa: the City of Cocoa envisions becoming a multimodal hub within Brevard County. In order to accomplish this, SR 520 must become a multimodal corridor that transitions from existing auto-centric patterns to providing more travel choices and more housing choices.

Future Trends and Opportunities

The social demand for the ability to walk and bike for everyday trips has become quite clear in Cocoa. There are a diverse number of destinations and activities within proximity to the study area that are accessible by walking or biking and highlight the importance of non-motorized travel modes within the SR 520 corridor. A transportation mode-shift from auto-oriented trips to non-motorized forms of transportation between 10-20% will promote SR 520 as a true multimodal corridor.

Vision

The working vision creates a mobility framework that defines a hierarchy of street networks reflecting the functional transportation system. It identifies mobility areas where there should be greater pedestrian emphasis, areas with greater transit emphasis, and areas that will maintain a high vehicle emphasis. The vision classifies roadways in the study area into different types that will be used when developing and evaluating concept alternatives:

- Major Regional Auto-Oriented
- Sub-Regional Auto-Oriented
- Pedestrian Streets
- Commuter Rail
- Bus Rapid Transit
- Regional Greenway/Bikeway

A map illustrating the working vision concepts is shown below:

¹Crash data for the study area was obtained from the State Signal 4 Analytics database for a five-year period between 2010 and 2015

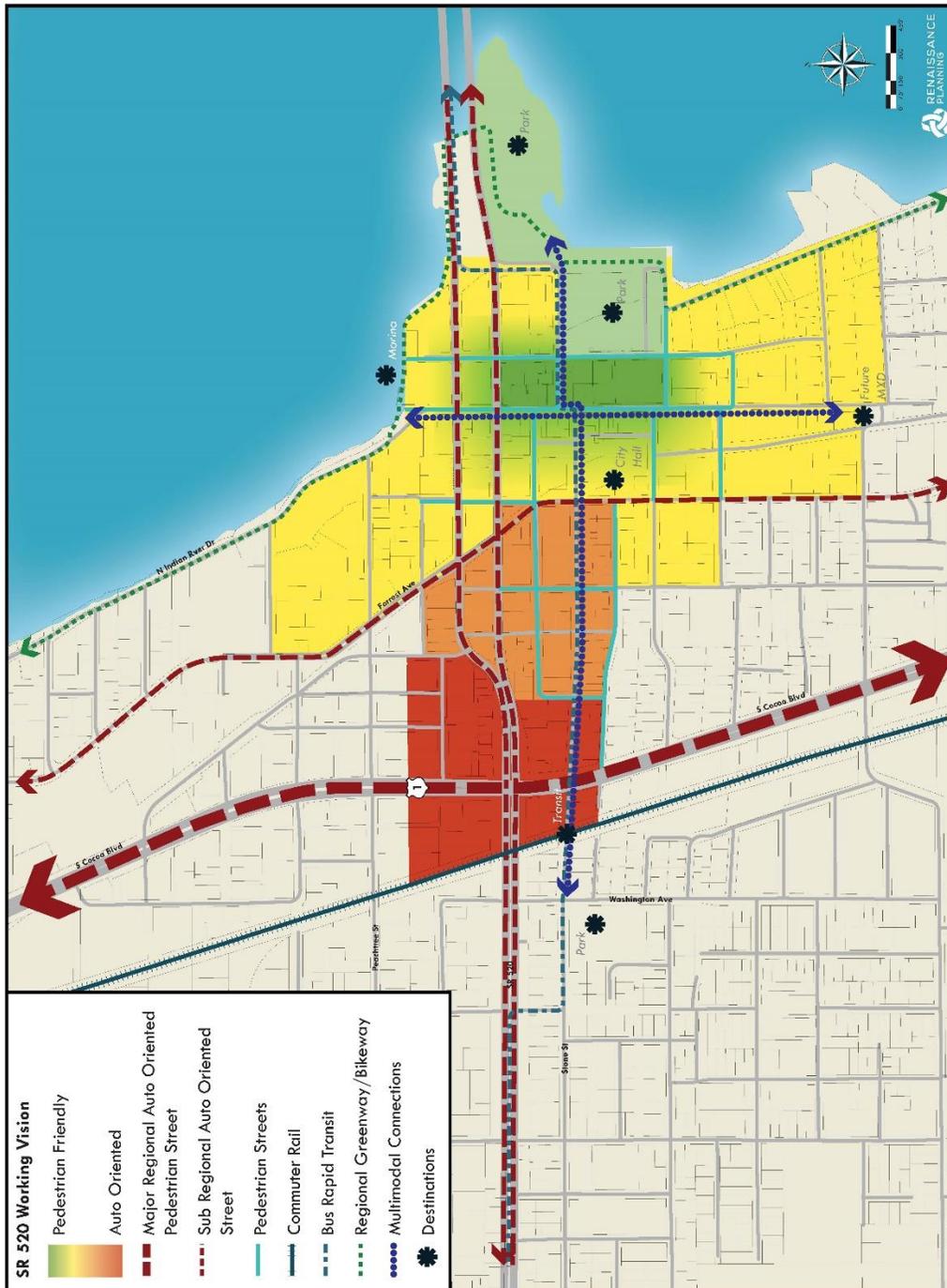


Figure 5: Working Vision Map

Planning

By examining the corridor context, the project team has gained a thorough understanding of the study area - its setting, mobility network, and key challenges and issues. With this planning foundation in place, the team can begin exploring and evaluating concepts for potential improvement options that support the purpose and need of this project, as well as the goals and values of the community.

Design Concepts

Before creating specific improvement scenarios, it is beneficial to consider the individual mobility components within the study area, how they function, and begin to visualize strategies that will help achieve the larger project goals, keeping in mind that the public realm is the common thread that connects the corridor, facilitates access, and provides places for social interaction. The public realm plays a critical role in the area's character and function, serving roles such as circulation and access, development framework and visual aesthetics. In order to have a safe and efficient multimodal transportation network, it is paramount to design with all modes of transportation in mind.

