NATURAL RESOURCES EVALUATION

Florida Department of Transportation

District One

State Road 544 (Lucerne Park Road) Project Development and Environment Study

From Martin Luther King Boulevard to State Road 17

Polk County, Florida

Financial Management Number: 440273-1-22-01

ETDM Number: 5873

Date: November 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

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EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) Study to evaluate the proposed widening of State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard (Avenue T) to SR 17 in Polk County, a length of approximately 7.96 miles. This project involves the widening of SR 544 from two lanes to four lanes to meet future travel demands, improving safety and providing bicycle and pedestrian features, such as a shared use path.

This Natural Resources Evaluation (NRE) has been prepared as part of the PD&E Study to identify potential impacts to natural resources throughout the SR 544 corridor. The purpose of this NRE is to document protected species and habitat and identify the location of wetlands and surface waters within the project corridor in order to determine potential impacts to these resources, provide rationale to support species effect determinations, identify avoidance and minimization measures, and quantify mitigation necessary for the recommended preferred alternative. This NRE has been prepared in accordance with the *Wetlands and Other Surface Waters* and *Protected Species and Habitat* chapters of the FDOT's *PD&E Manual* and the current Natural Resources Evaluation Outline and Guidance Document.

The Preferred Alternative is located within the US Fish and Wildlife Service (USFWS) Consultation Area (CA) of the Audubon's crested caracara (*Polyborus plancus audubonii*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida bonneted bat (*Eumops floridanus*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), sand skink (*Neoseps reynoldsi)* and blue-tailed mole skink (*Eumeces egregious lividus*), and Lake Wales Ridge plants. The Preferred Alternative falls within the Core Foraging Area (CFA) for five wood stork (*Mycertia americana*) colonies. The existing habitats in the study area may also support other federally protected species, as well as many state protected species. Effect determinations were based on the results of general wildlife and species-specific surveys, data collection, and USFWS' effect determination keys. **Table ES-1** identifies protected species evaluated in this document, their regulatory status, and the effect determination under the Preferred Alternative.

Table ES-1: Effect Determinations for Protected Species

Scientific Name	Common Name	Status	Effect Determination
Birds			
Ammodramus savannarum floridanus	Florida Grasshopper Sparrow	FE	NO EFFECT
Aphelocoma coerulescens	Florida Scrub-jay	FT	NO EFFECT
Athene cunicularia floridana	Burrowing Owl	ST	NAEA
Egretta caerulea	Little Blue Heron	ST	NAEA
Egretta tricolor	Tricolored Heron	ST	NAEA
Falco sparverius paulus	Southeastern American Kestrel	ST	NAEA
Grus canadensis pratensis	Florida Sandhill Crane	ST	NAEA
Haliaeetus leucocephalus	Bald Eagle	BGEPA/MGTA	--
Laterallus jamaicensis jamaicensis	Eastern Black Rail	FT	MANLAA
Mycteria americana	Wood Stork	FT	MANLAA
Platalea ajaja	Roseate Spoonbill	ST	NAEA
Polyborus plancus audubonii	Audubon's Crested Caracara	FT	MANLAA
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	MANLAA
Mammals			
Eumops floridanus	Florida Bonneted Bat	FE	NO EFFECT
Perimyotis subflavus	Tricolored Bat	C	--
Ursus americanus floridanus	Florida Black Bear	M	--
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	MANLAA
Eumeces egregious lividus	Blue-tailed Mole Skink	FT	MALAA
Gopherus polyphemus	Gopher Tortoise	ST	NAEA
Pituophis melanoleucus mugitis	Florida Pine Snake	ST	NAEA
Neoseps reynoldsi	Sand Skink	FT	MALAA
Plants			
Bonamia grandiflora	Florida Bonamia	FT/SE	NO EFFECT
Calamintha ashei	Ashe's Savory	ST	NAEA
Calopogon mutliflorus	Many-flowered Grass-pink	ST	NAEA
Carex chapmanni	Chapman's sedge	ST	NAEA
Centosema Arenicola	Sand Butterfly Pea	SE	NAEA
Chionanthus pygmaeus	Pygmy Fringe-tree	FE	NO EFFECT
Clitoria fragrans	Pigeon Wings	FT/SE	NO EFFECT
Coelorachis tuberculosa	Piedmont Jointgrass	ST	NAEA
Coleataenia abscissa	Cutthroatgrass	SE	NAEA
Conradia brevifolia	Short-leaved Rosemary	FE	NO EFFECT
Crotalaria avonensis	Avon Park Harebells	FE	NO EFFECT
Dicerandra frutescens	Scrub Mint	FE	NO EFFECT
Eriogonum longifolium	Scrub Buckwheat	FT/SE	NO EFFECT
Hartwrightia floridana	Hartwrightia	ST	NAEA

Scientific Name	Common Name	Status	Effect Determination
Plants (continued)			
Hypericum cumulicola	Highlands Scrub Hypericum	FE	NO EFFECT
Illicium parviflorum	Star Anise	SE	NAEA
Lechea cernua	Nodding Pinweed	ST	NAEA
Liatris ohlingerae	Florida Blazing Star	FE	NO EFFECT
Lupinus aridorum	Scrub Lupine	FE	NO EFFECT
Matelea floridana	Florida Spiny-pod	SE	NAEA
Nemasylis floridana	Celestial Lily	SE	NAEA
Nolina atopocarpa	Florida Beargrass	ST	NAEA
Nolina brittoniana	Britton's Beargrass	FE	NO EFFECT
Paronychia chartacea	Papery Witlow-wort	FT/SE	NO EFFECT
Polygala lewtonii	Lewton's Polygala	FE	NO EFFECT
Polygonella basiramia	Wireweed (Florida Jointweed)	FE	NO EFFECT
Polygonella myriophylla	Sandlace (Small's Jointweed)	FE	NO EFFECT
Prunus geniculate	Scrub Plum	FE	NO EFFECT
Pteroglossaspis ecristata	Giant Orchid	ST	NAEA
Salix floridana	Florida Willow	SE	NAEA
Warea amplexifolia	Clasping Warea	FE	NO EFFECT
Warea carteri	Carter's Mustard (Cater's Warea)	FE	NO EFFECT
Ziziphus celata	Florida Ziziphus	FE	NO EFFECT

MALAA = May Affect, Likely to Adversely Affect **MANLAA** = May Affect, Not Likely to Adversely Affect
NAEA = No Adverse Effect Anticipated **NEA** = No Effect Anticipated
FE = Federally Endangered **FT** = Federally Threatened **SE** = State Endangered **ST** = State Threatened
M = Managed **C** = Candidate
BGEPA = Bald and Golden Eagle Protection Act **MGTA** = Migratory Bird Treaty Act

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area. A wetland assessment was performed for wetlands and other surface waters in accordance with the Uniform Mitigation Assessment Method (UMAM), pursuant to Chapter 62-345, Florida Administrative Code (F.A.C.), to determine the functional value provided by the wetlands and other surface waters and determine the amount of mitigation required to offset adverse impacts. Other surface waters classified as upland cut ditches and permitted reservoirs were not included in the assessment as mitigation will not be required for impacts to these surface waters. Direct impacts to jurisdictional wetlands associated with the Preferred Alternative and preferred pond/floodplain compensation sites are approximately 14.11 acres. Direct impacts to surface waters are approximately 2.66 acres. Secondary impacts to adjacent wetlands are approximately 10.03 acres. The total project impacts result in a functional loss of 7.039 units for state and federal jurisdictional wetlands. Mitigation for unavoidable wetland impacts will be provided to satisfy all mitigation requirements of Part IV, Chapter 373 Florida Statutes (F.S.), and United States Code (U.S.C.) 1344.

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Section 7 of the Endangered Species Act (ESA), and the FDOT's PD&E Manual, the proposed project was evaluated for potential Essential Fish Habitat (EFH). No EFH is located within or adjacent to the project area. Therefore, no involvement with EFH resources is anticipated.

The proposed project was evaluated for the occurrence of Critical Habitat as defined by the ESA of 1973, as amended and 50 CFR Part 424. This analysis is consistent with the Protected Species and Habitat chapter of the PD&E Manual. No Critical Habitat occurs within the project corridor; therefore, no impacts to Critical Habitat are anticipated as a result of the proposed project.

SECTION 1 PROJECT OVERVIEW

1.1 Project Description

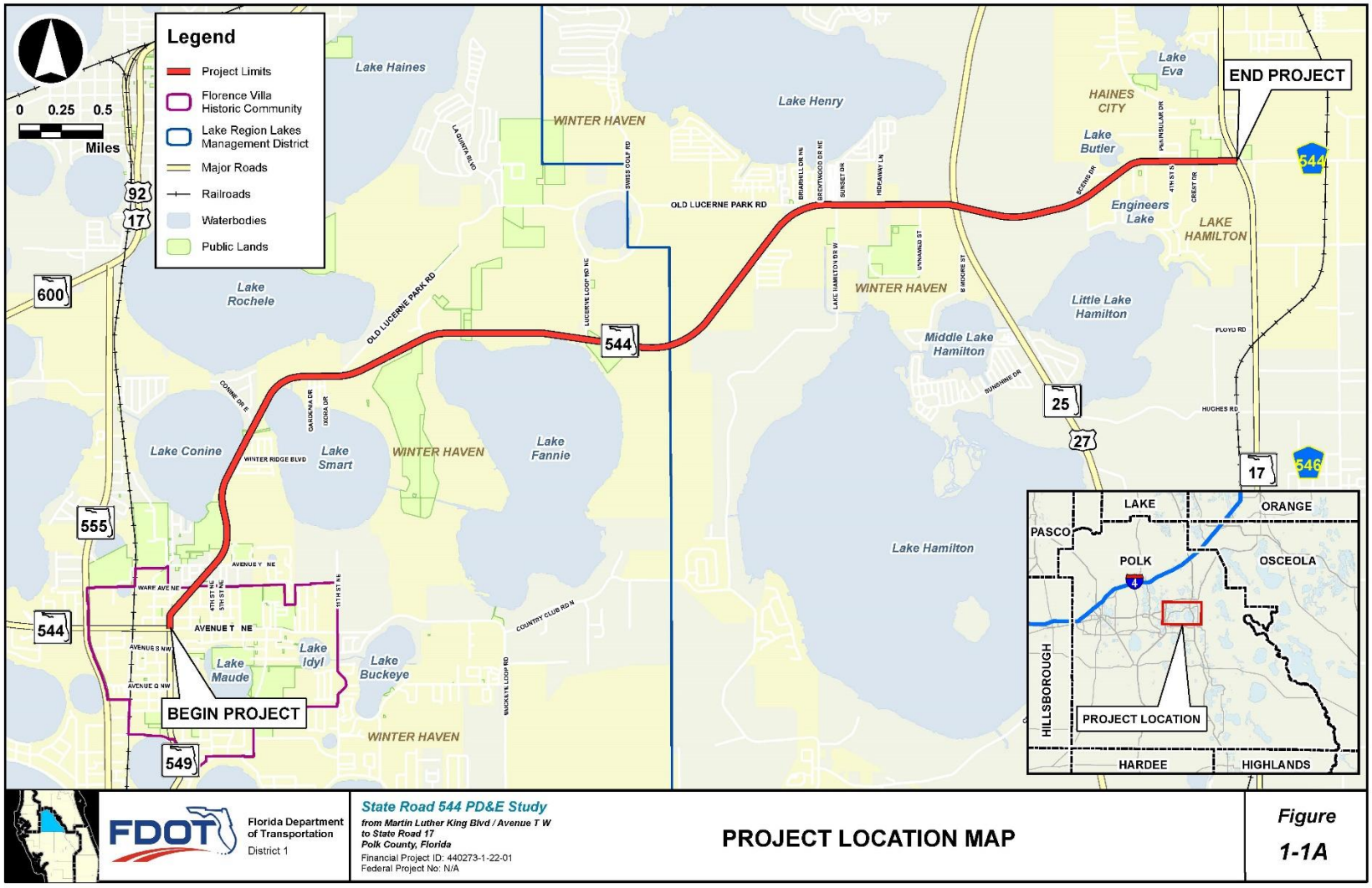
This project involves capacity and multi-modal improvements to SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County, a length of 7.96 miles. The project location map is provided as **Figure 1-1A**. The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system; however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.20 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. The Citrus Connection Route #60 bus route (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing right-of-way along SR 544 (Lucerne Park Road) ranges from 50 feet to 85 feet from Martin Luther King Boulevard to Avenue Y, 90 feet to 170 feet from Avenue Y to US 27, and 60 feet to 140 feet from US 27 to SR 17.

In addition to widening from two to four lanes, the proposed improvements will include sidewalks, and shared-use paths to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional right-of-way may be required depending on the proposed improvements and specific right-of-way requirements will be determined during this Project Development and Environment (PD&E) Study.

Figure 1-1A: Project Location Map



Environmental Assessment Study Area

The SR 544 Study Area is considered to be the areas directly or indirectly affected by the proposed action and not merely the immediate area involved in the action. The limits for this project begin at Martin Luther King Boulevard and extend 7.96 miles east to SR 17 in Polk County. The project limits are displayed in **Figure 1-1A**. For the purposes of this report, the study area includes all lands within 2000 feet of the current FDOT right-of-way and includes the proposed pond and flood plain compensation sites. Additionally, a 1500-meter (4,920 feet) buffer was added to the study area where suitable Audubon's crested caracara habitat occurred in order to fulfill the survey protocol requirements outlined by the USFWS.

1.1.1 Report Contents and Purpose

This NRE has been prepared as part of the PD&E Study to assess the various widening alternatives for SR 544 and identify potential impacts to natural resources throughout the corridor. The purpose of this NRE is to document protected species, wetlands, and essential fish habitat and identify the location of wetlands and surface waters within the project corridor in order to determine potential impacts to these resources, provide rationale to support species effect determinations, identify avoidance and minimization measures, and quantify mitigation necessary for the Preferred Alternative.

1.2 Purpose and Need

The purpose of this project is to address roadway capacity deficiency along SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County to accommodate future travel demand as a result of projected population and employment growth in the area. Other goals of the project include enhancing mobility options and multi-modal access as well as supporting local economic development initiatives. The need for the project is based on the following criteria:

CAPACITY/TRANSPORTATION DEMAND: Improve Operational Conditions and Accommodate Projected Travel Demand

This project is anticipated to improve traffic operations along SR 544 (Lucerne Park Road) by increasing operational capacity to meet the projected travel demand as a result of Polk County population and employment growth and increased regional travel in the corridor.

The project segment occurs within two of the eight Polk County planning areas [Central Planning Area and East Planning Area] as depicted in Momentum 2040 [the Polk Transportation Planning Organization's (TPO) Long Range Transportation Plan (LRTP)]. Of the eight planning areas, the East Planning Area is expected to experience the highest increase in population growth between

2010 and 2040 with a 29% increase in single-family dwelling units and a 34% increase in multi-family dwelling units. The Central Planning Area is anticipated to experience the second highest increase in single family dwelling units (25% increase) during the same time period. Accordingly, the Central Planning Area will experience the highest increase in employment growth between 2010 and 2040 with a 42% increase in industrial employment, 34% increase in commercial employment, and a 32% increase in service employment. Likewise, the East Planning Area will experience the second highest increase in commercial employment (26% increase) and the third highest increase in service employment (21% increase) during the same time period. Countywide employment is expected to increase by 79% between 2010 and 2040. Growth within the project area may be attributed to the numerous developments that have been approved and continue to be approved by the City of Haines City.

The greater SR 544 corridor serves commuters of the area as it provides access to regional transportation facilities [including US 92, US 17, US 27, and SR 17] as well as residential and commercial hubs within central Polk County. The project segment of SR 544 (Lucerne Park Road) specifically facilitates local commuter traffic between the population and employment centers of Winter Haven and Haines City. Identified as a Secondary Freight Network Highway Corridor by the Polk TPO, SR 544 additionally serves as a freight distribution route as it connects to a Strategic Intermodal System (SIS) Highway Corridor [US 27], Regional Freight Network Highway Corridors as designated by the Polk TPO [US 92, US 27, and SR 17], and another designated Polk TPO Secondary Freight Network Highway Corridor [US 17]. Truck traffic composes between 7.0% and 9.9 % of the total daily traffic present along the project segment of SR 544 (Lucerne Park Road). As such, this roadway plays an important role in facilitating truck traffic and the distribution of goods to both local and regional destinations.

While the roadway currently operates at an acceptable LOS, conditions are anticipated to deteriorate below established standards if no improvements occur by 2040 as the roadway lacks the capacity to accommodate the projected travel demand. With the proposed improvement, the corridor is expected to continue to operate at an acceptable LOS or improved LOS.

MODAL INTERRELATIONSHIPS: Enhance Mobility Options and Multi-Modal Access

Notable pedestrian and bicycle traffic in the corridor was observed in the field despite the fact that sidewalks and bicycle lanes are intermittent and disconnected along the corridor. In addition, a large transit dependent population is present, composed primarily of minority and low-income populations as well as housing units with no vehicle available. Compared to the demographic characteristics for Polk County, the project analysis area [which consists of United States census block groups within a 500-foot buffer surrounding the project] contains a significantly higher minority population percentage [20.1% higher], a higher percentage of housing units with no

vehicle available [1.2% higher], and a notably lower median family income [$11,246 less]. This indicates a population with a higher propensity to walk, bike, or take transit to access essential services. The need for multi-modal options within the corridor is critical as growth in the area has created a latent demand for increased bicycle and pedestrian activity.

It should be noted that a portion of the project segment [from Ave T to Old Lucerne Park Road] is identified by the Polk TPO as a Future Complete Streets Corridor. A Complete Street is defined as a corridor that is designed to provide safe access and travel for all users [pedestrians, bicyclists, motorists, and transit riders] of all ages and abilities. Some of the treatments proposed as part of the Future Complete Streets Corridor have been applied to a section immediately south/adjacent to the project corridor [from Ave T to Ave O] and to the westernmost/southernmost section of the project segment [Ave T to Ave Y]. These treatments included the reconstruction of driveways to meet Americans with Disabilities Act (ADA) standards, the addition of pedestrian street lighting, and the construction of crosswalks on intersecting minor streets. New or enhanced sidewalks, landscaping, enhanced bus stops, improved signage, as well as a shared use path [Old Dixie Trail - ETDM Project #14328] are some of the additional improvements being considered/evaluated along the project corridor.

Overall, the proposed project is anticipated to meet the mobility needs of the area by alleviating future congestion on the corridor, providing multimodal travel options, and improving east-west access within east-central Polk County. The proposed bicycle and pedestrian facilities are to enhance multi-modal access and connections between community points of interest and to the regional trail network.

SOCIAL DEMANDS AND ECONOMIC DEVELOPMENT: Support Economic Development

One Florida Opportunity Zone [formerly titled Florida Enterprise Zone] borders the northern portion of the project corridor from Old Lucerne Park Road to US 27. This program provides tax incentives for investments in low-income communities. In addition, the easternmost/northernmost section of the project corridor occurs within the Haines City Community Redevelopment Area. Further, the westernmost/ southernmost section of the project [Ave T to Ware Ave] occurs within the Florence Villa Community Redevelopment Area; the Winter Haven Community Redevelopment Agency fosters and promotes community redevelopment activities within this designated district of the City of Winter Haven. Community Redevelopment Areas are recognized as special districts under Florida Statute created to encourage investment within the district through a series of strategic and timely public investments; activities that occur within them are detailed in customized redevelopment plans and include: infrastructure improvements, streetscaping or beautification treatments, affordable housing, recreation and

park facility improvements, economic development/redevelopment strategies, transportation improvements, and neighborhood enhancement.

The enhanced roadway operational conditions resulting from the project, along with the bicycle and pedestrian facilities proposed for the corridor, are intended to provide infrastructure to support commerce and customers as well as modal options to serve the Florida Opportunity Zone and other communities along the corridor. It will also renew the aesthetic appeal of the surrounding area, thereby stimulating economic growth/revitalization and investment in the adjacent communities. As such, the project aligns with the economic development initiatives of the proximate local communities.

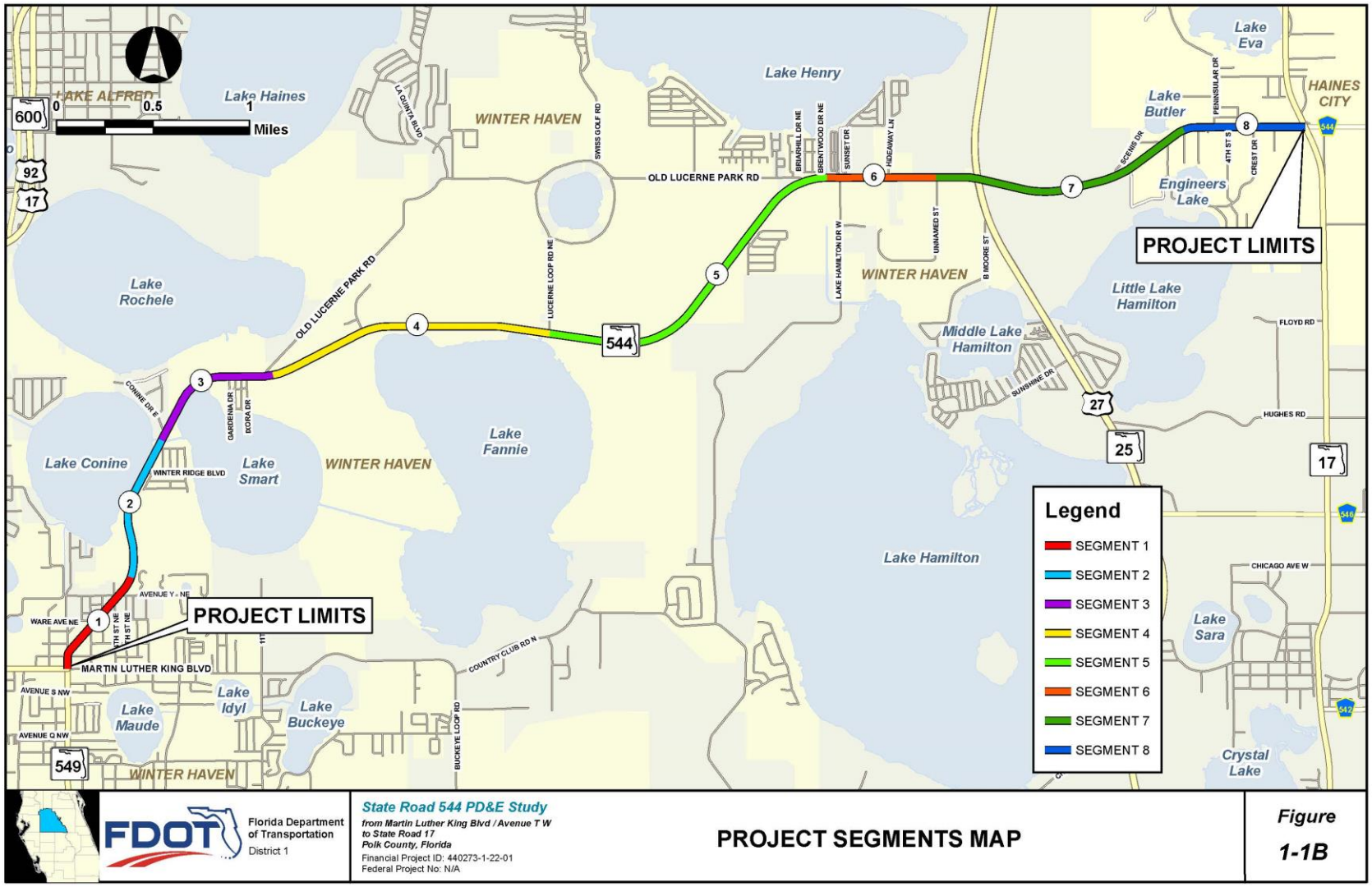
1.3 Alternatives Analysis

To meet the Purpose and Need for the project, four-lane roadway typical sections were developed and discussed with FDOT District One's Planning Studio. It was decided that due to the high speeds along SR 544, on-road bicycle lanes would not be considered. Therefore, a single 4-lane divided roadway typical section was developed for a majority of the project that includes 12-foot-wide outside travel lanes and 11-foot-wide inside travel lanes separated by a 22-foot raised median. Ten-foot shared use paths would be provided along both sides of the road. However due to constrained right-of-way conditions and potential impacts to existing residences and businesses, additional typical sections were considered at each end of the project corridor. The Alternatives Analysis can be found in Section 5 of the Preliminary Engineering Report (PER).

1.4 Preferred Alternative

Below is a summary of the preferred alternative for each roadway segment and intersection. **Figure 1-1B** identifies the locations of each segment within the project.

Figure 1-1B: Project Segments Map

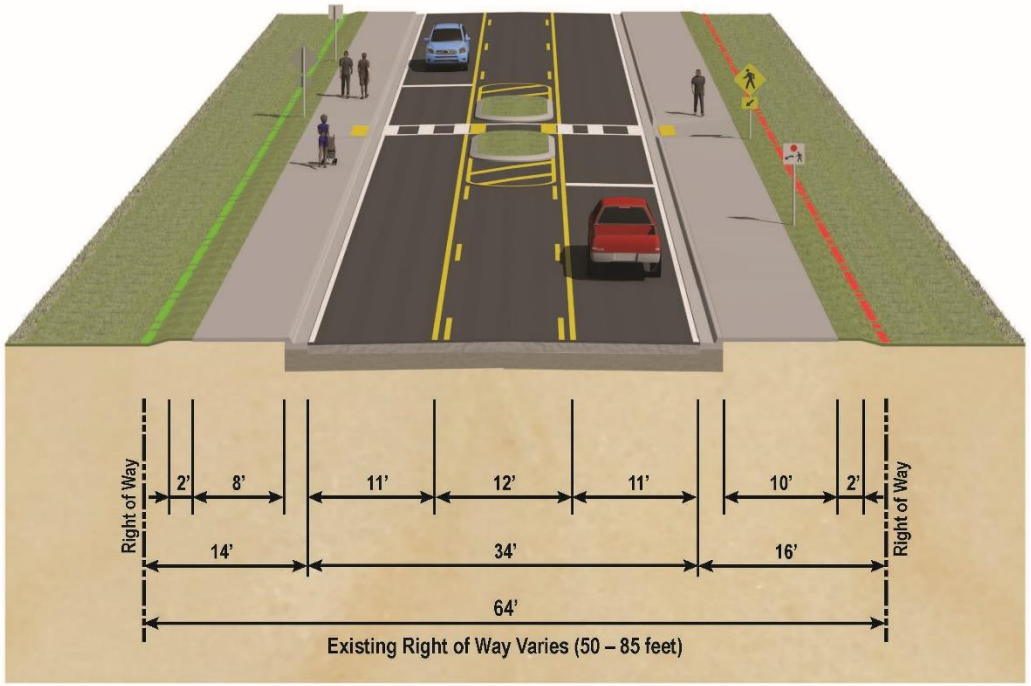


1.4.1 Segment 1 – Martin Luther King Boulevard to North of Avenue Y (0.86 miles)

The preferred typical section in Segment 1 is the three-lane typical section with a best fit alignment. It is slightly wider and will have minor right-of-way impacts (no residential relocations) than the two-lane alternative but will provide additional safety and capacity for turning vehicles with the center turn lane. **Figure 1-2** illustrates this typical section.

The preferred improvement at the Martin Luther King Boulevard intersection is to maintain the existing traffic signal but add a new southbound right turn lane at the intersection. Improvements also include realigning the 1st Street NW intersection with SR 544 farther away from the Martin Luther King Boulevard intersection.

Figure 1-2: Segment 1 Preferred Typical Section



The mini-roundabout with the 90-foot inscribed diameter is recommended at Avenue Y. This concept will minimize impacts to the residences, businesses and church located at this intersection while providing an opportunity for an entrance feature to the historic Florence Villa neighborhood and speed control for vehicles entering the neighborhood.

1.4.2 Segment 2 – North of Avenue Y to East of Lake Conine Canal (0.51 miles)

The four-lane divided roadway is proposed with widening to the south side of the road. This alignment is recommended to avoid impacts to the Lake Conine Wetland Restoration Area and due to the proximity of the road to Lake Conine and wetlands along the lake. **Figure 1-3** illustrates the proposed four-lane divided roadway typical section for Segments 2 through 7.

1.4.3 Segment 3 – East of Lake Conine Canal to East of Old Lucerne Park Road (west end) (1.11 miles)

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to existing residential developments on the south side of SR 544 and due to the proximity of the road to Lake Smart and wetlands along the lake.

The preferred concept at the Old Lucerne Park Road (west end) intersection is to realign Old Lucerne Park Road (west end) to align with Vista Del Lago Drive and to provide a roundabout at the intersection. The roundabout will help with speed control along SR 544 and improve safety when compared to the traffic signal option.

1.4.4 Segment 4 – East of Old Lucerne Park Road (west end) to East of Lucerne Loop Road (1.37 miles)

The four-lane divided roadway is proposed with centered widening. The existing road right-of-way can accommodate the proposed four-lane divided roadway in this segment.

The preferred improvement at the Lucerne Loop Road intersection is the roundabout. It will help with speed control along SR 544 and improve safety when compared to the traffic signal option.

1.4.5 Segment 5 – East of Lucerne Loop Road to East of Lake Hamilton (1.56 miles)

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to the Lake Region Lakes Management District boat ramp on the south side of the road and also to avoid impacts to the proposed Duke Energy transmission easement/poles on the south side of the road.

The preferred improvement at the Old Lucerne Park Road (east end) intersection is the roundabout. It will help with speed control SR 544 and increase safety when compared to the traffic signal option at this skewed intersection.

1.4.6 Segment 6 – East of Lake Hamilton Canal to West of Brenton Manor Avenue (0.51 miles)

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to the Duke Energy transmission easement/poles and existing commercial development on the south side of the road.

The signalized thru-cut alternative is recommended at the Lake Hamilton Drive intersection. This option includes realigning the two internal roads for the developments on the north side of SR 544 so that they intersect SR 544 in a single location (north leg of the intersection).

1.4.7 Segment 7 – West of Brenton Manor Avenue to LaVista Drive (1.45 miles)

The four-lane divided roadway is proposed with widening to the north side of the road west of US 27 and to the south side of the road east of US 27. This alignment is recommended to avoid impacts to Duke Energy transmission easement/poles that switch from the south side of the road to the north side of the road through the US 27 intersection.

The preferred intersection improvement at Brenton Manor Avenue is the roundabout. This intersection concept is paired with the recommended single point urban interchange at US 27.

The single point urban interchange is the recommended improvement at the US 27 intersection due to the lower predicted life cycle crash costs with this concept compared to the northwest quadrant roadway with three signalized intersections.

1.4.8 Segment 8 – LaVista Drive to SR 17 (0.63 miles)

The reduced four-lane divided roadway is proposed with centered widening through this segment. This alignment is recommended to minimize residential relocations through this segment of the project but providing access control with the raised median. **Figure 1-4** illustrates this typical section.

The preferred concept for the SR 17 intersection is a traffic signal with only improvements to the west leg of the intersection.

Figure 1-3: Segment 2 through Segment 7 Preferred Typical Section

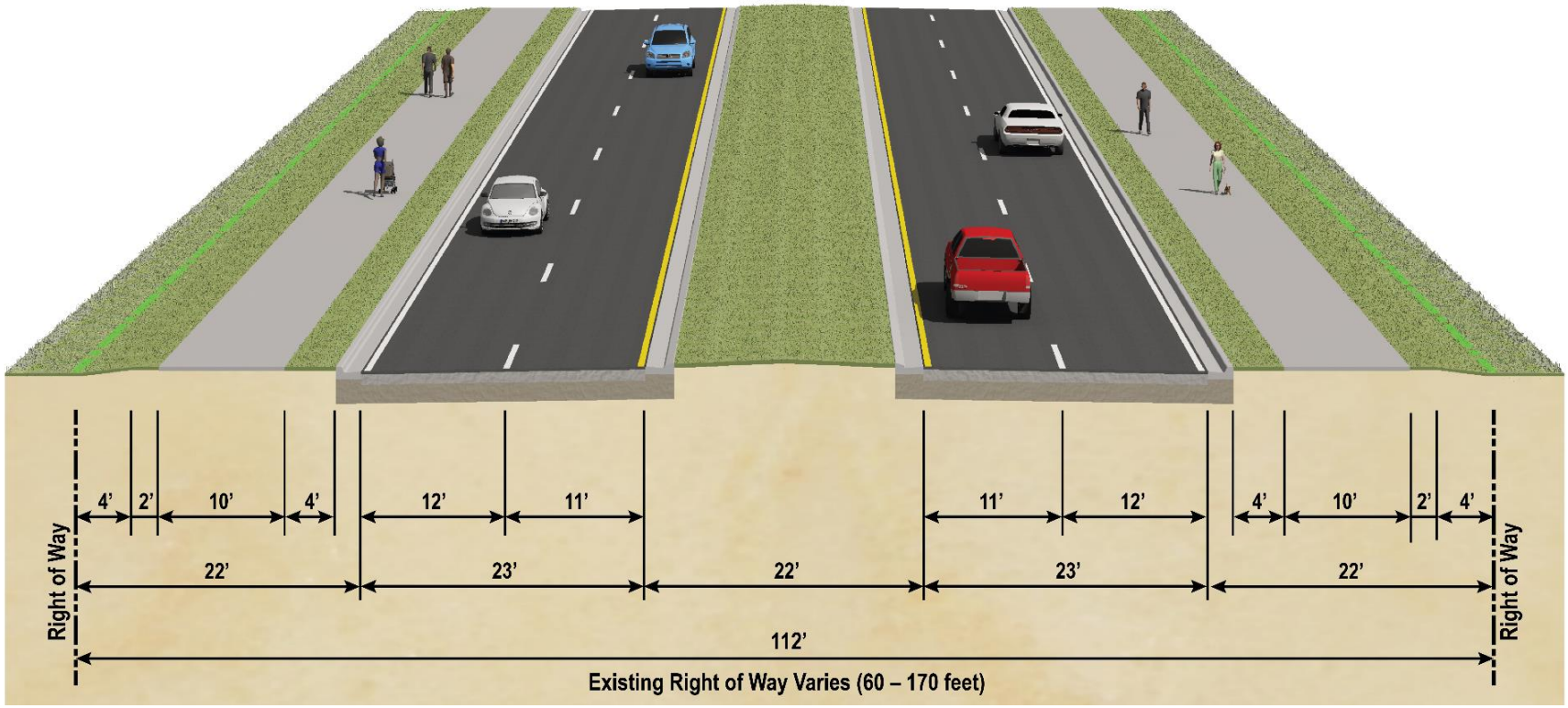
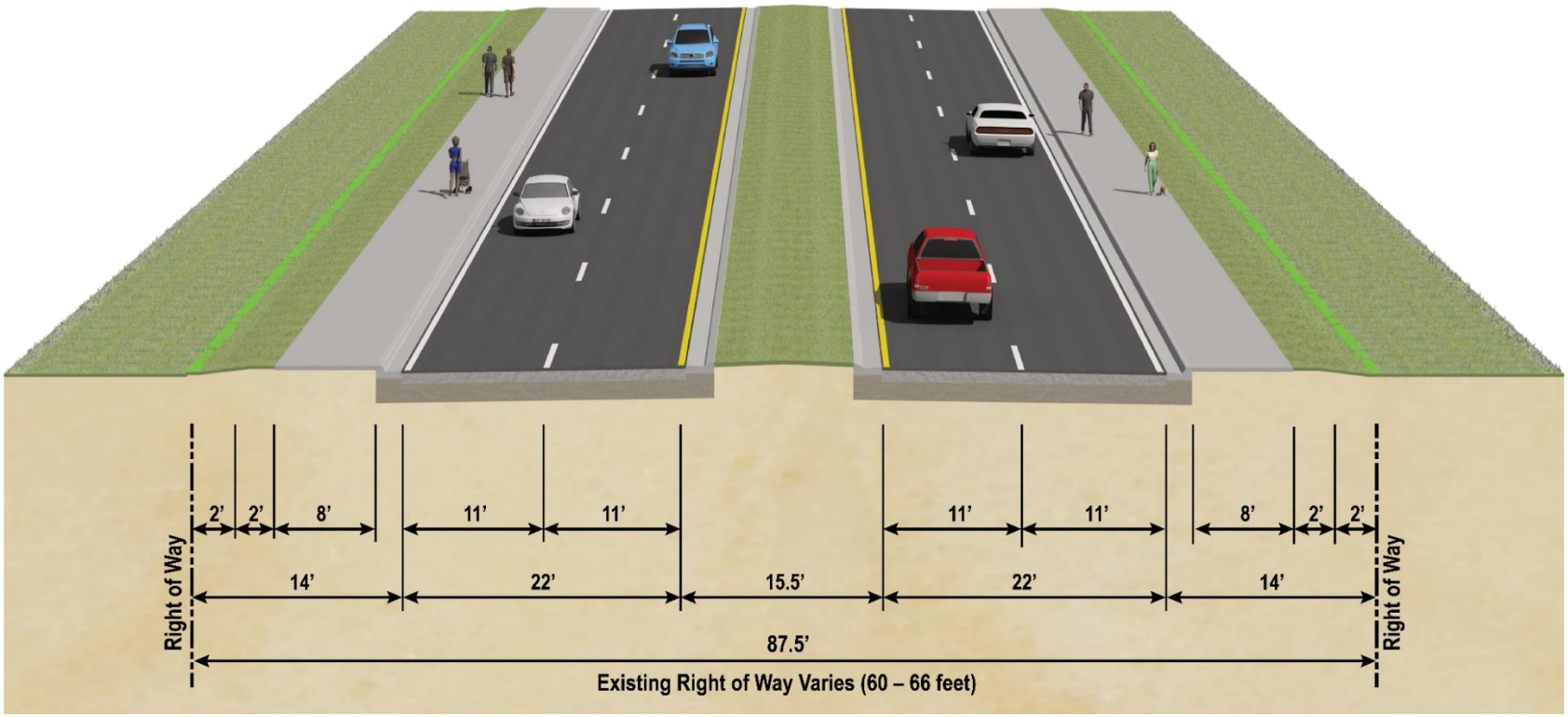


Figure 1-4: Segment 8 Preferred Typical Section



1.5 Proposed Drainage

The stormwater runoff from the project limits will be collected and conveyed via curb and gutter to the proposed offsite detention ponds. The ponds will discharge at or near the same cross drains that carry the roadway runoff in the existing condition, or directly into canals or wetlands where appropriate. Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric analysis, which accounts for water quality treatment and water quantity for runoff attenuation. Please note that the estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data calculations, reasonable engineering judgment, and assumptions. Pond sizes and configurations may change during final design as more detailed information on Seasonal High-Water Table (SHWT), wetland normal pool elevation, final roadway profile design, etc. become available.

There are currently twelve (12) proposed drainage basins within the project limits. One (1) pond site alternative has been identified and analyzed for each basin.

The onsite roadway basin areas draining to the ponds were determined to be the areas within the proposed right-of-way limits. The limits of the proposed basins begin and end at the same locations as the existing condition, except for Basin 1 which was split into two smaller basins, Basin 1A and Basin 1. Additionally, another basin (Basin 8A) was added to provide a pond alternative for the quadrant roadway intersection concept that is under consideration at US 27. Attenuation in the proposed ponds is provided in all basins.

Six (6) Floodplain Impact Areas (FIAs) have been identified within the project limits. Each FIA consists of a floodplain or multiple floodplain areas that are hydraulically connected. One (1) Floodplain Compensation Site (FPC) has been identified for each FIA, except for the FIA located just west of the US 27 intersection. All the proposed FPCs are offsite scraped down areas adjacent to or hydraulically connected to the 100-year floodplain. Compensation is provided between the SHWT of the pond and the lowest of either the pond top of bank or the 100-year floodplain elevation. Most of the floodplains within the project limits are Zone AE floodplains with Base Flood Elevations (BFEs) ranging from 124.20 FT to 131.10 FT NAVD across the project limits and are associated with various lakes. A few areas of Zone A floodplains are present, mainly associated with roadside ditches or existing detention ponds. Elevations for these floodplain areas have been estimated from LIDAR data or adjacent Zone AE BFEs.

Detailed information about the proposed drainage is provided in the Pond Siting Report found in the project file.

The preferred pond alternatives are shown on **Table 1-1** and **Figure 1-6**.

