



## Corridor Study Report

### Rock Springs Road From Welch Road to Lester Road

Prepared for:  
**MetroPlan Orlando**

Prepared by:  
Vanasse Hangen Brustlin, Inc.  
225 East Robinson Street, Suite 300  
Orlando, FL 32801

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## Introduction

MetroPlan Orlando is conducting an Access Management Study for Rock Springs Road from Welch Road to Lester Road (approximately 0.55 miles) and an Intersection Study at the Sandpiper Street and Park Avenue intersection.

The Intersection Study includes the addition of sidewalks to the south side of Sandpiper Street, east of Park Avenue to Ustler Road (approximately 0.5 miles); and to the north side of Sandpiper Street, west of Park Avenue to Lake Avenue (approximately 0.24 miles).

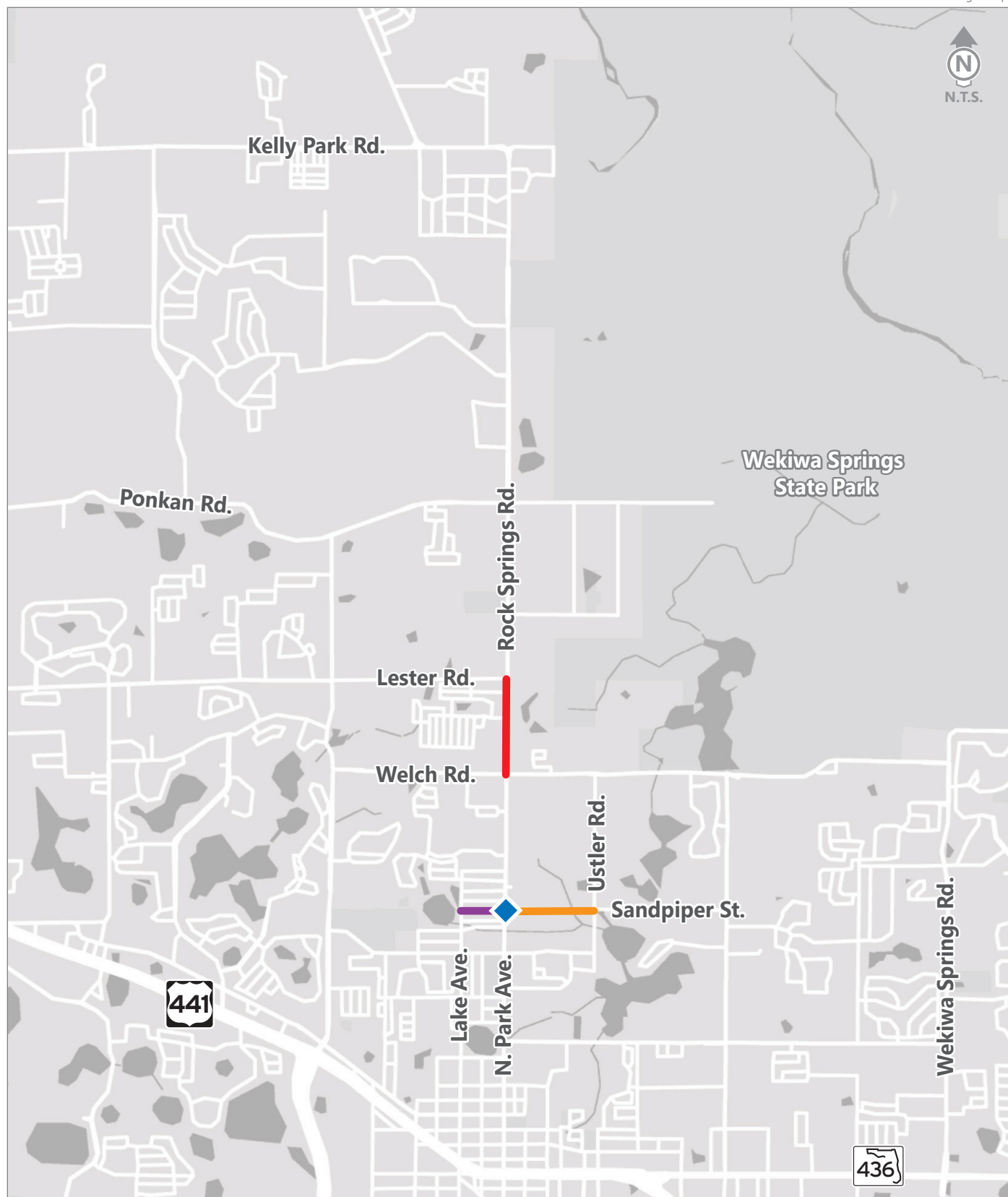
The study area is located within Orange County and in the city boundary of the City of Apopka. The study area location map is shown in **Figure 1**.

## Purpose and Need

The purpose of this study is to evaluate safety and access improvements at the intersection of Rock Springs Road and Welch Road, and along the half-mile of Rock Springs Road from Welch Road to Lester Road. The study also includes an intersection analysis and evaluation for the realignment of the intersection of Sandpiper Street with Park Avenue and recommends improvements to the studied facilities.

A Level of Service (LOS) Analysis was conducted for the study area intersections as part of the *Design Traffic Technical Memorandum* (DTTM) (under separate cover). The analysis shows that operations at the intersection of Rock Springs Road with Welch Road are failing under existing conditions. The target LOS for the study intersections and roadways is LOS E and the intersection operates at LOS D and LOS F during the AM and PM peak hours, respectively. The westbound through lane and westbound right-turn lane operate at LOS F with a volume to capacity (v/c) ratio greater than one during both AM and PM peak periods. The volume to capacity (v/c) ratio is a measure of congestion, it is the ratio of hourly traffic to capacity for a transportation facility. A v/c ratio greater than one indicates there is more vehicle volume on this facility than it has capacity to effectively serve. The southbound left turn 95<sup>th</sup> percentile queues extended beyond the Publix South access (~300 feet north of the intersection) during both AM and PM peak hours.

Additionally, the study shows that the minor street approaches are failing at the intersection of Sandpiper Street with Park Avenue in both the AM and PM peak hours.



- Access Management Study - Lester Rd to Welch Rd.
- ◆ Intersection Improvements - Park Ave / Sandpiper St.
- Sidewalk - north side of W Sandpiper St.
- Sidewalk - south side of E Sandpiper St.



**Figure 1**

**Study Area Location**  
Rock Springs Road

Access Management Study

## Conformance with Transportation Plans and Long-Range Plans

As of August 2022, no future phases of the Rock Springs Road Access Management Study are funded within MetroPlan Orlando's most recently adopted Metropolitan Transportation Plan or Transportation Improvement Plan. The intersection improvements at the intersection of Sandpiper Street with Park Avenue are currently in design by the City of Apopka. Funding for construction has been allocated by the City of Apopka in Fiscal Year (FY) 2023.

Other planned transportation improvements in the vicinity of the study area include:

- West Orange Trail Phase 4 Trail Extension Study
  - The trail extension study will evaluate the feasibility of extending the West Orange Trail along the following three corridors:
    - Rock Springs Road from Lester Road to Kelly Park Road
    - Welch Road from Rock Springs Road to the Wekiwa Springs State Park entrance
    - Ponkan Road from west of Jason Dwellley Parkway to Rock Springs Road
  - The trail extension study is being conducted in parallel with this Access Management and Intersection Improvement study, under separate cover.

## Existing Conditions

The existing conditions of the Rock Springs Road corridor are briefly summarized in the following sections. Additionally, where applicable, the existing conditions of Sandpiper Street are also provided.

### Roadway Characteristics

Within the project limits, Rock Springs Road from Welch Road to Lester Road and Park Avenue at Sandpiper Street is a four-lane divided urban major collector with a two-way left turn lane (TWLTL). The existing roadway characteristics of Rock Springs Road / Park Avenue and Sandpiper Street that are relevant to this study are shown in **Table 1** and **Table 2**, respectively, with additional information presented in the subsections below.

Table 1 | Roadway Characteristics of Rock Springs Road / Park Avenue Corridor

Characteristic	Observation
Roadway Maintaining Agency	Rock Springs Road: Orange County Park Avenue: Orange County
Functional Classification	Urban Major Collector
Level of Service (LOS) Target	LOS E
Posted Speed Limit	45 miles per hour (mph)
Jurisdiction	Orange County
Signalized Study Intersections from south to north	Welch Road Lester Road
Land Use	Residential and Commercial
Lane Width	11 to 12 feet
Median	TWLTL, 12 to 14 feet
Sidewalks	5-foot-wide concrete sidewalk on west side of the roadway
Shared Use Path and Bike Lanes	12 to 14-foot-wide asphalt trail on east side of the roadway / no bike lanes
Access Management Type	Non-Restrictive

Table 2 | Roadway Characteristics of Sandpiper Street Corridor

Characteristic	Observation
Roadway Maintaining Agency	City of Apopka
Functional Classification	Urban Local Road
LOS Target	LOS E
Posted Speed Limit	25 mph - Lake Avenue to Park Avenue 40 mph - Park Avenue to Ustler Road
Jurisdiction	City of Apopka
Study Intersection	Park Avenue (Orange County Jurisdiction)
Land Use	Residential, Public, and Industrial
Lane Width	12 feet
Median	None
Sidewalks	West of Park Avenue: 4-foot-wide concrete sidewalk on south side of the roadway East of Park Avenue: 5-foot-wide concrete sidewalk on north side of the roadway
Shared Use Path and Bike Lanes	None
Access Management Type	Non-Restrictive

### Transit Routes

Transit in Orange County is operated by LYNX. There are no transit routes running along Rock Springs Road between Welch Road and Lester Road, but LYNX Route 405 runs eastbound on Welch Road west of Rock Springs Road, turning south at the intersection with Rock Springs Road and running through the intersection with Sandpiper Street. The LYNX route map for this bus route can be found in **Appendix A**.

### Transit Stop Accommodations

There are no bus stops on Rock Springs Road between Welch Road and Lester Road; however, there are three bus stops on Park Avenue between Welch Road and Sandpiper Street. There is one bus stop 500 feet west of the intersection of Rock Springs Road and Welch Road on the south side of Welch Road. The bus stop has a landing pad, bench, and trash receptacle but no shelter or connection to sidewalk.

The nearest bus stop to Sandpiper Street is approximately 1,000 feet north of the intersection, located on the west side of Park Avenue between Nightingale Street and Thrush Street. The bus stop has a landing pad and bench but no shelter or trash receptacle.

### Sidewalks

There is a 5-foot-wide concrete sidewalk present along the west side of Rock Springs Road throughout the entire length of the study area. The sidewalk is separated from the roadway by a 3-foot-wide utility strip. There is a 5-foot-wide concrete sidewalk along the south side of Welch Road both east and west of Rock Springs Road and along the north side of Welch Road east of the intersection that each connect into the signalized intersection. Lester Road, at the intersection with Rock Springs Road, has a 5-foot-wide concrete sidewalk on the north side and an 11-foot-wide trail on the south side of the corridor.



A 4-foot-wide sidewalk is present on the south side of Sandpiper Street from Lake Avenue to Park Avenue, and a 5-foot-wide sidewalk is present on the north side of Sandpiper Street from Park Avenue to Ustler Avenue.

### Multi-Use Trail

A 14-foot-wide asphalt trail is present on the east side of Rock Springs Road throughout the length of the study area. The multi-use trail is separated from the roadway by a 4-foot-wide utility strip. The multi-use trail is part of the West Orange Trail system that currently terminates at the Lester Road and Rock Springs Road intersection.

### Bicycle Facilities

There are no paved shoulders or designated bicycle lanes on either side of Rock Springs Road or Sandpiper Street throughout the study area.

### Lighting

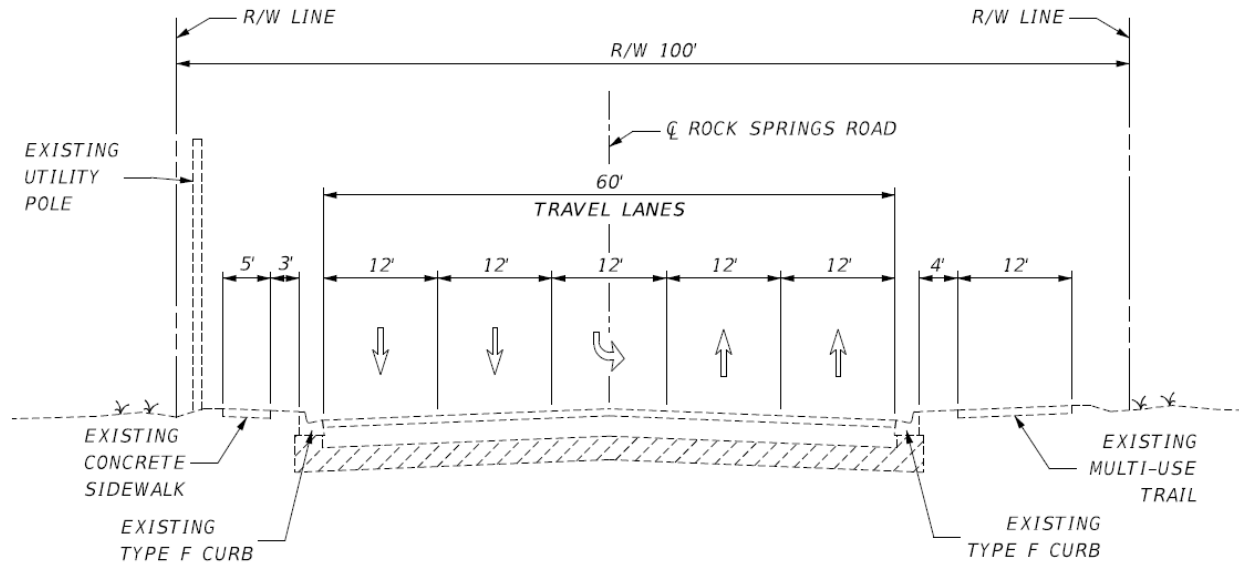
From Welch Road to Lester Road, lighting is present on both sides of Rock Springs Road. The lighting fixtures along the corridor are light-emitting diode (LED) cantilever lights mounted to either pre-existing utility poles (on the west side of the roadway), or to lighting poles (on the east side of the roadway) and spaced at regular intervals of approximately 150 feet. The intersection with Welch Road has shoebox light fixtures mounted to the mast arm support poles on all four corners. The intersection with Lester Road does not have any additional lighting.

The intersection of Park Avenue with Sandpiper Street has one LED cantilever light mounted to a pre-existing utility pole on the southeast corner of the intersection; additionally, there is a shoebox cantilever light mounted to a pre-existing utility pole on the north side of Sandpiper Street approximately 100 feet west of the intersection.

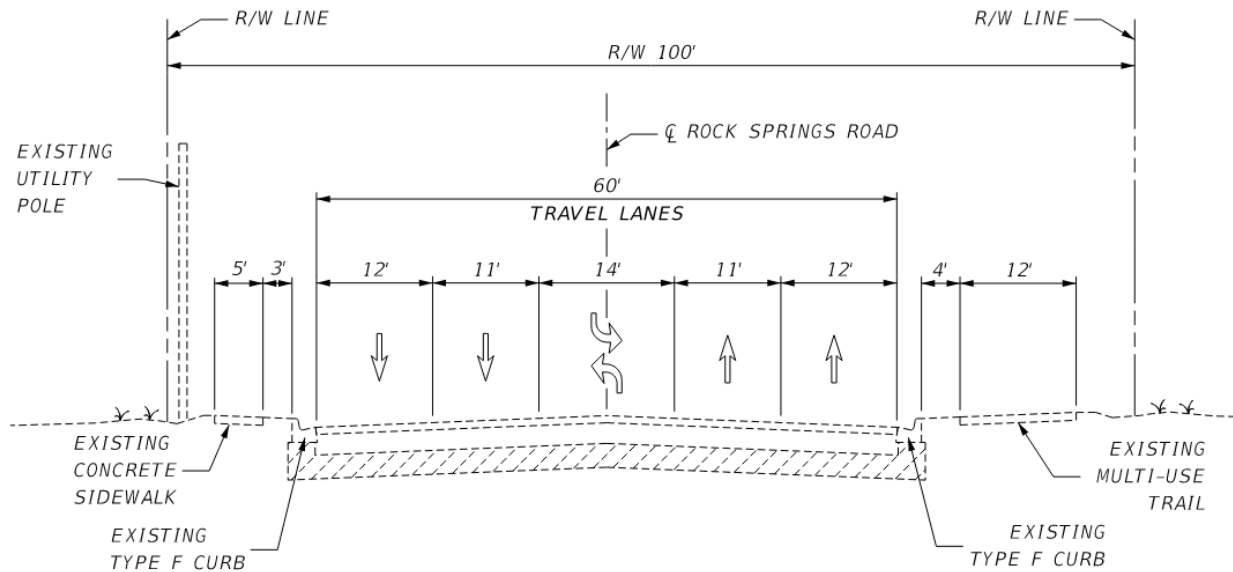
### Typical Sections

The existing typical sections for Rock Springs Road are shown in **Figure 2** through **Figure 5**. The existing typical sections for Welch Road are shown in **Figure 6** through **Figure 9**. Furthermore, the existing typical sections for Sandpiper Street are shown in **Figure 10** and **Figure 11**.

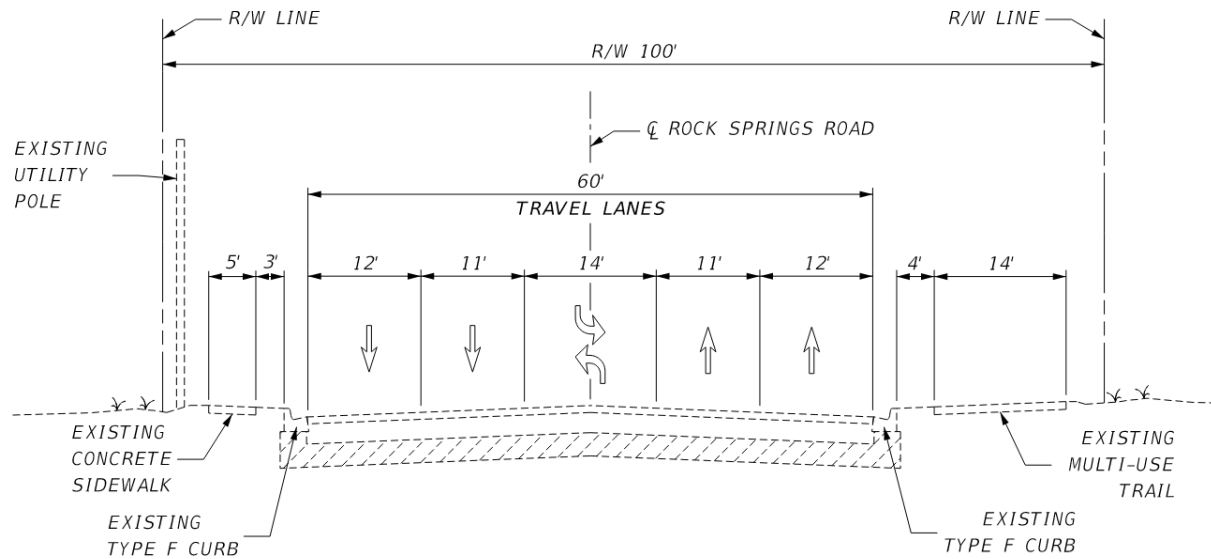
**Figure 2 | Existing Typical Section – Rock Springs Road from Welch Road to 360 feet north of Welch Road**



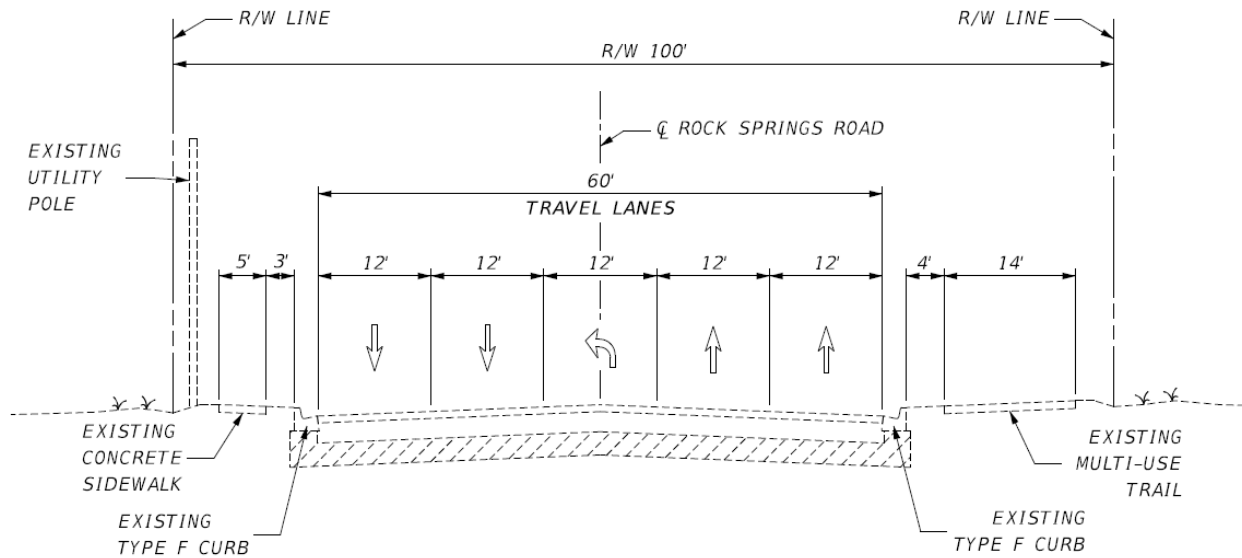
**Figure 3 | Existing Typical Section – Rock Springs Road from 360 feet north of Welch Road to 1,000 feet north of Welch Road and Park Avenue near Sandpiper Street**



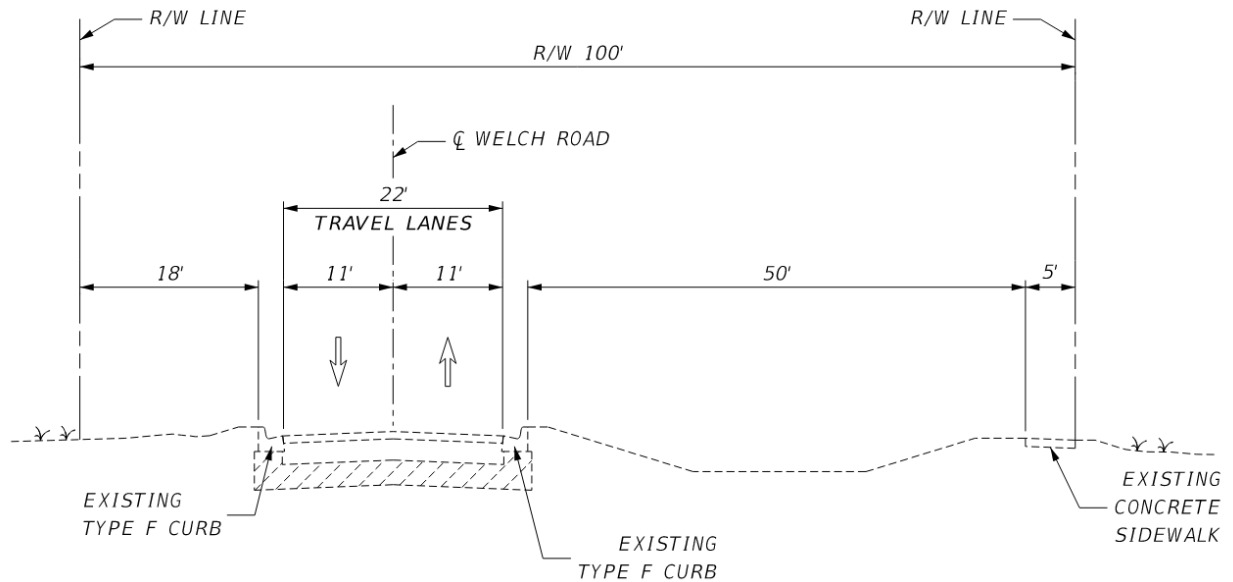
**Figure 4 | Existing Typical Section – Rock Springs Road from 1,000 feet north of Welch Road to Tahoe Street**



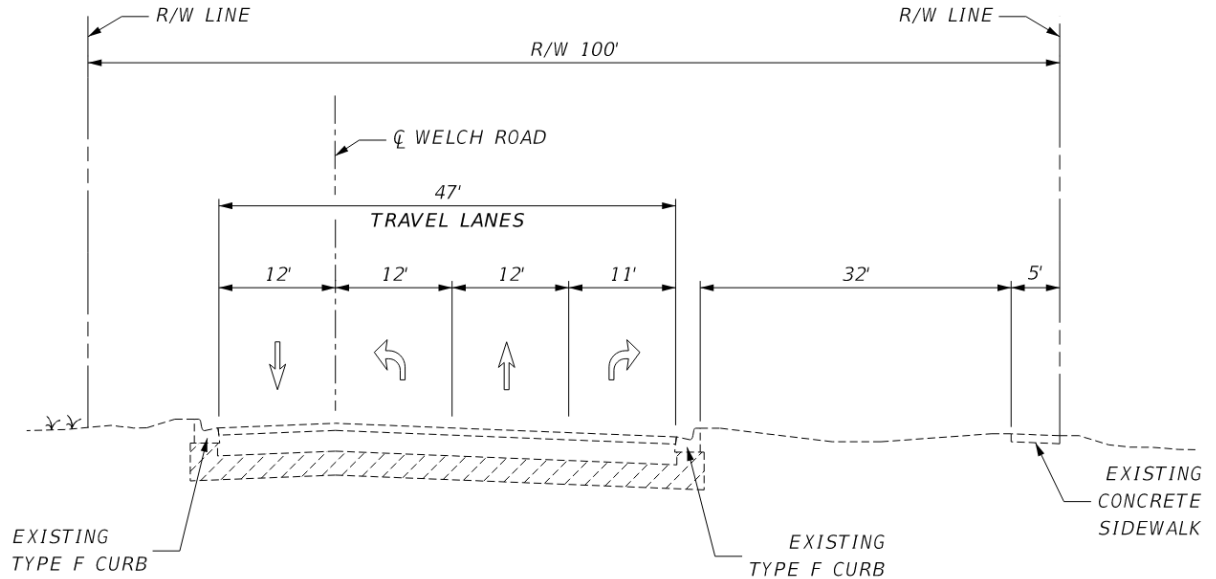
**Figure 5 | Existing Typical Section – Rock Springs Road from Tahoe Street to Lester Road**



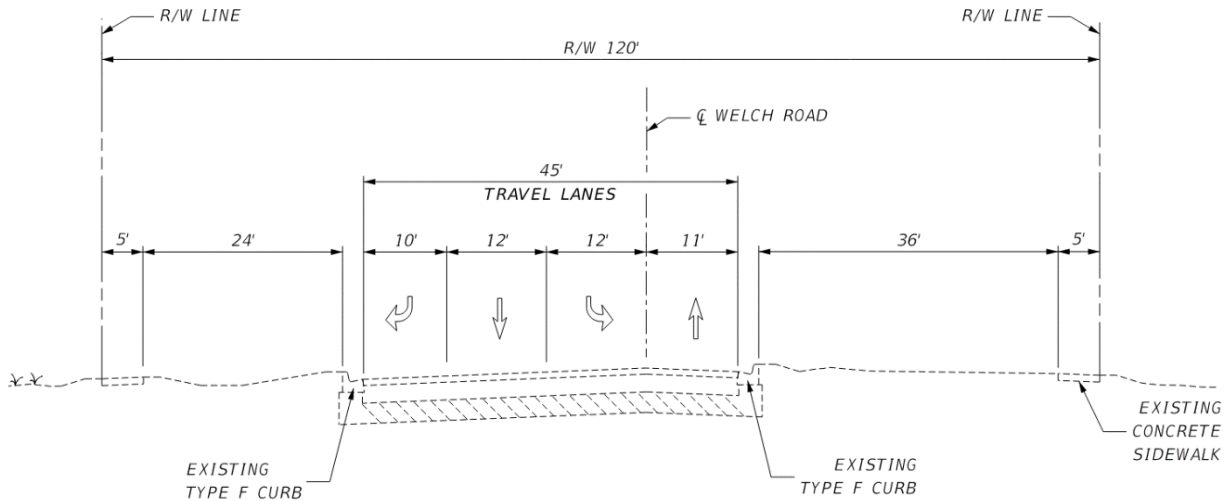
**Figure 6 | Existing Typical Section – Welch Road from 1150 feet west of Rock Springs Road to 400 feet west of Rock Springs Road**



**Figure 7 | Existing Typical Section – Welch Road from 400 feet west of Rock Springs Road to Rock Springs Road**



**Figure 8 | Existing Typical Section – Welch Road from Rock Springs Road to 280 feet east of Rock Springs Road**



**Figure 9 | Existing Typical Section – Welch Road from 280 feet east of Rock Springs Road to 1350 feet east of Rock Springs Road**

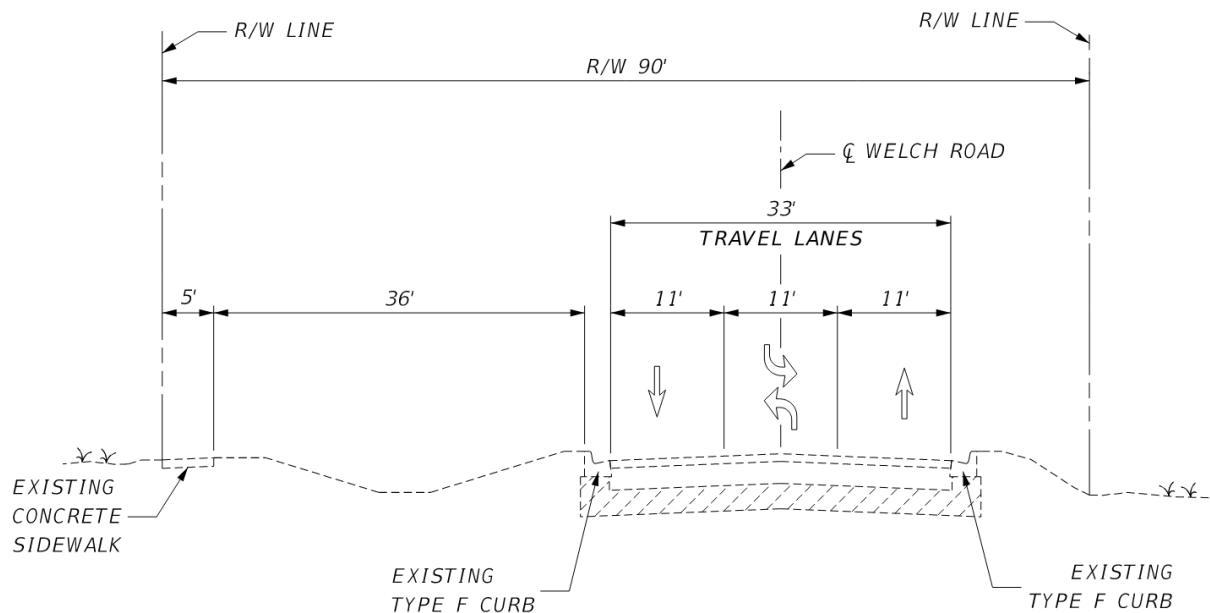


Figure 10 | Existing Typical Section – Sandpiper Street west of Park Avenue

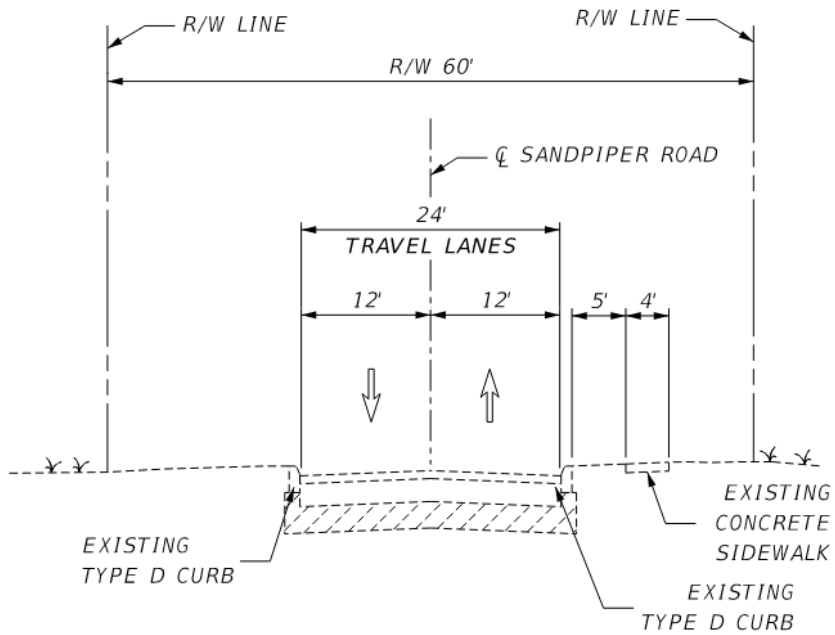
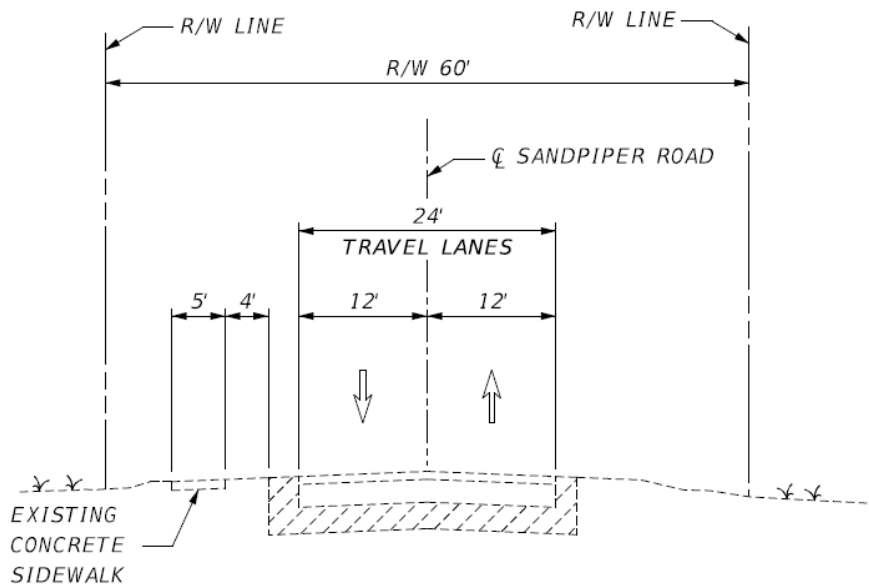


Figure 11 | Existing Typical Section – Sandpiper Street east of Park Avenue





## Drainage Type

The existing drainage along Rock Springs Road is a closed system with curb and gutter. Welch Road in the vicinity of the Rock Springs Road intersection is a closed system with curb and gutter. The existing drainage along Sandpiper Street consists of overland flow east of Park Avenue, and west of Park Avenue is a closed system with curb and gutter.

## Intersections

The following intersections were analyzed as part of this corridor study:

- Park Avenue at East/West Sandpiper Street (two-way stop controlled)
- Park Avenue at West Nightingale Street (two-way stop controlled)
- Rock Springs Road at Welch Road (signalized)
- Rock Springs Road at the southern Publix Plaza entrance (two-way stop controlled)
- Rock Springs Road at the northern Publix Plaza entrance (two-way stop controlled)
- Rock Springs Road at Tanglewood Drive (two-way stop controlled)
- Rock Springs Road at Vista Crest Drive (two-way stop controlled)
- Rock Springs Road at Seaflower Street (two-way stop controlled)
- Rock Springs Road at Tahoe Street (two-way stop controlled)
- Rock Springs Road at Lester Road (signalized)

A detailed analysis of the existing and future traffic operations at each intersection is included in the *DTTM*, under separate cover.