- **Pedestrian**

An organized, walkable, pedestrian-friendly environment encourages people to get out and explore and take advantage of what Cocoa has to offer. A public realm framed by buildings with walkable blocks, quality sidewalks and crosswalks, public spaces, landscape, streetscape elements, and open spaces encourages pedestrian activity and provides opportunities for shopping and dining, recreation, and gathering spaces to site, relax, and people watch. An enhanced pedestrian environment attracts new residents, businesses, and visitors.

- **Bicycle**

Bicycling has gained momentum in and around Cocoa, along SR 520 as well as along the Indian River, as both a form of recreation and as an alternative mode of transportation - for both casual users and serious riders. While the framework for a connected bicycle network is in place within the study area, the transitions needed to create urban bikeways have not yet been realized. There are many ways to improve bicycle visibility and safety, enhance facilities, and provide amenities to create a more bicycle-friendly atmosphere.

- **Street**

Design of the street cross-section contributes to the perception of an area and the manner in which people interact within the built environment. A clear street network provides logical and safe routes for pedestrian, bicycle, and vehicular traffic and minimizes conflicts between the different modes. Multi-purpose streets are important to creating a quality public realm. No street should serve vehicular traffic purposes only. Appropriate design treatments should be considered based on the purpose and function of the street in order to provide safe routes for all modes of travel.

- **Transit**

In increasing numbers, people are using public transportation and communities are expanding public transportation facilities accordingly. Everyone benefits from public transportation – it saves money, enhances personal mobility, saves fuel and resources, reduces road congestion and travel time, improves the environment and public health, provides economic opportunities, and helps drive community growth and revitalization. Public transportation is important to the future of Cocoa both locally and regionally, providing more capacity, creating more choices, and helping address the needs of a growing and changing population.

Scenarios

Utilizing background context and stakeholder input gathered from a variety of forums, the project team developed scenarios that provide FDOT, the City, and other agencies with a variety of useful tools to enable and encourage desired development activities along the project corridor, recognizing that the exact development structure and priorities can change as they are tested against time, community, resources, budget, and competing needs. Although each scenario planning exercise is unique based on context, the process encourages strategic thinking and helps organize complex and overlapping systems. While the scenarios may change, the values and desires of the community that form the foundation of the planning are likely to remain the same.

The following illustrations provide an overview of proposed improvements along the corridor. Details will be discussed for each of the proposed scenarios.

Short-Term Scenario

The short-term scenario primarily covers operations improvements – strategies that can be implemented easily to change transportation system characteristics and increase safety throughout the study area. These strategies will be initiated by FDOT, with City of Cocoa and other agency participation. Implementation measures to be considered include:

- Pedestrian
 - **Sidewalk improvements:** Eliminate deficiencies in the sidewalk network so that all pedestrian areas meet ADA requirements. This could include design modifications to improve elements such as space allowances, accessible routes and facilities, ground surfaces, curb ramps and detectable warnings.
 - **Crosswalk upgrades:** Use specialty pavers or textured / colored treatments to define and enhance the visibility of crosswalks at key intersections.
 - **Bulb outs:** Install sidewalk bulb outs at intersections to reduce pedestrian crossing distance, improve visibility and sight lines between pedestrians and vehicles, and define limits of on-street parking.
- Bicycle
 - **Signage:** Add signs indicating bicycle routes and bicycle traffic to increase awareness of bicyclists using the roadways.
- Street
 - **Speed monitoring:** Install digital speed display signs westbound coming over Indian River bridge to alert motorists of their vehicle speed versus posted speed limit.
 - **Pavement upgrades:** Use textured / colored pavement at SR 520 intersections with Brevard Ave. and Delannoy Ave. to denote key crossings.
 - **On-street parking:** Add on-street parking between bulb outs to provide spaces for adjacent uses and help slow traffic.
 - **Concrete lane separator:** Create vertical barrier between the through lanes and right turn lane from Delannoy Ave. to Riveredge Blvd. to prevent vehicle weaving (“slingshot” effect).
 - **Lane reduction:** Reduce southbound Riveredge Blvd. to one lane between Willard St. and King St.
 - **Loading area identification:** Restrict loading zones to designated side streets or alleys to reduce congestion on retail streets.
 - **Oversized parking area identification:** Create areas where tour buses and oversized vehicles can park that provide easy ingress / egress to SR 520.
 - **Wayfinding signs:** Add signs that guide visitors to destinations and parking to reduce vehicle recirculation on streets.
- Transit
 - **Transit stop enhancement:** Clearly identify bus stop locations and add amenities such as system maps, benches, shade, and lighting that improve comfort and enhance security. Evaluate stops to ensure that maneuvering space, height, slope and clearances at all stops meet ADA requirements.



Figure 7: Short-Term Scenario - Lane Elimination with On-Street Parking

Mid- and Long-Term Scenario

The mid- and long-term scenarios are more specific and cover complex alterations within the public realm, both to the roadway and to the sidewalk zone, to optimize traffic flow and increase efficiency for all components of the multimodal transportation network. Funding beyond FDOT will be required - these strategies will be led by the City of Cocoa / CRA in support of existing policy and projects. Scenario options and implementation measures to be considered include:

Scenario Option A

This option involves reconstruction of the right-of-way cross section - reducing the number of travel lanes from three to two, adding on-street parking, widening sidewalks and improving aesthetics. Specifics for this scenario include:

- Street
 - **Travel lanes:** Two 11' travel lanes
 - **On-street parking:** On-street parking (8.5') will be located on the right-hand side of the roadway on both King St. and Willard St. between Forrest Avenue and Delannoy Avenue
- Pedestrian
 - **Wider sidewalks:** Identifying wider sidewalks creates the opportunity to define and enhance the pedestrian realm (between the curb line and building façade) and help shape the walking experience. Sidewalk zones should be organized to ensure a measure of uniformity and provide pedestrian safety and comfort. Zones that should be incorporated into the sidewalk include:
 - ✚ Frontage zone: Space adjacent to buildings that may accommodate café seating, benches, container plantings or signs
 - ✚ Pedestrian zone: Clear portion of the sidewalk where pedestrians travel
 - ✚ Furnishings zone: Portion of the sidewalk used for street furniture, trees and landscaping, transit stops, lights, and other furnishings
 - ✚ Curb zone: Clear portion of the sidewalk where the curb is located
- Other
 - **Gateways:** Gateways elements will be located eastbound near King St. / Forrest Ave. and westbound near Willard St. / Riveredge Blvd. to help calm traffic and announce arrival into the Cocoa Village area

Scenario Option B

Option B is the same as Option A, but without the on-street parking. This option would likely be considered after a central parking structure facility has been constructed to serve Cocoa Village. Without the on-street parking, the sidewalk zones could be enhanced to a greater degree with landscaping and pedestrian amenities.