Table 1-1: Preferred Pond Alternatives

Pond Site	Pond Size (ac)
Pond 1A	0.12
Pond 1	2.83
Pond 2	3.83
Pond 3	2.73
Pond 4	2.32
Pond 5	2.22
Pond 6	1.69
Swale 7	0.70
Pond 8	2.75
Swale 8A	0.57
Pond 9	1.25
Pond 10	1.32

1.6 Existing Conditions

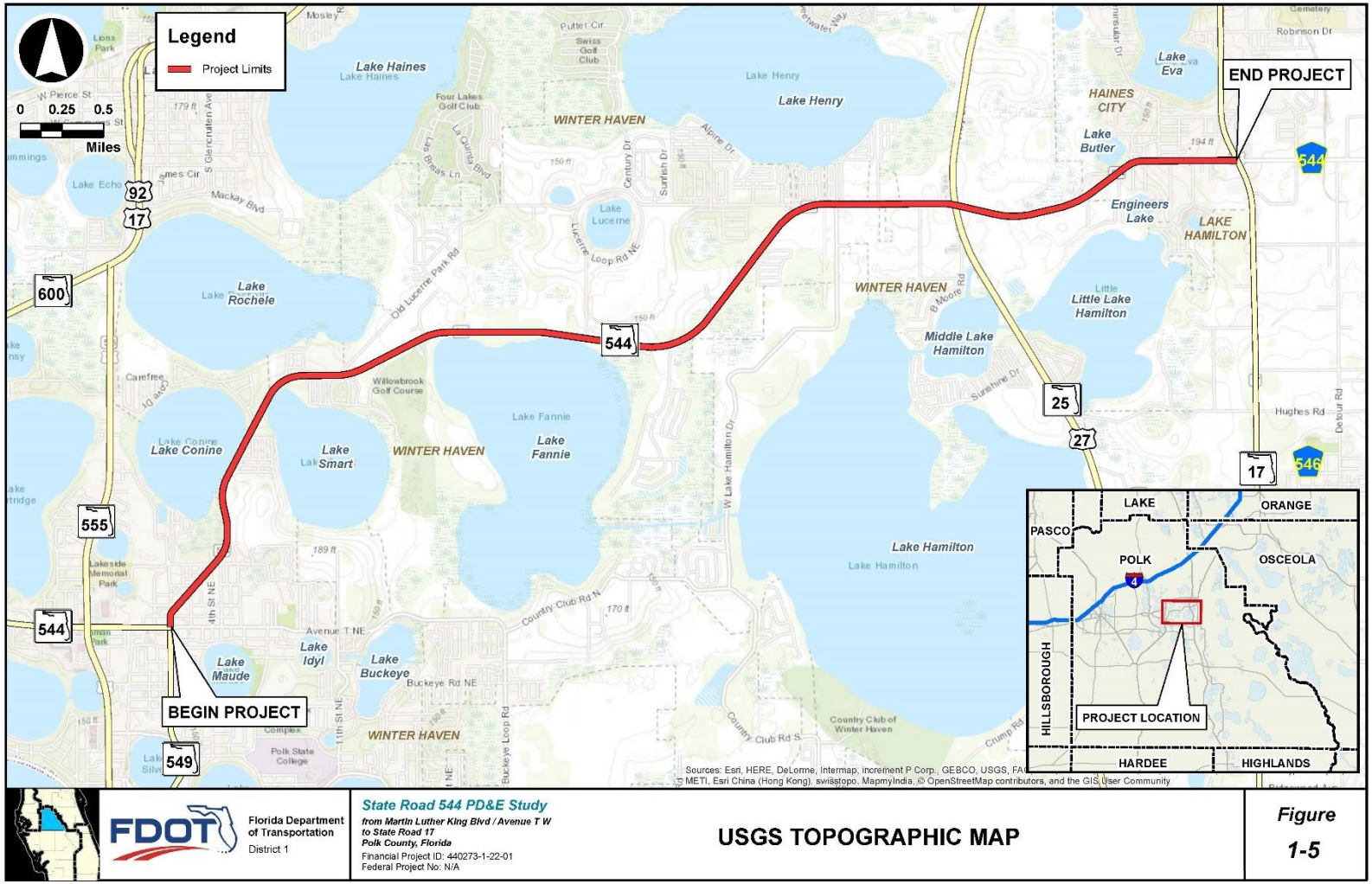
Prior to field surveys, staff ecologists reviewed the most currently available information to determine location and extent of habitats and land uses within the vicinity of the project area. This information included land use maps provided by the Southwest Florida Water Management District (SWFWMD). The land use descriptions were based on the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT 1999). Other information included but was not limited to:

- U.S. Geographic Survey (USGS) Topographic Maps (https://viewer.nationalmap.gov/launch/)
- Natural Resources Conservation Service (NRCS) Soil Maps (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)
- Florida Natural Areas Inventory (FNAI) Cooperative Land Cover Maps (https://www.fnai.org/services/coop-land-cover)
- FDOT Efficient Transportation Decision Making (ETDM) Summary Report #5873 (https://etdmpub.fla-etat.org/est/#)

1.6.1 Topography

The SR 544 Study Area lies within the Northern Lake Wales Ridge region of Florida. According to the USGS, elevations within the SR 544 Study Area vary from approximately 125 feet above sea level to approximately 175 feet above sea level (**Figure 1-5**). These elevations fluctuate throughout the corridor.

Figure 1-5: USGS TOPOGRAPHIC MAP



1.6.2 Vegetative Communities and Land Use

The land uses within the SR 544 Study Area were first characterized by SWFWMD online resources and later modified or delineated by ecologists to reflect field observations made at the time of the study. The SR 544 Study Area contains a mixture of several FLUCFCS types including urban and built-up, agriculture, rangeland, upland forests, water, wetland, barren land, and transportation or other linear utilities (**Figure 1-6**). A detailed list of the land uses within the study area is provided in **Table 1-2** along with additional descriptions of the land uses in **Appendix A**. Photographs of representative habitats in the study area are provided in **Appendix B**.

Table 1-2: FLUCFCS within the SR 544 Study Area

FLUCFCS Code	FLUCFCS Description	Area (ac.)
110	Residential Low Density	150
119	Low Density Under Construction	78
120	Residential Medium Density	447
130	Residential High Density	255
140	Commercial and Services	109
150	Industrial	289
170	Institutional	126
180	Recreational	3
182	Golf Courses	53
190	Open Land	169
210	Cropland and Pastureland	511
220	Tree Crops	149
260	Other Open Lands (Rural)	95
320	Shrub and Brushland	32
411	Pine Flatwoods	15
434	Hardwood Conifer Mixed	96
438	Mixed Hardwoods	18
440	Tree Plantations	84
510	Streams and Waterways	8
520	Lakes	645
530	Reservoirs	12
615	Streams and Lake Swamps (Bottomland)	77
618	Willow and Elderberry	2
620	Wetland Coniferous Forests	10
630	Wetland Forested Mixed	180
641	Freshwater Marshes	168

FLUCFCS Code	FLUCFCS Description	Area (ac.)
643	Wet Prairies	110
644	Emergent Aquatic Vegetation	84
653	Intermittent Ponds	14
740	Disturbed Land	26
810	Transportation	103
814	Roads and Highways	14
830	Utilities	23

Figure 1-6: FLUCFCS Map

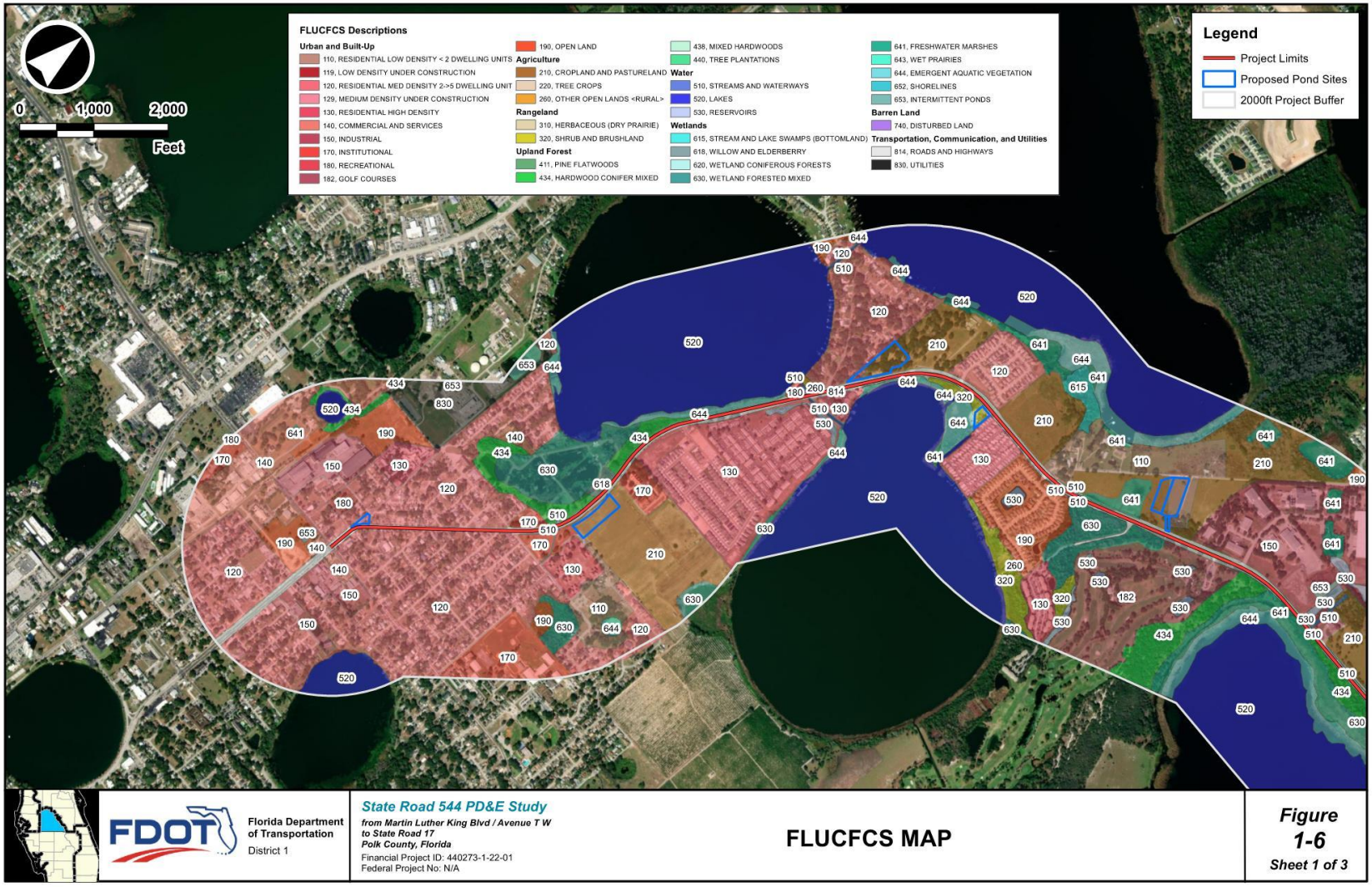


Figure 1-6: FLUCFCS Map

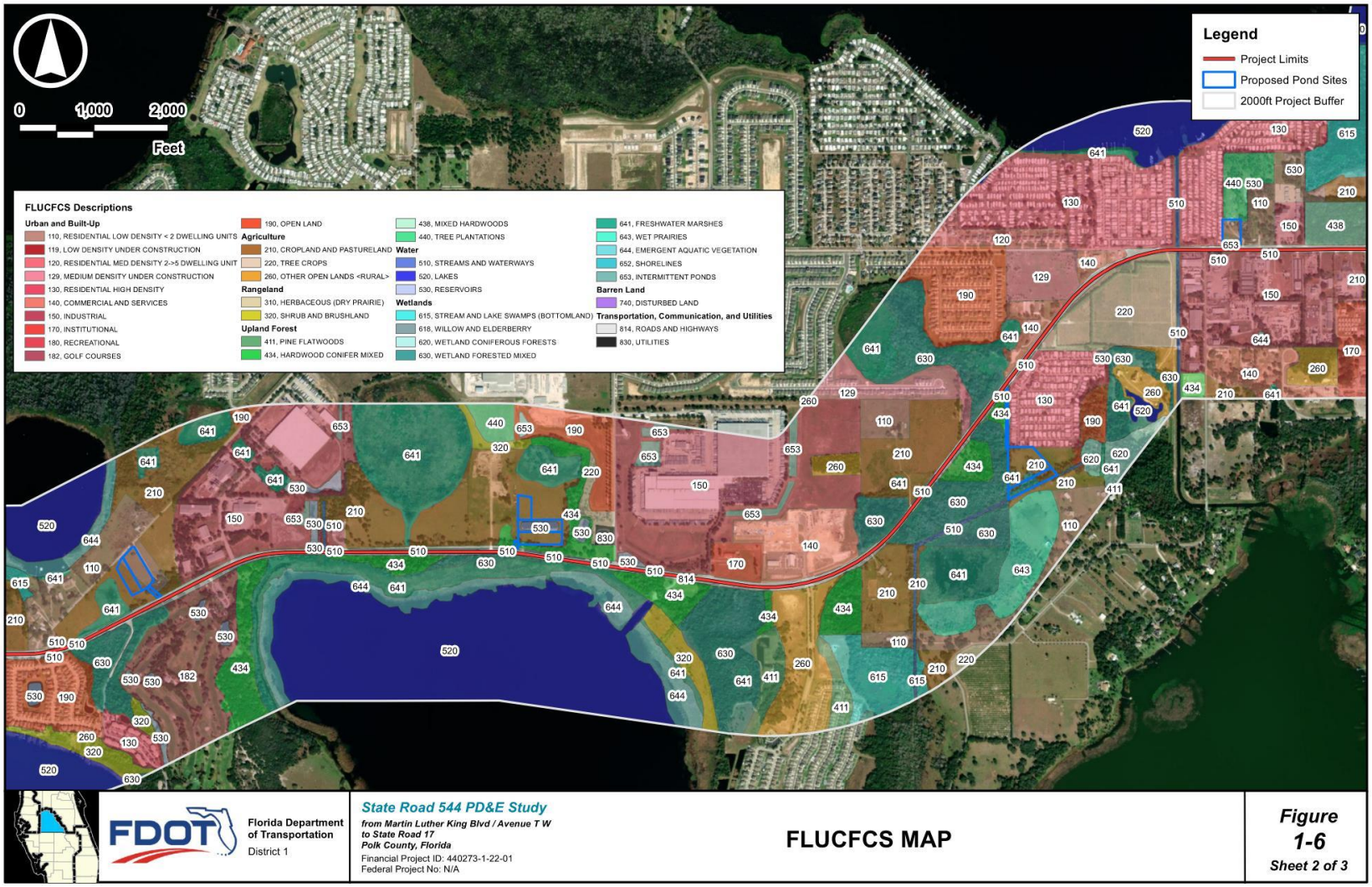
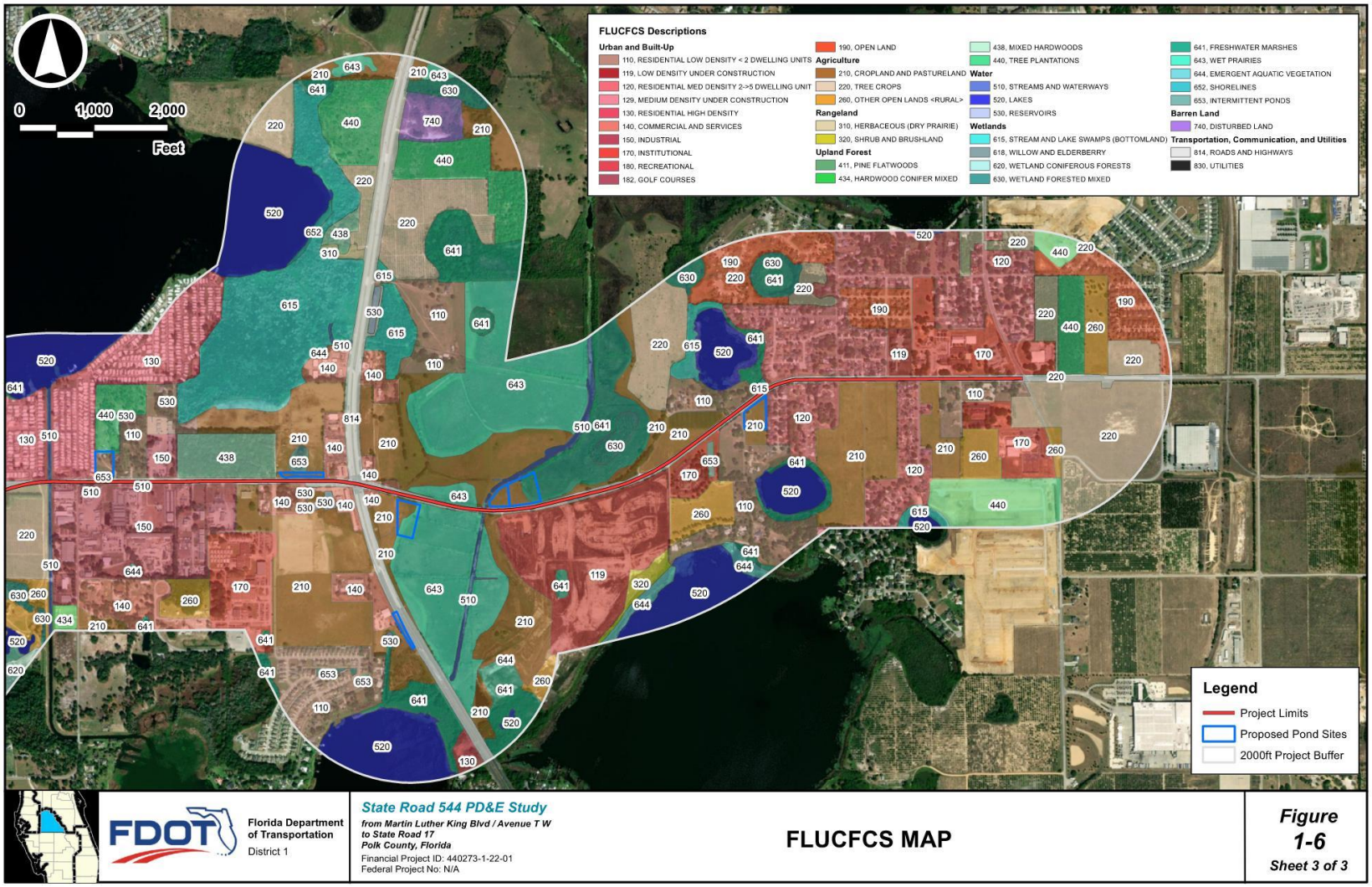


Figure 1-6: FLUCFCS Map



1.6.3 Soils

The soil survey of Polk County, Florida (NRCS 1985) and GIS data provided by NRCS were reviewed to determine the soil types and characteristics within the SR 544 Study Area (**Appendix C**). The soils encountered along the project limits include Hydrologic Soil Group (HSG) A, A/D, B/D, C/D and D. HSG A consists of deep, well to excessively well-drained sand or gravel soils. HSG B consists of moderately well drained soils that have moderately fine to moderately coarse texture. HSG C consists of moderately fine to fine-textured soil that restricts percolation of water. HSG D consists of soils with permanently high-water tables and often indicative of wetlands or depressions. According to the soil surveys, there are 32 different soil types within the SR 544 Study Area. The soil types are depicted in **Figure 1-7.**

Figure 1-7: NRCS Soils Map

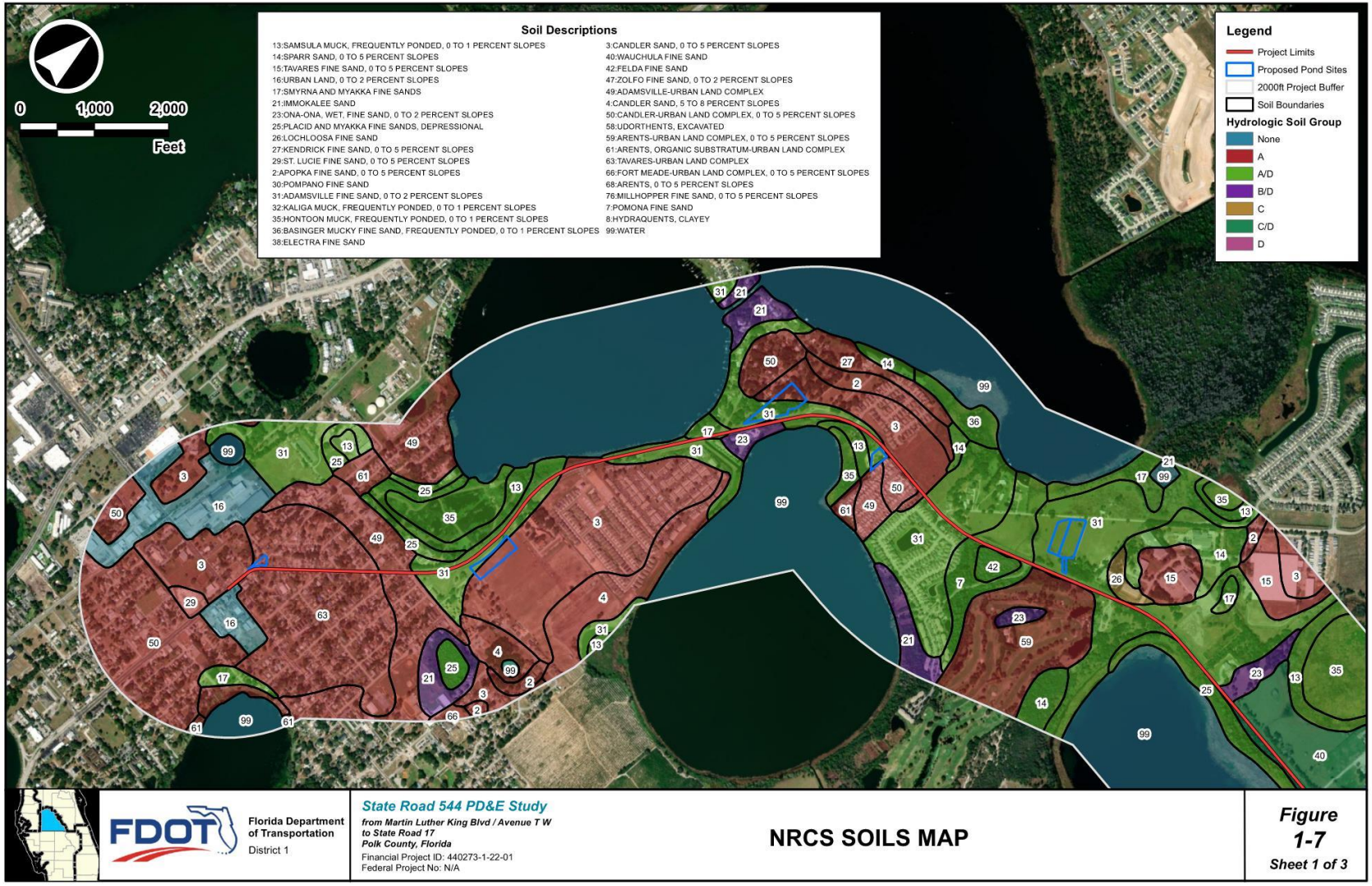


Figure 1-7: NRCS Soils Map

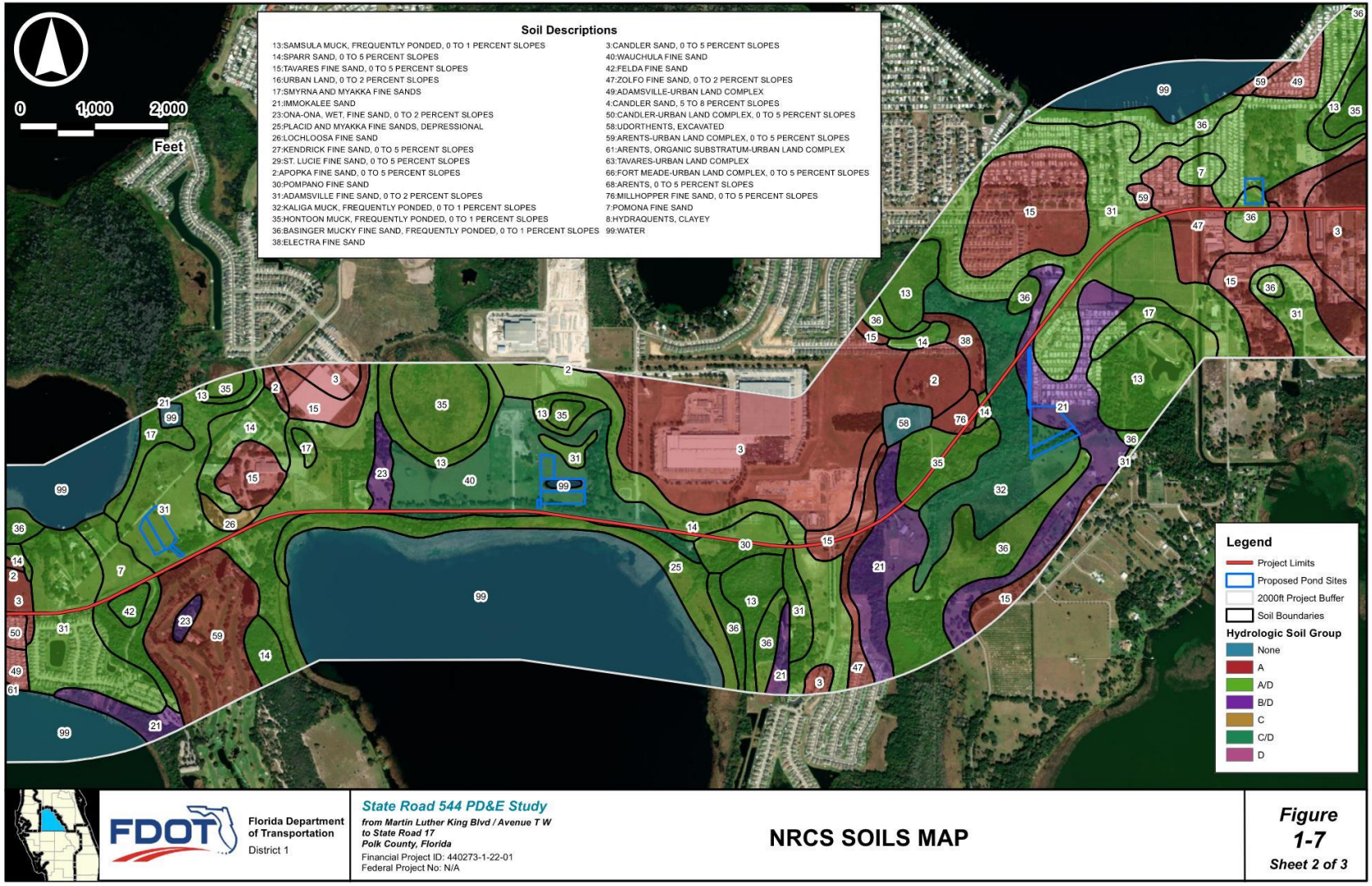
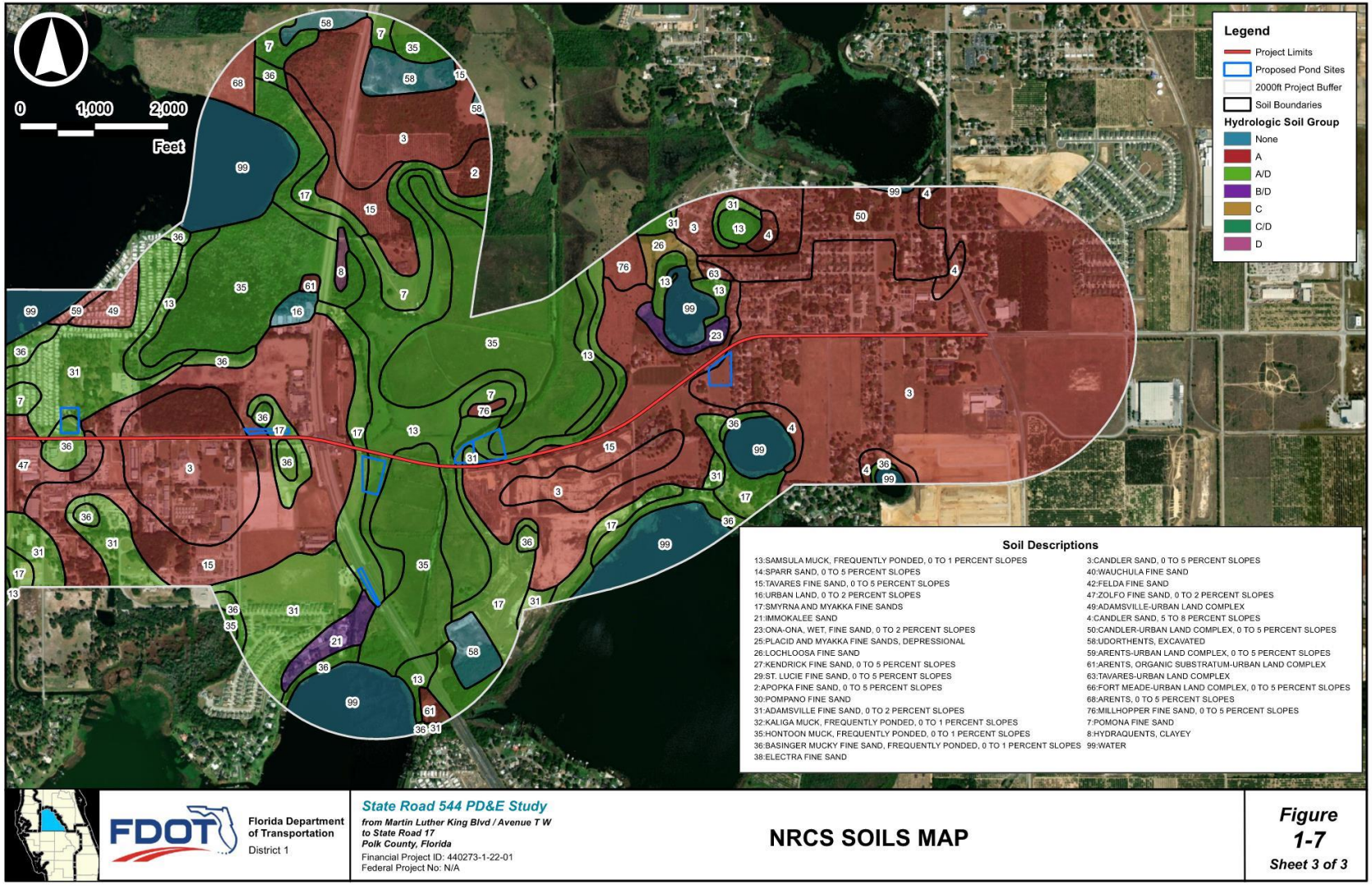


Figure 1-7: NRCS Soils Map



1.6.4 Natural Features

No other significant natural features were identified within the limits of the SR 544 Study Area including special aquatic sites, sanctuaries, and refuges, Wild and Scenic Rivers, Aquatic Preserves, and Outstanding Florida Waters; nor does the project provide designated Critical Habitat or Essential Fish Habitat to federally protected or managed species.

SECTION 2 PROTECTED SPECIES AND HABITAT

Ecologists used online resources and multiple field surveys to determine whether protected species occur or have the potential to occur in the SR 544 Study Area. The term protected species refers to those species that are protected by law, regulation, or rule. Specifically, the term protected species refers to those species listed under the Endangered Species Act (ESA) of 1973, as amended; those species listed under Florida's Endangered and Threatened Species List, Chapter 68A-27, F.A.C.; or those species listed under the Preservation of Native Flora of Florida, Chapter 5B-40, F.A.C. Florida Statutes also affords protection to federally-listed species, thus all federally-listed species are also state listed, pursuant to Chapter 68A-27.003(1)(b). The study area was also evaluated for the occurrence of Critical Habitat as defined by the ESA of 1973, as amended and 50 CFR Part 424. This analysis is consistent with the Protected Species and Habitat chapter of the PD&E Manual.

2.1 Efficient Transportation Decision Making

According to the ETDM Summary Report No. 5873, dated May 22, 2020, the FWC, SWFWMD, and USFWS indicated the project alternatives may create a "Minimal" to "Moderate" Degree of Effect (DOE) on wildlife and habitat resources. The primary issues were the direct loss of wetland habitats, potential adverse effects to a moderate number of state and federal listed species, potential increase in wildlife roadkill, and potential water quality degradation from the additional stormwater runoff from the expanded roadway surface draining into adjacent lakes and wetlands. Avoidance and minimization measures will be implemented for the noted species to the greatest extent practicable. In order to minimize the effect of the proposed project on protected species, FDOT will provide commitments that will be tracked through project completion. FDOT will coordinate with the USFWS and FWC to obtain concurrence with the effect determinations listed below and address potential impacts to each species.

2.2 Data Collection and Methodology

The study methodology included GIS analysis, ETAT comments review, agency coordination, agency database searches, general wildlife surveys, and species-specific surveys. The following lists the data sources utilized for review.

- FNAI Biodiversity Matrix Map Server (https://www.fnai.org/biodiversity-matrix-intro)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Maps (https://www.fws.gov/wetlands/data/mapper.html)
- USFWS CA and Critical Habitats Maps (https://crithab.fws.gov/)
- USFWS Wood Stork Nesting Colonies and CFA Maps
- National Marine Fisheries Service (NMFS) Essential Fish Habitat (EFH) Maps

(https://www.habitat.noaa.gov/protection/efh/habitatmapper.html)

- USFWS Environmental Conservation Online System (ECOS) (https://ecos.fws.gov/ecp/)
- USFWS Information for Planning and Consultation (IPac) (https://ipac.ecosphere.fws.gov/)
- Florida Fish and Wildlife Conservation Commission (FWC) Scrub-Jay Observation Maps (http://myfwc.com/research/gis/)
- FWC Bald Eagle Nesting Territory Maps (https://publictemp.myfwc.com/FWRI/EagleNests/nestlocator.aspx)
- Audubon Florida EagleWatch Nest Website (https://cbop.audubon.org/conservation/about-eaglewatch-program)
- FWC Red-Cockaded Woodpecker Observation Maps (http://geodata.myfwc.com/datasets/red-cockaded-woodpecker-observation-locations)
- FWC Wildlife Occurrence Maps (http://geodata.myfwc.com/datasets)
- FWC Species Action Plans (http://myfwc.com/wildlifehabitats/imperiled/species-action-plans/)

Ecologists familiar with Florida's protected species and natural habitats conducted general field surveys and species-specific surveys from October 2019 through December 2022 as part of the Study. The field surveys were performed utilizing pedestrian surveys conducted during daylight hours over multiple seasons to document the presence or evidence of protected species utilizing the study area. Species-specific surveys included the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, and sand skink and blue-tailed mole skink. The species-specific surveys were conducted in accordance with the survey protocols outlined by the USFWS. Species-specific survey methodologies were submitted to USFWS for approval before the surveys were conducted. Agency coordination is included in **Appendix D**. The ecologists also documented habitat types and predominant plant species, including general wetland limits, during the field reviews. Listed species occurrences and habitat within the SR 544 Study Area are shown on **Figure 2-1**.

A total of 55 protected species have the potential to occur in the SR 544 Study Area, according to the information obtained during the preliminary data collection. These include the 13 avian, four (4) mammal, five (5) reptile, and 33 plant species shown on **Table 2-1**. Ecologists determined a species' potential occurrence in the study area based on its habitat preferences and distributions, existing site conditions, historical data, and field survey results. The likelihood of occurrence was rated as no, low, moderate, high, or observed. Definitions for the likelihood of occurrence are provided below:

- No – Species with a no likelihood of occurrence are those species that are known to occur in Polk County but have specialized habitat requirements that do not occur in the project area.
- Low – Species with a low likelihood of occurrence are those species that are known to occur in Polk County, limited habitat occurs within the project site, but there are no known adjacent populations, limited dispersal abilities, and the species has not been observed or documented within the site.
- Moderate – Species with a moderate likelihood of occurrence are those species that are known to occur in Polk County, for which suitable habitat occurs within the project site, but there are no positive indications to verify presence, and the species has not been observed in or documented within the site.
- High – Species with a high likelihood of occurrence are those species that are known to occur in Polk County, are suspected in the project area based on the existence of suitable habitat within the project site, are known to occur adjacent to the site, or have been previously documented in the project vicinity.
- Observed – the species has been observed during this evaluation.

Table 2-1: Protected Species with Potential to Occur in the SR 544 Study Area

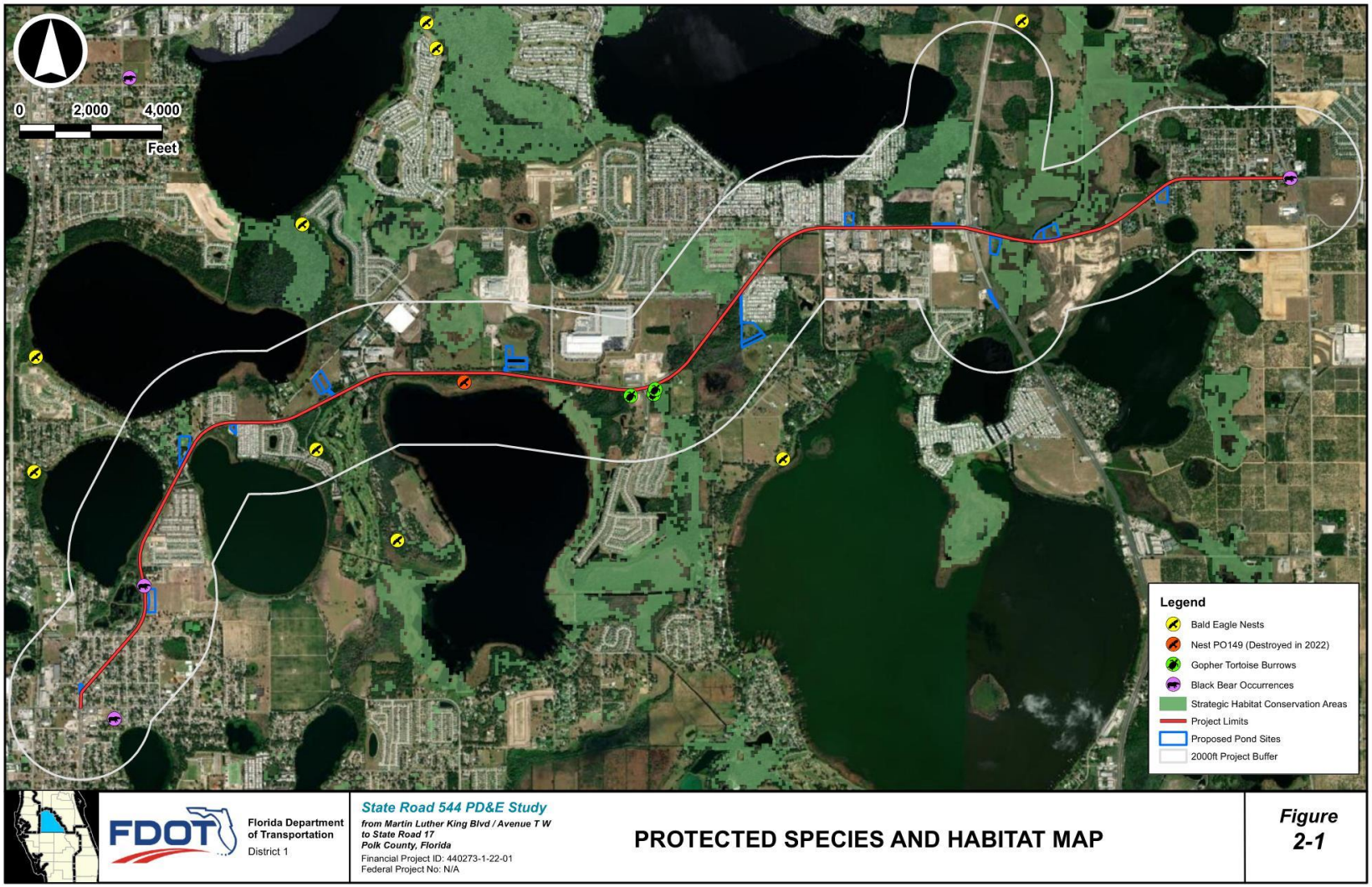
Scientific Name	Common Name	Status	Potential Occurence
Birds			
Ammodramus savannarum floridanus	Florida Grasshopper Sparrow	FE	No
Aphelocoma coerulescens	Florida Scrub-jay	FT	No
Athene cunicularia floridana	Florida Burrowing Owl	ST	Moderate
Egretta caerulea	Little Blue Heron	ST	Observed
Egretta tricolor	Tricolored Heron	ST	Observed
Falco sparverius paulus	Southeastern American Kestrel	ST	Observed
Grus canadensis pratensis	Florida Sandhill Crane	ST	Observed
Haliaeetus leucocephalus	Bald Eagle	BGEMA/MGTA	Observed
Laterallus jamaicensis jamaicensis	Eastern Black Rail	FT	Low
Mycteria americana	Wood Stork	FT	Observed
Platalea ajaja	Roseate Spoonbill	ST	Observed
Polyborus plancus audubonii	Audubon's Crested Caracara	FT	Moderate
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	High
Mammals			
Eumops floridanus	Florida Bonneted Bat	FE	Moderate
Perimyotis subflavus	Tricolored Bat	C	Observed
Sciurus niger niger	Southern Fox Squirrel	M	High
Ursus americanus floridanus	Florida Black Bear	M	Moderate
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	High
Eumeces egregious lividus	Blue-tailed Mole Skink	FT	Moderate
Gopherus polyphemus	Gopher Tortoise	ST	Observed
Pituophis melanoleucus mugitis	Florida Pine Snake	ST	Moderate
Neoseps reynoldsi	Sand Skink	FT	Moderate
Plants			
*Bonamia grandiflora**	Florida Bonamia	FT/SE	No
Calamintha ashei	Ashe's Savory	ST	No
Calopogon mutliflorus	Many-flowered Grass-pink	ST	No
Carex chapmanni	Chapman's sedge	ST	No
Centosema Arenicola	Sand Butterfly Pea	SE	No
*Chionanthus pygmaeus**	Pygmy Fringe-tree	FE	No
*Clitoria fragrans**	Pigeon Wings	FT/SE	No
Coelorachis tuberculosa	Piedmont Jointgrass	ST	No
Coleataenia abscissa	Cutthroatgrass	SE	No
*Conradia brevifolia**	Short-leaved Rosemary	FE	No
*Crotalaria avonensis**	Avon Park Harebells	FE	No
*Dicerandra frutescens**	Scrub Mint	FE	No
*Eriogonum longifolium**	Scrub Buckwheat	FT/SE	No
Hartwrightia floridana	Hartwrightia	ST	No

Scientific Name	Common Name	Status	Potential Occurence
*Hypericum cumulicola**	Highlands Scrub Hypericum	FE	No
Illicium parviflorum	Star Anise	SE	No
Lechea cernua	Nodding Pinweed	ST	No
*Liatris ohlingerae**	Florida Blazing Star	FE	No
*Lupinus aridorum**	Scrub Lupine	FE	No
Matelea floridana	Florida Spiny-pod	SE	No
Nemasylis floridana	Celestial Lily	SE	No
Nolina atopocarpa	Florida Beargrass	ST	No
*Nolina brittoniana**	Britton's Beargrass	FE	No
*Paronychia chartacea**	Papery Whitlow-wort	FT/SE	No
*Polygala lewtonii**	Lewton's Polygala	FE	No
*Polygonella basiramia**	Wireweed (Florida Jointweed)	FE	No
*Polygonella myriophylla**	Sandlace (Small's Jointweed)	FE	No
*Prunus geniculate**	Scrub Plum	FE	No
Pteroglossaspis ecristata	Giant Orchid	ST	No
Salix floridana	Florida Willow	SE	No
*Warea amplexifolia**	Clasping Warea	FE	No
*Warea carteri**	Carter's Mustard (Cater's Warea)	FE	No
Ziziphus celata	Florida Ziziphus	FE	No

FE = Federally Endangered **FT** = Federally Threatened
SE = State Endangered **ST** = State Threatened
M = Managed **C** = Candidate

***** Indicates Lake Wales Ridge plants

Figure 2-1: Protected Species and Habitat



2.3 Federally Listed Species and Designated Critical Habitat

2.3.1 Audubon's Crested Caracara

The entire study area occurs within the USFWS Audubon's crested caracara CA. It is a resident, non-migratory species in Florida that prefers grasslands and pastures in the south-central region of the state, particularly in Glades, Desoto, Highlands, Okeechobee, and Osceola Counties. Historically, caracara have inhabited dry or wet prairies with scattered cabbage palms (*Sabal palmetto*) and occasionally used lightly wooded areas next to those prairies. Many of those areas were converted and frequently replaced by pastures with non-native sod-forming grasses that still support caracaras. The caracara is classified as threatened due to habitat loss and population decline.