## Pedestrian Accommodation at Signalized Intersections

There are two signalized intersections within the study area:

- Rock Springs Road at Welch Road
- Rock Springs Road at Lester Road

Both signalized intersections have special emphasis crosswalks across all approaches (with the exception of the west leg at Welch Road, where recent repaving has resulted in the crosswalk being changed from special emphasis to regular) and pedestrian phases in the signal timing plans. At the southeast corner of Welch Road, the West Orange Trail is connected to the crosswalks over the south and east legs of the intersection by a short segment of 5-foot-wide sidewalk. Trail users are provided a crossing over the south leg at the Lester Road intersection to a bicycle and pedestrian path along the south side of Lester Road connecting to Vick Road.

## Schools and Public Facilities

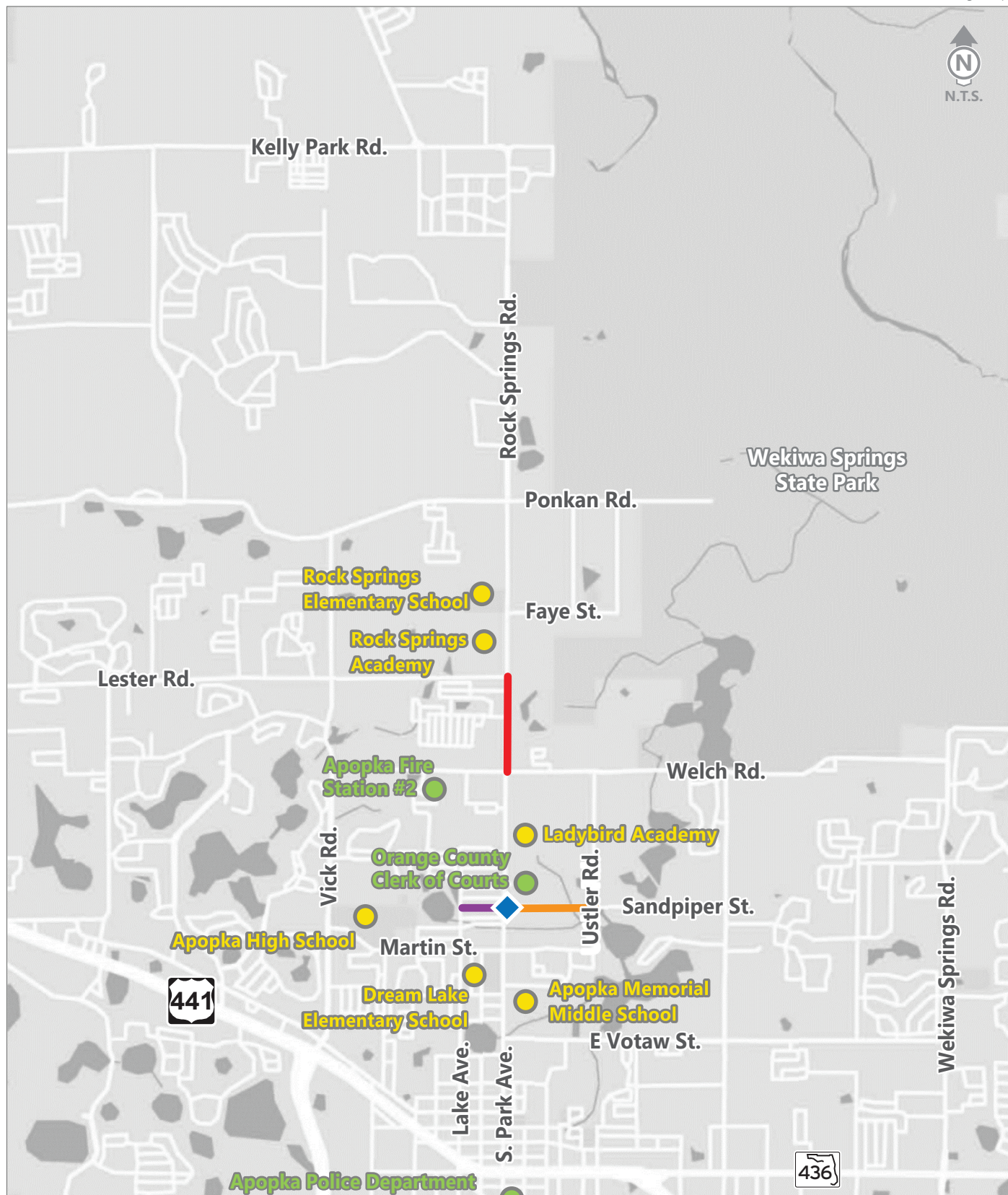
There are no schools located within the study area, however signing and pavement markings at the intersection with Welch Road indicate that the intersection is a school crossing (particularly at the crosswalk across the northern leg). Additionally, there are two schools located within one mile of the Rock Springs Road study area and four schools located within one mile of the Sandpiper Street study area. **Table 3** provides a summary of the locations and age groups served by each school.

Table 3 | Schools Near Study Area

School	Location	Age Group
Rock Springs Academy	Rock Springs Road @ Alexandria Place Drive – Southwest corner	2 years old – 4 years old
Rock Springs Elementary School	Rock Springs Road @ Wekiva Pointe Circle – Southwest corner	Kindergarten – 5 <sup>th</sup> Grade
Dream Lake Elementary School	Park Avenue @ Summit Street – Northwest corner	Kindergarten – 5 <sup>th</sup> Grade
Apopka Memorial Middle School	Park Avenue @ Lake McCoy Drive – Southeast corner	6 <sup>th</sup> Grade – 8 <sup>th</sup> Grade
Apopka High School	Vick Road @ Martin Street – Northwest corner	9 <sup>th</sup> Grade – 12 <sup>th</sup> Grade
Lady Bird Academy	Park Avenue @ Nancy Lee Lane – Northeast corner	6 weeks old – 5 years old (Summer Camp for 5 to 12 years old)

The Apopka Fire Station #2 is located on the south side of Welch Road approximately 1,500 feet west of the Rock Springs Road intersection. The Apopka Police Department is located on the east side of Park Avenue approximately 1.70 miles south of the Sandpiper Street intersection. The Orange County Clerk of Courts is located on the east side of Park Avenue, between the intersections of Wekiva Pines Boulevard and East Nancy Lee Lane.

The locations of the schools and public facilities near the study area are shown in **Figure 12**.



- Access Management Study - Lester Rd to Welch Rd.
- ◆ Intersection Improvements - Park Ave / Sandpiper St.
- Sidewalk - north side of W Sandpiper St.
- Sidewalk - south side of E Sandpiper St.
- School
- Public Facility



**Figure 12**

**Schools and Public Facilities  
Location Map**  
Rock Springs Road  
Access Management Study



## Railroad Crossings

There are no railroad crossings or railroad tracks located within one mile of the study area.

## Structures

There are no bridges or other structures within the Rock Springs Road study limits.

## Access Management Classification

The Florida Department of Transportation (FDOT) classifies access on state roadways using a seven-tier access management system established in Chapter 14-97, Administrative Rule of the Department of Transportation, State Highway System Access Management Classification System and Standards (Rule 14-97). The classification system ranges from Access Class 1, reserved for limited access freeway, to Access Class 7, assigned to lower priority state highways in areas that are already highly urbanized. This classification system assigns standards for driveway connections, spacing, median opening spacing, and signal spacing.

Rock Springs Road / Park Avenue and Sandpiper Street are not officially assigned FDOT Access Classes. However, both roadways fit the guidelines for classification as Access Class 6.

According to Rule 14-97; Access Class 6 roadways are controlled access facilities where adjacent land has been extensively developed, and the probability of major land use change is not high. These roadways are distinguished by existing or planned non-restrictive medians or centerlines.

The spacing requirements for Access Class 6 are shown in **Table 4**.

**Table 4 | Access Class 6 Spacing Requirements**

	Signal	Connection	
		≤45mph	>45mph
Minimum Spacing (feet)	1,320	245	440

Source: Administrative Rule of the Department of Transportation, Rule 14-97

## Zoning

Zoning data for the study area was provided by the City of Apopka and Orange County. Zoning within the study area is primarily residential with some commercial zoning. Zoning maps for the study area are included in **Appendix C**.

## Right-of-Way

The right-of-way (ROW) was identified for the study area using the following two sources:

- For Rock Springs Road and Park Avenue: FDOT ROW maps obtained from the FDOT District 5 Survey and Mapping Unit.
- For Sandpiper Street: Orange County Property Appraiser parcel records.

Rock Springs Road from Welch Road to Lester Road has a ROW width of 100 feet. At Sandpiper Street, Park Avenue has a ROW width of 80 feet south of the intersection, and 84 feet north of the intersection.

Sandpiper Street from Lake Avenue to Park Avenue and from Park Avenue to Ustler Road has a ROW of 60 feet. The ROW maps for Rock Springs Road and Park Avenue are included in **Appendix C**.

## Land Use and Context Classification

### Land Use

The existing and future land uses, as shown in **Figure 13** and **Figure 14**, within 300 feet of the corridor, were analyzed and the results of the analysis are displayed in **Table 5** and **Table 6**, respectively. The discrepancy in the total acreage for existing and future land uses is due to slight differences in mapping the land uses by the different agencies.

Based on the analysis of existing land use and future land use it has been determined that the future development around the study area can primarily be expected to remain residential. Residential currently makes up 48.6% of the existing land use, but it is projected to make up 76.8% of the future land use in the area. Industrial land uses are expected to decrease in the future from 6.6% to 0.6%. Commercial/Retail/Office land uses are expected to decrease from 25.7% to 20.0%.

Table 5 | Generalized Existing Land Use

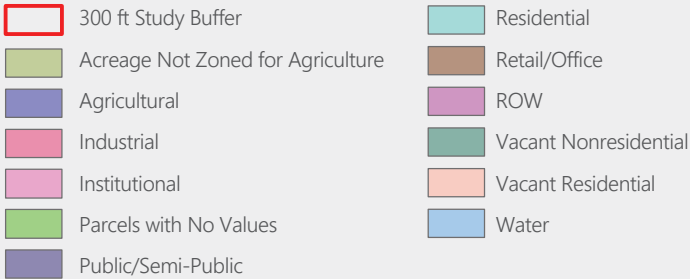
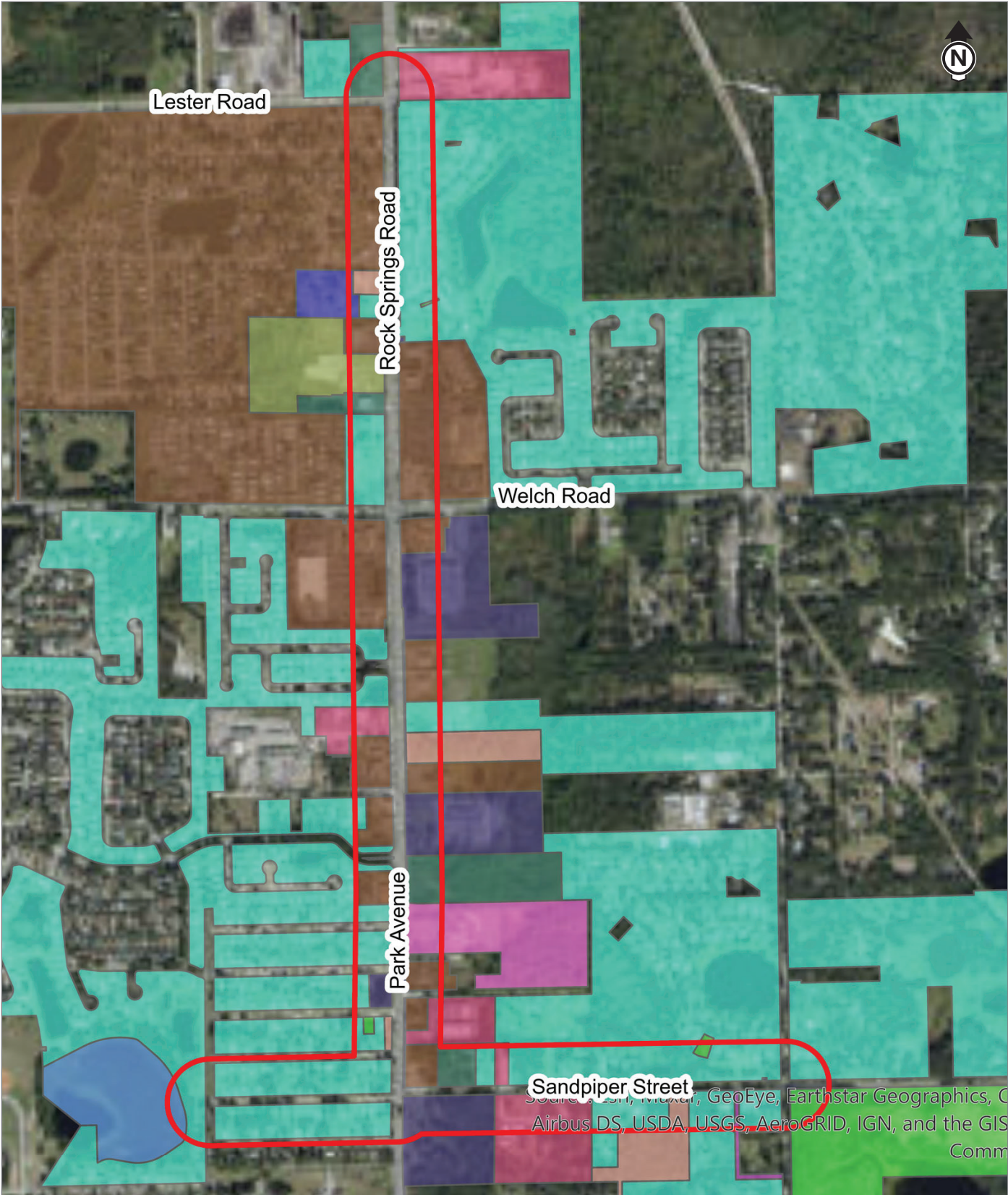
General Land Use	Parcel Count	Acres (within 300 feet)	Percent Total
Acreage not Zoned for Agriculture	1	1.497	1.2%
Agricultural	1	0.395	0.3%
Industrial	5	8.177	6.6%
Institutional	1	1.974	1.6%
Public / Semi-Public	8	11.893	9.5%
Residential	23	57.598	46.1%
Retail / Office	13	32.065	25.7%
ROW	1	0.210	0.2%
Vacant Nonresidential	8	7.176	5.7%
Vacant Residential	4	3.128	2.5%
Water	1	0.712	0.6%
<b>Total</b>	<b>66</b>	<b>124.825</b>	<b>100%</b>

Source: GeoPlan Florida's Generalized Land Use Data for Florida (2018).

Table 6 | Future Land Use

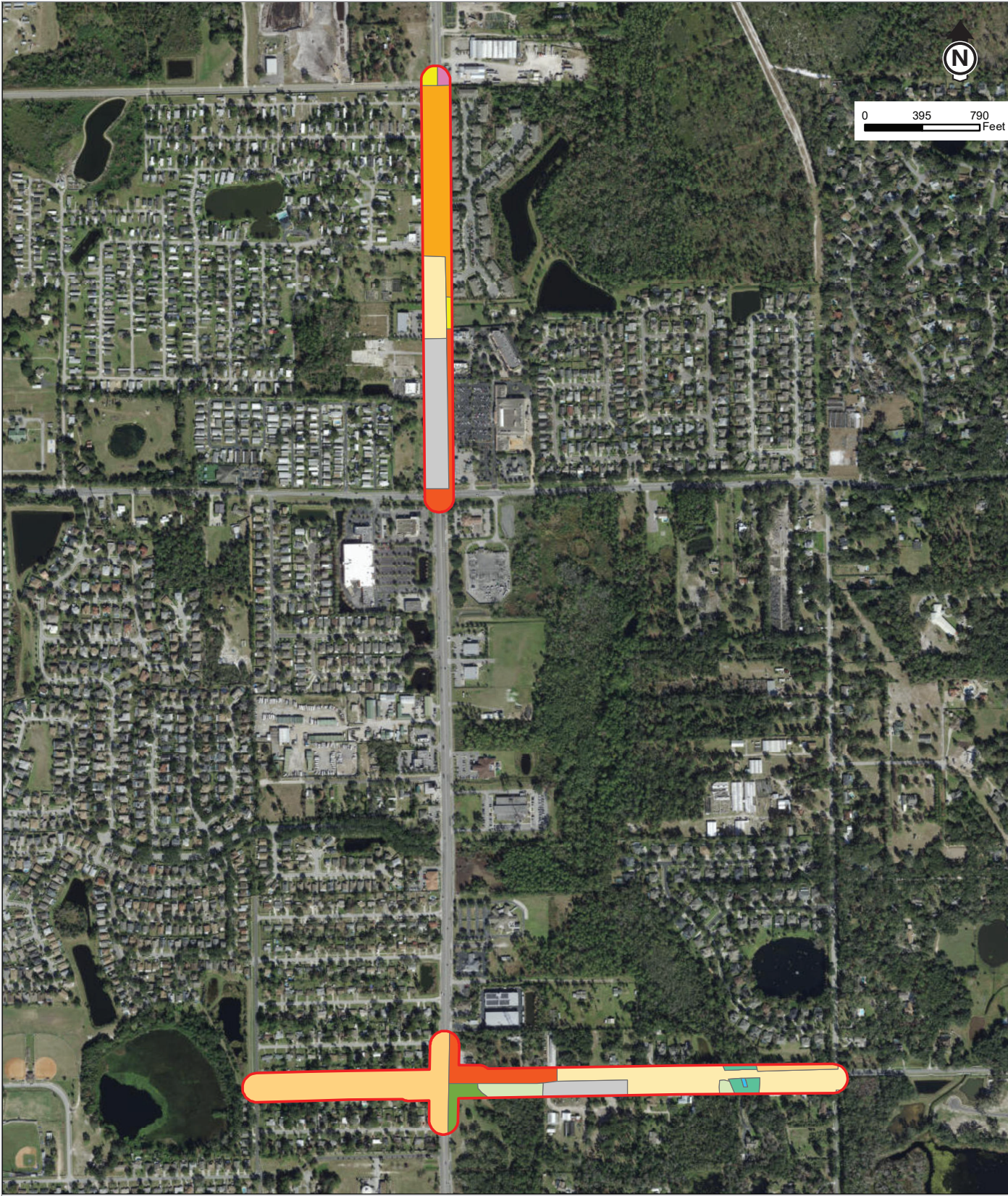
Future Land Use	Parcel Count	Acres (within 300 feet)	Percent Total
Agricultural	1	1.607	1.3%
Commercial	30	23.612	19.1%
Industrial	1	0.686	0.6%
Institutional	2	1.776	1.4%
Low Density Residential	39	83.234	67.4%
Low-Medium Density Residential	6	8.147	6.6%
Medium Density Residential	2	3.447	2.8%
Office	2	1.056	0.8%
<b>Total</b>	<b>83</b>	<b>123.565</b>	<b>100%</b>













Source: Orange County, City of Apopka



**Figure 13**  
**Existing Land Use**  
Rock Springs Road  
Access Management Study





- |   |  |
|---|--|
|  100 ft Study Buffer               |  2110: Improved Pastures        |
|  1100: Residential, Low Density    |  2430: Ornamentals              |
|  1200: Residential, Medium Density |  3100: Herbaceous (Dry Prairie) |
|  1300: Residential, High Density   |  4340: Hardwood - Conifer Mixed |
|  1400: Commercial and Services     |  5100: Open Water               |
|  1550: Other Light Industrial      |  6170: Mixed Wetland Hardwoods  |



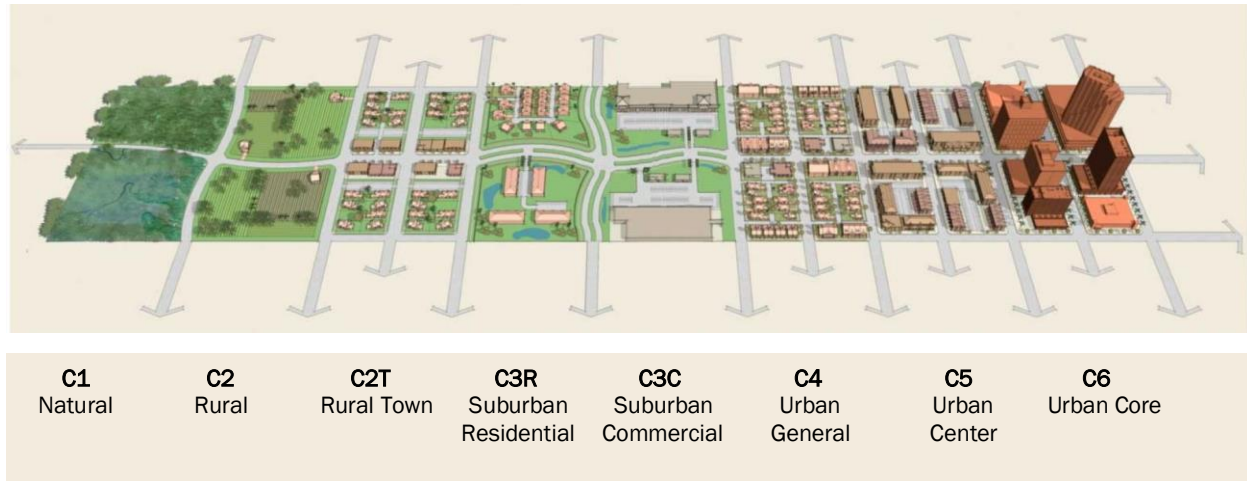
**Figure 14**  
**Future Land Use**  
**Rock Springs Road**  
**Access Management Study**



## Context Classification and Functional Classification

The FDOT assigns context classifications to roadways based on their surrounding environments, ranging from Natural (C1) to Urban Core (C6). The full range of FDOT context classifications is illustrated in **Figure 15**.

Figure 15 | FDOT Context Classifications



Rock Springs Road from Welch Road to Lester Road does not have an officially assigned context classification but has the characteristics correlating to context class C3R (Suburban Residential). Additionally, Park Avenue (in the vicinity of Sandpiper Street), and Sandpiper Street (in the vicinity of Park Avenue) does not have an officially assigned context classification but similarly has the characteristics correlating to context classification C3R (Suburban Residential). C3R classification is described as having mostly residential land uses with large blocks, and a disconnected or sparse roadway network.

As neither Rock Springs Road nor Sandpiper Street are a state road, their required design characteristics are found in the FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance (Florida Greenbook, July 2021) and are dependent on its functional classification. Rock Springs Road is functionally classified as an urban major collector and Sandpiper Street is functionally classified as an urban local road. The key required design characteristics related to this study are summarized in **Table 7**, further discussion on the design controls and criteria used for this study can be found in the Design Criteria section of the Build Alternatives chapter of this report.

Table 7 | Florida Greenbook Design Characteristics

Characteristic	Rock Springs Road Allowable Range		Sandpiper Street Allowable Range
Design Speed	30-50 mph <sup>1</sup>		20-30 mph <sup>1</sup>
Minimum Lane Width	11 feet <sup>2</sup>		10 feet <sup>2</sup>
Minimum Median Width	Design Speed $\geq$ 50 mph: 40 feet <sup>3</sup> Design Speed $\leq$ 45 mph: 22 feet <sup>3</sup> In constrained areas with design speed = 45 mph, 19.5 feet is permissible In constrained areas with design speed $\leq$ 40 mph, 15.5 feet is permissible TWLTL: 11 feet <sup>3,2</sup>		N/A <sup>8</sup>
Minimum Sidewalk Width	With minimum separation of 2 feet from curb: 5 feet At back of curb: 6 feet <sup>4</sup>		With minimum separation of 2 feet from curb: 5 feet At back of curb: 6 feet <sup>4</sup>
Standard Shared Use Path Width	10 - 14 feet <sup>5</sup> Short 8-foot-wide sections may be used in constrained conditions		N/A
Shared Use Path Separation	5 feet from face of curb/edge of shoulder <sup>6</sup> 3 feet from lateral obstructions (2 feet is permissible if in constrained conditions) <sup>5</sup>		N/A
Shared Use Path Design Speed	Grades $\leq$ 4%	18 mph <sup>7</sup>	N/A
	Grades > 4%	Consult American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities <sup>7</sup>	N/A

Sources:

<sup>1</sup> Florida Greenbook Table 3-1

<sup>2</sup> Florida Greenbook Table 3-20

<sup>3</sup> Florida Greenbook Table 3-23

<sup>4</sup> Florida Greenbook Chapter 8, Section B.1

<sup>5</sup> Florida Greenbook Chapter 9, Section C.1mp

<sup>6</sup> Florida Greenbook Chapter 9, Section C.2

<sup>7</sup> Florida Greenbook Chapter 9, Section C.3

<sup>8</sup> Not Applicable

## Development Patterns

There are six planned developments located within one mile of the study area. A summary of the developments is shown in **Table 8**. A map, Apopka Development Projects, showing the development locations is included in **Appendix D**.

Not included in the developments map are two new planned developments. One is located on the northwest corner of the Rock Springs Road and Welch Road intersection and one is located in the southeast corner of the Park Avenue and Sandpiper Street intersection. One additional area (located on the south side of Faye Street east of Rock Springs Road) is zoned by Orange County for a planned development, but it is not included in the Apopka Development Projects map as it lies outside of the city boundary (see the Orange County InfoMap in **Appendix B**); this area is part of the North Apopka/Wekiva Rural Settlement and does not have any planned development projects underway.

Table 8 | Development Project Summary

Development Name	Location	Type/Description	Acreage	Dwelling Units
Retail at Rock Springs & Tanglewood	Southwest corner of Rock Springs Road at Tanglewood Drive	Subdivision Plan – Retail Center	4.59	0
Gateway Plaza	Northwest corner of Rock Springs Road at Lester Road	Site Plan – Shopping Plaza	3.36	0
San Sebastian Reserve	North side of Lester Road, west of Rock Springs Road	Subdivision Plan – Single Family Subdivision	23	112
Hammock at Rock Springs	West side of Rock Springs Road, north of Wekiva Pointe Circle	Planned Unit Development – Single Family Subdivision	9.59	19
Bridlewood	North side of Lester Road, west of Rock Springs Road	Subdivision Plan – Single Family Subdivision	20	52
Ponkan Reserve	South side of Ponkan Road, west of Rock Springs Road	Subdivision Plan – Single Family Subdivision	7.47	14

Source: City of Apopka Developments Map

## Utilities

A Sunshine One Call ticket was processed in March 2021 to identify a list of potential utility providers within the study area. A 500-foot buffer was applied around the Rock Springs Road study area to identify the utility companies located adjacent to the study area as well. The identified utility companies were contacted to obtain information about their infrastructure or facilities present within the study area, and each company's response is summarized in **Table 9**. The information obtained on utilities is provided in **Appendix E**.

Table 9 | Utility Agencies and Contact Information

Utility Company	Service Provided	Summary of Infrastructure/Facilities within Study Area
<b>AT&amp;T/Distribution</b> Dino Farruggio (561) 997-0240	Telephone	No information provided.
<b>Black &amp; Veatch Orlando 1F</b> Chad Arnett (813) 207-7931	Fiber	No facilities are present within the study area.
<b>Century Link</b> Bill McCloud (850) 599-1444	Fiber, Telephone	Aerial copper and metro lines run along the west side of Rock Springs Road between Welch Road and Lester Road.  Underground copper and metro lines run along both sides of Rock Springs Road between Welch Road and Lester Road.
<b>Charter Communications</b> Ramon Nunez (407) 215-5870	Cable Television (CATV), Fiber, Telephone	No information provided.
<b>City of Apopka</b> Vladimir Simonovski (407) 703-1731	Sewer, Water	No information provided.
<b>Duke Energy</b> Jeffrey Trauth, Todd Khilmire, Sam Evans (407) 905-3376	Electric	Aerial transmission lines run along the west side of Rock Springs Road between Welch Road and Lester Road, also crossing the roadway at the Welch Road intersection and at the Publix south access.  At Sandpiper Road, aerial utilities run along both sides of Park Avenue and cross the roadway on the south side of the intersection.
<b>Florida Gas Transmission - Orlando</b> Joseph Sanchez (407) 838-7171	Gas	No facilities are present within the study area.
<b>Lake Apopka Natural Gas District</b> Patrick Nguyen (407) 656-2734	Natural Gas	6" and 4" poly gas mains run along the east side of Rock Springs Road from south of Welch Road to north of Lester Road.  2" gas main passes under the south and east sides of the intersection of Rock Springs Road with Welch Road.  1.5" steel gas main runs on the south side of Sandpiper Street from Lake Avenue to Park Avenue.
<b>MCI Verizon</b> MCIU01 Investigations (469) 886-4091	Communications Lines, Fiber	No information provided.
<b>Orange County Public Works</b> Matthew Shipley (407) 836-7814	Fiber, Traffic Signals	No information provided.
<b>Orange County Utilities</b> Victor Gonzalez (407) 836-6869 x66869	Water, Wastewater	No water or wastewater facilities are present within the study area.
<b>Zayo Group/Formerly Lightwave, LLC</b> Henry Klobucar (406) 496-6510	Fiber	No information provided.

Source: Sunshine State One Call

## Environmental Characteristics

### Social

#### Demographics

Preliminary demographics data was gathered for the City of Apopka to determine the population characteristics for the study area and its surroundings. The data gathered includes population characteristics, socioeconomic data, and major employers and activity centers and was collected from the City of Apopka, the United States Census Bureau, Environmental Systems Research Institute (ESRI) Tapestry, and the Florida Department of Health.

ESRI's Tapestry classifies neighborhoods and ZIP codes into 67 different types of segments based on socioeconomic characteristics as well as standard demographics data. According to the ESRI Tapestry profile for the neighborhoods in Apopka, the primary "Tapestry Segments" found around the study area and their key features are listed in **Table 10**.

Profiles for each segment, including age, race and ethnicity, income, housing, and occupation data are included in **Appendix F**.

Table 10| ESRI Tapestry Summaries

Segment Name	Description
Middleburg	<ul style="list-style-type: none"> <li>Semirural locales within metropolitan areas</li> <li>Neighborhoods changed rapidly in the previous decade <ul style="list-style-type: none"> <li>Single family homes</li> <li>Mobile homes</li> <li>Primarily young couples, many with children</li> <li>Average household size: 2.75</li> </ul> </li> <li>Median home value: \$175,000</li> <li>Low vacancy rate</li> </ul>
Home Improvement	<ul style="list-style-type: none"> <li>Low density suburban neighborhoods</li> <li>Primarily traditional, owner-occupied, single-family dwellings (80%) <ul style="list-style-type: none"> <li>Over 50% married-couple families</li> <li>Approximately 12% single-parent families</li> </ul> </li> <li>Majority of homes built between 1970 and 2000</li> </ul>
Green Acres	<ul style="list-style-type: none"> <li>Rural enclaves in metropolitan areas <ul style="list-style-type: none"> <li>Older market</li> <li>Primarily married couples, most with no children</li> </ul> </li> <li>Primarily (not exclusively) older homes with acreage</li> <li>New housing growth in the past 15 years <ul style="list-style-type: none"> <li>Single-family, owner-occupied housing</li> </ul> </li> <li>Median home value: \$235,500</li> </ul>

#### Population Characteristics

Population data was collected from the City of Apopka and the United States Census Bureau. The total population, number of households, average household size, and number of housing units were provided by the City of Apopka. The other population characteristic data was gathered from the 2019 American Community Survey (ACS) 5-Year Estimates. Due to the impacts of the Coronavirus (COVID-19) pandemic, the United States Census Bureau did not release ACS estimates for 2020. An overview of the demographics in Apopka is provided in **Table 11**. The demographics data provided by the City of Apopka is included in **Appendix F**.



Table 11 | Apopka Demographics Overview

Category	Measure
<b>Population</b>	
Total Population	56,727
Population Density (Persons per Acre)	2.49
<b>Households</b>	
Total Households	20,311
Average Household Size	2.79
Household Density (Households per Acre)	0.893
<b>Age</b>	
Median Age	37.3 years
Population over 65	12.8%
<b>Sex</b>	
Male	50.7%
Female	49.3%
<b>Race/Ethnicity</b>	
White	65.0%
Hispanic or Latino	21.6%
Not Hispanic or Latino	43.4%
Black or African American	25.2%
Hispanic or Latino	2.1%
Not Hispanic or Latino	23.1%
Asian	4.2%
Other	5.6%
<b>Income</b>	
Median Household Income	\$66,057
Persons Below Poverty	9.4%
<b>Housing</b>	
Total Housing Units	20,204
Owner-Occupied	70.2%
Renter-Occupied	28.5%
Vacant	1.3%
<b>Limited English Proficiency (LEP)</b>	
Block groups with >5% Spanish LEP surrounding study area	2 (7.56%, 5.24%)
<b>Vehicle Ownership</b>	
Households with No Vehicles	4.4%

Source: City of Apopka, United States Census Bureau 2019 ACS

## Age

Age data was collected from the United States Census Bureau 2019 ACS Estimates. The median age in Apopka is 37.3 years, 62.4% of the population falling between the ages of 18 and 65. Out of the total population in Apopka, 12.8% are over 65 years old, and 24.8% are under 18.

## Race/Ethnicity

Race and ethnicity data was collected from the United States Census Bureau 2019 ACS Estimates. The majority race in Apopka is White (65.0%), followed by Black or African American (25.2%), and Asian (4.2%). The remaining 5.6% of people in Apopka identify as Two or More Races (3.3%), or as some other race (2.3%). In total, 23.7% of the population are Hispanic, with 21.6% identifying as White Hispanic and 2.1% identifying as Black Hispanic.

## Income

Income data was collected from the United States Census Bureau 2019 ACS Estimates. Apopka has a median household income of \$66,057 and a poverty rate of 9.4% (the population which falls under the federal poverty line); 4.1% of households have an income less than \$10,000, and 7.6% of households have an income between \$10,000 and \$25,000.

## Education

Educational attainment data was gathered from the United States Census Bureau 2019 ACS Estimates and is summarized in **Table 12**.

Table 12 | Educational Attainment Data Summary

Demographic	Percentage of High School Graduates	Percentage of Bachelor's Degree Attainment
<b>Age</b>		
18 – 24	80.8%	12.6%
25 and older	86.4%	27.5%
<b>Race/Ethnicity</b>		
White	89.2%	30.2%
Not Hispanic or Latino	93.0%	34.5%
Black or African American	89.5%	19.0%
Hispanic or Latino Origin	67.4%	13.9%
Asian	89.0%	52.4%
Native Hawaiian and Other Pacific Islander	73.7%	28.9%
Other	61.7%	11.0%

Source: United States Census Bureau 2019 ACS

## Limited English Proficiency

Data on Limited English Proficiency (LEP) for the area surrounding the study area was gathered from the United States Census Bureau 2019 ACS Estimates. Four census block groups surround the study area. A summary of the percentages of LEP households by block group is shown in **Table 13**. As can be seen in the table, the two block groups west of Rock Springs Road/Park Avenue have Spanish LEP household percentages greater than 5% and the two block groups east of Rock Springs Road/Park Avenue both have Spanish LEP household percentages lower than 2%. No block groups surrounding the study area have significant LEP household populations for any other language group. A map showing the percentage of Spanish LEP households by block group is included in **Appendix F**.