The illustration below indicates the location of existing and proposed roadway cross-sections shown:

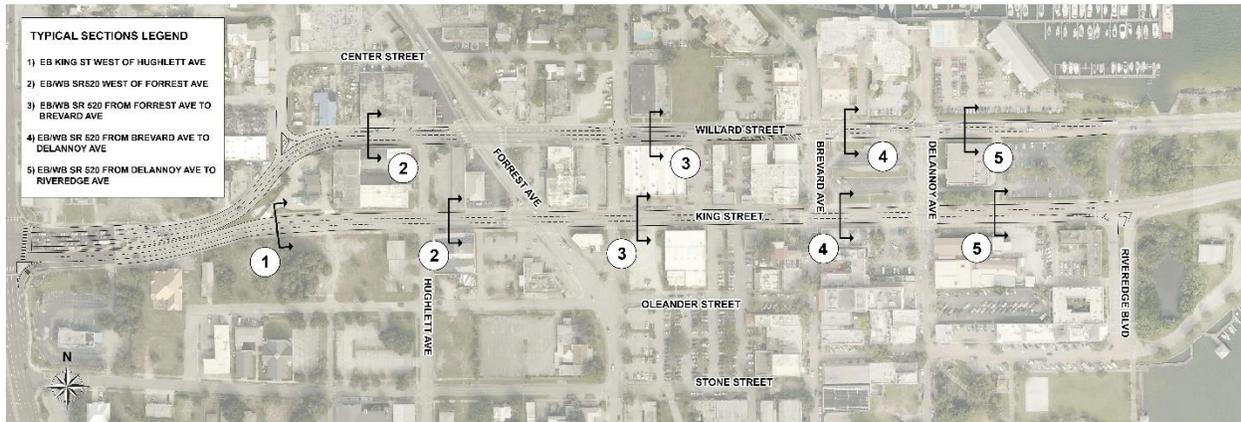


Figure 8: Roadway cross-section key map

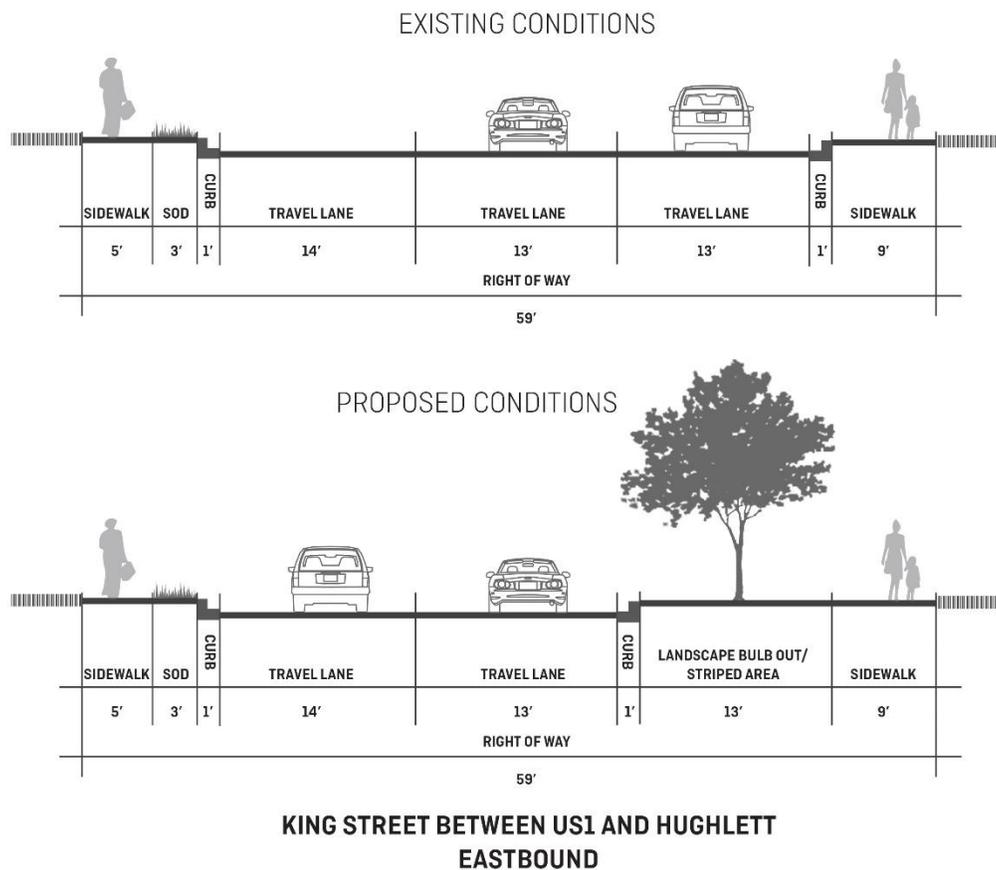
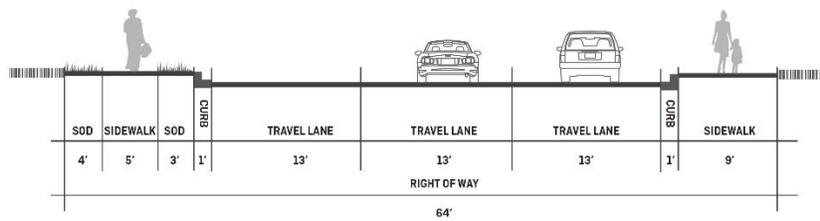
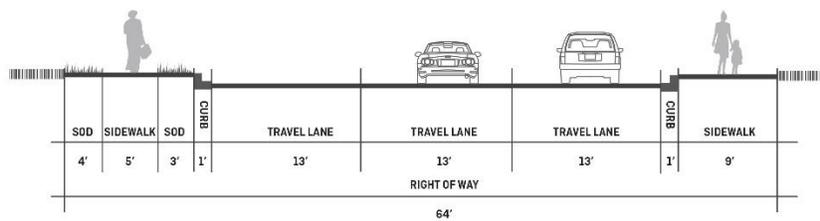