Species-specific caracara surveys were conducted in accordance with the caracara survey methodology developed by Morrison (2001), supplemental information established by the USFWS (2004), and additional survey guidance prepared by the USFWS (2015, 2016). A survey was conducted January through March 2020, but was halted due to the Covid-19 pandemic. The survey was repeated January through April 2021. Prior to the start of the 2020 survey, ecologists conducted site visits to determine the best vantage points to observe caracara activity along the corridor and up to 1,500 meters from the project boundary. Based on the preliminary field analysis, an *Audubon's Crested Caracara Survey Methodology* memorandum for the SR 544 PD&E Study was submitted to and approved by the USFWS on October 9, 2019 (**Appendix D**). Surveys were conducted by qualified ecologists at least 15 minutes prior to sunrise for at least three hours per survey block. Ecologists spent the entire three-hour survey session observing and recording caracara activity with the assistance of binoculars and a Nikon PROSTAFF 5 scope with 16-48 power. A total of five survey sessions were conducted for each survey block from January 7 through March 5, 2020. No caracara were observed during the 2020 survey.

The subsequent caracara survey conducted January through April 2021 consisted of nine survey sessions conducted in accordance with the approved methodology obtained October 9, 2019. The 2021 caracara survey was conducted utilizing the same protocol as the 2020 survey detailed above. No caracara were observed during the 2021 caracara survey. Survey maps depicting the overall project area, survey blocks, and 1,500-meter buffer; data sheets; caracara activity maps; and photographs are included in **Appendix E**.

No Audubon's crested caracara were observed during the 2020 and 2021 caracara surveys. According to FNAI's Biodiversity Matrix Query Report (FNAI) and eBird, no individuals have been documented within the study area. As a result, the proposed project "**may affect, but is not likely to adversely affect**" the Audubon's crested caracara.

2.3.2 Eastern Black Rail

The eastern black rail is listed by the USFWS as threatened due to habitat loss, destruction, and modification; sea level rise and tidal flooding; and incompatible land management. They are wetland-dependent birds and are primarily associated with herbaceous, persistent emergent plant cover. They require dense overhead perennial herbaceous cover with underlying moist to saturated soils with or adjacent to very shallow water.

Suitable habitat for the eastern black rail was observed within the study area. No eastern black rails were observed during the field reviews. Based on the best available information, there is no evidence that the eastern black rail occurs within the project area. According FNAI and eBird, no individuals have been documented in the project area. As part of this project, wetland impacts will be mitigated to prevent loss of wetland functions and values. Based on this information, the proposed project "**may affect, but is not likely to adversely affect**" the eastern black rail.

2.3.3 Eastern Indigo Snake

The eastern indigo snake is a large, stout-bodied, shiny black snake with a red throat and chin. The eastern indigo snake is listed by the USFWS as threatened due to over-collecting for the pet trade as well as habitat loss and fragmentation and is widely distributed throughout central and south Florida. They occur in a broad range of habitats, from scrub and sandhill to wet prairies and mangrove swamps. Indigo snakes are most closely associated with habitats occupied by gopher tortoises whose burrows provide refugia from cold or desiccating conditions.

Suitable habitat for the indigo snake was observed within the study area. No indigo snakes were observed during the field reviews. Suitable habitat for the gopher tortoise was also observed within the study area with one direct observation of a gopher tortoise burrow. A 100% gopher tortoise survey was not conducted during this PD&E Study but will be required before construction activities commence. To address any potential effects to the eastern indigo snake, all potentially occupied gopher tortoise burrows within the limits of construction will be excavated and the *Standard Protection Measures for the Indigo Snake* (USFWS 2013; **Appendix F**) will be implemented during construction activities. According to the *Eastern Indigo Snake Effect Determination Key* (**Appendix G**), the proposed project will result in the following sequential determination: A>B>C>D>E = "**may affect, but is not likely to adversely affect**" the eastern indigo snake.

2.3.4 Everglade Snail Kite

The entire study area occurs within the USFWS Everglade snail kite CA. The Everglade snail kite is a medium-sized hawk, with a slender and very hooked beak. The Everglade snail kite is classified as endangered due to a very small population and increasingly limited amount of fresh marsh with sufficient water to ensure an adequate supply of snails. It is a non-migratory subspecies only

found in Florida, particularly near large watersheds (e.g., Everglades, Lake Okeechobee) and the shallow vegetated edges of lakes that support apple snails, the primary component of the snail kite's diet. Foraging habitat can be described as being relatively shallow vegetated wetland systems, often in either expansive marsh systems or within the littoral zones of lakes. Ideal vegetation within these areas includes bulrushes, spike rushes, and maidencane as these create ideal habitat for the apple snail. Suitable nesting habitat for the snail kite almost always occurs over open water (0.2-1.3 meters deep) and greater than 150 meters from uplands. Vegetation in nesting habitat can include native and exotic species of both trees and shrubs, including but not limited to willow (*Salix spp*.), cypress (*Taxodium spp*.), melaleuca (*Melaleuca quinquenervia),* sweetbay (*Magnolia virginiana*), Brazilian pepper (*Schinus terebinthifolia*), button bush (*Cephalanthus occidentalis*), and elderberry (*Sambucus nigra*). Nesting can also occur in herbaceous vegetation consisting of bulrush (*Scirpus spp*.) and cattail (*Typha spp*.).

Suitable foraging and nesting habitat for the snail kite was observed within the project corridor. Ecologists conducted species-specific surveys for the presence of snail kites in these habitats during the 2020 and 2021 survey season in accordance with the USFWS Snail Kite Survey Guidelines. Prior to the start of the 2020 survey, ecologists conducted site visits to determine the best vantage points to observe snail activity along the corridor. Based on the preliminary field analysis, an *Everglade Snail Kite Survey Methodology for the SR 544 PD&E Study* memorandum was developed and submitted to the USFWS on January 8, 2020, and subsequently approved on January 14, 2020 (**Appendix D**). Due to the linear nature of the project and suitable snail kite habitat occurring within the lake shorelines near the adjacent SR 544 right-of-way, nine (9) observation stations were established along the roadway corridor and proposed pond sites. A buffer of 300-meters was utilized in order to accommodate both the roadway and potential pond site locations. A total of three survey events were conducted at each observation location. The visual surveys were conducted in January 2020, February 2020, and April 2021. No Everglade snail kites were observed during the surveys. Survey maps, data sheets, and photographs are included in **Appendix H**.

No Everglade snail kites were observed during the 2020 or 2021 species-specific surveys. No evidence of snail kite nesting within the project area was observed. As a result, the proposed project "**may affect, but is not likely to adversely affect**" the Everglade snail kite.

2.3.5 Florida Bonneted Bat

The entire study area is within USFWS Florida bonneted bat CA. The Florida bonneted bat is classified as endangered due habitat loss, degradation, and modification, as well as other manmade and natural factors including a small population size with few colonies, restricted range, slow reproductivity, and low fecundity. It has short glossy fur consisting of bicolored hairs and large broad ears that project over the eyes and are joined at the midline of the head. The Florida

bonneted bat is a subtropical species that does not hibernate and is active year-round. Habitat consists of foraging areas and roosting sites, including artificial structures. Foraging habitat consists of relatively open areas that provide sources of prey and drinking water, including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland and upland shrub, and agricultural areas. In urban areas, suitable foraging can be found at golf courses, parking lots, and parks. Potential roosting habitat includes forests and other areas with tall, mature trees or other areas with suitable roost structures, including utility poles and artificial structures. This includes habitat in which suitable structural features for breeding and sheltering are present. Roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. The project corridor is located between residential development as well as open fields, upland and wetland habitats, and open water associated with the Winter Haven Chain of Lakes. There is proposed Critical Habitat for this species; however, the proposed project is not within the Critical Habitat.

Two full acoustic and roost surveys were conducted in 2020/2021 and 2022 to determine Florida bonneted bat activity within the study corridor. The survey methodologies were submitted and approved by the USFWS prior to the commencement of the surveys (**Appendix D**). The acoustic and roost surveys were conducted by qualified ecologists with the required acoustic survey course training and experience. The 2020/2021 acoustic survey was conducted from November 16, 2020, through January 3, 2021. The 100% roost survey was conducted in December 2020. Due to the addition of a quadrant roadway alternative and updated pond site locations, a supplemental acoustic and roost survey was conducted in October 2022. The results of the surveys showed no Florida bonneted bat activity within the study area. *The Florida Bonneted Bat Survey Report* and *Supplemental Florida Bonneted Bat Survey Report* can be found in **Appendix I**.

Based on the results of the acoustic and roost surveys, no evidence of roosting or foraging by the Florida bonneted bat within the project corridor was detected. The USFWS Florida Bonneted Bat Consultation Key (**Appendix J**) was used and resulted in the following pathway: 1a>2a>3b>6b = "**no effect**". Due to the absence of FBB activity and the USFWS Florida Bonneted Bat Consultation Key, this project is anticipated to have "**no effect**" on the Florida bonneted bat.

2.3.6 Florida Grasshopper Sparrow

The entire study area occurs within the USFWS Florida grasshopper sparrow CA. The Florida grasshopper sparrow was listed as endangered because of habitat loss and degradation resulting from conversion of native vegetation to improved pasture and agriculture. It is a subspecies of grasshopper sparrow that is endemic to the dry prairie region of central and south Florida. This subspecies is extremely habitat specific and relies on fire every two or three years to maintain its habitat. The primary habitat consists of large (>50 hectares), treeless (less than one tree per acre),

and relatively poorly drained prairies dominated by saw palmetto and dwarf oaks. It is known to occur only in Highlands, Okeechobee, Osceola, and Polk counties.

The project corridor does not contain large, treeless prairie habitats required by the grasshopper sparrow. No suitable habitat and no individuals were observed during the field reviews. Due to the lack of suitable habitat, the proposed project will have "**no effect**" on the Florida grasshopper sparrow.

2.3.7 Florida Scrub-Jay

The entire study area occurs within the USFWS Florida scrub-jay CA. The scrub-jay is classified as threatened due to habitat loss, degradation, and fragmentation. They are restricted to xeric scrub habitats with optimal habitat consisting of fire-dominated, low-growing oak scrub found on well-drained sandy soils with patches of bare sandy soil.

The study area includes a mix of residential, commercial, and agricultural lands that do not contain the xeric scrub habitats required by the Florida scrub-jay. According to FNAI, eBird, and FWC's statewide occurrence data, there are no documented occurrences within the study area. No individuals or suitable scrub-jay habitat was observed within the project area. Due to the lack of suitable habitat, the proposed project will have "**no effect**" for the Florida scrub-jay.

2.3.8 Sand Skink and Blue-tailed Mole Skink

The entire study area occurs within the USFWS sand skink and blue-tailed mole skink CAs. These species are highly adapted to life in sand, spending most of their time "swimming" though loose sand in search of food, shelter, and mates. They are rarely seen above ground. Their motion leaves sinusoidal ("S"-shaped) tracks in the soil surface that can be identified through visual pedestrian surveys. Both the sand skink and the blue-tailed mole skink are classified as threatened due to habitat loss, degradation, and fragmentation.

The geographic range of these skinks is limited to sandy ridges and ancient dunes of the Central Highlands, particularly the Lakes Wales Ridge, the Winter Haven Ridge, and the Mount Dora Ridge. These areas contain excessively drained, well-drained, and moderately well-drained sandy soils that usually support scrub habitats like sand pine scrub, xeric oak scrub, rosemary scrub, and scrubby flatwoods; high pine habitats like sandhills, longleaf pine-turkey oak, turkey oak barrens, and xeric hammock; and managed lands, such as citrus groves, pine plantations and pastures. Skinks prefer habitats with open canopies, scattered shrubby vegetation, and patches of bare sand. According to criteria defined by the USFWS, suitable habitat is considered to be "skink soils" located within the CA at elevations at or above 82 feet above sea level. Specific soil series referred to as "skink soils" are identified in the *Peninsular Florida Species Conservation Guidelines for Sand and Blue-tailed Mole Skink* (**Appendix K**).

Portions of the study area contain suitable skink habitat based on the location, soil types, and elevation criteria in the *Peninsular Florida Species Conservation Guidelines for Sand and Blue-tailed Mole Skink* (**Appendix K**). A soils investigation was conducted in order to identify areas within the project that are suitable for skinks. A Skink Soils Investigation Report was developed and included in **Appendix L**. As a result of this investigation, four areas of potential suitable soils were identified and a skink coverboard survey was performed within these areas in March through April 2021. Survey blocks were established using the maximum typical section widths for both north and south alignments. UWSFWS coordination regarding the sand skink survey is included in **Appendix D**. Coverboards were installed within each block at a minimum of 40 coverboards per acre. Areas of exposed soil were visually inspected via pedestrian transects for evidence of skink activity. Survey maps, data sheets, and photographs are included in **Appendix M**. No skink tracks or evidence of skink activity was observed during the coverboard and pedestrian surveys.

The proposed pond and FPC sites were not surveyed during the March 2021 coverboard surveys. These areas contain suitable habitat for skinks based on location, soil types, and elevation criteria. Skink presence is assumed and therefore the project "**may affect and is likely to adversely affect"** sand and blue-tailed mole skinks unless there is a negative survey or conservation measures and/or mitigation to offset impacts. FDOT commits to conduct a skink coverboard survey in suitable habitats during the design phase of the project. FDOT will consult with the USFWS once the survey is completed, and the results are known. If skinks are determined to be present and mitigation is required, mitigation for unavoidable impacts to occupied skink habitat will be provided through the purchase of credits from an USFWS-approved conservation bank.

2.3.9 Tricolored Bat

The tricolored bat is a candidate species for federal listing. It is Florida's smallest bat and distinguished by its unique tricolored fur and pink forearms that contrast their black wings. This wide-ranging species is found throughout the central and eastern United States, and portions of Canada, Mexico, and Central America. Typically hibernating in caves and mines during the winter, tricolored bats in the southern U.S. have an increased utilization of culverts as hibernacula, with shorter hibernation durations and increased winter activity. The tricolored bat is mostly associated with forested habitats and requires habitat suitable for roosting, foraging, and commuting between winter and summer habitats. Roosting singly or in small groups, the tricolored bat prefers to roost in caves, tree foliage, tree cavities, Spanish moss, and man-made structures such as buildings and culverts. They form summer colonies in forested habitats, utilizing cavities, bark, and foliage. The maternity season in Florida is May - June. They forage most commonly over watercourses and along forest edges.

Suitable roosting and foraging habitat was observed throughout the study corridor. Acoustic and roost surveys were conducted in 2020/2021 and 2022 in accordance with the Florida bonneted

bat survey guidelines. While the data analysis and manual vetting focused on low frequency calls and the Florida bonneted bat, the results of the acoustic survey identified the presence of tricolored bats in the study area. Tricolored bats were recorded at 13 of the 16 survey stations; however, activity appears low throughout the corridor with the majority of the stations only recording one call per night, but not each night of the survey. The roost survey focused on cavities and roosts preferred by the Florida bonneted bat; however, no evidence of bat roosting was observed within the study area during the roost survey or general wildlife surveys. Impacts to forested habitats within the project area are minimal, leaving the larger forested communities intact. If the listing status of the tricolored bat is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area, FDOT commits to re-initiating consultation with the USFWS to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the tricolored bat.

2.3.10 Wood Stork

The wood stork is listed by the USFWS as threatened due to the reduction in food base attributed to the loss of suitable foraging habitat (SFH). Wood storks are associated with freshwater and estuarine wetlands that are used for nesting, roosting, and foraging. Nesting typically occurs in medium to tall trees that occur in stands located in swamps or islands surrounded by open water. Because of their specialized feeding behavior, they forage most effectively in shallow water with highly concentrated prey. The USFWS defines suitable foraging habitat as shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between two to fifteen inches. SFH includes freshwater marshes, swamps, lagoons, tidal creeks and pools, ponds, ditches, and flooded pastures.

According to the USFWS South Florida Ecological Service Office, the habitats within 18.6 miles of a wood stork breeding colony are considered to be wood stork CFAs. The proposed project site is within the CFA of five wood stork colonies: Lake Rosalie, Lake Russell, Lake Somerset, Lone Palm, and Mulberry Northeast. Wood storks were observed flying and foraging within the project area and adjacent habitats during the field reviews. SFH is located throughout the project corridor. The proposed project will impact approximately 10.81 acres of SFH. This acreage was calculated based on direct impacts to herbaceous wetlands and surface waters which provide SFH for wood storks. According to the *South Florida Programmatic Concurrence Key for the Wood Stork* (USFWS 2010) (**Appendix N**), the proposed project will result in the following sequential determination: A>B>C>E= "**may affect, but is not likely to adversely affect**" the wood stork. Based on the current design, the project will impact over 5 acres of wetlands, and therefore, a foraging prey base analysis is required. The estimated impacts include all wetlands and surface waters within the existing right-of-way, which will be minimized during design. The final impacts will be calculated during the design phase and any mitigation will adhere to the requirements of the USACE and USFWS Effect Determination Key. FDOT commits to conducting a foraging prey base

analysis during design. Mitigation for impacts to wood stork SFH will be provided within the Service area of an USFWS-approved wetland mitigation bank or wood stork conservation bank. According to the currently published mitigation bank ledgers, there are several mitigation banks within the five (5) CFAs with available credits. The options include Boarshead Ranch Mitigation Bank, Bullfrog Bay Mitigation Bank, Florida Mitigation Bank, Hammock Lakes Mitigation Bank, Hilochee Bank, Shingle Creek Mitigation Bank, and Wiggins Prairie Mitigation Bank.

2.3.11 Federally Listed Plants

The Lake Wales Ridge is the remnant of an ancient dune system that runs north and south through Florida's peninsula. The entire study area occurs within the USFWS Lake Wales Ridge Plants CA. According to the Florida Natural Areas Inventory (FNAI) and USFWS, 19 federally listed plants have the potential to occur within the study area (**Table 2-1**). These include the endangered Avon Park harebells, Britton's beargrass, Carter's mustard, clasping warea, Florida ziziphus, Highlands scrub hypericum, Lewton's polygala, pygmy fringe tree, sandlace, scrub blazingstar, scrub lupine, scrub mint, scrub plum, short-leaved rosemary, and wireweed; and the threatened Florida bonamia, scrub pigeon wings, scrub buckwheat, and papery Whitlow-wort. These species are restricted to sandy habitats with specific fire regime requirements. This suite of species share a narrow geographic range on the paleo-dunes of Central Florida, where they occur in xeric scrub and sandhill vegetation and face the same general threats. These species were listed due to habitat destruction, modification, and curtailment of habitat range, primarily as result of development and lack of prescribed fire.

The Lake Wales Ridge Plants are restricted to sandy habitats maintained by periodic fire, such as scrub, high pine, turkey oak barrens, and sandhill. These habitats do not occur within the project area impacted by the Preferred Alternative, including pond sites. The right-of-way is mowed and maintained, minimizing the ability for these species to grow in these areas. The proposed pond sites do not contain the scrub habitats to support these species. According to FNAI, none of these species have been documented within the project area. No federally listed plants were observed during the field surveys, however FDOT will conduct appropriately timed surveys for listed plant species during design and permitting. Because there is no suitable habitat and no documented occurrences, the proposed project will have "**no effect"** on federally listed plants.

2.3.12 Critical Habitat

No Critical Habitat designated for listed species occurs within the SR 544 Study Area. Therefore, no destruction or adverse modification of critical habitat will occur.

2.5 State Listed Species

The FWC maintains the list of animals designated as federally endangered, federally threatened, or state threatened. While the USFWS has primary responsibility for federally endangered or

threatened species in Florida, the FWC works as a cooperating agency to help conserve these species and other imperiled species found in the state. Some listed and non-listed species are considered 'managed species' because of the well-developed programs that address their species' conservation, management, or recovery. The FWC has developed a comprehensive management plan and species action plans for the state's 57 state-listed species.

2.5.1 Florida Burrowing Owl

The FWC listed the Florida burrowing owl as threatened due to loss of native habitat, dependence on altered habitat, and lack of regulatory protections. The burrowing owl is a non-migratory resident of Florida and maintains home ranges and territories while nesting. Burrowing owls inhabit upland areas that are sparsely vegetated. Natural habitats include dry prairie and sandhill, but they will make use of ruderal areas such as pastures, airports, parks, and road rights-of-way because much of their native habitat has been altered or converted to other uses.

Suitable habitat was observed throughout the study area. No burrowing owls were observed during the general wildlife surveys or species-specific surveys. Burrowing owls usually dig their own burrows but are known to utilize gopher tortoise burrows and armadillo burrows as well. Gopher tortoise and mammal burrows were observed within the study area. Pre-construction surveys will be conducted to adhere to the components of the Imperiled Species Management Plan (ISMP) and permitting guidelines and the necessary FWC coordination and permitting will be required if burrows are found prior to construction; therefore, "**no adverse effect is anticipated**" for the burrowing owl resulting from the proposed project.

2.5.2 Florida Pine Snake

The Florida pine snake is listed by the FWC as threatened due to habitat loss, fragmentation, and degradation to upland habitats from development and fire suppression. They inhabit areas that feature well-drained sandy soils with a moderate to open canopy. Preferred habitats include sandhill and former sandhill, including old fields and pastures, sand pine scrub, and scrubby flatwoods. The pine snake often coexists with gopher tortoise and pocket gophers, spending the majority of its time underground.

No pine snakes were observed during the field surveys. Suitable habitat was observed within the site. Gopher tortoise, mammal burrows and pocket gopher mounds were observed. All gopher tortoise burrows within the construction limits will be excavated. Current FWC guidelines for the relocation of the Florida pine snake state that any incidentally captured pine snake should be released on-site or allowed to escape unharmed if habitat will remain post-development. Based on existing conservation measures, "**no adverse effect is anticipated**" for the Florida pine snake resulting from the proposed project.

2.5.3 Florida Sandhill Crane

The FWC listed the Florida sandhill crane as threatened due to the loss and degradation to nesting and foraging habitat from development and hydrologic alteration to their potential nesting habitat. The Florida sandhill crane is a heavy-bodied gray bird, with a long neck and long legs. It is widely distributed throughout most of peninsular Florida. Sandhill cranes rely on shallow marshes for roosting and nesting and open upland and wetland habitats for foraging.

Florida sandhill cranes were observed foraging or flying on multiple occasions throughout the study area. The marshes and wet prairies within the study area provide potential nesting habitat for the sandhill crane. While the mainline of the roadway has minimal nesting habitat, some of the proposed pond site locations are within or adjacent to suitable nesting habitat. The pastures and other open uplands, including the roadway right-of-way, provide foraging habitat. Ecologists observed sandhill cranes, including juveniles, foraging in these areas and roadside ditches during numerous field surveys. Pre-construction surveys will be conducted to adhere to the components of the ISMP. Based on this information, "**no adverse effect is anticipated**" for the Florida sandhill crane resulting from the proposed project.

2.5.4 Gopher Tortoise

The gopher tortoise is listed as threatened by the FWC. They occur in the southeastern Coastal Plain from Louisiana to South Carolina; the largest portion of the population is located in Florida. Gopher tortoises require well-drained, sandy soils for burrowing and nest construction, with a generally open canopy and an abundance of herbaceous groundcover, particularly broadleaf grasses, wiregrass (*Aristida stricta*), legumes and fruits for foraging. Gopher tortoises can be found in most types of upland communities including disturbed areas and pastures.

Suitable gopher tortoise habitat was observed throughout the study corridor, including proposed pond sites. Gopher tortoises and gopher tortoise burrows were observed during the field reviews; however, a 100% gopher tortoise survey was not conducted. A relocation permit from FWC will be required if tortoises are present within any permanent or temporary construction area. FDOT will conduct a 100% pre-construction survey for the gopher tortoise in accordance with 68A-27.003 and the current FWC Gopher Tortoise Permitting Guidelines and coordinate with FWC to receive necessary permit authorizations prior to construction. Mitigation contributions for the gopher tortoise will be calculated and provided to FWC during the gopher tortoise relocation permitting process. Based on the information provided above, "**no adverse effect is anticipated**" for the gopher tortoise.

2.5.5 Short-Tailed Snake

The FWC listed the short-tailed snake as threatened because it is a Florida endemic with a restricted geographic range. It inhabits xeric upland habitats that are in great demand for development with approximately 57% of its potential habitat privately owned. The short-tailed

snake is endemic to Florida and is only found from the Suwannee River south to Highlands County. Short-tailed snakes are rarely seen above ground as they spend most of the time burrowed in sandy soils. They primarily inhabit areas with well drained sandy soils, particularly longleaf pine and xeric oak habitats, but may also be found in scrub and xeric hammock habitats.

Limited habitat for the short-tailed snake occurs within the study area. No individuals were observed during the field surveys. The project will have minimal impacts to xeric habitats where this cryptic species is found; therefore, "**no adverse effect is anticipated**" for the short-tailed snake.

2.5.6 Southeastern American Kestrel

The southeastern American kestrel is listed by the FWC as threatened due to habitat loss, degradation and fragmentation, as well as lack of regulatory protection. The southeastern American kestrel is the only non-migratory, permanent resident kestrel in Florida. However, the seasonal occurrence of a migratory subspecies of the northern American kestrel (*Falco sparverius sparverius*) occurs from September through March in Florida. Confident identification of southeastern American kestrels can only be made during the portion of the breeding season when migratory species are not present. Preferred habitat consists of fire-maintained sandhill and open pine savannah. They utilize open pine habitats, woodland edges, prairies, pastures, and other agricultural lands. The southeastern American kestrel is a secondary cavity nester, typically nesting in tall trees or utility poles with existing cavities.

Suitable nesting and foraging habitat for kestrels were observed throughout the study area, including proposed pond site locations. Individuals were observed on multiple occasions during field surveys. No active nests were observed. Activities within the 492 feet (150 meter) buffer of an active nest are considered to cause take. Surveys for the Southeastern American Kestrel will be conducted during the nesting season (May through August) in the design phase. If it is determined nest areas are found and could be impacted by the project, FDOT will coordinate with FWC to determine appropriate avoidance and minimization measures to apply during construction. Based on this information "**no adverse effect is anticipated**" for the southeastern American kestrel resulting from the proposed project.

2.5.7 Imperiled Wading Birds

Three wading birds have the potential to occur in the study area. These species are the little blue heron, roseate spoonbill, and tricolored heron. All three are listed by the FWC as threatened due to habitat loss and degradation. These species are widely distributed throughout peninsular Florida. Wading birds depend on healthy wetlands and vegetated areas suitable for resting and breeding which are near foraging area. They forage in freshwater, brackish, and saltwater habitats.

They tend to nest in multi-species colonies of a variety of woody vegetation types including cypress, willow, maple, black mangrove, and cabbage palm.

Ecologists observed suitable foraging and minimal nesting habitat for wading birds throughout the study area, including proposed pond sites. All three species were observed throughout the study area. These observations include flyovers and foraging in roadside ditches. No nesting activity was observed during the field reviews conducted during nesting season. According to FNAI and the FWC Wading Bird Rookery Database, no active wading bird rookeries are located within the project area. Impacts to wetlands will be mitigated and foraging habitat for these species is abundant adjacent to the project area. Based on the information provided, "**no adverse effect is anticipated**" for wading birds resulting from the proposed project.

2.5.8 State Listed Plants

Through regulation by the FDACS Division of Plant Industry, Florida protects plant species native to the state that are endangered, threatened, or commercially exploited. The Florida Regulated Plant Index includes all plants listed as endangered, threatened, or commercially exploited as defined in Chapter 5B-40.0055, F.A.C. According to the FNAI and FDACS, 14 state protected plant species have the potential to occur in the project area (**Table 2-1**). However, FNAI listed no occurrences of protected plants within the study area. Many of these plant species are endemic to the Lake Wales Ridge or otherwise occur in open sandy habitats maintained by periodic fire, such as sandhill, oak scrub, and scrubby flatwoods and include Ashe's savory (ST), Florida beargrass (ST), Florida spiny-pod (SE), giant orchid (ST), nodding pinweed (ST), and sand butterfly pea (SE). These species are listed due to habitat destruction and modification, primarily as a result of development and fire suppression. The remaining listed plant species include celestial lily (SE), Chapman's sedge (ST), cutthroatgrass (SE), Florida willow (SE), hartwrightia (ST), many-flowered grass-pink (ST), Piedmont jointgrass (ST), and star anise (SE), and require mesic or wetland habitats. These species are listed due to habitat destruction and modification as a result of water quality degradation, hydrologic disturbances, and lack of fire.

The scrub habitats required to support many of these species do not occur within the project area impacted by the Preferred Alternative, including pond sites. Mesic and wetland habitats were observed throughout the corridor. The majority of the areas within or immediately adjacent to the project footprint have been disturbed or developed and the right-of-way is mowed and maintained, minimizing the ability for these species to grow in these areas. No listed plant species were observed during the field surveys. FDOT will conduct appropriately timed surveys for listed plant species during design and permitting. Based on the information provided, "**no adverse effect is anticipated**" for state listed plant species resulting from the proposed project.

2.6 Other Protected Species or Habitats

2.6.1 Bald Eagle

The bald eagle was removed from the ESA in 2007 and Florida's Endangered and Threatened Species list in 2008; however, it remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles tend to nest in the tops of very tall trees that provide unobstructed lines of sight to nearby habitats, particularly lakes and other open waters. Because eagles are piscivorous (fish-eating) raptors, nearly all eagles' nests occur within 1.8 miles of water.

Suitable habitat for the bald eagle was observed throughout the study area. Several bald eagles were observed during the field reviews. According to the FWC's Eagle Nest locator and the Audubon Florida EagleWatch Nest website (EagleWatch), there are seven (7) nests located within one mile of the study area. All the documented nests are located outside the 660-foot eagle nest protection zone except Nest PO149. Nest PO149 was located approximately 95 feet from the existing roadway and nesting activity was observed during multiple field visits (**Figure 2-1**). In 2019, the nest tree was observed to be dying and had dropped most of its limbs, with the nest at the top of the tree with little structural support. The nest was still observed to be active. Similar conditions were observed and documented in 2020 and 2021 with increasing evidence of decay. The status of Nest PO149 was active and successful for the 2022 nesting season. Hurricane Ian struck Florida on September 28, 2022. Ecologists conducted a field review on October 10, 2022, and observed the nest had been destroyed. Only a snag remained of the tree and the nest had fallen to the ground. FDOT will conduct an eagle nest survey during design and permitting. Based on the current nest status, it is anticipated that the proposed project will have no impact on the bald eagle since the proposed activities are outside the 660-ft eagle nest protection buffer.

2.6.2 Florida Black Bear

The Florida black bear was removed from Florida's Endangered and Threatened Species list in 2012; however, it remains protected under Chapter 68A-4.009 F.A.C., the Florida Black Bear Conservation Plan. The study area is located in the occasional range of the South Central Bear Management Unit (BMU).

The black bear requires large amounts of space for its home range and a variety of forested habitats, including flatwoods, swamps, scrub oak ridges, bayheads, and hammocks. Self-sustaining populations of bears are generally found on large tracks of contiguous forests with understories of berry producing shrubs or trees. The corridor primarily consists of residential and agricultural land uses with a number of lakes throughout the corridor. Additionally, the project corridor continues to be developed and site clearing and construction was observed during the field reviews. The mobility of bears throughout the study area is limited by the surrounding development and lakes as evidenced by the FWC data. The most current FWC data for the Florida

black bear was reviewed and documents only four (4) historical occurrences within a one-mile buffer of the SR 544 roadway (**Figure 2-1**). No recent bear activity has been recorded in the corridor. No impacts to the Florida black bear are anticipated as a result of this project based on the lack of suitable habitat, including connectivity to suitable habitat, and bear utilization within the project area.

2.6.3 Strategic Habitat Conservation Areas

Strategic Habitat Conservation Areas (SHCA) are lands in need of protection to maintain natural communities and viable populations of many species that are indicators of the state's biological diversity. In 1994, FWC completed a project entitled *Closing the Gaps in Florida's Wildlife Habitat Conservation System*, which assessed the security of rare and imperiled species on existing conservation lands in Florida. This research identified important habitat areas in Florida with no conservation protection. These SHCA serve as a foundation for conservation planning for species protection through habitat conservation.

FWC designated SHCA occur throughout the study area for the sand skink, snail kite, and Cooper's hawk (**Figure 2-1**). No regulatory action is required for impacts to SHCA.

SECTION 3 WETLAND EVALUATION

This wetland evaluation was performed in accordance with the Presidential Executive Order (EO) 11990 ("Protection of Wetlands"); U.S. Department of Transportation Order 5660.1A ("Preservation of the Nation's Wetlands"); and the *Wetlands and Other Surface Waters* chapter of the FDOT's PD&E Manual.

3.1 Efficient Transportation Decision Making

According to the ETDM Summary Report No. 5873, dated May 22, 2020, the U.S. Environmental Protection Agency (EPA), SWFWMD, and USACE indicated the project alternatives may create a "moderate" DOE to wetlands and surface waters; while the Florida Department of Environmental Protection (FDEP) indicated a DOE of "minimal." The primary issues were the potential loss of wetland functions; loss of wildlife habitat; degradation of water quality in wetlands and surface waters; and reduction in flood storage and capacity. In order to provide reasonable assurances that direct, indirect, or cumulative impacts from construction, alteration and intended or reasonably expected uses of the proposed alternatives will not contribute to violations of water quality standards or adverse impacts to the functions of wetlands or other surface waters, the FDOT will calculate the appropriate mitigation during the design and permitting phase to satisfy the requirements of 33 United States Code (U.S.C.) § 1344 and Part IV of Chapter 373, Florida Statutes (F.S.)

3.2 Data Collection and Methodology

The wetland evaluation included GIS analysis, agency database search, and field reviews. This information included SWFWMD land use maps and regulatory GIS data. Other information included but was not limited to:

- FDOT FLUCFCS Manual
- USFWS National Wetlands Inventory (NWI) Maps (https://www.fws.gov/wetlands/data/mapper.html)
- U.S. Geographic Survey (USGS) Topographic Maps (https://viewer.nationalmap.gov/launch/)
- Natural Resources Conservation Service (NRCS) Soil Maps (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)
- Florida Natural Areas Inventory (FNAI) Cooperative Land Cover Maps (https://www.fnai.org/services/coop-land-cover)

Ecologists familiar with Florida's natural plant communities performed an assessment of the study area to identify wetland vegetation, wetland hydrology, and hydrologic indicators to determine the presence of wetlands and other surface waters within the study area. Field reviews were conducted from October 2019 through December 2022. A formal wetland delineation to determine jurisdictional boundaries was not performed; however, the general limits of wetlands and other surface waters were identified in the field using the criteria established in Rule 62-340, F.A.C. The wetland limits have not been reviewed by the agencies. Wetlands and surface waters were classified per the FLUCFCS (FDOT 1999), and the Classification of Wetlands and Deepwater Habitats of the US (NWI). The Uniform Mitigation Assessment Method (UMAM) was utilized, per Chapter 62-345, F.A.C., for the functional assessment of wetlands within the SR 544 Study Area. Additionally, a Sovereign Submerged Lands (SSL) determination was obtained from the FDEP (**Appendix D**) regarding Lake Conine, Lake Smart, Lake Fannie, the canal between Lake Conine and Lake Smart, the canal between Lake Henry and Lake Hamilton, and the unnamed canal in S5, 28S, 27E.

3.3 Wetlands and Surface Waters

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area (**Figure 3-1**). The following section includes a brief description of each wetland type and other surface water within the study area. **Table 3-1** provides details identifying each wetland including the wetland number, NWI and FLUCFCS classification, and a brief description.

