



SPRUCE STREET PEDESTRIAN AND BICYCLE IMPROVEMENTS  
TECHNICAL MEMORANDUM  
DRAFT MAY 2017



**Hillsborough MPO**  
Metropolitan Planning  
for Transportation



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**GPI**

# Spruce Street Pedestrian and Bicycle Improvements Technical Memorandum

Completed in Coordination with the  
Dale Mabry Pedestrian Overpass Technical Feasibility Analysis

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## Introduction

The City of Tampa's *Imagine 2040 Comprehensive Plan* establishes a "Livable City" vision that is about creating an attractive and safe city that evokes pride, passion, and a sense of belonging. Establishing a robust network of safe, inviting, and comfortable pedestrian and bicycle facilities is critical for both transportation and livability and supports the "Livable City" vision by providing increased mobility options.

Spruce Street is a lower-volume thoroughfare that runs parallel to and north of Interstate 275 and connects the Westshore Business District, running through the Carver City-Lincoln Gardens, MacFarland Park, and Old West Tampa neighborhoods to the planned West River redevelopment area east of North Boulevard. The recently-completed Greenways and Trails Master Plan update and the previously-completed Tampa Walk-Bike Plan identified Spruce Street as a potential candidate for multimodal improvements. This technical memorandum, completed in coordination with the Dale Mabry Highway Pedestrian Overpass Feasibility Analysis, explores potential opportunities to enhance the pedestrian and bicycle environment along Spruce Street between Dale Mabry Highway and Rome Avenue (see Figure 1) while respecting and preserving the existing fabric of the residential neighborhoods along the corridor.

## Background Data

A review of existing conditions along the Spruce Street corridor was conducted to provide background information that was used to guide the development of the potential pedestrian and bicycle improvements along the corridor. This section provides an overview of the data collected and evaluated as part of this background data review.

### Roadway Classification

Roadways are grouped into classes according to the character of service they provide. Figure 2 illustrates the current roadway classes of the streets within the Spruce Street corridor. As shown, Spruce Street is divided into the following classes:

- *Neighborhood Collector* – Between Dale Mabry Highway and MacDill Avenue, Spruce Street is classified as a neighborhood collector street. Neighborhood collector streets typically distribute and/or collect traffic from local roads in residential neighborhoods and provide access to the arterial/collector road system. Although neighborhood collectors may serve traffic from local generators such as elementary schools and churches, they typically serve little to no traffic generated outside of the adjacent neighborhoods.
- *Local Street* – Between MacDill Avenue and Rome Avenue, Spruce Street is classified as a local street. Local streets typically serve neighborhood traffic, through traffic typically is discouraged, and they provide direct access from adjacent (residential) properties to the arterial/collector road system.



Figure 1: Spruce Street Corridor Study Area



Figure 2: Spruce Street Corridor Roadway Classification



## Intersection Control

Figure 3 illustrates the various intersection (stop) control types along the corridor. As shown, the signalized intersections along the corridor include Spruce Street at Dale Mabry Highway, Himes Avenue, and MacDill Avenue. At Rome Avenue, the intersection is completely stop-controlled with a four-way stop. The remaining intersections are two-way stop-controlled, with traffic along Spruce Street stopping at the intersections of Habana Avenue, Tampania Avenue, Armenia Avenue, Howard Avenue, and Albany Avenue.



Figure 3: Spruce Street Intersection Control

## Street Lighting

Existing overhead street lights were identified and mapped, as shown in Figure 4. For the most part, the presence and spacing of the existing overhead street lighting appears to be sufficient, especially for a more residential street such as Spruce Street. At the corridor-level, there appears to be sufficient street light coverage; a more detailed (qualitative) evaluation of street lighting at various intersections along the corridor was completed as part of this study.

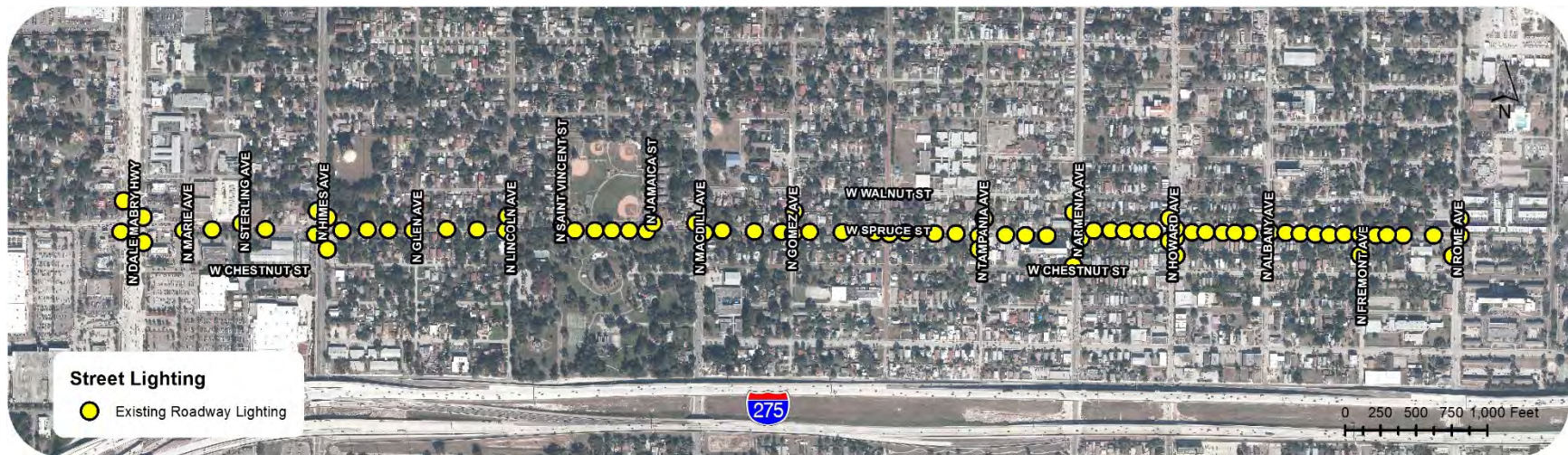
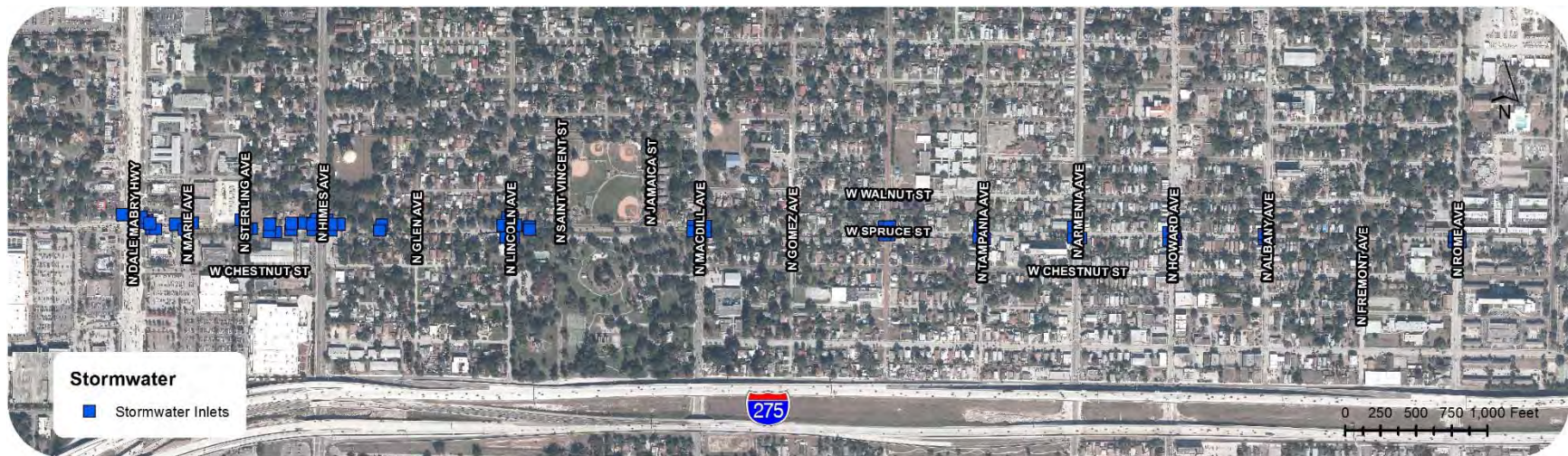


Figure 4: Existing Street Lighting

## Drainage Inlets

Figure 5 shows the location of the existing stormwater inlets found along Spruce Street. Although not necessarily critical in the development of pedestrian and bicycle improvements, understanding the location of drainage inlets and how a recommendation may or may not impact that drainage helps in evaluating the feasibility of a recommendation.

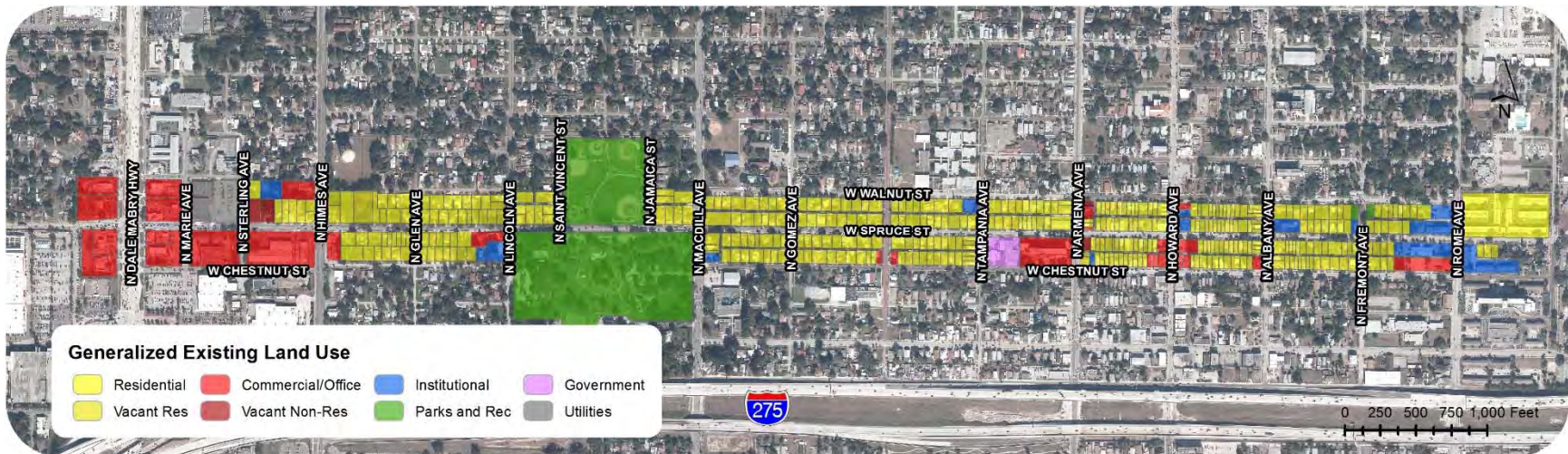


Source: City of Tampa

Figure 5: Location of Existing Drainage Inlets

## Existing Land Use

Existing land use, derived from Florida Department of Revenue (DOR) codes found in parcel data from the corridor, shows that most properties along Spruce Street are residential, with some commercial properties clustered primarily in the blocks between Dale Mabry Highway and Himes Avenue and around the intersections of Spruce Street at Armenia Avenue and Howard Avenue. Although not explicitly shown in Figure 6, the majority of the properties along Spruce Street are primarily single-family residential and have an average single-family home age in the study area of 57 years.

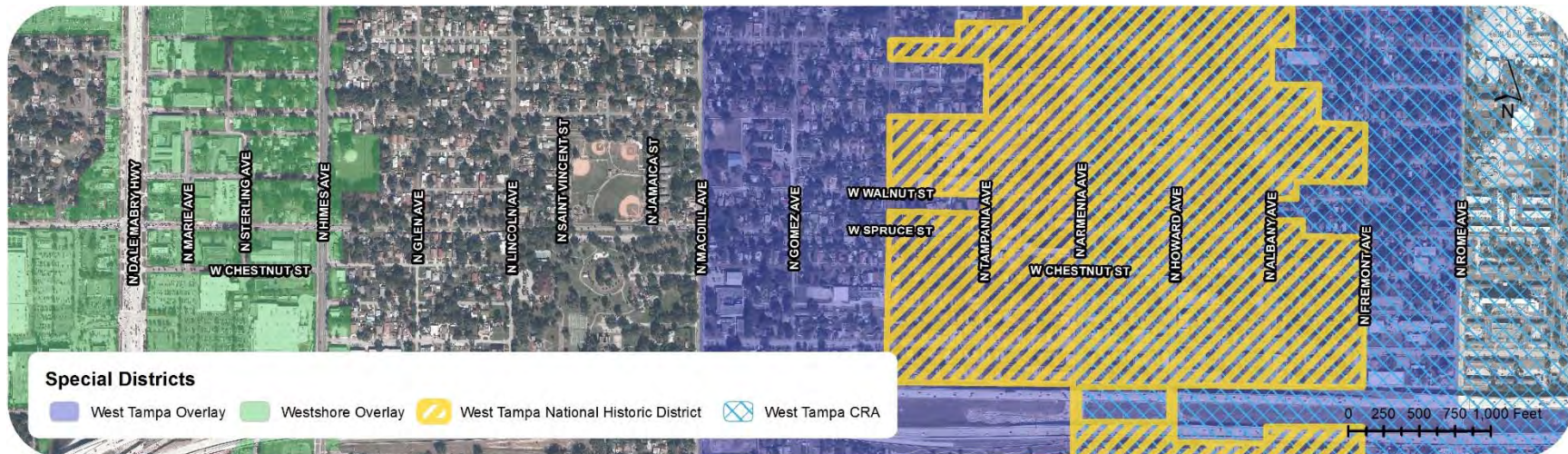


Source: Department of Revenue Codes from the Hillsborough County Property Appraiser Parcel Data

**Figure 6: Existing Land Use**

## Special Districts

There are multiple designated districts that fall within the Spruce Street corridor. Figure 7 shows the boundaries of these districts, which include the Westshore Overlay District, West Tampa Overlay District, West Tampa Community Redevelopment Area (CRA), and the Old West Tampa National Historic District. For the most part, these districts provide guidance on development and design elements and recognize the value and importance of enhancements that increase mobility options.