Table 13 | Spanish LEP Household Percentages

Block Group #	Location	Percentage of Spanish LEP Households
120950178042	West side of Rock Springs Road between Welch Road and Ponkan Road	7.56%
120950177011	West side of Park Avenue, south of Welch Road	5.24%
120950178051	East side of Rock Springs Road and north side of Welch Road	1.97%
120950178021	South side of Welch Road, between Rock Springs Road and Ustler Road	1.00%

Source: United States Census Bureau 2019 ACS Estimates

## Health

Health data was collected from the Florida Department of Health. The average life expectancy for the census tract surrounding the study area is 80.0 years, for Orange County overall it is 80.1 years. This is slightly higher than the statewide life expectancy of 79.7 years. In Orange County, 12.4% of adults are active smokers (lower than the national rate of 17.1%), and 27.5% of adults are clinically obese (lower than the national rate of 31.9%). Death rates for the most common illness-related causes of death are also lower in Apopka than nationally, as shown in **Table 14**.

**Table 14 | Apopka Death Rates by Illness**

Cause of Death	Death Rate per 100,000	
	Apopka	National
Cardiovascular	186.1	200
Cancer	153.7	185
Respiratory Disease	37.0	53
Diabetes	24.7	25

Source: Florida Department of Health (<http://www.flhealthcharts.com>) (2021)

## Transportation

Transportation data was collected from the United States Census Bureau 2019 ACS Estimates. Zero-car households make up 4.4% of the households within Apopka. Of the 25,773 workers in Apopka, 4.6% rely on multi-modal transportation (biking, walking, public transit, etc.) to get to work.

## Major Employers and Activity Centers

Major employers and activity centers within the study area were determined based on a desktop review conducted on December 6, 2021. Two of the largest activity centers are located at the intersection of Rock Springs Road with Welch Road. Wekiva Plaza is located in the northeast quadrant of the intersection and comprises of approximately 20 businesses, while Rock Springs Plaza is located in the southwest quadrant of the intersection and comprises approximately 10 businesses. Major employers within the study area include Publix, Dollar General, and McDonald's.

## Cultural and Social Facilities

Cultural and social resource facilities include, but are not limited to, trails, parks, schools and recreational areas as well as the neighborhoods they serve. Many of these features are protected under the Department of Transportation Act (DOT Act) of 1966, Section 4(f) which limits the use of public land. **Table 15** summarizes the number of sites that are in public ownership or use. A 100-foot buffer along the centerline of the study area was used to determine the locations of social resources within the study area; these are provided as Exhibit A in **Appendix G**.

Table 15 | Summary of Cultural and Social Facilities

Social Resources	Within Study Area
Cemetery	0
Community Center	0
Cultural Center	0
Fire Station	0
Government Building	0
Health Care Facility	0
Hospital	0
Park	0
Religious Center	0
School	0
Social Service Facility	0
Veteran Facility	0
Existing Trail	1

Source: Florida Geographic Data Library (FGDL), Efficient Transportation Decision Making (ETDM) Tool

The study area currently has one existing trail, the West Orange Trail, that is within and adjacent to the Rock Springs Road ROW. The existing trail is part of a proposed project to improve and expand connections to other trails in and around of the study area including the proposed Wekiva Trail extension and the Wekiva River Blueway Trail. There are no other social/cultural resources or facilities directly within the study area, however there are several just outside:

- Wekiwa Springs State Park is located approximately .75 miles east of Rock Springs Road.
- A healthcare facility (Infinity Dental) is located in the southwest quadrant of the Welch Road intersection.
- Apopka Fire Station #2 is located approximately 1,500 feet west of the Rock Springs Road intersection with Welch Road.
- The Apopka Service Center for the Orange County Clerk of Courts is located in the southeast quadrant of the intersection of Park Avenue with Nancy Lee Lane, approximately 1,800 feet north of the intersection with Sandpiper Street.
- The Hope CommUnity Center is located approximately 1,400 feet north of the Park Avenue intersection with Sandpiper Street.
- A United States Post Office is located in the southeast quadrant of the intersection of Park Avenue with Martin Street/Tanglewilde Street, approximately 1,300 feet south of the intersection with Sandpiper Street.

### Historical and Archaeological Resources

Cultural resources are defined by the National Historic Preservation Act (NHPA) of 1966 and governed by federal and state regulations. Section 106 of the NHPA provides a general process for cultural resource assessments and requires historic and archaeological resources be considered in project planning for federally funded or permitted projects. Cultural resources or “historic properties” include any “prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places (NRHP).”

Archaeological sites or historic resources that are listed, determined eligible, or considered potentially eligible by the State Historic Preservation Office (SHPO) for listing in the NRHP, are identified in **Table 16**.

Table 16 | Summary of Cultural Resources

Cultural Resources	Within Rock Springs Rd Study Area
SHPO Structures	0
SHPO Bridges	0
SHPO Resource Groups	0
National Register (Site, District, Building)	0
Archaeological Sites	0
SHPO Surveys	1

Source: FGDL, Florida Master Site File (FMSF)

According to the Florida Master Site File (FMSF), there are no historic sites, resource groups, or archeological sites within the study area. However, one cultural resource assessment survey has been conducted in the vicinity of the study area located in the southeast quadrant of the intersection of East Sandpiper Street and Ustler Road. This survey location is graphically depicted in Exhibit B found in **Appendix G**.

### Natural

Existing literature and publicly available Geographical Information System (GIS) data sources including, but not limited to, the data and maps of the following were used to evaluate hydrologic and other natural features found within the study area:

- United States Army Corps of Engineers (USACE)
- Florida Natural Areas Inventory (FNAI)
- St. Johns River Water Management District (SJWMD)
- Florida Department of Environmental Protection (FDEP)
- Florida Land Use and Cover Classification Systems (FLUCFCS)
- Natural Resources Conservation Service (NRCS)
- Orange County Stormwater
- Federal Emergency Management Agency (FEMA) basin studies
- Florida Fish and Wildlife Conservation Commission (FWC) Habitat Model Data
- United States Fish and Wildlife Service's (USFWS) IPaC tool
- Specific site indicators such as:
  - Topography
  - Vegetation
  - Soils data
  - Floodplain information
  - Other field observations

### Soils

Soil types within a 300-foot buffer of Rock Springs Road and Sandpiper Street were mapped using GIS data obtained from the Natural Resources Conservation Service (NRCS). **Table 17** provides an overview of the soils found within the study area. The study area NRCS soils map can be found as Exhibit C in **Appendix G**.

Table 17 | Summary of Soil Types

Map Unit Symbol	Map Unit Name	Study Area Acreage	Percent of Study Area	Hydric Status
3	Basinger fine sand, depressional	0.54	1.52%	Hydric Soil
6	Candler-Apopka fine sands, 5 to 12 percent slopes	0.94	2.68%	Non-Hydric Soil
16	Floridana fine sand, frequently flooded	3.28	9.33%	Hydric Soil
20	Immokalee fine sand	0.20	0.56%	Hydric Inclusions
28	Florahome fine sand, 0 to 5 percent slopes	4.03	11.46%	Non-Hydric Soil
34	Pomello fine sand, 0 to 5 percent slopes	3.81	10.84%	Hydric Inclusions
35	Pomello-urban land complex, 0 to 5 percent slopes	4.06	11.55%	Hydric Inclusions
37	St. Johns fine sand	1.13	3.23%	Hydric Inclusions
44	Smyrna Fine sand	10.26	29.19%	Hydric Inclusions
45	Smyrna-Urban land complex	5.59	15.91%	Hydric Inclusions
47	Tavares-Millhopper fine sands, 0 to 5 percent slopes	1.31	3.74%	Non-Hydric Soil
<b>Totals for Area of Interest</b>		<b>35.16</b>	<b>100.00%</b>	-

Source: NRCS and United States Department of Agriculture (USDA)

The following are general descriptions of the soil types and their characteristics, taken from the *United States Department of Agriculture (USDA) Soil Conservation Service's Soil Survey of Orange County, Florida* (March 1990). Hydric and non-hydric soil designations are based on the *Hydric Soils of Florida Handbook*. Non-hydric soils are typically associated with uplands and hydric soils are generally associated with wetlands.

Basinger Fine Sand, depressional (3) – This nearly level and very poorly drained soil is found on shallow depressions and sloughs and along the edges of freshwater marshes and swamps. Slopes range from 0 to 2 percent. Under natural conditions, the water table is above the surface for six to nine months or more each year and is within 12 inches of the surface for the rest of the year. Permeability is rapid throughout. The available water capacity is low in the surface and subsurface layers and in the substratum and is medium in the subsoil. This is considered a hydric soil associated with wetlands.

Candler-Apopka Fine Sands, 5 to 12 percent slopes (6) – This sloping to strongly sloping and excessively drained soil is typically located on uplands. The seasonal high-water table is typically at a depth more than 80 inches for Candler soil and a depth of more than 72 inches for Apopka soil. The permeability is rapid in the surface and subsurface layer and rapid to moderately rapid in the subsoil for Candler soil while the permeability is rapid in the surface and subsurface layers and moderate in the subsoil for Apopka soil. The available water capacity is very low in the surface and subsurface and low in the subsoil of Candler soil while the available water capacity is very low in the surface and subsurface layers, and medium to high in the subsoil of Apopka soil. This is considered a non-hydric soil and is indicative of uplands.

Floridana Fine Sand, frequently flooded (16) – This nearly level and poorly drained soil is typically found on the floodplains of the St. Johns River and its major tributaries. The slopes are smooth to concave and range from 0 to 2 percent. The seasonal high-water table is typically within 10 inches of the surface for more than six months. Flooding occurs frequently during rainy periods and normally lasts from one to four months. The permeability is rapid in the surface and subsurface layers, slow in the subsoil and moderate in the substratum. The available water capacity is medium in the surface layer and subsoil and is low in the subsurface layer and substratum. This is considered a hydric soil associated with wetlands.

Immokalee Fine Sand (20) – This nearly level and poorly drained soil is typically located on broad flatwoods. Slopes are smooth and range from 0 to 2 percent. The seasonal high-water table is within 10 inches of the surface for 1 month to 3 months, and it recedes to a depth of 10 to 40 inches for more than six months. The permeability is rapid in the surface and subsurface layers and in the substratum and is moderate in the subsoil. The available water capacity is very low in the surface and subsurface layers and in the substratum and is medium in the subsoil. This is considered a soil with hydric inclusions and can be indicative of uplands or wetlands depending on where it lies in the landscape.

Florahome fine sand, 0 to 5 percent slopes (28) – This nearly level to gently sloping and moderately well drained soil is typically located on uplands. The seasonal high-water table is typically at a depth of 48 to 72 inches for four to six months and recedes to a depth of 72 inches or more during extended dry periods. It is also within 30 to 48 inches of the surface for up to two weeks during periods of heavy rains. The permeability is rapid throughout. The available water capacity is low in the upper part of the surface layer and very low in the lower part and the underlying material. This is considered a non-hydric soil and is indicative of uplands.

Pomello Fine Sand, 0 to 5 percent slopes (34) – This nearly level to gently sloping and moderately well drained soil is typically located on low ridges and knolls on the flatwoods. Slopes are smooth to convex. The seasonal high-water table is at a depth to 24 to 40 inches for one month to four months and recedes to a depth of 40 to 60 inches during dry periods. The permeability is very rapid in the surface layer and subsurface layers, moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is very low in the surface and subsurface layers and in the substratum, and it is medium in the subsoil. This is considered a soil with hydric inclusions and can be indicative of uplands or wetlands depending on where it lies in the landscape.

Pomello-Urban Land Complex, 0 to 5 percent slopes (35) – This nearly level to gently sloping and moderately well drained soil is associated with urban areas but can be located on low ridges and knolls on the flatwoods. The urban land part of this complex is covered by concrete, asphalt, buildings, or another impervious surface. Slopes are smooth to convex. The seasonal high-water table is at a depth of 24 to 40 inches for one month to four months and recedes to a depth of 40 to 60 inches during dry periods. The permeability is very rapid in the surface layer and subsurface layers, moderately rapid in the subsoil, and rapid in the substratum. The available water capacity is very low in the surface and subsurface layers and in the substratum, and it is medium in the subsoil. This is considered a soil with hydric inclusions and can be indicative of uplands or wetlands depending on where it lies in the landscape.

St. Johns Fine Sand (37) – This nearly level and poorly drained soil is typically located on broad flats in the flatwoods. Slopes are smooth to concave and range from 0 to 2 percent. The seasonal high-water table is within 10 inches of the surface for six to 12 months and between depths of 10 and 40 inches for more than six months. In rainy period, it rises to the surface for brief periods. The permeability is rapid in surface layer and subsurface layers and the substratum, and it is moderately slow to moderate in the subsoil. The available water capacity is medium in the surface layer, very low to low in the subsurface layer and substratum, and medium to very high in the subsoil. This is considered a soil with hydric inclusions and can be indicative of uplands or wetlands depending on where it lies in the landscape.



Smyrna Fine Sand (44) – This nearly level and poorly drained soil is typically located on broad flatwoods. Slopes are smooth to concave and range from 0 to 2 percent. The seasonal high-water table is within 10 inches of the surface for one month to four months. It recedes to a depth of 10 to 40 inches for more than 6 months. The permeability is rapid in the surface and subsurface layers and in the substratum, and it is moderate to moderately rapid in the subsoil. The available water capacity is low to very low in the surface and subsurface layers and in the substratum, and it is medium in the subsoil. This is considered soil with hydric inclusions and can be indicative of uplands or wetlands depending on where it lies in the landscape.

Smyrna-Urban Land Complex (45) – This complex contains nearly level and poorly drained soil and areas of urban land. It is typically located on the flatwoods. Slopes are smooth to concave and range from 0 to 2 percent. The seasonal high-water table is within 10 inches of the surface for one month to four months. The permeability is rapid in the surface and subsurface layers and in the substratum, and it is moderate to moderately rapid in the subsoil. The available water capacity is low to very low in the surface, subsurface, and in the substratum layers, and it is medium in the subsoil. This is considered a soil with hydric inclusions and can be indicative of uplands or wetlands depending on where it lies in the landscape.

Tavares-Milhopper Fine Sands, 0 to 5 percent slopes (47) – This nearly level to gently sloping and moderately well drained soil is typically located on low ridges and knolls on the uplands and flatwoods. Slopes are smooth to concave. The seasonal high-water table in Tavares soil is at a depth of 40 to 72 inches for more than six months and it recedes to a depth of more than 80 inches during extended dry periods. The seasonal high-water table in Millhopper soil is at a depth of 40 to 60 inches for one to four months and recedes to a depth of 60 to 72 inches for two to four months. During periods of high rainfall, it reaches to a depth of 30 to 40 inches for cumulative periods of one to three weeks. The permeability is very rapid throughout for Tavares soil and the permeability is rapid in the surface and subsurface layers and moderately rapid or moderate in the subsoil for Millhopper soil. The available water capacity is very low throughout Tavares soil and the available water capacity is low in the surface and subsurface layers and medium in the subsoil of Millhopper soil. This is considered a non-hydric soil and is indicative of uplands.

## Wetlands and Other Surface Waters

The wetland and surface water analysis used the 2020 United States Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI) data, 2019 St. Johns River Water Management District (SJRWMD) Land Use and Cover data, and aerial interpretation based on satellite imagery dated 2019. The data shows that there are natural wetland and surface water systems within the study area as identified in **Table 18**. A map of wetlands and surface waters can be found as Exhibit D in **Appendix G**.

**Table 18 | Summary of Wetland and Surface Water Acreage within Study Area**

FLUCFCS Code	FLUCFCS Description	Acres
5100	Water	0.03
6170	Non-forested Wetland	0.61

Source: FGD, USFWS, SJRWMD



The wetland and surface water system eventually drains into Lake McCoy which is located outside of the study area. The proposed project is expected to use the majority of the existing road ROW for construction and improvements to Rock Springs Road and associated streets/sidewalks; however, if wetland or surface water impacts cannot be avoided, mitigation may be required in accordance with state and federal wetland permitting requirements. The study area falls under the Wekiva River Nested drainage basin. If mitigation is required, mitigation banking credits must be bought from the same drainage basin which is an area of land that drains into the same body of water. Two mitigation banks serve the Wekiva River Nested drainage basin, the Wekiva River Mitigation Bank and Blackwater Creek Mitigation Bank.

## Floodplain

According to the Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Map (DFIRM) dated October 2020, the majority of the study area is located within Floodplain Zone X. This zone is also known as “low-risk flood zone” and has a 0.2% annual chance of flood; areas of 1% chance of flood with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance of flood. A small area in the easternmost portion of the Sandpiper Street study area buffer is within the vicinity of a 100-year floodplain where there is a 1% annual chance of flood. This floodplain Zone (AE) has determined base flood elevations of 88 North American Vertical Datum (NAVD) and is associated with Lake McCoy.

Any fill of floodplain occurring between the Seasonal Highwater Level (SHWL) and the floodplain elevation will require floodplain compensation. No net encroachment into the floodplain is allowed between the SHWL and the floodplain elevation. It is anticipated floodplain encroachment can be avoided.

The location of floodplain that falls within the study area is illustrated on Exhibit E in **Appendix G**.

## Contamination

Contaminated sites within the study area were identified using data made available by the Florida Department of Health (DOH) and the Florida Department of Environmental Protection (FDEP). **Table 19** summarizes the number of sites that have the potential for contamination or are being monitored, while a map depicting the locations of these sites can be found as Exhibit F in **Appendix G**. It must be noted that the facilities shown are regulated facilities which have the potential for contamination or environmental concern but are not necessarily contaminated.

Table 19 | Summary of Contamination Analysis

Analysis Type	Within Study Area
Biomedical Waste Facility	2
Brownfield Area	0
Hazardous Waste Facility	1
National Pollutant Discharge Elimination System (NPDES)	4
Petroleum Contamination Monitoring Site (PCMS)	0
Storage Tank Contamination Monitoring (STCM)	0
SUPER Act Risk Sources	0
United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) Regulated Facilities	0
Toxic Release Inventory Sites	0
Waste Cleanup Responsible Party Sites - Open	0

Source: FGDL, DOH, FDEP, USEPA

As shown in **Appendix G**, Exhibit F, there is one hazardous waste facility in the study area. A hazardous waste facility is a facility that possesses wastes that are characterized by 40 CFR Part 261, Subpart C, as hazardous by exhibiting one of the four characteristics such as, ignitability, corrosivity, reactivity, or toxicity. This site is associated with a closed Circle K which provided fuel. In addition, the study area contains two biomedical waste facilities. The National Pollutant Discharge Elimination System (NPDES) was created in 1972 by the Clean Water Act to address water pollution by regulating point sources that discharge pollutants to waters of the United States of which four sites are located in the study area buffer; however, two have been terminated and both are located on Rock Springs Road.

### Wildlife Corridors and Crossings

Wildlife corridors typically consist of a large area of natural preserved habitats in the form of wetlands, forests, and prairies that support a range of wildlife that are separated by structures such as roads and housing development. Wildlife corridors usually support the movement and range of different species to promote diversity and access to resources such as surface waters and suitable foraging habitats. Improved habitat connectivity, road permeability, and deterrents onto roads are all important factors when developing mitigation strategies for wildlife on future road projects.

While the probability of wildlife utilizing the area is moderate to low, the density of urban growth and development surrounding the study area most likely further reduces the frequency of crossing by wildlife. Therefore, there are minimal wildlife corridors present within the study area, though potential corridors are present to the northeast and east given the location of the Wekiwa Springs State Park and lower density development. With that in mind, one location was identified as having an increased potential to warrant a wildlife crossing or habitat connectivity enhancements (Exhibit G, **Appendix G**) on East Sandpiper Street west of Ustler Road. This location provides opportunity to facilitate wildlife movement between an undeveloped forested system to the north with Lake McCoy to the south. This area consists of wetlands which may increase migration of certain species. However, further investigation will need to be completed to determine the viability of any increased accommodations for wildlife movement.

## Threatened and Endangered Species

The Florida Natural Areas Inventory (FNAI) and GIS data from the USFWS and the Florida Fish and Wildlife Conservation Commission (FWC) identified protected species with the potential to occur, and Core Foraging Habitat (CFA) and Consultation Areas (CA) for threatened and endangered species within the study area. As identified by USFWS, CA encompass all areas where populations are known to exist and where agency involvement may be necessary. The study area buffer does not include any critical or strategic habitat. **Table 20** provides a summary of protected species with the potential to occur within the study area. A map depicting the potential locations of these species can be found as Exhibit H in **Appendix G**.

Table 20 | Summary of Protected Species with the Potential to Occur

Fauna	Federal Status	State Status
<b><u>Avian</u></b>		
Florida Sandhill Crane ( <i>Antigone canadensis pratensis</i> )	NL	T
Florida Scrub-jay ( <i>Aphelocoma coerulescens</i> )	T	T
American Bald Eagle ( <i>Haliaeetus leucocephalus</i> )*	NL	NL
Eastern Black Rail ( <i>Laterallus jamaicensis</i> )	T	T
Wood Stork ( <i>Mycteria americana</i> )	T	T
Audubon's Crested Caracara ( <i>Polyborus plancus audubonii</i> )	T	T
Everglade snail kite ( <i>Rostrhamus sociabilis plumbeus</i> )	E	E
<b><u>Reptiles</u></b>		
Eastern Indigo Snake ( <i>Drymarchon couperi</i> )	T	T
Gopher Tortoise ( <i>Gopher polyphemus</i> )	C	T
Short-tailed Snake ( <i>Lampropeltis extenuata</i> )	NL	T
Sand Skink ( <i>Plestiodon reynoldsi</i> )	T	T
<b><u>Mammals</u></b>		
Florida Black Bear ( <i>Ursus americanus floridanus</i> )**	NL	NL
<b><u>Flora</u></b>		
Incised Grove-burr ( <i>Agrimonia incisa</i> )	T	T
Variable-leaved Indian-plantain ( <i>Arnoglossum diversifolium</i> )	NL	T
Florida Bonamia ( <i>Bonamia grandiflora</i> )	T	T
Many-flowered Grass-pink ( <i>Calopogon multiflorus</i> )	NL	T
Chapmans's Sedge ( <i>Carex chapmanii</i> )	NL	T
Sand butterfly pea ( <i>Centrosema arenicola</i> )	NL	E
Pigeon wings ( <i>Clitoria fragrans</i> )	T	T
Piedmont Jointgrass ( <i>Coelorachis tuberculosa</i> )	NL	T
Cutthroat Grass ( <i>Coleataenia abscissum</i> )	NL	E
Beautiful Pawpaw ( <i>Deeringothamnus pulchellus</i> )	E	E
Scrub Buckwheat ( <i>Eriogonum longifolium</i> var. <i>gnaphalifolium</i> )	T	T
Hartwrightia ( <i>Hartwrightia floridana</i> )	NL	T
Star Anise ( <i>Illicium parviflorum</i> )	NL	E
Nodding Pinweed ( <i>Lechea cernua</i> )	NL	T
Scrub Lupine ( <i>Lupinus aridorum</i> )	E	E
Florida Spiny-pod ( <i>Matelea floridana</i> )	NL	E
Pinesap ( <i>Monotropa hypopithys</i> )	NL	E
Celestial Lily ( <i>Nemastylis floridana</i> )	NL	E
Florida Beargrass ( <i>Nolina atopocarpa</i> )	NL	T

Fauna	Federal Status	State Status
Britton's Beargrass ( <i>Nolina brittoniana</i> )	E	E
Papery Whitlow-wort ( <i>Paronychia chartacea</i> )	T	T
Lewton's Polygala ( <i>Polygala lewtonii</i> )	E	E
Sandlace ( <i>Polygonella myriophylla</i> )	E	E
Scrub Plum ( <i>Prunus geniculata</i> )	E	E
Giant Orchid ( <i>Pteroglossaspis ecristata</i> )	NL	T
Florida Willow ( <i>Salix floridana</i> )	NL	E
Scrub Stylisma ( <i>Stylisma abdita</i> )	NL	E
Clasping Warea ( <i>Warea amplexifolia</i> )	E	FE
Carter's Warea ( <i>Warea carteri</i> )	E	FE

Source: United States Fish and Wildlife Service (USFWS); FNAI.

F = Federally

E = Endangered: species in danger of extinction throughout all or a significant portion of its range.

T = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.

C = Candidate for listing at the Federal level by the U. S. Fish and Wildlife Service

NL = Not currently listed

\*Protected by the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act of 1918.

\*\*FAC 68A-4.009

## Drainage Analysis

Rock Springs Road between Welch Road and Lester Road and the intersection of Park Avenue and Sandpiper Street are within the jurisdiction of the SJRWMD. These segments are located within the Wekiva River Hydrological Basin, more specifically in the Prevatt Lake and the Park Avenue Drainage Basins. The Prevatt Lake Basin, in the vicinity of Rock Springs Road, drains from west to east.

Rock Springs Road between Welch Road and Lester Road is maintained by Orange County, even though most of the surrounding property has been annexed by the City of Apopka. On the other hand, Sandpiper Street is maintained by the City of Apopka.

Rock Springs Road between Welch Road and Lester Road was previously a two-lane road with open swales on both sides which collected offsite runoff from the west and from the road.

In the year 2000, an Environmental Resource Permit (ERP 27569 - 2) was issued by the SJRWMD to convert the two-lane road to a four-lane road with a two-way left turn in the middle, a sidewalk on the west side and a multi-use trail on the east side (See **Figure 16**). The improvements were constructed, and the runoff from the improvements is now collected in a closed drainage system (See **Figure 17**) that begins north of the intersection of Rock Springs Road and Welch Road and ends approximately 1,350 feet north of Lester Road. At this point the closed system turns east, approximately 1,200 feet, and discharges to an elongated wet pond owned by the City of Apopka. The pond outfalls to the wetland, which then discharges to Prevatt Lake (See Drainage Map, **Figure 18**).

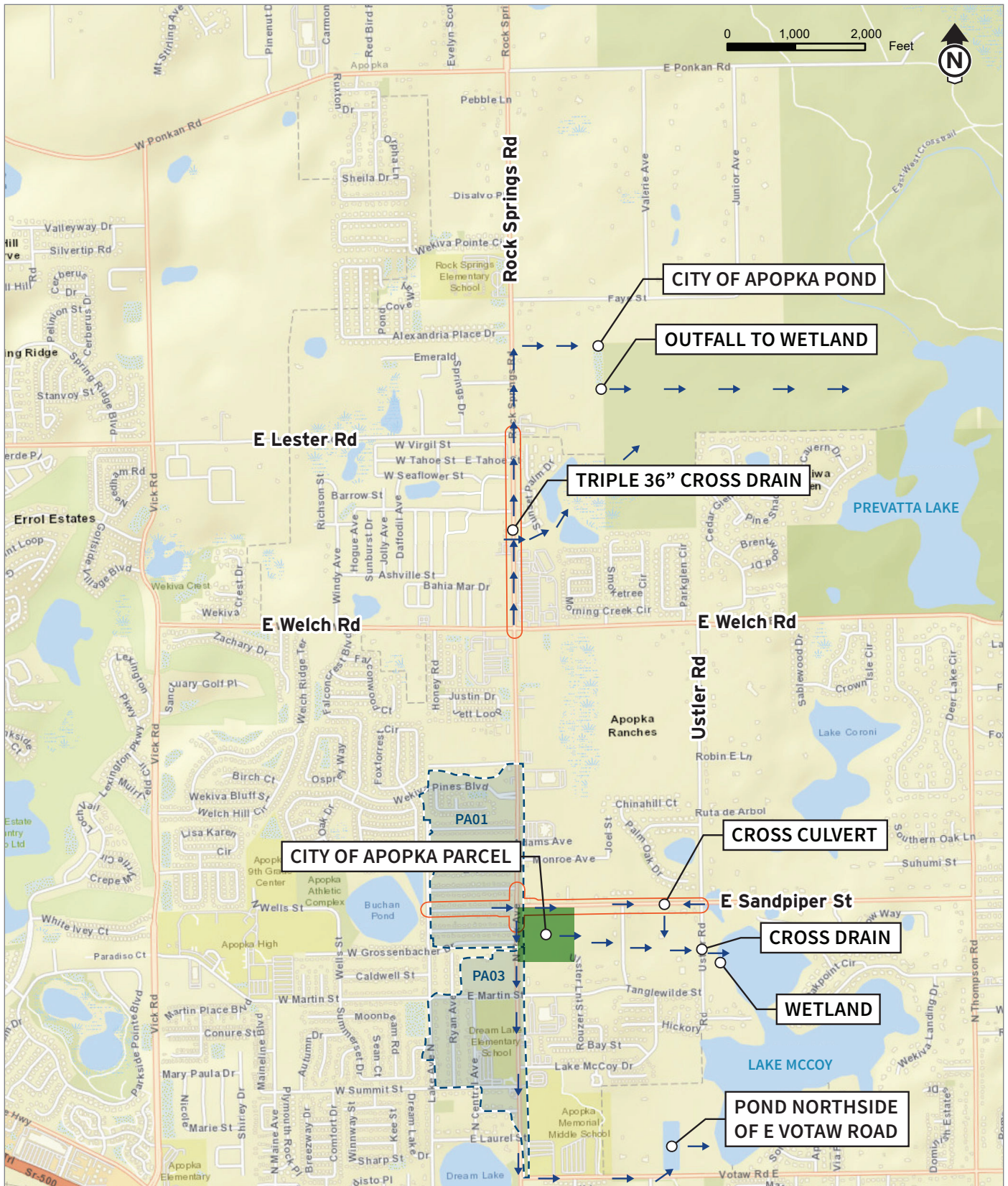
Figure 16 | Multi-Use Trail





Figure 17 | Closed Drainage System





- 100 ft Study Buffer
- Drainage Flow Arrows
- Park Avenue Basin



**Figure 18**  
**Drainage Map**  
 Rock Springs Road  
 Access Management Study



From Welch Road to Lester Road, the west offsite runoff, which previously discharged to the open swales, is collected by a closed sewer system behind the sidewalk (See **Figure 19**) and directed to a triple 36-inch cross drain (See **Figure 20**), which was upsized during the road widening. This runoff continues to flow east, per the pre-widening condition, along a ditch that outfalls to the wetland and then discharges to Prevatt Lake.

An ERP was not located for the Sandpiper Street intersection with Park Avenue. Sandpiper Street, west of Park Avenue/Rock Springs Road, drains to the Park Avenue Drainage Basin and flows south. This system ultimately discharges to the pond on the northside of Votaw Road, west of Lake McCoy and then outfalls to Lake McCoy.

Sandpiper Street, east of Park Avenue, drains to a sub-basin in the Lake McCoy North Drainage Basin. This segment of Sandpiper Street drains eastward to a cross culvert that crosses Sandpiper Street approximately 550 feet west of Ustler Road. The system drains south to another sub-basin to the east, until it reaches a cross drain under Ustler Road, which discharges to the wetland on the eastside of Ustler Road, which drains to Lake McCoy.

The City of Apopka parcel located at the southeast corner of Park Avenue and Sandpiper Street also drains to a sub-basin in the Lake McCoy North Drainage Basin. Approximately 20 percent of the parcel drains to the same sub-basin as the above segment of Sandpiper Street. The remaining area drains to another sub-basin to the east, until it reaches a cross drain under Ustler Road, which discharges to the wetland on the eastside of Ustler Road, which drains to Lake McCoy.

Figure 19 | Back of Sidewalk - West side of Rock Springs Road



Figure 20 | Triple 36-inch Cross Drain



### St. Johns River Water Management District, Orange County and City of Apopka Drainage Criteria

Proposed improvements to Rock Springs Road are subject to the SJRWMD and Orange County criteria that are current at the time of the improvements. The improvements to the intersection of Sandpiper Street are subject to SJRWMD and the City of Apopka criteria that are current at the time of the improvements.

#### SJRWMD

There is a possibility of obtaining an exemption from permitting from the SJRWMD, if the proposed improvements adhere to *F.A.C. 62-330.051*. See the potentially applicable exemption criteria below.

#### 62-330.051 Exempt Activities:

- (4)(c) *Minor Roadway Safety Construction Alteration, Maintenance and Operation, provided:*
  1. *There is no work in, on, or over wetlands other than those in drainage ditches constructed in uplands;*



2. *There is no reduction in the capacity of existing swales, ditches, or other systems legally in existence under Chapter 403 or Part IV of Chapter 373, F.S;*
  3. *All work is conducted in compliance with subsection 62-330.050(9), F.A.C.; and*
  4. *The work is limited to:*
    - a) *Sidewalks having a width of six feet or less;*
    - b) *Turn lanes less than 0.25 mile in length, and other safety-related intersection improvements; and*
    - c) *Road widening and shoulder paving that does not create additional traffic lanes and is necessary to meet current, generally accepted roadway design and safety standards.*
- *(4)(d) Resurfacing and Repair of Existing Paved Roads, and Grading of Existing Unpaved Roads, provided:*
    1. *Travel lanes are not paved that are not already paved;*
    2. *No substantive changes occur to existing road surface elevations, grades, or profiles; and*
    3. *All work is conducted in compliance with subsection 62-330.050(9), F.A.C.*

If a permit exemption is not granted and a standard general permit is the next permitting option, it shall adhere to the applicable F.A.C. See the applicable criteria below.

#### *62-330.405 General Conditions for All General Permits.*

#### *62-330.447 General Permit to the Florida Department of Transportation, Counties, and Municipalities for Minor Activities within Existing Rights-of-Way or Easements:*

- *(1)(g) Roadway safety activities, such as installation of shoulders, sidewalks, guard rails, signs, poles, and mast arms within an existing right-of-way that incur no more dredging or filling than 500 square feet per activity, provided the total impact to wetlands or other surface waters does not involve more than 0.5 acre.*
- *(2)(b) This general permit shall not apply to ditch construction in Class I or Class II surface waters, Outstanding National Resource Waters or waters designated as Outstanding Florida Waters.*
- *(2)(c) Activities under this general permit must not diminish existing stormwater treatment, attenuation, or conveyance capacity.*
- *(2)(d) This general permit does not authorize the construction of additional traffic lanes. Activities that require additional traffic lanes must first obtain an individual environmental resource permit under this chapter, as applicable, before the start of construction.*

#### *62-330.451 General Permit to Counties, Municipalities, and other Agencies to Conduct Stormwater Retrofit Activities:*

- *(1) A general permit is granted to counties, municipalities, state agencies and water management districts to construct, operate, and maintain stormwater retrofit activities as authorized below for improving existing surface water and stormwater systems. This general permit may be used in conjunction with exempt activities.*
- *(2)(a) Construction or alteration that will add additional treatment or attenuation capacity and capability to an existing stormwater management system.*
- *(2)(b) The modification, reconstruction, or relocation of an existing stormwater management system or stormwater discharge facility.*

Should a permit exemption or a standard general permit not be accepted, SJRWMD might require full treatment and attenuation volumes of the previously untreated existing road.

Specific nutrient requirements may apply to the project since the study area outfalls to Class III water bodies. Stormwater may need to be treated prior to its discharge to the respective water bodies and adequate erosion and turbidity barriers will be needed during the proposed construction activities. Since most of the roadway isn't formally treated prior to its outfall, SJRWMD may only require treatment of any new impervious areas.

If treatment volumes are required and off-line dry retention systems are used, the project will need to provide retention for the water quality volume equal to runoff from 0.5-inch runoff from the contributing area or 1.25-inches of runoff from the impervious area, per the requirements set forth by SJRWMD. On-line dry retention will require an additional 0.5-inch of runoff from the contributing area over the volume specified for off-line treatment. On-line treatment that provides for percolation from runoff from the three-year, one-hour storm can be substituted for the previous criteria.

If treatment volumes are required, and wet detention systems are used, the project will need to provide storage for the water quality volume equal to 1-inch of runoff over the contributing area, or 2.5-inches times the impervious area (excluding water bodies). The outfall structure shall be designed to drawdown one-half the required treatment volume within 24 and 30 hours following a storm event, but no more than one-half this volume will be discharged within the first 24 hours.