Figure 3-1: Wetlands and Other Surface Waters

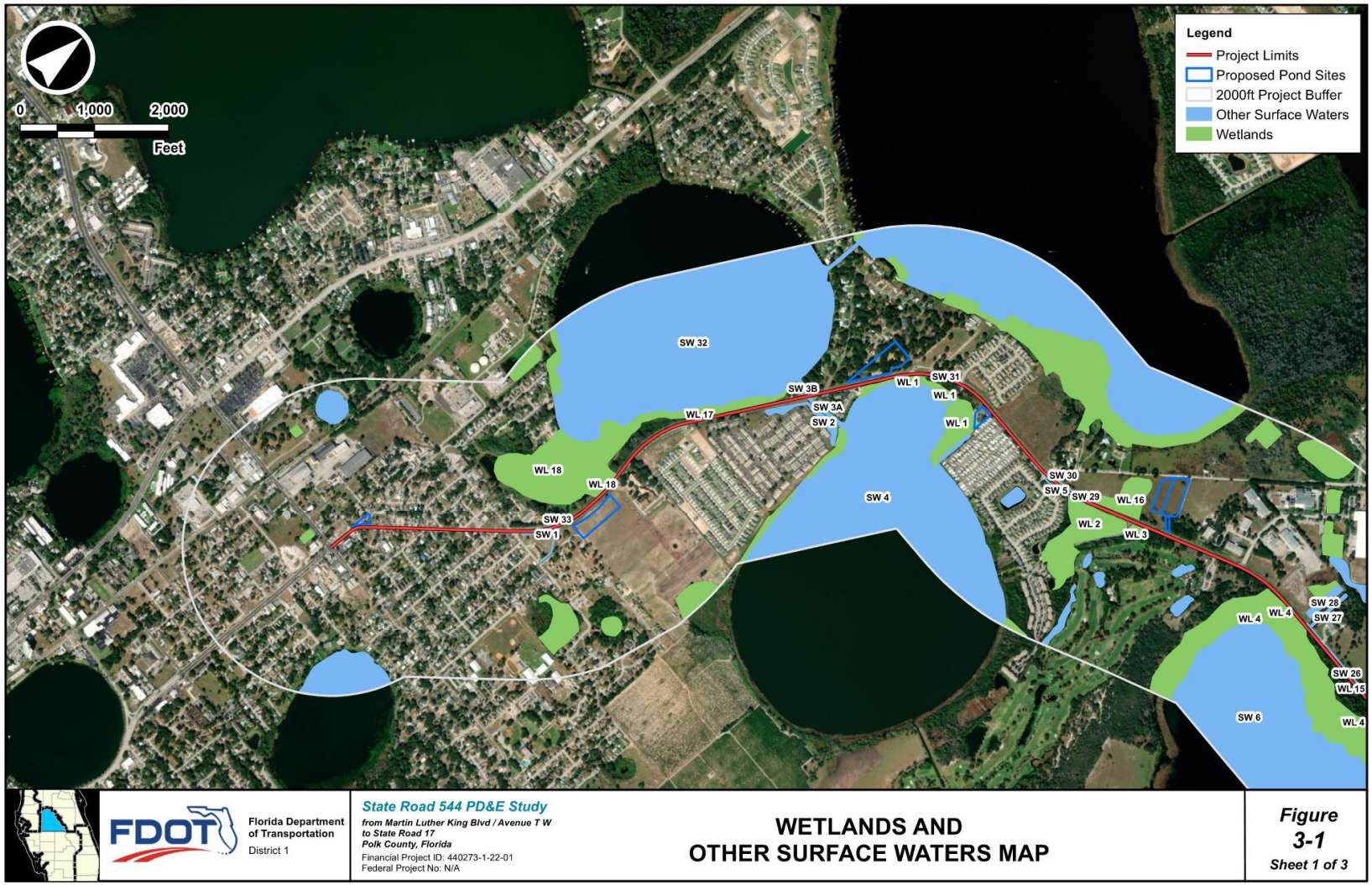


Figure 3-1: Wetlands and Other Surface Waters

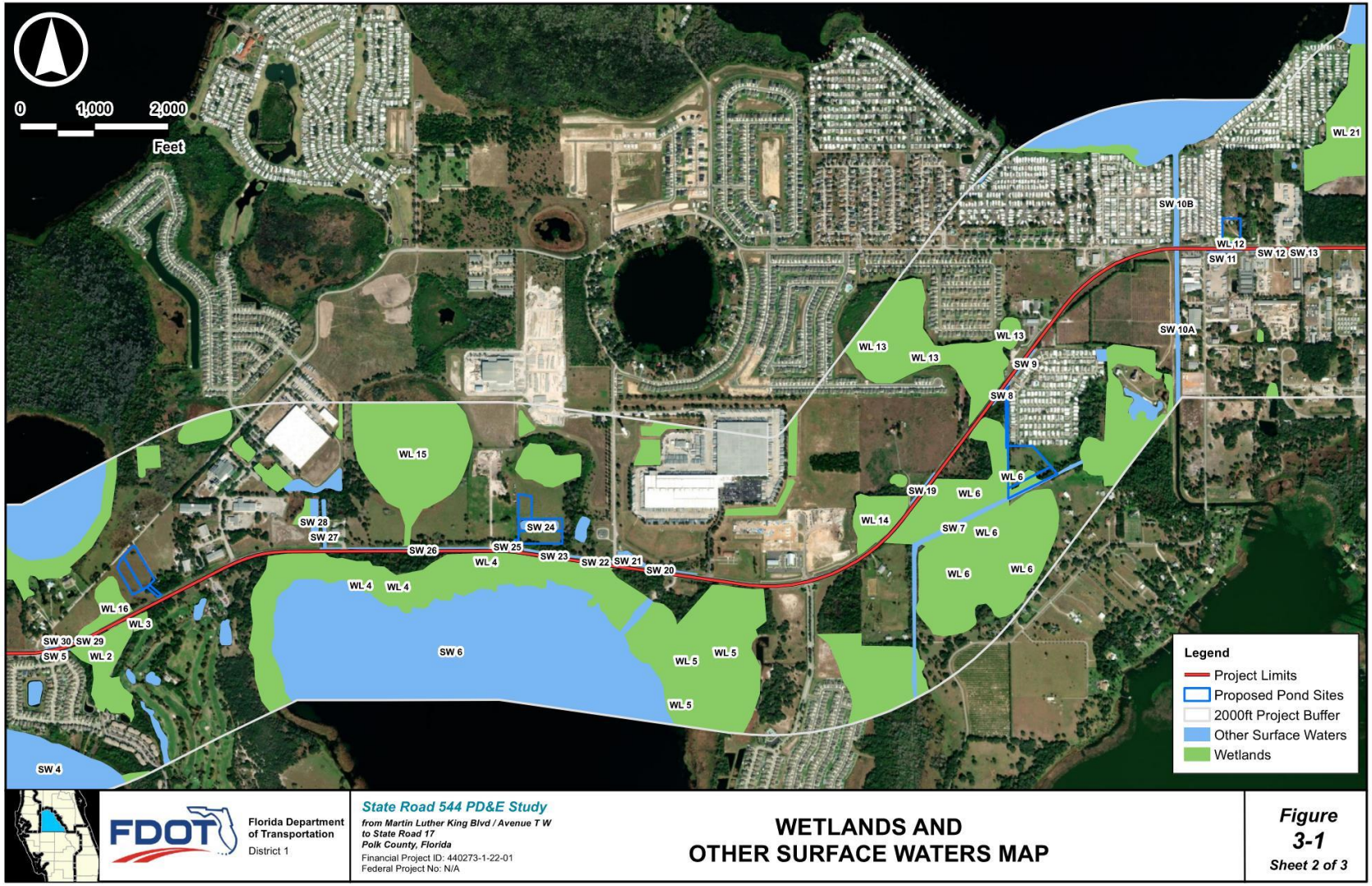


Figure 3-1: Wetlands and Other Surface Waters

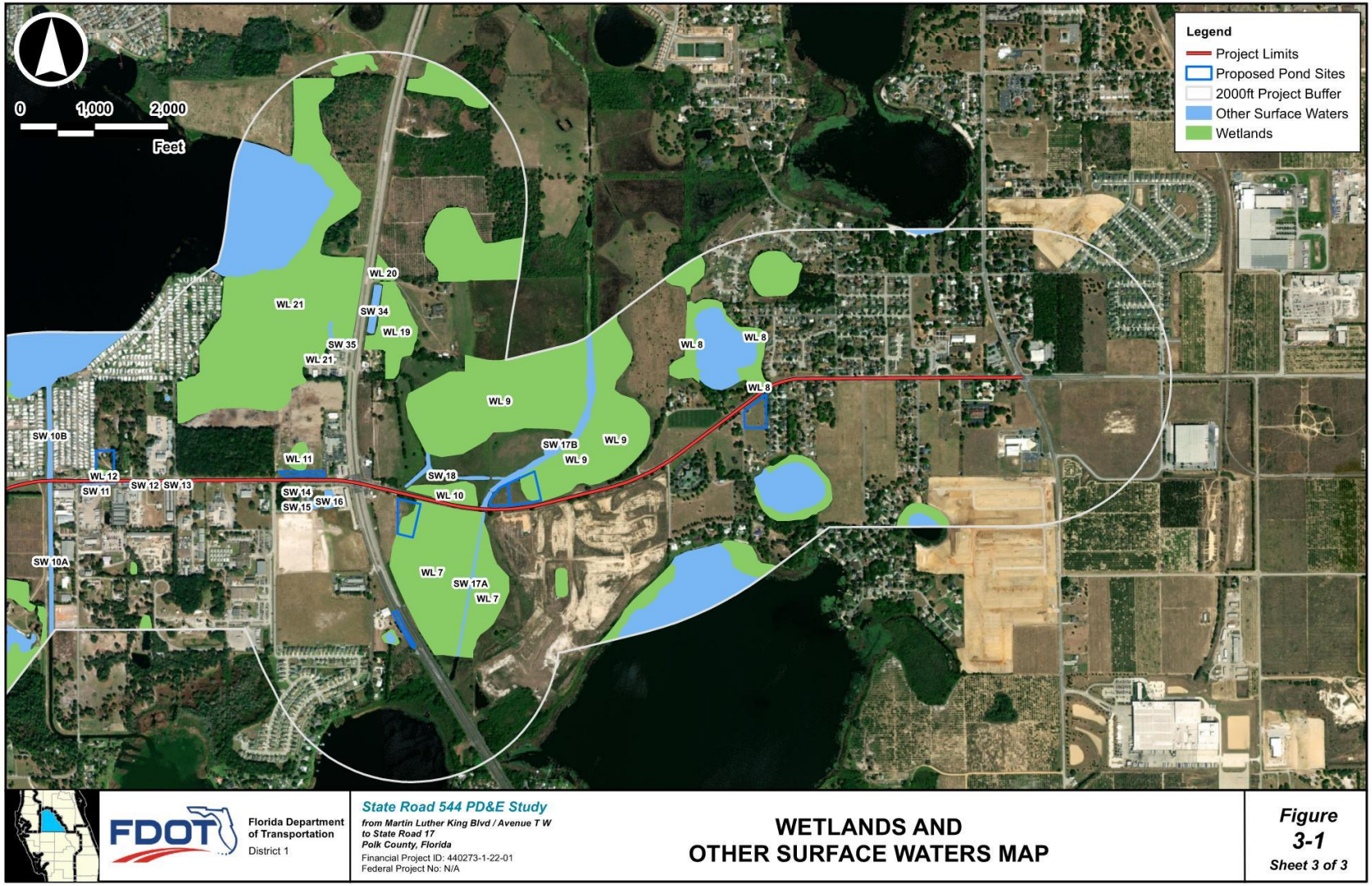


Table 3-1: Wetlands and Other Surface Waters in the SR 544 Study Area

WETLAND ID	FLUCFCS	NWI	DESCRIPTION
WL 1	644	PEM1C	Emergent Aquatic Vegetation
WL 2	630	PFO7C/ PSS3B	Wetland Forested Mixed
WL 3	630	PFO7C/ PSS3B	Wetland Forested Mixed
WL 4	630/641/ 644	PEM1F/PEM1G	Wetland Forested Mixed/Freshwater Marshes/Emergent Aquatic Vegetation
WL 5	630/641/ 644	PFO6F/PFO7F/PEM1F	Wetland Forested Mixed/Freshwater Marshes/Emergent Aquatic Vegetation
WL 6	630/640/ 643	PFO7B/PFO1C/PAB4Hx/PSS1F	Wetland Forested Mixed/Freshwater Marshes/Wet Prairies
WL 7	643	PEM1Cd	Wet Prairies
WL 8	615/641	PEM1F	Stream and Lake Swamps/Freshwater Marshes
WL 9	630/641/ 643	PEM1Cd/PFO2F	Wetland Forested Mixes/Freshwater Marshes/Wet Prairies
WL 10	643	PEM1Cd	Wet Prairies
WL11	653	PEM1F	Intermittent Ponds
WL 12	653	PUBHx	Intermittent Ponds
WL 13	630/641	PFO7B/PEM1F	Wetland Forested Mixed/Freshwater Marshes
WL 14	630	PFO7C/PFO6F	Wetland Forested Mixed
WL 15	641	PFO6F/PSSF	Freshwater Marshes
WL 16	615/641	PEM1C	Freshwater Marshes
WL 17	644	L1UBH	Emergent Aquatic Vegetation
WL 18	618/630	PFO3A	Willow and Elderberry/Wetland Forested Mixed
WL 19	615	PFO1/3C	Stream and Lake Swamps
WL 20	615	PFO1/3C	Stream and Lake Swamps
WL 21	615/644	PFO1/3C/PEM1F/PFO6F/PFO7C	Stream and Lake Swamps/Emergent Aquatic Vegetation
SW 1	510	R5UBFx	Streams and Waterways
SW 2	530	N/A	Reservoirs
SW 3A	510	L1UBHx	Streams and Waterways
SW 3B	510	L1UBHx	Streams and Waterways
SW 4	520	L1UBH	Lakes
SW 5	510	PUBCx	Streams and Waterways
SW 6	520	L1UBH	Lakes
SW 7	510	R5UBFx	Streams and Waterways
SW 8	510	PUBCx	Streams and Waterways

WETLAND ID	FLUCFCS	NWI	DESCRIPTION
SW 9	510	PUBCx	Streams and Waterways
SW 10A	510	R2UBHx	Streams and Waterways
SW 10B	510	R2UBHx	Streams and Waterways
SW 11	510	PUBCx	Streams and Waterways
SW 12	510	PUBCx	Streams and Waterways
SW 13	510	PUBCx	Streams and Waterways
SW 14	530	PUBCx	Reservoirs
SW 15	530	PUBCx	Reservoirs
SW 16	530	PEM1F	Reservoirs
SW 17A	510	R2UBHx	Streams and Waterways
SW 17B	510	R2UBHx	Streams and Waterways
SW 18	510	R5UBFx	Streams and Waterways
SW 19	510	PUBCx	Streams and Waterways
SW 20	510	PUBCx	Streams and Waterways
SW 21	530	PUBCx	Reservoirs
SW 22	510	R5UBFx	Streams and Waterways
SW 23	510	R5UBFx	Streams and Waterways
SW 24	530	PUBHx	Reservoirs
SW 25	510	R5UBFx	Streams and Waterways
SW 26	510	R5UBFx	Streams and Waterways
SW 27	510	R5UBFx	Streams and Waterways
SW 28	530	PUBHx	Reservoirs
SW 29	510	PUBCx	Streams and Waterways
SW 30	510	PUBCx	Streams and Waterways
SW 31	510	PUBCx	Streams and Waterways
SW 32	520	L1UBH	Lakes
SW 33	510	R5UBH	Streams and Waterways
SW 34	530	PEM1Cx	Reservoirs
SW 35	510	R5UBFx	Streams and Waterways

3.3.1 Stream and Lake Swamps (Bottomland)

FLUCFCS: 615

USFWS: PFO7C, PPFO1/3C, PEM1F

Wetlands: WL 8, WL 19, WL 20, WL 21

Streams and Lake Swamps (Bottomland) usually occur in floodplain or overflow areas. This wetland type occurs within the project area along northern and eastern project termini. Observed canopy species include red maple (*Acer rubrum*). Shrub species observed include immature canopy

species, Carolina willow (*Salix caroliniana*), elderberry (*Sambucus nigra*), and Peruvian primrose willow (*Ludwigia peruviana*). Groundcover includes pickerelweed (*Pontederia cordata*).

3.3.2 Willow and Elderberry

FLUCFCS: 618
USFWS: PFO3A
Wetlands: WL 18

The willow and elderberry classification consists of a vegetative community that is dominated by Carolina willow. The portion of WL 18 that abuts SR 544 is classified as Willow and Elderberry. Vegetative species within this portion of WL 18 include red maple, Carolina willow, elderberry, Brazilian pepper (*Schinus terebinthifolia*), and lantana.

3.3.3 Wetland Forested Mixed

FLUCFCS: 630
USFWS: PFO7C, PSS3B
Wetlands: WL 2, WL 3, WL 4, WL 5, WL 6, W L9, WL 13, WL 14, WL 18

Wetland Forested Mixed wetlands contain communities in which neither hardwoods nor conifers achieve 66 percent canopy composition. This type of forested wetland occurs throughout the project area. Vegetative species observed in these communities include a canopy of red maple, sweet bay (*Magnolia virginiana*), black gum (*Nyssa sylvatica),* bald cypress (*Taxodium distichum*), slash pine (*Pinus Elliotti*), and laurel oak (*Quercus laurifolia*). Understory species observed include Brazilian pepper, Peruvian primrose willow, immature canopy species, Carolina willow, elderberry, salt bush *(Baccharis halimifolia*), and wax myrtle (*Myrica cerifera*). Groundcover species observed include various rush *(Juncus* spp.), torpedograss (*Panicum repens*), cinnamon fern (*Osmunda cinnamomea*), beggar ticks (*Bidens alba*), and swamp fern *(Blechnum serrulatum*).

3.3.4 Freshwater Marshes

FLUCFCS: 641
USFWS: PEM1G, PEM1CD, PEM1F,
Wetlands: WL 4, WL 5, WL 13, WL 15, WL 16

Freshwater Marshes are non-forested wetlands that are usually confined to relatively low-lying areas. This type of non-forested wetland occurs multiple times throughout the project area. Vegetative species observed in these communities are comprised of Peruvian primrose willow, saltbush, Carolina willow, and red maple saplings, cinnamon fern, torpedograss, soft rush, various sedges (*Adropogon* spp.), arrowhead (*Sagitaria latifolia*), lizards' tail (*Saururus cernuus*), and cattails (*Typha* spp.)

3.3.5 Wet Prairies

FLUCFCS: 643
USFWS: PEM1CD
Wetlands: WL 6, WL 7, WL 9, WL 10

Wet Prairies are non-forested wetlands composed predominantly of grassy vegetation and usually distinguished from marshes by having less water and shorter herbage. Wet prairies occur throughout the study area. Vegetative species observed within these communities include St. Johns wort (*Hypericum* spp.), Peruvian primrose willow, cordgrass (*Spartina bakeri*), yellow-eyed grass (*Xyris* spp.), maidencane *(Panicum hemitomon*), smartweed (*Polygonum hydropiperoides*), dollarweed *(Hydrocotyle* spp.), and torpedograss.

3.3.6 Emergent Aquatic Vegetation

FLUCFCS: 644
USFWS: PEM1C, L2AB3H
Wetlands: WL 1, WL 4, WL 5, WL 17, WL 21

Emergent Aquatic Vegetation wetlands are non-forested wetlands comprised of both floating vegetation and vegetation which is found either partially or completely above the surface of water. These wetland communities are associated with the lakes within the project corridor. Vegetative species observed within these communities include spatterdock (*Nuphar* spp.), smartweed (*Persicari hydropiperoides*), duck weed (*Lemna* spp.), pickerel week, Peruvian primrose willow, and cattails.

3.3.7 Intermittent Ponds

FLUCFCS: 652
USFWS: PEM1F, PUBHx
Wetlands: WL 11, WL 12

Intermittent Ponds is a category of wetland defined as a waterbody which exists for only a portion of the year. These land use types occur in WL 11 and WL 12. Water levels were observed to fluctuate throughout the year, with WL 11 almost completely drying up. Observed vegetation within WL 12 includes soft rush, Peruvian primrose willow, torpedo grass, and maidencane.

3.3.8 Streams and Waterways

FLUCFCS: 510
USFWS: R2UBSx, R5UBFx, L1UBHx
Surface Water: SW 1, SW 3A, SW 3B, SW 5, SW 7, SW 8, SW 9, SW 10A, SW 10B, SW 11, SW 12, SW 13, SW 17A, SW 17B, SW 18, SW 19, SW 20, SW 22, SW 23, SW 25, SW 26, SW 27, SW 29, SW 30, SW 31, SW 33, SW 35

Streams and Waterways include rivers, creeks, canals, and other linear bodies of water. The surface waters within the study area consists of canals, agricultural ditches, and roadside ditches. These ditches generally contain standing water during the rainy season and are shallow or dry during the dry season. Many of these systems support hydrophytic vegetation. Typical vegetation observed in these surface waters include red maple, water oak (*Quercus nigra*), duck potato (*sagitaria lancifolia*), pickerel weed, smart weed, Carolina willow, and Peruvian primrose willow.

3.3.9 Lakes

FLUCFCS: 520
USFWS: L1UBH
Surface Water: SW 4, SW 6, SW 32

Lakes include extensive inland water bodies, excluding man-made reservoirs. Three lakes occur immediately adjacent to the SR 544 roadway. These lakes include Lake Conine, Lake Smart, and Lake Fannie.

3.3.10 Reservoirs

FLUCFCS: 530
USFWS: PUBHX, PEM1F
Surface Water: SW 2, SW 14, SW 15, SW 16, SW 21, SW 24, SW 28, SW 34

Reservoirs are artificial impoundments of water used for irrigation, flood control, and municipal and rural water supplies. Reservoirs occur throughout the study area. Many of the reservoirs are permitted stormwater ponds.

3.4 Wetland and Surface Water Impacts

Data collected during the literature review, previous permit history, and field survey were used to evaluate the potential adverse direct and secondary impacts of the project to wetlands and the potential cumulative impacts to those wetlands and surface waters in the project limits. Practicable measures to avoid or minimize impacts to wetlands and surface waters were considered during the SR 544 Study. The unavoidable adverse impacts will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and U.S.C. §1344. **Table 3-2** details the proposed wetland and surface water impacts.

3.4.1 Direct Impacts

The Preferred Alternative will result in 14.11 acres of direct impacts to wetlands and 2.66 acres of direct impacts to other surface waters. Final direct impacts will be determined during design and permitting and will be assessed accordingly.

3.4.2 Secondary Impacts

Secondary impacts were assessed at a distance of 25 feet beyond any direct wetland impacts. The proposed project will result in approximately 10.03 acres of secondary impacts to wetlands. Final secondary impacts will be determined during design and permitting and will be assessed accordingly.

3.4.3 Cumulative Impacts

Cumulative impacts can result from incremental but collectively significant impacts within the basin over time. In order to provide reasonable assurances that the project will not cause unacceptable cumulative impacts, mitigation will be provided from within the same drainage basin as the anticipated impacts or the project will utilize a regional mitigation plan pursuant to Section 373.4137, F. S.

Table 3-2: Potential Wetland and Other Surface Water Impacts from the Preferred Alternative and Pond Site Alternatives

Wetland ID	FLUCFCS	Description	Impact Type	Impact Area (ac.)
WL 1	644	Emergent Aquatic Vegetation	Right-of-Way	0.32
			FPC 1	0.09
WL 2	630	Wetland Forested Mixed	Right-of-Way	0.53
WL 3	630	Wetland Forested Mixed	Right-of-Way	0.17
WL 4	630	Wetland Forested Mixed	Right-of-Way	0.89
	641	Freshwater Marshes	Right-of-Way	1.19
WL 5	630	Wetland Forested Mixed	Right-of-Way	0.08
WL 6	630	Wetland Forested Mixed	Right-of-Way	0.47
			Pond 5	1.05
			FPC 4	0.45
	641	Freshwater Marshes	FPC 4	0.28
WL 7	643	Wet Prairies	Right-of-Way	0.75
			Pond 8	1.59
WL 8	615	Stream and Lake Swamps (Bottomland)	Right-of-Way	0.16
WL 9	641	Freshwater Marshes	Right-of-Way	0.04
			FPC 5	1.66
WL 10	643	Wet Prairies	Right-of-Way	0.18
WL 12	653	Intermittent Ponds	Right-of-Way	0.10
			Pond 6	0.33
WL 13	630	Wetland Forested Mixed	Right-of-Way	0.24
WL 14	630	Wetland Forested Mixed	Right-of-Way	0.41
WL 16	641	Freshwater Marshes	Right-of-Way	1.16
WL 17	644	Emergent Aquatic Vegetation	Right-of-Way	0.48
WL 18	618	Willow and Elderberry	Right-of-Way	0.14
WL 21	615	Stream and Lake Swamps (Bottomland)	Right-of-Way	1.35
SW 1	510	Streams and Waterways	Right-of-Way	0.18
SW 3A	510	Streams and Waterways	Right-of-Way	0.02
SW 3B	510	Streams and Waterways	Right-of-Way	0.02
SW 5	510	Streams and Waterways	Right-of-Way	0.07
SW 8	510	Streams and Waterways	Right-of-Way	0.09
SW 9	510	Streams and Waterways	Right-of-Way	0.08
SW 10A	510	Streams and Waterways	Right-of-Way	0.03
SW 10B	510	Streams and Waterways	Right-of-Way	0.04
SW 11	510	Streams and Waterways	Right-of-Way	0.08
SW 12	510	Streams and Waterways	Right-of-Way	0.09
SW 13	510	Streams and Waterways	Right-of-Way	0.01

Wetland ID	FLUCFCS	Description	Impact Type	Impact Area (ac.)
SW 17A	510	Streams and Waterways	Right-of-Way	0.02
SW 17B	510	Streams and Waterways	Right-of-Way	0.04
SW 19	510	Streams and Waterways	Right-of-Way	0.14
SW 20	510	Streams and Waterways	Right-of-Way	0.21
SW 21	530	Reservoirs	Right-of-Way	0.20
SW 22	510	Streams and Waterways	Right-of-Way	0.13
SW 23	510	Streams and Waterways	Right-of-Way	0.33
SW 25	510	Streams and Waterways	Right-of-Way	0.06
SW 26	510	Streams and Waterways	Right-of-Way	0.48
SW 27	510	Streams and Waterways	Right-of-Way	0.06
SW 29	510	Streams and Waterways	Right-of-Way	0.02
SW 30	510	Streams and Waterways	Right-of-Way	0.05
SW 31	510	Streams and Waterways	Right-of-Way	0.05
SW 33	510	Streams and Waterways	Right-of-Way	0.04
SW 35	510	Streams and Waterways	Right-of-Way	0.12
Total Impacts				
Total Right-of-Way Wetland Impacts (ac.)		**Total Pond and FPC Wetland Impacts (ac.)**	**Secondary Wetland Impacts (ac.)**	
8.66		**5.45**	**10.03**	
			Total Direct Wetland Impacts	**14.11**
			Total Other Surface Water Impacts	**2.66**
			Total Secondary Impacts	**10.03**
			Total Proposed Impacts	**26.80**

3.5 Wetland Assessment

A wetland assessment was performed for wetlands and other surface waters in the SR 544 Study Area. The wetland assessment was conducted in accordance with UMAM, as described in Chapter 62-345, F.A.C. The UMAM is the state-wide methodology for determining the functional value provided by wetlands and other surface waters and the amount of mitigation required to offset adverse impacts to those areas for regulatory permits. The results of the UMAM assessment are provided in **Table 3-3**. UMAM summary sheets can be found in **Appendix O**. The proposed project functional loss as a result of direct and secondary impacts is 6.371 units and 0.668 units, respectively. The total project functional loss is approximately 7.039 units. These values may be refined during the design and permitting phases of the project.

Table 3-3: Proposed Wetland Functional Loss Due to Impacts from the Preferred Alternative

Wetland ID	Wetland Type	Impact Type	UMAM Delta	Impact Area (ac.)	Functional Loss
WL 1	Herbaceous	Direct	0.43	0.41	0.178
		Secondary	0.07	0.57	0.038
WL 2	Forested	Direct	0.40	0.53	0.212
		Secondary	0.07	0.59	0.039
WL 3	Forested	Direct	0.40	0.17	0.068
		Secondary	0.07	0.14	0.009
WL 4	Forested and Herbaceous	Direct	0.40	2.08	0.832
		Secondary	0.07	1.77	0.118
WL 5	Forested	Direct	0.57	0.08	0.045
		Secondary	0.07	0.31	0.021
WL 6	Forested and Herbaceous	Direct	0.57	2.25	1.275
		Secondary	0.07	1.39	0.093
WL 7	Herbaceous	Direct	0.40	2.34	0.636
		Secondary	0.07	0.88	0.059
WL 8	Forested	Direct	0.40	0.16	0.064
		Secondary	0.07	0.11	0.007
WL 9	Herbaceous	Direct	0.40	1.70	0.680
		Secondary	0.07	0.47	0.031
WL 10	Herbaceous	Direct	0.40	0.18	0.072
		Secondary	0.07	0.36	0.024
WL 12	Herbaceous	Direct	0.40	0.43	0.143
		Secondary	0.00	0.00	0.00
WL 13	Forested	Direct	0.40	0.24	0.136
		Secondary	0.07	0.44	0.029
WL 14	Forested	Direct	0.40	0.41	0.232
		Secondary	0.07	0.59	0.039
WL 16	Herbaceous	Direct	0.40	1.16	0.464
		Secondary	0.07	0.89	0.059
WL 17	Herbaceous	Direct	0.40	0.48	0.208
		Secondary	0.07	0.71	0.047
WL 18	Herbaceous	Direct	0.40	0.14	0.061
		Secondary	0.07	0.24	0.016
WL 21	Forested	Direct	0.40	1.35	0.765
		Secondary	0.07	0.57	0.038
				Total Direct Functional Loss	**6.371**
				Total Secondary Functional Loss	**0.668**
				Total Functional Loss	**7.039**

3.6 Avoidance and Minimization

Several alternatives described above were considered to reduce overall impacts to wetlands to the greatest extent practicable. Complete avoidance of impacts was not feasible due to the nature of the roadway widening project and the occurrence of wetland habitats immediately adjacent to the proposed project. Avoidance and minimization measures utilized by the proposed project include pond siting to minimize or completely avoid impacts to wetlands and protected species occurring within the project area. The Alternatives Analysis can be found in Section 5 of the Preliminary Engineering Report (PER) within the project file.

3.7 Wetlands Finding

The Preferred Alternative was evaluated for impacts to wetlands in accordance with EO 11990 and USDOT Order 5560.1A. The Preferred Alternative will be constructed almost entirely within the existing right-of-way to avoid impacts to wetlands. Unavoidable impacts to wetlands and surface waters outside of the existing right-of-way include impacts to unnamed systems immediately abutting the existing right-of-way that, due to the horizontal geometry of the preferred alternative or the establishment of FPC sites, cannot be avoided. In order to minimize impacts to wetlands, the roadway preferred alternative is located within the existing right-of-way as much as is practicable and proposed stormwater ponds are located in upland areas wherever practicable.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. The proposed project will have no significant short-term or long-term impacts to wetlands.

3.8 Conceptual Mitigation

Wetland impacts which will result from the construction of this project will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and U.S.C. §1344. Compensatory mitigation for this project will be completed through the use of mitigation banks and any other mitigation options that satisfy state and federal requirements.

The study area is located within the Peace River Regulatory Basin. There are multiple mitigation banks within this basin, including the Peace River Mitigation Bank, Horse Creek Mitigation Bank, Boran Ranch Mitigation Bank, and Tippen Bay Wetland Mitigation Bank with forested and herbaceous credits available for both state and federal mitigation, according to the mitigation ledgers available to the public. Multiple banks may be needed to fulfil the mitigation requirements depending on the availability of credits during permitting.

SECTION 4 ESSENTIAL FISH HABITAT

The National Marine Fisheries Service (NMFS) is the regulatory agency responsible for the nation's living marine resources and their habitats, including essential fish habitat (EFH). This authority is designated by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended. The MSFCMA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)].

In accordance with the MSFCMA, Section 7 of the ESA, and the Essential Fish Habitat chapter of the FDOT's PD&E Manual, the SR 544 Road Study Area was evaluated for potential EFH. According to the ETDM Summary Report No. 5873, dated May 28, 2020, NMFS staff concluded that the project will not impact EFH. The proposed project will have no involvement with EFH resources.

SECTION 5 ANTICIPATED PERMITS

FDOT construction and maintenance activities are regulated by numerous environmental laws and regulations administered by state and federal agencies. These agencies have established environmental programs to conserve, protect, manage, and control the air, land, water and natural resources of the state or U.S. The following is a list of anticipated permits needed from the state and federal agencies for the proposed project.

5.1 State 404 Permit

Section 404 of the CWA established a program to regulate the discharge of dredge or fill material into the waters of the United States, including wetlands. Responsibility for Section 404 was previously administered by the USACE. However, the State of Florida requested and was granted authority on December 22, 2020 (85 FR 83553), to operate the Section 404 Program for work in most non-tidal waters in the state. The State 404 Program is administered by the FDEP. All waters of the United States with potential to be impacted by the proposed project are not retained by the USACE and are therefore assumed by FDEP. Based on the amount of wetland and surface water impacts, a State 404 Individual Permit is anticipated.

5.2 Biological Opinion/Incidental Take Permit

The ESA of 1973, as amended, requires all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the ESA. Section 7(a)(2) of the ESA is the mechanism by which Federal agencies ensure the action they take, including those they fund or authorize (i.e., Federal permit), do not jeopardize the existence of any listed species. When a federal action "may affect and is likely to adversely affect" a listed endangered or threatened species, the lead Federal agency submits a request to the USFWS for formal consultation. Then the USFWS prepares a Biological Opinion (BO) on whether the proposed activity will jeopardize the continued existence of a listed species. This process would occur during

Clean Water Act § 404 Dredge and Fill permitting if jurisdictional wetlands to waters of the U.S. would be impacted by the proposed project. Otherwise, an incidental take permit (ITP) would be necessary under Section 10(a)(1)(B) of the ESA for impacts to federally listed species without nexus to a federal action. A Habitat Conservation Plan is required as part of an ITP from the USFWS. As the project does include federal funds, the Federal action used to initiate ESA Section 7 consultation will be Clean Water Act § 404 Dredge and Fill permitting review by the FDEP with the FWC being responsible for the federal wildlife review, following the assumption of a portion of the CWA 404 program from the USACE in December 2020.

Due to the presence of suitable sand skink habitat, the project "**may affect and is likely to adversely affect**" the sand skink and blue-tailed mole skink. A BO would be required if survey results found them to be present within the project area.

5.3 NPDES Permit

As authorized by the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The Environmental Protection Agency (EPA) delegated its authority to implement the NPDES program to the FDEP. This permit is required because the proposed project will disturb more than one acre of land, and the stormwater runoff will discharge to waters of the state. A Stormwater Pollution Prevention Plan (SWPPP) is required to be developed as part of the NPDES and implemented during construction. The objectives of the SWPPP are to prevent erosion where construction activities occur, prevent pollutants from mixing with stormwater, and prevent pollutants from being discharged by trapping them on-site, before they can affect the receiving waters. The contractor will be responsible for obtaining the NPDES permit. The applicant must submit a Notice of Intent with the FDEP at least two days prior to the commencement of construction.

5.4 Environmental Resource Permit

FDEP and Florida's five Water Management Districts implemented Chapter 62-330, F.A.C, Environmental Resource Permitting (ERP) to govern certain regulated activities, such as works in waters of the state, including wetlands, and construction of stormwater management systems. The proposed project is located within the jurisdiction of the SWFWMD. The proposed project is expected to require an ERP for a stormwater management plan and impacts to wetlands and other surface waters. Additionally, according to the SSL determination, title to the submerged lands below the ordinary high water line of Lake Conine, Lake Smart, and Lake Fannie is held by the Board of Trustees. Any work performed below the ordinary high water line in these areas may require an SSL easement. In the event additional SSL easements are needed, this will be addressed during the permitting phase.

5.5 Gopher Tortoise Relocation Permit

Gopher tortoises and their burrows are protected by Chapter 68A-27.003, F.A.C. A gopher tortoise relocation permit must be obtained from the FWC before disturbing burrows or if construction activities occur within 25 feet of a gopher tortoise burrow. The number of gopher tortoise burrows located within 25 feet of the project footprint will determine the type of gopher tortoise relocation permit that is needed. A 100% gopher tortoise survey will be completed during the design of the project to finalize potential permit needs. Surveys, permitting, excavation, and relocation must be performed by an FWC Authorized Gopher Tortoise Agent.

SECTION 6 CONCLUSIONS

The Preferred Alternative will provide additional capacity on SR 544, consistent with existing long-range transportation plans for the roadway and region and the stated purpose and need for this PD&E Study. The Preferred Alternative will avoid and minimize impacts to wetlands, protected species, and their habitats to the greatest extent practicable. However, due to the assumed presence of skinks, the Preferred Alternative "**may affect and is likely to adversely affect**" the sand skink and blue-tailed mole skink, but through commitments to conduct surveys and provide conservation measures and/or mitigation as needed, it is expected that the project will not likely jeopardize the continued existence of these species. **Table 6-1** identifies the species that were evaluated in this document, including project effect determinations. Additional coordination with the appropriate agencies during the design and permitting phase and additional surveys will be required prior to or during construction. No EFH is located within or adjacent to the project area. Therefore, no involvement with EFH resources is anticipated.

Table 6-1: Effect Determinations for Protected Species

Scientific Name	Common Name	Status	Effect Determination
Birds			
Ammodramus savannarum floridanus	Florida Grasshopper Sparrow	FE	NO EFFECT
Aphelocoma coerulescens	Florida Scrub-jay	FT	NO EFFECT
Athene cunicularia floridana	Burrowing Owl	ST	NAEA
Egretta caerulea	Little Blue Heron	ST	NAEA
Egretta tricolor	Tricolored Heron	ST	NAEA
Falco sparverius paulus	Southeastern American Kestrel	ST	NAEA
Grus canadensis pratensis	Florida Sandhill Crane	ST	NAEA
Haliaeetus leucocephalus	Bald Eagle	BGEPA/MGTA	--
Laterallus jamaicensis jamaicensis	Eastern Black Rail	FT	MANLAA
Mycteria americana	Wood Stork	FT	MANLAA
Platalea ajaja	Roseate Spoonbill	ST	NAEA
Polyborus plancus audubonii	Audubon's Crested Caracara	FT	MANLAA
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	MANLAA
Mammals			
Eumops floridanus	Florida Bonneted Bat	FE	NO EFFECT
Perimyotis subflavus	Tricolored Bat	C	--
Sciurus niger niger	Southern Fox Squirrel	M	--
Ursus americanus floridanus	Florida Black Bear	M	--
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	MANLAA
Eumeces egregious lividus	Blue-tailed Mole Skink	FT	MALAA
Gopherus polyphemus	Gopher Tortoise	ST	NAEA
Pituophis melanoleucus mugitis	Florida Pine Snake	ST	NAEA

Scientific Name	Common Name	Status	Effect Determination
Neoseps reynoldsi	Sand Skink	FT	MALAA
Plants			
Bonamia grandiflora	Florida Bonamia	FT/SE	NO EFFECT
Calamintha ashei	Ashe's Savory	ST	NAEA
Calopogon mutliflorus	Many-flowered Grass-pink	ST	NAEA
Carex chapmanni	Chapman's sedge	ST	NAEA
Centosema Arenicola	Sand Butterfly Pea	SE	NAEA
Chionanthus pygmaeus	Pygmy Fringe-tree	FE	NO EFFECT
Clitoria fragrans	Pigeon Wings	FT/SE	NO EFFECT
Coelorachis tuberculosa	Piedmont Jointgrass	ST	NAEA
Coleataenia abscissa	Cutthroatgrass	SE	NAEA
Conradia brevifolia	Short-leaved Rosemary	FE	NO EFFECT
Crotalaria avonensis	Avon Park Harebells	FE	NO EFFECT
Dicerandra frutescens	Scrub Mint	FE	NO EFFECT
Eriogonum longifolium	Scrub Buckwheat	FT/SE	NO EFFECT
Plants (continued)			
Hartwrightia floridana	Hartwrightia	ST	NAEA
Hypericum cumulicola	Highlands Scrub Hypericum	FE	NO EFFECT
Illicium parviflorum	Star Anise	SE	NAEA
Lechea cernua	Nodding Pinweed	ST	NAEA
Liatris ohlingerae	Florida Blazing Star	FE	NO EFFECT
Lupinus aridorum	Scrub Lupine	FE	NO EFFECT
Matelea floridana	Florida Spiny-pod	SE	NAEA
Nemasylis floridana	Celestial Lily	SE	NAEA
Nolina atopocarpa	Florida Beargrass	ST	NAEA
Nolina brittoniana	Britton's Beargrass	FE	NO EFFECT
Paronychia chartacea	Papery Witlow-wort	FT/SE	NO EFFECT
Polygala lewtonii	Lewton's Polygala	FE	NO EFFECT
Polygonella basiramia	Wireweed (Florida Jointweed)	FE	NO EFFECT
Polygonella myriophylla	Sandlace (Small's Jointweed)	FE	NO EFFECT
Prunus geniculate	Scrub Plum	FE	NO EFFECT
Pteroglossaspis ecristata	Giant Orchid	ST	NAEA
Salix floridana	Florida Willow	SE	NAEA
Warea amplexifolia	Clasping Warea	FE	NO EFFECT
Warea carteri	Carter's Mustard (Cater's Warea)	FE	NO EFFECT
Ziziphus celata	Florida Ziziphus	FE	NO EFFECT

MALAA = May Affect, Likely to Adversely Affect **MANLAA** = May Affect, Not Likely to Adversely Affect
NAEA = No Adverse Effect Anticipated **NEA** = No Effect Anticipated
FE = Federally Endangered **FT** = Federally Threatened **SE** = State Endangered **ST** = State Threatened
M = Managed **C** = Candidate
BGEPA = Bald and Golden Eagle Protection Act **MGTA** = Migratory Bird Treaty Act

The Preferred Alternative will result in unavoidable wetland and other surface water impacts (**Table 6-2**). During the design phase, the final impacts will be determined, and the appropriate mitigation will be calculated to satisfy the requirements of 33 U.S.C. § 1344 and Part IV of Chapter 373, F.S.

Table 6-2: Proposed Project Wetland and OSW Impacts Summary

Total Direct WL Impacts	Total Direct OSW Impacts (ac.)	Total Secondary Impacts (ac.)	Total Functional Loss (units)
14.11 acres	**2.66 acres**	**10.03**	**7.039**

6.1 Implementation Measures/Design Considerations

To ensure the project will not adversely affect protected species or contribute to water quality degradation, the following measures will be implemented:

- Surveys for gopher tortoise burrows, as well as commensal species, will be conducted during the design phase and permits to relocate tortoises and commensals as appropriate will be obtained from the FWC.
- Surveys for the Florida burrowing owl will be conducted during the design phase. If it is determined individuals or nest areas are found and could be impacted by the project, FDOT will coordinate with FWC to determine appropriate avoidance and minimization measures to apply during construction.
- Surveys for Florida sandhill crane nest sites will be conducted during the design phase. If it is determined nest areas are found and could be impacted by the project, FDOT will coordinate with FWC to determine appropriate avoidance and minimization measures to apply during construction.
- Surveys for the Southeastern American kestrel will be conducted during the nesting season (May through August) in the design phase. If it is determined nest areas are found and could be impacted by the project, FDOT will coordinate with FWC to determine appropriate avoidance and minimization measures to apply during construction.
- FDOT will provide mitigation for wetland impacts resulting from project design and construction per 373.4137, F.S. and 33 U.S.C. § 1344.
- Apply erosion and sediment controls and other best management practices prior to and throughout construction to prevent adverse impacts to wetland and aquatic resources adjacent to the project area.
- Surveys to update locations of active osprey and bald eagle nest sites will be conducted during the design phase, and permits will be acquired if there will be unavoidable impacts during construction. Coordination with USFWS and FWC will take place as necessary.

6.2 Commitments

To ensure the project will not adversely affect protected species and their habitats, the following commitments will be implemented:

- A survey will be conducted for sand skinks in suitable sand skink habitat per USFWS protocol during the design phase. Consultation with USFWS will be reinitiated at this time.
- The most recent version of the USFWS *Standard Protection Measures for the Eastern Indigo Snake* will be utilized during project construction.
- The FDOT will conduct a foraging prey base analysis during design.
- The FDOT will provide mitigation for impacts to wood stork SFH within the Service Area of the USFWS-approved wetland mitigation bank or wood stork conservation bank.
- If the listing status of the tricolored bat is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area, FDOT commits to re-initiating consultation with the USFWS to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the tricolored bat.