Figure 9: King Street west of Hughlett

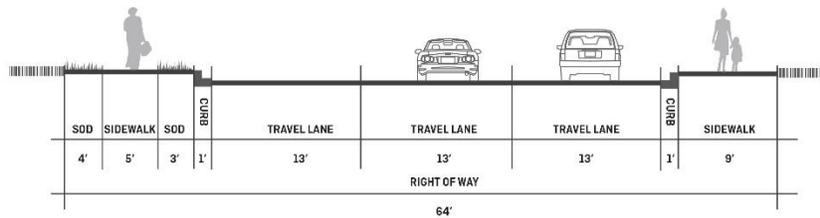
EXISTING CONDITIONS



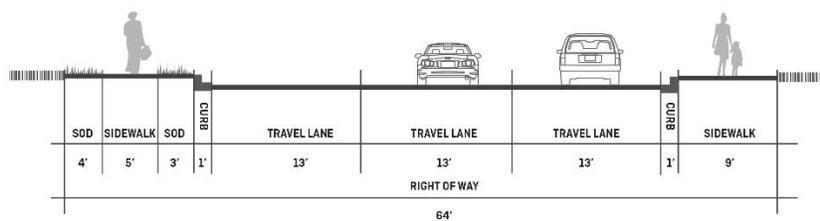
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SHORT TERM (NO CHANGE)



PROPOSED CONDITIONS
MID/LONG TERM- OPTION A (NO CHANGE)

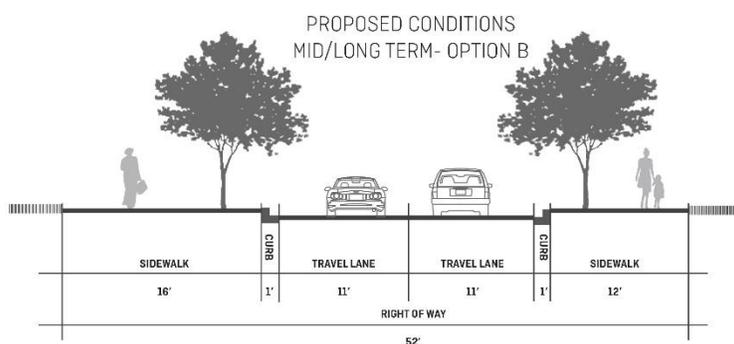
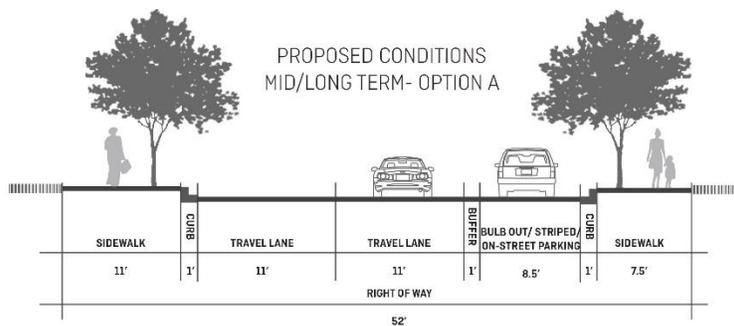
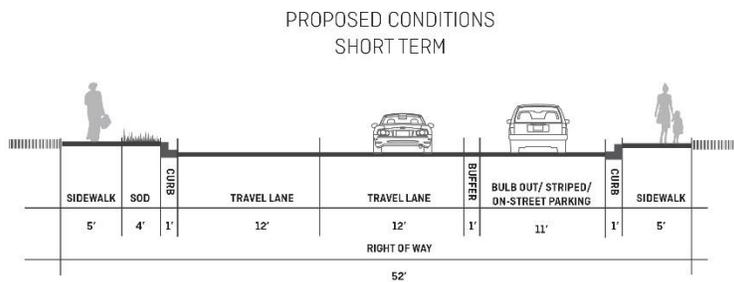
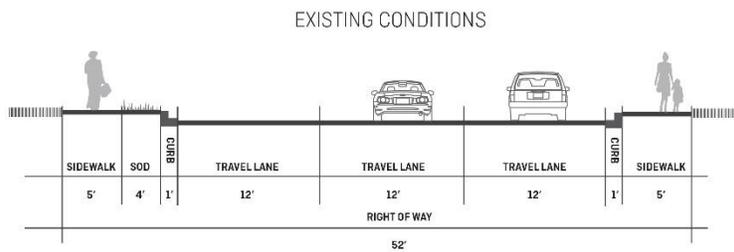


PROPOSED CONDITIONS
MID/LONG TERM- OPTION B (NO CHANGE)



**KING STREET AT HUGHLETT AVENUE
EASTBOUND**

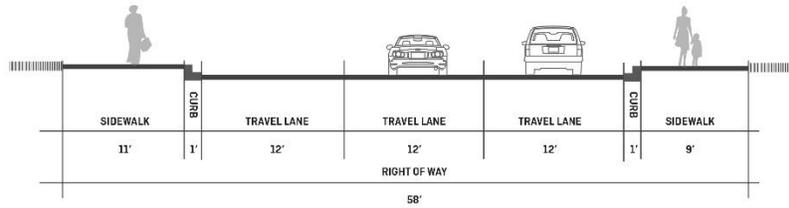
Figure 10: King Street at Hughlett Avenue (eastbound)