Stormwater management systems must be designed to treat and attenuate the 25-year, 24-hour storm for open basins. The study area is within an open basin.

Any impacts to existing permitted facilities will require permit modifications and additional stormwater treatment and attenuation.

## Orange County

### Roadway Drainage Design

#### General

Good pavement drainage design consists of the proper selection of grades, cross slopes, curb types, inlet location, etc., to remove the design storm rainfall from the pavement in a cost-effective manner while preserving the safety, traffic capacity and integrity of the highway and street system. These factors are generally considered to be satisfied, provided that excessive spreads of the water are removed from the vehicular traveled way and that siltation at pavement low points is not allowed to occur.

#### Swales

Swale drainage will be permitted only when the estimated wet-season water table is a minimum of two feet below the invert of the swale and only in single-family subdivisions with the minimum lot width equal to 100 feet.

## **Curbs and gutters**

All roadway drainage not considered suitable for swale and/or ditch type drainage shall be designed as one of the following:

- Miami curb and gutter section; or
- Standard curb and gutter section.

## **Design storm frequency**

The design storm frequency to be utilized for the design of pavement drainage shall set the hydraulic gradient line at six inches below gutter for a ten-year frequency storm.

## **Runoff determination**

The peak rates of runoff for which the pavement drainage system must be designed shall be determined by the rational method. The time of concentration, individual drainage areas and rainfall intensity amounts shall be submitted as part of the drainage plans. A separate Rational Runoff Coefficient (C) shall be determined for the specific contributing area to each inlet/catch basin within the proposed storm sewer system. A composite C value shall be computed for each contributing area based on an individual C value of 0.9 for the estimated impervious portion of the actual area and an individual C value of 0.2 for the remaining pervious (grassed) portion of the actual area.

## **Stormwater spread into traveled lane**

Inlets shall be located at all low points, intersections and along continuous grades to prevent the spread of water from exceeding tolerable limits. The acceptable tolerable limits for roadways with projected volumes in excess of an Average Daily Traffic (ADT) of 3,500 vehicles per day (vpd) is defined as approximately one-half the traveled lane width. Acceptable tolerable limits for roadways with projected volumes less than 3,500 ADT are defined as a maximum of one inch above the crown of the road.

## **Maximum inlet interception rates**

The FDOT Types 1 and 3 (single) inlets shall be located such that a maximum of 4.1 and 1.9 cubic feet per second (cfs), respectively, shall be intercepted during the ten-year frequency storm. (Types 2 and 4 – nine and six and one-half cfs, respectively, maximum.) Bypass flow is limited to a maximum of one cfs. Off-site flows from impervious areas of more than one-half acre shall be intercepted prior to the ROW line. No part of an inlet structure shall be located within a curb radius or in front of the access to the retention pond.

## **Inlet types**

The curb inlet types to be used shall be the latest version of the FDOT inlet types 1, 2, 3, 4, 7 and 8. Ditch bottom inlets shall be FDOT inlet types C, D, E and H. All ditch bottom inlets located within the ROW shall have traffic-bearing grates.

## **Low point inlets**

All inlets at low points (sumps) shall be designed to intercept 100 percent of the design flow without exceeding the allowable spread of water onto the traveled lanes as defined above. On roadways with greater than an ADT of 3,500 vpd, in order to prevent siltation and to provide for a safety factor against clogging of a single inlet in a sump location, multiple inlets are required at all sump locations.

## **Storm Sewer Design**

### **Design discharges**

Storm sewer system design is to be based upon a ten-year frequency event and shall be designed to handle the flows from the contributory area within the proposed subdivision. The system shall be analyzed a second time to ensure that any off-site flows can also be accommodated. This second analysis shall consider the relative timing of the on-site and off-site flows in determining the adequacy of the designed system.

### **Minimum pipe size**

The minimum size of pipe to be used in storm sewer systems is 15 inches. Designs shall be based upon six-inch increments in sizes above 18 inches.

### **Pipe grade**

All storm sewers shall be designed and constructed to produce a minimum velocity of two and one-half feet per second (fps) when flowing full. No storm sewer system, or portion thereof, will be designed to produce velocities in excess of twenty 20 fps for reinforced concrete pipe or ten fps for metal pipe, and these maximums shall only be used when these outlet ends have sufficient erosion protection and/or energy dissipators.

### **Maximum lengths of pipe**

The following maximum runs of pipe shall be used when spacing access structures of any type:

- 15" = 200'
- 18" = 300'
- 24" to 36" = 400'
- 42" and larger = 200'

### **Design tailwater**

All storm sewer systems shall be designed taking into consideration the tailwater of the receiving facility. In the case where the detention pond is the receiving facility, the design tailwater level can be estimated from the information generated by routing through the pond the hydrograph resulting from a ten-year frequency storm of duration equal to that used in designing the pond. The design tailwater level can be assumed to be the ten-year pond level corresponding to the time at which peak inflow occurs from the storm sewer into the pond. In lieu of the above-detailed analysis, a simpler design tailwater estimate can be obtained by averaging the established 25-year design high water elevation for the pond and the pond bottom elevation for "dry bottom" ponds or the normal water elevation for "wet bottom" ponds.

### **Hydraulic gradient line computations**

The hydraulic gradient line for the storm sewer system shall be computed taking into consideration the design tailwater on the system and the energy losses associated with entrance into and exit from the system, friction through the system, and turbulence in the individual manholes/catch-basins/junction boxes within the system. The energy losses associated with the turbulence in the individual manholes are minor for an open channel or gravity storm sewer system and can typically be overcome by adjusting (increasing) the upstream pipe invert elevations in a manhole by a small

amount. However, the energy losses associated with the turbulence in the individual manholes can be significant for a pressure or surcharged storm sewer system and must be accounted for in establishing a reasonable hydraulic gradient line.

### **Allowable materials**

Allowable materials for storm sewers shall be in accordance with the county road construction specifications.

### **Separation**

The stormwater collection system shall be separate from the retention outfall system.

### **Hydraulic grade exceptions**

Hydraulic grade exceptions apply to acceptable hydraulic grade lines that do not meet minimum scouring velocities of two and one-half fps. It is recognized that sites characterized by flat topography may not be able to satisfy this requirement for minimum velocity. Therefore, for the portions of the storm sewer system which do not meet the minimum required pipe velocity, the reach (pipe) hydraulic slope resulting from the upstream hydraulic grade line (HGL) elevation set at the roadway crown, or profile grade line (PGL), elevation, and the downstream HGL elevation set at the backwater elevation for the 10-year design storm event will be utilized to determine the maximum attainable pipe velocity. This scenario is utilized, on a pipe-by-pipe basis, assuming a storm sewer segment has become silted, whereupon the roadway has flooded at the upstream inlet up to the roadway crown, or profile grade line (PGL), elevation. If, under this scenario, a pipe velocity is determined to be equal to, or greater than the Orange County minimum pipe velocity, then it is assumed that the minimum scouring velocity of two- and one-half fps is attained.

### **Culvert Design**

No new culverts, or culvert extensions are anticipated.

### **City of Apopka**

The following criteria are applicable to the City of Apopka:

- The post-development peak rate of discharge shall not exceed the predevelopment peak rate of discharge for the 25-year, 24-hour storm.
- Pollution abatement volume shall be in accordance with the SJRWMD criteria.
- The City shall receive a copy of the SJRWMD permit before the City grants an approval of final engineering plans.
- The 25-year/24-hour rainfall amount of 8.6 inches and the 100-year/24-hours rainfall amount of 11.3 inches shall be used in runoff calculations.
- Retention ponds and detention ponds shall meet the following requirements based on type:
  - *No retention ponds or detention ponds are anticipated. Work is expected to be exempt.*



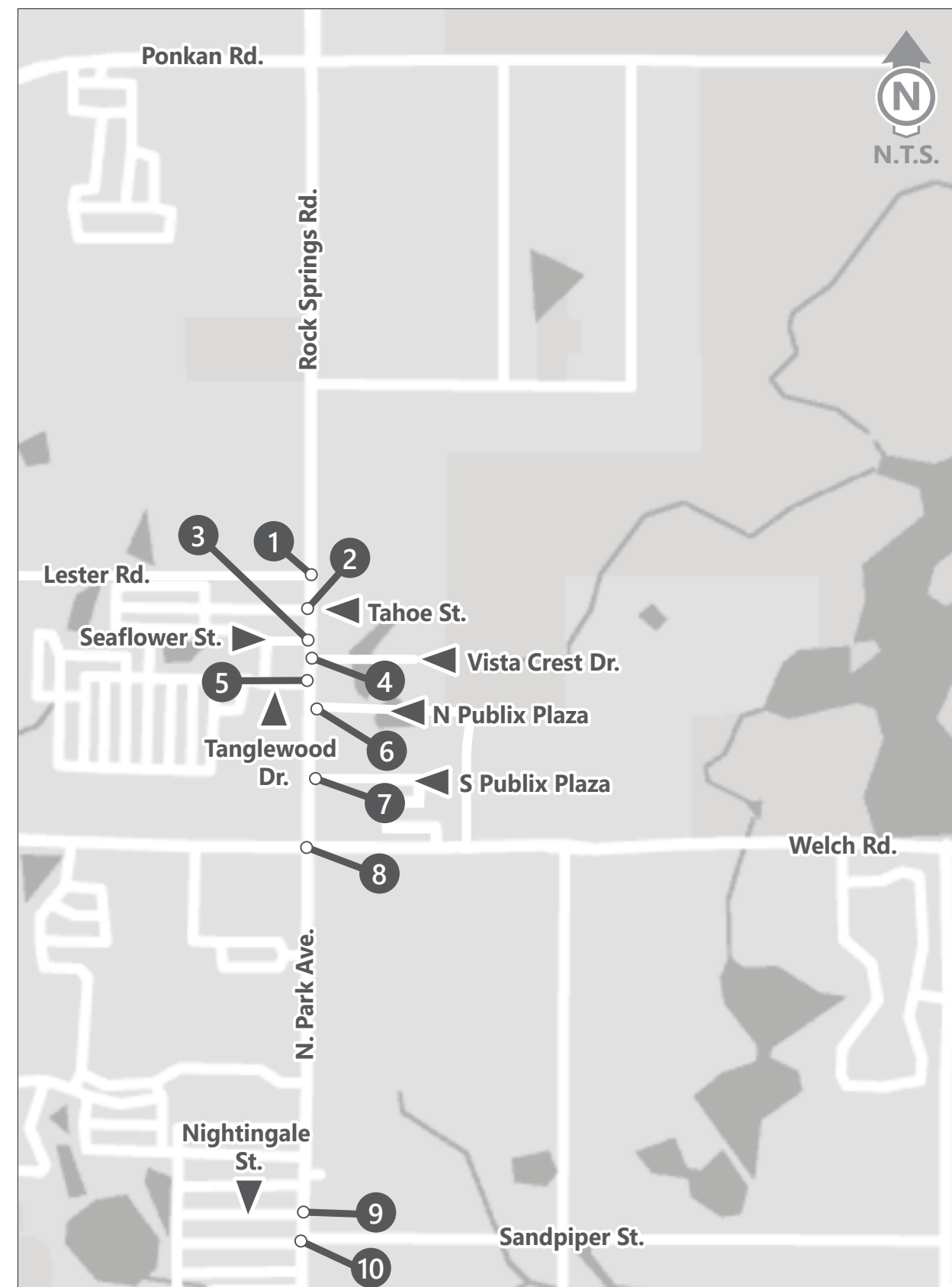
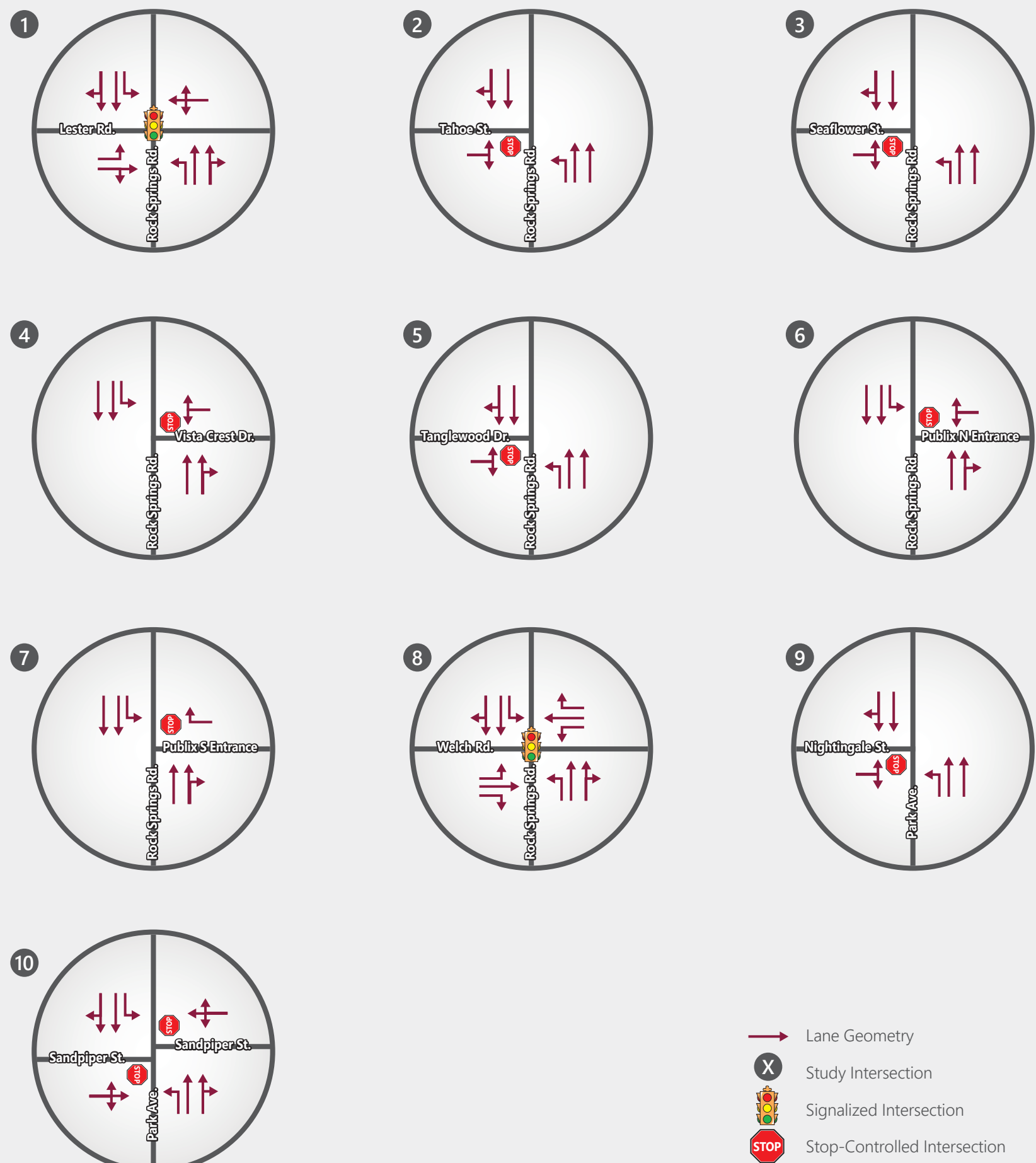
## Traffic Analysis

This section summarizes the operating conditions for the existing year, 2021, at the study intersections and roadway segments along the study corridor.

In analyzing the year 2021 operating conditions of the intersections and roadway segments, 72-hour classification counts and 8-hour turning movement counts collected in March of 2021 were used along with the existing roadway and intersection geometry. The existing Turning Movement Counts (TMCs) were seasonally adjusted using the Orange County Countywide Seasonal Factors collected from Florida Traffic Online (FTO). The intersection LOS analysis for the existing year 2021 was performed using signal timing data provided by the City of Apopka. The following sub-sections describe the overall analysis. For information relating to data collection and methodology, see the *DTTM* under separate cover.

### Existing Geometry

**Figure 21** provides the existing intersection geometry for all the intersections evaluated for this study. The existing intersection geometry information was obtained based on aerial photographs and field verified.

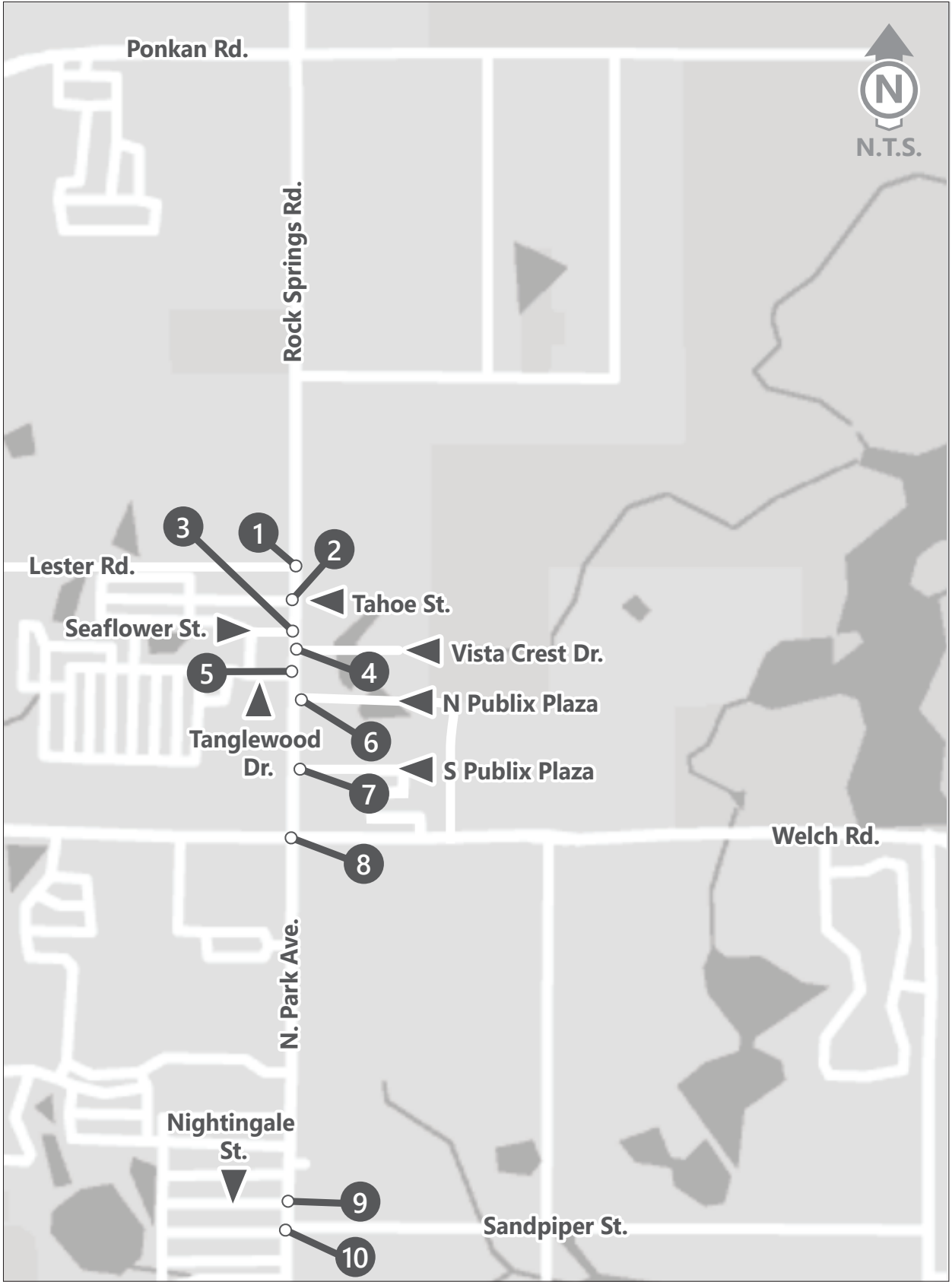
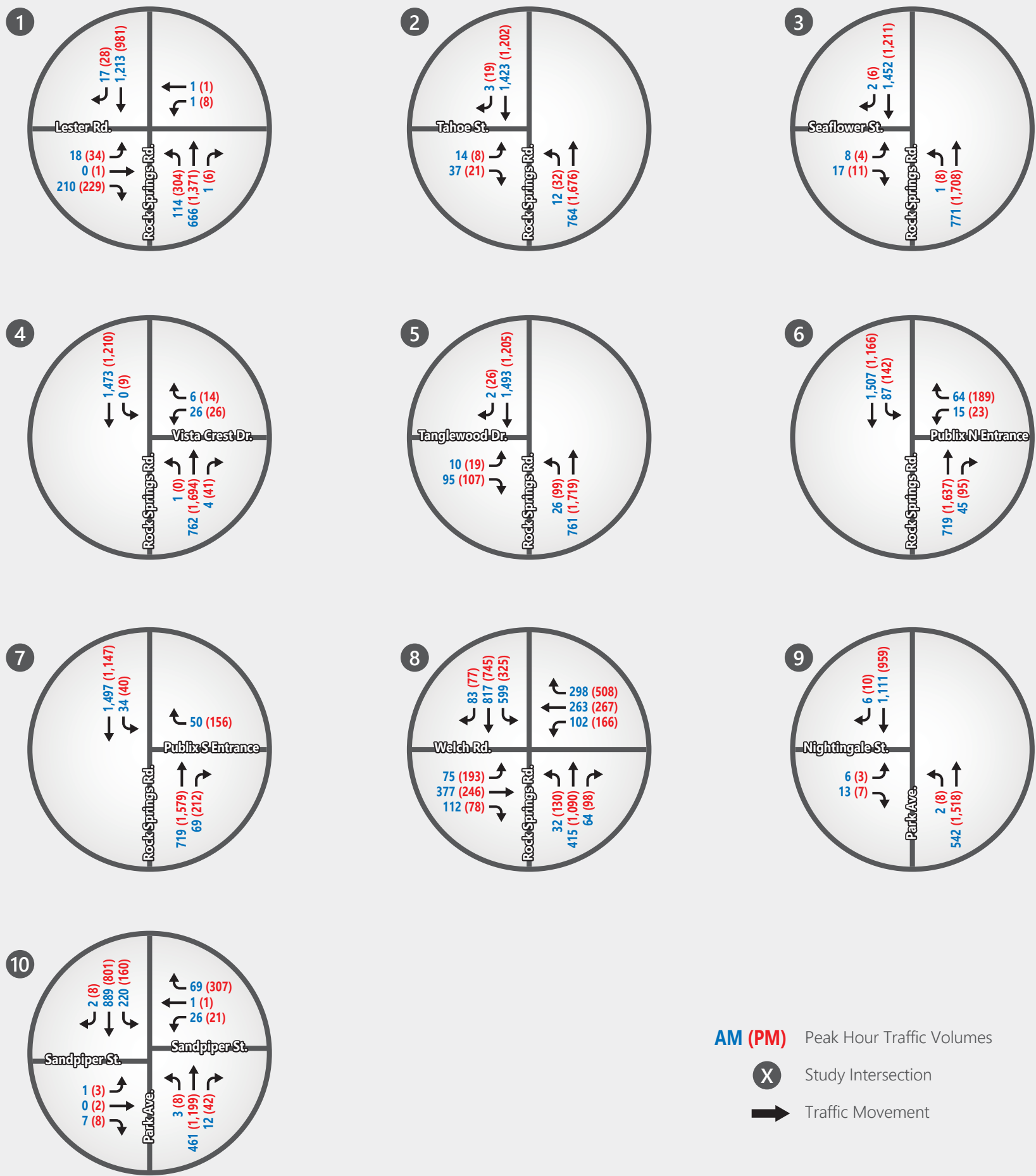
**Figure 21**

**Existing Geometry**  
 Rock Springs Road  
 Access Management Study

The existing geometry plays a vital role in assessing the intersection LOS. The existing geometry, along with existing volumes, is a factor to determine the operations, or LOS, of an intersection. The LOS is a qualitative measure of how efficiently a roadway or intersection operates. The LOS A represents the highest traffic flow quality, while LOS E represents traffic flow at capacity. The LOS F represents forced flow congested conditions. The LOS from B to C, and from C to D, represent a gradual degradation in traffic flow quality before reaching capacity.

### Existing Year Turning Movement Counts

The existing vehicular TMCs were seasonally adjusted using the Orange County Countywide Seasonal Factors collected from FTO and then balanced to ensure flow continuity along the main corridor. The adjusted existing year 2021 AM and PM peak hour Turning Movement Volumes (TMVs) for the study corridor are shown in **Figure 22**.



**Figure 22**  
**Existing Year 2021 AM & PM Peak Vehicular Turning Movement Volumes**  
Rock Springs Road  
Access Management Study



## Existing Year 2021 LOS Analysis

Synchro 11 was used to perform the LOS operational analyses for three modes (automobile [auto], pedestrian, and bicycle) at the study intersections. Auto LOS analysis was conducted for both the signalized and unsignalized study intersections. Pedestrian and bicycle LOS analysis was conducted at the signalized study intersections and roadway segments. Highway Capacity Manual (HCM 6<sup>th</sup> Edition) based analysis results from Synchro are provided for all the modes. Roadway segment LOS for the auto mode was computed using Synchro reported average speeds and criteria from Exhibit 18-1 of the HCM. Pedestrian, cyclist, and transit LOS for the study roadway segment is provided based on the criteria outlined in the 2020 Q/LOS Handbook.

Based on Orange County's Comprehensive Plan and the City of Apopka's Concurrency Management Systems (CMS) Database, the target LOS for the study intersections and roadways is LOS E, a target LOS D is assumed for the pedestrian, bicycle, and transit modes.

The existing year 2021 AM and PM peak hour Synchro outputs are included in the *DTTM*, under separate cover.

## Existing Year 2021 Intersection LOS Analysis

The year 2021 AM and PM peak hour turning movement volumes (**Figure 22**) along with existing intersection geometry and signal timings were used in the intersection LOS analysis. As the counts were collected in 15-minute intervals, Peak Hour Factors (PHFs) were applied based on individual intersection data.

A summary of the LOS analysis for the study intersections is included in **Table 21**. As shown in **Table 21**, the signalized intersection of Rock Springs Road at Lester Road was found to operate at LOS C during both AM and PM peak hours. The signalized intersection of Rock Springs Road at Welch Road was found to operate at LOS F during both the AM and PM peak hours. At the intersection of Rock Springs Road and Welch Road, the westbound shared through-right-turn lane and westbound right-turn lane were found to operate at LOS F with  $v/c > 1.0$  during both AM and PM peak periods. It is also noted that the southbound left turn 95<sup>th</sup> percentile queues extended beyond the Publix South access during both AM and PM peak periods.

None of the unsignalized intersections were found to operate below the target LOS E on the major approaches in either peak hour. In the PM peak hour, the minor approaches at the Publix Plaza North Access and East Sandpiper Street were found to exceed the target LOS E. In the AM peak hour, only the minor approach on East Sandpiper Street failed to meet the target LOS E.



Table 21 | Existing Year 2021 AM & PM Peak Intersection Analysis Summary

Study Intersections along Rock Springs Road	Control Type	Target LOS	Existing Year 2021			
			AM Peak Hour		PM Peak Hour	
			Delay (s)	LOS	Delay (s)	LOS
Lester Road	Signal	E	22.0	C	20.5	C
Tahoe Street	Stop	E	14.7 / 29.3	B/D	11.8 / 20.8	B/C
East Seaflower Street	Stop	E	14.1 / 25.1	B/D	11.4 / 18.5	B/C
Vista Crest Drive	Stop	E	0.0 / 23.4	A/C	15.9 / 49.3	C/E
Tanglewood Drive	Stop	E	16.0 / 31.6	C/D	13.0 / 25.5	B/D
Publix Plaza North Access	Stop	E	10.5 / 17.1	B/C	23.0 / 108.2	C/ <b>F</b>
Publix Plaza South Access	Stop	E	9.9 / 12.2	A/B	17.3 / 35.0	C/E
Welch Road	Signal	E	96.3	<b>F</b>	114.1	<b>F</b>
East Nightingale Street	Stop	E	11.4 / 17.2	B/C	10.3 / 16.1	B/C
East Sandpiper Street	Stop	E	10.0 / 72.0	B/E	15.0 / >300.0	B/ <b>F</b>

Notes:

1. HCM 6<sup>th</sup> Edition based outputs are presented in this table for the signalized and unsignalized intersections, respectively
2. Overall delay and LOS are reported for signalized intersections
3. Worst case results (delay and LOS) of major/minor movements are reported for unsignalized intersections

### Existing Year 2021 Roadway Arterial Performance

The roadway arterial operational analysis was performed for the existing year traffic conditions for AM and PM peak hours based on Synchro 11. The LOS reported in **Table 22** is based on Exhibit 18-1 (for 45 mph travel speed) of HCM 6<sup>th</sup> Edition. As shown in **Table 22**, the study corridor of Rock Springs Road between Welch Road and Lester Road is meeting the target LOS E in both directions. In the northbound direction, the corridor was found to operate at LOS A and B in the AM and PM peak hours, respectively. In the southbound direction, the corridor was found to operate at LOS C in both the AM and PM peak hours.

Table 22 | Existing Year 2021 Roadway Arterial Analysis Summary

Rock Springs Road between Lester Road and Welch Road	Year 2021 AM Peak Hour		Year 2021 PM Peak Hour	
	Speed (mph)	LOS	Speed (mph)	LOS
Northbound Direction	37.8	A	34.5	B
Southbound Direction	25.3	C	26.6	C

Note: Segment LOS is computed using Synchro reported average speed and LOS criteria from Exhibit 18-1 of HCM 6<sup>th</sup> Edition

### Existing Year 2021 Multimodal LOS Analysis

A summary of the pedestrian and bicycle LOS analysis at the signalized study intersections is included in **Table 23**. For this study, a LOS condition below LOS D for the non-auto modes was considered as operating at an unacceptable condition. As shown in **Table 23**, both the pedestrian and bicycle modes are found to operate within LOS D for both the AM and PM peak hours at the signalized intersections.

The pedestrian and bicycle LOS values reported at the signalized study intersections are based on the HCM 6<sup>th</sup> Edition methodologies.

Table 23 | Existing Year 2021 Multimodal LOS Analysis (Signalized Intersections)

Study Intersections at Rock Springs Road	Control Type	Pedestrian Mode LOS				Bicycle Mode LOS			
		EB	WB	NB	SB	EB	WB	NB	SB
AM Peak Hour									
Lester Road	Signal	B	B	C	C	C	B	C	C
Welch Road	Signal	C	D	C	C	D	D	C	D
PM Peak Hour									
Lester Road	Signal	C	B	C	C	C	B	D	C
Welch Road	Signal	C	C	C	C	C	D	D	C

Notes:

1. Signalized intersection multimodal LOS is based on HCM 6<sup>th</sup> Edition methodology
2. EB/WB is for side street movements and NB/SB is for Rock Springs Road movements

Pedestrian LOS at a signalized intersection is based on factors such as the number of traffic lanes crossed, disturbance caused by motorized vehicle traffic (traffic volumes, turning types, etc.), and the presence of channelized right-turns. The bicycle LOS at a signalized intersection is based on factors such as the presence of bicycle lanes and/or paved shoulders, separation from motorized vehicle traffic, traffic volumes and speeds, and heavy vehicle percentage.

Table 24 shows the multimodal LOS including pedestrian, bicycle, and transit LOS for the study corridor. This LOS is based on the Generalized Service Volume Table 1 of the 2020 Q/LOS Handbook.

The roadway segment bicycle LOS is based on a combination of paved shoulder/bicycle lane coverage and roadway volumes, pedestrian LOS is based on a combination of sidewalk coverage and roadway volumes, and transit LOS is based on a combination of sidewalk coverage and the number of buses in the peak hour peak direction. As shown in Table 24, the corridor is operating below the target LOS D for bicycles and transit.