6.3 Agency Coordination

6.3.1 Prior Coordination

Comments from the ETAT were provided in the ETDM Summary Report No. 5873, dated May 22, 2020. ETAT members submitted comments related to protected species and their habitats, noting the need for protected species surveys and coordination during the PD&E Study, and implementation of protection measures during construction. ETAT members also commented on potential impacts to wetlands and surface waters, noting the need to avoid and/or minimize impacts to wetlands, document cumulative impact criteria, meet water quality and quantity requirements, and implement proper best management practices during construction. Through the PD&E process, the FDOT has continued to meet with and address the concerns from the commenting agencies as documented in this report.

Species-specific surveys were conducted for the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, and skinks. Coordination with the USFWS was conducted for survey requirements and methodology approval. Agency coordination documentation is included in **Appendix D**.

6.3.2 Continuing Coordination

Agency coordination will continue during and throughout the design phase of the project when environmental permitting typically occurs. Environmental permits will be required from the FDEP and SWFWMD, and possibly FWC, for the proposed project. Permit applications will be reviewed by the regulatory agencies for potential impacts to environmental resources. During the

permitting process, the regulatory agencies will likely request input from the commenting agencies to ensure consistency with regulatory criteria under their purview. Consultation with, or technical assistance by the USFWS shall be required for potential impacts to federally protected species, particularly skinks and wood stork.

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APPENDIX A

Land Use and Habitat Descriptions

Urban and Built-up (FLUCFCS 100)

This land use type consists of areas of intensive use with much of the land occupied by man-made structures. Residential, commercial, recreational, industrial, and institutional developments are included in this category. Within the project corridor, identified Urban land uses include: Low Density Residential (FLUCFCS 110), Low Density Residential Under Construction (FLUCFCS 119), Medium Density Residential (FLUCFCS 120), High Density Residential (FLUCFCS 130), Commercial and Services (FLUCFCS 140), Industrial (FLUCFCS 150), Institutional (FLUCFCS 170), Recreational (FLUCFCS 180), Golf Courses (FLUCFCS 182), and Open Land (FLUCFCS 190). This FLUCFCS type is found throughout the project corridor. The densest Urban and Built-up land uses occur toward the beginning of the project and the project terminus. The majority of these areas lack natural habitat, and as a result provide little to no habitat for listed species.

Agriculture (FLUCFCS 200)

Agricultural lands are lands which are cultivated to produce food crops and livestock. Included in this category are pastures, crops, citrus groves, nurseries and orchards. Within the project corridor, identified Agriculture land uses include: Cropland and Pastureland (FLUCFCS 210), Tree Crops (FLUCFCS 220), and Other Open Rural Lands (FLUCFCS 260).

Agriculture lands occur sporadically throughout the project corridor. Agriculture lands occurring adjacent to the roadway primarily include pastureland and tree crops. Pasturelands are dominated by herbaceous species and grasses associated with active cattle grazing, with minimal canopy and shrub species. These agricultural lands provide large areas of undeveloped land which provide valuable foraging habitat for listed species and common wildlife species.

Rangeland (FLUCFCS 300)

Rangeland is defined as “land where the potential natural vegetation is predominantly grasses, grass-like plants, forbs or shrubs and is capable of being grazed.” This category includes herbaceous (dry prairie), shrub and brushland, and mixed rangeland. Within the project corridor, identified Rangeland includes: Herbaceous (dry prairie) (FLUCFCS 310), and Shrub and Brushland (FLUCFCS 320).

There are only a few instances where rangelands occur within the project corridor and only two times where it occurs immediately adjacent to SR 544. Vegetation in these areas include native grasses, forbs, and shrubs. These rangelands provide large areas of undeveloped land which provide valuable foraging habitat for listed species and common wildlife species.

Upland Forests (FLUCFCS 400)

Upland Forests consists of upland areas which support a tree canopy closure of ten percent or more. This category includes both xeric and mesic forest communities. Within the project corridor, identified Upland Forests include: Pine Flatwoods (FLUCFCS 411), Upland Hardwood Forests (FLUCFCS 420), Hardwood Conifer Mixed (FLUCFCS 434), and Tree Plantations (FLUCFCS 440).

This FLUCFCS type occurs sporadically throughout the project corridor, however, Hardwood Conifer Mixed and Tree Plantations occur immediately adjacent to the roadway. The upland forests within the project corridor provide valuable foraging habitat for listed species and common wildlife species.

Water (FLUCFCS 500)

Water includes all areas within the land mass of the United States that are predominantly or persistently water covered. Within the project corridor, identified water types include: Streams and Waterways (FLUCFCS 510), Lakes (FLUCFCS 520), and Reservoirs (FLUCFCS 530). This land use type occurs throughout the project corridor and consists of Lake Conine, Lake Smart, Lake Rochelle, Lake Fannie, Lake Lucerne, Lake Henry, Lake Hamilton, Middle Lake Hamilton, Little Lake Hamilton, Lake Butler, Engineers Lake, Lake Eva, canals, and stormwater ponds. These areas provide valuable foraging and nesting habitat for listed species, including the Everglade Snail Kite and wading birds.

Wetlands (FLUCFCS 600)

Wetlands consist of areas where the water is at, near or above the land surface for a significant portion of most years. This category includes forested and non-forested wetlands. Within the project corridor, identified Wetlands include: Stream and Lake Swamps (Bottomland) (FLUCFCS 615), Wetland Coniferous Forests (FLUCFCS 620), Wetland Forested Mixed (FLUCFCS 630), Freshwater Marshes (FLUCFCS 641), Wet Prairies (FLUCFCS 643), Emergent Aquatic Vegetation (FLUCFCS 644), and Intermittent Ponds (FLUCFCS 653).

Forested and non-forested wetlands are common throughout the project corridor. Wetland Forested Mixed is the most common forested wetland community in the study area. Forested wetland systems are categorized as Wetland Forested Mixed when neither hardwoods nor conifers achieve a 66 percent dominance. Vegetation within these areas include a canopy comprised of red maple (*Acer rubrum*), cabbage palm (*Sabal palmetto*), sweet bay (*Magnolia virginiana*), black gum (*Nyssa sylvatica*), and earpod tree (*Enterolobium contortisiliquum*). Understory and groundcover species include Brazilian pepper (*Schinus terebinthifolia*), Carolina willow (*Salix caroliniana*), elderberry (*Sambucus nigra*), caesarweed (*Urena lobata*), saltbush (*Atriplex pentandra*), cinnamon fern (*Osmundastrum cinnamomeum*), ragweed (*Ambrosia artemisiifolia*), beggarticks (*Bidens alba*), primrose willow (*Ludwigia* spp.), and sedges (*Cyperus* spp.).

Freshwater Marshes are the most common non-forested wetland systems within the study area. A freshwater marsh is characterized by consisting of one or more perennial, forb, or shrub rather than trees. Freshwater marshes within the study area contain vegetation including bushy bluestem (*Andropogon glomeratus*), lizard's tail (*Saururus cernuus*), primrose willow, dollarweed (*Hydrocotyle* spp.), paragrass (*Urochloa mutica*), and rushes (*Juncus* spp.). Both forested and non-forested wetlands provide valuable habitat for listed species.

Barren Land (FLUCFCS 700)

Barren Land has very little or no vegetation and limited potential to support vegetative communities. Within the project corridor, identified Barren Land includes Disturbed Land (FLUCFCS 740). Disturbed lands are categorized as having been changed primarily by human activities other than mining. Disturbed lands occur three times within the study area, however, it only occurs once immediately adjacent to SR 544. This area is toward the center of the project corridor and appears to be used for holding sand and other construction materials. Disturbed lands provide little to no habitat for listed species.

Communication, Transportation, and Utilities (FLUCFCS 800)

Roads and Highways (FLUCFCS 814) and Utilities (FLUCFCS 830) both occur within the study area. Roads and Highways include areas used for interchanges, limited access of rights-of-way, and service facilities. Roads and Highways within the project area include SR 544 and SR 27.

Utilities generally include facilities used for water treatment or generating power. This land use type occurs 3 times within the study area; a water treatment plant located north of the start of the project, an energy plant located north of SR 544 toward the center of the project, and a water treatment plant north of the end of the project.

APPENDIX B

Photographs

Photo 1: SR 544

Photo 2: Habitat at wetland 1

Photo 3: Habitat at wetland 1

Photo 4: Habitat at wetland 4

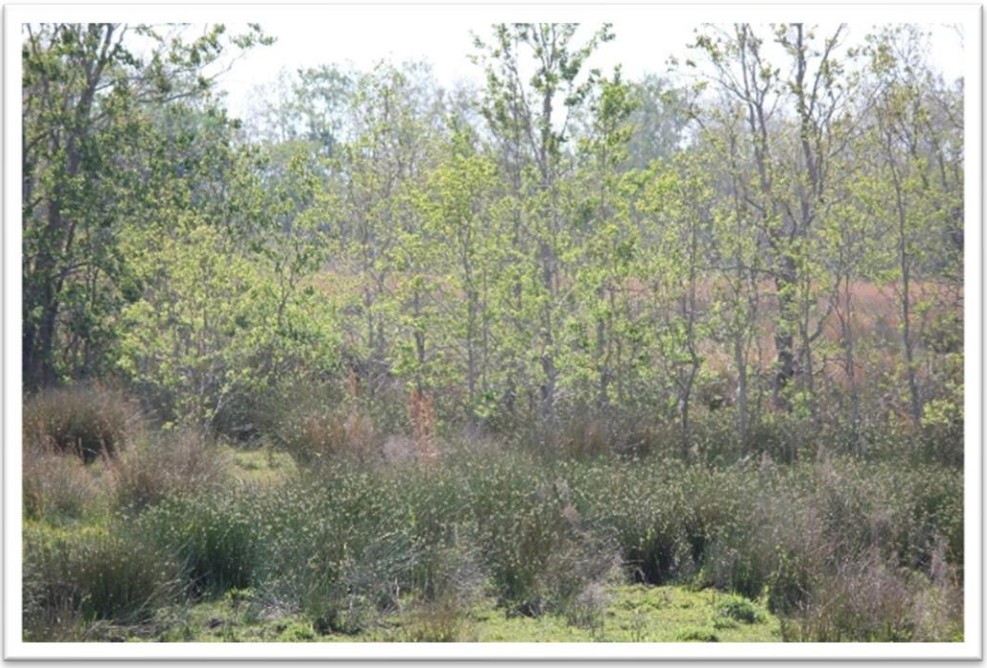

Photo 5: Habitat at wetland 7

Photo 6: Habitat at wetland 9

Photo 7: Habitat at wetland 9 and 544

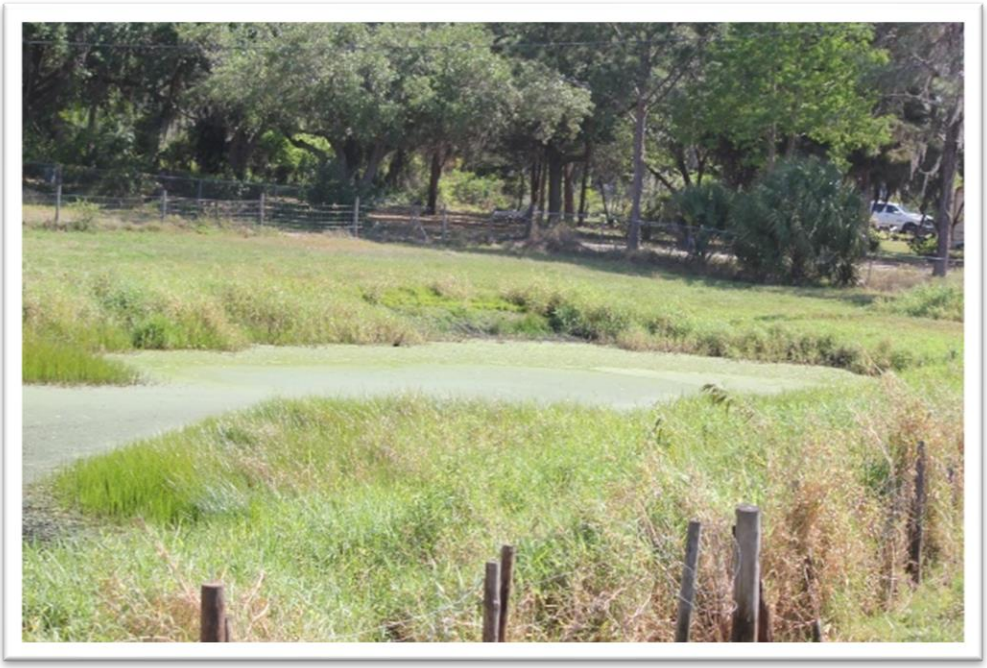

Photo 8: Habitat at wetland 12

Photo 9: Habitat at wetland 15

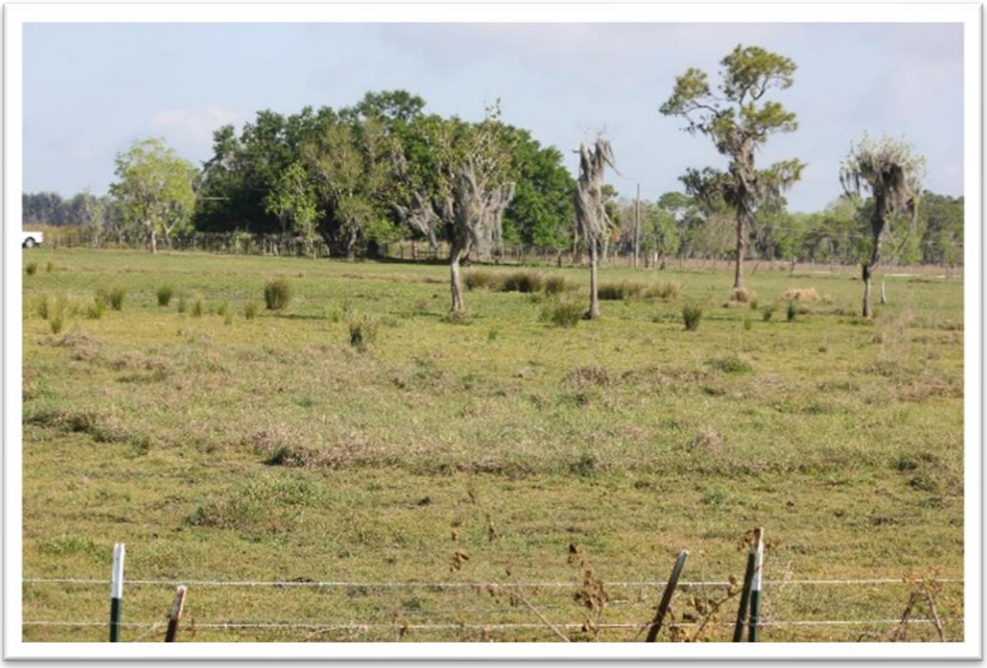

Photo 10: Habitat at wetland 16

Photo 11: Habitat at wetland 17 and 544

Photo 12: Habitat at wetland 18

Photo 13: Habitat at wetland 18 and SR 544

Photo 14: Limpkin

Photo 15: Osprey nest

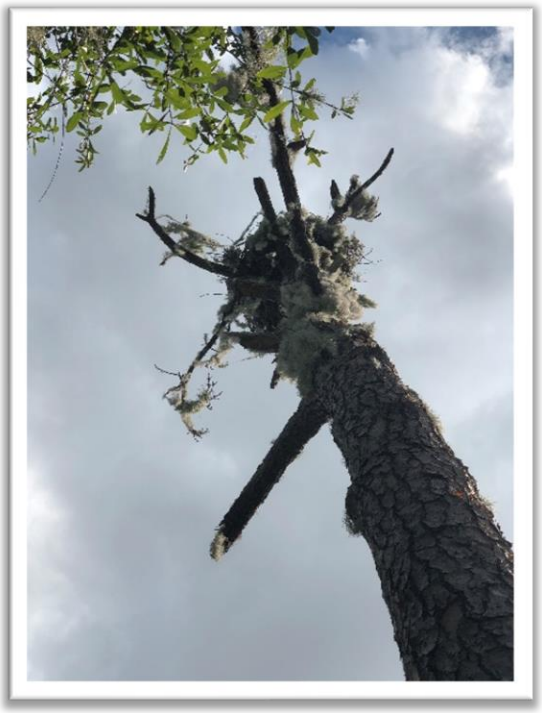

Photo 16: Eagle nest (prior to being destroyed in 2022)

Photo 17: Remnants of eagle nest after Hurricane Ian

Photo 18: Surface water 3

APPENDIX C

NRCS Soil Descriptions

POLK COUNTY SOIL DATA										
Soil Number	Soil Name	Seasonal High Ground Water				Hydric	HSG	Soil Classification		
		Duration (mo.)		Depth (ft)				Depth (Inches)	Unified	AASHTO
		Beg.	End	High	Low					
2	Apopka fine sand, 0 to 5 percent slopes	--	--	>6	>6	No	A	0-51	SP, SP-SM	A-3
								51-80	SM-SC, SC	A-2-4, A-2-6, A-4, A-6
3	Candler sand, 0 to 5 percent slopes	--	--	>6	>6	No	A	0-80	SP, SP-SM	A-3
4	Candler sand, 5 to 8 percent slopes	--	--	>6	>6	No	A	0 - 80	SP, SP-SM	A - 3
7	Pomona fine sand	Jun	Oct	0	1	Yes	B/D	0 - 6	SP, SP-SM	A - 3, A - 2 - 4
								6 - 21	SP, SP - SM	A - 3, A - 2 - 4
								21 - 26	SP - SM, SM	A - 3, A - 2 - 4
								26 - 48	SP, SP - SM, SM	A - 3, A - 2 - 4
								48 - 73	SC, SM - SC, SM	A -2, A - 4, A - 6
								73 - 80	--	--
13	Samsula muck	Jan	Dec	2	0	Yes	B/D	0 - 80	PT	--
14	Sparr sand, 0 to 5 percent slopes	Jul	Oct	1.5	3.5	No	C	0-8	SP-SM, SM	A-3, A-2-4
								8 - 57	SP-SM, SM	A-3, A-2-4
								57 - 80	SM-SC, SC, SM	A-2-4, A-6
15	Tavares fine sand, 0 to 5 percent slopes	Jun	Dec	3.5	6	No	A	0 – 80	SP, SP-SM	A-3
16	Urban Land	--	--	--	--	--	--	--	--	--
17	Smyrna and Myakka fine sands	Jun	Oct	0	1	Yes	B/D	0 – 12	SP, SP-SM	A-3, A-2-4
								12 – 25	SM, SP-SM	A-3, A-2-4
								25 – 42	SP, SP-SM	A-3
								42 – 48	SM, SP-SM	A-3, A-2-4
								48 – 80	SP, SP-SM	A-3
21	Immokalee sand	Jun	Oct	0	1	Yes	B/D	0 - 7	SP, SP-SM	A-3
								7 - 39	SP, SP-SM	A-3
								39 - 58	SP - SM, SM	A-3, A-2-4
								58 - 66	SP, SP-SM	A-3
								66 - 80	SP - SM, SM	A-3
23	Ona fine sand	Jun	Oct	0	1	Yes	B/D	0 - 10	SP -SM, SP	A-3
								10 - 19	SP - SM, SM	A-3, A-2-4
								19 - 50	SP -SM, SP	A-3
								50 - 80	SP - SM, SM	A-3, A-2-4
25	Placid and Myakka fine sands,	Jun	Mar	2	0	Yes	A/D	0 - 18	SP - SM, SM	A-3, A-2-4
								18 - 80	SM, SP-SM	A-3
26	Lochloosa fine sand	Jul	Oct	2.5	5	No	C	0 - 36	SP - SM, SM	A-2-4, A-6
								36 - 80	SC, SM-SC	A - 2, A - 4, A - 6
27	Kendrick fine sand, 0 to 5 percent slopes	--	--	>6	>6	No	A	0 – 29	SP-SM, SM	A-3, A-2-4
								29 – 34	SC, SM-SC	A-2-6, A-2-4
								34 – 64	SC	A-2-6, A-6
								64 – 80	SC, SM-SC	A-2-6, A-2-4
29	St. Lucie fine sand, 0 to 5 percent slopes	--	--	>6	>6	No	A	0 - 80	SP	A - 3
30	Pompano fine sand	Jun	Nov	0	1	Yes	B/D	0 - 80	SP, SP - SM	A - 3, A - 2 - 4
31	Adamsville fine sand	Jun	Nov	2	3.5	No	C	0 - 6	SP - SM	A - 3, A - 2 - 4
								6 - 80	SP -SM, SP	A - 3, A - 2 - 4
32	Kaliga muck	Jan	Dec	1	0	Yes	B/D	0 - 30	PT	--
								30 - 75	SM, SM, - SC, SC, M	A -2, A - 4, A - 6
								75 - 80	SP, SP -SM	A - 3, A - 2 - 4
35	Hontoon muck	Jan	Dec	2	0	Yes	B/D	0 - 75	PT	A -8
								--	--	--
36	Basinger mucky fine sand, depressional	Jun	Feb	2	0	Yes	D	0 - 7	SP, SP -SM	A - 3, A - 2 - 4
								7 - 80	SP, SP -SM	A - 3, A - 2 - 4
38	Electra fine sand	Jul	Oct	2	3.5	No	C	0 - 6	SP, SP -SM	A - 3
								6 - 42	SP, SP -SM	A - 3
								42 - 55	SP - SM, SM	A - 3, A - 2 - 4
								55- 50	SC, SM - SC	A -2, A - 4, A - 6

Soil Number	Soil Name	Seasonal High Ground Water				Hydric	HSG	Soil Classification		
		Duration (mo.)		Depth (ft)				Depth (Inches)	Unified	AASHTO
		Beg.	End	High	Low					
40	Wauchula fine sand	Jun	Oct	0	1	Yes	C/D	0 - 7	SP-SM	A-3, A-2-4
								7 - 18	SP-SM	A-3, A-2-4
								18 - 26	SP - SM, SM	A-3, A-2-4
								26 - 33	SP - SM, SM	A-3, A-2-4
								33 - 80	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6
42	Felda fine sand	Jun	Feb	0	1	Yes	B/D	0 - 22	SP - SM, SM	A-3
								22 - 80	SM, SM-SC, SC	A-2-4, A-2-6
47	Zolfo fine sand	Jun	Nov	2	3.5	Yes	C	0 – 7	SP-SM	A-3, A-2-4
								7 – 80	SP-SM, SM	A-3, A-2-4
49	Adamsville-Urban land complex	Jun	Nov	2	3.5	No	A	0 - 6	SP-SM	A-3, A-2-4
								6 - 80	SP -SM, SP	A-3, A-2-4
50	Candler-Urban land complex, 0 to 5 percent slopes	--	--	>6	>6	No	A	0 - 80	SP, SP -SM	A-3
58	Udorthents, excavated	--	--	--	--	--	--	--	--	--
59	Arents-Urban land complex, 0 to 5 percent slopes	Jan	Dec	1.5	3	No	A	0 - 80	SP, SP -SM	A-3, A-2-4
61	Arents, organic substratum-Urban land complex	Jun	Nov	2	3	No	A	0 - 30	SP, SP -SM	A-3, A-2-4
								30 - 65	PT	A-8
								65 - 80	SP, SP -SM	A-3, A-2-4
63	Tavares-Urban land complex	Jun	Dec	3.5	6	No	A	0 - 8	SP, SP -SM	A-3
								8 - 80	SP, SP -SM	A-3
66	Fort Meades-Urban land complex, 0 to 5	--	--	>6	>6	No	A	0 - 25	SM	A-2-4
								25 - 80	SM	A-2-4
76	Milhopper fine sand, 0 to 5 percent slopes	Jul	Dec	3.5	6	Yes	A	0 – 63	SP-SM, SM	A-3, A-2-4
								63 – 80	SM, SM-SC, SC	A-2-4, A-4

APPENDIX D

Agency Coordination

Jada Barhorst

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Wednesday, October 9, 2019 11:04 AM
To: Jason Houck
Cc: Bennett, Jonathon; Turley, David; David Dangel
Subject: Re: [EXTERNAL] 440273-1 SR 544 (LUCERNE PARK RD) FROM MARTIN LUTHER KING BLVD TO SR 17 ETDM #5873

Jason, I find the proposed survey methodology acceptable. John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

On Wed, Oct 9, 2019 at 10:36 AM Jason Houck <jhouck@inwoodinc.com> wrote:

> John,
>
> Good morning. As a follow up to Jonathon's email, we have developed the attached mythology memo outlining our proposed caracara survey methodology and observation station locations for the upcoming caracara surveys season which will begin in January 2020. Inwood's proposed survey staff all have the requisite experience as caracara observers to conduct the survey.
>
> We are requesting that you review our proposed survey methods as outlined in the memo and provide any feedback or concerns that you might have. If there are none, we respectfully ask that you provide concurrence with the memo.
>
> Thanks,
>
> Jason
>
> **Jason Houck, GISP, PWS**
>
> **ASSOCIATE PRINCIPAL - ECOLOGICAL SERVICES MANAGER**
>
> **FWC Authorized Gopher Tortoise Agent**
>
> _____
>
> ***INWOOD CONSULTING ENGINEERS***
>
> 3000 Dovera Dr., Suite 200, Oviedo, FL 32765

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D: 407-542-0129

F: 407-971-8955

C: 321-202-3907

www.inwoodinc.com

Please consider the environment before printing this e-mail

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Tuesday, October 8, 2019 1:48 PM
To: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Cc: Turley, David <David.Turley@dot.state.fl.us>; David Dangel <ddangel@inwoodinc.com>; Jason Houck <jhouck@inwoodinc.com>
Subject: Re: [EXTERNAL] 440273-1 SR 544 (LUCERNE PARK RD) FROM MARTIN LUTHER KING BLVD TO SR 17 ETDM #5873

Jonathon, if the project footprint is located with 1,000 feet of suitable nesting sites (i.e., single, or scattered cabbage palms or clumps of cabbage palms), and provided that there is suitable foraging

habitat (e.g., pasture or other suitable habitat types) located between the project footprint and the potential nest sites, then nest surveys should be conducted in these areas based on the Service's guidance

to determine the status of carcara nesting. If you have any questions, please let me know.

John

John M. Wrublik

U.S. Fish and Wildlife Service

1339 20th Street

Vero Beach, Florida 32960

Office: (772) 469-4282

Fax: (772) 562-4288

email: John_Wrublik@fws.gov

On Tue, Oct 8, 2019 at 11:35 AM Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us> wrote:

> Mr. Wrublik,

The FDOT is beginning a PD&E study along SR 544 in Polk County from Martin Luther King Blvd to SR 17 (please see the attached location map below). The project corridor is located within the USFWS Consultation Area for the Audubon's crested caracara, as well as several other federally listed species. Regarding the caracara, in reviewing FDOT's data, the closest documented caracara nest is approximately ten miles east of the current eastern terminus of the study (see map below), that data was recorded in 2006. While much of the project corridor is developed or is actively being developed, portions of the corridor do contain suitable habitat for caracara nesting and foraging according to the current Species Conservation Guidelines – South Florida. These areas are limited primarily to portions of SR 544 immediately east and west of the intersection with US 27 towards the eastern end of the project. The FDOT is requesting technical assistance regarding the need to complete caracara nesting/foraging surveys utilizing the methods outlined in the 2016-2017 survey protocol. It is our intention, upon completion of the draft Natural Environment Report, to request concurrence from your office on the effect determinations assigned to all federally-listed species and, if necessary, initiate formal consultation under Section 7 of the ESA in the event the project is anticipated to adversely affect a federally-listed species or its habitat. If it would be beneficial to set up a field review we would be glad to meet you on site. Below is the ETDM comment on Wildlife and Habitat from the FWS made on 08/23/2019:

Direct Effects

Identified Resources and Level of Importance:

Federally listed species and fish and wildlife resources

Comments on Effects to Resources:

Federally-listed species -

The Service has reviewed our Geographic Information Systems (GIS) database for recorded locations of federally listed threatened and endangered species on or adjacent to the project study area. The GIS database is a compilation of data received from several sources. Based on review of our GIS database, the Service notes that the following federally listed species may occur in or near the project area.

Wood Stork

The project corridor is located in the Core Foraging Area (CFA; all lands within 18.6 miles) of several active nesting colonies of the endangered wood stork (*Mycteria americana*). The Service believes that the loss of wetlands within a CFA due to an action could result in the loss of foraging habitat for the wood stork. To minimize adverse effects to the wood stork, we recommend that any lost foraging habitat resulting from the project be replaced within the CFA of the affected nesting colony. Moreover, wetlands provided as mitigation should adequately replace the wetland functions lost as a result of the action. The Service does not consider the preservation of wetlands, by itself, as adequate compensation for impacts to wood stork foraging habitat, because the habitat lost is not replaced. Accordingly, any wetland mitigation plan proposed should include a restoration, enhancement, or creation component. In some cases, the Service accepts wetlands compensation located outside the CFA of the affected wood stork nesting colony. Specifically, wetland credits purchased from a "Service Approved" mitigation bank located outside of the CFA would be acceptable to the Service, provided that the impacted wetlands occur within the permitted service area of the bank.

For projects that impact 5 or more acres of wood stork foraging habitat, the Service requires a functional assessment be conducted using our "Wood Stork Foraging Analysis Methodology" (Methodology) on the foraging habitat to be impacted and the foraging habitat provided as mitigation. The Methodology can be found at: https://www.fws.gov/verobeach/BirdsPDFs/20120712_WOST Forage Assessment Methodology_Appendix.pdf.

Federally listed skinks

The project corridor is located in the geographic range and the Service's consultation Area for the threatened sand skink (*Plestiodon reynoldsi* = *Neoseps reynoldsi*) and bluetailed mole skink (*Plestiodon egregious lividus* = *Eumeces*

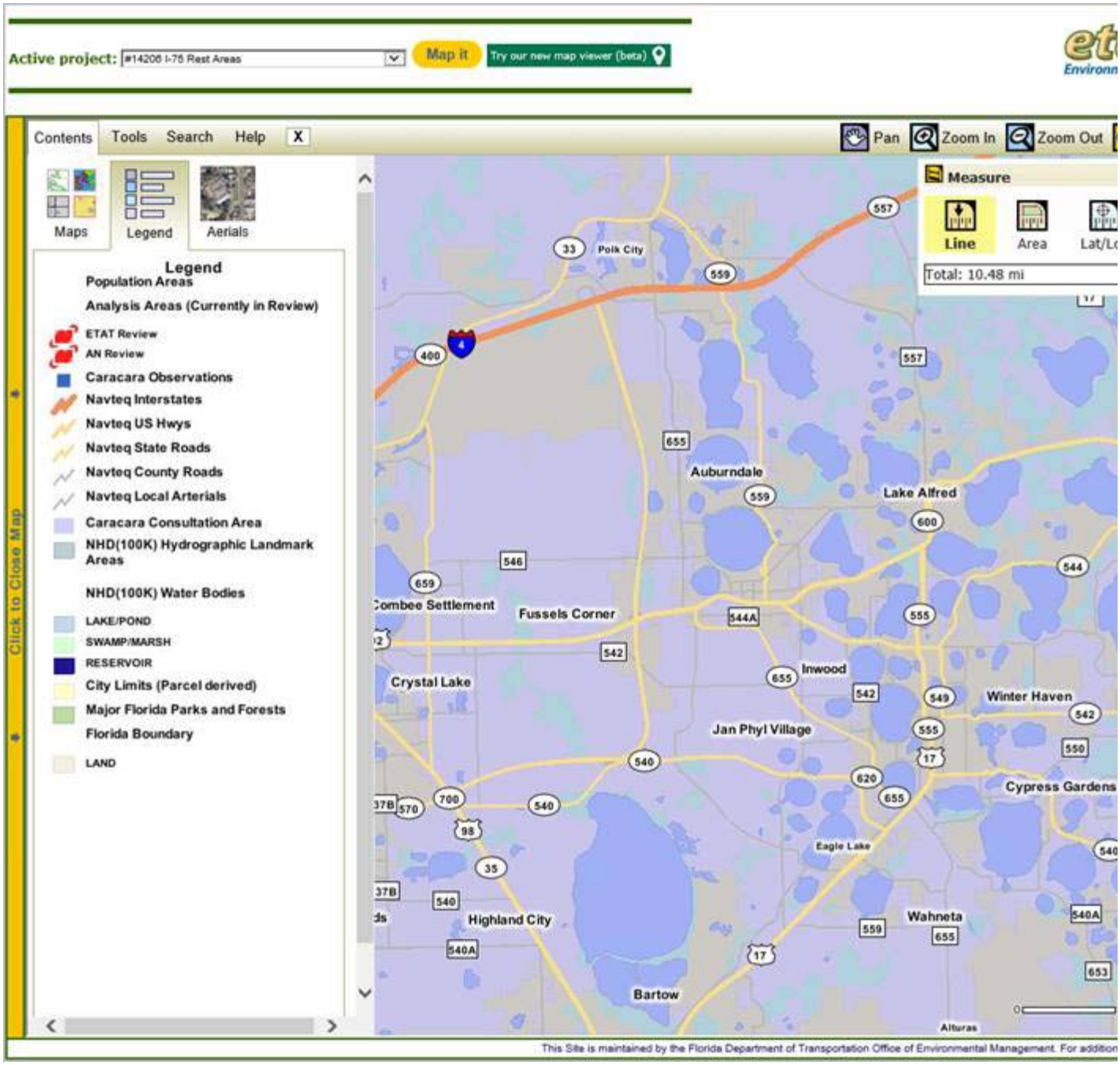
egregious lividus). If suitable skink soils occur within the project footprint, we recommend that coverboard suveys based on the Service's survey guidance be conducted to determine the status of these species.

The Service also believes that the following federally listed species have the potential to occur in or near the project site: Audubon's crested caracara (*Caracara cheriway* = *Polyborus plancus audubonii*), Eastern indigo snake (Drymarchon corais couperi), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida scrub-jay (*Aphelocoma coerulescens*), and Federally listed plants (http://www.fws.gov/verobeach/ListedSpeciesPlants.html). Accordingly, the Service recommends that the Florida Department of Transportation (FDOT) prepare a Biological Assessment for the project (as required by 50 CFR 402.12) during the FDOT's Project Development and Environment process.

Fish and Wildlife Resources -

To benefit fish and wildlife, we recommend that native plants, trees and shrubs be used in the landscaping of the lands within the center and outside right-of-ways of the roadway. The use of native wildflowers would be especially beneficial to insect pollinators and provide a more aesthetically pleasing environment than sod by itself.

Wetlands provide important habitat for fish and wildlife and may occur within and near the project site. We recommend that these valuable resources be avoided to the greatest extent practicable. If impacts to these wetlands are unavoidable, we recommend the Florida Department of Transportation provide mitigation that fully compensates for the loss of these important resources.



Thank you for your guidance,

Jonathon A. Bennett

Environmental Project Manager

Florida Department of Transportation District One

801 North Broadway Avenue

Bartow, Florida 33830

Office – (863) 519-2495

Jonathon.Bennett@dot.state.fl.us

Jada Barhorst

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Wednesday, January 8, 2020 11:37 AM
To: Wrublik, John
Cc: Turley, David; David Dangel; Ben Shepherd; Jason Houck; Mark Hales
Subject: 440273-1 SR 544 (LUCERNE PARK RD) FROM MARTIN LUTHER KING BLVD TO SR 17 ETDM #5873
Attachments: Figure_1_Project_Location_Map.pdf; Figure_2_Snail_Kite_Habitat.pdf; Figure_3 _FBB_Consultation_Area.pdf

Mr. Wrublik,

The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) Study to evaluate alternatives for widening State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard (Avenue T NW) to SR 17 in Polk County. The proposed project is approximately 8 miles long and is located within Sections 01, 09, 16, 10, 11, 12, Township 28S, Range 26E and Sections 04, 05, 06, Township 28S, Range 27E. A project location map (**Figure 1**) is included as part of this correspondence.

Everglade Snail Kite

The project area is located within the U.S. Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Everglade snail kite (*Rostrhamus sociabilis*). Inwood Consulting Engineers, Inc. (Inwood) is preparing to conduct a snail kite survey in the project area. Based on preliminary field reviews of the project area, Inwood is proposing to visually survey suitable habitat (**Figure 2**) for the Florida snail kite between January and May of 2020. Suitable habitat for the snail kite includes habitats for both foraging and nesting. Foraging habitat can be described as being relatively shallow vegetated wetland systems, often in either expansive marsh systems or within the littoral zones of lakes. Ideal vegetation within these areas include bulrushes, spike rushes, and maidencane as these create ideal habitat for the apple snail, the preferred diet of the snail kite. Suitable nesting habitat for the snail kite almost always occurs over open water (0.2-1.3 meters deep) and greater than 150 meters from uplands. Vegetation in nesting habitat can include native and exotic species of both trees and shrubs, including but not limited to willow, cypress, melaleuca, sweetbay, Brazilian pepper, button bush, and elderberry. Nesting can also occur in herbaceous vegetation consisting of bulrush and cattail.

A buffer of 300-meters was utilized to accommodate both the roadway and potential pond site locations. Observation stations were established during field review based on these limits and best line of site. These stations allow for biologists to field adjust as necessary throughout the course of the survey.

The biologists will visually survey suitable habitat utilizing binoculars and a Nikon PROSTAFF 5 scope with 16-48 power. Observations will be documented on data sheets and aerial maps. Onsite communication between observers will be conducted through the use of cell phones and two- way radios.

Florida Bonneted Bat

The project area is located within the northern limits of the USFWS's CA for the Florida bonneted bat (*Eumops floridanus*). Based on preliminary research and existing land use information, the project corridor is located between residential development as well as open fields, upland and wetland habitats, and open water associated with the Winter Haven Chain of Lakes. We request technical assistance to determine if surveys will be required and whether they will necessitate full acoustic surveys given the proximity of the project to development and the upper limits of the CA (**Figure 3**).

Please review the proposed Everglade snail kite methodology and Florida bonneted bat survey question, above, and the attached figures, and provide concurrence that these are acceptable to USFWS. We appreciate your cooperation.

Thank you,

Jonathon A. Bennett
Environmental Project Manager
Florida Department of Transportation District One
801 North Broadway Avenue
Bartow, Florida 33830
Office – (863) 519-2495
Jonathon.Bennett@dot.state.fl.us

Jada Barhorst

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Tuesday, January 14, 2020 1:17 PM
To: Jason Houck
Cc: Turley, David; David Dangel; Ben Shepherd; Mark Hales
Subject: FW: 440273-1 SR 544 from MLK blvd to SR 17
Attachments: 440273-1 SR 544 (LUCERNE PARK RD) FROM MARTIN LUTHER KING BLVD TO SR 17 ETDM #5873

Jason,

Wrublik's response is below.

Jonathon A. Bennett
Environmental Project Manager
Florida Department of Transportation District One
801 North Broadway Avenue
Bartow, Florida 33830
Office – (863) 519-2495
Jonathon.Bennett@dot.state.fl.us

From: Wrublik, John [mailto:john_wrublik@fws.gov]
Sent: Tuesday, January 14, 2020 12:19 PM
To: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Subject: SR 544 from MLK blvd to SR 17

Jonathon,

Everglade snail kite - The survey methods proposed to assess Everglade snail kite nesting are acceptable to the Service

Florida bonneted bat (FBB) - I looked at the project site on Google Earth Pro and it appears that the project may impact forested parcels that could provide roosting habitat for the FBB. The Service's 2019 FBB Consultation Key (https://www.fws.gov/verobeach/ProgrammaticPDFs/20191022_letter_ServicetoCorps_FBB-ProgrammaticKey.pdf),
see page 6, recommends that a full acoustic/roost survey be conducted for projects where potential FBB roosting habitat occurs within the project area and contain project footrprints > 5acres. This appears to the be the case for this project. As such I recommend that you follow the guidance provided in our 2019 consultation key and conduct a full roost acoustic/roost survey as described in the document.

If you have any questions, please let me know.

John
John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

Jada Barhorst

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Tuesday, November 17, 2020 6:20 AM
To: Bennett, Jonathon
Cc: Turley, David; David Dangel; Jason Houck; Jada Barhorst; Pipkin, Gwen G
Subject: Re: [EXTERNAL] 440273-1 SR 544 from MLK to SR 14 PD&E, ETDM 5873

Jonathon,

I have reviewed the information provided and the survey protocol proposed to determine the status of Florida bonneted bat on or near the project site is acceptable to the Service.

John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Monday, November 16, 2020 4:22 PM
To: Wrublik, John <john_wrublik@fws.gov>
Cc: Turley, David <David.Turley@dot.state.fl.us>; David Dangel <ddangel@inwoodinc.com>; Jason Houck <jhouck@inwoodinc.com>; Jada Barhorst <jbarhorst@inwoodinc.com>; Pipkin, Gwen G <Gwen.Pipkin@dot.state.fl.us>
Subject: [EXTERNAL] 440273-1 SR 544 from MLK to SR 14 PD&E, ETDM 5873

Mr. Wrublik,
The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) Study to evaluate improvements to SR 544 (Lucerne Park Road). A project location map (Attachment 1) is included as part of this correspondence.
The project area is located within the U.S. Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Florida bonneted bat (FBB) (Eumops floridanus). FDOT is preparing to conduct a full acoustic and roost survey to determine the presence/absence of the FBB in the project area. The current survey protocol for linear projects requires 5 detector nights per 0.6 mile (1 Km). Based on a preliminary field review of the project area, 12 survey sites are proposed to accommodate the linear survey requirement, including pond sites, for a total of 60 survey nights. The survey sites are shown on Attachment 1. These sites have been selected and ground-truthed based on existing habitats within the project area that provide suitable roosting and/or foraging habitat for the FBB, with the primary focus given to roosting habitat that may be lost or modified as a result of the proposed project. Photographs of survey site locations are

provided with this correspondence Attachment 2. FDOT will conduct the survey in accordance with current USFWS Florida Bonneted Bat Consultation Guidelines (October 2019) during November and December 2020.
Please review the proposed FBB acoustic survey, the attached figures, and respond that these are acceptable to USFWS. We appreciate your cooperation and look forward to working with you on this project.
Thank you,

Jonathon A. Bennett
Environmental Project Manager
ETDM Coordinator
Florida Department of Transportation District One
801 North Broadway Avenue|Bartow, Florida 33830
PH: (863) 519-2495 EMAIL: Jonathon.Bennett@dot.state.fl.us

Jada Barhorst

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Wednesday, October 5, 2022 11:19 AM
To: Bennett, Jonathon
Cc: Jada Barhorst; Jason Houck; Turley, David; David Dangel
Subject: Re: [EXTERNAL] 440273-1 SR 544 Lucerne Pkwy - FBB Supplemental Survey Methodology

Jonathan,

I have reviewed the documented provided and the find that the Florida bonneted bat survey protocol proposed is acceptable to the Service.