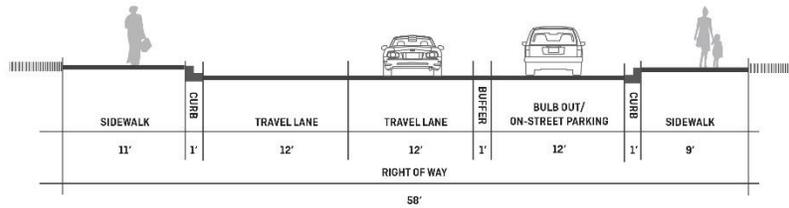
**KING STREET AT FLORIDA AVENUE
EASTBOUND**

Figure 11: King Street at Florida Avenue (eastbound)

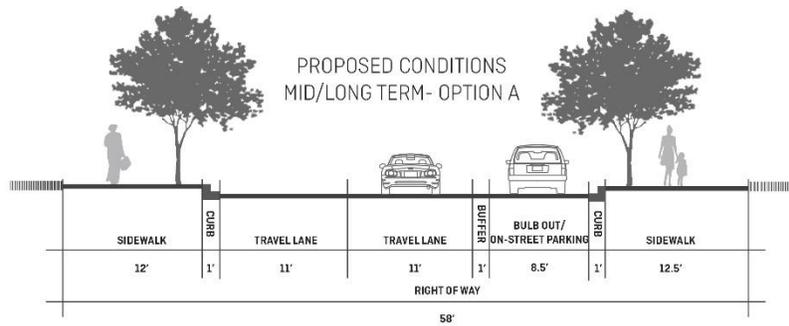
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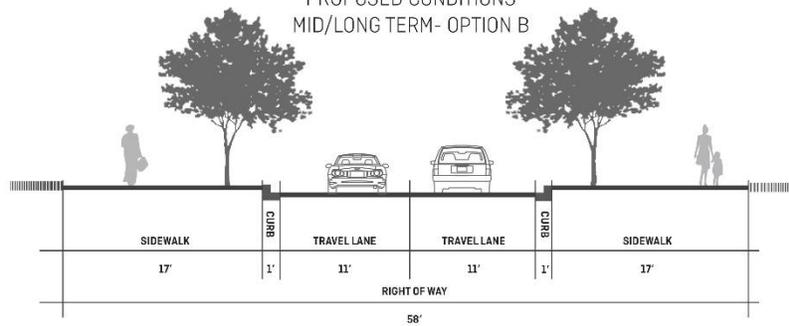
PROPOSED CONDITIONS
SHORT TERM



PROPOSED CONDITIONS
MID/LONG TERM- OPTION A



PROPOSED CONDITIONS
MID/LONG TERM- OPTION B



KING STREET AT BREVARD AVENUE
EASTBOUND

Figure 12: King Street at Brevard Avenue (eastbound)

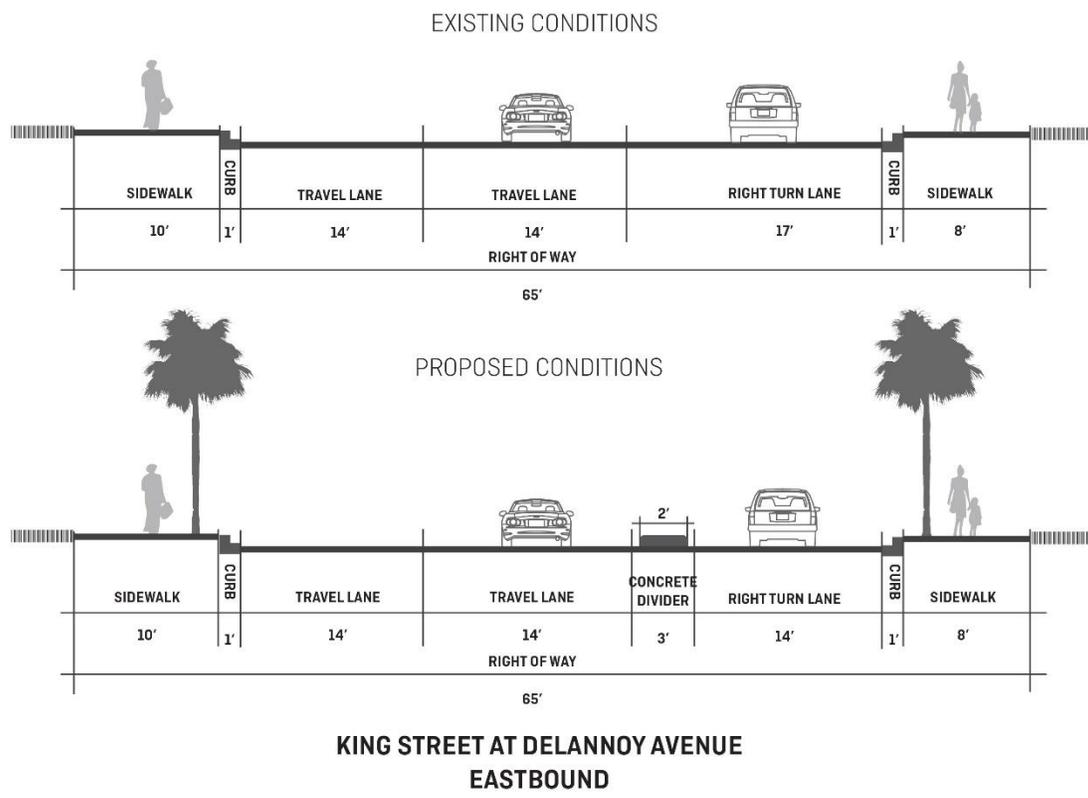
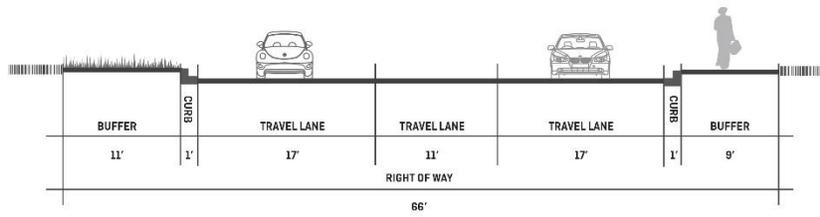
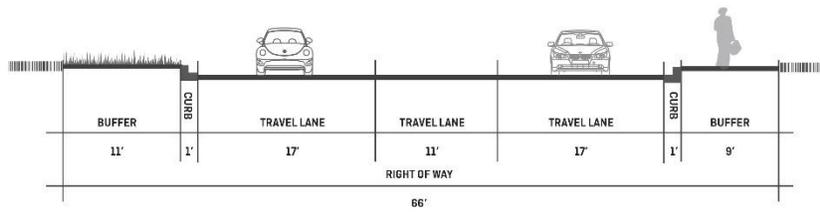