Source: City of Tampa

Figure 7: Designated Special Districts

## Transit Service and Ridership

Transit Service in the Spruce Street corridor is provided by Hillsborough Regional Transit Authority (HART) routes 7, 36, and 45. Figure 8 shows the extent of the transit service and average weekday ridership for the stops along and near the Spruce Street corridor. As shown, the area with the highest transit ridership is near the intersection of Spruce Street and Dale Mabry Highway, with approximately 270 people getting on or off of a bus near this intersection every day.



Source: HART July 2016 Stop-Level Ridership Data

**Figure 8: Transit Service and Ridership**

## Total Crashes

A three-year history of crashes within the corridor was analyzed using data extracted from the Crash Analysis Reporting System (CARS). During this analysis period, 143 crashes were reported within the corridor. Figure 9 shows the location and frequency of crashes within the corridor, indicating a concentration of crashes at the intersection of Spruce Street at Dale Mabry Highway and Spruce Street at MacDill Avenue. In total, there were zero fatal crashes, 9 incapacitating injury crashes, 20 non-incapacitating injury crashes, and 50 possible injury crashes. The most common crash types in the corridor were angle/left-turn crashes and rear-end crashes.



Source: Crash Analysis Reporting System 2013 – 2015 Crash Data Extract

Figure 9: Total Crashes, Location, and Frequency

## Pedestrian and Bicycle Crashes

Given that the primary purpose of this technical memorandum is to identify potential pedestrian and bicycle improvements that will make walking and biking safer and more inviting, understanding where pedestrian and bicycle crashes have occurred and the actions that contributed to the crashes is valuable information and aids in focusing on locations with potential safety issues. A review of the pedestrian and bicycle crashes that occurred within the corridor

between 2013 and 2015 was conducted. Figure 10 shows the location and frequency of the one pedestrian and six bicycle crashes that occurred during the analysis timeframe. Five of the seven crashes were attributed to drivers failing to yield the right-of-way to pedestrians and bicyclists, one was the result of a vehicle traveling in the wrong direction to improperly pass a standing traffic queue, and one was the result of a bicyclist disregarding the traffic signal at Spruce Street and Dale Mabry Highway.



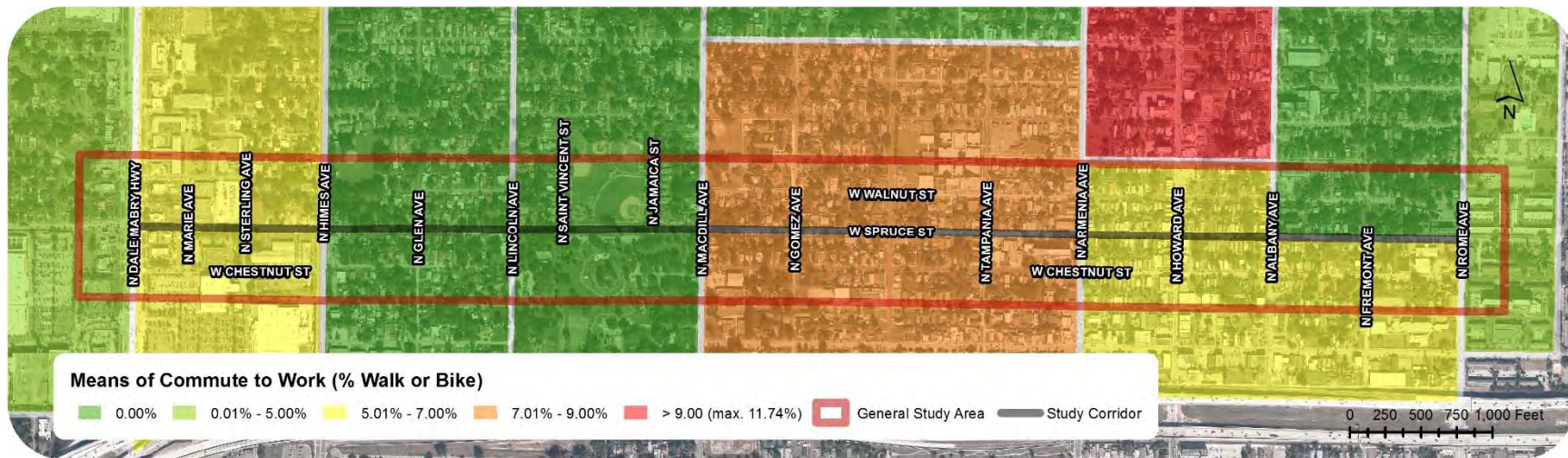
Source: Crash Analysis Reporting System 2013 – 2015 Crash Data Extract

**Figure 10: Pedestrian and Bicycle Crashes, Location, and Frequency**



## Percentage of Workers Walking or Biking to Work

Data reflecting the existing means of transportation to work for workers living within the census block groups along Spruce Street were evaluated using data from the U.S. Census Bureau's 2015 Five-Year American Community Survey (ACS). Figure 11 shows the percentages of surveyed workers who claim to walk and/or bike as their primary means of travel for work. As illustrated, there is considerable diversity in the percentages of workers walking and biking to work along the corridor, with some areas reporting 0% and others reporting as high as nearly 12%. According to the ACS, approximately 3.9% of the workers who live in Tampa walk or bike to work; within the evaluated study area, that percentage is approximately 4.3%.



Source: U.S. Census Bureau 2015 5-Year American Community Survey

**Figure 11: Percentage of Workers Walking or Biking to Work**

## Detailed Corridor Segment Review

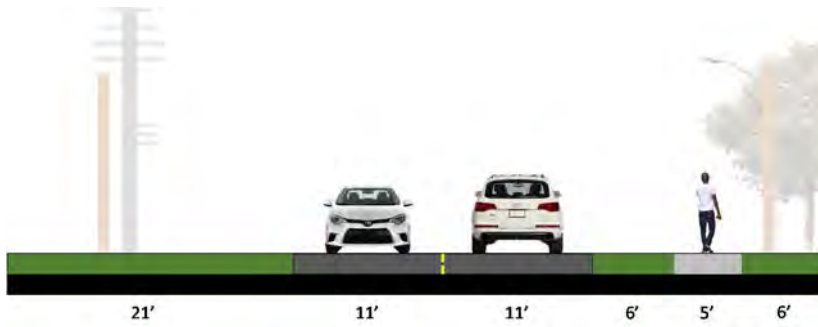
In addition to looking at existing conditions from a corridor-wide approach, a more in-depth review of the existing conditions along the corridor was conducted. This review included items such as right-of-way width, pavement width, documentation of existing pedestrian and bicycle facilities, drainage, and general observations about the roadway. For this review, the corridor was divided into seven segments (see Figure 12). The following pages contain an overview of the review of these segments:

- Spruce Street, Dale Mabry Highway to Himes Avenue
- Spruce Street, Himes Avenue to Lincoln Avenue
- Spruce Street, Lincoln Avenue to MacDill Avenue
- Spruce Street, MacDill Avenue to Tampania Avenue
- Spruce Street, Tampania Avenue to Armenia Avenue
- Spruce Street, Armenia Avenue to Albany Avenue
- Spruce Street, Albany Avenue to Rome Avenue



Figure 12: Percentage of Workers Walking or Biking to Work

### Spruce Street, Dale Mabry Highway to Himes Avenue

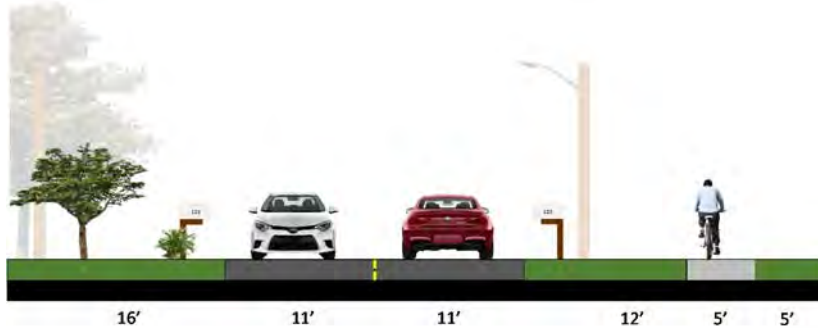


**Figure 13: Existing Typical Section, Dale Mabry Highway to Himes Avenue**

Roadway Type:	Neighborhood Collector
Right-of-Way:	60'
Pavement Width:	22'
Road Edge Type:	Raised curb in first block, otherwise grass shoulder, no curb
Drainage:	Drainage swale along both sides; grate inlets along north side, open drainage along south side
Pedestrian Facilities:	5' sidewalk along south side, 5' sidewalk along north side between Dale Mabry Hwy and Marie Ave and small section east of Sterling Ave
Bicycle Facilities:	None
General Adjacent Land Use:	Non-Residential, commercial
General Observations:	Presence of electric/utility poles, especially high-voltage electric poles, along north side may present a challenge. Impacts to drainage will need to be carefully evaluated and mitigated.



Spruce Street, Himes Avenue to Lincoln Avenue

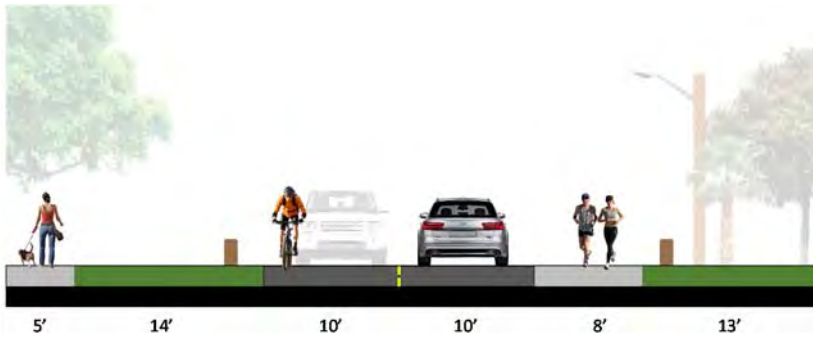


**Figure 14: Existing Typical Section, Himes Avenue to Lincoln Avenue**

Roadway Type:	Neighborhood Collector
Right-of-Way:	60'
Pavement Width:	22'
Road Edge Type:	Grass shoulder, no curb
Drainage:	Swale with grate inlet drains along both sides
Pedestrian Facilities:	5' sidewalk along south side, 5' sidewalk along north side in first parcel east of Himes Ave
Bicycle Facilities:	None
General Adjacent Land Use:	Residential, single-family; Non-Residential, commercial at intersections of Himes Ave and Lincoln Ave
General Observations:	Vegetation, including some larger trees, and personal property ROW encroachment along north side may present a challenge. Parking for commercial strip along south side west of Lincoln Ave may limit ability to continue sidewalk along south side. Impacts to drainage will need to be carefully evaluated and mitigated.



### Spruce Street, Lincoln Avenue to MacDill Avenue

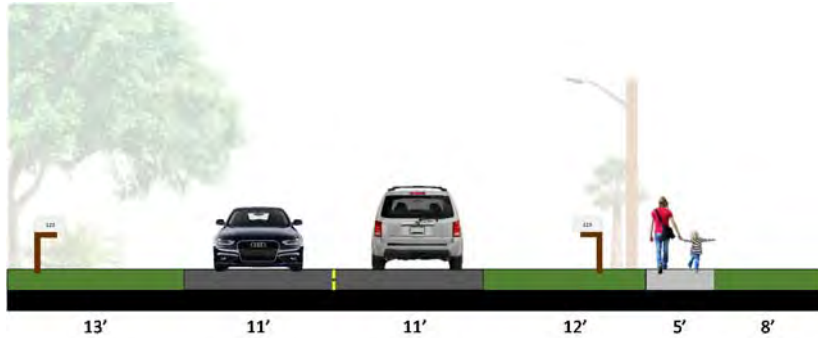


**Figure 15: Existing Typical Section, Lincoln Avenue to MacDill Avenue**

Roadway Type:	Neighborhood Collector
Right-of-Way:	60'
Pavement Width:	20'
Road Edge Type:	Grass shoulder (no curb) between St. Vincent St and Jamaica St; raised curb throughout remainder of segment
Drainage:	Curb inlets near Lincoln Ave and MacDill Ave
Pedestrian Facilities:	8' sidewalk along south (park) side, 5' sidewalk along majority of north side
Bicycle Facilities:	None
General Adjacent Land Use:	Institutional, parks and recreation
General Observations:	No physical separation between sidewalk in front of Macfarlane Park and Spruce St; sidewalk is directly level and adjacent to travel lane; only form of separation is white roadway edge stripe. Traffic signal at intersection of Spruce St and MacDill Ave appears to have been recently reconstructed along with addition of new LED intersection street lighting.



Spruce Street, MacDill Avenue to Tampania Avenue

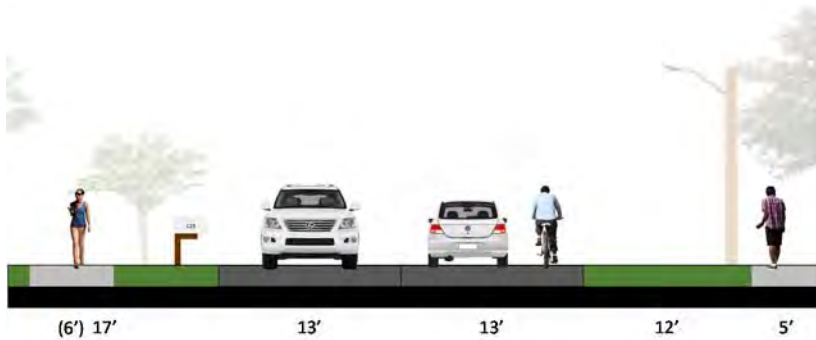


**Figure 16: Existing Typical Section, MacDill Avenue to Tampania Avenue**

Roadway Type:	Local
Right-of-Way:	60'
Pavement Width:	22'
Road Edge Type:	Grass shoulder, no curb
Drainage:	Swale with inlets along side streets
Pedestrian Facilities:	5' sidewalk along south side
Bicycle Facilities:	None
General Adjacent Land Use:	Residential, single-family
General Observations:	For most part, ROW along north side fairly clear, with minimal encroachment from vegetation and personal property.