Sincerely

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Wednesday, October 5, 2022 8:39 AM
To: Wrublik, John <john_wrublik@fws.gov>
Cc: Jada Barhorst <jbarhorst@inwoodinc.com>; Jason Houck <jhouck@inwoodinc.com>; Turley, David <David.Turley@dot.state.fl.us>; David Dangel <ddangel@inwoodinc.com>
Subject: [EXTERNAL] 440273-1 SR 544 Lucerne Pkwy - FBB Supplemental Survey Methodology

John,

Please see attached Florida Bonneted Bat Methodology Memo, we have additional area that was not included in the prior surveys to look at for 440273-1 SR 544 PD&E.

Hope all is well.
Thanks,

Jonathon A. Bennett
Environmental Project Manager

ETDM Coordinator
Florida Department of Transportation|District One
801 North Broadway Avenue|Bartow, Florida 33830
PH: (863) 519-2495 EMAIL: Jonathon.Bennett@dot.state.fl.us

FLORIDA DEPARTMENT OF
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

May 5, 2023

Gary Haddle
Inwood Consulting Engineers, Inc.
3000 Dovera Dr., Ste. 200
Oviedo, Florida 32765

RE: Lake Conine (Eastern shore adjacent to SR 544); Canal at SR 544 between Lake Conine and Lake Smart; Lake Smart (Northwestern shore adjacent to SR 544); Lake Fannie (Northern shore adjacent to SR 544); Canal at SR 544 between Lake Henry and Lake Hamilton; Peace Creek, south of Raintree Lane (possible future pond site); Unnamed Canal in S5, 28S, 27E
Worksheet # 127647

Dear Mr. Gary Haddle:

This letter is in response to your recent inquiry requesting a determination of state owned lands in Section 1,9,10,11, Township 28 South, Range 26 East; Section 5, Township 28 South, Range 27 East; Polk County.

Based on the records within the Title and Land Records Section, the Board of Trustees holds title to the submerged lands below the ordinary high water line of Lake Conine, Lake Smart and Lake Fannie at the subject sites. Any work done landward of the ordinary high water line, would not affect Board of Trustees owned lands. The submerged lands of the canal between Lake Conine and Lake Smart, the canal between Lake Henry and Lake Hamilton and the canal in S5, 28S, 27E appears to have been dredged from uplands. Therefore, for regulatory permitting purposes only, we recommend proprietary authorization normally required for the use of state owned lands not be required for these canals. The Title and Land Records Section has not conducted the research and analysis necessary to determine the original location of the ordinary high water line of Peace Creek at the subject site. Therefore, for regulatory permitting purposes only, we recommend proprietary authorization normally required for the use of state owned lands not be required for Peace Creek at this time.

The conclusions stated herein are based on a review of records currently available within the Department of Environmental Protection as supplemented, in some cases, by information furnished by the requesting party and do not constitute a legal opinion of title. A permit from the Department of Environmental Protection and other federal, state and local agencies may be required prior to conducting activities.

Should you have any questions regarding this determination, please contact Clayton Hall, Government Operations Consultant, at mail station 108 at the above address or call at (850) 245-2643.

Sincerely,

Karen McMillan for Scott Woolam

Scott Woolam
Chief
Bureau of Survey and Mapping
Division of State Lands
SW/CH
"L:\data\TITLE\Clayton Hall\202304-06\Polk\SR 544 Project\Letter To Gary Haddle Inwood Consulting Engineers, Inc. 20230505.docx"

APPENDIX E

Audubon's Crested Caracara Survey Data

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1/6/21	7:04am	10:04 am	B. Shepherd

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:04	45°	NNW 2mph	0%	N/A	N/A
Finish: 10:04	59°	NNE 6 mph	0%	N/A	N/A

Observation Point Information

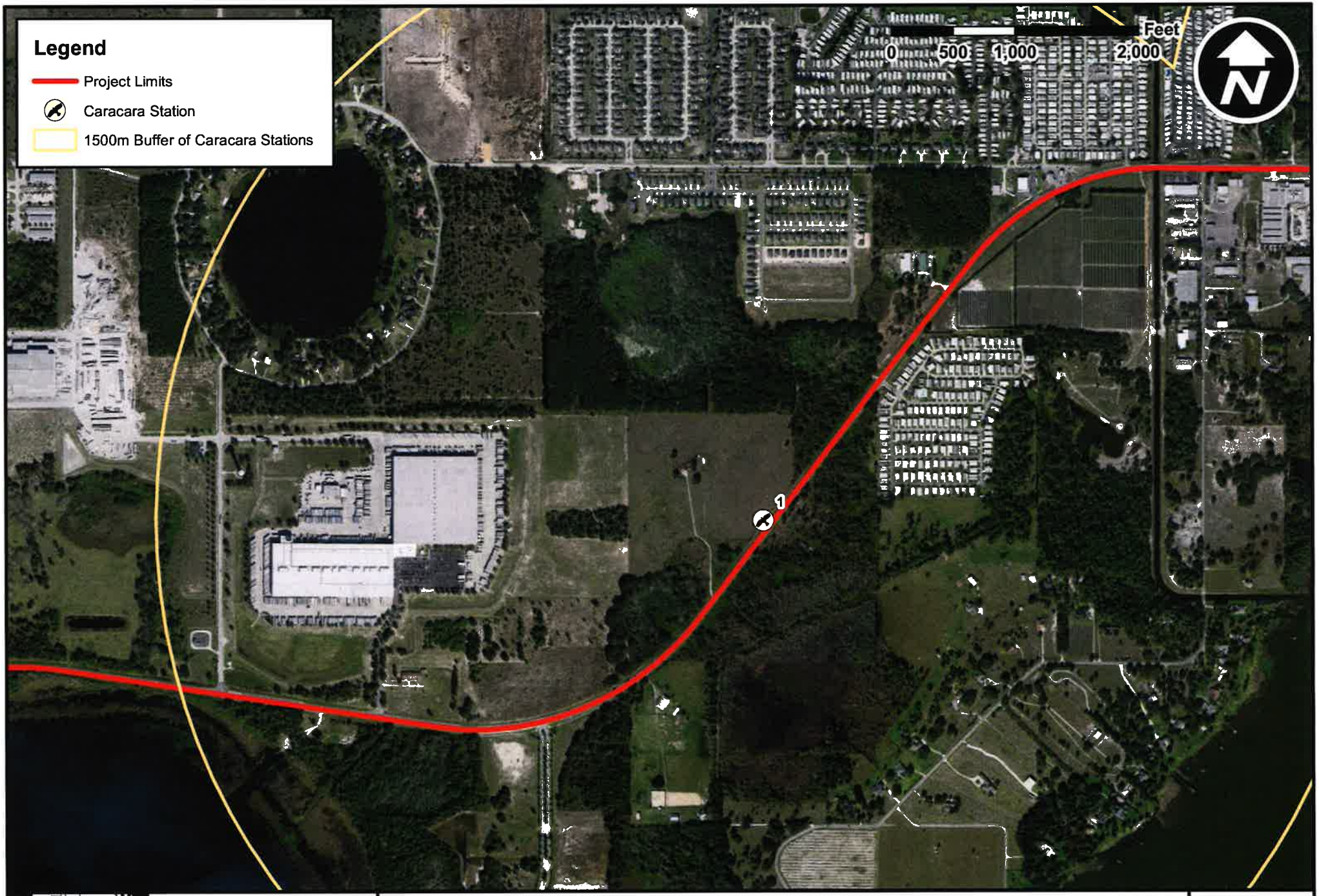
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

osprey, sandhill crane, great blue heron, bald eagle, cattle egret, great egret, grackle



District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1 / 6 / 2021

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1/7/21	7:04am	10:04am	B. Shepherd

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:04	52°	WNW 1mph	45%	altocumulus, stratus	N/A
Finish: 10:04	62°	ESE 6mph	95%	stratus, cirrus	N/A

Observation Point Information

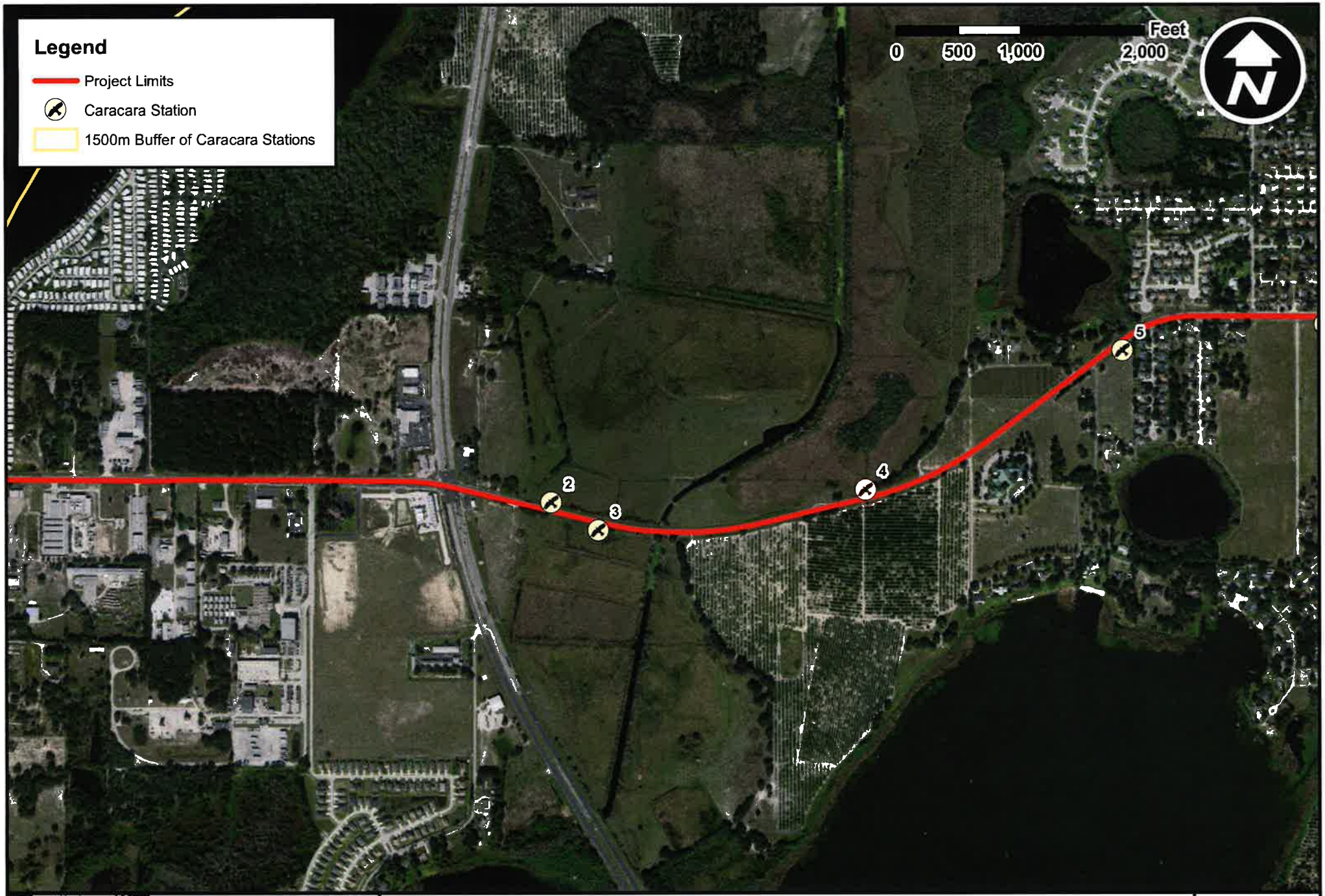
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

sandhill crane, white ibis, osprey, meadowlark, great blue heron, great egret, cattle egret, harrier, kestrel, mourning dove



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1 / 7 / 2021

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544 PD&E Study
Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1.8.21	7:02 AM	10:05 AM	J. Ballard

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:02 AM	58°F	4 mph W	10%	Stratus & fo Stratus	very light fog - mostly lifted @ survey start
Finish: 10:05 AM	63°F	~~10~~ 14 mph W	70%	stratus, cirrus Alto cumulus	NO

Observation Point Information

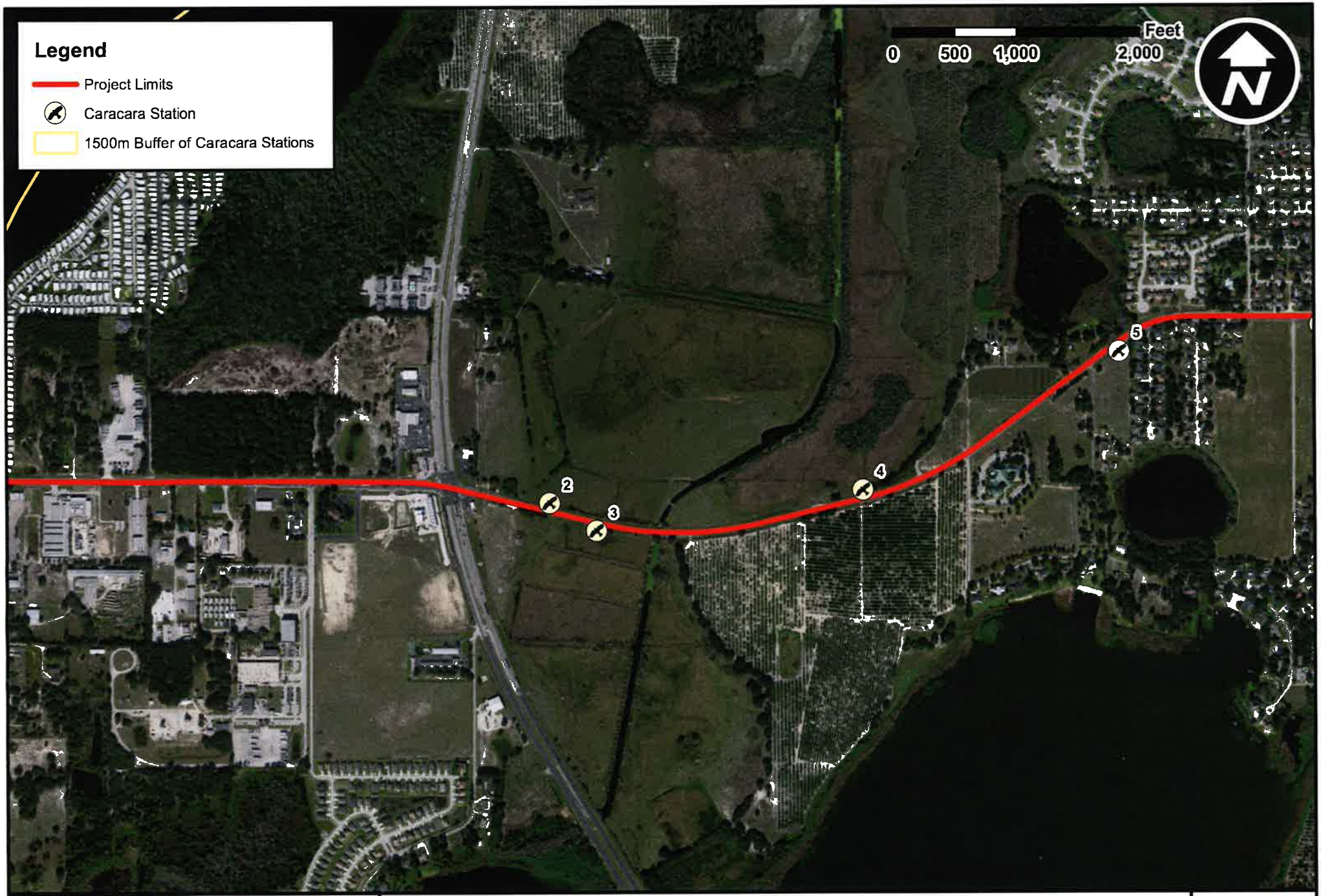
General Site and Habitat Conditions; Other Activities in the Area
Herbaceous prairie & cleared citrus grove S of SR 544. Canal & herbaceous wetland. citrus/Row crops & Lake Hamilton to the SSE. US 27 bounds the west. SR 544 & open pasture w/ active cattle & forested & non-forested wetlands are located north of station 3.

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc

White ibis, Sandhill crane, house wren, cormorant, bald eagle, palm warbler, red-winged blackbird, boat-tailed grackle, cat bird, tree swallow, cardinal, great blue heron, red-tailed hawk, Killdeer, wood stork, northern harrier, cattle egret, Gull, black vulture, copperhead, shrike, eastern phoebe



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

J. Barhorst

CARACARA SURVEY STATION LOCATION MAP

DATE 1/8/21

STATION 3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
01/06/21	0704	1004	Jason Houck ; Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 0704	45°	2mph NNW	0	n/a	light
Finish: 1004	59°	6mph NNE	0	n/a	n/a

Observation Point Information

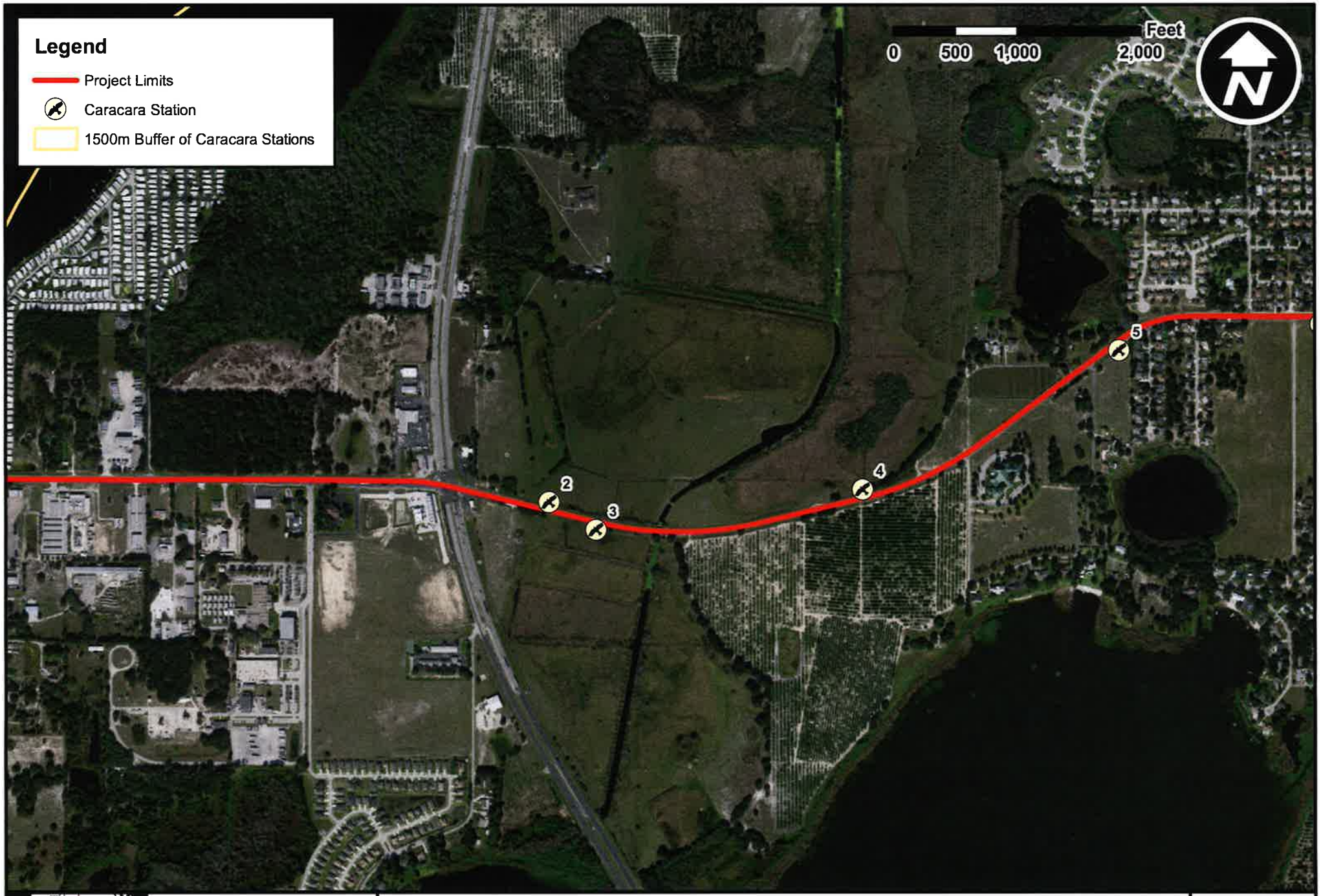
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

marsh hawk, ibis, Sandhill crane, eastern phoebe, cormorant, carolina wren, brown headed cowbird, great blue heron, great egret, palm warbler, bald eagle



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/6/21

STATION

4

USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station S

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
01/07/21	0704	10:04	Jadu Barhorst ; Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 0704	52°	1mph WNW	45%	alto cumulus; stratus cirrocumulus	n/a
Finish: 1004	62°	0mph ESE	95%	Stratus cirrus	n/a

Observation Point Information

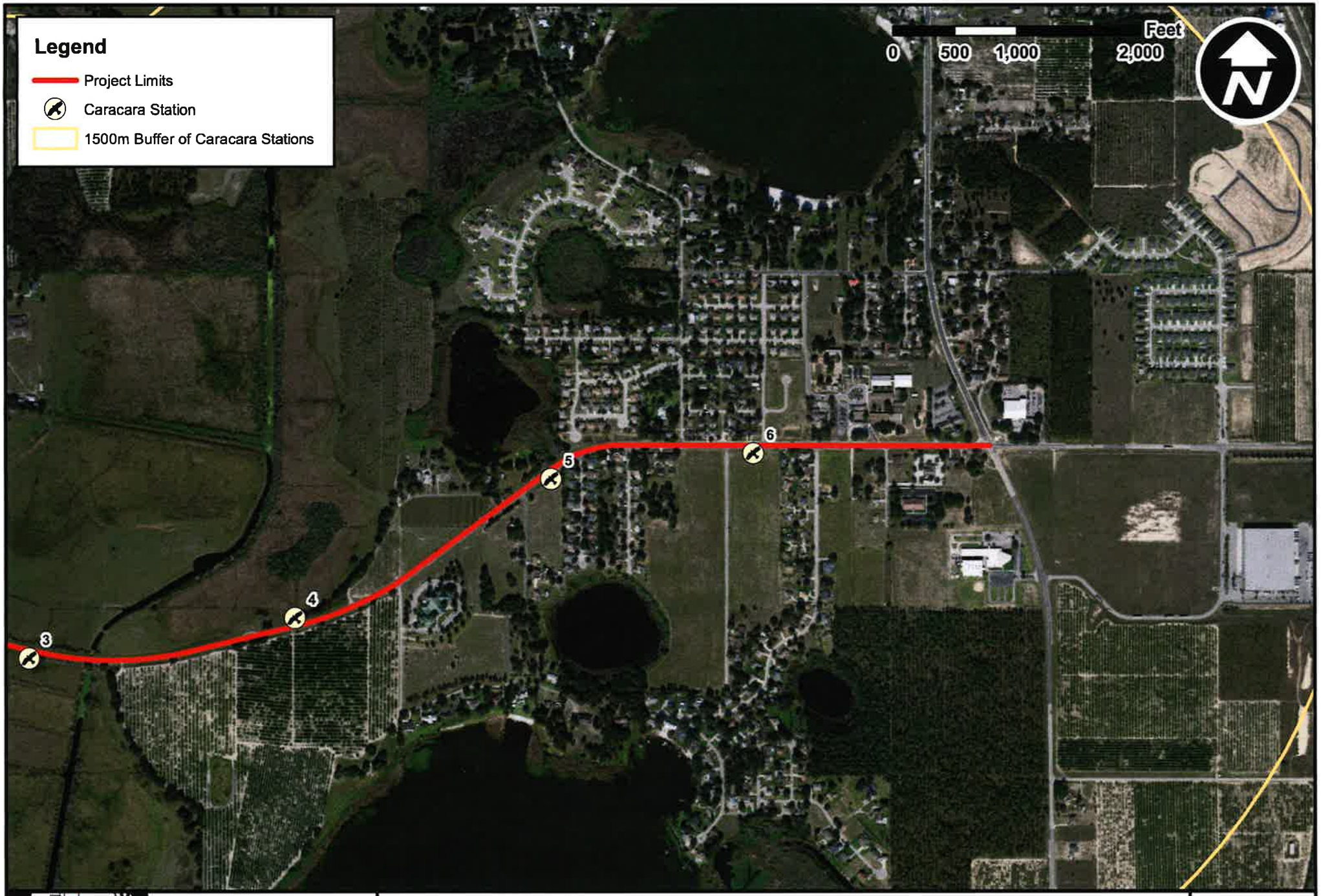
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
	n/a		no caracara observed

osprey, glossy ibis, gull, cormorant, Sandhill crane, blue jay, mourning dove, wood duck, great egret, cardinal, anhinga, palm warbler, American crow, black vulture, carolina wren, northern mockingbird



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/7/21

STATION

5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
01/08/21	0704	1004	Jason Houck ; Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 0704	58°	4mph W	10%	Stratus	n/a
Finish 1004	63°	14mph W	80%	Stratus	n/a

Observation Point Information

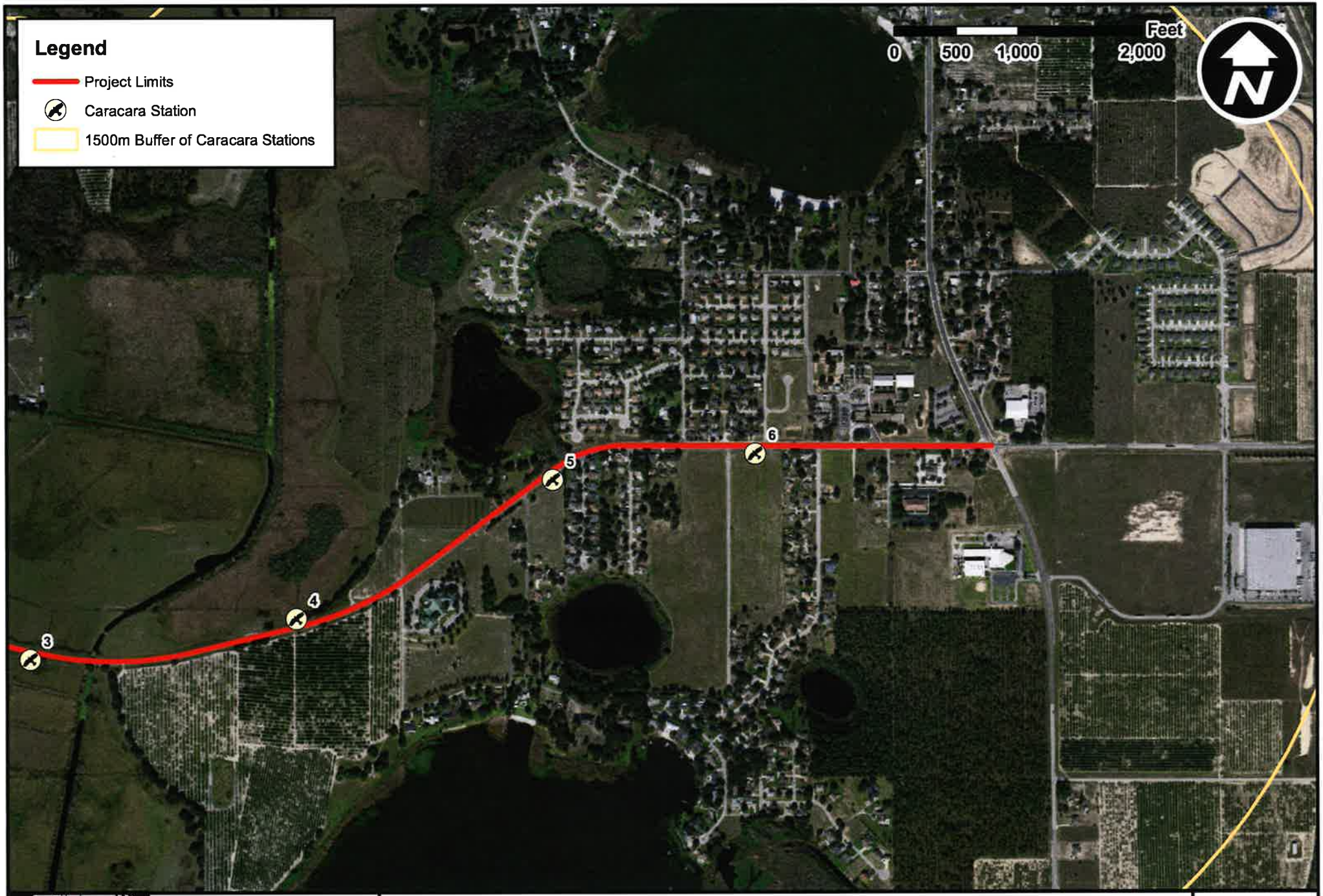
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

Osprey, Sandhill crane, ibis, boat tailed grackle, American crow, killdeer, black vulture, great egret, mourning dove, Cormorant, cattle egret, palm warbler, bluejay, bald eagle, red-bellied woodpecker, Cardinal
Coopers hawk (?)



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

No caracara observed

DATE 1/8/21

STATION #6

USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544 PD&E

Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1.18.21	7:00 Am	10:05 Am	J. Barbers x

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:00 Am	50°F	0-2 mph NW	5%	cirrus, stratus	NO
Finish: 10:05 Am	58°F	4 mph NW	30°	stratus cirrus	NO

Observation Point Information

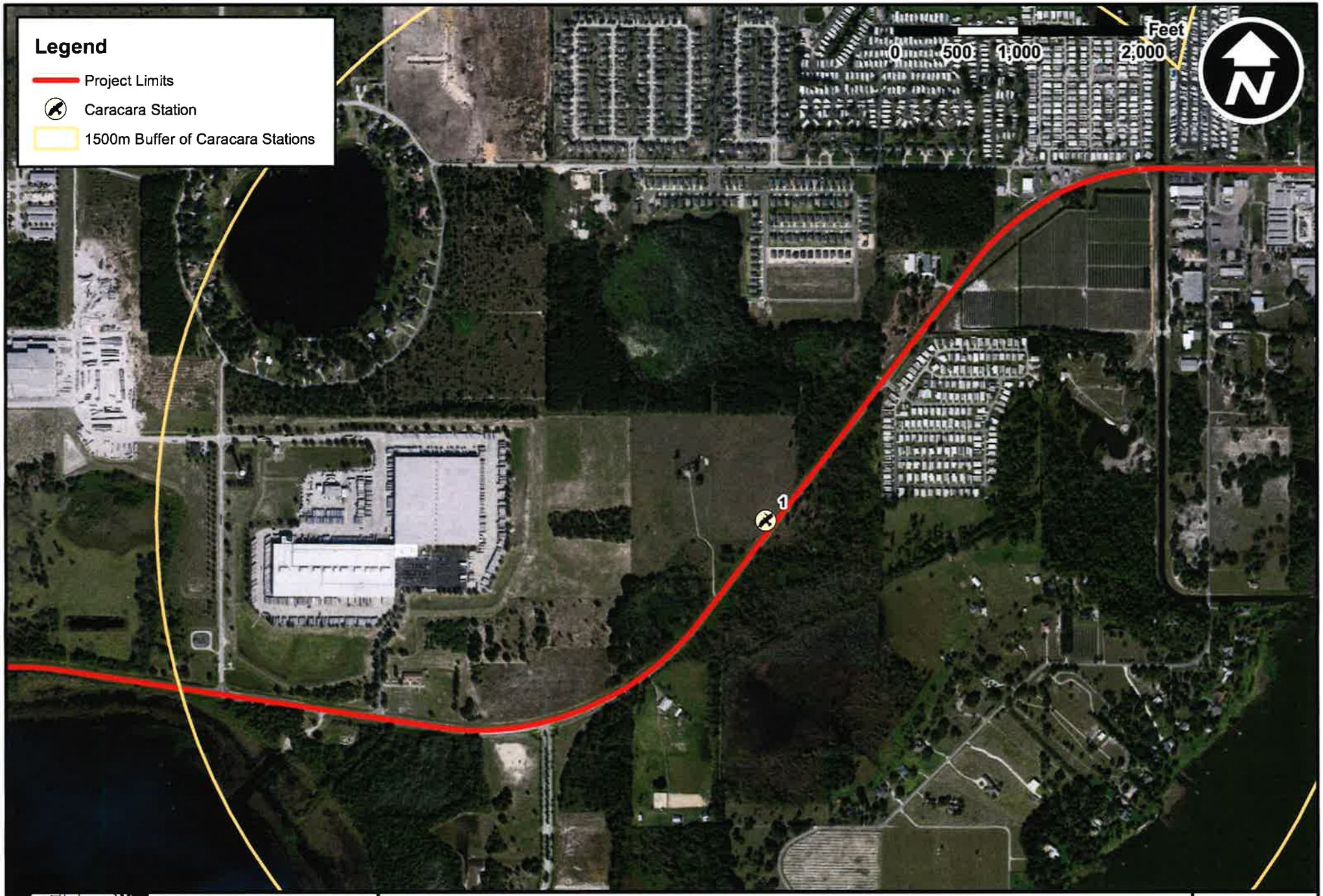
General Site and Habitat Conditions; Other Activities in the Area
Pasture - open, herbaceous w. Th surrounding tree line. Forested wetlands to the N & W w/ commercial development to the W NW. South of SR 544 consists of upland flatwoods forested wetlands w/ some residential development along Lake Hamilton (south of Station 1)

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No Caracara observed

Kestrel, great egret, Osprey, bald eagle, boat-tailed grackle, cattle egret, tree swallow, blue jay, great blue heron, sandhill crane



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/18/21

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544 PD&E

Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1.19.21	6:59 AM	10:07 AM	J. Barkas +

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:59 AM	40°F	0-5 mph N	N/A	N/A clear	NO
Finish: 10:07 AM	57°F	5-10 mph E NE	N/A	clear	NO

Observation Point Information

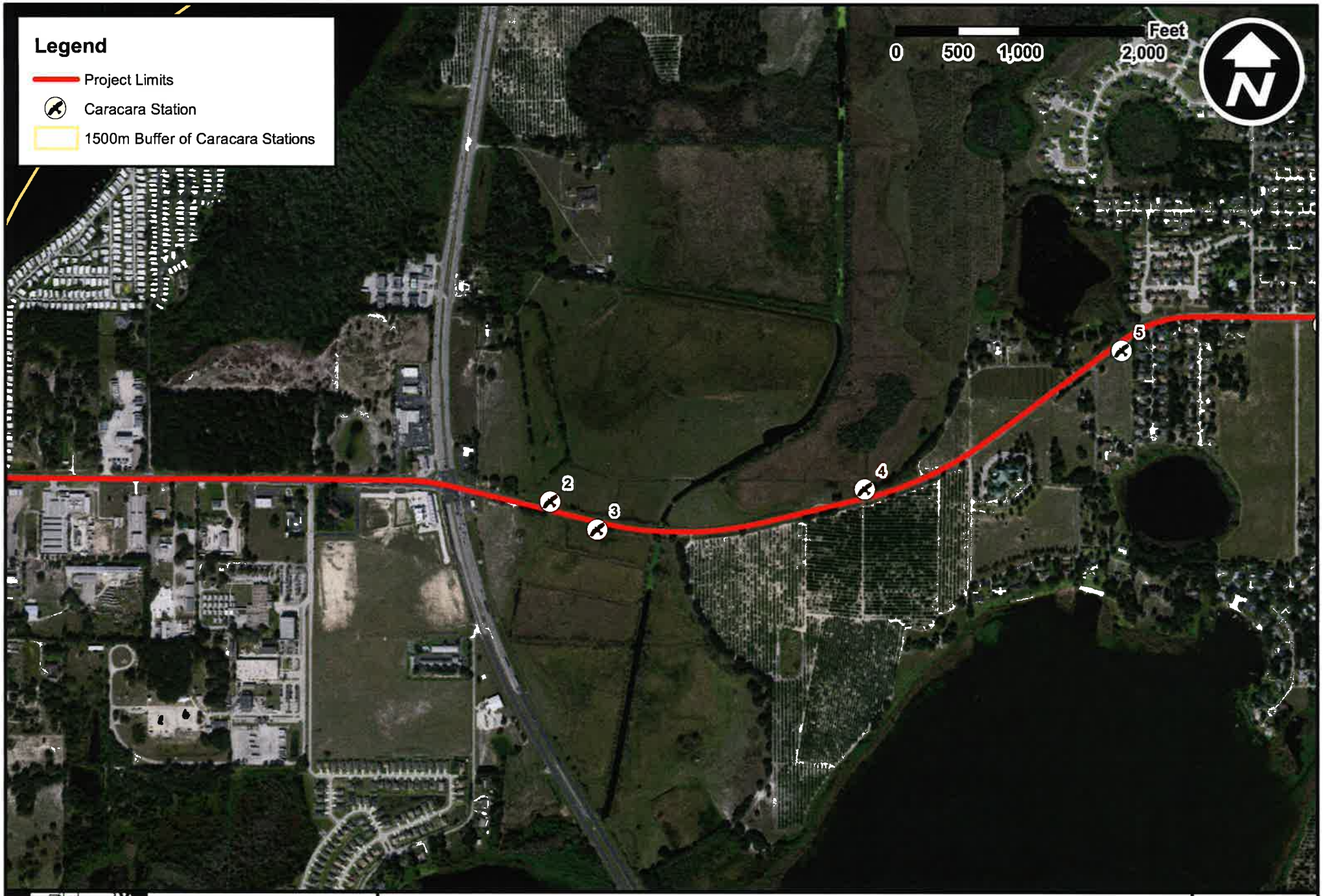
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No Caracara Observed

Sandhill crane, white ibis, blue-gray gnatcatcher, boat-tailed grackle, Palm warbler, meadowlark, cormorant, great blue heron, great egret, Killdeer, Kestrel, Mourning dove, black vulture, northern harrier, phoebe



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/19/21

STATION

2

USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544 PD&E

Location/Observation Block/Lat-Long: ~~Eastcoast~~ Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1.20.21	7:01AM	10:05AM	J. Barkoski

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:01AM	60°F	calm	>5%	Cirrus	Fog - lifted by 7:35 visibility - 1mile
Finish: 10:05AM	61°F	0-5mph N	10%	Cirrus	NO

Observation Point Information

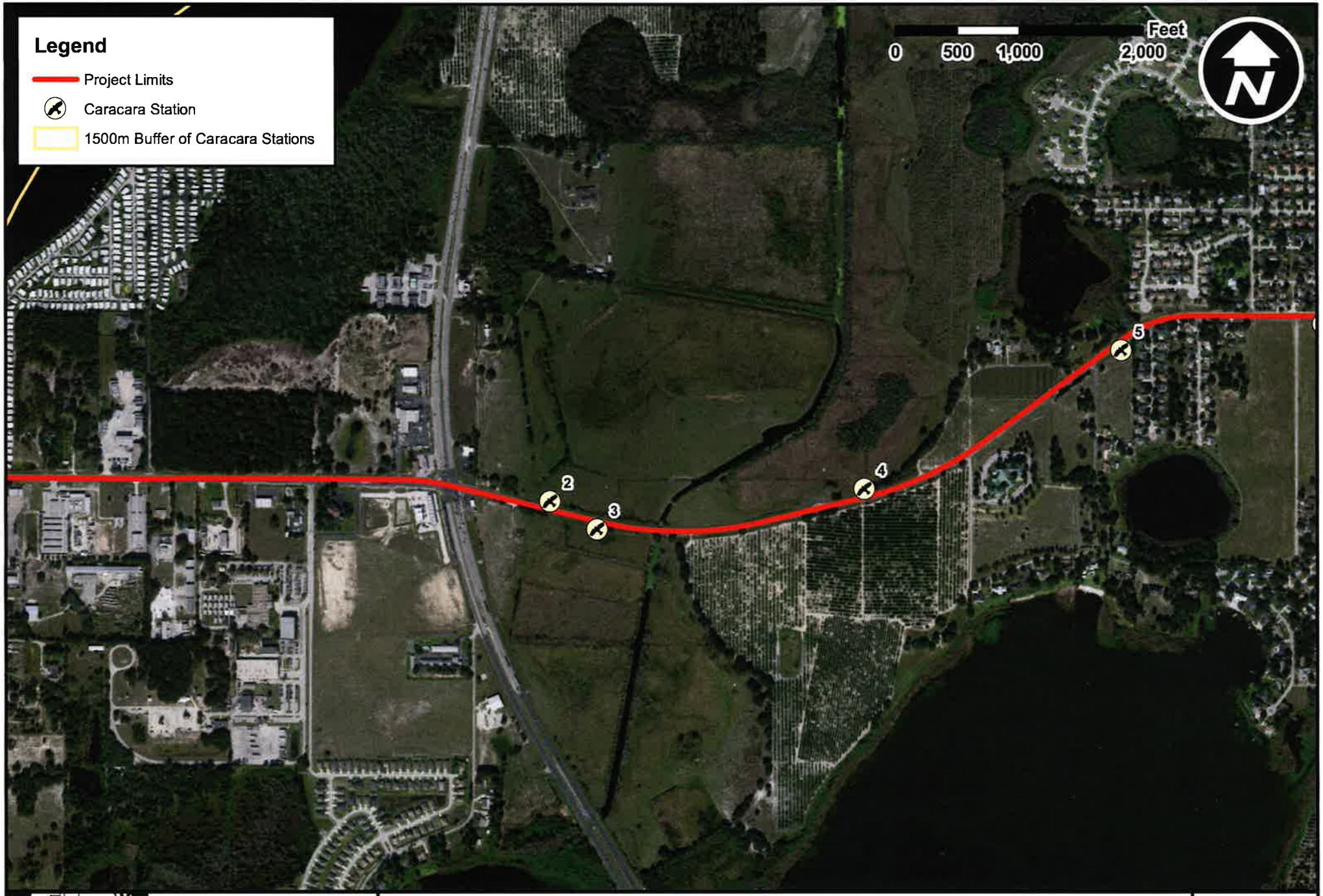
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			NO Caracara observed