Figure 13: King Street at Delannoy Avenue (eastbound)

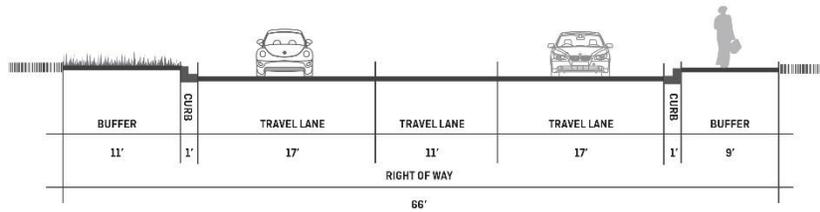
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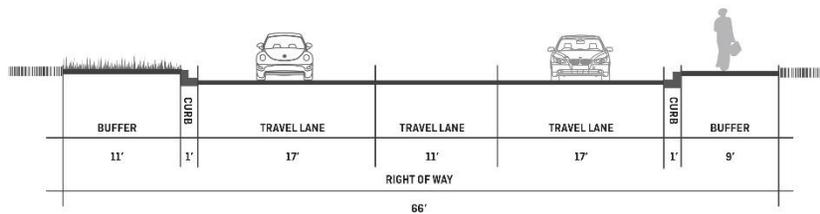
PROPOSED CONDITIONS
SHORT TERM (NO CHANGE)



PROPOSED CONDITIONS
MID/LONG TERM- OPTION A (NO CHANGE)



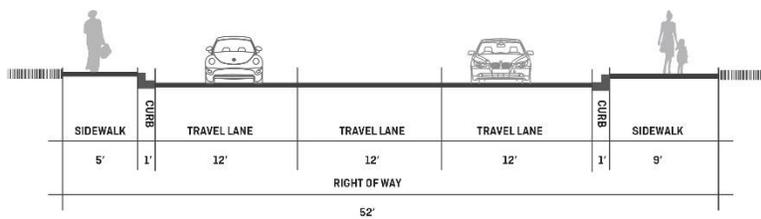
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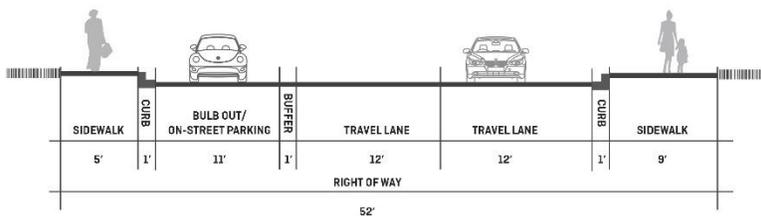
**WILLARD STREET AT DELANNOY AVENUE
WESTBOUND**

Figure 14: Willard Street at Delannoy Avenue (westbound)

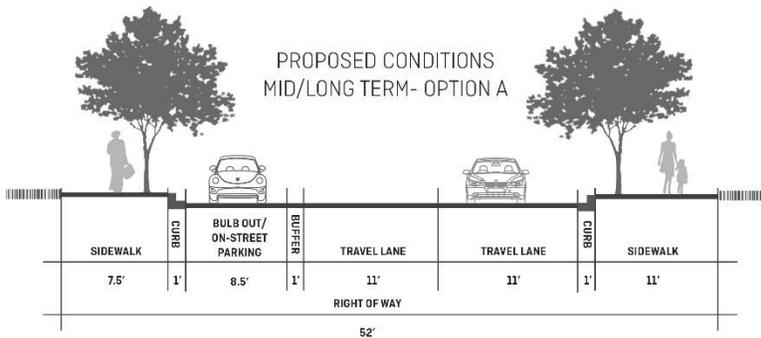
EXISTING CONDITIONS



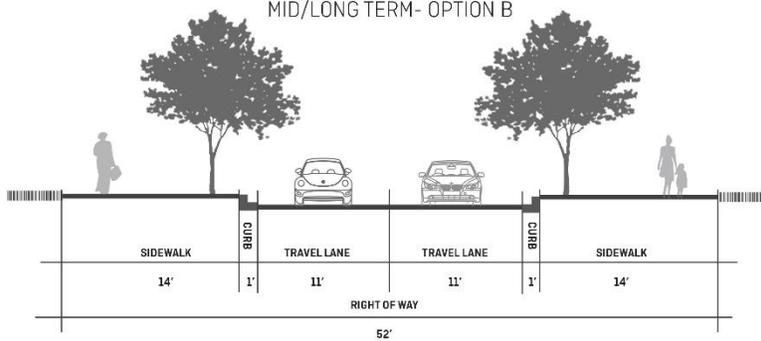
PROPOSED CONDITIONS
SHORT TERM



PROPOSED CONDITIONS
MID/LONG TERM- OPTION A



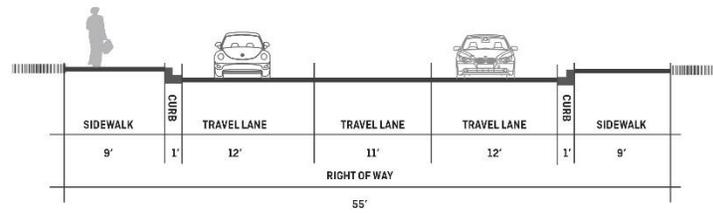
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MID/LONG TERM- OPTION B