### Spruce Street, Tampania Avenue to Armenia Avenue



**Figure 17: Existing Typical Section, Tampania Avenue to Armenia Avenue**

Roadway Type:	Local
Right-of-Way:	60'
Pavement Width:	26'
Road Edge Type:	Grass shoulder, no curb
Drainage:	Swale with inlets along side streets
Pedestrian Facilities:	5' sidewalk along south side, 6' sidewalk along approx. 175' of north side
Bicycle Facilities:	None
General Adjacent Land Use:	Residential, single-family; Institutional uses along south side
General Observations:	ROW along north side mostly clear; some personal property, e.g., fencing, may encroach upon ROW. Some on-street parking observed through this segment.



Spruce Street, Armenia Avenue to Albany Avenue



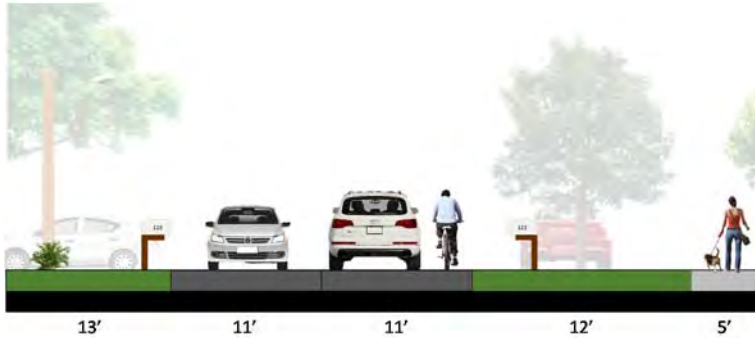
**Figure 18: Existing Typical Section, Armenia Avenue to Albany Avenue**

Roadway Type:	Local
Right-of-Way:	60'
Pavement Width:	30'
Road Edge Type:	Raised curb
Drainage:	Inlets at intersections along side streets
Pedestrian Facilities:	6' sidewalk along both sides of Spruce St
Bicycle Facilities:	None
General Adjacent Land Use:	Residential, single- and multi-family; Non-Residential, commercial near Howard Ave
General Observations:	On-street parking prevalent along both sides of street throughout segment. More frequent pedestrian and bicycle crossing observed at intersections of Spruce St at Howard Ave and Armenia Ave.





### Spruce Street, Albany Avenue to Rome Avenue



**Figure 19: Existing Typical Section, Albany Avenue to Rome Avenue**

Roadway Type:	Local
Right-of-Way:	55'
Pavement Width:	22'
Road Edge Type:	Grass shoulder, no curb
Drainage:	Inlets at intersections along side streets, grate inlets in roadway at Rome Ave
Pedestrian Facilities:	5' sidewalk along south side
Bicycle Facilities:	None
General Adjacent Land Use:	Residential, single-family
General Observations:	Vegetation, including some larger trees, within ROW along north side may present challenges. Some on-street parking observed in segment. Fremont Ave dead-ends north of Spruce St; 8' path (part of Fremont Linear Park) continues north from dead-end along Fremont Ave ROW.



## Potential Pedestrian and Bicycle Improvements

As previously stated, the purpose of this technical evaluation is to explore potential opportunities to enhance the pedestrian and bicycle environment along Spruce Street while respecting and preserving the existing fabric of the residential neighborhoods along the corridor. A two-step approach to identifying potential pedestrian and bicycle improvements along Spruce Street was developed. The first step was to identify systemic or “best practice” enhancements for the corridor; these are the type of enhancements that, if not already in place, should be considered wherever appropriate. The second step was to identify specific intersection and/or segment (from point A to point B) enhancements. Both best practice and site-specific enhancements are discussed on the following pages.

### Best Practice Enhancements

Many of these strategies focus on systemic improvements that could be applied throughout the corridor, where applicable, or incorporated into future projects along the corridor. Although some of the site-specific enhancements reference these strategies, every location at which these strategies could be applied is not specifically identified.

#### Crosswalk Markings

Crosswalks are a vital piece of the pedestrian network; they define the designated crossing area for pedestrians and alert drivers to the likelihood of pedestrians. In addition to these benefits, marked and well-defined crosswalks can help pedestrians to safely assert their right-of-way when crossing a street. There are many types of acceptable crosswalk treatments that can be applied, but

consideration should be given to the types of marking treatments that provide the highest levels of visibility to drivers from the greatest distances.

#### Street and Intersection Lighting

Roadway lighting, especially at intersections, is a critical component of roadway safety and should be designed to provide adequate illumination for all roadway users. Many factors affect roadway lighting and its effectiveness in improving safety, including location (spacing and setback), orientation, intensity, color, ambient light, technology (e.g., LED lights), etc. A better understanding of how the placement of lighting in relationship to an intersection and crosswalks helps in illuminating crossing pedestrians has led to better lighting layout and design guidance. Generally, when an overhead luminaire is located in advance of a crosswalk, the light from the luminaire provides a positive contrast of crossing pedestrians by illuminating the driver approach side of the pedestrian, which makes the pedestrian more visible to the driver. Chapter 7.3.2.2 of FDOT’s *Plans Preparation Manual (PPM)* describes the new standards for lighting design and illuminance levels for urban roadways. In general, lighting enhancements should be considered where needed and appropriate, especially near intersections and existing and planned crosswalks.

#### Pedestrian Signals and Pushbuttons

Countdown pedestrian signals have become fairly standard throughout most of Florida. These signals provide pedestrians with more definitive feedback on the amount of time left to cross a street than the older flashing “DON’T WALK” pedestrian signals. Functioning and well-placed pedestrian pushbuttons are important in encouraging crosswalk usage and compliance. In addition to the use of pedestrian countdown signals, the use of responsive

pushbuttons could be considered in locations with heavy pedestrian activity. Responsive pushbuttons typically provide pedestrians with either a visual (light) or audible sound once the pushbutton has been activated to inform the pedestrian that the button is working and that the request for the pedestrian signal is being processed.

### **Signage**

Signs are an important part of the driving environment. Signs can be used to warn drivers and other roadway users of potential threats and also can serve as visual reminders about how drivers are required to act in specific situations. Signs such as the MUTCD R10-15 sign remind turning drivers of their responsibility to yield to pedestrians within the crosswalks. Although signage can be useful and effective, the placement of signs should be done with care; too many signs could result in driver desensitization and lead to noncompliance. Making sure that appropriate signage is in place and is visible can help in creating an environment that is safer for all road users.

### **Accessible Pathways**

Well-designed roadways and pedestrian facilities accommodate all roadway users. The Americans with Disabilities Act (ADA) requires that pedestrian facilities and routes be accessible to pedestrians with mobility, visual, cognitive, and other types of impairments. The ADA Accessibility Guidelines (ADAAG) provide specific accessibility guidelines for the design of certain pedestrian facilities and are enforceable by law. Making sure that there are accessible pathways and that existing facilities do not deny access to persons with disabilities helps ensure that there is access to all users. Making certain that items such as pedestrian curb ramps and detectable warning surfaces are properly in place can go a long way toward enhancing the pedestrian environment for everyone.

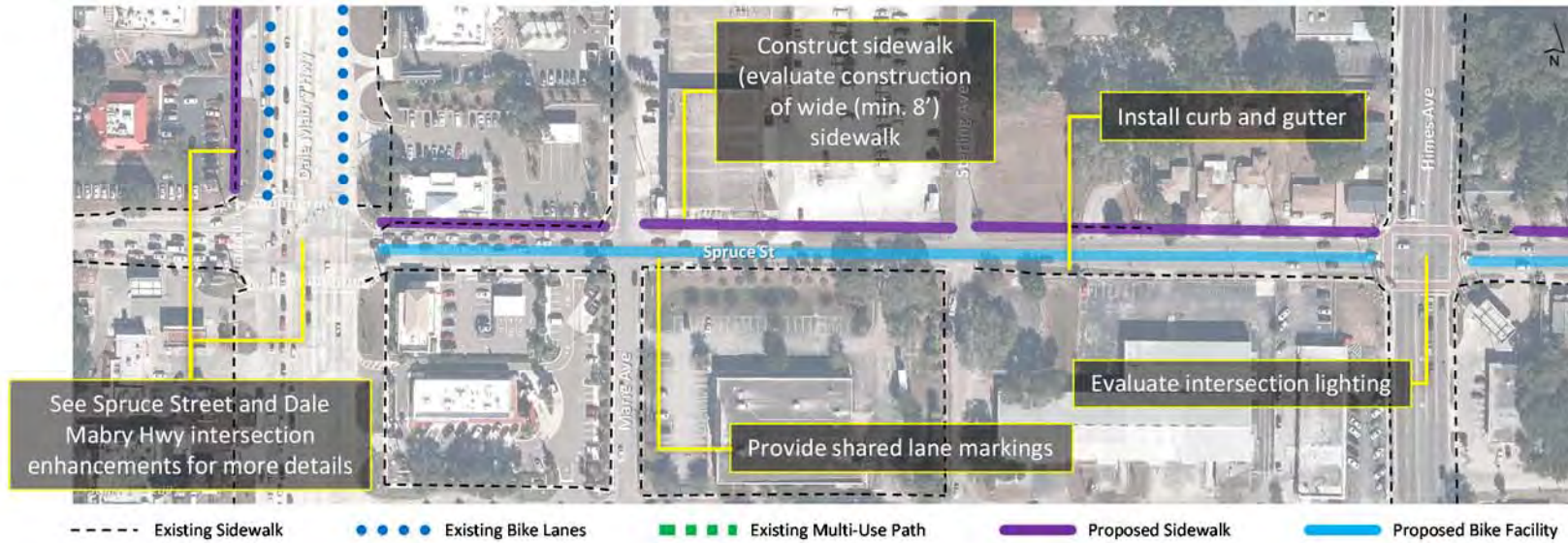
## **Site-Specific Enhancements**

The following provides an overview of the potential site-specific enhancements identified to improve the pedestrian and bicycle environment along Spruce Street. For the most part, the improvements noted in this section were identified as enhancements to walking and biking while also maintaining the current neighborhood character and feel along Spruce Street. Also, most of the identified potential improvements are geared towards the types of enhancements that will be impactful, but could be implemented within a relatively short timeframe and at lower costs.

The site-specific improvements are presented moving from the west to the east along Spruce Street and have been organized into the following seven segments:

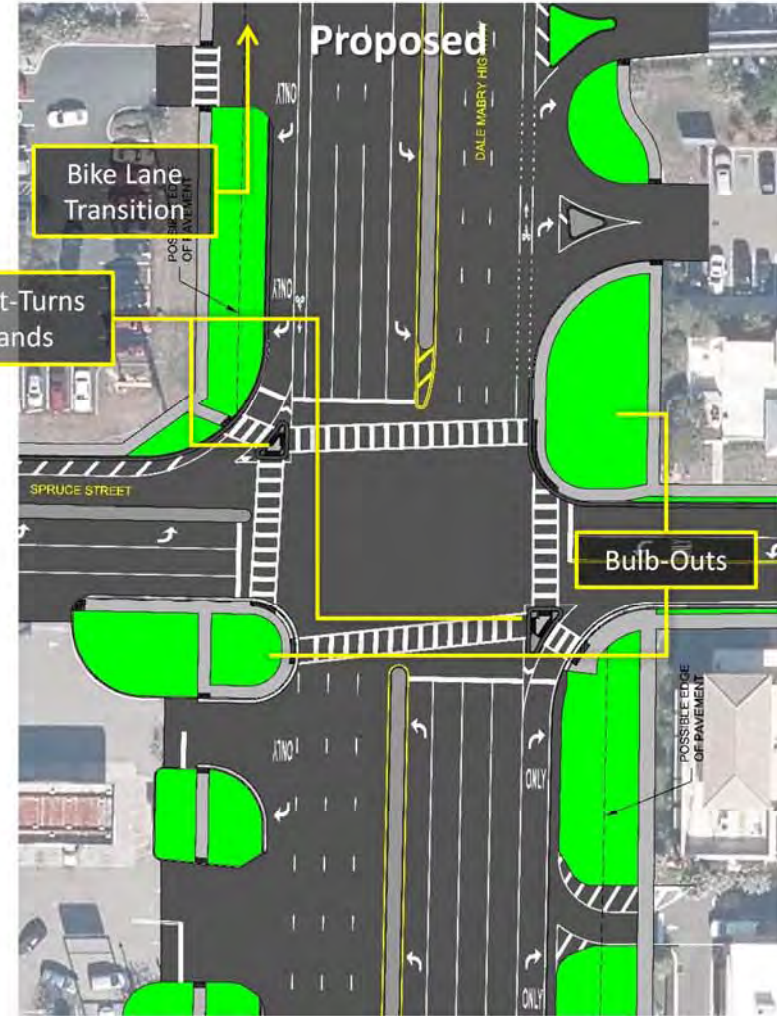
1. Dale Mabry Highway to Himes Avenue
  - a. Spruce Street at Dale Mabry Highway
2. Himes Avenue to Lincoln Avenue
3. Lincoln Avenue to MacDill Avenue
4. MacDill Avenue to Habana Avenue
5. Habana Avenue to Armenia Avenue
6. Armenia Avenue to Albany Avenue
7. Albany Avenue to Rome Avenue