Black vulture, white ibis, sandhill crane, red-winged blackbird, boat-tailed grackle, kestrel, meadowlark, cattbird, blue-gray gnatcatcher, fish crow, tree swallow, phoebe, blue jay



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/20/21

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1/18/21	7:03am	10:03 am	Jason Houck, Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:03	49°	NW 2 mph	5%	Stratus	n/a
Finish: 10:03	58°	NW 5 mph	30%	cirrus	n/a

Observation Point Information

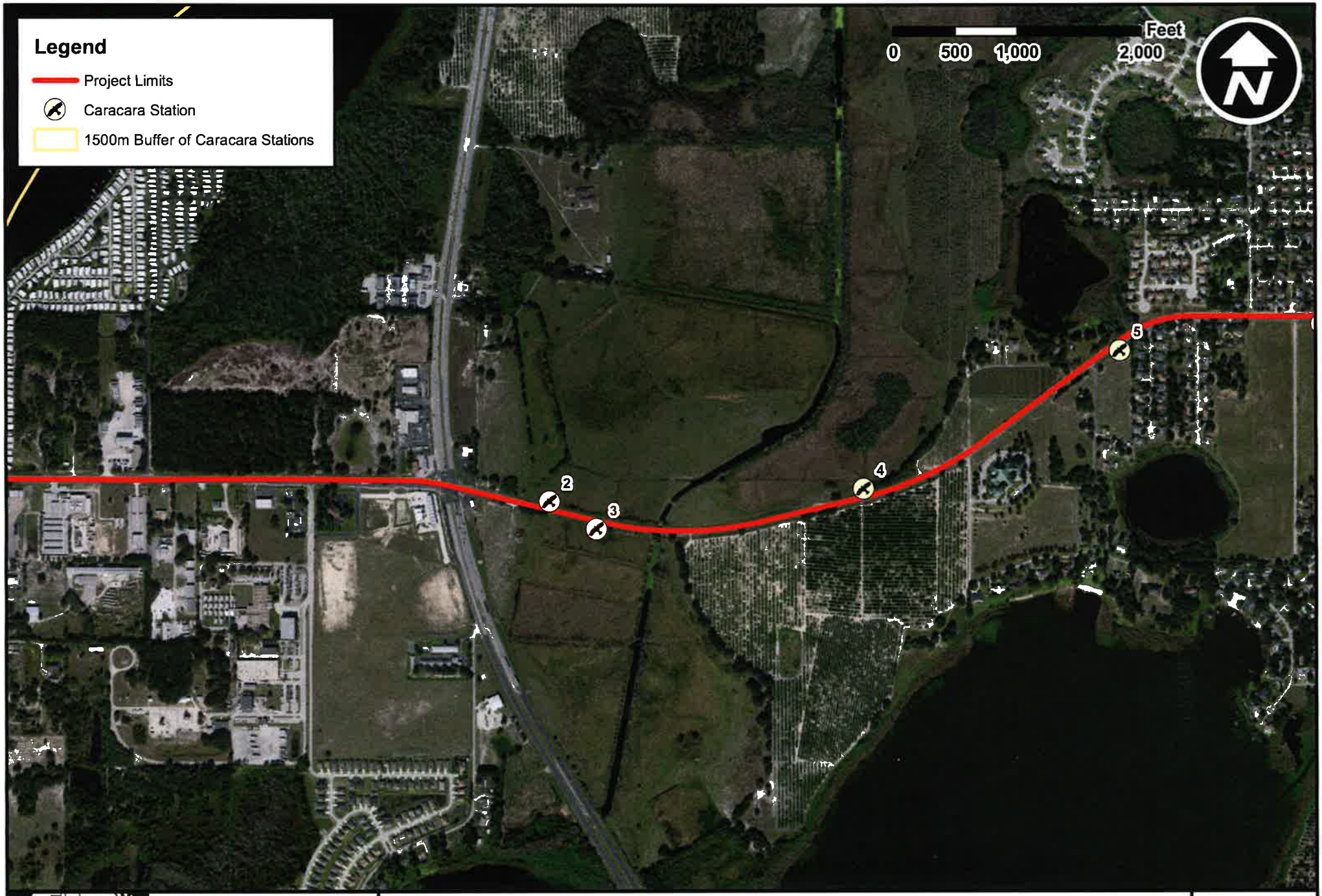
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no Caracara Observed

Cardinal, crow, red shouldered hawk, palm warbler, Sandhill crane, white ibis, great egret, American robin, great blue heron, Mockingbird, eastern phoebe, black vulture, cormorant.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1 / 18 / 21

STATION

4

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1/19/21	7:03	10:03	R. Scherer A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:03	40°	NS mph	0%	n/a	n/a
Finish: 10:03	56°	NE 7 mph	0%	n/a	n/a

Observation Point Information

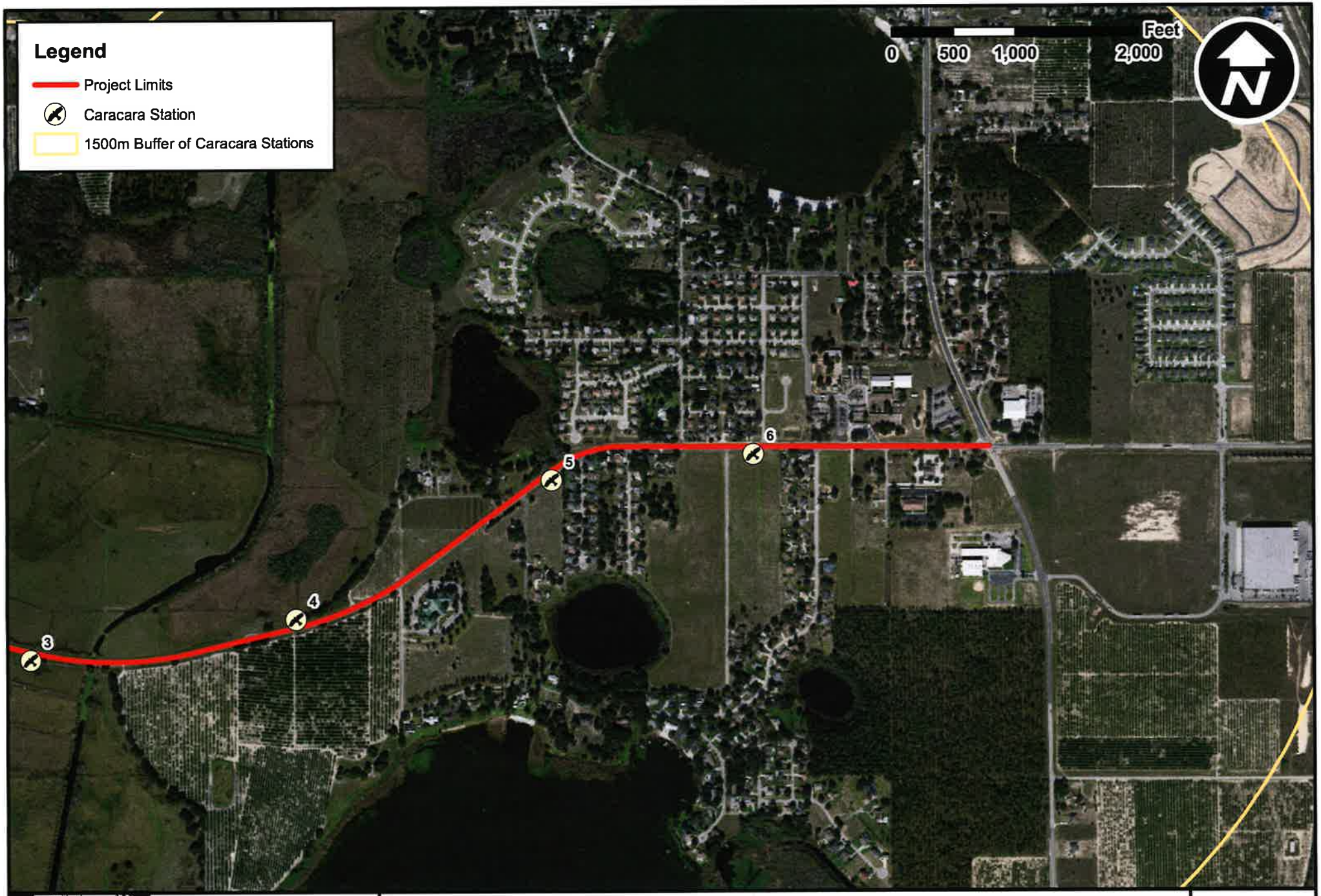
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No Caracara observed

American crow, red shouldered hawk, ~~grackle~~ common grackle, ~~ring-billed~~ gull, bald eagle, osprey, white ibis, cattle egret, Sandhill crane, blue jay, mourning dove, cormorant, forster's tern, robin, common moorehen, killdeer, red-bellied woodpecker, eastern phoebe, tree swallow, palm warbler, great blue heron, great egret, mockingbird



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/19/21

STATION 5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
1/20/21	7:03	10:03	R Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:03	45°	SSW 1 mph	0%	N/A	N/A
Finish: 10:03	60°	N 3 mph	0%	N/A	N/A

Observation Point Information

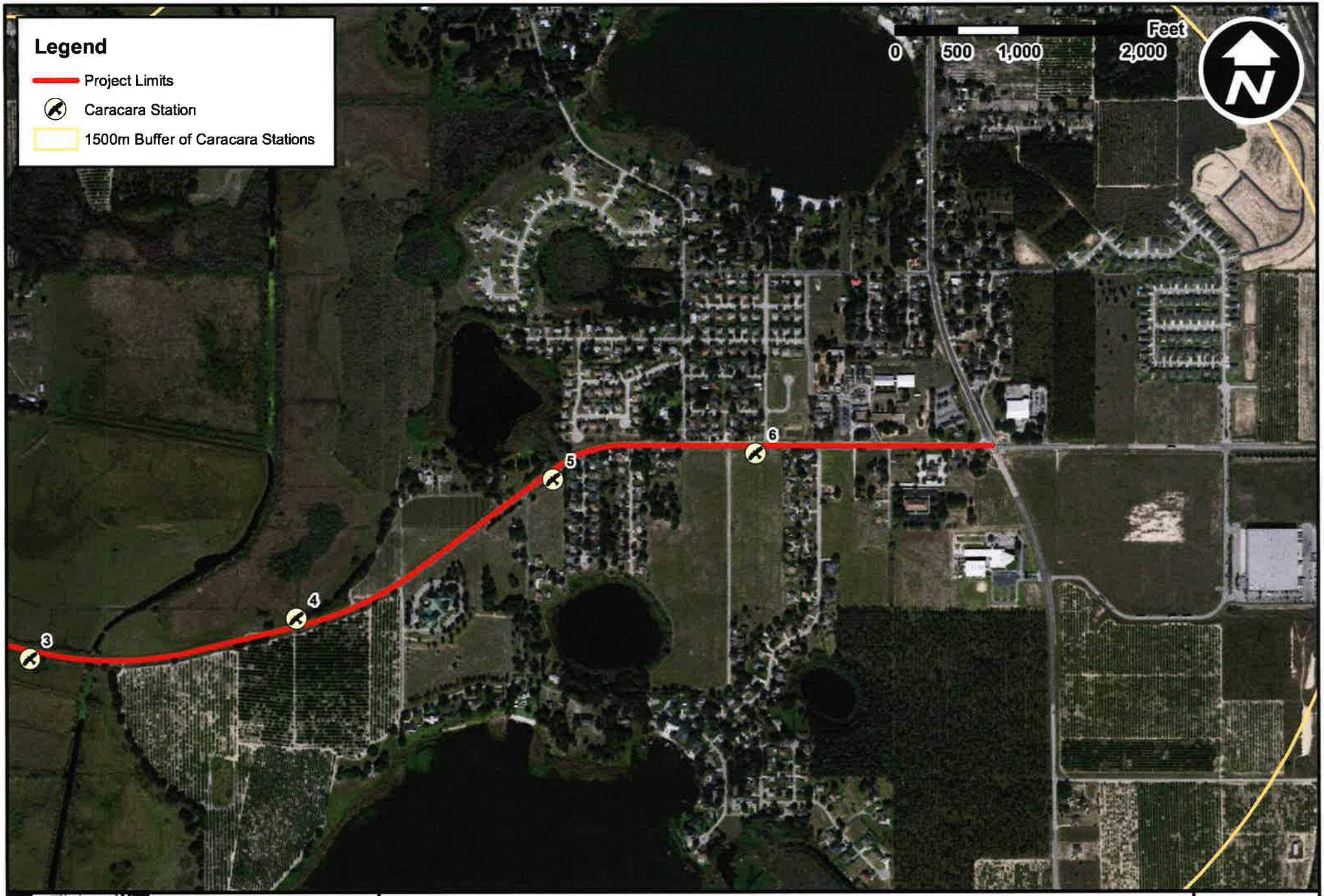
General Site and Habitat Conditions; Other Activities in the Area
large cleared field south of SR 544, surrounded by residential area, south west corner of field is adjacent to Engineers Lake

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: common grackle, osprey, red shouldered hawk, blue jay, white ibis, killdeer, tree swallow, cormorant, mourning dove, pileated woodpecker, sandhill crane, fish crow, mockingbird, cattle egret, kestrel, northern harrier, red bellied woodpecker, great egret



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No Caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 1/20/21

STATION

6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/2/21	6:58 am	9:58 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:58 am	43 °F	WNW 15 mph	100 %	Stratus	N/A
Finish: 9:58 am	46 °F	NW 20 mph	10%	Stratocumulus	N/A

Observation Point Information

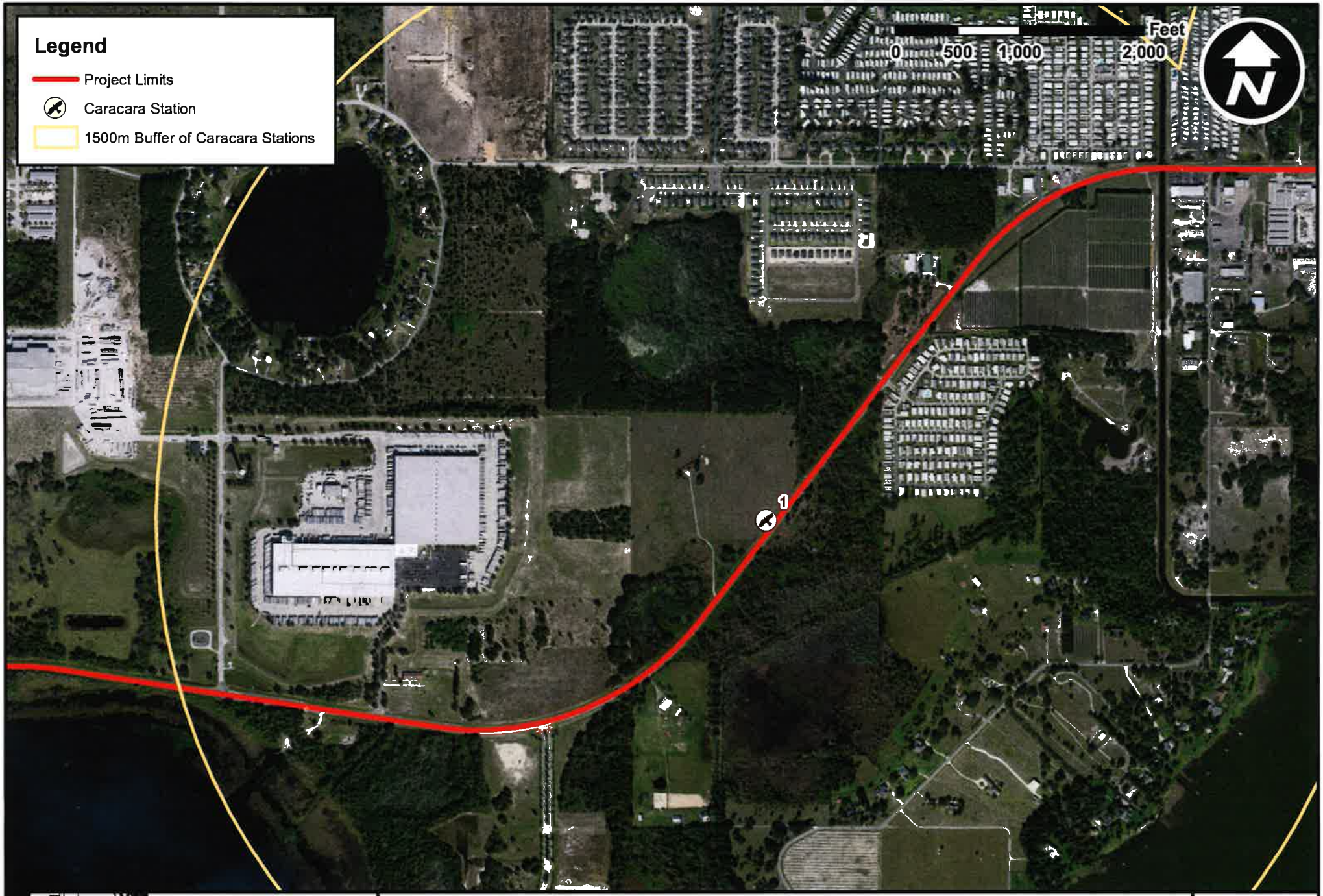
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: grackle, wood stork, black vulture, great egret, cattle egret, osprey, mourning dove, American robin, sandhill crane, turkey vulture, bald eagle, kestrel



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2 / 2 / 2021

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/3/21	6:57am	9:57am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:57am	39°F	WNW 8 mph	0%	N/A	N/A
Finish: 9:57am	47°F	NW 11 mph	0%	N/A	N/A

Observation Point Information

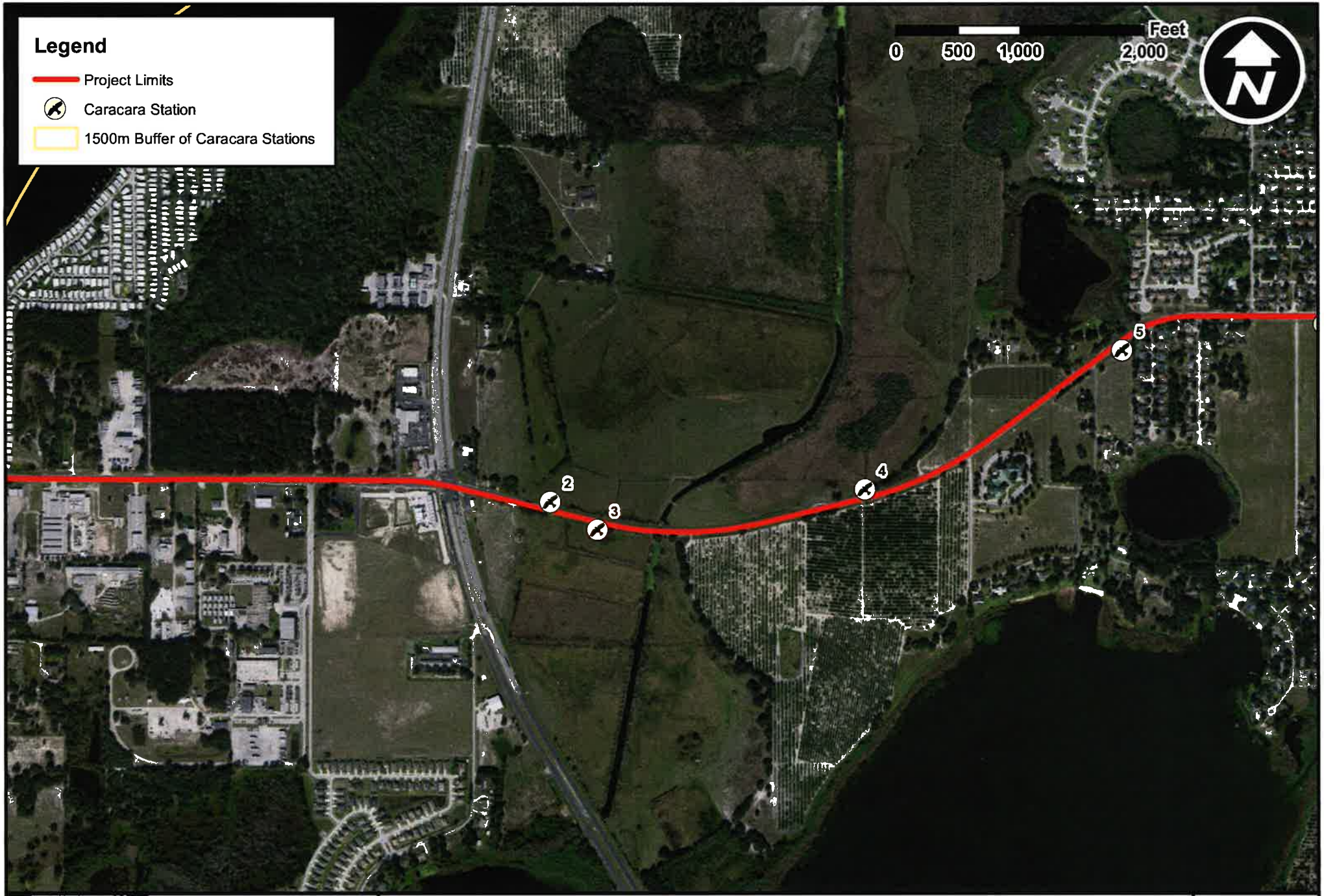
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: great blue heron, grackle, sandhill crane, great egret, osprey, American robin, glossy ibis, red-tailed hawk, white ibis, eastern meadowlark, cormorant, little blue heron, northern harrier, snowy egret, kestrel, tree swallow, bald eagle, red-bellied woodpecker, eastern bluebird, turkey vulture



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2 / 3 / 2021

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/4/21	6:57am	9:57am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:57am	35°F	Calm	10%	cirrus	light, lifting fog
Finish: 9:57am	52°F	E 6 mph	40%	cirrus	N/A

Observation Point Information

General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: grackle, northern harrier, white ibis, American robin, great egret, sandhill crane, palm warbler, eastern meadowlark, cormorant, kestrel, red-tailed hawk, crow, tree swallow, osprey, brown pelican, great blue heron, house wren, cattle egret, turkey vulture

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2 / 4 / 2021

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/2/21	6:58	~~9:58~~	Jaala Barhorst; Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:58	43°	15mph WNW	100%	Stratus	n/a
Finish: 9:58	46°	15mph WNW	3%	Stratus	n/a

Observation Point Information

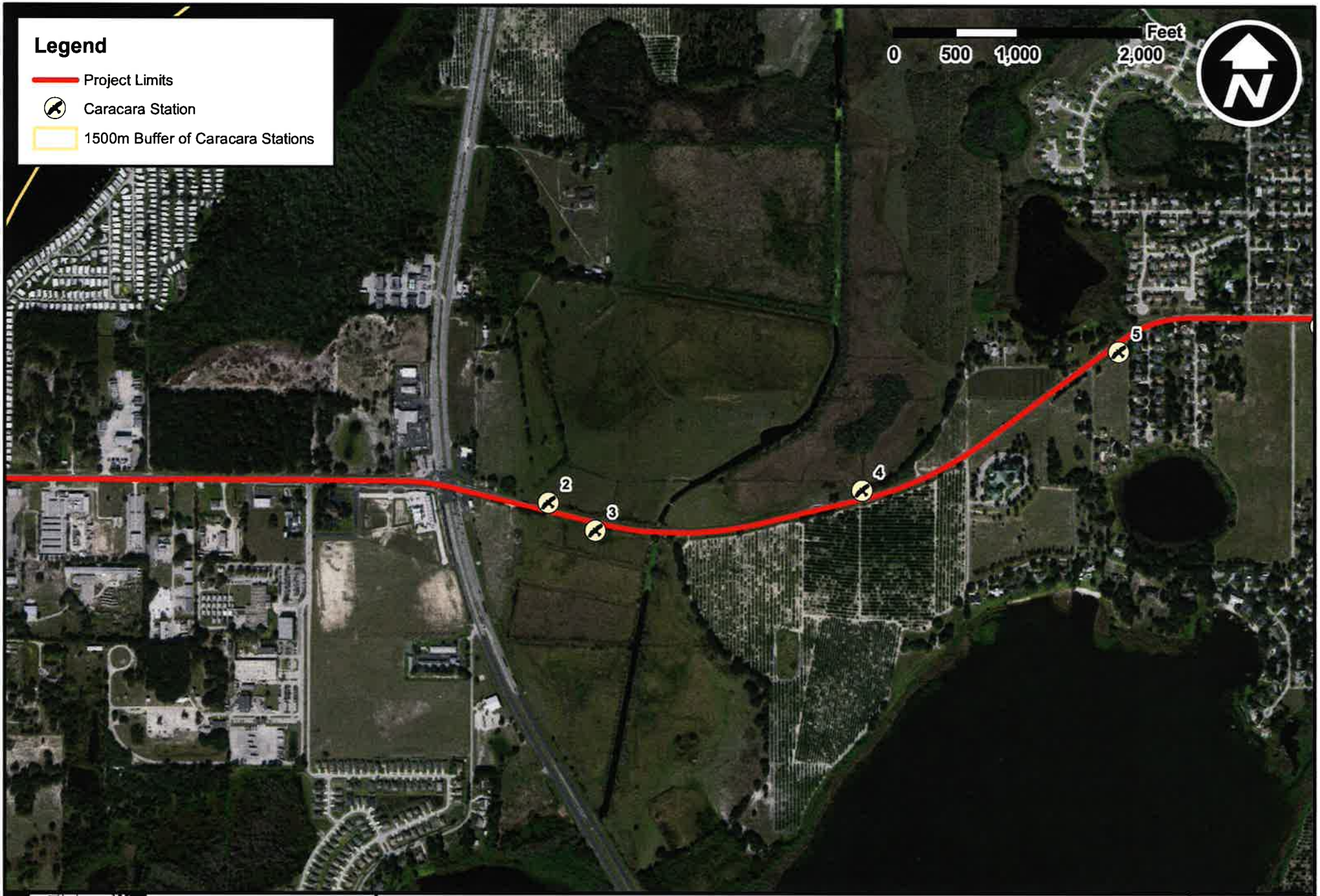
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

Sandhill cranes, red-tail hawk, great blue heron, american robin, Cormorant, ring-billed gull, great egret, eastern phoebe, white ibis, palm warbler, meadowlark, osprey, black vulture, turkey vulture, common grackle, red-winged blackbird



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2/2/21

STATION

4

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544
Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/3/21	6:57	9:57	Jada Barhorst; Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:57	39°	7mph WNW	0	n/a	n/a
Finish: 9:57	47°	10mph NW	0	n/a	n/a

Observation Point Information

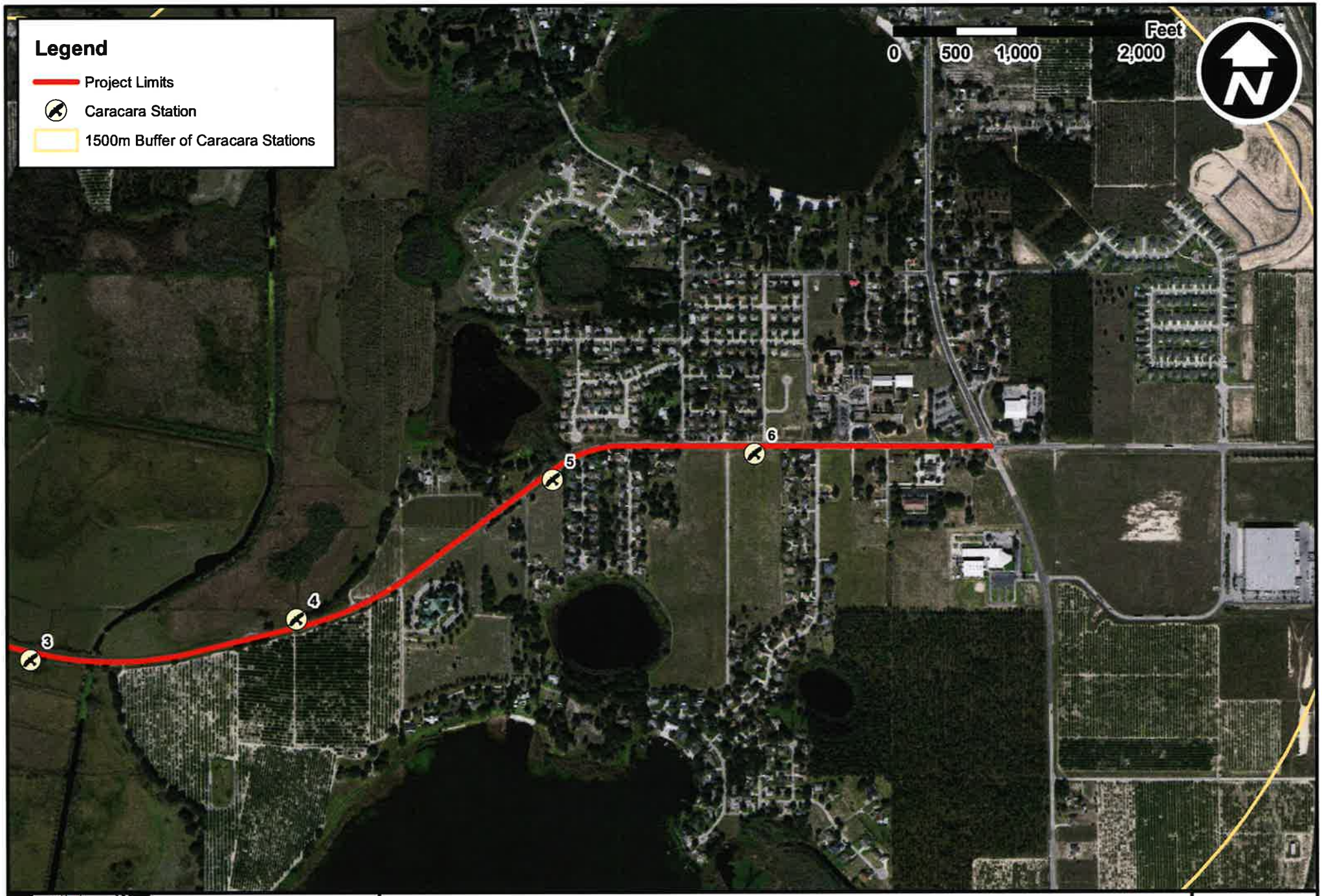
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No Caracara observed

tree swallow, palm warbler, sandhill cranes, osprey, white ibis, American Robin, cormorant, mourning dove, wood duck, red bellied woodpecker, ring billed gull, eastern phoebe, brown-headed cowbird, purple martin, blue gray gnatcatcher, blue jay, bald eagle, turkey vulture, common grackle, great egret,



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2/3/21

STATION

5

USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2-4-21	6:56a		T. Mueller; A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:56a	34°	1 mph WNW	5%	Cirrus	none
Finish: 9:56a	52°	5mph E	15%	Cirrus	n/a

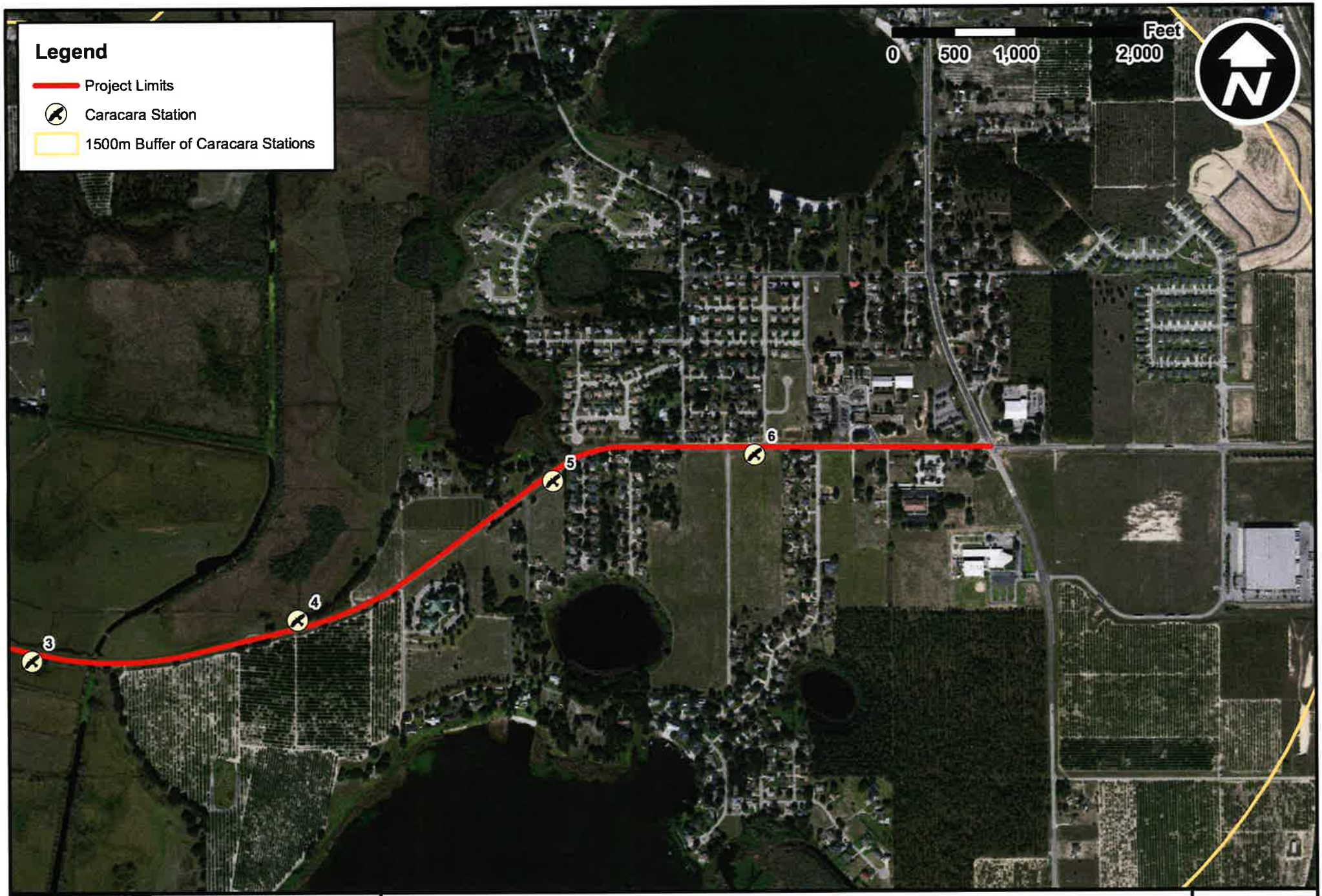
Observation Point Information

General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			Osprey; ibis; American Crow; great egret; mourning dove; Sandhill crane; boat-tailed grackle; Killdeer, blue jay; SE kestrel; tree swallow; ring-billed gull; American white pelican; red-bellied woodpecker; cattle egret; bald eagle;
			no caracara observed



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2/4/21

STATION 6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/16/22	6:48 am	9:48 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:48am	64°F	WNW 12 mph	100%	Stratus, stratocumulus	N/A
Finish: 9:48am	65°F	WNW 13 mph	100%	stratus	N/A

Observation Point Information

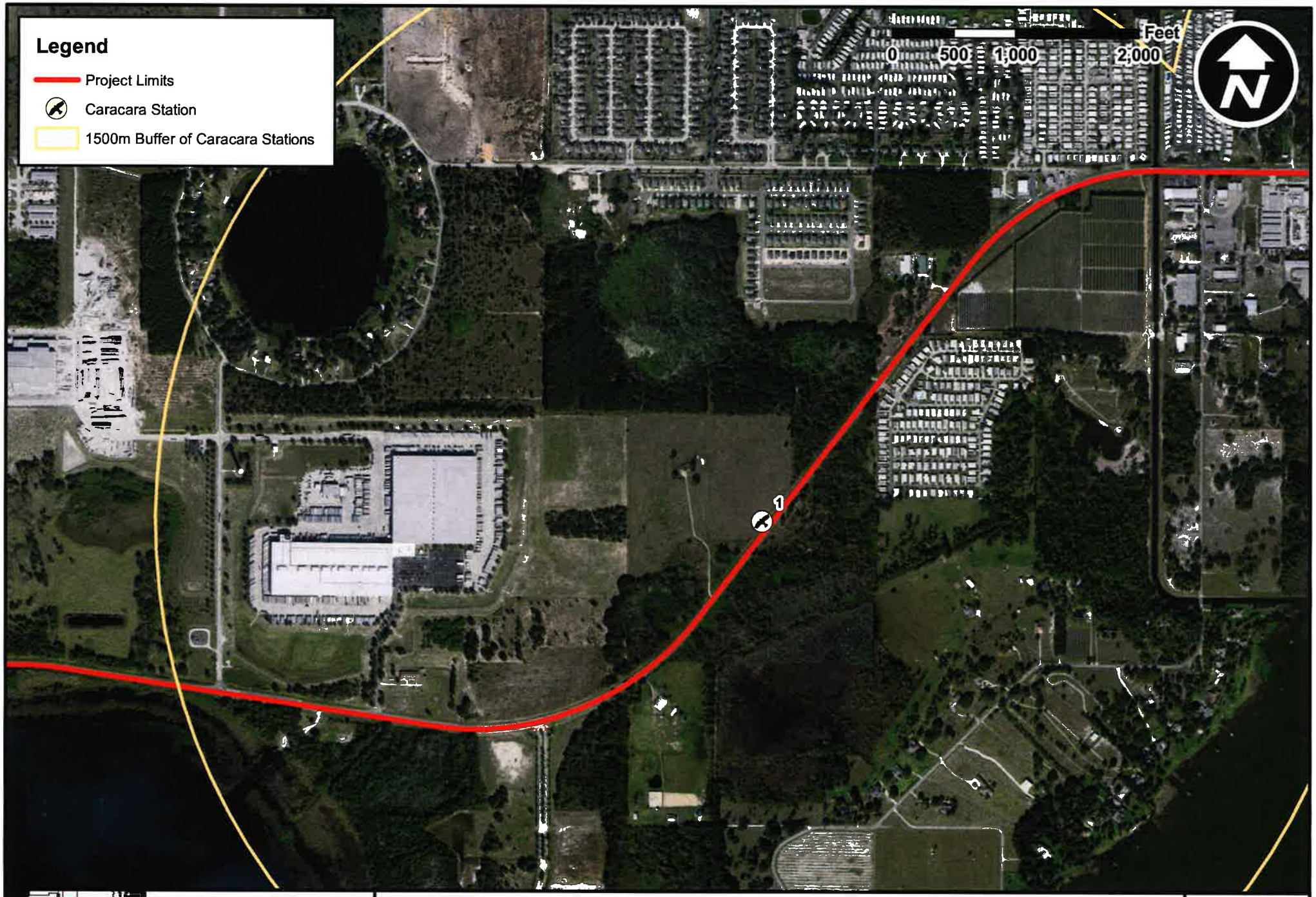
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: sandhill crane, osprey, white ibis, crow, kestrel, mourning dove, little blue heron, black vulture, American robin, mocking bird, common grackle, bobcat, turkey vulture



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2/16/2021

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/17/21	6:47am	9:47am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:47am	59°F	NNW 5mph	100%	stratus	N/A
Finish: 9:47am	61°F	NNW 6 mph	100%	stratus	very light, misty rain