Table 24 | Existing Year 2021 Multimodal LOS Analysis (Segments)

Rock Springs Road between Lester Road and Welch Road						
2021 AADT	Bicycle Mode LOS		Pedestrian Mode LOS		Transit Mode LOS	
	Paved Shoulder/Bicycle Lane Coverage	LOS	Sidewalk Coverage	LOS	Sidewalk Coverage (1 bus per hour)	LOS
29,000	0-49%	E	85-100%	D	85-100%	E

Notes:

1. Segment multimodal LOS is based on Generalized Service Volume Table 1 of the 2020 Q/LOS
2. 2021 AADT based on average AADT between Lester Road and Welch Road

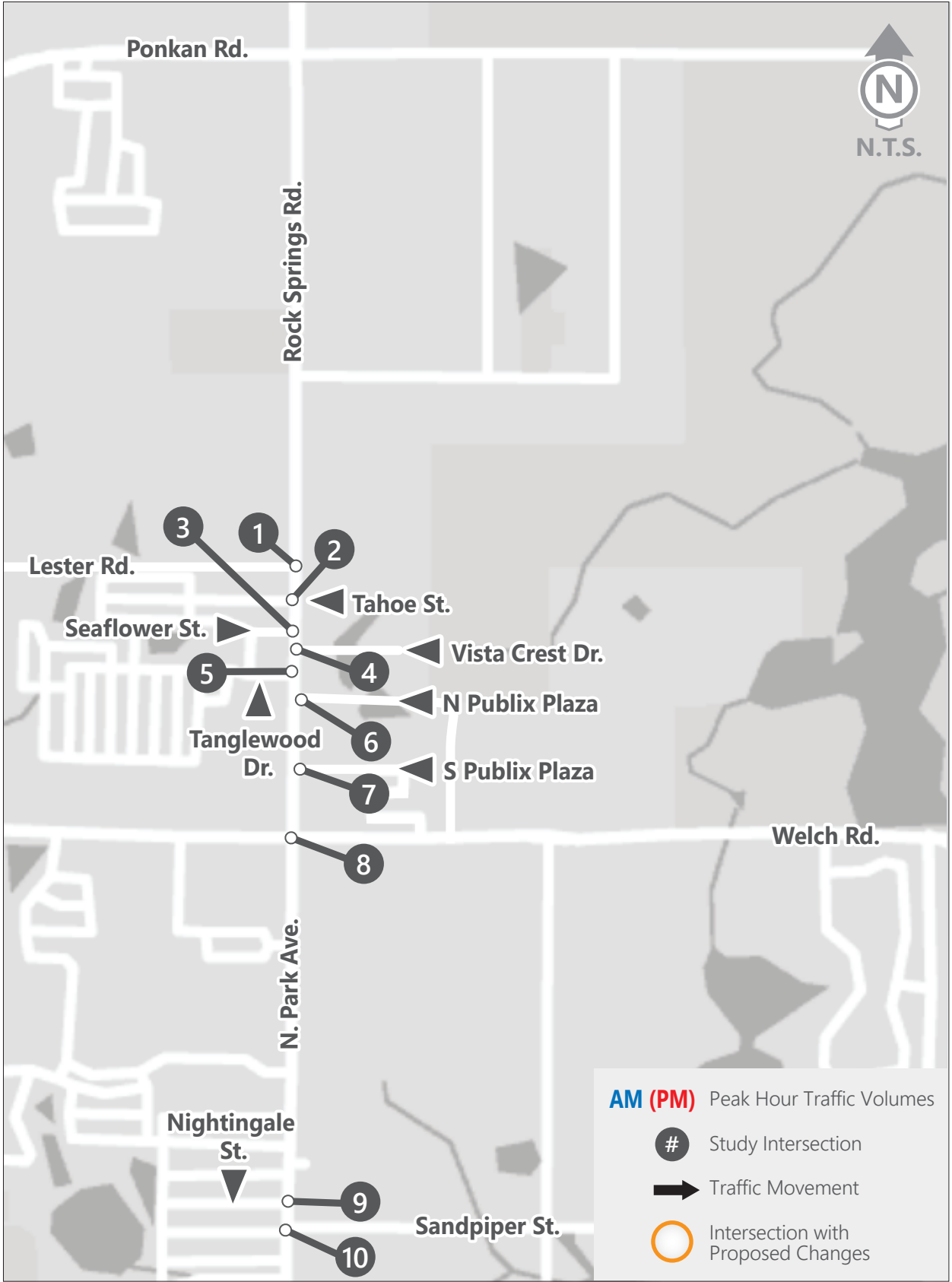
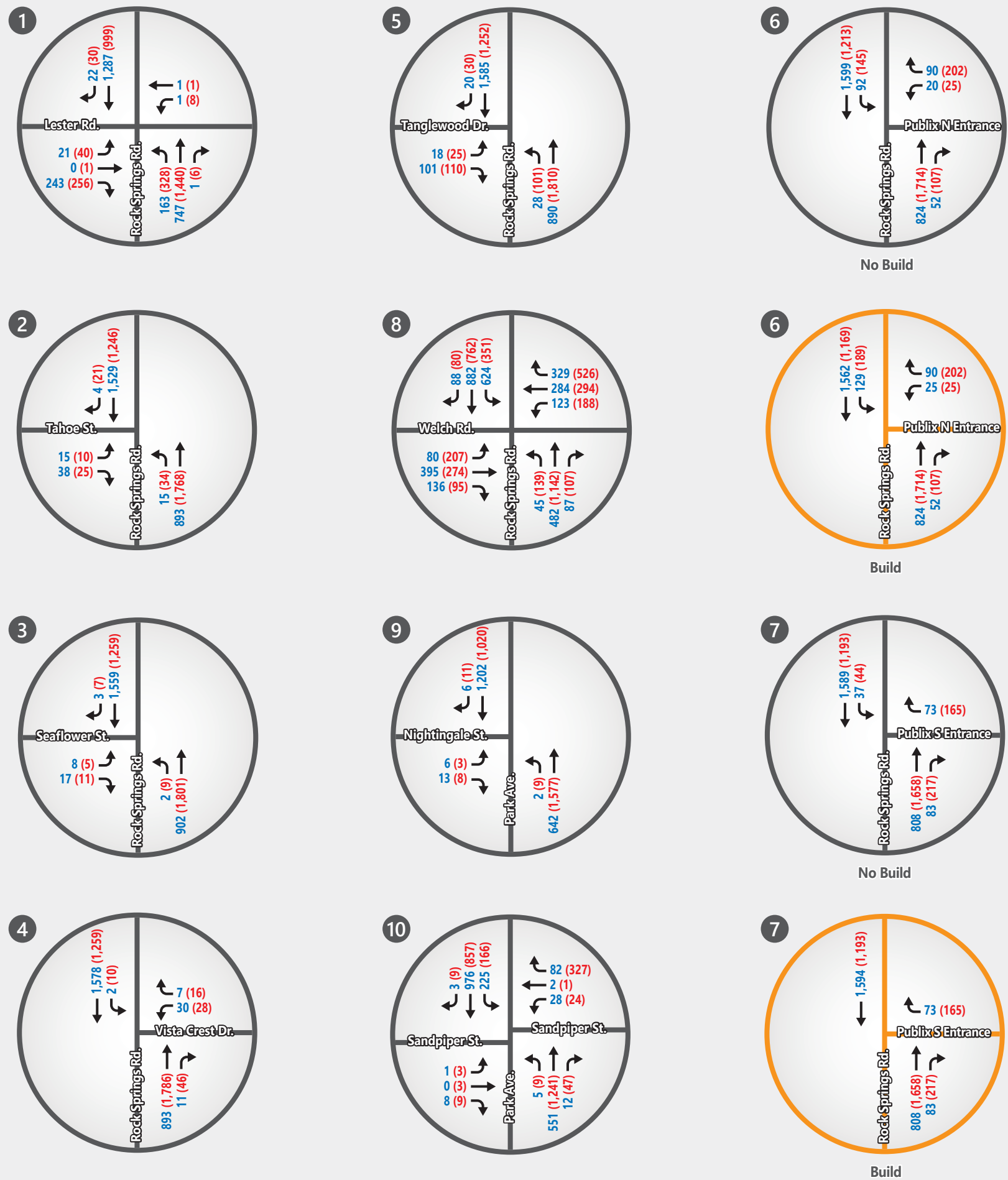
Based on the results shown in Table 23 and Table 24, the differences between the pedestrian and bicycle LOS for signalized intersections and segments are because of the different factors and methodologies used in calculating each of these LOS values. In general, the worst performing mode is the bicycle mode for both the intersection and segment analyses. This is due to the lack of bicycle

facilities such as paved shoulders or marked bicycle lanes, in combination with the high volumes along the main corridor of Rock Springs Road.

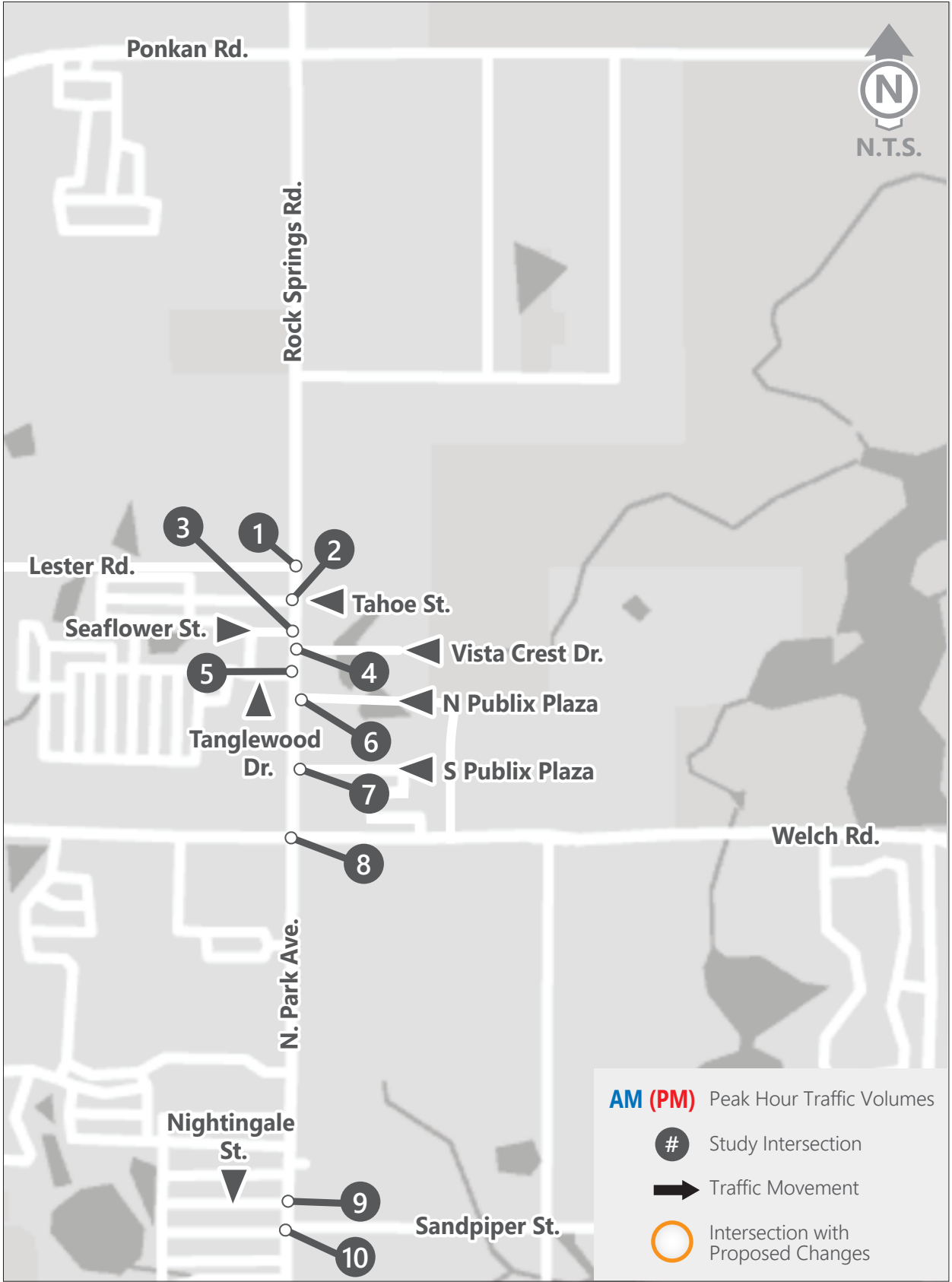
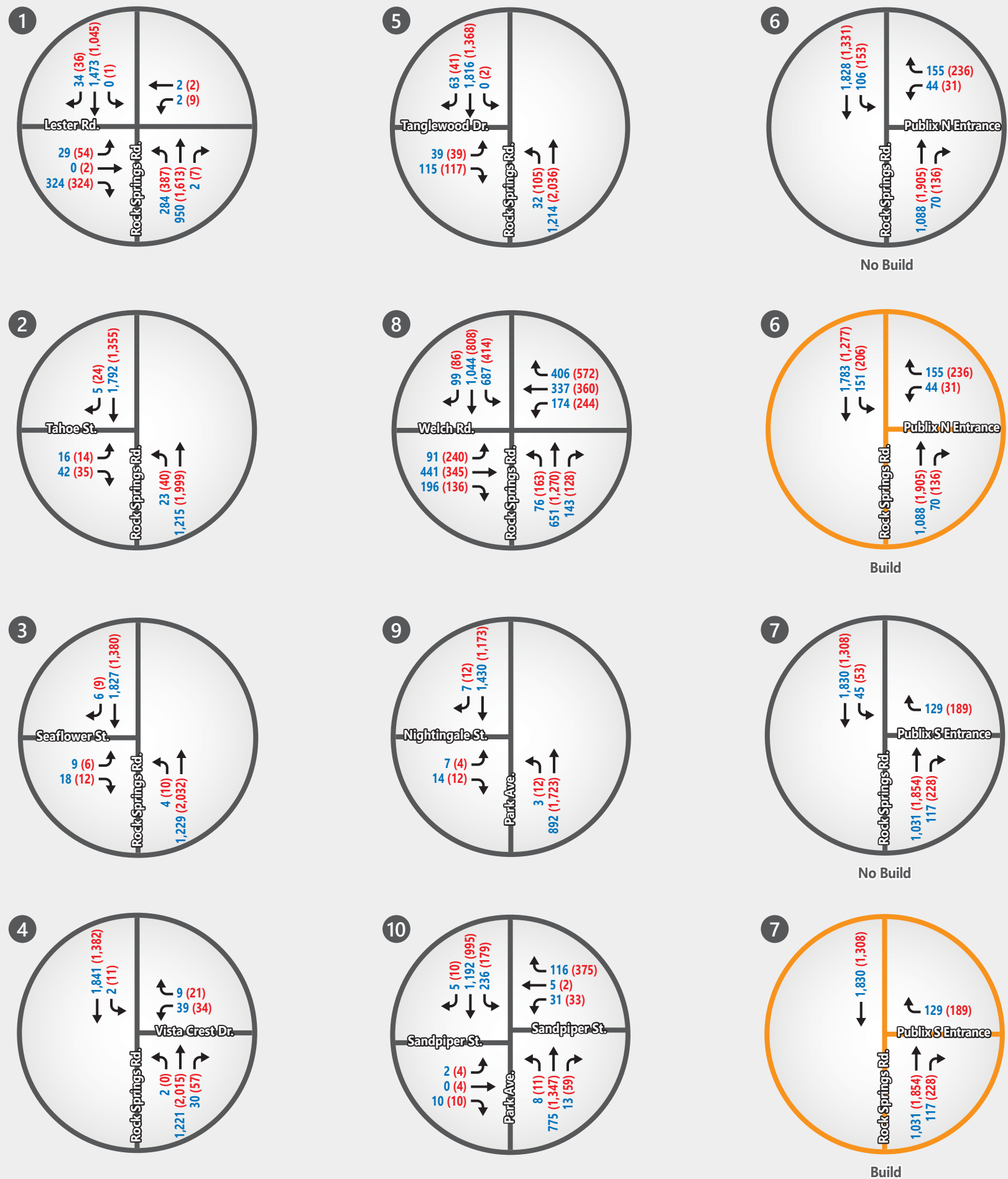
### Future Turning Movement Volumes (TMVs)

**Figure 23** through **Figure 25** provide the projected opening year 2025, interim year 2035, and design year 2045 TMVs based on the recommended growth rates for the study corridor. These volumes were developed utilizing FDOT's TURNS5 forecasting tool. TURNS5 forecasts future turning movement volumes based on existing turning movement patterns, K and D factors, and forecasted approach Annual Average Daily Traffics (AADTs). The resulting volumes are then adjusted to ensure volume balancing between intersections and reasonableness in forecasted traffic patterns. The above referenced information such as K and D factors as well as AADTs can be found in the *DTTM*, under separate cover.

The TMVs shown for the Publix access, north and south, display a Build and No-Build option where the Build option is represented to include the access management changes proposed for the Publix accesses outlined in the *DTTM*.

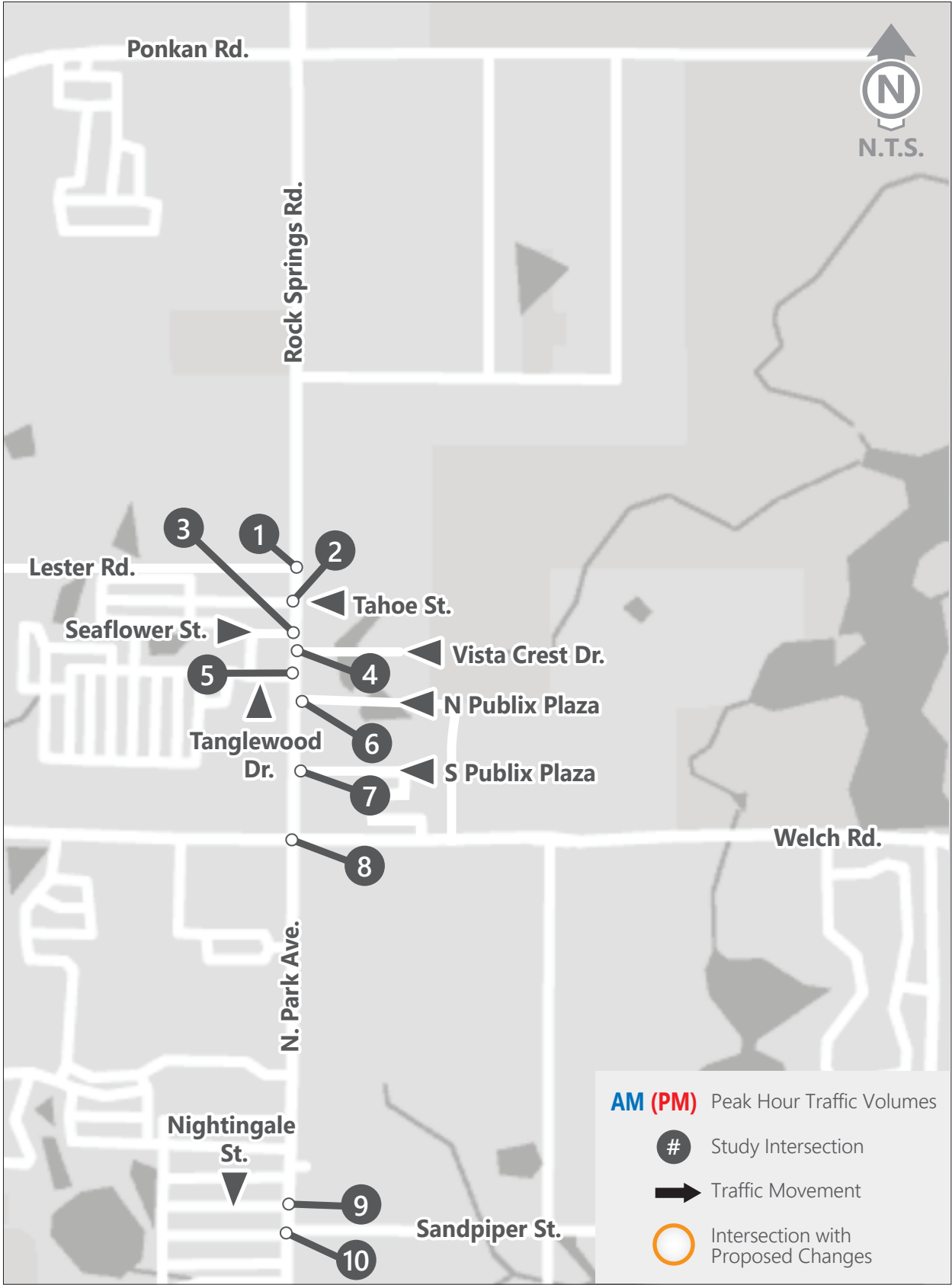
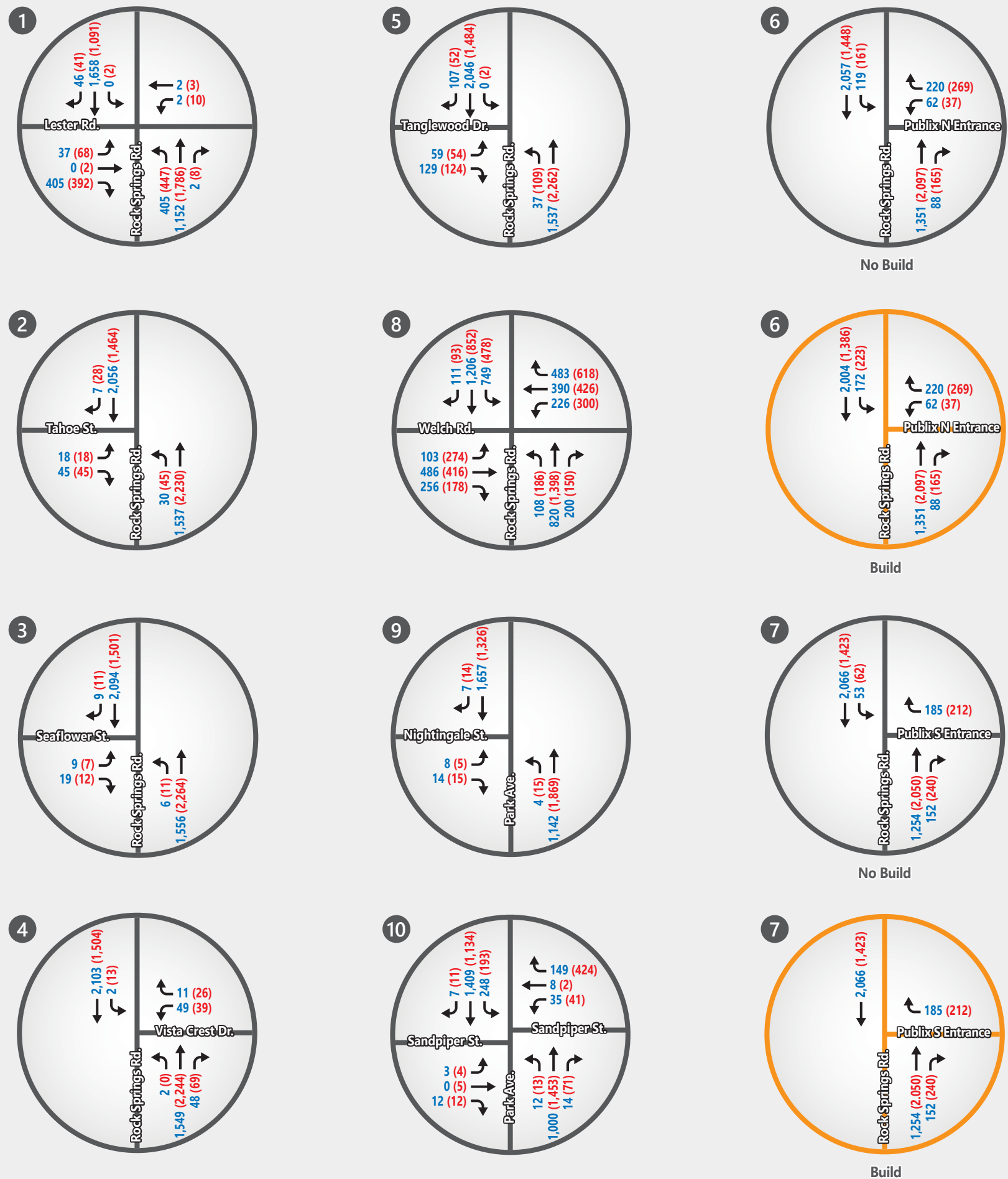


**Figure 23**  
**Future Year 2025 Intersection Turning Movement Volumes**  
Rock Springs Road  
Access Management Study



**Figure 24**  
**Future Year 2035 Intersection Turning Movement Volumes**  
Rock Springs Road  
Access Management Study





**Figure 25**  
**Future Year 2045 Intersection Turning Movement Volumes**  
Rock Springs Road  
Access Management Study

## Safety Analysis

A total of 268 crashes, including 91 injury crashes (163 total injuries) and 4 fatal crashes (5 total fatalities), were reported over the five years from January 1, 2016, to December 31, 2020, within the study area limits, as illustrated in **Table 25**. The largest proportion (43.65%) of these crashes occur during the PM peak hours from 3 pm to 7 pm. The predominant crash types were rear end (41.8%), left turn (21.3%), and angle crashes (10.4%). The summary of fatal crashes can be found in **Table 27**.

Table 25 | Crash Summary by Severity and Conditions

Year	All Crashes	Number of Injury Crashes	Total Number of Injuries	Number of Fatal Crashes	Total Number of Fatalities	Number of Night Crashes	Number of Wet Crashes
2016	60	16	27	0	0	19	7
2017	56	18	33	2	2	16	5
2018	64	25	46	0	0	8	8
2019	49	17	33	2	3	17	4
2020	39	15	24	0	0	10	3
Total	268	91	163	4	5	70	27
Average	53.6	18.2	32.6	0.8	1.0	14.0	5.4
Percent	100%	33.96%	-	1.49%	-	26.12%	10.07%

## Bicycle & Pedestrian Crashes

A total of eleven crashes involving bicycles and pedestrians have occurred in the study area, four involving bicycles and seven involving pedestrians. **Table 26** provides a summary of the locations and conditions of each crash. Of the eleven crashes, two were fatal and seven caused injuries; two occurred in dark conditions, one was alcohol-related, and two were distraction-related.

Table 26 | Bicycle and Pedestrian Crash Summary

Crash Type	Severity	Report Number	Location	Weather Condition	Lighting Condition	Road Surface Condition	Alcohol/Drug-Related	Distraction-Related
Pedestrian	Fatality	N/A	Park Ave at Sandpiper St	Clear	Dark – Not Lighted	Dry	No	No
	Injury	85377296	Rock Springs Rd at Welch Rd	Clear	Daylight	Dry	No	Yes
		87468234	Rock Springs Rd at Welch Rd	Clear	Daylight	Dry	No	No
		87468803	Rock Springs Rd at Tanglewood Dr	Clear	Daylight	Dry	No	No
		88313909	Rock Springs Rd at Tanglewood Dr	Clear	Daylight	Dry	No	No
		89502601	Rock Springs Rd at Tanglewood Dr	Clear	Daylight	Dry	No	No
	Property Damage	88093511	Rock Springs Rd at Lester Rd	Clear	Daylight	Dry	No	No
Bicycle	Fatality	87121265	Rock Springs Rd at Tahoe Street	Clear	Dark – Not Lighted	Dry	Yes	No
	Injury	88010257	Rock Springs Rd at Welch Road	Clear	Daylight	Dry	No	No
		N/A	Park Ave at Sandpiper St	Clear	Daylight	Dry	No	No
	Property Damage	N/A	Park Ave at Sandpiper St	Clear	Daylight	Dry	No	Yes

### Fatal Crash Summaries

Four fatal crashes resulting in five fatalities occurred during the study period within the study area. **Table 27** provides a summary of the locations and conditions of each crash.

Table 27 | Fatal Crash Summary

Crash Type	Report Number	Location	Weather Condition	Lighting Condition	Road Surface Condition	Alcohol/Drug-Related	Distraction-Related	Number of Fatalities
Pedestrian	N/A	Park Ave at Sandpiper Street	Clear	Dark – Not Lighted	Dry	No	No	1
Bicycle	87121265	Rock Springs Rd at Tahoe Street	Clear	Dark – Not Lighted	Dry	Yes	No	1
Off-Road	88113121	Rock Springs Rd at Tahoe Street	Clear	Dark – Lighted	Dry	No	No	2
Off-Road	85523176	Rock Springs Rd at Welch Road	Clear	Daylight	Dry	No	No	1

### Crash Rate

The segment crash rate (in crashes per million vehicle-miles traveled) was calculated for the Rock Springs Road segment from Welch Road to Lester Road to compare the actual crash rate of the corridor to the statewide average crash rate for similar facilities during the study period. The FDOT average crash rate statistics used in the comparison were extracted from the FDOT Crash Analysis Reporting System (CARS).

**Table 28** shows that the roadway segments on Rock Springs Road experienced an average crash rate higher than the average crash rate for similar facilities. Considering the location of the crashes along the segment from Welch Road to Tanglewood Drive, 158 out of the 166 total crashes occurred at the Rock Springs Road and Welch Road intersection, which contributes to the segment's high crash rate.

**Table 28 | Segment Crash Rate Comparison**

Segment	Number of Crashes <sup>3</sup>	Length (miles)	AADT <sup>4</sup>	ACR <sup>5</sup>	Crash Rate Category	AVG <sup>6</sup>	High Crash Segment?
Welch Road to Tanglewood Drive <sup>1</sup>	166	0.332	27,500	9.963	Urban 4-5 Lane 2 Way Divided - Paved	5.6	Yes
Tanglewood Drive to Lester Road <sup>2</sup>	74	0.218	29,000	6.414	Urban 4-5 Lane 2 Way Divided - Paved	5.6	Yes

Notes:

1. The segment includes Welch Road crashes but does not include Tanglewood Drive crashes
2. The segment includes both Tanglewood Drive and Lester Road Crashes
3. The number of crashes from January 1, 2016, to December 31, 2020. Crash totals exclude crashes occurring on intersection approaches at Welch Street and Lester Road that do not fall within the segment.
4. Data obtained from project traffic counts
5. Actual Crash Rate (ACR) =  $(N * 1,000,000) / (365 * Y * AADT * L)$ , where N = number of crashes, Y = number of years, AADT = Annual Average Daily Traffic, and L = Length of the segment in miles.
6. AVG = Statewide Average Crash Rate for the corresponding category

The intersection crash rates for the study area are shown in **Table 29**. As can be seen in the table, the intersections of Rock Springs Road with Welch Road and Lester Road are both high crash rate intersections, with the average crash rate at the intersection of Rock Springs Road and Welch Road being approximately three times as high as the statewide average. Also, the intersection of Park Avenue and Sandpiper Street has a slightly higher average crash rate compared to the statewide average.

**Table 29 | Intersection Crash Rate Comparison**

Intersection	Number of Crashes <sup>1</sup>	No. Entering Vehicles <sup>2</sup>	ACR <sup>3</sup>	Crash Rate Category	AVG <sup>4</sup>	High Crash Intersection?
Rock Springs Rd at Welch Rd	158	41,606	2.081	Urban 4-5 Lane, 2 Way, Divided – Paved, 4-leg	0.722	Yes
Rock Springs Rd at Lester Rd	36	31,918	0.618	Urban 4-5 Lane, 2 Way, Divided – Paved, 3-leg	0.472	Yes
Park Ave at Sandpiper St	28	20,449	0.75	Urban 4-5 Lane, 2 Way, Divided – Paved, 4-leg	0.722	Yes

Notes:

1. The number of crashes from January 1, 2016, to December 31, 2020.
2. Data obtained from project traffic counts
3. ACR =  $(N * 1,000,000) / (365 * Y * AADT)$ , where N = number of crashes, Y = number of years, AADT = Annual Average Daily Traffic.
4. AVG = Statewide Average Crash Rate for Corresponding Category.

# No-Build Alternative

## Programmed Improvements

To understand which relevant projects are planned and programmed, the following documents were reviewed:

- FDOT District 5 Work Program FY 2023-27, *[Adopted: July 1, 2022]*
- MetroPlan Orlando 2045 Metropolitan Transportation Plan (MTP), *[Adopted: December 9, 2020; Revised: March 9, 2022]*
- MetroPlan Orlando Transportation Improvement Plan (TIP): 2022/23-2026/27, *[Adopted: July 27, 2022]*
- MetroPlan Orlando Prioritized Project List (PPL): 2027 – 2036, *[Adopted: July 27, 2022]*
- Orange County Comprehensive Plan: 2030 (Transportation Element), *[Adopted: May 19, 2009; Effective: March 30, 2015]*
- City of Apopka Comprehensive Plan: 2030 (Transportation Element), *[EST: July 2010]*

### FDOT FY 2021/22-2025/26 Work Program

The adopted FDOT Work Program was reviewed on August 12, 2022, for any programmed projects within the Rock Springs Road study area. No programmed projects were found within the study area.

### MetroPlan Orlando 2045 MTP

The adopted MetroPlan Orlando 2045 MTP was reviewed on August 12, 2022, for any programmed projects for Rock Springs Road. Seven projects relating to the study area are included in the MTP, these are summarized in **Table 30**.

### MetroPlan Orlando TIP 2022/23-2026/27

The adopted MetroPlan Orlando TIP was reviewed on August 12<sup>th</sup>, 2022, for any programmed projects within the study area. No planned improvements were found relating to the study area.



Table 30 | MetroPlan Orlando 2045 MTP Programmed Projects Summary

Project Name	MTP ID#	Limits	Length (miles)	Total Cost (2020 \$'s in Millions)	Phases	Funding Status
West Orange Trail Phase 4	5077	Rock Springs Road from Lester Road to Kelly Park Road	6.63	13.25	PE, ROW	Plan Period II (2031-2035) (partially) Local Funding (unallocated)
					Environmental, Construction, CEI	Plan Period III (2036-2045) (partially) Local Funding (unallocated)
West Orange Trail Phase 4B	5014	Welch Road from Wekiva Parkway to Rock Springs Road	2.69	5.38	PE, ROW, Environmental	Plan Period III (2036-2045)
		Rock Springs Road from Welch Road to Kelly Park Road			Construction, CEI	Unfunded
Complete Streets / Safety / Operational Study on Welch Road	7377	Rock Springs Road to Seminole County Line	3.23	33.94	PD&E, PE, ROW, Environmental, Construction, CEI	Plan Period I (2026-2030)
Widening of Welch Road from 2 lanes to 4 lanes	7547	Rock Springs Road to Thompson Road	1.26	14.16	PD&E, PE, ROW, Environmental, Construction, CEI	Plan Period II (2031-2035)
Operational / Safety Study at Sandpiper Road and Park Avenue (this project)	7306	Sandpiper Road at Park Avenue	0.12	0.57	PE, ROW, Environmental, Construction, CEI	Unfunded
Rock Springs Road Access Study (this project)	B2	Rock Springs Road at Welch Road Rock Springs Road with Lester Road	0.79	3.76	PE, ROW, Environmental, Construction, CEI	Unfunded
Complete Streets Study on Rock Springs Road	4010	Votaw Road to Ponkan Road	3.05	20.10	PD&E, PE, Environmental, Construction, CEI	Plan Period III (2036-2045) (partially) Local Funding (unallocated)

Notes:

PD&E = Project Development & Environmental

PE = Preliminary Engineering (PE)

CEI = Construction Engineering and Inspection

## MetroPlan Orlando PPL 2027– 2036 (Adopted: July 27, 2022)

The adopted MetroPlan Orlando Prioritized Project List (PPL) was reviewed on August 12, 2022, for any programmed projects along Rock Springs Road. One planned improvement was found within the study area in the Adopted PPL as summarized in **Table 31**.

Table 31 | MetroPlan Orlando PPL 2027 – 2036 Projects Summary

Project	Priority Phase	Cost	Project Type	Source Location	Priority Ranking
West Orange Trail Phase 4 from Kelly Park / Rock Springs to West Lester Road	PE	\$3,081,000	Shared Use Path	Page 36 of 56	#3 (Pedestrian and Bicycle Infrastructure Projects)

## Orange County Comprehensive Plan – Transportation Element

The adopted Orange County Comprehensive Plan’s Transportation Element was reviewed on August 12, 2022, to identify any sections related to this study. The Transportation Element includes the Orange County Long Range Transportation Plan (LRTP) as Map 1, showing all planned and programmed county and state roadway projects; no projects are shown either within the study area or in its immediate vicinity. The LRTP Map is included in **Appendix H**.

Within the ‘Goals, Objectives, and Policies’ section, the following are specifically related to the improvement of roadway operations and safety:

**Goal T1:** A safe, accessible, convenient, efficient, and financially feasible multimodal transportation system which minimizes environmental impacts.

**Goal T2:** A concurrency management system and mobility strategy which ensures that the transportation facilities and services needed to support land use designations established in the Future Land Use Element are available.

**Objective T2.1:** The County will continue to ensure minimum level of service standards on County roads and State roads within unincorporated Orange County.

## City of Apopka Comprehensive Plan – Transportation Element

The adopted City of Apopka Comprehensive Plan’s Transportation Element for 2030 was reviewed on August 12, 2022, to identify any sections related to this study.

Within the ‘Goals, Objectives, and Policies’ section, the following are specifically related to the improvement of roadway operations and safety:

**Goal:** The City of Apopka shall promote the continued development of a financially feasible, safe, and energy-efficient multi-modal transportation system that is integrated functionally and aesthetically into the surrounding land use framework and enhances the mobility needs of the Apopka area.

**Objective 3:** The City of Apopka shall coordinate with Orange County, MetroPlan Orlando and FDOT to develop an efficient, interconnected roadway network that addresses regional and local traffic circulation needs while respecting environmentally sensitive lands and the character of surrounding neighborhoods.

**Objective 5, Policy 5.7:** In the evaluation of alternative road improvements, the City of Apopka shall give priority to alternatives that promote expansion of the Apopka area’s collector road system and minimize the need to add lanes to existing roads.

**Objective 7:** The City of Apopka shall work toward the implementation of a transportation system that allows for the movement of vehicular traffic on a network that adheres to minimum transportation planning and engineering design criteria.

### City of Apopka – Programmed Improvements

The realignment and signalization of the intersection of Sandpiper Street with Park Avenue is currently in design by the City of Apopka. The City of Apopka has allocated funding for construction to begin in FY 2023.

## No Build Operations Analysis

The No Build operational analysis represents the baseline evaluation of the operational performance of the corridor. Under the No Build scenario, the corridor operations are evaluated assuming the existing geometry. The lane geometries assumed for each intersection are as presented in **Figure 21** and used for all future year No Build scenarios (2025, 2035, and 2045).

### Intersection LOS Analysis

Intersection analysis was performed to determine any deficiencies at the study intersections in the future years. Forecasted turning movement volumes, as shown in **Figure 23** through **Figure 25**, were used to evaluate the No Build alternative.

Like the existing conditions operational analysis, Synchro 11 was used to perform the LOS operational analyses for three modes (automobile [auto], pedestrian, and bicycle) at the study intersections. HCM 6<sup>th</sup> Edition based analysis results from Synchro are provided for all the modes. Roadway segment LOS for the auto mode was computed using Synchro reported average speeds and criteria from Exhibit 18-1 of the HCM. Pedestrian, cyclist, and transit LOS for the study roadway segment is provided based on the criteria outlined in the 2020 Q/LOS Handbook. Synchro (HCM 6<sup>th</sup> Edition) output sheets for each of these analyses are provided in the *DTTM*, under separate cover.