1. – Spruce Street from Dale Mabry Highway to Himes Avenue



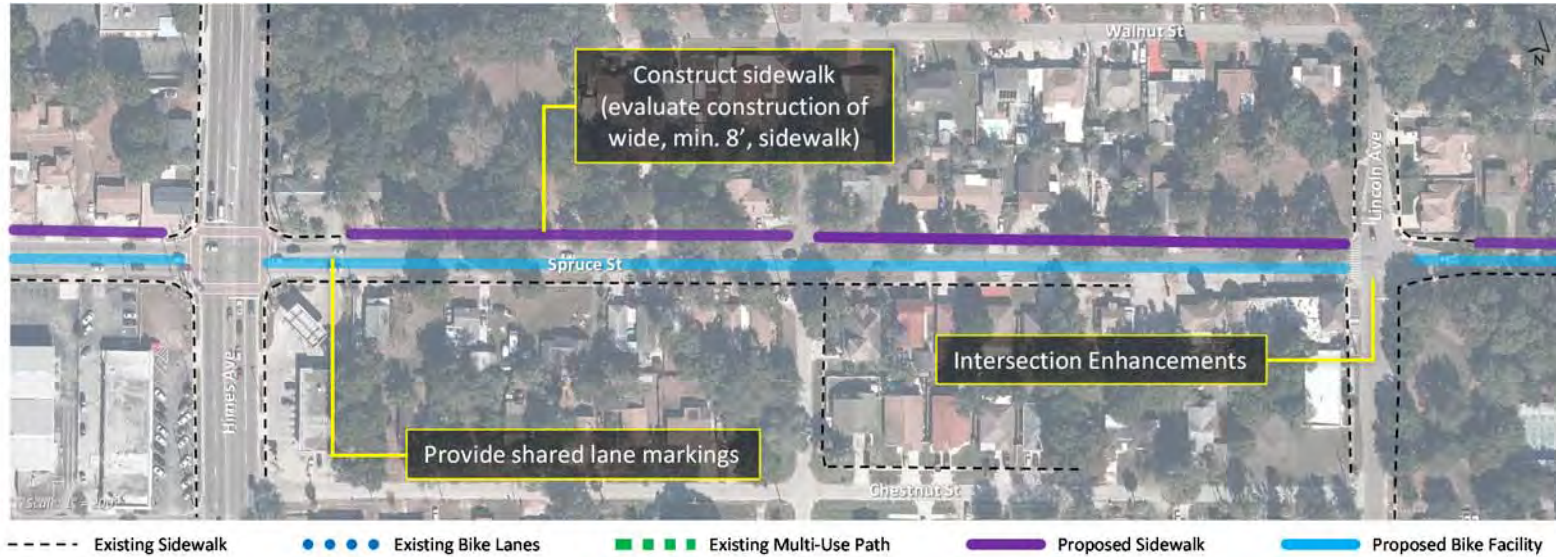
Ref.	Location	Description
1.A	Spruce St at Dale Mabry Hwy	Intersection enhancements - see separate intersection enhancement pages.
1.B	Spruce St between Dale Mabry Hwy and Himes Ave	Install shared lane markings (a.k.a. sharrows) along Spruce St; existing posted speed limit on Spruce St is 25 MPH.
1.C	Spruce St between Dale Mabry Hwy and Himes Ave (north side)	<p>Complete sidewalk along north side of Spruce St. Evaluate feasibility of providing wide (min. 8') sidewalk along north side of Spruce St. Wide sidewalk could tie into planned improvements that City of Tampa has proposed along north side of Spruce St west of Dale Mabry Hwy. Also, Westshore Area Pedestrian System Plan identified north side of this segment (Manhattan Ave to Himes Ave) for sidewalk improvements and listed it as third priority in priority sidewalk enhancement implementation plan. Following need to be considered and evaluated further:</p> <ul style="list-style-type: none"> <li>• 7 wood utility poles within ROW that may need to be relocated.</li> <li>• 6 high-voltage transmission line poles that may need to be mitigated by either implementing a pinch-point treatment (dropping width of sidewalk) or acquiring easement to route wider sidewalk around poles.</li> <li>• Impacts to drainage will need to be considered and evaluated; installing sidewalk could impact existing drainage system and could require re-profiling of drainage swale and/or movement of existing grate inlets. Consider installing either curb and gutter or a bio-swale with curb as part of sidewalk installation.</li> <li>• Coordination with other local utilities needed to minimize/mitigate potential impacts; during field review, markers for communications and gas lines observed.</li> <li>• Reconstructing existing 5' sidewalk to 8' sidewalk in front of Chase Bank may necessitate retainage of some soil at property line and dropping elevation of sidewalk to level with top of curb; may require reconstructing existing ramp to entrance of back as step-up – if this is the case, ADA access to/from Spruce St could be provided via sidewalk adjacent to parking lot.</li> </ul>
1.C.i	Spruce St between Marie Ave and Himes Ave (south side)	If curb and gutter installed along north side, also consider installing curb and gutter along south side where there is currently grass shoulder.
1.D	Spruce St at Himes Ave	Consider rebuilding existing span-wire signal structure as mast-arm signal structure that includes intersection lighting, as outlined in Chapter 7.3.2.2 of FDOT's PPM. Additionally, consider placing east-west pedestrian signal on automatic recall; appears to be adequate time to accommodate this pedestrian movement without impacting existing signal timing/phasing.

1.A. – Spruce Street at Dale Mabry Highway



Ref.	Location	Description
1.A	Spruce St at Dale Mabry Hwy	Intersection enhancements: <ul style="list-style-type: none"> <li>• Consider constructing right-turn channelization islands within southeast and northwest quadrants of intersection to reinforce right-turn-only movements from northbound and southbound Dale Mabry Hwy onto Spruce St.               <ul style="list-style-type: none"> <li>- During field visits, multiple drivers observed using right-turn-only as through lane to “jump” queues at intersection; poses potential safety concern; right-turn islands will help ensure that right-turn-only lane used as prescribed. Additionally, islands will help to reduce pedestrian crossing distance and exposure at intersection.</li> <li>- Consider extending curb (construct bulb-outs) within northeast and southwest quadrants of the intersection in conjunction with construction of right-turn channelization islands in northwest and southeast quadrants of intersection.</li> </ul> </li> </ul>
1.A.i		
1.A.ii		
1.A.iii	Dale Mabry Hwy, west side north of Spruce St	Marked bike lanes along Dale Mabry Hwy north of Spruce St. Southbound bike lane along Dale Mabry Hwy terminates at intersection of Spruce St; consider providing transition between bike lane and sidewalk, similar to bike ramps used on approaches to a roundabout, prior to development of right-turn lane keyhole. Transition would provide bicyclists with option to either stay in bike lane or move to sidewalk to navigate ending of bike lane south of intersection. <ul style="list-style-type: none"> <li>• Consider widening sidewalk along west side of Dale Mabry Hwy to min. 8' from proposed bike lane transition (approx. 560' north of Spruce St) to intersection of Spruce St and Dale Mabry Hwy to help better facilitate both pedestrian and bicycle traffic along sidewalk.</li> </ul>
1.A.iv	Spruce St west of Dale Mabry Hwy	City of Tampa is in process of identifying opportunities to improve operations and safety along Spruce St west of Dale Mabry Hwy that includes eastbound (west side) approach to intersection. Based on reviews of City’s Preliminary Engineering (PE) Report, appear to be no conflicts between suggestions from this report and City’s PE report. However, improvements to intersection should be carefully coordinated to ensure that efforts align with each other.

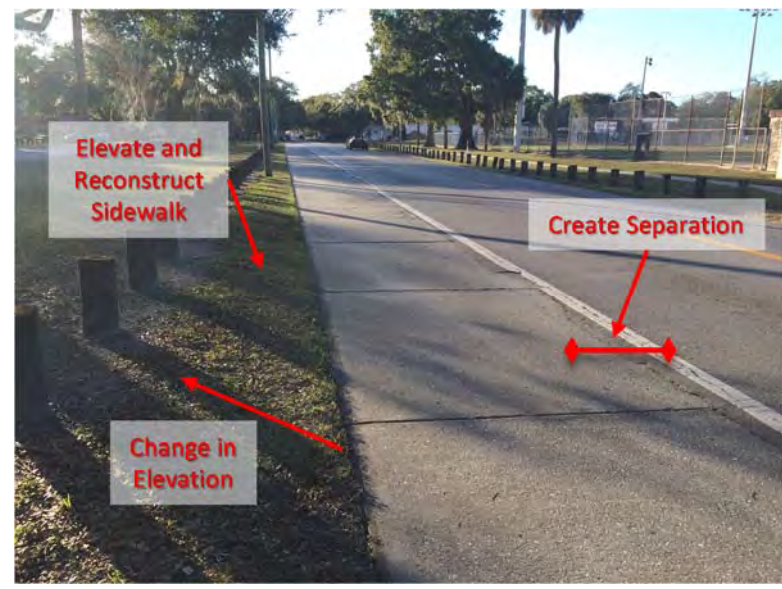
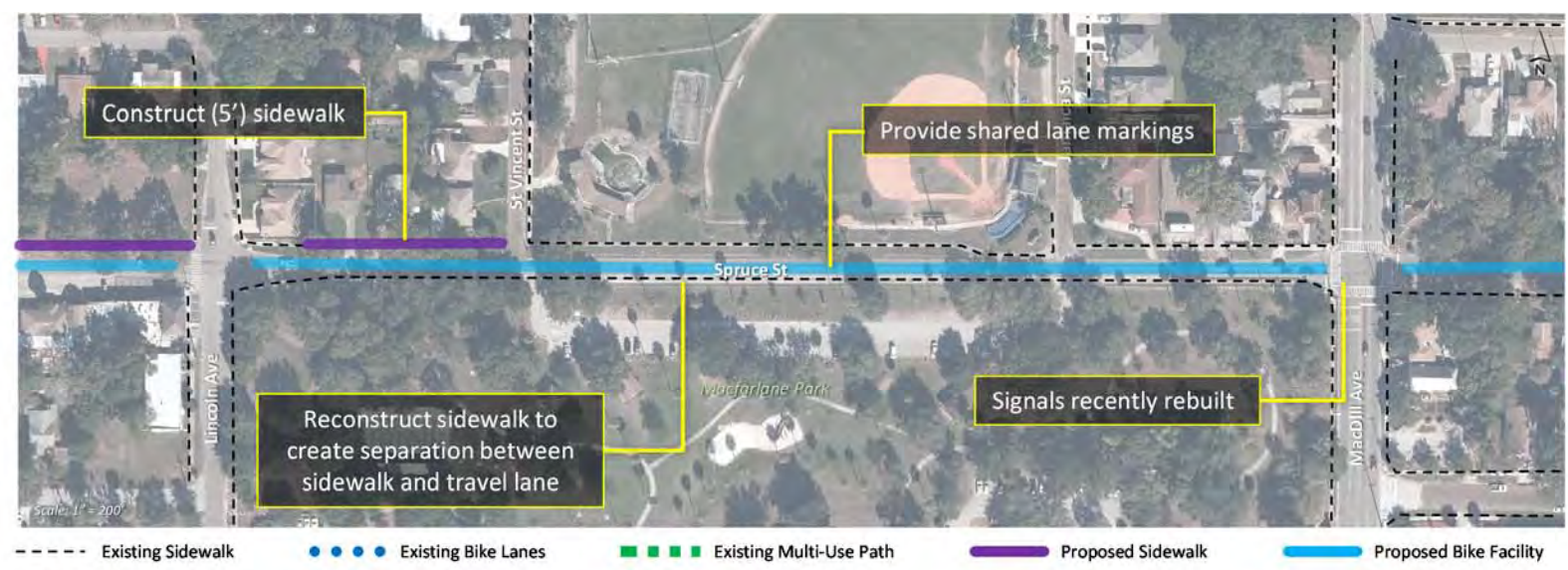
2. – Spruce Street from Himes Avenue to Lincoln Avenue





Ref.	Location	Description
2.A	Spruce St between Himes Ave and Lincoln Ave	Install shared lane markings (a.k.a. sharrows) along Spruce St; existing posted speed limit on Spruce St is 25 MPH.
2.B	Spruce St between Himes Ave and Lincoln Ave	<p>Consider constructing wide sidewalk (min. 8') along north side of Spruce St; may require clearing of ROW, including the mitigation of trees within or directly adjacent to ROW line. Other considerations include:</p> <ul style="list-style-type: none"> <li>• 9 wood utility poles may need to be relocated to accommodate sidewalk.</li> <li>• 2 high-voltage transmission line poles that may require either pinch-point treatment or easements to mitigate.</li> <li>• Evaluate impacts to drainage; drainage grate inlets located within ROW along with a shallow swale.</li> <li>• If 8' sidewalk not feasible due to costs to mitigate drainage and/or clearing of ROW, evaluate impacts of 5' sidewalk.</li> </ul>
2.C	Spruce St at Lincoln Ave	Intersection enhancements:
2.C.i		<ul style="list-style-type: none"> <li>• Build out curb in southwest quadrant to accommodate improved pedestrian landing, shorten pedestrian crossing distance, and accommodate pedestrian crossing along south side of Spruce St across Lincoln Ave (see Appendix A for more detail).</li> </ul>
2.C.ii		<ul style="list-style-type: none"> <li>• Consider building-out curb and providing improved pedestrian landing and curb ramp in northwest quadrant.</li> </ul>
2.C.iii		<ul style="list-style-type: none"> <li>• Install marked crosswalk along south side of Spruce St across Lincoln Ave.</li> </ul>
2.C.iv		<ul style="list-style-type: none"> <li>• Evaluate opportunities for additional intersection lighting.</li> </ul>

### 3. – Spruce Street from Lincoln Avenue to MacDill Avenue



Ref.	Location	Description
3.A	Spruce St between Lincoln Ave and MacDill Ave	Install shared lane markings (a.k.a. sharrows) along Spruce St; existing posted speed limit on Spruce St is 25 MPH.
3.B	Spruce St between Lincoln Ave and St. Vincent St	Install sidewalk (5') along north side of Spruce St.
3.C	Spruce St between St. Vincent St and Jamaica St	<p>Currently 8' sidewalk along south side of Spruce St; however, currently no physical separation (including curb) between sidewalk and adjacent travel lane – sidewalk level with travel lane. Explore opportunities to enhance separation between sidewalk and travel lane.</p> <ul style="list-style-type: none"> <li>Consider constructing curb and raising sidewalk; elevation of shoulder increases south of existing sidewalk where existing wooden bollards located. Evaluate reconstructing sidewalk slightly to south to provide raised physical separation and potential narrow buffer strip between sidewalk and eastbound travel lane of Spruce St (see Appendix A for more detail).</li> </ul>
3.D	Spruce St at MacDill Ave	Traffic signal recently upgraded to mast-arm support and includes LED street lighting in northwest and southeast quadrants