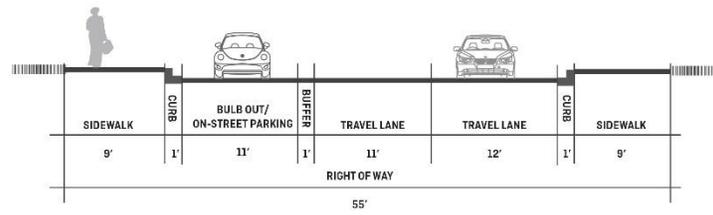
WILLARD STREET AT BREVARD AVENUE
WESTBOUND

Figure 15: Willard Street at Brevard Avenue (westbound)

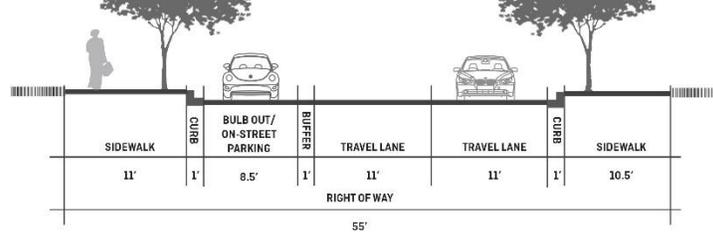
EXISTING CONDITIONS



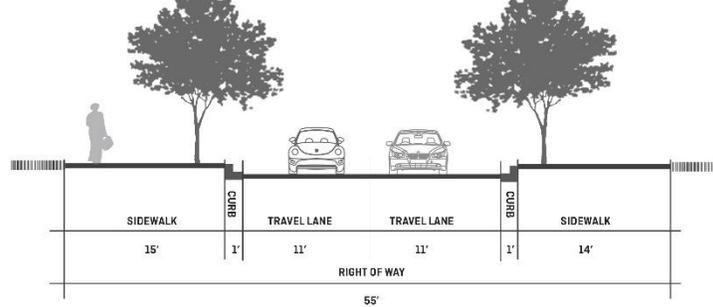
PROPOSED CONDITIONS
SHORT TERM



PROPOSED CONDITIONS
MID/LONG TERM- OPTION A



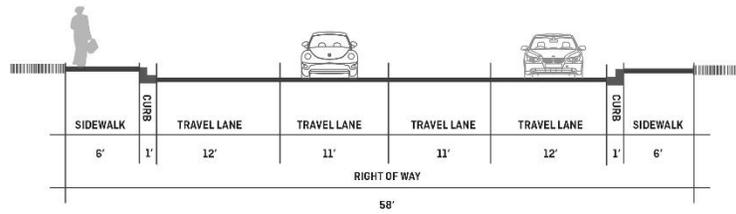
PROPOSED CONDITIONS
MID/LONG TERM- OPTION B



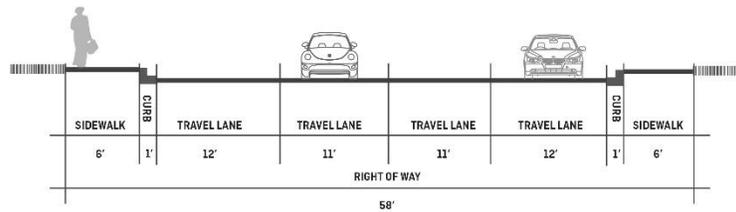
**WILLARD STREET AT FLORIDA AVENUE
WESTBOUND**

Figure 16: Willard Street Florida Avenue (westbound)

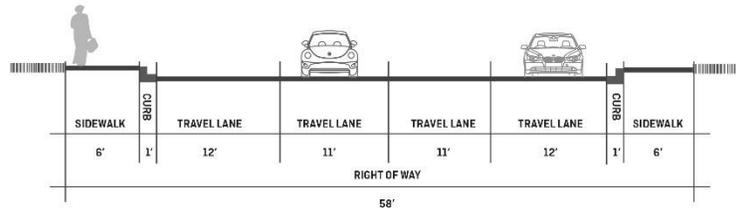
EXISTING CONDITIONS



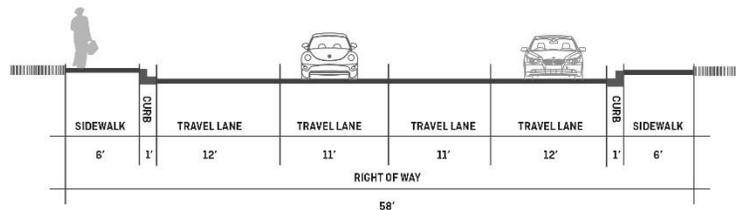
PROPOSED CONDITIONS
SHORT TERM (NO CHANGE)



PROPOSED CONDITIONS
MID/LONG TERM- OPTION A (NO CHANGE)



PROPOSED CONDITIONS
MID/LONG TERM- OPTION B (NO CHANGE)



**WILLARD STREET AT HUGHLETT AVENUE
WESTBOUND**

Figure 17: Willard Street at Hughlett Avenue (westbound)

Scenario Option C

This scenario could be designed in conjunction with either Option A or Option B as described above. It involves construction of a roundabout centered on Riveredge Boulevard that would serve as a gateway element and provide new options for continuous ingress/egress to SR 520. Its configuration would also slow traffic, especially coming westbound off the Indian River Bridge - a lane shift would redirect the driver's cone of visibility and eliminate the current tunnel vision along SR 520 that drivers currently experience. Figure 18 illustrates the basic configuration of a roundabout in this location. [Please note that this is conceptual only – detailed engineering design and layout will need to be completed to ensure safe traffic flow and sight lines for both vehicles and pedestrians.]