The results of the No Build analysis are presented in **Table 32** and summarized below:

- The signalized intersection of Rock Springs Road at Lester Road is projected to operate with the target LOS E through the design year 2045.
- The signalized intersection of Rock Springs Road at Welch Road is projected to fail with LOS F starting from the opening year 2025.
- The Rock Springs Road approaches at all the unsignalized intersections are expected to operate within the target LOS E except for the major street approach at the intersection of Rock Springs Road and Publix Plaza North Access (LOS F) in the year 2045 PM design hour.
- Starting from the year 2025, the minor street approaches on Vista Crest Drive, Tanglewood Drive, Publix Plaza North Access, and East Sandpiper Street are expected to operate at LOS F. By the year 2035, the minor street approaches on Tahoe Street and Publix Plaza South Access are also expected to operate at LOS F. By the year 2045, except for East Nightingale Street, all the other minor street approaches are expected to operate at LOS F.

Table 32 | No Build Intersection Analysis Summary

Rock Springs Road at	Control Type	Target LOS	2025 No Build				2035 No Build				2045 No Build			
			AM Design Hour		PM Design Hour		AM Design Hour		PM Design Hour		AM Design Hour		PM Design Hour	
			Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Lester Road	Signal	E	29.2	C	24.6	C	48.5	D	45.9	D	77.6	E	70.0	E
Tahoe Street	Stop	E	16.0/35.8	C/E	12.2/22.7	B/C	20.3/63.1	C/F	13.1/28.2	B/D	27.1/158.5	D/F	14.2/36.4	B/E
East Seaflower Street	Stop	E	15.2/28.4	C/D	11.8/20.3	B/C	18.6/42.1	C/E	12.5/23.6	B/C	23.2/63.5	C/F	13.5/28.1	B/D
Vista Crest Drive	Stop	E	10.4/28.3	B/D	17.0/59.7	C/F	12.7/51.5	B/F	20.3/110.2	C/F	16.0/131.9	C/F	24.8/234.6	C/F
Tanglewood Drive	Stop	E	17.6/52.0	C/F	13.6/32.1	B/D	22.9/292.1	C/F	15.0/66.5	C/F	31.5/>300.0	D/F	16.8/176.2	C/F
Publix Plaza North Access	Stop	E	11.3/24.1	B/C	26.0/225.2	D/F	14.3/142.0	B/F	38.5/>300.0	E/F	19.7/>300.0	C/F	66.6/>300.0	F/F
Publix Plaza South Access	Stop	E	10.5/13.4	B/B	18.6/42.4	C/E	12.4/18.6	B/C	22.9/81.5	C/F	15.1/33.6	C/D	29.4/172.3	D/F
Welch Road	Signal	E	111.9	F	134.6	F	154.8	F	193.0	F	214.0	F	278.8	F
East Nightingale Street	Stop	E	12.0/18.7	B/C	10.7/16.5	B/C	13.7/24.0	B/C	11.6/18.4	B/C	16.0/32.1	C/D	12.7/21.2	B/C
East Sandpiper Street	Stop	E	10.5/86.6	B/F	15.8/>300.0	C/F	11.8/>300.0	B/F	18.5/>300.0	C/F	14.6/>300.0	B/F	22.5/>300.0	C/F

- Notes:
- 1. HCM 6<sup>th</sup> Edition based outputs are presented in this table for the signalized and unsignalized intersections, respectively
  - 2. Overall delay and LOS are reported for signalized intersections
  - 3. Worst case results (delay and LOS) of major/minor movements are reported for unsignalized intersections

## Roadway Arterial LOS Analysis

The No Build roadway arterial operational analysis was performed for three future year traffic conditions (2025, 2035, and 2045) for AM and PM design hours based on Synchro 11. The LOS reported in **Table 33** is based on Exhibit 18-1 of HCM 6<sup>th</sup> Edition. As shown in **Table 33**, the Rock Springs Road segment between Welch Road and Lester Road, in both directions, is expected to fail to meet the target LOS E starting from the year 2035.

Table 33 | Roadway Arterial LOS Summary – No Build

Rock Springs Road between Welch Road and Lester Road	AM Design Hour		PM Design Hour	
	Speed (mph)	LOS	Speed (mph)	LOS
2025 No Build				
Northbound Direction	25.8	C	20.9	D
Southbound Direction	21.3	D	20.8	D
2035 No Build				
Northbound Direction	14.5	F	13.9	F
Southbound Direction	16.8	E	19.4	E
2045 No Build				
Northbound Direction	12.5	F	9.7	F
Southbound Direction	10.7	F	18.5	E

## Multimodal LOS Analysis

A summary of the pedestrian and bicycle LOS analyses at the signalized study intersections is included in **Table 34**. For this study, a LOS condition below LOS D for the non-auto modes was considered as operating at an unacceptable condition. The pedestrian mode at the study signalized intersections is projected to be within LOS D through the design year 2045. The bicycle mode at Rock Springs Road and Lester Road is projected to be within LOS D through the design year 2045. The bicycle mode on the westbound approach at the intersection of Rock Springs Road and Welch Road is anticipated not to meet the assumed target LOS D in the years 2035 and 2045.



Table 34 | Multimodal LOS Analysis (Signalized Intersections) Summary – No Build

Study Intersections at Rock Springs Road	Control Type	Pedestrian Mode LOS				Bicycle Mode LOS			
		EB	WB	NB	SB	EB	WB	NB	SB
2025 No Build									
AM Design Hour									
Lester Road	Signal	B	B	C	C	C	B	C	C
Welch Road	Signal	C	D	C	C	D	D	C	D
PM Design Hour									
Lester Road	Signal	C	B	C	C	C	B	D	C
Welch Road	Signal	C	C	C	D	C	D	D	C
2035 No Build									
AM Design Hour									
Lester Road	Signal	B	B	C	C	C	B	C	C
Welch Road	Signal	C	D	C	C	D	D	C	D
PM Design Hour									
Lester Road	Signal	C	B	D	C	C	B	D	C
Welch Road	Signal	C	C	D	D	D	E	D	D
2045 No Build									
AM Design Hour									
Lester Road	Signal	C	B	D	C	C	B	D	D
Welch Road	Signal	C	D	C	D	D	E	C	D
PM Design Hour									
Lester Road	Signal	C	B	D	C	C	C	D	C
Welch Road	Signal	C	D	D	D	D	E	D	D

Notes:

1. Signalized intersection multimodal LOS is based on HCM 6<sup>th</sup> Edition methodology
2. EB/WB is for side street movements and NB/SB is for Rock Springs Road movements

**Table 35** shows the multimodal LOS including pedestrian, bicycle, and transit LOS for the study corridor. This LOS is based on the Generalized Service Volume Table 1 of the 2020 Q/LOS Handbook. As shown in **Table 35**, the corridor is not anticipated to meet the assumed target LOS D for either bicycles or transit in all years, and pedestrians in 2035 and 2045.

Table 35 | Multimodal LOS Analysis (Segments) Summary – No Build

Rock Springs Road between Lester Road and Welch Road						
Segment Average AADT	Bicycle Mode LOS		Pedestrian Mode LOS		Transit Mode LOS	
	Paved Shoulder/Bicycle Lane Coverage	LOS	Sidewalk Coverage	LOS	Sidewalk Coverage (1 bus per hour)	LOS
2025 No Build						
31,500	0-49%	E	85-100%	D	85-100%	E
2035 No Build						
37,000	0-49%	E	85-100%	E	85-100%	E
2045 No Build						
43,000	0-49%	F	85-100%	F	85-100%	E

Notes:

1. Segment multimodal LOS is based on Generalized Service Volume Table 1 of the 2020 Q/LOS

There are many factors and methodologies used to determine pedestrian and bicycle LOS for signalized intersections and segments. Transit LOS is based on a combination of sidewalk coverage and the number of buses in the peak hour peak direction.

Based on the results shown in **Table 34** and **Table 35**:

- Bicycle LOS will continue to operate below the target LOS D (for all the future analysis years) due to the lack of cyclist facilities (such as marked bike lanes or paved shoulders) that is considered for both the intersection and segment methodologies. The bicycle LOS is based on a combination of paved shoulder/bicycle lane coverage and roadway volumes.
- Pedestrian LOS will also operate below the target LOS D for the years 2035 and 2045 following the methodology for multimodal segment LOS. Despite the substantial sidewalk coverage along Rock Springs Road, the high forecasted volumes result in a lower LOS for segments. For intersections, while the pedestrian LOS is within the target LOS D, **Table 35** demonstrates how the LOS is worsened over time due to the increasing volumes. Pedestrian LOS is based on a combination of sidewalk coverage and roadway volumes.
- Transit LOS continues to operate below the target LOS D due to the low frequency of bus service on this segment. The transit LOS methodology accounts only for sidewalk availability and bus service frequency.

# Build Alternatives

## Alternatives Development

Results from the existing and future conditions analysis of the study area, combined with feedback from local stakeholders, were used to develop two alternatives throughout the study area for further evaluation. The two alternatives are described in this chapter.

### Design Criteria

Rock Springs Road, Welch Road, and Sandpiper Street within the study area are not state roads. Therefore, the 2018 Florida Greenbook was used to determine their context classification. The context classification evaluation results are shown in **Table 36**.

Table 36 | Summary of Context Classification Evaluation

Road	Context Classification	Context Classification Description
Rock Springs Road	C3R*	Mostly residential uses within large blocks and a disconnected or sparse roadway network.
Welch Road	C3R*	
Sandpiper Street	C3R*	

\*FDOT does not define a context classification for these roads, therefore a context classification was determined based on the criteria set in the FDOT Context Classification Guide (July 2020).

The design criteria determined by the assigned context classification are provided in **Table 37**, as defined in the 2018 Florida Greenbook. All criteria are subject to change, and only the most current criteria should be used during the final design phase.

Table 37 | 2018 Florida Greenbook Design Criteria by Context Classification

Design Control	Rock Springs Road/Park Avenue	Welch Road	East Sandpiper Street	Source
Context Classification	C3R – Suburban Residential	C3R – Suburban Residential	C3R – Suburban Residential	Selected by Study
Functional Classification	Major Collector Urban	Major Collector Urban	Local Urban	FDOT Functional Classification Maps / Selected by Study
Design Speed	45 mph	35 mph	40 mph	Selected by Study / FDOT Context Classification Guide, Table 8
Lane Widths (Travel and Auxiliary)	11 feet	11 feet	10 feet	Florida Greenbook Table 3-20
Minimum Median Width for Divided Roadways	22 feet	22 feet	22 feet	Florida Greenbook Table 3-23
Standard Sidewalk Width	5 feet	5 feet	5 feet	Florida Greenbook Chapter 8 Section B.1
Shared-Use Path Width	12 feet	12 feet	N/A	Florida Greenbook Chapter 9 Section C.1
Curb & Gutter Type	Median – Type E Outside – Type F	Median – Type E Outside – Type F	Median – Type E Outside – Type F	Florida Greenbook Chapter 3 Section C.7.g

**Table 38** provides additional design criteria not controlled by the context classification for each of the project segments.

Table 38 | 2018 Florida Greenbook Design Criteria Additional Standards

Design Control	Rock Springs Road/Park Avenue	Welch Road	East Sandpiper Street	Source
Typical Section Type	Urban	Urban	Urban	Selected by Study
Access Management Classification	5 – Restrictive	5 – Non-Restrictive	6 – Non-Restrictive	Selected by Study
Access Class - Connection Spacing	245 feet	245 feet	245 feet	Access Management Guidebook Table 3
Access Class – Signal Spacing	2,640 1,320 feet	2,640 1,320 feet	1,320 feet	Access Management Guidebook Table 3
Pavement Cross Slope	Inside two lanes: 0.02	Inside two lanes: 0.02	0.02	Florida Greenbook Chapter 3 Section C.7.b.2
Roadside Front Slopes	1:4 (minimum) 1:6 (recommended)	1:4 (minimum) 1:6 (recommended)	1:4 (minimum) 1:6 (recommended)	Florida Greenbook Chapter 4 Section B.1.a
Max Deflection Without a Curve	1°00'00"	2°00'00"	2°00'00"	Florida Greenbook Chapter 3 Section C.4.b
Max Deflection for Through Lanes Through Intersections	3°00'00"	6°00'00"	5°00'00"	Florida Greenbook Table 3-7
Maximum Curvature	8°15'	14°15'	10°45'	Florida Greenbook Table 3-11
Min Length of Curve	Desired: 675 feet Minimum: 400 feet	Desired: 525 feet Minimum: 400 feet	Desired: 600 feet Minimum: 400 feet	Florida Greenbook Table 3-8
Max Profile Grade	8%	9%	7%	Florida Greenbook Table 3-16
Max Change in Grade w/o Vertical Curve	0.70	0.90	0.80	Florida Greenbook Table 3-17
Min Sight Distance	360 feet	250 feet	305 feet	Florida Greenbook Table 3-4
Min Crest Curve Length	135 feet	105 feet	120 feet	Florida Greenbook Table 3-18
Min Sag Curve Length	135 feet	105 feet	120 feet	Florida Greenbook Table 3-18
Min Crest Vertical Curve (K)	61	29	44	Florida Greenbook Table 3-18
Min Sag Vertical Curve (K)	79	49	64	Florida Greenbook Table 3-18

## Alternative Improvement Concepts

For the Rock Springs Road Corridor Study, two alternatives were developed. Each alternative includes intersection improvements at the intersections of Park Avenue and East Sandpiper Street, Rock Springs Road and Welch Road, Rock Springs Road and Publix North entrance, and Rock Springs Road and Lester Road. The two alternatives are described in the following sections. See **Figure 26** and **Figure 27** for intersection geometry for Alternative 1 and Alternative 2, respectively.

## Alternative 1

### Rock Springs Road Improvements

#### Welch Road Intersection

At the intersection of Rock Springs Road and Welch Road, Alternative 1 proposes widening all legs of the intersection to improve traffic flow. The west leg of the intersection will have one dedicated left turn lane, two through lanes, and one dedicated right-turn lane. The east leg of the intersection will have one dedicated left-turn lane, two through lanes, and two dedicated right-turn lanes. The south leg of the intersection will have one dedicated left-turn lane, two through lanes, and one dedicated right-turn lane. The north leg of the intersection will have two dedicated left-turn lanes, two through lanes, and one dedicated right-turn lane. All legs of the intersection will have two receiving lanes. Additionally, at all four legs of the intersection, Alternative 1 proposes to add traffic separators between directions of travel, which improves safety by restricting left-turns out of driveways in the vicinity of the intersection.

#### Publix North Entrance to Lester Road

At the intersection of Rock Springs Road and the Publix North entrance Alternative 1 proposes to signalize the intersection. The south leg of the intersection will have two through lanes and one dedicated right-turn lane. The north leg of the intersection will have one dedicated left-turn lane and two through lanes. Additionally, a traffic separator will separate directions of travel. Both the south and north legs of the intersection will have two receiving lanes. At the east leg of the intersection, the current all directional westbound lane will become a dedicated left-turn lane and a dedicated right-turn lane.

After the proposed improvements at the intersection of Rock Springs Road and Publix North entrance are implemented, the operations of this intersection will be analyzed. If the improvements do not sufficiently meet the pedestrian crossing needs, Alternative 1 proposes to add a midblock crossing with rectangular rapid-flashing beacons (RRFB) between the Publix North entrance and Tanglewood Drive, which will allow pedestrians to safely cross Rock Springs Road.

#### Lester Road Intersection

At the intersection of Rock Springs Road and Lester Road, Alternative 1 proposes to increase the storage length of the left-turn lanes at the south, west, and north legs of the intersection. Additionally, the west leg of the intersection will switch from a through-right lane and dedicated left-turn lane to a dedicated right-turn lane and through-left lane configuration. No widening or additional lanes are proposed at this intersection.

### Park Avenue Improvements

#### Sandpiper Street Intersection

At the intersection of Park Avenue and East Sandpiper Road, Alternative 1 proposes realignment of the eastern leg of East Sandpiper Street to align with the current western leg of East Sandpiper Street. Currently, the legs are misaligned by approximately 45 feet. Additionally, the east leg of the intersection will be widened to accommodate a dedicated right-turn lane and a through-left lane. As part of the realignment, Alternative 1 proposes to signalize the intersection. At the north leg of the intersection, Alternative 1 proposes to increase the storage length of the southbound left-turn lane.

#### Sandpiper Street Sidewalks

Alternative 1 proposes to add a 5-foot sidewalk on the north side of East Sandpiper Street between North Lake Avenue and Park Avenue, and a 5-foot sidewalk on the south side of East Sandpiper Street between Park Avenue and Ustler Road. These additional sidewalks will mean that East Sandpiper Street will have sidewalks on both sides of the street between North Lake Avenue and Ustler Road.



Furthermore, the existing sidewalk on the north side of Sandpiper Street east of the Park Avenue intersection will be realigned to follow the realigned Sandpiper Street. Additionally, the intersection of Park Avenue and Sandpiper Street will be improved by the addition of crosswalks over Park Avenue, along with ADA standard curb ramps leading to these crosswalks.

## Alternative 2

### Rock Springs Road Improvements

#### Welch Road Intersection

At the intersection of Rock Springs Road and Welch Road, Alternative 2 proposes widening all legs of the intersection to improve traffic flow. The west leg of the intersection will have one dedicated left-turn lane, two through lanes, and one dedicated right-turn lane. The east leg of the intersection will have one dedicated left-turn lane, two through lanes, and two dedicated right-turn lanes. The south leg of the intersection will have one dedicated left-turn lane and two through lanes. The north leg of the intersection will have two dedicated left-turn lanes and two through lanes. All legs of the intersection will have two receiving lanes. Additionally, at all four legs of the intersection, Alternative 2 proposes to add traffic separators between directions of travel, which improves safety by restricting left-turns out of driveways in the vicinity of the intersection.

#### Publix North Entrance to Lester Road

At the intersection of Rock Springs Road and the Publix North entrance, Alternative 2 proposes to signalize the intersection. The south leg of the intersection will have one through lane and one through-right lane. The north leg of the intersection will have one dedicated left-turn lane and two through lanes. Both the south and north legs of the intersection will have two receiving lanes. Additionally, a traffic separator will separate directions of travel. At the east leg of the intersection, the current all directional westbound lane will become a dedicated left-turn lane and a dedicated right-turn lane.

After the proposed improvements at the intersection of Rock Springs Road and Publix North entrance are implemented, the operations of this intersection will be analyzed. If the improvements do not sufficiently meet the pedestrian crossing needs, Alternative 2 proposes to add a midblock crossing with rectangular rapid-flashing beacons (RRFB) between the Publix North entrance and Tanglewood Drive, which will allow pedestrians to safely cross Rock Springs Road.

#### Lester Road Intersection

Alternative 2 proposes the same improvements at the Rock Springs Road/Lester Road intersection as Alternative 1.

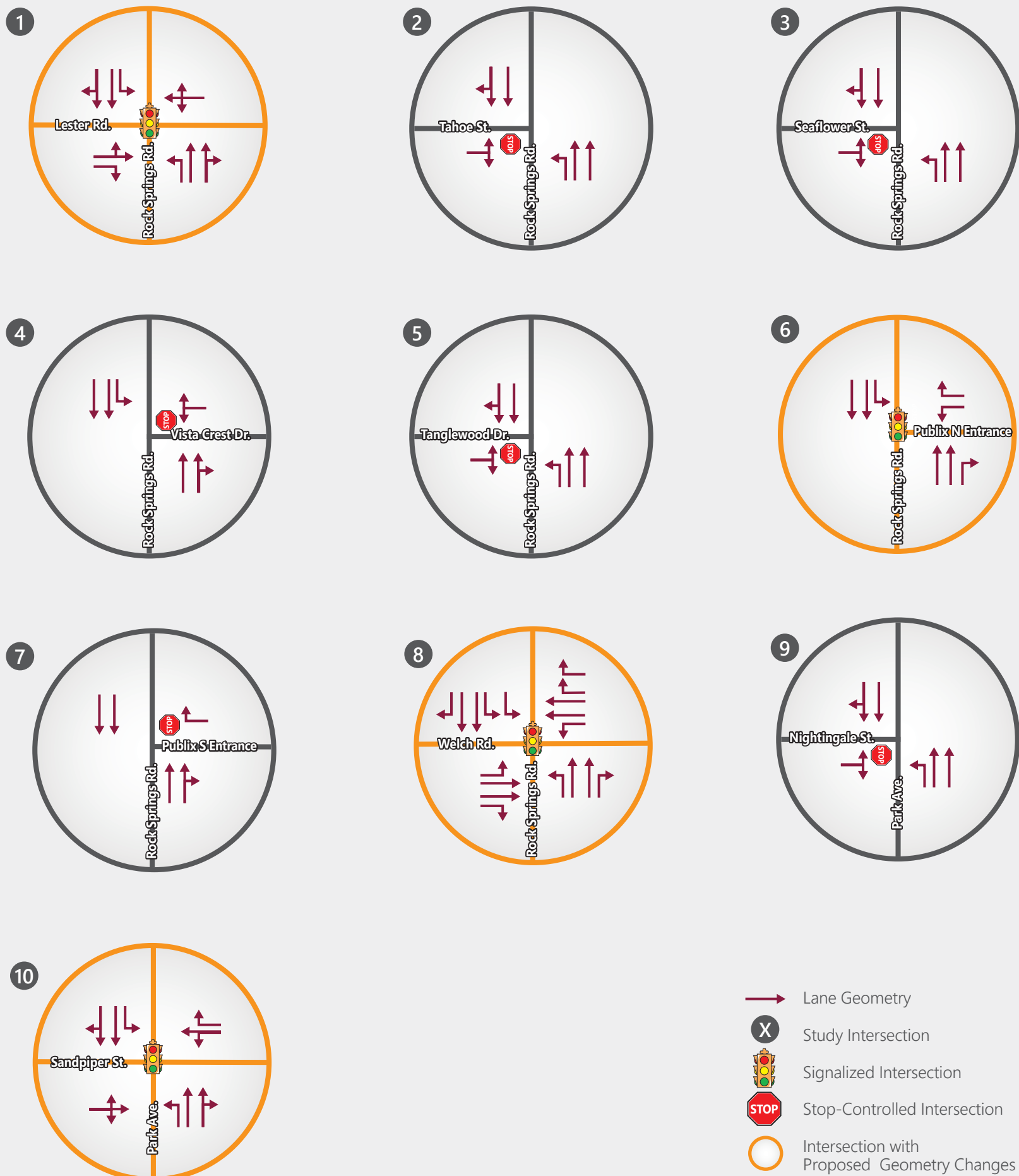
### Park Avenue Improvements

#### Sandpiper Street Intersection

Alternative 2 proposes the same improvements at the Park Avenue/Sandpiper Street intersection as Alternative 1.

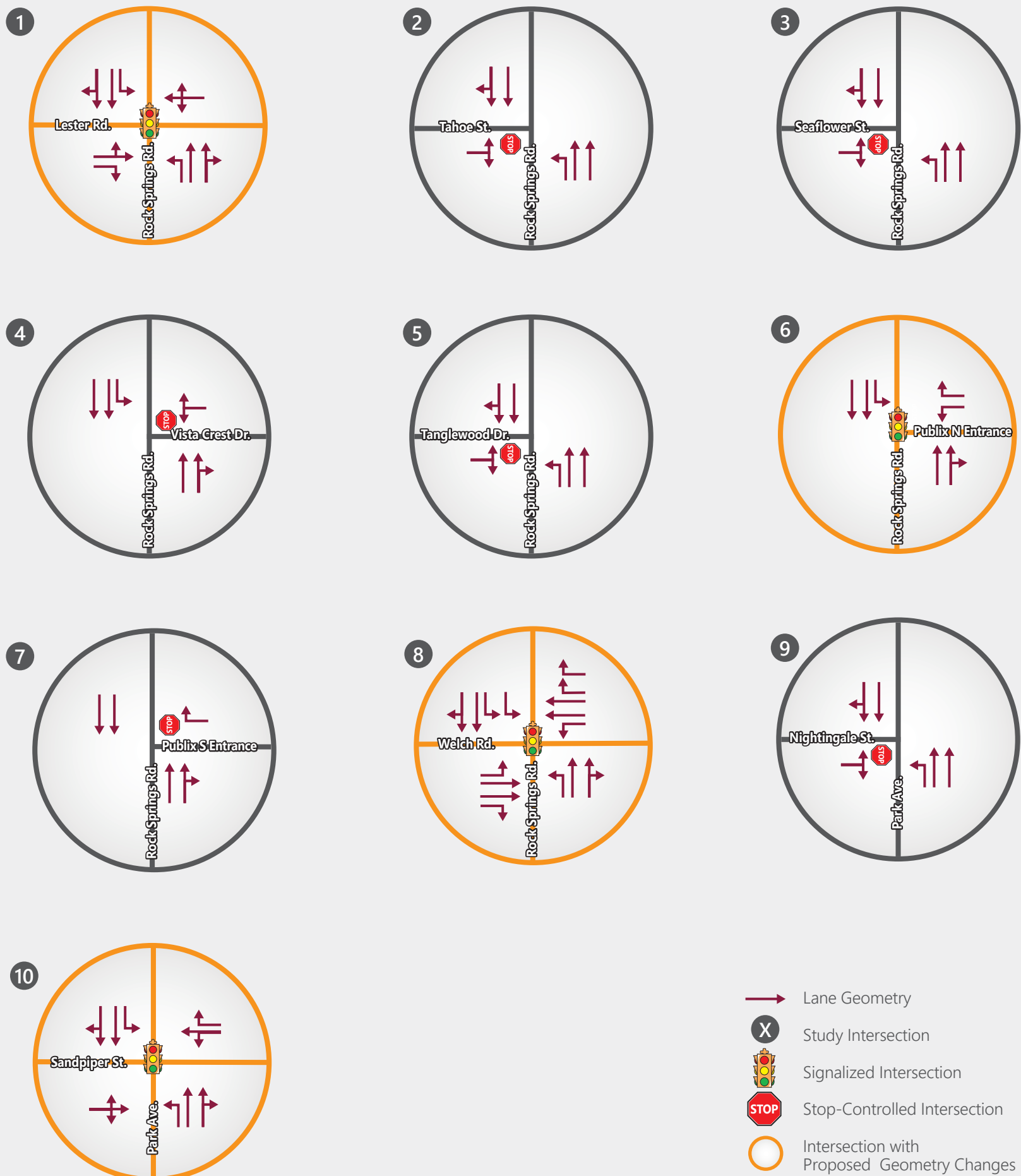
#### Sandpiper Street Sidewalks

Alternative 2 proposes the same improvements for the Sandpiper Street Sidewalks as Alternative 1.



**Figure 26**  
**Build Geometry - Alternative 1**  
Rock Springs Road  
Access Management Study





**Figure 27**  
**Build Geometry - Alternative 2**  
Rock Springs Road  
Access Management Study

## Transportation Systems Management & Operations Alternatives

Transportation Systems Management and Operations (TSM&O) is a program focused on actively managing the multimodal transportation network, improving the existing transportation system, and measuring performance to deliver safety and mobility benefits to the traveling public in a cost-effective manner. TSM&O solutions can complement or potentially replace larger capital projects, such as roadway widening, under certain circumstances. Based on the existing conditions of the Rock Springs Road corridor, it was determined a TSM&O-only alternative could not adequately improve the safety and mobility outcomes of the corridor in the existing and future condition. However, there are several TSM&O and Intelligent Transportation Systems (ITS) solutions that can complement the recommendations. Summarized in **Table 39**, these recommended ITS improvements may enhance safety and operations along the Rock Springs Road corridor.

Table 39 | Recommended ITS Improvements

Roadway/Intersection	Improvement
Rock Springs Road at Welch Road	Conduct traffic signal retiming to accommodate changing traffic patterns and new traffic signals nearby
Rock Springs Road at Welch Road	Coordinate existing traffic signal with nearby traffic signals
Rock Springs Road at Publix North Entrance	Coordinate new traffic signal with nearby traffic signals
Rock Springs Road at Lester Road	Coordinate existing traffic signal with nearby traffic signals
Park Avenue at Sandpiper Street	Coordinate new traffic signal with nearby traffic signals
Corridor Study signalized intersections	Consult with FDOT regarding potential PedSafe pilot deployment at corridor signalized intersections and mid-block crossings. Include Leading Pedestrian Interval (LPI) to provide pedestrians the opportunity to enter the crosswalk before vehicles are given green indication.

Traffic signal retiming is recommended for the Rock Springs Road/Welch Road intersection. Additionally, signal coordination is recommended between the four signalized intersections examined in this Corridor Study Report:

- Park Avenue at Sandpiper Street (proposed),
- Rock Springs Road at Welch Road (existing),
- Rock Springs Road at Publix North Entrance (proposed), and
- Rock Springs Road at Lester Road (existing).

Given the crashes involving pedestrians and/or bicyclists identified near major intersections within the corridor (see **Table 39**), consideration of additional ITS safety enhancements may be appropriate. FDOT has developed *PedSafe*, a pedestrian and bicycle collision avoidance system, to improve roadway safety for all users. The *PedSafe* system uses cameras, advanced sensors, roadside units (RSU), and advanced traffic controllers (ATC) to broadcast Personal Safety Messages (PSM), Basic Safety Messages (BSM), and other connected vehicle (CV) communications, alerting drivers to the presence of pedestrians and bicyclists at intersections. FDOT and MetroPlan Orlando have partnered to conduct pilot deployments of the *PedSafe* system at signalized intersections in several areas of Central Florida. FDOT and MetroPlan Orlando are also examining additional enhancements, such as a non-numeric visual countdown posted on the pedestrian signal. This visual countdown would indicate to the pedestrian that their pushbutton was received, and the traffic signal/mid-block crossing is

working to activate the pedestrian crossing in a safe and efficient manner. As of August 2022, there are several PedSafe pilot projects in various stages of development/deployment within Central Florida. The signalized intersections and mid-block crossing along Park Avenue and Rock Springs Road that are considered in this Corridor Study Report may be appropriate candidates for another PedSafe pilot project. If the City of Apopka is interested in the PedSafe system, additional coordination between FDOT, MetroPlan Orlando, and the city is recommended in design.

## Access Management

To improve the access management of the study corridor, it is recommended that several changes be made to the median openings; of the existing openings, it is recommended to close 10 median openings and modify two openings to full-signalized operations. In addition to several proposed median changes, the access classification for Rock Springs Road/ Park Avenue and Welch Road are proposed to change as well, and are detailed below:

- Rock Springs Road/Park Avenue – Access Class 5
- Welch Road – Access Class 5
- East Sandpiper Street – Access Class 6

Tables 40, 41, and 42 show the recommended changes to the median openings. **Notes:**

1. Green text indicates no change in median opening access

Table 43, 44, and 45 show the resulting opening spacings along the corridor and the spacing requirements for the applicable access classes. As a result of the proposed median changes, all median openings satisfy standards of rule 14-97 of the FAC.

Table 40| Proposed Changes to Median Openings – Rock Springs Road

#	Spacing	East Side Road/Connection	West Side Road/Connection	Existing Median Opening Type	Proposed Median Opening Type
1	-	Fifth Third Bank Entrance	Rock Springs Plaza North Entrance	Full	Close
2	355	Welch Road	Welch Road	Full-Signal	Full-Signal
3	360	South Wekiva Plaza Entrance	N/A	Full	Close
4	325	N/A	Marco's Pizza Entrance	Full	Close
5	310	Publix North Entrance	N/A	Full	Full-Signal
6	115	N/A	Dollar General Entrance	Full	Close
7	1,730	Trader Mae's Entrance	Lester Road	Full-Signal	Full-Signal

Notes:

1. Red text indicates change in median opening access
2. Green text indicates no change in median opening access



Table 41 | Proposed Changes to Median Openings – Welch Road

#	Spacing	North Side Road/Connection	South Side Road/Connection	Existing Median Opening Type	Proposed Median Opening Type
1	-	Curless Ave	N/A	Full	Close
2	210	N/A	Rock Springs Plaza Entrance	Full	Close
3	190	WMG Acquisitions LLC	N/A	Full	Close
4	245	Rock Springs Road	Rock Springs Road	Full-Signal	Full-Signal
5	225	7-Eleven	N/A	Full	Close
6	155	Wekiva Plaza Shopping Center West Entrance	Duke Energy Florida Inc	Full	Close
7	260	Wekiva Plaza Shopping Center East Entrance	N/A	Full	Close

Notes:

1. Red text indicates change in median opening access
2. Green text indicates no change in median opening access

Table 42 | Proposed Changes to Median Openings – Sandpiper Street

#	Spacing	North Side Road/Connection	South Side Road/Connection	Existing Median Opening Type	Proposed Median Opening Type
1	-	Park Avenue	Park Avenue	Full	Full-Signal
2	360	Coin Laundry	N/A	Full	Full

Notes:

1. Green text indicates no change in median opening access

Table 43 | Proposed Median Openings – Rock Springs Road

Median Opening #	Spacing	Median Opening Type	East Side Road/Connection	West Side Road/Connection	Distance from Previous
1	-	Full	N/A	Rock Springs Plaza South Entrance	-
2	650	Full-Signal	Welch Road	Welch Road	650
3	990	Full-Signal	Publix North Entrance	N/A	990
4	715	Full	N/A	Tanglewood Drive	715
5	320	Full	Vista Crest Drive	N/A	320
6	205	Full	N/A	East Seaflower Street	205
7	245	Full	N/A	Tahoe Street	245
8	360	Full-Signal	Trader Mae's Entrance	Lester Road	360

Table 44 | Proposed Median Openings – Welch Road

Median Opening #	Spacing	Median Opening Type	North Side Road/Connection	South Side Road/Connection	Distance from Previous
1	-	Full	N/A	Honey Road	-
2	1,160	Full-Signal	Rock Springs Road	Welch Road	1,160
3	360	Full	Creekline Lane	N/A	360

Table 45 | Proposed Median Openings – Sandpiper Street

Median Opening #	Spacing	Median Opening Type	North Side Road/ Connection	South Side Road/ Connection	Distance from Previous
1	-	Full	North Lake Avenue	North Lake Avenue	-
2	1,280	Full-Signal	Park Avenue	Park Avenue	1,280
3	360	Full	Coin Laundry	N/A	360

### Publix Plaza Driveways

The current access at Rock Springs Road and Publix Plaza South Access along Welch Road will be modified from a two-way-left-turn lane to a right-in right out access, preventing the southbound left-turn movement. Additionally, the current Publix Plaza South Access along Rock Springs Road will be modified from a left-turn lane to right-in right-out access, preventing the westbound left-turn movement. To account for these access changes, rerouting of these blocked movements via the Publix North intersection will occur.

# Build Alternatives Analysis

## Build Operations Analysis

This section presents the results of the traffic operations analysis conducted for the future Build alternatives. A detailed operational evaluation of the study intersections using Synchro software version 11 was performed to develop the operational recommendations. The results are presented according to the same HCM 6th Edition methodology used in the existing conditions analysis for signalized and unsignalized - two-way-stop-controlled (TWSC) - intersections.

The Build operational analysis represents the evaluation of the study corridor with proposed improvements. Under the Build alternative, traffic operations were evaluated with the required capacity and operational improvements (to accommodate the design year volumes), and access management changes at the study intersections referenced in the access management section of this report.

The analysis considered the Build alternatives for three design years:

- Opening Year (2025)
- Mid-design Year (2035)
- Design Year (2045)

The results of this analysis are presented in the following subsections.

### Signal Warrant Analysis

The need for future signal requirements at the study unsignalized intersections was evaluated using signal warrants 1A and 1B as specified in the Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition. Based on the signal warrant analyses, the intersections of Rock Springs Road at Publix North Entrance and Park Avenue at Sandpiper Street satisfied warrants 1A and 1B starting from the year 2025. The future signal warrant sheets are provided in the *DTTM*, under separate cover.