4. – Spruce Street from MacDill Avenue to Habana Avenue



Ref.	Location	Description
4.A	Spruce St between MacDill Ave and Habana Ave	Construct 5' sidewalk along north side of Spruce St; as with previous segments, some trees and vegetation may need to be removed or mitigated, some properties may need to relocate mailboxes, and some private property (e.g., fencing and other landscape materials) may have encroached upon ROW and may need to be removed.
4.B	Spruce St at Habana Ave	Intersection enhancements:
4.B.i		<ul style="list-style-type: none"> <li>• Provide crosswalk markings for crossing on east side of intersection, across Spruce St.</li> </ul>
4.B.ii		<ul style="list-style-type: none"> <li>• Install westbound stop bar on Spruce St east of Habana Ave.</li> </ul>
4.B.iii		<ul style="list-style-type: none"> <li>• Construct accessible pedestrian ramp(s) in northwest quadrant as part of sidewalk construction to accommodate pedestrian crossings.</li> </ul>
4.B.iv		<ul style="list-style-type: none"> <li>• Reconstruct existing (north-south) curb ramp in southwest quadrant to meet ADA curb ramp standards.</li> </ul>
4.B.v		<ul style="list-style-type: none"> <li>• Consider providing marked crossing across Habana Ave along south side of Spruce St; at a minimum, consider providing accessible pedestrian curb ramps to help facilitate east-west movement across Habana Ave.</li> </ul>
4.B.vi		<ul style="list-style-type: none"> <li>• Consider installing bright-sticks on stop sign posts to increase sign visibility at night.</li> </ul>
4.B.vii		<ul style="list-style-type: none"> <li>• Existing overhead street light in southeast quadrant most likely adequate for intersection.</li> </ul>

5. – Spruce Street from Habana Avenue to Armenia Avenue



Ref.	Location	Description
5.A	Spruce St between Habana Ave and Armenia Ave	Construct 5' sidewalk along north side of Spruce St; ROW appears to be fairly clear through segment, with existing 5' sidewalk across front of a few properties.
5.B	Spruce St at Tampania Ave	Intersection enhancements:
5.B.i		<ul style="list-style-type: none"> <li>• Provide east-west accessible pedestrian curb ramps along north side of Spruce St as part of sidewalk construction within northwest and northeast quadrants.</li> </ul>
5.B.ii		<ul style="list-style-type: none"> <li>• Evaluate installing east-west pedestrian curb ramp in southwest quadrant to better facilitate east-west pedestrian crossing across Tampania Ave.</li> </ul>
5.B.iii		<ul style="list-style-type: none"> <li>• Install bright-sticks to stop sign posts to increase sign visibility.</li> </ul>
5.C	Spruce St at Armenia Ave	Intersection enhancements:
5.C.i		<ul style="list-style-type: none"> <li>• Build out intersection curb lines to provide full bulb-outs; impacts to drainage will need to be evaluated, but should not be prohibitive. Include pedestrian curb ramps for east-west crossings as part of bulb-out construction.</li> </ul>
5.C.ii		<ul style="list-style-type: none"> <li>• Existing textured pattern pavement markings are worn and not very visible to drivers; consider rehabbing pavement markings and adding white parallel edge line crosswalk markings to improve crosswalk visibility.</li> </ul>
5.C.iii		<ul style="list-style-type: none"> <li>• Evaluate intersection lighting levels and enhance if necessary.</li> </ul>
5.C.iv		<ul style="list-style-type: none"> <li>• Consider installing rapid rectangular flashing beacons (RRFBs) to enhance pedestrian crossings across Armenia Ave. If RRFBs installed, consider installing for northern east-west crossing and consider removing marked crossing along south side of intersection (see Appendix A for more detail).</li> </ul>

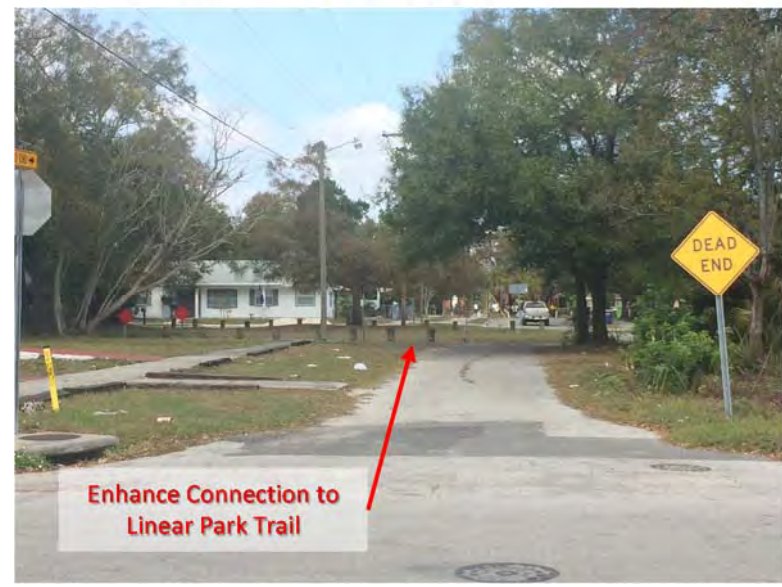
6. – Spruce Street from Armenia Avenue to Albany Avenue





Ref.	Location	Description
6.A	Spruce St at Howard Ave	<p>Intersection enhancements:</p> <ul style="list-style-type: none"> <li>• Provide marked pedestrian crossing along northern leg of intersection.</li> <li>• Build out intersection curb lines to provide full bulb-outs; impacts to drainage will need to be evaluated, but does not appear to be prohibitive.</li> <li>• Textured pattern pavement markings are worn and are not very visible to drivers; consider rehabbing pavement markings and adding white parallel crosswalk markings to improve crosswalk visibility.</li> <li>• Evaluate intersection lighting levels and enhance if necessary.</li> <li>• Consider installing rectangular rapid flashing beacons (RRFBs) to enhance pedestrian crossings across Howard Ave. If RRFBs installed, consider installing on southern leg of intersection (see Appendix A for more detail).</li> </ul>
6.A.i		
6.A.ii		
6.A.iii		
6.A.iv		
6.A.v		
6.B	Spruce St at Albany Ave	<p>Intersection enhancements:</p> <ul style="list-style-type: none"> <li>• Provide marked north-south crossing along west side of intersection.</li> <li>• Install bright-sticks to stop sign posts to increase sign visibility.</li> <li>• As longer-term alternative, consider reconstructing intersection as modern small single-lane roundabout (see Appendix A for more detail).</li> </ul>
6.B.i		
6.B.ii		
6.B.iii		

7. – Spruce Street from Albany Avenue to Rome Avenue



Ref.	Location	Description
7.A	Spruce St between Albany Ave and Rome Ave	Construct 5' sidewalk along north side of Spruce St; may be some items within ROW that will need to be mitigated, including utility poles, trees, landscaping, mailboxes, fences, and other private property items.
7.B	Spruce St at Fremont Ave	Consider providing wayfinding signage guiding people along Spruce to Fremont Ave Linear Park and trail located at north end of Fremont Ave, approximately 130' north of Spruce St.
7.C	Spruce St at Rome Ave	Intersection enhancements:
7.C.i		<ul style="list-style-type: none"> <li>• Crosswalk markings across Rome Ave on southern leg of the intersection showing signs of wear; consider replacing existing markings with high-emphasis crosswalk markings.</li> </ul>
7.C.ii		<ul style="list-style-type: none"> <li>• Install bright-sticks to stop sign posts to increase sign visibility at night.</li> </ul>
7.C.iii		<ul style="list-style-type: none"> <li>• Evaluate intersection lighting conditions; only existing overhead street light located in northeast corner of intersection; enhance if necessary.</li> </ul>
7.C.iv		<ul style="list-style-type: none"> <li>• Provide (high-emphasis) crosswalk markings across remaining legs of intersection.</li> </ul>
7.C.v		<ul style="list-style-type: none"> <li>• Evaluate building-out curbs in southeast and southwest quadrants to develop bulb-outs along Rome Ave south of Spruce St; bulb-outs would shorten pedestrian crossing distances, provide better visibility for pedestrians, and could help define on-street parking areas along Rome Ave south of Spruce St.</li> <li>• Alternatively, consider reconstructing intersection as modern small single-lane roundabout. Roundabout at intersection could also serve as gateway feature to planned West River Redevelopment Area east of Rome Ave (see Appendix A for more detail).</li> </ul>

## Other Considerations

The majority of the identified enhancements in the previous section were developed to provide improved and safer walking and bicycling conditions along Spruce Street while not significantly altering the current character and feel of the corridor. For example, installing sidewalks, enhancing lighting, improving crossings at intersections, and installing signage are all impactful and beneficial to the multimodal environment, but these improvements are not necessarily transformative. Without extensive public engagement, it was determined that identifying improvements that fit within the current character of the roadway and neighborhoods along Spruce Street would be most appropriate at this time. However, it is worth noting that there are alternatives that could be considered along Spruce Street that could significantly transform the way Spruce Street operates, looks, and feels. This section explores some of these potential alternatives while also recognizing that the people who live, work, and play along Spruce Street should be key partners in determining if more transformative measures along Spruce Street are desired.

## Bicycle Boulevard

Bicycle boulevards are low-stress, low-speed shared roadways designed to encourage bicycle travel by offer priority treatments for bicyclists operating within a roadway shared with motor vehicles. Bicycle boulevards typically are located along neighborhood streets and may include traffic calming design treatments (speed cushions, pinch-points, chicanes, curb extensions, etc.), special signing, pavement markings (see Figure 20), traffic diversion, and intersection crossing treatments. The intention of a bicycle boulevard is to provide a comfortable, convenient, and attractive environment for bicyclists and pedestrians of all ages and experience.



Source: [nacto.org](http://nacto.org)

**Figure 20: Example of a Bicycle Boulevard in Berkeley, CA**

In addition to the management of speed, a critical element that can determine the success of a bicycle boulevard is the management of traffic volume. Typically, streets with more than 1,500 average daily traffic (ADT) are less attractive to younger and less experienced bicyclists who prefer to not ride in traffic. Several design techniques can be used to help manage speed along bicycle boulevards, including full and partial diverters that prevent motor vehicles from continuing along the bicycle boulevard at certain locations while allowing bicyclists and pedestrians to continue through. A consideration with the potential for a bicycle boulevard along Spruce Street is that Spruce Street is one of a few east-west streets north of Interstate 275 that connect all the way through from Dale Mabry Highway to Rome Avenue. Understanding the impacts of applying a bicycle boulevard treatment to Spruce Street and the community's desire for this type of treatment would need to be considered before moving forward with developing a concept for a bicycle boulevard along Spruce Street.

### Installing Curb and Gutter

Currently, most of Spruce Street between Dale Mabry Highway and Rome Ave has a grass shoulder with open/grate drainage located either within a shallow drainage swale or along the roadway at intersecting streets. An option that could be explored in the future would be to install a raised curb and provide either a closed drainage system or gutter to channel water towards drainage inlets along Spruce Street. Providing a raised curb and eliminating the existing drainage swale could help in defining the roadway edge and create a more defined space for on-street parking or bicycle facilities along Spruce Street. Installing curb and gutter could help to eliminate water ponding and facilitate better drainage. Additionally, a raised curb along Spruce Street could provide pedestrians along the sidewalk with added physical protection from moving vehicles. Installing curb

and gutter along Spruce Street could help to better define the roadway and shoulder while giving the street a more formal and finished look.

### Green Infrastructure/Bioswale System

A bioswale is a drainage treatment that uses a shallow depression to capture and treat stormwater before it enters into the sewer system and/or waterways. Unlike traditional stormwater drainage systems that are designed to quickly move water away from a location, bioswales often are designed to slow the flow of stormwater, which allows the water to be filtered and allows for the infiltration of some water back into the local water table before entering the sewer system. Bioswales often are filled with native plantings and an open-graded layer of rock beneath the plantings to help with erosion, which also facilitate filtration and the movement of water. Figure 21 shows an example of an existing bioswale located between the curb and sidewalk along a residential street. Using green infrastructure such as a bioswale can create healthier urban environments by mimicking the processes found in nature that help to reduce water pollution, runoff, and localized flooding.

Installing a bioswale along Spruce Street could be done as an alternative to installing a traditional urban curb and gutter system or could possibly be incorporated into the existing drainage system. Beyond the environmental benefits, a bioswale system could provide an opportunity to provide landscaping along Spruce Street that could help to enhance the walking and bicycling environment. As with the other options discussed in this section, community input and acceptance should be sought before moving forward with any actual plans for a bioswale along Spruce Street.



Source [epa.gov](http://epa.gov)

**Figure 21: Bioswale along a Residential Street**

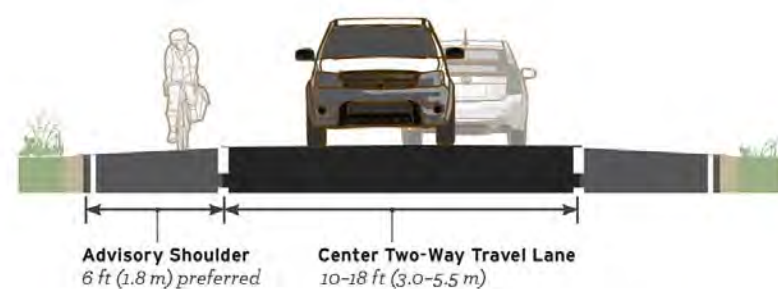
### Advisory Shoulders

Advisory shoulders, also known as dashed bicycle lanes, are an experimental roadway treatment that provides a delineated but non-exclusive space for bicyclists on a roadway that is otherwise too narrow to accommodate a bicycle facility. Unlike a conventional roadway shoulder or bicycle lane, an advisory shoulder is considered part of the regular travel way and may be used by vehicles. However, motorists may enter the delineated shoulder area only when no bicyclists are present; if a bicyclist is present within the shoulder area and there is opposing traffic, the driver must yield to the bicyclist before carefully overtaking the bicyclist. Ultimately, advisory shoulders are intended to encourage the shared use of the street by increasing predictability and clarifying desired lateral positioning between bicyclists and drivers. Additional benefits of advisory

shoulders are that they can minimize potential impacts to visual or natural resources through an efficient use of existing pavement and space, and may improve overall safety by encouraging slower travel speeds.

Figure 22 shows a typical cross-section of a street with advisory shoulders. Note that the preferred width of the shoulder lanes are 6 ft (min. 4 ft), with 10–18 ft for the center two-way travel lane. Generally, this type of treatment is considered acceptable for lower volume (preferred less than 3,000 ADT, but can be accommodated on streets with up to 6,000 ADT) and lower speed (< 35 MPH, 25 MPH, or lower preferred) streets in either residential, small town, or rural settings.