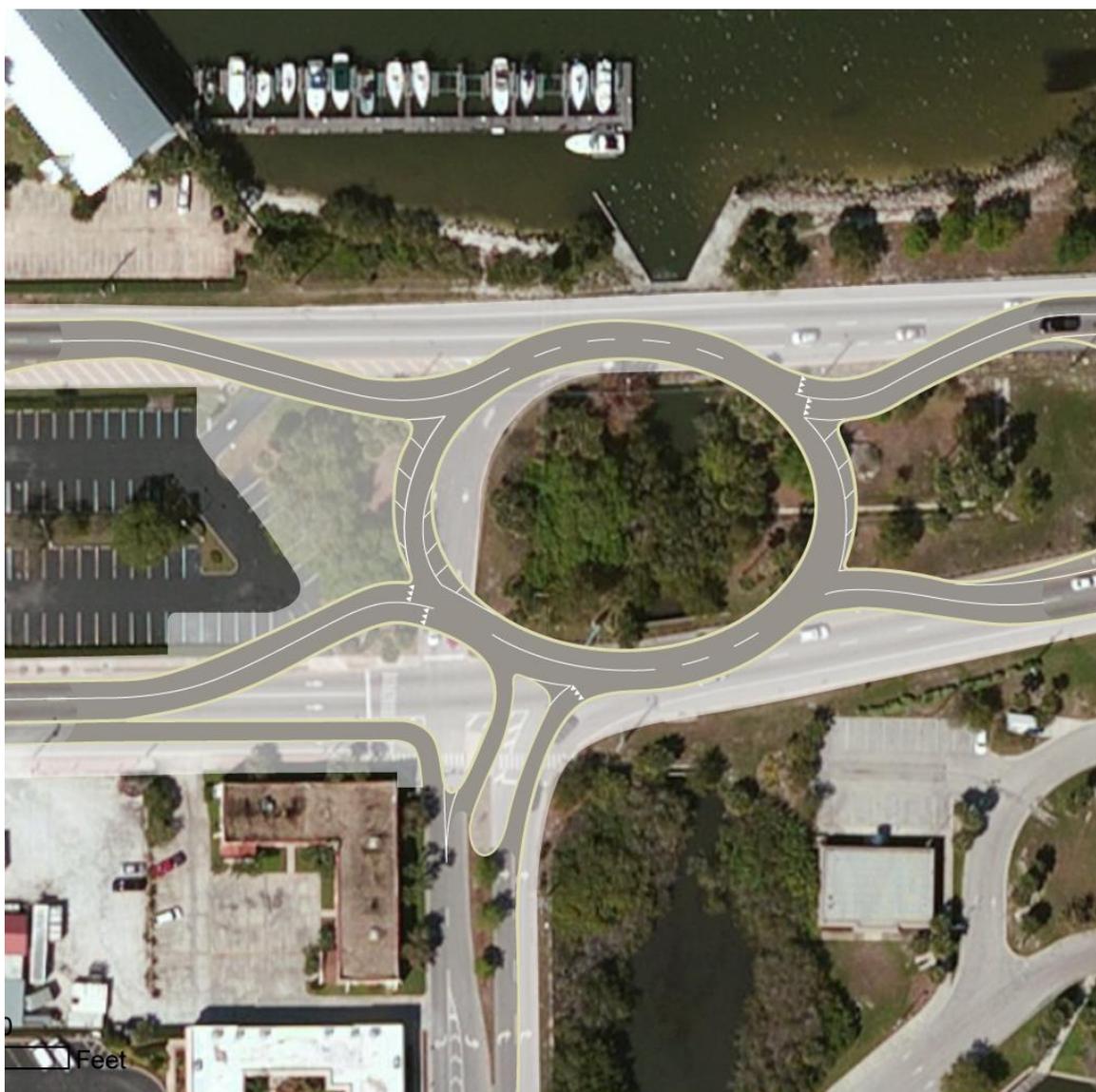


Figure 18: Mid/Long Term Scenario - Option C (Roundabout at Riveredge Boulevard)



Figure 19: Mid/Long Term Scenario - Streetscape

Vision Scenario

The vision scenario covers strategies beyond the scope of this project, but that have been considered through stakeholder discussion and in the context of larger vision projects. These strategies could include:

- **Structured parking:** The City has long discussed structured parking with ground floor commercial uses in the existing surface lot between Oleander Street and Stone Street adjacent to City Hall. Structured parking would cut down traffic recirculation, concentrate land and resources needed to park Cocoa village uses, and reduce vehicle conflicts with pedestrians and bicyclists.
- **Bus Rapid Transit (BRT) and transit center:** Although it is unfunded and not a part of the latest LRTP, Space Coast Area Transit has started to explore the long-term possibility of complementing existing transit service with new BRT routes. One of the new routes evaluated is SR 520, with BRT detouring into Cocoa Village, where a centrally-located multimodal transit station (potentially adjacent to the proposed parking structure) would be located.
- **Regional train service connections:** There has been discussion of regional commuter rail service utilizing the FEC railroad tracks west of the study area, with a station located near Stone Street. This station would bookend with the transit center to enhance Stone Street as a multimodal corridor.
- **“Complete streets” expansion:** Complete Streets projects are currently underway on Peachtree Street and Florida Avenue and the program should be expanded to other streets to create a connected system. Complete Streets is an approach that encourages roadways to be planned, designed, operated and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation, be it walking, bicycling, driving, riding public transportation or delivering goods.
- **Boardwalk extension:** One of the ways to connect areas north and south of SR 520 and provide access to recreational and open space amenities would be to create a continuous boardwalk starting at Peachtree Street on the north (where complete streets treatments are being designed), running east around the point, and connecting to the existing boardwalk in Lee Wenner Park.

Evaluation

The project will be implemented through a strategic plan that organizes the vision into achievable and actionable steps that can be undertaken over time. It is a blueprint for implementation of short-, mid- and long-term actions. In order to justify those actions, improvements need to be evaluated to determine which scenarios and design options are most cost-effective and practical. Evaluation should consider engineering feasibility, costs, funding and community priorities.