### Build Alternative Proposed Improvements

Based on the existing and No-Build operational analyses, required turn lane improvements were considered in addition to the signal and access changes as described in the access management section of this report. **Table 47** through **Table 49** summarizes the proposed improvements (also shown in **Figure 26** and **Figure 27**) considered in the two build alternatives.

### Intersection LOS Analysis

An intersection analysis was performed to determine the performance of the study intersections with the proposed changes for the future years. Forecasted turning movement volumes as shown in **Figure 23** through **Figure 25** were used to evaluate the Build alternative. Synchro (HCM 6<sup>th</sup> Edition) output sheets for each of these analyses are provided in the *DTTM*, under separate cover.

The results of the Build alternatives analysis are presented in **Table 46** and **Table 47** and summarized below.

- Outside of Build Alternative 2's Welch Road intersection, all the study signalized intersections are projected to operate at the target LOS E or better through the design year 2045.

- Based on Failure Analysis completed in the Addendum to the Final DTTM, under separate cover, the Welch Road intersection for Build Alternative 2 will operate at target LOS E or better through 2043 and will begin to fail in 2044.
- The Rock Springs Road approaches at all the unsignalized intersections are expected to operate at LOS D or better through the 2045 design year.
- Starting from the year 2025, the minor street approaches on Vista Crest Drive and Tanglewood Drive are expected to operate at LOS F. By the year 2035, the minor street approaches on Tahoe Street and Publix Plaza South Access are also expected to operate at LOS F. By the year 2045, except for East Nightingale Street, all the other minor street approaches are expected to operate at LOS F.

Table 46 | Build Intersection Analysis Summary – Welch Road and Publix Plaza North Access

Rock Springs Road at	Build Alternative	Control Type	Target LOS	2025 Build				2035 Build				2045 Build			
				AM Design Hour		PM Design Hour		AM Design Hour		PM Design Hour		AM Design Hour		PM Design Hour	
				Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Publix North Entrance	Alternative 1	Signal	E	2.8	A	5.9	A	6.8	A	9.5	A	15.6	B	28.4	C
	Alternative 2	Signal	E	*	*	*	*	*	*	*	*	18.6	B	28.8	C
Welch Road	Alternative 1	Signal	E	43.8	D	46.5	D	44.7	D	57.1	E	48.7	D	66.7	E
	Alternative 2	Signal	E	*	*	*	*	*	*	*	*	60.6	E	83.6	F

- Notes:
- \*2025 and 2035 Delay and LOS values are only reported for Alternative 1
  - HCM 6th Edition based outputs are presented in this table for the signalized and unsignalized intersections, respectively
  - Overall delay and LOS are reported for signalized intersections
  - Worst case results (delay and LOS) of major/minor movements are reported for unsignalized intersections

Table 47 | Build Intersection Analysis Summary – Minor Side Streets, All Build Alternatives

Rock Springs Road at	Control Type	Target LOS	2025 Build				2035 Build				2045 Build			
			AM Design Hour		PM Design Hour		AM Design Hour		PM Design Hour		AM Design Hour		PM Design Hour	
			Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Lester Road	Signal	E	31.0	C	16.5	B	33.2	C	20.5	C	40.3	D	25.6	C
Tahoe Street	Stop	E	16.0/35.8	C/E	12.2/22.7	B/C	20.3/63.1	C/F	13.1/28.2	B/D	27.1/158.5	D/F	14.2/36.4	B/E
East Seaflower Street	Stop	E	15.2/28.4	C/D	11.8/20.3	B/C	18.6/42.1	C/E	12.5/23.6	B/C	23.2/63.5	C/F	13.5/28.1	B/D
Vista Crest Drive	Stop	E	10.4/28.3	B/D	17.0/59.7	C/F	12.7/51.5	B/F	20.3/110.2	C/F	16.0/131.9	C/F	24.8/234.6	C/F
Tanglewood Drive	Stop	E	17.6/52.0	C/F	13.6/32.1	B/D	22.9/292.1	C/F	15.0/66.5	C/F	31.5/>300.0	D/F	16.8/176.2	C/F
Publix Plaza South Access*	Stop	E	12.7	B	30.5	D	16.7	C	50.1	F	26.3	D	98.4	F
East Nightingale Street	Stop	E	12.0/18.7	B/C	10.7/16.5	B/C	13.7/24.0	B/C	11.6/18.4	B/C	16.0/32.1	C/D	12.7/21.2	B/C
East Sandpiper Street	Signal	E	14.1	B	23.0	C	16.6	B	25.5	C	19.8	B	29.1	C

- Notes:
- \*The delay is reported for the WB right-turn movement (all other movements are free)
  - HCM 6th Edition based outputs are presented in this table for the signalized and unsignalized intersections, respectively
  - Overall delay and LOS are reported for signalized intersections
  - Worst case results (delay and LOS) of major/minor movements are reported for unsignalized intersections



## Roadway Arterial LOS Analysis – Build

The Build roadway arterial operational analysis was performed for three future year traffic conditions (2025, 2035, and 2045) for AM and PM design hours based on Synchro 11. The LOS reported in **Table 48** is based on Exhibit 18-1 of HCM 6th Edition and is the same for both build alternatives. As shown in **Table 48**, the Rock Springs Road segment between Welch Road and Lester Road is expected to operate at the target LOS E or better through the design year 2045.

Table 48 | Roadway Arterial LOS Summary – Build

Rock Springs Road between Welch Road and Lester Road	AM Design Hour		PM Design Hour	
	Speed (mph)	LOS	Speed (mph)	LOS
<b>2025 Build</b>				
Northbound Direction	28.5	C	25.7	C
Southbound Direction	24.9	D	21.9	D
<b>2035 Build</b>				
Northbound Direction	26.1	C	23.0	D
Southbound Direction	23.2	D	19.9	E
<b>2045 Build</b>				
Northbound Direction	23.3	D	18.8	E
Southbound Direction	20.9	D	19.1	E

## Multimodal LOS Analysis – Build

A summary of the pedestrian and bicycle LOS analysis at the signalized study intersections is included in **Table 49** and is the same for the two build alternatives. As shown in **Table 49**, the pedestrian and bicycle modes at the study signalized intersections are projected to operate within LOS D through the design year 2045.

Table 49 | Multimodal LOS Analysis (Signalized Intersections) Summary – Build

Rock Springs Road at	Pedestrian Mode LOS				Bicycle Mode LOS			
	EB	WB	NB	SB	EB	WB	NB	SB
<b>2025 Build</b>								
<b>AM Design Hour</b>								
Lester Road	B	B	C	C	B	A	B	B
Publix Access N	-	B	C	C	-	B	B	C
Welch Road	C	D	C	C	B	B	B	C
Sandpiper Street	B	B	C	C	A	B	B	B
<b>PM Design Hour</b>								
Lester Road	C	B	C	C	B	A	B	B
Publix Access N	-	B	C	C	-	B	B	C
Welch Road	C	C	C	D	B	C	C	C
Sandpiper Street	B	B	C	C	A	B	B	B
<b>2035 Build</b>								
<b>AM Design Hour</b>								
Lester Road	B	B	C	C	B	A	B	B
Publix Access N	-	B	C	C	-	B	B	C
Welch Road	C	D	C	C	B	C	C	C
Sandpiper Street	B	B	C	C	A	B	B	B
<b>PM Design Hour</b>								
Lester Road	C	B	C	C	B	A	C	B
Publix Access N	-	B	C	C	-	B	C	C
Welch Road	C	D	C	D	B	C	C	C
Sandpiper Street	B	B	C	C	A	B	B	B
<b>2045 Build</b>								
<b>AM Design Hour</b>								
Lester Road	C	B	D	C	B	A	B	C
Publix Access N	-	B	D	D	-	B	B	C
Welch Road	C	D	C	D	C	C	C	D
Sandpiper Street	B	B	C	C	A	B	B	B
<b>PM Design Hour</b>								
Lester Road	C	B	D	C	B	A	C	B
Publix Access N	-	B	D	D	-	B	C	C
Welch Road	C	D	D	D	C	C	C	C
Sandpiper Street	B	B	C	C	C	C	C	C

Notes:

1. Signalized intersection multimodal LOS is based on HCM 6<sup>th</sup> Edition methodology
2. EB/WB is for side street movements and NB/SB is for Rock Springs Road movements

**Table 50** shows the multimodal LOS, including pedestrian, bicycle, and transit LOS, for the study corridor, and is the same for the two build alternatives. This LOS is based on the Generalized Service Volume Table 1 of the 2020 Q/LOS Handbook. As shown in **Table 50**, the corridor is not anticipated to operate at the assumed target LOS D for transit, bicyclists, and pedestrians in the 2035 mid-design year and 2045 design year.

Table 50 | Multimodal LOS Analysis (Segments) Summary – Build

Rock Springs Road between Lester Road and Welch Road						
Segment Average AADT	Bicycle Mode LOS		Pedestrian Mode LOS		Transit Mode LOS	
	Paved Shoulder/Bicycle Lane Coverage	LOS	Sidewalk Coverage	LOS	Sidewalk Coverage (1 bus per hour)	LOS
<b>2025 Build</b>						
37,000	0-85%	C	85-100%	E	85-100%	E
<b>2035 Build</b>						
37,000	0-85%	C	85-100%	E	85-100%	E
<b>2045 Build</b>						
43,000	0-85%	D	85-100%	F	85-100%	E

Note:

1. Segment multimodal LOS is based on Generalized Service Volume Table 1 of the 2020 Q/LOS

### Build Alternative Improvements

Based on the evaluation of the design year 2045 Build traffic conditions, this study proposes the capacity improvements as shown in **Table 51** through **Table 53**, and in **Figure 26** and **Figure 27**, to accommodate the projected traffic volumes and enhance the mobility and safety within the study corridor.

Table 51 | Recommended Improvements – Alternative 1

Study Intersection	Improvement
Rock Springs Road at Lester Road	Convert the eastbound shared through-right and exclusive left lanes to an exclusive right and shared through-left lanes
Rock Springs Road at Publix Plaza North Access	Add a signal by the year 2025 Add an exclusive westbound left-turn lane Add an exclusive northbound right-turn lane
Rock Springs Road at Publix Plaza South Access	Convert the existing access to a right-in right-out
Rock Springs Road at Welch Road	Add an exclusive northbound right-turn lane Add an exclusive southbound right-turn lane and a second southbound left-turn lane Add a second eastbound through lane Add a second westbound right-turn lane and a through lane
Rock Springs Road/Park Avenue at Sandpiper Street	Add an exclusive westbound right-turn lane Align the minor approaches Add a signal by the year 2025

Table 52 | Recommended Improvements – Alternative 2

Study Intersection	Improvement
Rock Springs Road at Lester Road	Convert the eastbound shared through-right and exclusive left lanes to an exclusive right and shared through-left lanes
Rock Springs Road at Publix Plaza North Access	Add a signal by the year 2025 Add an exclusive westbound left-turn lane
Rock Springs Road at Publix Plaza South Access	Convert the existing access to a right-in right-out
Rock Springs Road at Welch Road	Add a second southbound left-turn lane Add a second eastbound through lane Add a second westbound right-turn lane and a through lane
Park Avenue at Sandpiper Street	Add an exclusive westbound right-turn lane Align the minor approaches Add a signal by the year 2025

In addition to the proposed improvements, **Table 53** shows the recommended 95<sup>th</sup> percentile queue lengths for the design year 2045 design hour conditions per the *DTTM*.

Table 53 | Recommended Queue Lengths for Turn Lanes at Signals

Rock Springs Road at	Turn Lane Queue Length (feet)							
	Side Streets				Rock Springs Road			
	EB Left	EB Right	WB Left	WB Right	NB Left	NB Right	SB Left	SB Right
Lester Road	150	675	-	-	700	-	25	-
Publix North Access	-	-	72	250	-	75	275	-
Welch Road	550	450	575	500	375	275	575	25
Sandpiper Street	-	-	100	375	25	-	375	-

## Evaluation Matrix

A preliminary evaluation of the No-Build alternative and the Build alternatives was performed to estimate traffic operations, safety, community, and environmental impacts, as well as project cost for comparison. An evaluation matrix, provided in **Table 54** and **Table 55**, was prepared for a side-by-side assessment of each alternative and its estimated impacts. Each topic within the evaluation matrix is described further in the following sections.

Table 54 | Evaluation Matrix - Rock Springs Road from Welch Road to Lester Road

Evaluation Criteria	Project Alternatives		
	No Build	Alternative 1	Alternative 2
<b>Purpose &amp; Need</b>			
Accommodates Future Traffic Demand	No	Yes	Yes
Enhances Roadway Safety	No	Yes	Yes
<b>Potential Community Impacts</b>			
ROW Potentially Needed (acres)	0	1.01	0.56
Total Potential Parcels Impacted (#)	0	18	14
Potential Historic/Archaeological Impacts (Low/Moderate/High)	None	Low	Low
Potential Utility Impacts (Low/Moderate/High)	None	Low	Low
<b>Potential Environmental Impacts</b>			
Wetlands (Low/Moderate/High)	None	Low	Low
Floodplains (Low/Moderate/High)	None	Low	Low
Threatened & Endangered Species (Low/Moderate/High)	None	Low	Low
Potential Contamination Sites (Low/Medium/High)	None	Low	Low
<b>Estimated Project Cost</b>			
Total Estimated Construction Cost (in millions) <sup>1</sup>	\$0	\$5.48	\$5.21

Note: Total Estimated Costs are included in **Appendix I**.



Table 55 | Evaluation Matrix - Sandpiper Street Alternatives

Evaluation Criteria	Project Alternatives	
	No-Build	Build
<b>Purpose &amp; Need</b>		
Accommodates Future Traffic Demand	No	Yes
Enhances Roadway Safety	No	Yes
<b>Potential Community Impacts</b>		
ROW Potentially Needed (acres)	0	0.003
Potential Parcels Impacted (#)	0	2
Potential Historic/Archaeological Impacts (Low/Moderate/High)	None	Low
Potential Utility Impacts (Low/Moderate/High)	None	Moderate
<b>Potential Environmental Impacts</b>		
Wetlands (Low/Moderate/High)	None	Low
Floodplains (Low/Moderate/High)	None	Low
Threatened & Endangered Species (Low/Moderate/High)	None	Low
Potential Contamination Sites (Low/Moderate/High)	None	Moderate
<b>Estimated Project Cost</b>		
Estimated Construction Cost of Roadway (in millions) <sup>1</sup>	\$0	\$1.3
Estimated Construction Cost of Sidewalk (in millions)	\$0	\$0.38

Note: Total Estimated Costs are included in **Appendix I**.

### Purpose and Need

The findings are based on the No-Build and Build operational analysis summarized in the No-Build Operations Analysis and Build Operations Analysis sections, respectively.

### Rock Springs Road

The two Rock Springs Road alternatives accommodate future traffic demand and enhance roadway safety.

### Sandpiper Street

Compared to the No-Build alternative, Sandpiper Street improvements accommodate future traffic demand and enhance roadway safety.

### Potential Community Impacts

The preliminary findings are based on information available in the Environmental Characteristics section in the Existing Conditions chapter of this report.

### Rock Springs Road

The two Rock Springs Road alternatives anticipate low impacts to archaeological and historical resources, and low impacts to utilities.

### Sandpiper Street

Compared to the No-Build alternative, the Sandpiper Street alternative anticipates low impacts to archaeological and historical resources, and moderate impacts to utilities.

### Potential Environmental Impacts

The preliminary findings are based on information available in the Environmental Characteristics section in the Existing Conditions chapter of this report.

### Rock Springs Road

The two Rock Springs Road alternatives anticipate low potential environmental impacts. These measures include wetlands, floodplains, threatened and endangered species, and contamination sites.

### Sandpiper Street

Compared to the No-Build alternative, the Sandpiper Street alternative anticipates low potential environmental impacts to wetlands, floodplains, and threatened and endangered species. The Build alternative anticipates moderate impacts to contamination sites.

### Estimated ROW Needs

#### Rock Springs Road

The two Rock Springs Road alternatives have ROW impacts ranging from 0.56 to 1.13 acres, with Alternative 2 requiring the least amount of acreage. Alternative 1 requires 1.01 acres of ROW spanning across 18 parcels. Alternative 2 requires 0.56 acres of ROW spanning across 14 parcels. No relocations are required for either alternative.

#### Sandpiper Street

The Sandpiper Street alternative has a ROW impact of 0.003 acres spanning across 2 parcels.

### Estimated Project Cost

The estimated project cost for both alternatives is broken down in the sections below. Estimated ROW cost has not yet been determined and will be analyzed during the design phase of this project.

#### Rock Springs Road

The two Rock Springs Road alternatives have an estimated project cost that ranges from \$7.81 million to \$8.32 million, which includes costs for final design and construction, but not ROW costs. Estimated ROW costs have not yet been determined and will be analyzed during the design phase of this project. **Table 56** provides a summary of the cost estimates for the two Rock Springs Road alternatives. The detailed construction cost estimates are included in **Appendix I**.

Table 56 | Rock Springs Road Build Alternatives Cost Estimates Summary

Recommended Alternative Segment	Estimated Design Cost (millions)	Estimated Construction Cost (millions)
Rock Springs Road - Alternative 1	\$1.37	\$6.85
Rock Springs Road - Alternative 2	\$1.30	\$6.51

Notes:

*Project Costs are in 2022 dollars.*

### Sandpiper Street Intersection

The Sandpiper Street intersection alternative has an estimated project cost of \$1.97 million, which includes costs for final design and construction. The estimated ROW cost has not yet been determined and will be analyzed during the design phase of this project. **Table 57** provides a summary of the cost estimate for the Sandpiper Street Intersection alternative. The detailed construction cost estimates are included in **Appendix I**.

Table 57 | Sandpiper Street Intersection Build Alternative Cost Estimates Summary

Recommended Alternative Segment	Estimated Design Cost (millions)	Estimated Construction Cost (millions)
Sandpiper Street Intersection	\$0.33	\$1.64

Note: Project Costs are in 2022 dollars.

### Sandpiper Street Sidewalks

The Sandpiper Street alternative has the same proposed improvements for the proposed sidewalks along Sandpiper Street. This portion of the project has an estimated project cost of \$0.48 million, which includes costs for final design and construction. Estimated ROW costs have not yet been determined and will be analyzed during the design phase of this project. **Table 58** provides a summary of the cost estimate for the Sandpiper Street sidewalks alternative. The detailed construction cost estimates are included in **Appendix I**.

Table 58 | Sandpiper Street Sidewalks Build Alternatives Cost Estimates Summary

Recommended Alternative Segment	Estimated Design Cost (millions)	Estimated Construction Cost (millions)
Sandpiper Street Sidewalks	\$0.10	\$0.38

Note: Project Costs are in 2022 dollars.

## Selection of Recommended Alternative

After developing the two alternatives, analyzing the impacts of each alternative, and gathering public feedback, a recommended alternative was chosen. The recommended alternative, the Build Alternative, along with the reasons it was selected, is described below.

For the Rock Springs Road portion of the project, which includes the intersections of Rock Springs Road with Welch Road, North Publix Entrance, and Lester Road, Alternative 2 is the recommended build alternative. Alternative 2 has the least anticipated amount of required ROW needed, along with

the least anticipated number of parcels impacted. Additionally, Alternative 2 has the lowest expected cost of the two alternatives.

Regarding traffic operations between the Rock Springs Road alternatives, Alternative 1 is projected to have less intersection delay compared to Alternative 2 at the Welch Road intersection. Alternative 1 is projected to have an intersection delay of 48.7 seconds in the AM design hour as compared to 60.6 seconds for Alternative 2. For the PM design hour, Alternative 1 is projected to have an intersection delay of 66.7 seconds, while Alternative 2 is projected to have an intersection delay of 83.6 seconds. However, because Alternative 1 includes additional right-turn lanes, the intersection requires a larger footprint and increases the number of conflict points for bicyclists and pedestrians using the intersection compared to Alternative 2. Overall, the two build alternatives reduce the overall delay at the Welch Road intersection by about 70%-75% over the No Build alternative. Because the two build alternatives have similar overall intersection delay reduction values, and the main goal of this project is to increase safety, Alternative 2 is recommended.

As mentioned in the Build Alternatives chapter, the two build alternatives have the same design for the proposed intersection with Park Avenue and Sandpiper Street. Overall, the recommended alternative for this intersection has low anticipated environmental and community impacts, while meeting the future traffic demands and enhancing safety of users of the corridor.

As mentioned in the Build Alternatives chapter, the two build alternatives have the same design for the proposed sidewalks along Sandpiper Street. Overall, the recommended alternative for the proposed sidewalks has low anticipated environmental and community impacts, while meeting the future traffic demands and enhancing safety of all users of the corridor.

### **Welch Road Intersection Dual Left-Turn Lane Option**

Based on coordination with the Orange County Transportation Planning Division, the option to convert the long, single dedicated left-turn lanes at the east and west legs of the Welch Road intersection to dual dedicated left-turn lanes at both legs of the intersection was discussed. Based on traffic analysis of the eastbound and westbound dual-left-turn intersection, the intersection operations are slightly improved over the Recommended Alternative and is expected to operate at the target LOS E or better through the design year 2045. However, the addition of the extra lane further increases the footprint of the intersection, including the length of the crosswalk for West Orange Trail across the east leg of the intersection. Because the operational improvements of this intersection would only be marginally improved by adding a second left turn lane, and the main goal of this project is to increase safety, the dual left-turn lane option was not incorporated into the Recommended Alternative.

# Recommended Alternative

## Recommendations

The recommended alternative includes intersection improvements at Welch Road, Publix North Entrance, Lester Road, and Sandpiper Street. Additionally, pedestrian improvements are proposed along Sandpiper Street. Pedestrian improvements will be further analyzed just north of the Publix North Entrance intersection and south of Tanglewood Drive once the new signal at the North Publix entrance is operational. The recommended alternative for each section of the roadway is described below. See **Appendix J** for concept plans for the recommended alternative.

### Welch Road Intersection

At the intersection of Rock Springs Road and Welch Road, the recommended alternative proposes widening all legs of the intersection to improve traffic flow. The west leg of the intersection will have one dedicated left-turn lane, two through lanes, and one dedicated right-turn lane. The east leg of the intersection will have one dedicated left-turn lane, two through lanes, and two dedicated right-turn lanes. The south leg of the intersection will have one dedicated left-turn lane and two through lanes. The north leg of the intersection will have two dedicated left-turn lanes and two through lanes. All legs of the intersection will have two receiving lanes. Additionally, at all four legs of the intersection, the recommended alternative proposes to add traffic separators between directions of travel, which improves safety by restricting left-turns out of driveways in the vicinity of the intersection. Furthermore, all four corners of the intersection have curb radii of 40 feet, which matches or exceeds the existing curb radii. This is important due to the large number of trucks that travel along the roadways. Due to their size, trucks have a larger turning movements than pedestrian vehicles, and require larger curb radii to stay on the pavement and avoid running over the curb.

### Publix North Entrance Intersection

At the intersection of Rock Springs Road and the Publix North entrance, the recommended alternative proposes to signalize the intersection. The south leg of the intersection will have one through lane and one through-right lane. The north leg of the intersection will have one dedicated left-turn lane and two through lanes. Both the south and north legs of the intersection will have two receiving lanes. Additionally, a traffic separator will separate directions of travel. At the east leg of the intersection, the current all directional westbound lane will become a dedicated left-turn lane and a dedicated right-turn lane.

### Publix North Entrance to Lester Segment

Between the Publix North entrance and Lester Road, the recommended alternative proposes to study the need to add a future midblock crossing. Once the Publix North Entrance intersection is modified, further analysis will be conducted to determine if the midblock crossing is needed, or if the crosswalks at the signalized Publix North Entrance intersection can handle all the crossing pedestrian traffic. The rest of this segment proposes to maintain the existing condition.

### Lester Intersection

At the intersection of Rock Springs Road and Lester Road, the recommended alternative proposes to increase the storage length of the left-turn lanes at the south, west, and north legs of the intersection.



Additionally, the west leg of the intersection will switch from a through-right lane and dedicated left-turn lane to a dedicated right-turn lane and through-left lane configuration. No widening or additional lanes are proposed at this intersection.

### Sandpiper Street Intersection

At the intersection of Park Avenue and East Sandpiper Road, the recommended alternative proposes realignment of the eastern leg of East Sandpiper Street to align with the current western leg of East Sandpiper Street. Currently, the legs are misaligned by approximately 45 feet. Additionally, the east leg of the intersection will be widened to accommodate a dedicated right-turn lane and a through-left lane. As part of the realignment, the recommended alternative proposes to signalize the intersection. At the north leg of the intersection, the recommended alternative proposes to increase the storage length of the southbound left-turn lane.

### Sandpiper Street Sidewalks

The recommended alternative proposes to add a 5-foot sidewalk on the north side of East Sandpiper Street between North Lake Avenue and Park Avenue, and a 5-foot sidewalk on the south side of East Sandpiper Street between Park Avenue and Ustler Road. These additional sidewalks will mean that East Sandpiper Street will have sidewalks on both sides of the street between North Lake Avenue and Ustler Road.

Furthermore, the existing sidewalk on the north side of Sandpiper Street of the intersection will be realigned to follow the realigned Sandpiper Street. Additionally, the intersection of Park Avenue and Sandpiper Street will be improved by the addition of crosswalks over Park Avenue, along with ADA standard curb ramps leading to these crosswalks.

### ROW Needs

The total amount of anticipated ROW required for the recommended alternative is 0.56 acres. The recommended alternative is anticipated to require ROW from 14 parcels. These amounts are further broken out in **Table 59** below. No relocations are anticipated for any segment of the recommended alternative.

The concept plans shown in **Appendix J** provide an overview of the anticipated impacts for the recommended alternative. **Table 59** summarizes the ROW impacts for the recommended alternative.

Table 59 | Recommended Alternative ROW Impacts

Preferred Alternative Segment	Impact (acres)	Parcels Impacted	Potential Relocations		
			Total	Business	Residential
Sandpiper Street Intersection	0.003	2	0	0	0
Welch Road Intersection	0.472	6	0	0	0
Publix North Intersection	0.089	6	0	0	0
Lester Road Intersection	0	0	0	0	0

## Drainage Recommendations

Based on the drainage analysis of the proposed improvements to the study area, the existing ponds receiving runoff from the project area have additional treatment capacity as per the current permits and documents, as shown in **Table 60**. As such, no additional pond sites will be needed.

Table 60 | Rock Springs Road Pond Capacity

Permit No.	Location	Drainage Location <sup>1</sup>	Pond Capacity (ac-ft)	Required Volume as per Permit (WQV) (ac-ft)	Availability (ac-ft)
Master Plan	Park Avenue at Sandpiper Street	Pond Northside of East Votaw Road	10.42 <sup>2</sup>	No permits were found <sup>3</sup>	10.42
ERP 27569-2	Rock Springs Road between Welch Road and Lester Road	City of Apopka Pond	3.51	1.65	1.86

Notes:

- The locations of each pond are shown in the Drainage Map included in Figure 18.
- Lakes McCoy, Coroni, Prevatt Drainage Basin Study, Engineering Report Volumes I and II, Prepared for Orange County, City of Apopka, and SJRWMD, March 2017
- Per the Master Plan Report, the pond provides approximately 0.5 inches of water quality treatment over the entire contributing basin area encompassing approximately 250 acres.

## Floodplains

According to the FEMA DFIRM dated October 2020, the overall study area along Rock Springs Road is located within Floodplain Zone X. This zone is also known as a “low-risk flood zone” and has a 0.2% annual chance of flood; areas of 1% chance of flood with drainage areas less than one square mile; and areas protected by levees from 1% annual chance of flood. The 100-year floodplain Zone (AE), where there is a 1% annual chance of flood has a determined base flood elevation of 88 feet North American Vertical Datum (NAVD) and is associated with Lake McCoy. The recommended alternative of Rock Springs Road is located outside Zone (AE). Therefore, no floodplain encroachment is anticipated for the project area. The location of the floodplain that falls within the overall study area is illustrated in **Appendix G**.

## Projected Traffic Operations

The Recommended Alternative, with redirected volumes from the driveways on Welch Road east of Rock Springs Road, will result in the intersection of Welch Road and Rock Springs Road failing with

LOS F by the design year 2045. However, based on a year of failure analysis conducted as part of an Addendum to the DTTM (August 2022), under separate cover, this intersection is expected to meet the target LOS E until the year 2044. The remaining study signalized intersections are projected to operate at the target LOS E or better through the design year 2045.

## Environmental Impacts

### Contamination Sites

Contaminated sites within the vicinity of the recommended alternative were identified using the DOH and the FDEP and GIS data.

#### Welch Road Intersection

There is one biomedical waste facility located within the vicinity of the Welch Road intersection, and two biomedical waste facilities are immediately adjacent to the study corridor (Exhibit A in **Appendix K**). In addition, two NPDES sites are located within the recommended alternative, and four NPDES sites are immediately adjacent to this recommended alternative. The biomedical waste facility within the Welch Road intersection is Walgreens #5246, and the two adjacent to the recommended alternative are Take Care Health Services (owned by Walgreens) and Publix Pharmacy #0501. Both NPDES sites within this recommended alternative are associated with NPDES construction permits, and both have been terminated. The NPDES sites adjacent to the recommended alternative includes three terminated (Integrated Compliance Information System (ICIS)-NPDES Non-major discharge points and one effective ICIS-NPDES Non-major discharge point.

#### Sandpiper Street Intersection

There are no potentially contaminated sites documented at the Sandpiper Street intersection, however there are two sites immediately adjacent to the recommended alternative (Exhibit A in **Appendix K**). In addition, there is one NPDES site within the recommended alternative, and three NPDES sites are immediately adjacent to the recommended alternative. The potentially contaminated site is Circle K #7104, which is both a USEPA RCRA site and a hazardous waste facility. The NPDES site located within the recommended alternative is associated with a NPDES construction permit and has been terminated. One adjacent NPDES site is associated with a construction permit and is effective. One adjacent NPDES site is a terminated ICIS-NPDES Non-major discharge point. The last adjacent NPDES site is an effective ICIS-NPDES Non-major discharge point.

It is unlikely that contamination would affect completion of any of the recommended alternatives. **Table 61** lists the contamination and NPDES sites immediately adjacent to each recommended alternative.

**Table 61 | Contamination and NPDES Site by Recommended Alternative**

Recommended Alternative	Within Recommended Alternative		Adjacent to Recommended Alternative	
	Contamination Sites	NPDES Sites	Contamination Sites	NPDES Sites
Rock Springs Road and Welch Road	1	2	2	4
Rock Springs Road and Sandpiper Street	0	1	2	3

## Cultural and Social Facilities

Cultural and social facilities include, but are not limited to, trails, parks, schools, healthcare, and recreational areas, as well as the neighborhoods they serve. Many of these features are protected under the DOT Act of 1966, section 4(f), which limits the use of public land for federally protected transportation projects. The locations of cultural and social facilities are provided as Exhibit B in **Appendix K**. The recommended alternative is primarily located within the existing ROWs of the adjacent roads. No social or cultural facilities are located within the recommended alternatives, and the recommended alternatives would improve and expand connections between these facilities and existing trails, benefiting the surrounding communities and neighborhoods.

### Welch Road Intersection

Adjacent to the Welch Road intersection, there is one health care facility (Walgreens owned Take Care Health Services), one fire station (Apopka Fire Department Station 2), and one religious center (Crossroads Church) (Exhibit B in **Appendix K**). It is unlikely that the proposed intersection improvements for Welch Road would negatively impact these facilities.

### Sandpiper Street Intersection

Adjacent to the Sandpiper Street intersection, there is one religious center (Apopka Assembly of God Church) (Exhibit B in **Appendix K**). It is unlikely that the proposed intersection improvements for Sandpiper Street would negatively impact these facilities.

## Archaeological and Historical Resources

The following subsections will identify the potential impacts to archaeological and historical resources based on the recommended alternatives.

### Welch Road Intersection

As depicted in Exhibit C of **Appendix K**, no archaeological sites or historic resources that are listed, determined eligible, or considered potentially eligible by the SHPO for listing in the NRHP have been documented within the Welch Road recommended alternatives. However, no Cultural Resource Assessment Surveys (CRAS) have been conducted within the recommended alternative to identify historic or archaeological resources. A CRAS was conducted at the east end of the recommended alternative in 2015 for the Sandpiper Project. No structures or archaeological sites were identified for evaluation during this survey. No CRAS have been conducted within the vicinity of the intersection to identify historic or archaeological resources.

### Sandpiper Street Intersection

As depicted in Exhibit C of **Appendix K**, no archaeological sites or historic resources that are listed, determined eligible, or considered potentially eligible by the SHPO for listing in the NRHP have been documented within or near the Sandpiper Street intersection. However, no CRAS have been conducted within the vicinity of the intersection to identify historic or archaeological resources.

## Hydraulic and Natural Features

Existing literature and publicly available GIS data sources include, but are not limited to, the data and maps of the United States Army Corps of Engineers (USACE), FNAI, SJRWMD, FDEP, Florida Land Use and Cover Classification Systems (FLUCFCS), NRCS, FWC Habitat Model Data, USFWS.

## Soils

Soil types were mapped for the recommended alternative using GIS data obtained from the NRCS. **Table 62** provides an overview of the soils found within the recommended alternative and the NRCS soils map depicting the soil types located in the recommended alternatives can be found in as Exhibit D in **Appendix K**.



Table 62 | Summary of Soil Types

Map Unit Symbol	Map Unit Name	Total Acreage	Percent of Total	Hydric Status	Recommended Alternative
2	Archbold fine sand, 0 to 5 percent slopes	0.09	0.35%	Non-Hydric Soil	Sandpiper St
3	Basinger fine sand, depressional	1.75	6.84%	Hydric Soil	Welch Rd Sandpiper St
6	Candler-Apopka fine sands, 5 to 12 percent slopes	0.16	0.63%	Non-Hydric Soil	Sandpiper St
16	Floridana fine sand, frequently flooded	1.01	3.95%	Hydric	Sandpiper St
20	Immokalee fine sand	1.20	4.69%	Hydric Inclusions	Welch Road
28	Florahome fine sand, 0 to 5 percent slopes	1.27	4.96%	Non-Hydric Soil	Sandpiper St
34	Pomello fine sand, 0 to 5 percent slopes	6.34	24.78%	Hydric Inclusions	Welch Road Sandpiper St
35	Pomello-Urban land complex, 0 to 5 percent slopes	4.01	15.68%	Hydric Inclusions	Welch Road Sandpiper St
37	St. Johns fine sand	0.34	1.33%	Hydric Inclusions	Sandpiper St
39	St. Lucie-Urban land complex, 0 to 5 percent slopes	0.21	0.82%	Non-Hydric	Sandpiper St
44	Smyrna Fine sand	6.13	23.96%	Hydric Inclusions	Welch Road Sandpiper St
45	Smyrna-Urban land complex	2.35	9.19%	Hydric Inclusions	Welch Road Sandpiper St
47	Tavares-Millhopper fine sands, 0 to 5 percent slopes	0.40	1.57%	Non-Hydric Soil	Sandpiper St
54	Zolfo fine sand	0.32	1.25%	Non-Hydric Soil	Welch Road
<b>Totals for Area of Interest</b>		<b>25.5825.58</b>	<b>100.00%</b>		

Source: NRCS and USDA

A description of soil types located in the recommended alternatives can be found in the environmental characteristics section of the existing conditions chapter in this report. Three soil types that are not found in the existing conditions chapter of this report, Archbold fine sand, St. Lucie-Urban land complex, and Zolfo fine sand, are described below using characteristics taken from the USDA *Soil Conservation Service's Soil Survey of Orange County, Florida* (March 1990).