Also, since advisory shoulders are currently an experimental treatment, implementation requires an approved request to experiment from the Federal Highway Administration (FHWA).



Source FHWA Small Town and Rural Design Guide ([ruralsdesignguide.com](http://ruralsdesignguide.com))

**Figure 22: Advisory Shoulder Cross-Section**

## Project Evaluation

### Feasibility Review

A review of project feasibility was conducted with the goal to identify potential fatal flaws that would make the recommended improvements unfeasible (physically or fiscally) and potential challenges that could increase the complexity and/or cost to complete the improvements. Appendix B contains a summary of the feasibility review for the identified improvements along Spruce Street.

Although the feasibility review was conducted to identify fatal flaws that would prohibit the type of improvements being suggested, it is recommended that necessary engineering, survey, and/or design work be completed prior to commencing construction on any of the identified recommendations. Unless otherwise noted, most of the improvements identified herein were developed to avoid major ROW impacts and to avoid/minimize major reconstruction of the roadway, curb, and drainage structures.

### Cost Estimates

Along with the feasibility review, planning-level cost estimates for the identified improvements were developed to provide general guidance. The cost estimates for the identified improvements were developed using a mix of generic cost estimate, and more detailed pay-item unit costs from FDOT’s historical cost estimates that were applied to the identified improvements. To develop the cost estimates the following percentages were applied to the associated item/unit and base construction costs:

- Maintenance of Traffic (MOT) – 10%
- Mobilization – 10%
- Project Unknowns – 20%
- Engineering Design – 15%
- Construction, Engineering, and Inspection (CEI) – 20%

Figure 23 lists some of the cost assumptions used to develop the improvement cost estimates for Spruce Street. Additional detailed engineering and design work will be required to determine actual cost to construct the identified improvements. Appendix B provides a detailed breakdown of the cost estimates for the improvements along Spruce Street.

Type of Treatment	Cost Estimate <sup>1</sup>
Sidewalk 5', one side only	\$275,000 per mi
Sidewalk 8', one side only	\$410,000 per mi
Shared lane markings	\$20,000 per mi
Crosswalk markings (ladder style)	\$20 per linear ft
Signage (e.g., R10-15 right-turn yield to ped)	\$700 ea
Curb extensions (varies depending upon size, complexity, and drainage impacts)	\$7,500–\$75,000 ea
Small modern roundabout	\$60,000 - \$100,000 per intersection
Rectangular rapid flashing beacons (RRFB), 2 signs + beacons	\$50,000 per crossing
Utility pole relocation	\$9,500 ea

<sup>1</sup>Inclusive of construction (including MOT, mobilization, design, project unknowns, and construction, engineering, and inspection (CEI)).

**Figure 23: Planning Level Cost Estimate Assumptions**

## Next Steps

Implementing the improvements identified herein could be accomplished in a number of ways—the improvements could be completed as one project or they could be implemented in phases as funding becomes available. Even though the majority of the identified improvements will need to be coordinated through the City of Tampa, coordination among the Hillsborough MPO, the City of Tampa, and FDOT District 7 should continue to ensure that the identified improvements are realized. In addition to coordination among the local agencies, public input on the identified improvements, beyond the scope of this effort, should be sought. Based on input from the community, it could be determined that more transformative improvements are desired along Spruce Street and that it may make more sense to delay some of the more cost-intensive improvements until a community vision for Spruce Street is established.

Irrespective of public input, funding for additional project evaluation and engineering design should be allocated prior to implementing the identified improvements. The design effort will identify any additional challenges into the feasibility of the improvements, will develop more accurate cost estimates that could be used in programming funding for the improvements, and may result in some changes to the improvements identified in this memorandum.

Finally, the City of Tampa has been exploring multimodal improvement opportunities along Spruce Street west of Dale Mabry Highway. The outcome of the City's efforts could have impacts on the intersection of Dale Mabry Highway and Spruce Street that could change how this intersection operates. It is recommended that the City's efforts be closely monitored for opportunities to improve the pedestrian and bicycle environment at this intersection and for opportunities to coordinate project implementation efforts and/or funding.



## Appendix A – Additional Design Concept Graphics

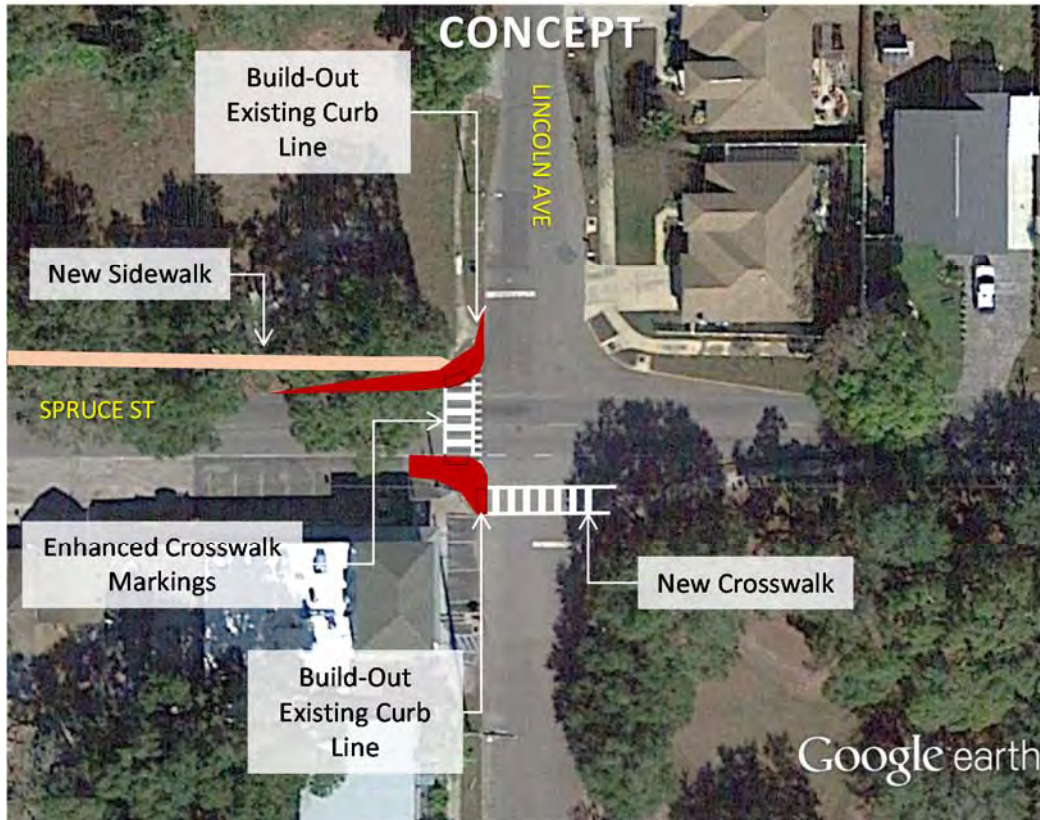
## Dale Mabry Highway north of Spruce Street

### Intersection Enhancements (Ref. # 1.A.iii)



## Spruce Street at Lincoln Avenue

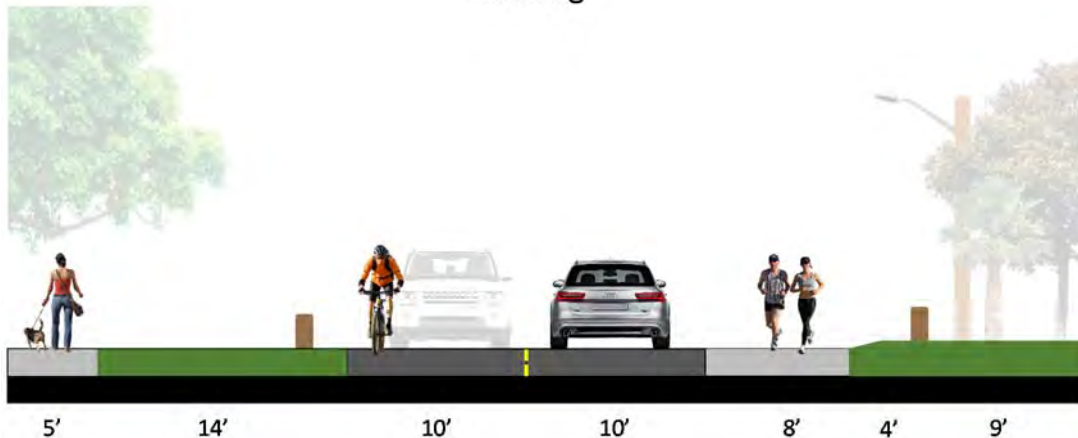
*Intersection Enhancements (Ref. # 2.C)*



## Spruce Street from St Vincent Avenue to MacDill Avenue

### Sidewalk Enhancements (Ref. # 3.C)

Existing



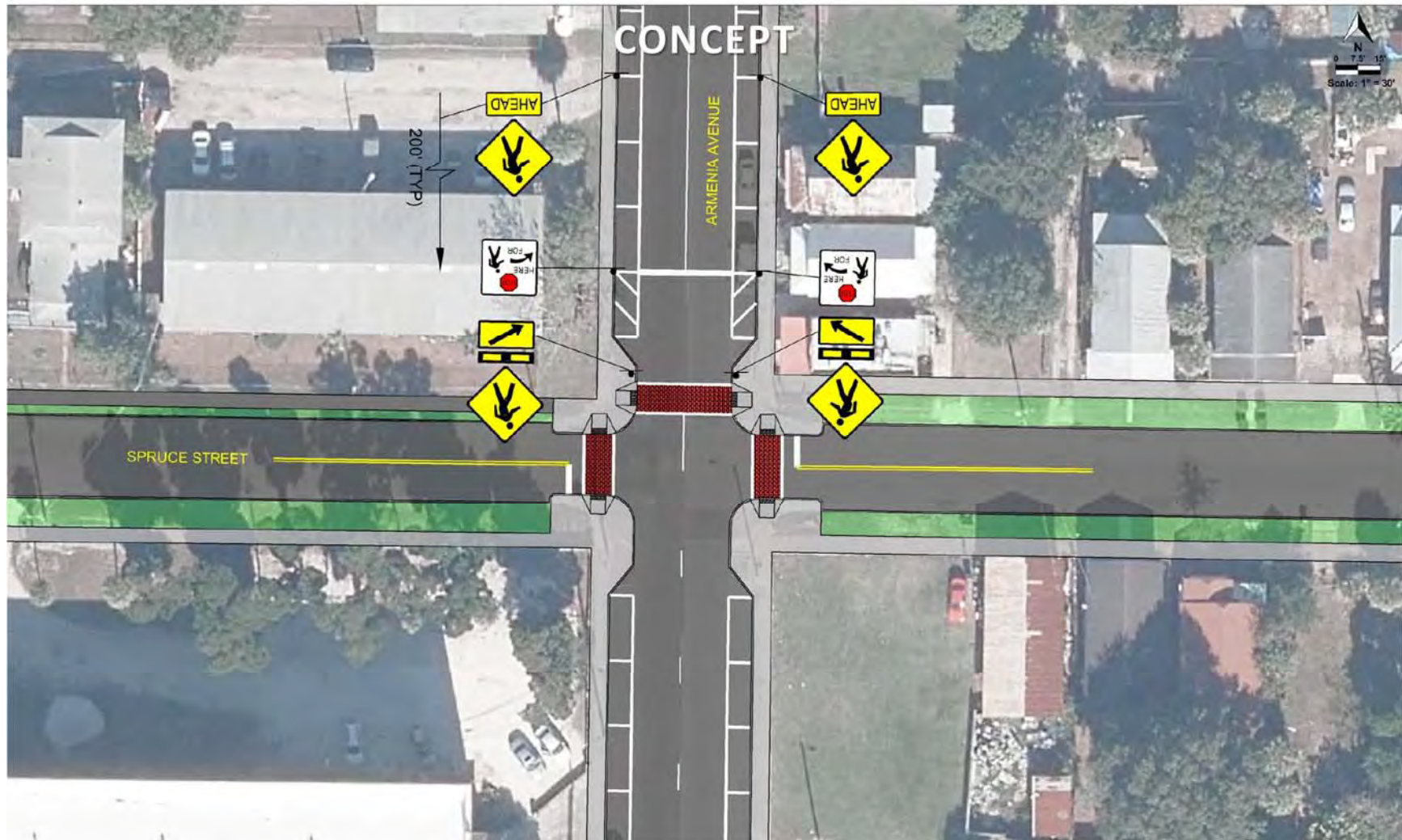
Proposed Concept



Install raised curb and rebuild sidewalk 2' to south using 4' of space between existing sidewalk and bollards. This provides 2' buffer (includes curb) between street and sidewalk and sidewalk and bollards.