Archbold Fine Sand, 0 to 5 percent slopes (2) – This soil is mapped within the Sandpiper Street intersection. It is nearly level to gently sloping and moderately well drained. It is typically found on low ridges and knolls within flatwoods, and it can be indicative of marine terraces in the coastal plain and

associated upland. Slopes are smooth to convex. The water table is found at a depth of 42 to 60 inches of the surface for about 6 months, and it recedes to a depth of 60 to 80 inches for the remainder of the year. During extended wet periods, the water table may be at a depth of 24 to 40 inches for about 1 to 4 months, and it may recede to a depth of more than 80 inches during extended dry periods. The permeability is very rapid throughout, and the available water capacity is very low. This is considered a non-hydric soil.

**St. Lucie-Urban Land Complex, 0 to 5 percent slopes (39)** – This soil is mapped within the Sandpiper Street intersection. This soil complex consists of St. Lucie soil that is nearly level to gently sloping, and it is excessively well drained. It is found in areas of urban land. The water table is at a depth of 72 inches or more. The permeability is very rapid throughout the soil, and the available water capacity is very low in all strata. This is considered a non-hydric soil and is typically found in uplands.

**Zolfo Fine Sand (54)** – This soil is mapped within the Welch Road intersection. This nearly level and somewhat poorly drained soil is typically located on broad, slightly higher positions adjacent to the flatwoods. Slopes are smooth to convex and range from 0 to 5 percent. The water table is at a depth of 24 to 40 inches for 2 to 6 months, and it is a depth of 10 to 24 inches during periods of heavy rains. It recedes to a depth of about 60 inches during extended dry periods. The permeability is rapid in the surface and subsurface layers, and it is moderate in the subsoil. The available water capacity is low in the surface and subsurface layers and is medium in the subsoil. This is considered a non-hydric soil and is indicative of uplands.

## Land Use

The Florida Land Use, Cover, and Forms Classification System (FLUCFCS) was used to identify the existing land uses within the recommended alternatives. The existing land use map can be found as Exhibit E in **Appendix K. Table 63** summarizes the existing land uses located within the recommended alternatives.

**Table 63 | Summary of Land Use Types**

Map Unit Name	Total Acres	Percent of Total
Acreage not Zoned for Agriculture	1.61	6.29
Agricultural	3.36	13.14
Industrial	0.11	0.43%
Institutional	0.51	1.99%
Residential	12.93	50.55
Retail/Office	6.35	24.82%
Electrical Power Facilities	0.68	2.66%
Water	0.03	0.12%
<b>Totals</b>	<b>25.58</b>	<b>100.00%</b>

Source: FLUCFCS

Within the recommended alternatives, the most prominent land use is Residential followed by Retail/Office. A general description of the land use types and their characteristics taken from the FDOT

Florida Land Use, Cover and Forms Classification System, (January 1999) handbook and review of the surrounding environment is included in **Appendix K**.

### Wetlands and Other Surface Waters

The wetland and surface water analysis used the 2020 USFWS NWI data, 2019 SJRWMD land use and cover GIS data, and aerial interpretation based on satellite imagery dated 2019. The data shows that there are natural wetland systems and surface waters (lakes, rivers, and permitted stormwater ponds) within the two recommended alternatives as identified in **Table 64**. A map of wetlands and surface waters can be found as Exhibit F in **Appendix K**.

**Table 64 | Summary of Wetland and Surface Water Acreage within the Preferred Recommended Alternatives**

FLUCFCS Code	FLUCFCS Description	Acres	Recommended Alternative
5300	Reservoirs	0.03	Welch Rd Sandpiper St
6170	Mixed Wetland Hardwoods	0.30	Welch Rd

Source: FGDL, USFWS, SJRWMD

The proposed project is expected to primarily use the existing road ROW for the intersection improvements on Rock Springs Road. However, if wetland or surface water impacts cannot be avoided, permits from the SJRWMD and FDEP will be required, and wetland mitigation will be required for any unavoidable wetland impacts in accordance with state and federal wetland permitting requirements. In the vicinity of the recommended alternatives, the western boundary of the Wekiva River Protection Area is Rock Springs Road; therefore, the eastern portion of both intersections are within the protection area. The recommended alternatives also lie within the Wekiva River Nested drainage basin, and two mitigation banks serve this watershed, the Wekiva River Mitigation Bank and Blackwater Creek Mitigation Bank. Both mitigation banks have available mitigation credits.

### Wildlife Corridors and Crossings

Wildlife corridors typically consist of a large area of natural preserved habitats in the form of wetlands, forests, and prairies that support many wildlife species. Structures such as roads and housing development separate the corridors. Wildlife corridors usually support the movement of multiple species to promote diversity and provide access to resources such as surface waters and suitable foraging habitats. Improved habitat connectivity, road permeability, and deterrents to crossing roads are all important factors when developing mitigation strategies for wildlife on road projects. In the existing conditions, one wildlife crossing was identified for further analysis. Therefore, a review of the FDOT Wildlife Crossing Guidelines (2018) was conducted, and the location of the potential wildlife crossing was deemed inappropriate for these recommended alternatives because there are no conservation areas, public lands, or other lands protected from development present on both sides of the recommended alternatives that would facilitate wildlife movement through the area.

### Threatened and Endangered Species

The FNAI and GIS data and an Information for Planning and Conservation (IPaC) from the USFWS and the FWC identified protected species with the potential to occur and CFA and CA for threatened and endangered species within the recommended alternatives. Consultation Areas, identified by USFWS,

encompass all areas where populations are known to exist and where agency involvement may be necessary. **Table 65** provides a summary of threatened and endangered species with the potential to occur within and adjacent to the recommend alternatives. A map of protected species can be found as Exhibit G in **Appendix K**.

Table 65 | Summary of Protected Species with the Potential to Occur

Fauna	Federal Status	State Status	Probability of Occurrence
<b>Avian</b>			
Florida Sandhill Crane ( <i>Antigone canadensis pratensis</i> )	NL	T	Low
Florida Scrub-jay ( <i>Aphelocoma coerulescens</i> )	T	T	Low
American Bald Eagle ( <i>Haliaeetus leucocephalus</i> )*	NL	NL	Low
Eastern Black Rail ( <i>Laterallus jamaicensis</i> )	T	T	Low
Wood Stork ( <i>Mycteria americana</i> )	T	T	Moderate
Audubon's Crested Caracara ( <i>Polyborus plancus audubonii</i> )	T	T	Low
Everglade snail kite ( <i>Rostrhamus sociabilis plumbeus</i> )	E	E	Low
<b>Reptiles</b>			
Eastern Indigo Snake ( <i>Drymarchon couperi</i> )	T	T	Low
Gopher Tortoise ( <i>Gopher polyphemus</i> )	C	T	Moderate
Short-tailed Snake ( <i>Lampropeltis extenuata</i> )	NL	T	Low
Sand Skink ( <i>Plestiodon reynoldsi</i> )	T	T	Low
<b>Mammals</b>			
Florida Black Bear ( <i>Ursus americanus floridanus</i> )**	NL*	NL*	Moderate
<b>Flora</b>			
Incised Grove-burr ( <i>Agrimonia incisa</i> )	T	T	Low
Variable-leaved Indian-plantain ( <i>Arnoglossum diversifolium</i> )	NL	T	Low
Florida Bonamia ( <i>Bonamia grandiflora</i> )	T	T	Low
Many-flowered Grass-pink ( <i>Calopogon multiflorus</i> )	NL	T	Low
Chapman's Sedge ( <i>Carex chapmanii</i> )	NL	T	Low
Sand butterfly pea ( <i>Centrosema arenicola</i> )	NL	E	Low
Pigeon wings ( <i>Clitoria fragrans</i> )	T	T	Low
Piedmont Jointgrass ( <i>Coelorachis tuberculosa</i> )	NL	T	Low
Cutthroat Grass ( <i>Coleataenia abscissum</i> )	NL	E	Low
Beautiful Pawpaw ( <i>Deeringothamnus pulchellus</i> )	E	E	Low
Scrub Buckwheat ( <i>Eriogonum longifolium</i> var. <i>gnaphalifolium</i> )	T	T	Low
Hartwrightia ( <i>Hartwrightia floridana</i> )	NL	T	Low
Star Anise ( <i>Illicium parviflorum</i> )	NL	E	Low
Nodding Pinweed ( <i>Lechea cernua</i> )	NL	T	Low
Scrub Lupine ( <i>Lupinus aridorum</i> )	E	E	Low
Florida Spiny-pod ( <i>Matelea floridana</i> )	NL	E	Low
Pinesap ( <i>Monotropa hypopithys</i> )	NL	E	Low
Celestial Lily ( <i>Nemastylis floridana</i> )	NL	E	Low
Florida Beargrass ( <i>Nolina atopocarpa</i> )	NL	T	Low
Britton's Beargrass ( <i>Nolina brittoniana</i> )	E	E	Low
Papery Whitlow-wort ( <i>Paronychia chartacea</i> )	T	T	Low
Lewton's Polygala ( <i>Polygala lewtonii</i> )	E	E	Low
Sandlace ( <i>Polygonella myriophylla</i> )	E	E	Low
Scrub Plum ( <i>Prunus geniculata</i> )	E	E	Low
Giant Orchid ( <i>Pteroglossaspis ecristata</i> )	NL	T	Low

Fauna	Federal Status	State Status	Probability of Occurrence
Florida Willow ( <i>Salix floridana</i> )	NL	E	Low
Scrub Stylisma ( <i>Stylisma abdita</i> )	NL	E	Low
Clasping Warea ( <i>Warea amplexifolia</i> )	E	FE	Low
Carter's Warea ( <i>Warea carteri</i> )	E	FE	Low

Source: USFWS; FNAI.

F = Federally

E = Endangered: species in danger of extinction throughout all or a significant portion of its range.

T = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.

C = Candidate for listing at the Federal level by the USFWS

NL = Not currently listed

\*Protected by the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act of 1918.

\*\*FAC 68A-4.009

Based on the IPaC and FNAI searches, twelve protected wildlife species have the potential to occupy habitats within and immediately adjacent to the recommended alternatives, and some species have a higher probability of occurrence than others. The types of habitats found in the vicinity of the recommended alternatives were assessed to determinate the likelihood of occurrence of each listed species as described below.

### Federally Protected Species

#### Avian

Audubon's Crested Caracara – The Audubon's crested caracara is listed as Threatened by the USFWS and FWC, but the recommended alternatives do not lie within the USFWS Consultation Area for this species. The crested caracara typically inhabits prairies and pastures with scattered cabbage palms, wooded areas with scattered saw palmetto, cypress, and scrub oaks. The recommended alternatives primarily include ROW for existing roadway. It is unlikely that crested caracara would nest or forage within the recommended alternatives, and it is unlikely that formal consultation for this species would be required by USFWS. Because the recommended alternatives are not within the Consultation Area, the project will have no effect on the Audubon's crested caracara.

Eastern Black Rail – The eastern black rail is listed as Threatened by the USFWS and FWC. The black rail prefers dense marshes where they can remain undetected and elusive. They are usually located by their vocalizations, but the full extent of their habitat remains unknown. Due to their elusive nature and habitat preference, the likelihood of this species utilizing the recommended alternatives is low. Because the recommended alternatives are located on existing road ROWs and not in native habitat, they will have no effect on the eastern black rail.

Everglade snail kite – The Everglade snail kite is listed as Endangered by the USFWS and FWC, and the project falls within the USFWS Consultation Area for this species. Snail kites are generally found in lowland freshwater marshes and the shallow vegetated edges of lakes where they feed almost exclusively on apple snails (*Pomacea* spp.). Freshwater marshes or shallow vegetated lakes are located outside of the recommended alternatives in several locations (Prevatt Lake, Wolf Lake, Lake Cora, and Lake Merrill). Due to the density of urban growth and development in the area and the presence of more suitable habitat within Wekiwa Springs State Park, the likelihood of this species utilizing habitats within the recommended alternatives is low. The recommended alternatives will have no effect on the everglade snail kite.



Florida Scrub-jay – The Florida scrub-jay is listed as Threatened by the USFWS and FWC. The scrub-jay prefers relict oak-dominated scrub or xeric oak scrub habitat, and it requires a permanent 25-acre territory. While the recommended alternatives are within the USFWS Consultation Area for scrub-jays, there appears to be no scrub or suitable habitat for the scrub-jay located within or adjacent to the recommended alternatives. The likelihood of scrub-jays utilizing the area is low due to the urbanized nature of the land use surrounding the recommended alternatives, and these alternatives will be constructed within existing maintained ROW. The recommended alternatives will have no effect on the Florida scrub-jay.

Wood Stork – The wood stork is listed as Threatened by the USFWS and FWC, and consultation with the USFWS is required for any proposed work that impacts wood stork suitable foraging habitat (SFH) (primarily shallow, non-forested wetlands and surface waters) within a defined CFA. The recommended alternatives are located within the designated CFA for this species, with the closest known nest (Lawne Lake) located approximately 12.05 miles to the south. There is potential SFH in the recommended alternatives in the form of wetlands and surface waters, so the likelihood of this species utilizing the recommended alternatives for foraging is moderate. Below lists the sequence of selections when following The Corps of Engineers, Jacksonville District, USFWS, Jacksonville Ecological Services Field Office and State of Florida Effect Determination Key for the Wood Stork in Central and North Peninsular Florida (2008):

- The project is located more than 2,500 feet from a colony site;
- The project may impact suitable foraging habitat (SFH); and
- The project impacts to SFH are less than or equal to 0.5 acre.

The Rock Springs Road and Sandpiper Street recommended alternatives will not impact any SFH, therefore, these recommended alternatives would have no effect on the wood stork.

### ***Reptiles***

Eastern Indigo Snake – The eastern indigo snake is listed as Threatened by the USFWS and FWC. The indigo snake prefers pine flatwoods, hardwood forests, moist hammocks, and areas that surround cypress swamps. Their habitat is also closely associated with gopher tortoise burrows. If any gopher tortoise burrows are found in the recommended alternatives, the Standard Protection Measures for the eastern Indigo Snake (revised August 12, 2013) will be followed during construction activities. Since the recommended alternatives mainly consist of maintained road ROW, the likelihood of indigo snakes utilizing the area is low. Below lists the sequence of selections following The Corps of Engineers, Jacksonville District, USFWS, Jacksonville Ecological Services Field Office and State of Florida Eastern Indigo Snake Programmatic Effect Determination Key (2010):

- The project is not located in open water or salt marsh;
- The permit will be conditioned for use of the Service's Standard Protection Measures for the Eastern Indigo Snake during site preparation and project construction;
- There are gopher tortoise burrows, holes, cavities, or other refugia where a snake could be buried or trapped and injured during project activities;
- The project will impact less than 25 acres of xeric habitat supporting less than 25 active and inactive gopher tortoise burrows;
- Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be evacuated prior to site manipulation in the vicinity of the burrow. If an indigo snake is

encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Any permit will also be conditioned such that holes, cavities, and refugia will be inspected each morning before planned site manipulation.

Therefore, the recommended alternatives may affect, but are not likely to adversely affect, the eastern indigo snake.

**Sand Skink** – The sand skink is listed as Threatened by the USFWS and FWC. Both recommended alternatives lie within the USFWS Consultation Area for this species. Sand skinks are endemic to ridge habitats including rosemary scrub, scrubby flatwoods, sand pine and oak scrubs, and turkey oak ridge. Suitable habitat is found within the Mount Dora Ridge in Orange County and in well drained sandy soils that include the Apopka, Archbold, Candler, Florahome, Immokalee, Pomello, Smyrna, and Tavares soil series at elevations above 82 feet. All recommended alternatives contain suitable soils, with elevations ranging from 70 to 130 feet. In areas with surrounding development, existing roadways, and construction of the recommended alternatives within maintain ROWs, the likelihood of sand skink utilizing the recommended alternatives is low. Where open lands exist along undeveloped portions of the recommended alternatives, the potential for sand skink occurrence may be higher. A pedestrian survey should be conducted during the design phase to determine if the recommended alternatives contain suitable habitats for sand skinks. If suitable habitat is located within the recommended alternatives, then coordination with USFWS will be required. Given that the recommended alternatives will be constructed within the maintained ROW, it is anticipated that the recommended alternatives may affect, but are not likely to adversely affect the sand skink.

### **Flora**

Thirteen (13) federally listed plants may occur within the recommended alternatives based on the results of an IPaC and FNAI search. The recommended alternatives primarily include maintained ROW for an existing road, and no listed plant species are expected to occur or be disturbed during construction. Coordination with the USFWS to address listed plant occurrence may be necessary if listed plant species are found during subsequent surveys. It is anticipated that the recommended alternatives will have no effect on federally listed plant species.

### **Critical Habitat**

Based on the review of the USFWS IPaC search and USFWS GIS data and literature, the recommended alternatives are not located within any designated critical habitats. Therefore, no coordination with USFWS with regards to critical habitat is anticipated.

### **State Protected Species**

#### **Avian**

**Florida Sandhill Crane** – The Florida sandhill crane is listed as Threatened by the FWC. The sandhill crane prefers freshwater marshes, prairies, and pastures. Their breeding season falls between December and August, and they may be found foraging within the recommended alternatives due to the presence of surface waters, wetlands, and pasture grasses. Due to the density of urban growth and development, the likelihood of sandhill cranes nesting and occupying the area is low; however, the likelihood of this species utilizing the area for foraging is moderate. The recommended conservation practices provided in the FWC Florida Sandhill Crane Species Conservation Measures and Permitting Guidelines (2016) will be followed to the extent practicable, and potential habitat

(surface waters, marshes, and prairies) impacts will either be avoided or minimized (less than 0.5 acres). It is anticipated that no impacts to sandhill cranes or their nests will occur. If sandhill cranes enter the construction area, construction will cease until the crane has exited of its own accord. If the recommended conservation practices are followed, it is anticipated that there will be no impacts to the Florida sandhill crane.

## **Reptiles**

Gopher Tortoise – The gopher tortoise is listed as Threatened by the FWC, and it is a candidate for listing by the USFWS. They require well-drained, sandy soils for burrowing and can be found in scrub, dry hammock, pine flatwoods, dry prairies, mixed hardwood-pine communities, and a variety of other habitats including power line easements and roadside ROW. In accordance with FWC Gopher Tortoise Permitting Guidelines (2020), a gopher tortoise survey will be required prior to the commencement of work. Should burrows be identified within 25 feet of areas that would be affected by proposed construction, a FWC gopher tortoise relocation permit will be required. No adverse impacts to gopher tortoises are anticipated.

Short-tailed Snake – The short-tailed snake is listed as Threatened by the FWC. The short-tailed snake prefers sandy soils, particularly longleaf pine and xeric oak sandhills, but it also may be found in scrub and xeric hammock habitats. Because the density of urban development and the construction of the recommended alternatives will primarily occur within the maintained ROW of adjacent roadways, the likelihood of this species using the recommended alternatives is low and there will be no habitat loss. Due to these factors, it is anticipated that the recommended alternative will not impact the short-tailed snake.

## **Flora**

Sixteen (16) state-listed plants may occur within the recommended alternatives based on the results of a FNAI review. The recommended alternatives primarily include the maintained ROW for an existing road, and no listed plant species are expected to occur or be disturbed. Coordination with the Florida Department of Agricultural and Consumer Services (FDACS) to address listed plant occurrence may be necessary if listed plant species are found in subsequent surveys. However, there are no restrictions on the removal of state listed plant species for landowners unless the sale of plants is involved.

## **Other Protected Species**

### **Avian**

American Bald Eagle – The American bald eagle is protected under the Federal Bald and Golden Eagle Protection Act. According to the Audubon Center for Birds of Prey EagleWatch Program database and the FWC GIS database of known bald eagle nests, there are no eagle nests within 1.5 miles of the recommended alternatives. The closest known active nest (OR058) is located approximately 1.56 miles east of the recommended alternative, and it was recorded as active for the 2021 nesting season. The USFWS indicates that all projects greater than 660 feet from a bald eagle nest do not require USFWS consultation. Given the distance to the nest, there should be no need for USFWS coordination or review. Also, the likelihood of this species using the recommended alternatives is low. Therefore, no impacts to Bald Eagles are anticipated.

## Mammals

**Florida Black Bear** - The Florida black bear has been de-listed from Florida's imperiled species list, although it still receives protection under the state's Florida Black Bear Conservation Rule; 68A- 4.009, F.A.C. This rule protects bears from intentional "take", which includes pursuing, hunting, molesting, capturing, killing, or attempting those actions, whether or not such actions result in possession of the bear. Records for nuisance black bear reporting identify a high number of reports in proximity to the recommended alternatives. As provided in the Florida Black Bear Management Plan (2019), the recommended alternatives are located in the Central Bear Management Unit, and bear occurrences in the area around the recommended alternatives are described as frequent. FWC-established black bear best management practices for construction sites, but recommendations include temporarily halting operations until the bear has left the construction area and providing regular gaps in safety fences or other barriers to travel. Daily removal of trash from the site is also recommended. The proximity of Wekiwa Springs State Park and the rate of bear nuisance reports in the area indicate that the likelihood of this species using the recommended alternatives for migratory movement is moderate to high. Due to the mobility of this species and passive use of the recommended alternatives after construction, it is anticipated that the recommended alternatives will not impact the Florida black bear.

## Cost Estimates

The recommended alternative has an estimated total project cost of \$10.26 million, which includes costs for final design and construction. Estimated ROW cost has not yet been determined and will be analyzed during the design phase of this project. **Table 66** provides a summary of the recommended alternative cost estimates by segment. The detailed construction cost estimates are included in **Appendix I**.

Table 66 | Preferred Sites Cost Estimates Summary

Recommended Alternative Segment	Estimated Design Cost (millions)	Estimated Construction Cost (millions)
Welch Road, North Publix Entrance, and Lester Road Intersections	\$1.30	\$6.51
Sandpiper Street Intersection	\$0.33	\$1.64
Sandpiper Street Sidewalks	\$0.10	\$0.38

Notes: Project Costs are in 2022 dollars.

## Public Involvement

Local input was sought throughout the study process to ensure that the needs and desires of the surrounding community were accounted for. Engagement with local stakeholders and the community began early on with a survey and questions for input on the issues and opportunities. The local stakeholders and community were also engaged during the alternatives development process to guide the selection and refinement of the recommendations for the study. This section provides a summary of public outreach held over the course of the study. Public involvement for the Rock Springs Road study was held concurrently with the West Orange Trail Extension Study, also being conducted by MetroPlan Orlando.

### Public Participation Plan

At the start of the study, a public participation program was developed and documented in the *Public Participation Plan (PPP)*, under separate cover. The fundamental objectives of the PPP were to:

- Allow people living and working within the study area and those who travel through, the opportunity to contribute to the decision-making process;
- Ensure that the concerns and issues of those with a stake in the project are identified and given opportunities to review and comment on the findings of the alternatives; and
- Ensure that stakeholder concerns are addressed.

The PPP ensured the study's recommendation meets the needs and had greater support of the community.

### Local Agency and Stakeholder Meetings

The following agency and stakeholder meetings took place over the course of the study. All materials associated with the stakeholder meetings are included in **Appendix L**.

#### Agency Kickoff Meeting

An Agency Kickoff Meeting was held on April 8, 2021. The purpose of this meeting was to introduce the study to local agencies and to gather feedback on any considerations that should be made during the study process. The meeting was attended by representatives of MetroPlan Orlando, City of Apopka, Orange County, Bike/Walk Central Florida, and the study team.

#### Agency Coordination Meeting #2

The second Agency Coordination Meeting was held on November 9, 2021. The purpose of this meeting was to give a presentation covering a review of survey responses, working concepts, and next steps for the Rock Springs Road Corridor Study, and to gather input from the agency stakeholders prior to the public meeting held on January 27, 2022. The meeting was attended by representatives of MetroPlan Orlando, City of Apopka, Orange County, Bike/Walk Central Florida, FDEP, Wekiwa River Basin State Park, LYNX, and the study team.



### Agency Coordination Meeting #3

The final Agency Coordination Meeting was held on August 1, 2022. The purpose of this meeting was to give a presentation covering a review of public engagement, recommended alternatives, and next steps for the Rock Springs Road Corridor Study and gather input from the agency stakeholders prior to the public meeting being held on September 22, 2022. The meeting was attended by representatives of MetroPlan Orlando, City of Apopka, Orange County, Bike/Walk Central Florida, FDEP, Wekiwa River Basin State Park, LYNX, and the study team.

### Wekiwa Springs State Park Meeting

A Park Meeting was held on May 26, 2021. The purpose of this meeting was to introduce the Rock Springs Road Study to FDEP and also gather input and feedback on any considerations that should be made during the study process.

### Duke Energy

A meeting with Duke Energy was held on June 17, 2021. The purpose of this meeting was to present a brief project overview including existing conditions and study schedule, and to gather input and feedback that should be made during the study process. Duke Energy was open to providing a utility feasibility review and high-level cost estimate to be used for the Alternative Development stage of the study.

### Business Owners Coordination Meeting

A Business Owners Coordination Meeting was held on July 19, 2021. The purpose of this meeting was to introduce the study to business owners along the study corridor and gather input and feedback on any considerations that should be made during the study process. No participants joined the meeting.

### School Meeting

A school meeting was held on November 1, 2021. The purpose of this meeting was to give a brief overview of improvements being made along Rock Springs Road and to gather input on how students use the corridor. The meeting was by representatives of Wolf Lake Elementary and Middle Schools, Orange County Public Schools (OCPS) Transportation Services, OCPS Safety Department, OCPS Occupational Safety and Health, OCPS District 7 board, and the study team. An update email was sent to meeting attendees on December 6, 2022, to provide an update on the study results at the conclusion of the study.

### Intersection Meeting

An Intersection Meeting was held on March 8, 2022. The purpose of this meeting was to discuss the Rock Springs Road at Welch Road intersection with members from MetroPlan Orlando, City of Apopka, Orange County, and the study team. The topic of discussion was related to projected traffic operations for various lane configuration scenarios in 2045 to gain consensus on the priorities and preferences with Orange County and the City of Apopka.

### City of Apopka Coordination Meeting

A City of Apopka Coordination Meeting was held on April 20, 2022. The purpose of the meeting was to discuss the Rock Springs Road Corridor Study with the City of Apopka. Topics discussed during the

meeting were the status of site development in the northwest parcel of Rock Springs Road and Welch Road, the status of Sandpiper Street design, and outreach efforts to Publix and Duke Energy.

### Publix South Access Meeting

A Publix South Access Meeting was held on June 3, 2022. The purpose of this meeting was to discuss the Rock Springs Road Corridor Study with members from MetroPlan Orlando, City of Apopka, Orange County, and the study team. The topic of discussion was related to the southern driveway of the Publix Shopping Center to gain consensus on the next steps regarding the driveway.

### Project Partner Update Meeting

A Project Partner Update Meeting was held on November 4, 2022. The purpose of this meeting was to give a presentation reviewing the public feedback received during the second public meeting and survey #3 and to garner support for the final study recommendations. The meeting was attended by representatives of MetroPlan Orlando, City of Apopka, Orange County, Orange County Parks and Recreation, and the study team.

### Orange County Commissioner Briefing

An Orange County Commissioner Briefing was held on November 14, 2022. The purpose of this meeting was to review the public feedback received during the second public meeting and survey #3 and to garner support for the final study recommendations. The meeting was attended by representatives of MetroPlan Orlando, Orange County Commissioner Christine Moore, and the study team.

### Small Group Meetings

In addition to the scheduled stakeholder outreach activities, small group meetings were held during the study when necessary. **Table 67** provides a summary of the small group meetings held during the study.

Table 67 | Small Group Meetings

Participants	Date	Purpose/Outcome
7-11	6/16/2022	Present overview of study recommendations for input, particularly potential revisions to the Publix South access.
Publix at Wekiva Plaza	6/16/2022	Present overview of study recommendations for input, particularly potential revisions to the Publix South access. Expressed safety concerns along the study corridor and in the Publix parking lot. Suggested to reach out to Publix area manager.
Publix Area Property Management (Real Estate Department)	7/20/2022	Present overview of study recommendations for input, particularly potential revisions to the Publix South access. Open to helping get the conversation started with Publix Real Estate Department representatives.

## Public Meetings

Two public meetings were held during the study to solicit input from all interested parties that wished to engage in the planning process. The public meetings were held at two key milestones in the study

(1) during the alternatives development and selection stage and (2) during the recommended improvements refinement and documentation stage.

The following is a summary of the two public meetings.

### Alternatives Community Meeting

The first public meeting was held on January 27, 2022. The purpose of the public meeting was to present the Rock Springs Road Corridor Study to the public and explain the alternatives developed for the study corridor in order to receive public feedback. The meeting was comprised of two elements, a live presentation, and a virtual meeting room.

The live presentation was streamed live via Zoom and on MetroPlan Orlando's YouTube page on January 27, 2022, at 6:00 p.m. Virtual attendees using Zoom were given the opportunity to ask questions to available project team panelists in a live question and answer forum. A virtual meeting room remained open to the public from January 27 to February 28, 2022. In the virtual meeting room, visitors could view a recording of the live presentation, project displays and interactive webmaps, review study documents, sign up for project update emails, and provide feedback about the study.

There were several ways the public could provide feedback on the study:

- Participating in the live Q&A session following the live presentation
- Filling out a comment form in the virtual meeting room
- Email or phone call to the project manager
- Sharing feedback in the free response sections included in the survey.

The following is a summary of questions and feedback received during the Q&A session of the first public meeting:

- Questions about existing traffic volumes along Rock Springs Road at Welch Road and Sandpiper Street
- Questions about the westbound dual right turn lanes being reintroduced into the study corridor
- Desire for gridded street network in Apopka
- Request for traffic remediation eastbound on Welch Road from Rock Springs Road to Thompson Road

An Alternatives Community Meeting summary is included in **Appendix L**.

### Recommended Alternative Community Meeting

The second public meeting was held September 22, 2022. The purpose of the public meeting was to share the Rock Springs Road Study recommended alternatives in order to receive public feedback. The meeting comprised of two elements, an in-person meeting, and an online live-stream of the presentation.

The in-person meeting was held at the City of Apopka Council Chambers and streamed live via Zoom and on MetroPlan Orlando's YouTube page on January 27, 2022, at 6:00 p.m.

There were several ways the public could provide feedback on the study:

- Participating in the live Q&A session following the live presentation (in-person and virtual)
- Attending the in-person public meeting
- Filling out a comment form

- Email or phone call to the project manager
- Sharing feedback in the free response sections included in the survey

The following is a summary of questions and feedback received during the Q&A session of the second public meeting:

- Questions about changes to access at the Rock Springs Road and Welch Road intersection
- Questions about the proposed improvement to add westbound dual right turn lanes from Welch Road onto Rock Springs Road as this change was previously ineffective
- Request for signalization at the Wekiva Townhomes at Vista Crest Drive
- Desire for addition of bike lanes along Rock Springs Road and Welch Road
- Desire for traffic calming measures and lower speed limits throughout the corridor
- Concerns for environmental impacts to Wekiwa Springs State Park as a result of the recommended alternatives

A Recommended Alternatives Community Meeting summary is included in **Appendix L**.

## Agency Updates

Several update presentations were given to various entities during the study. Local agencies to receive an update include Apopka City Council, Apopka Development Review Committee (DRC), MetroPlan Orlando Committees, and the Orange County Commissioner Christine Moore. The following is a summary of the Agency Update presentations given during the study. All materials associated with Agency Update meetings are included in **Appendix L**.

### City Council Update Presentations

#### City Council Update #1

A presentation was given to the Apopka City Council during the January 19, 2022, regularly scheduled meeting. The presentation included an introduction to the study and an overview of the proposed Rock Springs Road strategies and alternatives for input from the City Council prior to the Alternatives Community Meeting. Input received from the City Council following the presentation include the following:

- Questions regarding the cost of the project and the overall timeline
- Overall support for the project to help address traffic issues along the corridor
- Request to look into improving the staging area for the school bus stop in front of the Citgo
- Questions about changes to access along the corridor.

#### City Council Update #2

A second presentation was given to the Apopka City Council during the August 17, 2022, regularly scheduled meeting. The presentation included an overview of the study progress and Rock Springs Road recommended alternatives for input from the City Council prior to the second public meeting. Input received from the City Council following the presentation include the following:

- Questions regarding the westbound dual right turn lanes and how they will be made better
- Questions about the proposed signalized intersection at the Publix North entrance and changes to access to nearby businesses
- Questions about the proposed Sandpiper Street improvements

## DRC Update Presentation

A presentation was given to the Development Review Committee during the January 19, 2022, regularly scheduled meeting. The presentation included an introduction to the study and an overview of the proposed Rock Springs Road strategies and alternatives for input from the Council Committee prior to the Alternatives Community Meeting. Input received from the DRC following the presentation include the following.

- Questions regarding utility relocations along the corridor
- Concerns for safety regarding the mid-block crossing on Rock Springs Road
- Questions about lighting improvements within the study corridor as part of this project
- Comments about the feasibility of the improvements at the Rock Springs Road and Welch Road intersection

## MPO Committee Update Presentations

Table 68 summarizes the update presentations given to MPO committees during the study.

Table 68 | MPO Committee Update Presentations

Committee	Date	Purpose/Outcome
MPO TSM&O Advisory Meeting	1/7/2022	To present the study alternatives for input from the Committee members prior to the Alternatives Community Meeting.
MPO Technical Advisory Committee Meeting	1/7/2022	To present the study alternatives for input from the Committee members prior to the Alternatives Community Meeting.
MPO TSM&O Advisory Meeting	12/2/2022	To present the recommended study alternatives for input from the Committee members prior to finalizing the study.
MPO Technical Advisory Committee Meeting	12/2/2022	To present the recommended alternatives for input from the Committee members prior to finalizing the study.
MPO Community Advisory Committee Meeting	12/7/2022	To present the recommended alternatives for input from the Committee members prior to finalizing the study.
MPO Municipal Advisory Committee Meeting	12/8/2022	To present the recommended alternatives for input from the Committee members prior to finalizing the study.

## Additional Community Engagement

Community engagement was encouraged throughout the duration of the study. The following sections summarize the methods of additional engagement.

### Website

A study website was developed and made live at the start of the study. The website was frequently updated and a constant contact list, populated by email sign up, was used through the study to provide up to date information on changes to the website and information relating to upcoming events including public meetings to the public. Reports from the study were also made available for download on the website. A record of all communication received outside of scheduled meetings was documented throughout the study.



Yard signs were placed throughout the study area along Rock Springs Road, Welch Road, and Ponkan Road for the website launch and prior to the two public meetings. The signs contained a quick response (QR) code which directed to the study website. Additionally, a mailer was distributed to all property owners adjacent to the study area for the website launch.

### Public Survey

Three public surveys were conducted over the course of the study. The surveys were developed to provide the opportunity for the public to view proposed concepts and give feedback on the preferred Rock Springs Road study alternatives. A copy of survey questions and responses are included in the public meeting summaries found in **Appendix L**.

### Additional Coordination

A record of all communication received outside of scheduled meetings was documented throughout the study. **Table 69** provides a summary of all additional coordination.

**Table 69 | Additional Coordination**

Name	Date	Method	Notes
Mrs. Kennedy	6/18/2021	Phone Call	Request for information about the sidewalk gap along Welch Road.
Sundeep Singh	8/8/2022	E-mail	Request for information about the traffic light and median being proposed at Rock Springs Road just north of Welch Road regarding access management.
Michelle Kumm	9/7/2022	E-mail	Concern for homeowner safety as a result of the proposed sidewalks along Sandpiper Street.
Victor Malas	9/23/2022	E-mail	Request for information about potential access changes at the proposed development in the NW corner of the Rock Springs Road and Welch Road intersection. Additional concern for the effectiveness of the proposed signal at the Publix North Entrance intersection.
Steve Hooks	9/27/2022	E-mail	Request for information about access changes at the Rock Springs Road and Welch Road intersection.