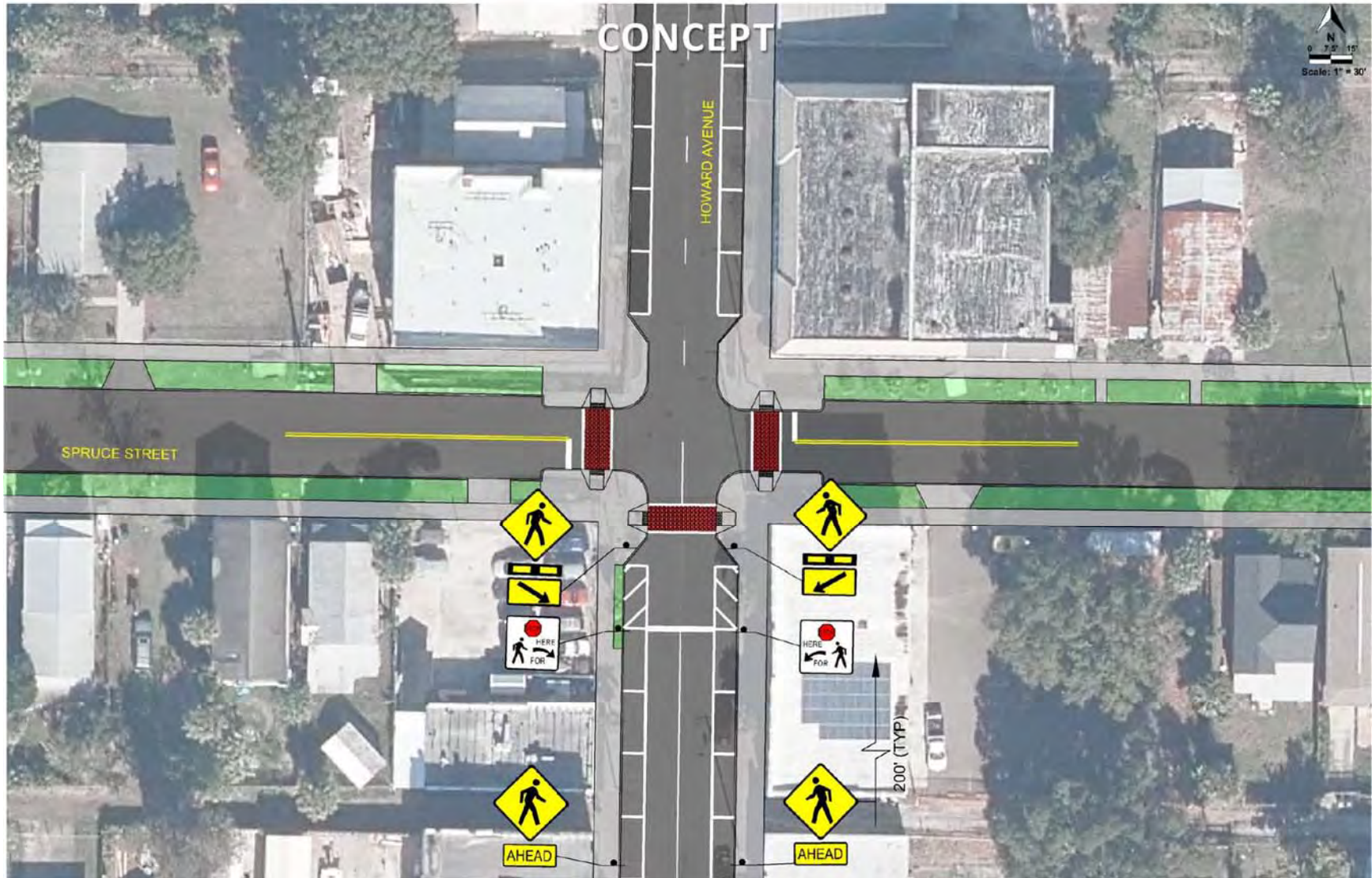
## Spruce Street at Armenia Avenue

### Crossing Enhancements (Ref. # 5.C.iv)



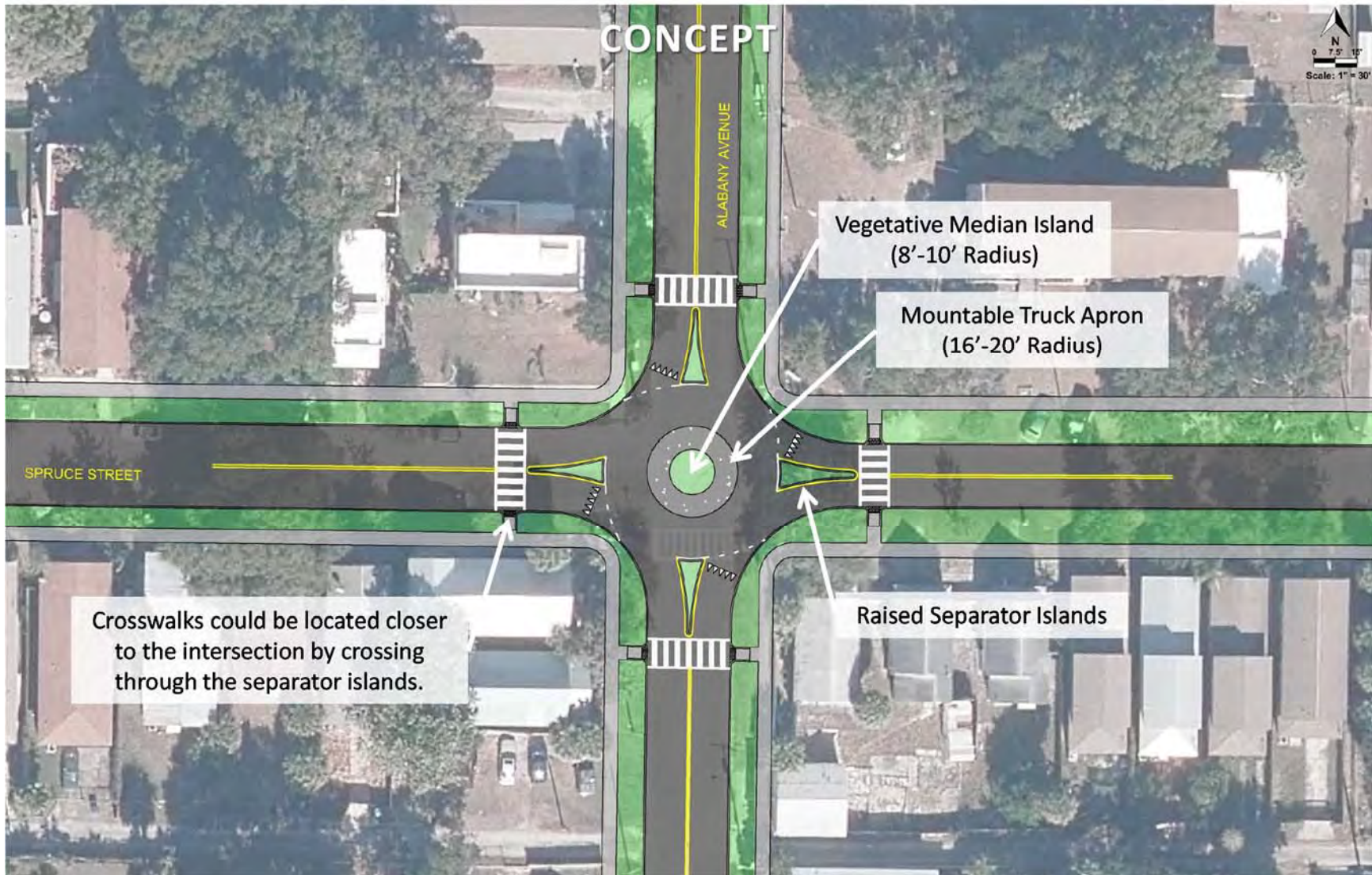
## Spruce Street at Howard Avenue

Crossing Enhancements (Ref. # 6.A.v)



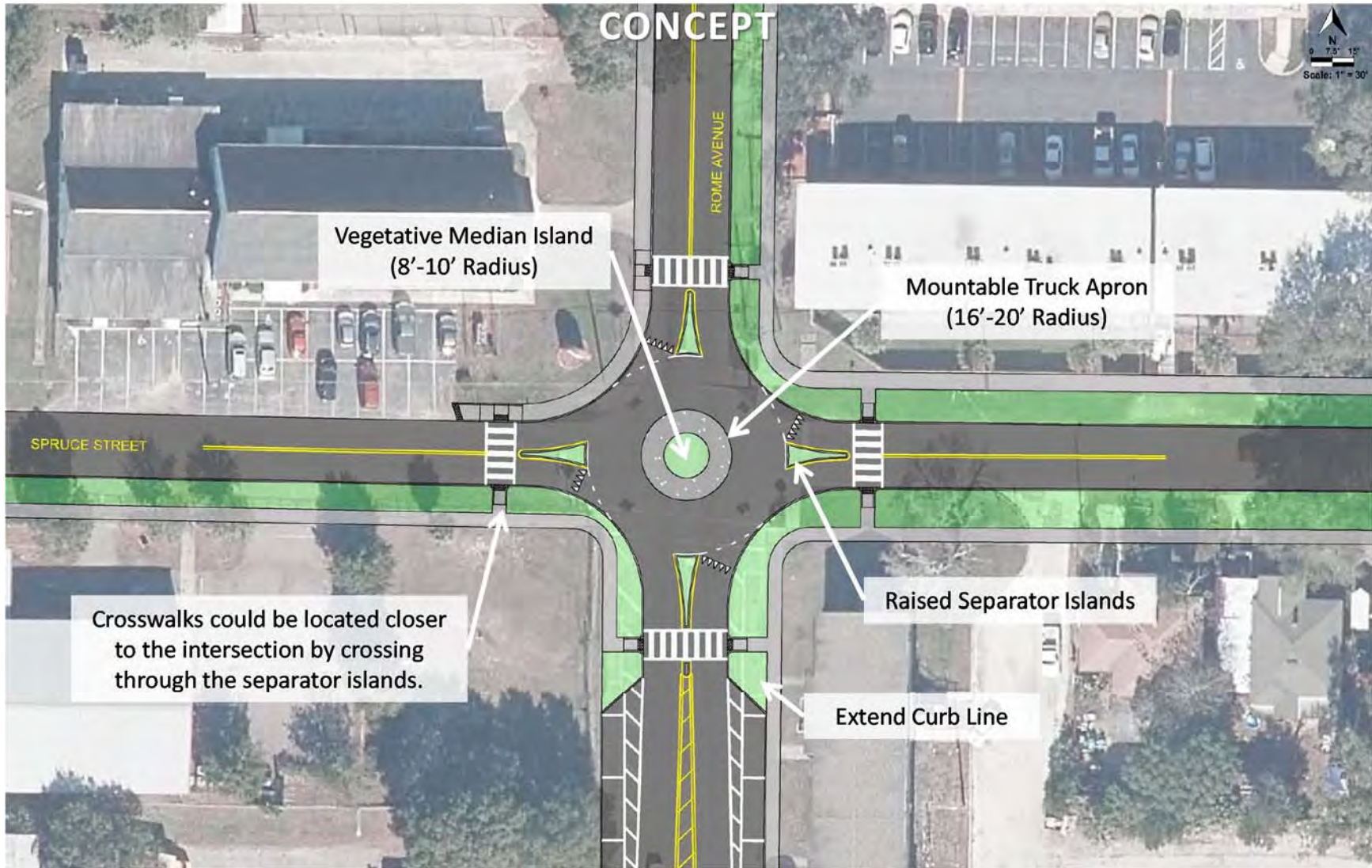
## Spruce Street at Albany Avenue

### Roundabout Concept (Ref. # 6.B.iii)



## Spruce Street at Rome Avenue

Roundabout Concept (Ref. # 7.C.v)





## Appendix B – Feasibility Review and Cost Estimates

Ref.	Location	Description	Feasibility Review	Cost Estimate
1.A	Spruce St at Dale Mabry Hwy	Intersection enhancements including:	Cost estimate does not include potential impacts to drainage	\$ 225,000
1.A.i		<ul style="list-style-type: none"> <li>Consider constructing right-turn channelization islands within the southeast and northwest quadrants of the intersection to reinforce the right-turn only movements from northbound and southbound Dale Mabry Hwy onto Spruce St.</li> <li>During field visits multiple drivers were observed using the right-turn only as a through lane in order to “jump” queues at the intersection, this poses as a potential safety concern, the right-turn islands will help to ensure that the right-turn only lane is used as prescribed. Additionally, the islands will help to reduce pedestrian crossing distance and exposure at the intersection.</li> </ul>		
1.A.ii		<ul style="list-style-type: none"> <li>Consider extending the curb (construct bulb-outs) within the northeast and southwest quadrants of the intersection in conjunction with the construction of the right-turn channelization islands in the northwest and southeast quadrants of the intersection.</li> </ul>		
1.A.iii	Dale Mabry Hwy, west side north of Spruce St	<p>There are marked bike lanes along Dale Mabry Hwy north of Spruce St. The southbound bike lane along Dale Mabry Hwy terminates at the intersection of Spruce St, consider providing a transition between the bike lane and the sidewalk, similar to the bike ramps that are used on the approaches to a roundabout, prior to the development of the right-turn lane keyhole. This transition would provide bicyclists with the option to either stay in the bike lane or move to the sidewalk in order to navigate the ending of the bike lane south of the intersection.</p> <ul style="list-style-type: none"> <li>Consider widening the sidewalk along the west side of Dale Mabry Hwy, to a min. of 8', from the proposed bike lane transition (approx. 560' north of Spruce St) to the intersection of Spruce St and Dale Mabry Hwy to help better facilitate both pedestrian and bicycle traffic along the sidewalk.</li> </ul>	Utilities would need to be verified, coordination with local utilities will be needed to minimize/mitigate potential impacts. Based on aerial reviews could not find any obvious constraints. Would need to make sure that approach to the intersection would not impact the strain pole within the NE corner of the intersection.	
1.A.iv	Spruce St west of Dale Mabry Hwy	The City of Tampa is in the process of identifying operational and safety improvements along Spruce St west of Dale Mabry Hwy that includes the western (eastbound) approach to the intersection. Base on reviews of the City's Preliminary Engineering Report there are no apparent conflicts between the recommendations from this study or the City's report, however coordination on improvements to this intersection should be coordinated.		NA

Ref.	Location	Description	Feasibility Review	Cost Estimate
1.B	Spruce St between Dale Mabry Hwy and Himes Ave	Install shared lane markings (a.k.a. sharrows) along Spruce St; the existing posted speed limit on Spruce St is 25 MPH.		\$ 5,500
1.C	Spruce St between Dale Mabry Hwy and Himes Ave (north side)	<p>Complete the sidewalk along the north side of Spruce St. Evaluate the feasibility of providing a wide (min. 8') sidewalk along the north side of Spruce St. The wide sidewalk could tie-into planned improvements that the City of Tampa has proposed along the north side of Spruce St west of Dale Mabry Hwy. Also, the Westshore Area Pedestrian System Plan has identified the north side of this segment (Manhattan Ave to Himes Ave) for sidewalk improvements and has it listed as the third priority in the priority sidewalk enhancement implementation plan. The following will need to be considered and evaluated further:</p> <ul style="list-style-type: none"> <li>• There are seven wood utility poles within the right-of-way that may need to be relocated.</li> <li>• There are six high-voltage transmission line poles that may need to be mitigated by either implementing a pinch-point treatment (dropping the width of the sidewalk) or by acquiring an easement to route a wider sidewalk around the poles.</li> <li>• Impacts to drainage will need to be considered and evaluated, installing a sidewalk could impact the existing drainage system and could require re-profiling of the drainage swale and/or movement of the existing grate inlets. Consider installing either curb and gutter or a bio-swale with curb as part of the sidewalk installation.</li> <li>• Coordination with other local utilities will be needed to minimize/mitigate potential impacts, during the field review markers for communications and gas lines were observed.</li> <li>• Reconstructing the existing 5' sidewalk to an 8' sidewalk in front of the Chase Bank may necessitate the retainage of some soil at the property line and dropping the elevation of the sidewalk to level with the top of the curb; this may require reconstructing the existing ramp to the entrance of the back as a step-up, if this is the case ADA access to/from Spruce St could be provided via the sidewalk adjacent to the parking lot.</li> </ul>	Cost estimate does not include potential impacts to drainage. Property in the northwest quadrant of the intersection has a paver driveway that extends into the ROW, impacts to this driveway would be anticipated if an 8' sidewalk were to be constructed.	\$ 150,000
1.C.i	Spruce St between Marie Ave and Himes Ave (south side)	If curb and gutter is installed along the north side, also consider installing curb and gutter along the south side where there is currently a grass shoulder.	The roadway cross-slope will need to be evaluated as the introduction of curb and gutter would likely have some drainage impacts.	\$ 20,000
1.D	Spruce St at Himes Ave	Consider rebuilding the existing span-wire signal structure as a mast-arm signal structure that includes intersection lighting as outlined in Chapter 7.3.2.2 of FDOT's Plans Preparation Manual (PPM). Additionally, consider placing the east-west pedestrian signal on automatic recall, there appears to be adequate time to accommodate this pedestrian movement without impacting existing signal timing/phasing.	The cost estimate doesn't not include ROW cost, the acquisition of ROW could have significant impacts on the cost estimate.	\$ 450,000

Ref.	Location	Description	Feasibility Review	Cost Estimate
2.A	Spruce St between Himes Ave and Lincoln Ave	Install shared lane markings (a.k.a. sharrows) along Spruce St; the existing posted speed limit on Spruce St is 25 MPH		\$ 5,500
2.B	Spruce St between Himes Ave and Lincoln Ave	Consider construct a wide sidewalk (min. 8') along the north side of Spruce St; this may require the clearing of right-of-way, including the mitigation of trees that are within or directly adjacent to the right-of-way line. Other consideration include:	Cost estimate does not include cost associated with potential drainage impacts. The relocation of utility poles could account for 20% - 25% of the total project cost, costs could be reduced if poles do not need to be relocated.	\$ 175,000
		<ul style="list-style-type: none"> <li>There are 9 wood utility poles may need to be relocated to accommodate the sidewalk</li> </ul>		
		<ul style="list-style-type: none"> <li>There are 2 high-voltage transmission line poles that may require either a pinch-point treatment or easements to mitigate</li> <li>Evaluate impacts to drainage; there are currently drainage grate inlets located within the right-of-way along with a shallow swale</li> </ul>		
		<ul style="list-style-type: none"> <li>If an 8' sidewalk is not feasible, due to costs to mitigate drainage and/or clearing of right-of-way, evaluate the impacts of a 5' sidewalk.</li> </ul>	Depending on utility impacts the cost estimate for a 5' sidewalk could be anywhere between \$70,000 and \$150,000.	
2.C	Spruce St at Lincoln Ave	Intersection enhancements include:		NA
2.C.i		<ul style="list-style-type: none"> <li>Building-out the curb in the southwest quadrant to accommodate an improved pedestrian landing, shorten pedestrian crossing distance, and to accommodate a pedestrian crossing along the south side of Spruce St across Lincoln Ave</li> </ul>		\$ 7,500
2.C.ii		<ul style="list-style-type: none"> <li>Consider building-out the curb and providing an improved pedestrian landing and curb ramp in the northwest quadrant</li> </ul>		\$ 10,000
2.C.iii		<ul style="list-style-type: none"> <li>Install marked crosswalk along the south side of Spruce St across Lincoln Ave</li> </ul>		\$ 650
2.C.iv		<ul style="list-style-type: none"> <li>Enhance existing crosswalk markings to high-emphasis (ladder) style crosswalk markings</li> </ul>	Cost estimate assumes application of thermoplastic preformed striping, cost could be lower if paint was used in place of thermoplastic	\$ 6,000
2.C.v		<ul style="list-style-type: none"> <li>Evaluate opportunities for additional intersection lighting</li> </ul>		NA

Ref.	Location	Description	Feasibility Review	Cost Estimate
3.A	Spruce St between Lincoln Ave and MacDill Ave	Install shared lane markings (a.k.a. sharrows) along Spruce St; the existing posted speed limit on Spruce St is 25 MPH		\$ 5,500
3.B	Spruce St between Lincoln Ave and St Vincent St	Install sidewalk (5') along the north side of Spruce St	This may require the clearing of ROW, including the mitigation of trees that are within or directly adjacent to the ROW line.	\$ 11,800
3.C	Spruce St between St Vincent St and Jamaica St	<p>There is currently an 8' sidewalk along the south side of Spruce St, however there currently is no physical separation (including curb) between the sidewalk and adjacent travel lane, the sidewalk is level with the travel lane. Explore opportunities to enhance the separation between the sidewalk and travel lane including:</p> <ul style="list-style-type: none"> <li>Consider constructing a curb and raising the sidewalk, the elevation of the shoulder increases south of the existing sidewalk where the existing wooden bollards are located. Evaluate reconstructing the sidewalk slightly to the south in order to provide the raised physical separation and potential a narrow buffer strip between the sidewalk and the eastbound travel lane of Spruce St.</li> </ul>	Drainage impacts should be anticipated with the introduction of raised curb.	\$ 150,000
3.D	Spruce St at MacDill Ave	The traffic signal had recently been upgraded to a mast-arm support and includes LED street lighting in the northwest and southeast quadrants		NA

Ref.	Location	Description	Feasibility Review	Cost Estimate
4.A	Spruce St between MacDill Ave and Habana Ave	Construct a 5' sidewalk along the north side of Spruce St; as with previous segments some trees and vegetation may need to be removed or mitigated, some properties may need to relocate mailboxes, and some private property (e.g., fencing and other landscape materials) may have encroached upon the right-of-way and may need to be removed.	There is a low brick wall that appears to be within the ROW that may need to be removed to accommodate a sidewalk.	\$ 90,000
4.B	Spruce St at Habana Ave	Intersection enhancements that include:		NA
4.B.i		<ul style="list-style-type: none"> <li>Provide crosswalk markings for the crossing on the east side of the intersection, across Spruce St.</li> </ul>		\$ 700
4.B.ii		<ul style="list-style-type: none"> <li>Install westbound stop bar on Spruce St east of Habana Ave</li> </ul>		\$ 100
4.B.iii		<ul style="list-style-type: none"> <li>Construct accessible pedestrian ramp(s) in the northwest quadrant, as part of the sidewalk construction, to accommodate pedestrian crossings.</li> </ul>		NA
4.B.iv		<ul style="list-style-type: none"> <li>Reconstruct the existing (north-south) curb ramp in the southwest quadrant to meet ADA curb ramp standards.</li> </ul>		\$ 1,500
4.B.v		<ul style="list-style-type: none"> <li>Consider providing a marked crossing across Habana Ave along the south side of Spruce St; at a minimum consider providing accessible pedestrian curb ramps to help facilitate east-west movement across Habana Ave.</li> </ul>		\$ 2,500
4.B.vi		<ul style="list-style-type: none"> <li>Consider installing bright-sticks on the Stop sign posts to increase sign visibility at night</li> </ul>		\$ 150
4.B.vii	<ul style="list-style-type: none"> <li>There is an existing overhead street light in the southeast quadrant, while probably not great, lighting is most likely adequate for this intersection.</li> </ul>		NA	

Ref.	Location	Description	Feasibility Review	Cost Estimate
5.A	Spruce St between Habana Ave and Armenia Ave	Construct 5' sidewalk along the north side of Spruce St; right-of-way appears to be fairly clear through this segment with existing 5' sidewalk across the front of a few properties.	Installing sidewalk may require possible embankment or flattening of sidewalk area for a level grade.	\$ 70,000
5.B	Spruce St at Tampania Ave	Intersection Enhancements, including:		NA
5.B.i		<ul style="list-style-type: none"> <li>Provide east-west accessible pedestrian curb ramps along the north side of Spruce St, as part of sidewalk construction, within the northwest and northeast quadrants.</li> </ul>		\$ 1,500
5.B.ii		<ul style="list-style-type: none"> <li>Evaluate installing an east-west pedestrian curb ramp in the southwest quadrant to better facilitate east-west pedestrian crossing across Tampania Ave.</li> </ul>		\$ 1,500
5.B.iii		<ul style="list-style-type: none"> <li>Install bright-sticks to the Stop sign posts to increase sign visibility.</li> </ul>		\$ 150
5.C	Spruce St at Armenia Ave	Intersection enhancements, include the following:		NA
5.C.i		<ul style="list-style-type: none"> <li>Build-out the intersection curb lines to provide full bulb-outs; impacts to drainage will need to be evaluated, but should not be prohibitive. Include pedestrian curb ramps for east-west crossings as part of bulb-out construction.</li> </ul>		\$ 160,000
5.C.ii		<ul style="list-style-type: none"> <li>Existing textured pattern pavement markings are worn and are not very visible to drivers; consider rehabbing pavement markings and adding white parallel edge line crosswalk markings to improve crosswalk visibility.</li> </ul>		\$ 33,000
5.C.iii		<ul style="list-style-type: none"> <li>Evaluate intersection lighting levels and enhance if necessary.</li> </ul>		NA
5.C.iv		<ul style="list-style-type: none"> <li>Consider installing rectangular rapid flashing beacons (RRFBs) to enhance pedestrian crossings across Armenia Ave. If RRFBs are installed consider installing them for the northern east-west crossing and then consider removing the marked crossing along the south side of the intersection.</li> </ul>		\$ 50,000

Ref.	Location	Description	Feasibility Review	Cost Estimate
6.A	Spruce St at Howard Ave	Intersection enhancements include the following:		NA
6.A.i		<ul style="list-style-type: none"> <li>Consider providing a marked pedestrian crossing along the northern leg of the intersection if RRFBs (see item 6.A.v) are not installed for the existing marked crossing on the southern leg of the intersection.</li> </ul>		\$ 9,000
6.A.ii		<ul style="list-style-type: none"> <li>Build-out the intersection curb lines to provide full bulb-outs; impacts to drainage will need to be evaluated, but does not appear to be prohibitive.</li> </ul>		\$ 160,000
6.A.iii		<ul style="list-style-type: none"> <li>Textured pattern pavement markings are worn and are not very visible to drivers; consider rehabbing pavement markings and adding white parallel crosswalk markings to improve crosswalk visibility.</li> </ul>		\$ 33,000
6.A.iv		<ul style="list-style-type: none"> <li>Evaluate intersection lighting levels and enhance if necessary.</li> </ul>		NA
6.A.v		<ul style="list-style-type: none"> <li>Consider installing rectangular rapid flashing beacons (RRFBs) to enhance pedestrian crossing across Howard Ave. If RRFBs are installed consider installing them for the southern (east-west) crossing and then consider removing the marked crosswalk along the north side of the intersection.</li> </ul>		\$ 50,000
6.B	Spruce St at Albany Ave	Intersection enhancements including:		NA
6.B.i		<ul style="list-style-type: none"> <li>Provide a marked north-south crossing along the west side of the intersection</li> </ul>		\$ 800
6.B.ii		<ul style="list-style-type: none"> <li>Install bright-sticks to the Stop sign posts to increase sign visibility</li> </ul>		\$ 150
6.B.iii		<ul style="list-style-type: none"> <li>As a longer-term alternative consider reconstructing the intersection as a modern small single lane roundabout.</li> </ul>	Appears that a small roundabout could be accommodated within the existing ROW, if ROW is needed, the costs could be significantly higher.	\$ 100,000



Ref.	Location	Description	Feasibility Review	Cost Estimate
7.A	Spruce St between Albany Ave and Rome Ave	Construct 5' sidewalk along the north side of Spruce St; there may be some items within the right-of-way that will need to be mitigated, including utility poles, trees, landscaping, mailboxes, fences, and other private property items.		\$ 150,000
7.B	Spruce St at Fremont Ave	Consider providing wayfinding signage guiding people along Spruce St to the Fremont Ave Linear Park trail located at the north end of Fremont Ave approximately 130 feet north of Spruce St.		\$ 700
7.C	Spruce St at Rome Ave	Intersection enhancements including:		NA
7.C.i		<ul style="list-style-type: none"> <li>Crosswalk markings across Rome Ave on the southern leg of the intersection are showing signs of wear, consider replacing the existing markings with high-emphasis crosswalk markings.</li> </ul>	Cost estimate is for thermoplastic preformed striping, cost could be reduced if paint is used.	\$ 3,000
7.C.ii		<ul style="list-style-type: none"> <li>Install bright-sticks to the Stop sign posts to increase sign visibility at night</li> </ul>		\$ 150
7.C.iii		<ul style="list-style-type: none"> <li>Evaluate intersection lighting conditions, the only existing overhead street light is located in the northeast corner of the intersection, enhance if necessary</li> </ul>		NA
7.C.iv		<ul style="list-style-type: none"> <li>Provide (high-emphasis) crosswalk markings across the remaining legs of the intersection.</li> </ul>	Cost estimate is for thermoplastic preformed striping, cost could be reduced if paint is used.	\$ 5,000
7.C.v		<ul style="list-style-type: none"> <li>Evaluate building-out the curbs in the southeast and southwest quadrants to develop bulb-outs along Rome Ave south of Spruce St. The bulb-outs would shorten pedestrian crossing distances, provide better visibility for pedestrians, and could help to define the on-street parking areas along Rome Ave south of Spruce St.</li> </ul>		\$ 70,000
		<ul style="list-style-type: none"> <li>Alternatively, evaluate the potential for a modern small single lane roundabout at this intersection.</li> </ul>	Appears that a small roundabout could be accommodated within the existing ROW, if ROW is needed, the costs could be significantly higher.	\$ 100,000