Observation Point Information

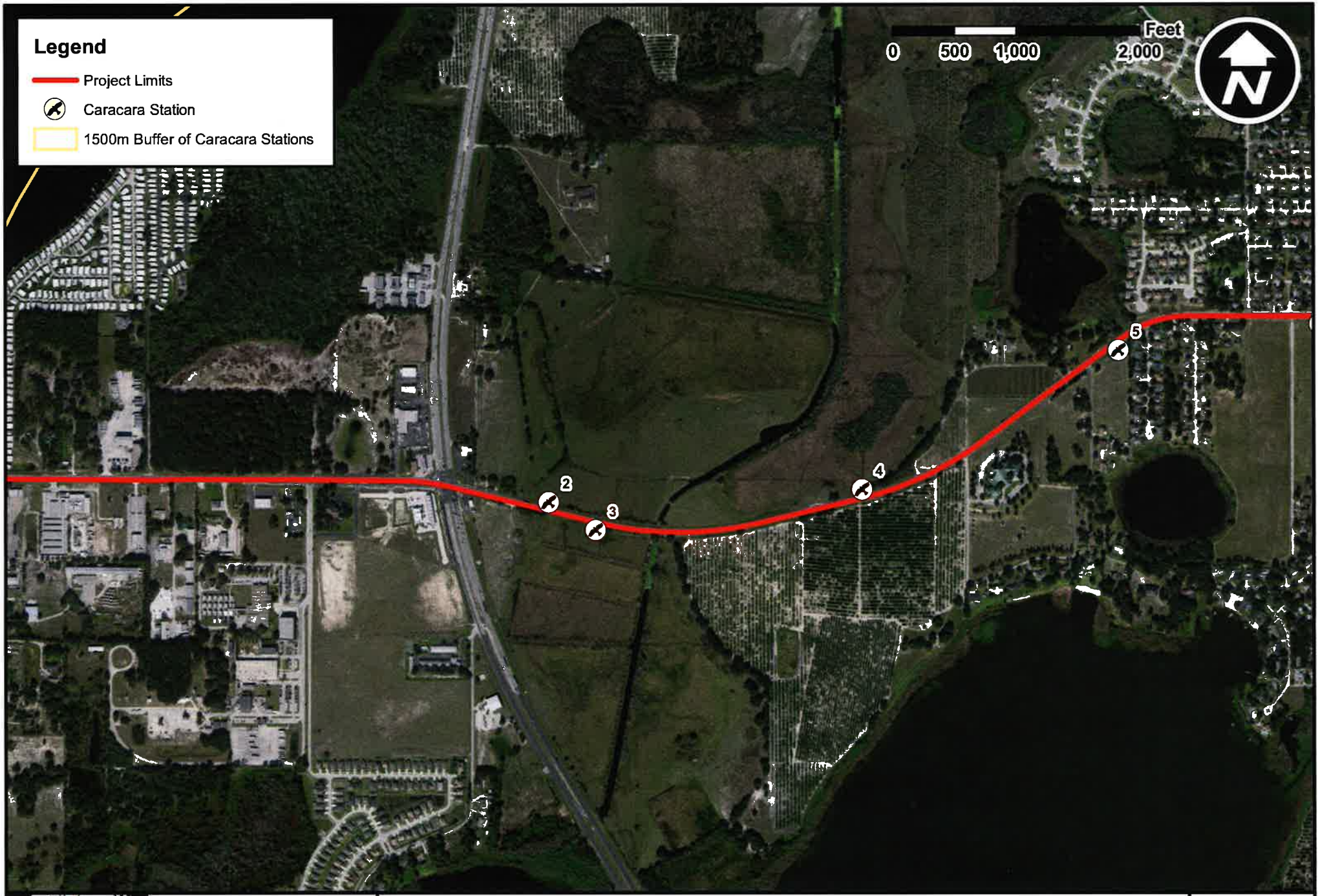
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No Caracara observed

Wildlife observed: great egret, sandhill crane, cattle egret, American robin, osprey, white ibis, common grackle, little blue heron, great blue heron, crow, pine warbler, bald eagle, glossy ibis, eastern phoebe, & cormorant



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

No caracara observed

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

DATE 2 / 17 / 2021

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/16/21	6:48am	9:48am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:48am	65°	12mph WNW	98%	cirrus, stratus	n/a
Finish: 9:48am	65°	13 mph WNW	100%	Stratus	n/a

Observation Point Information

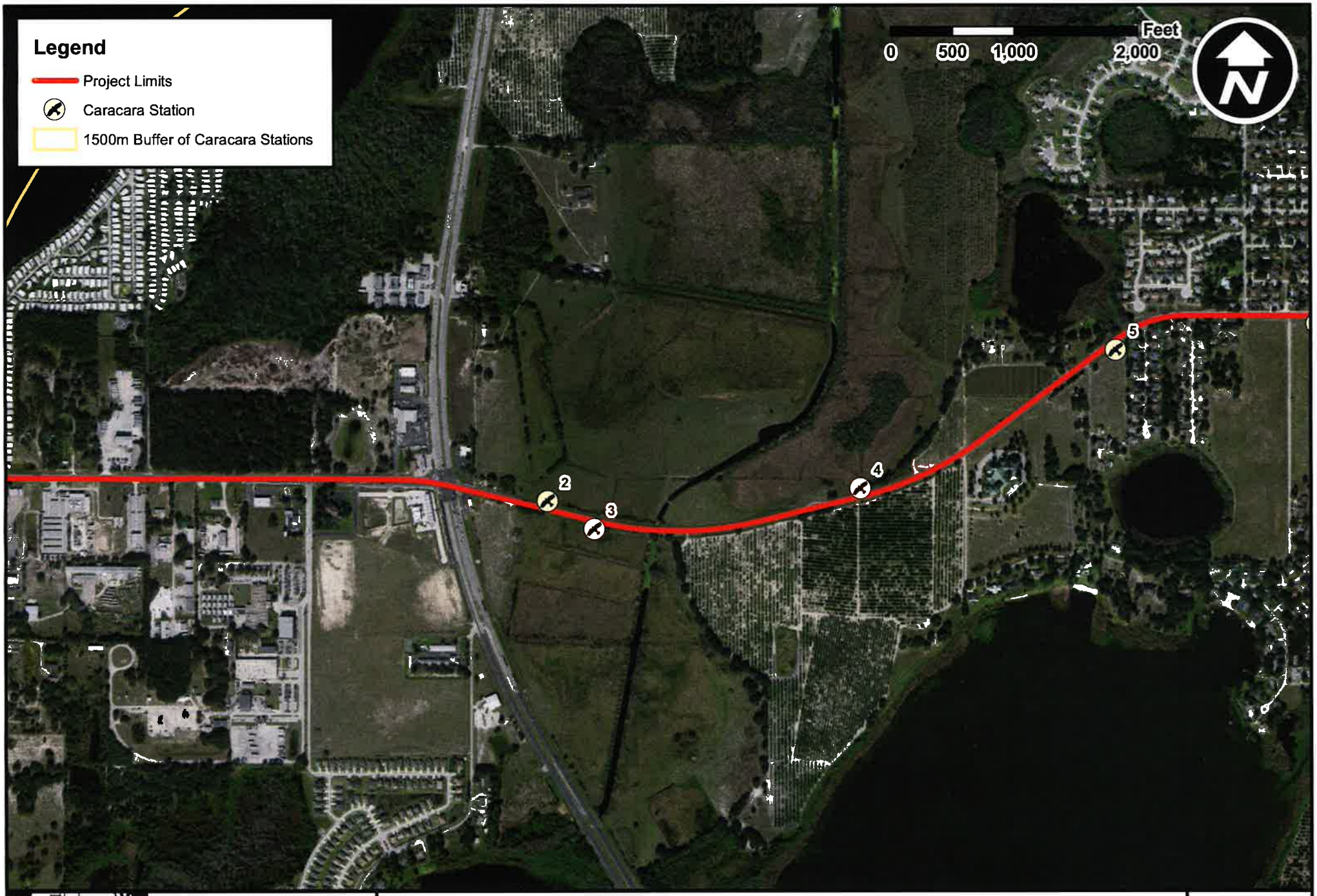
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
1			n/a no caracara observed

Purple martin, American crow, cardinal, great egret, common grackle, white ibis, glossy ibis, brown headed cowbird, palm warbler, woodstorks, Sandhill crane, cormorant, black vulture, American Robin, tree swallow, Osprey, bald eagle, great blue heron, killdeer.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2/16/21

STATION 3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/17/21	6:47am	9:47am	Allyson Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:47am	59°	5mph NNW	100%	Stratus	n/a
Finish: 9:47am	61°	6mph NNW	100%	Stratus	light mist

Observation Point Information

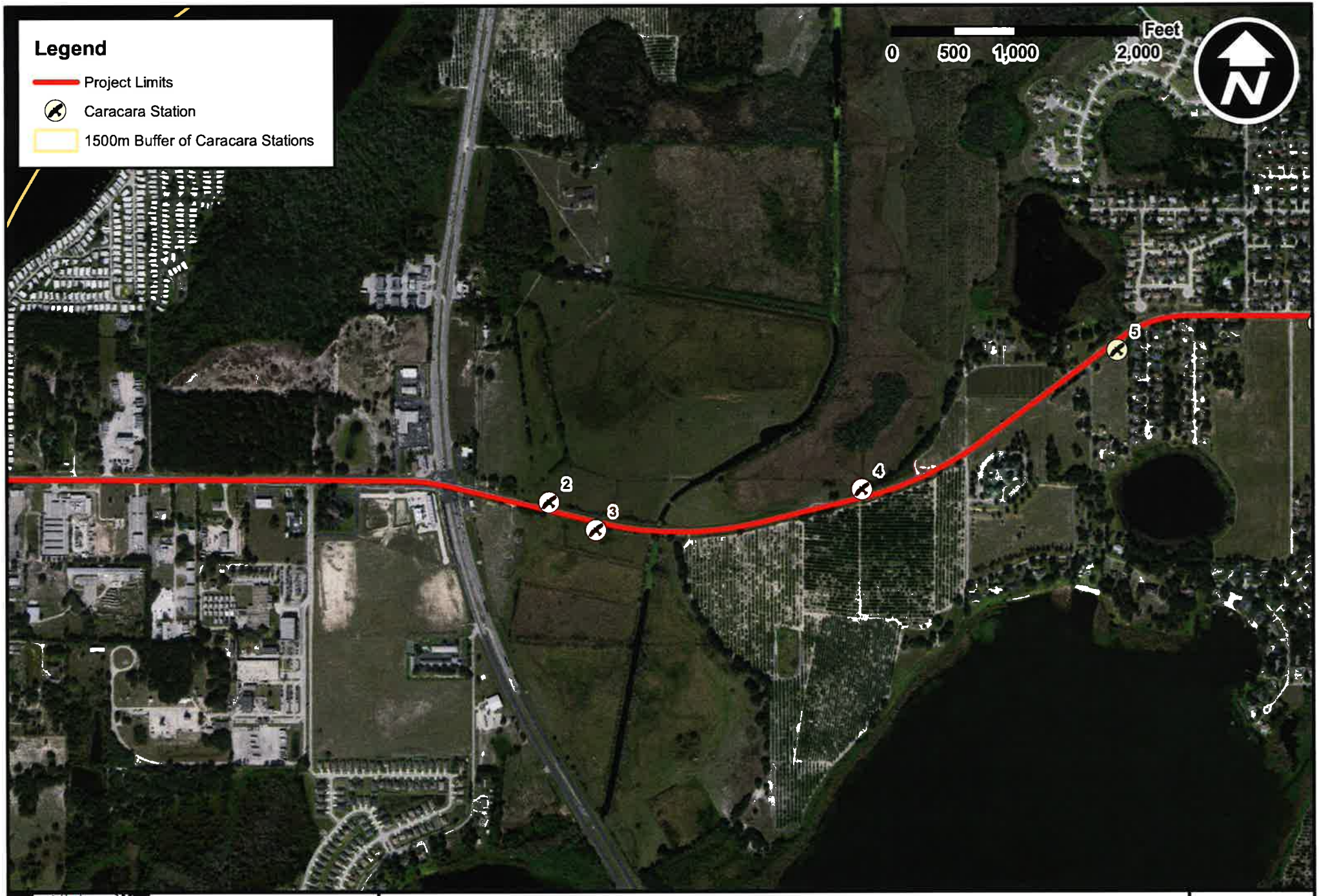
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

palm warbler, tree swallow, great blue heron, American robin, White ibis, osprey, great egret, cardinal, mourning dove, Sandhill crane, cormorant, eastern bluebird, American crow, boat tail grackle, red bellied woodpecker, black vulture, eastern phoebe



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2 / 17 / 21

STATION

4

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/18/21	6:46 am	9:46 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:46 am	71°F	S 11 mph	100%	stratus	N/A
Finish: 9:46 am	76°F	S 13 mph	60%	cumulus, stratocumulus	N/A

Observation Point Information

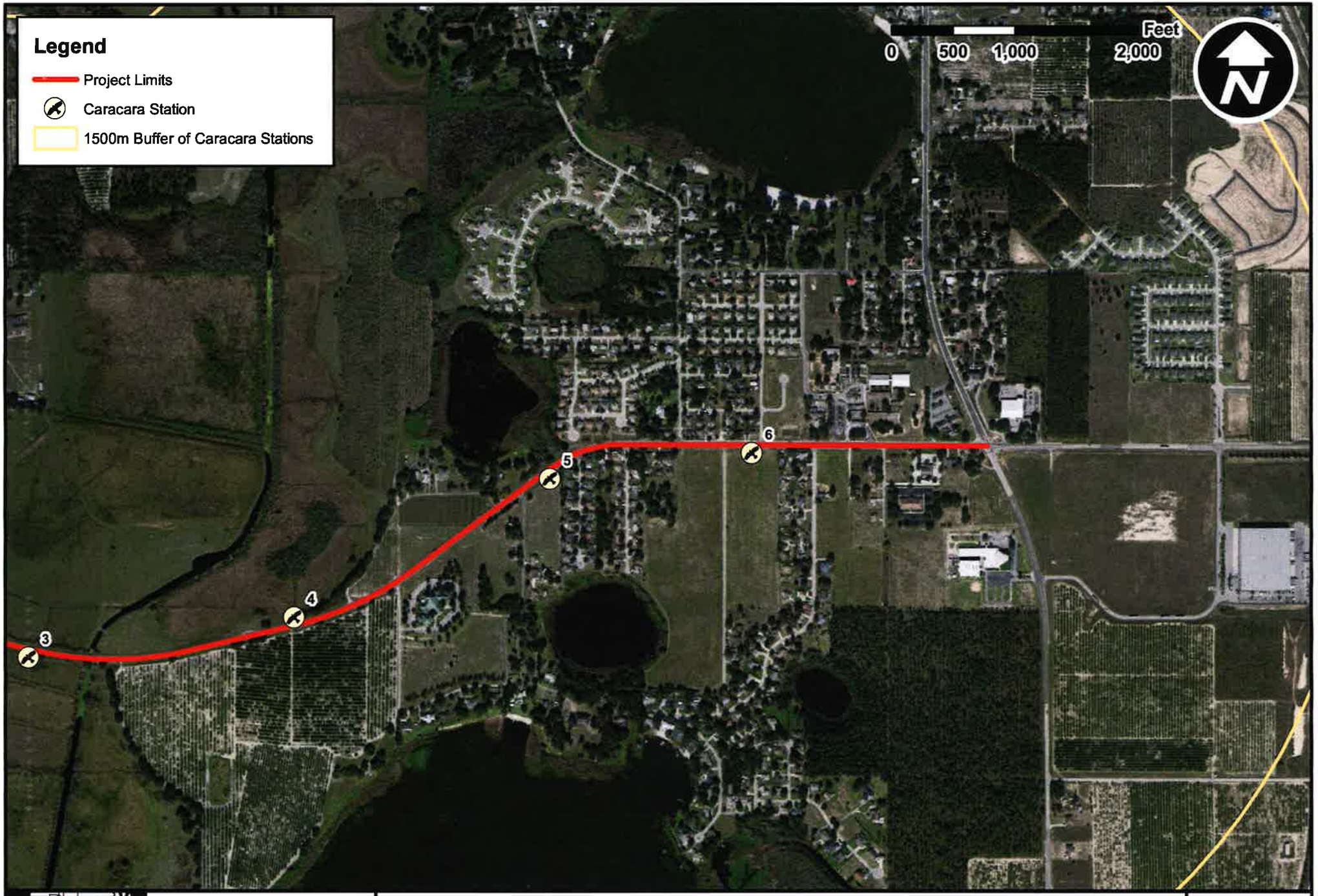
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: cormorant, gray squirrel, white ibis's, anhinga, fish crow, tern spp, red-bellied woodpecker, mourning dove, bluejay, wood duck, Sandhill crane, osprey, bald eagle, white-winged dove, turkey vulture, eastern phoebe, northern cardinal, tree swallow, black vulture, red-tailed hawk



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2 / 18 / 2021

STATION

5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
2/18/21	6:45a	9:45a	T. Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:45a	71°	S 11 mph	100%	cumulus	none
Finish: 9:45a	76°	S 12 mph	50%	cumulus	none

Observation Point Information

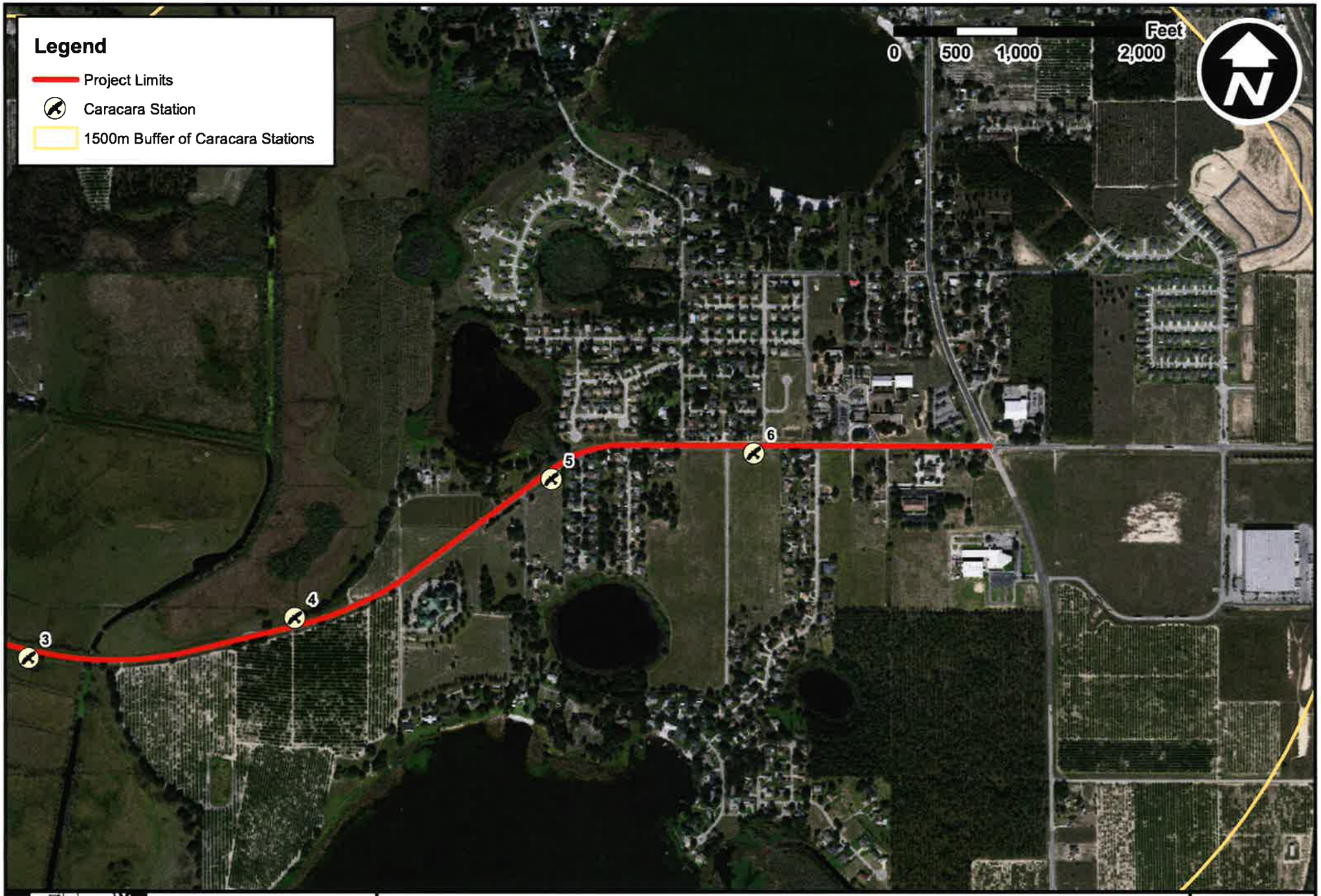
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

observed wildlife: killdeer; mourning dove; Kestrel; Sandhill crane; red cockaded woodpecker; cardinal; American Crow; grey squirrel; boat tailed grackle; American Robin; mockingbird; tree swallows; osprey; white ibis; red shouldered hawk; great white egret; turkey vulture;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd to SR17

Polk County, FL

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

No caracara observed

DATE 2/18/21

STATION

6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/2/21	6:35am	9:35 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:35am	71°F	NE 4 mph	100%	Stratus, Stratocumulus	N/A
Finish: 9:35am	71°F	ENE 4 mph	100%	Stratus	N/A

Observation Point Information

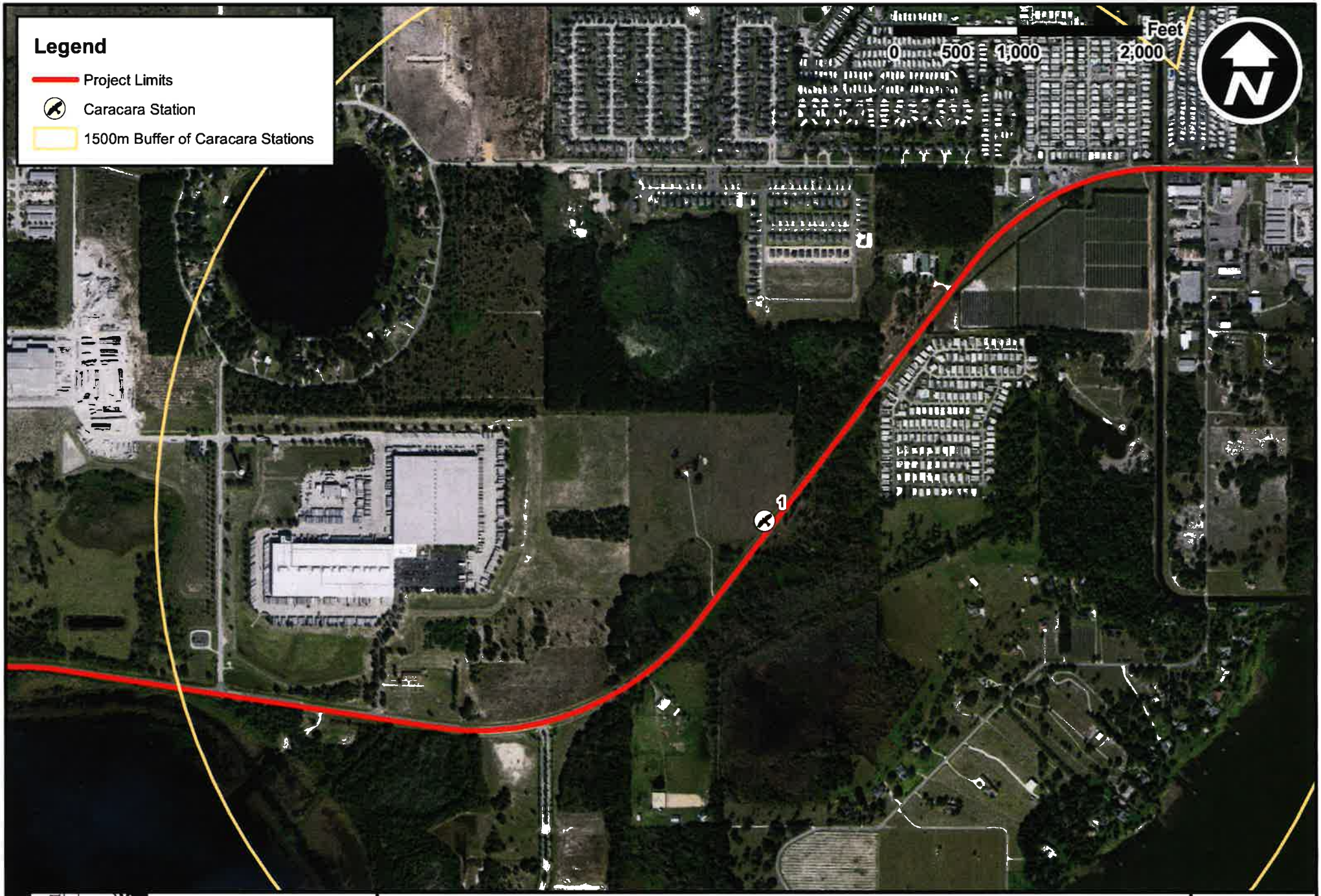
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

Wildlife observed: White ibis, sandhill crane, osprey, kestrel, cattle egret, eastern gray squirrel, crow, grackle, blue-gray gnatcatcher, American robin, gull spp., mockingbird, little blue heron



FDOT
District 1

State Road 544 (Lucerne Park Road)
From Martin Luther King Blvd
to SR17
Polk County, FL
FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/2/2021

STATION
1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/2/21	6:35a	9:35a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:35a	71°	NNE 4 mph	100%	cirrocumulus	none
Finish: 9:35a	70°	ENE 5 mph	100%	Stratocumulus	none

Observation Point Information

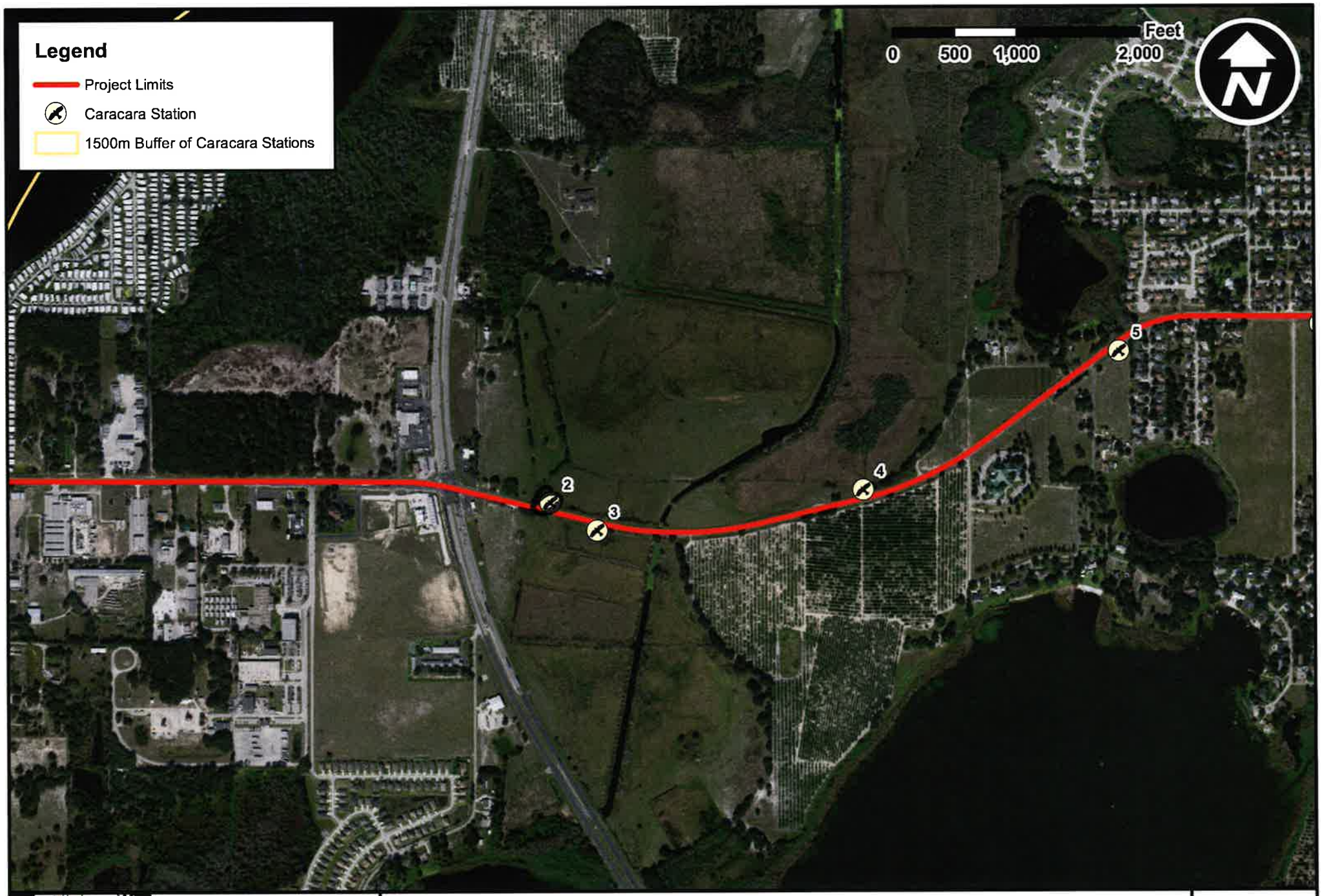
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

Observed wildlife: palm warbler; osprey; cattle egret; white ibis; American Crow; green anole; boat-tailed grackle; red shouldered hawk, cardinal; sandhill crane;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no concerns observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/2/24

STATION 2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/3/21	6:34 am	9:34 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:34 am	70°F	SSW 14 mph	100%	Stratocumulus	N/A
Finish: 9:34 am	71°F	W 14 mph	90%	Cumulus	N/A

Observation Point Information

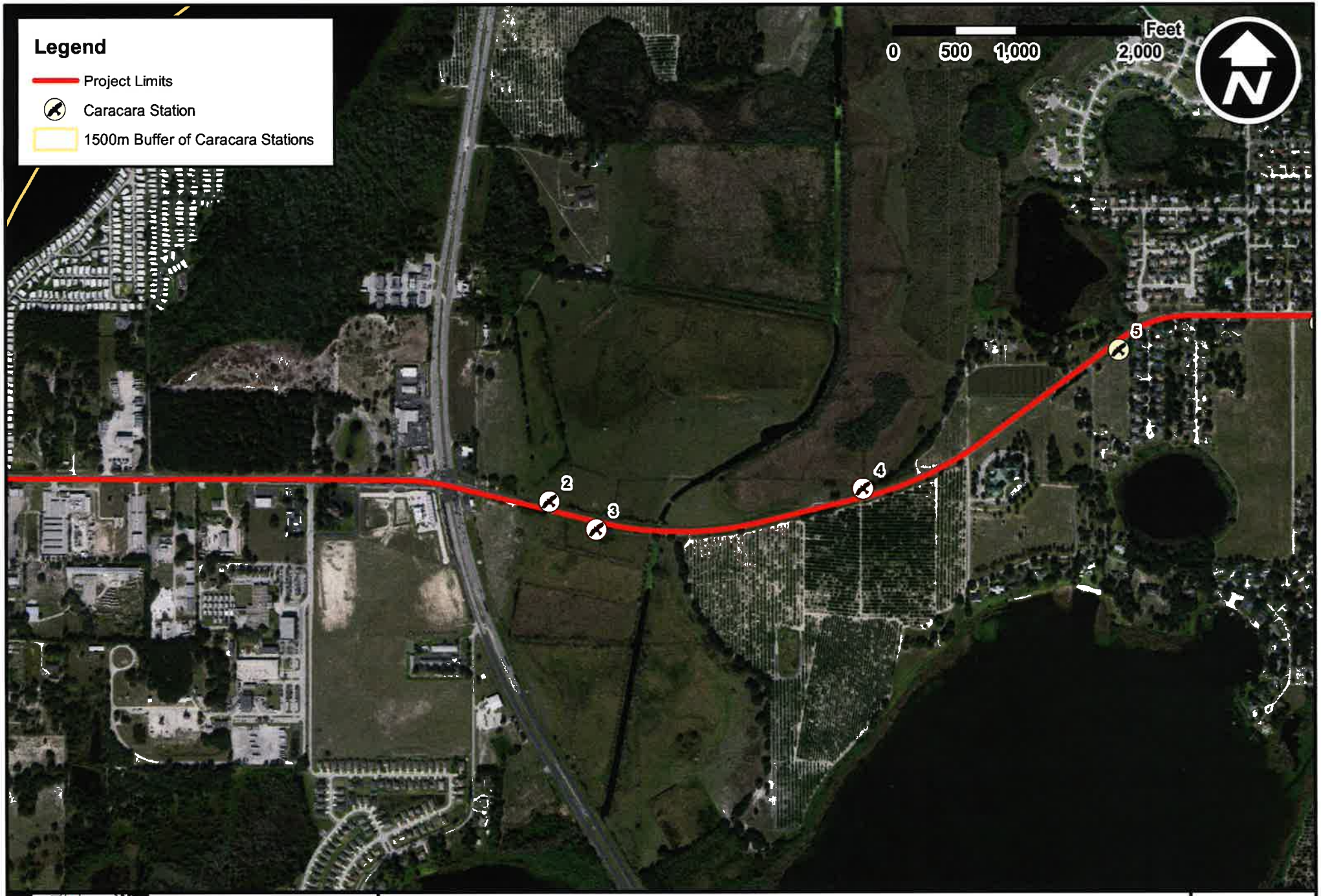
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

Wildlife observed: Sandhill crane, common grackle, osprey, eastern meadowlark, crow, red-bellied woodpecker, northern harrier, mourning dove, tree swallow, great egret, American robin, tricolor heron, white ibis, great blue heron, cormorant, black vulture, swallow-tailed kite



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No Caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 2/3/2021

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3.3.21	6:35a	9:35a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:35a	71°	SSW 12mph	100%	Stratocumulus	none
Finish: 9:35a	71°	W 14mph	100%	cumulus	none

Observation Point Information

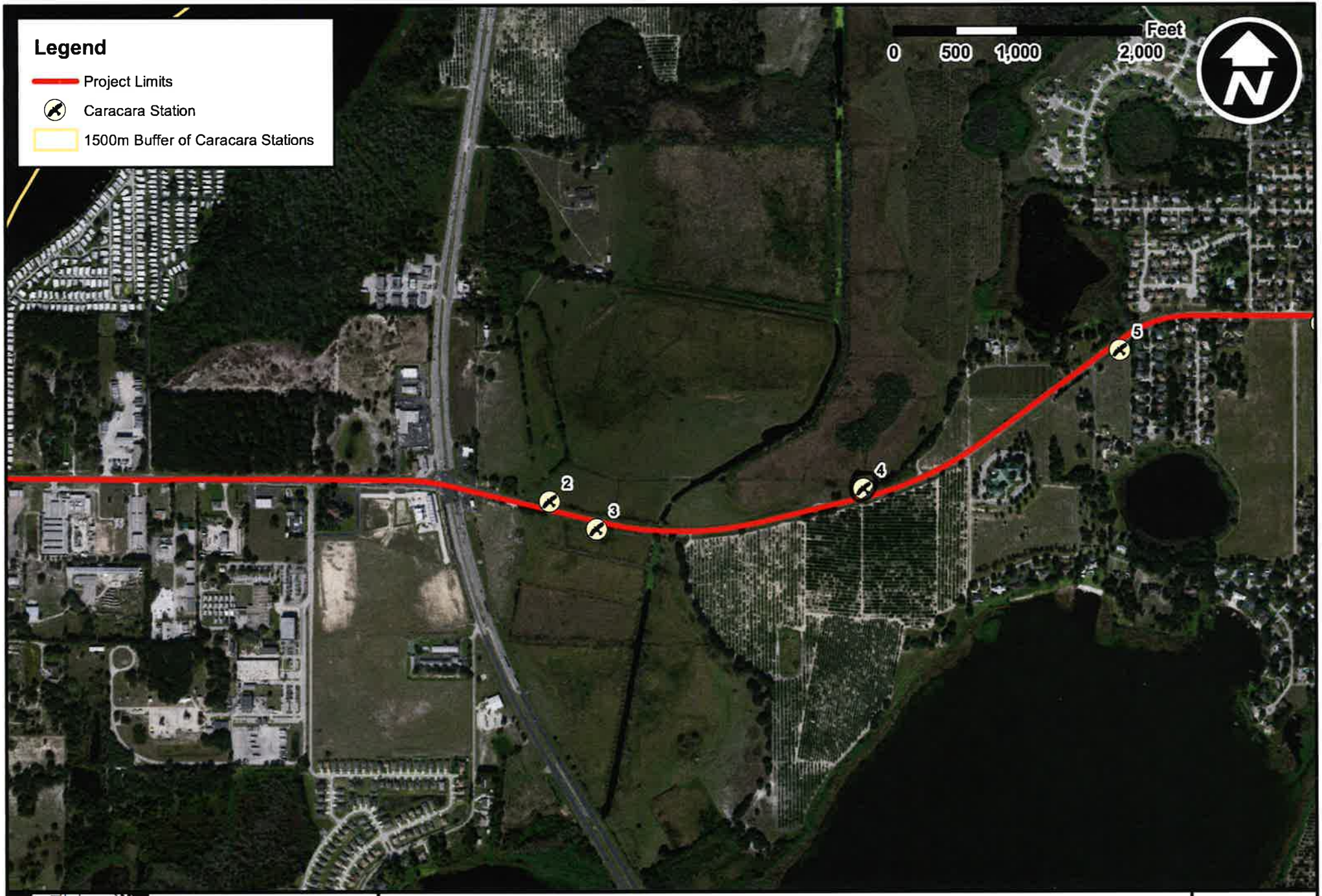
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no cara cara observed

Observed wildlife @ Osprey; common grackle; American Crow; mottled ducks; cattle egret; boat tailed grackle; palm warbler; Robin; white egret; black vulture



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no concerns observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/3/24

STATION

4

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/4/21	6:33 am	9:33 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:33 am	57°F	NNW 8 mph	100%	stratus	N/A
Finish: 9:33 am	58°F	N 10 mph	100%	stratus	N/A

Observation Point Information

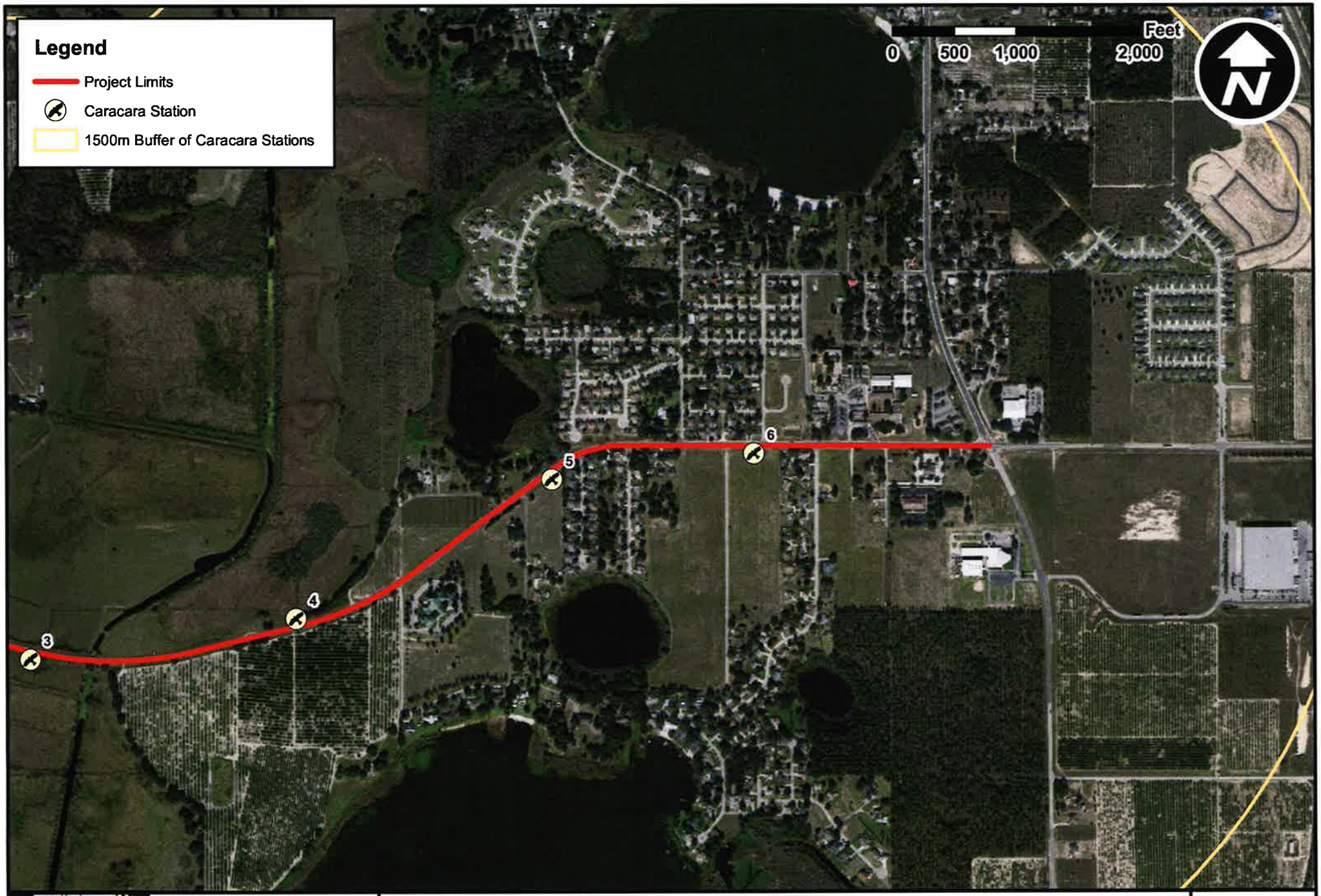
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

Wildlife observed: wood duck, sandhill crane, white ibis, bluejay, white-winged dove, mourning dove, tree swallow, American robin, osprey, American crow, red-bellied woodpecker, boat-tailed grackle, eastern gray squirrel, eastern mockingbird, cormorant, cattle egret, turkey vulture, red-shouldered hawk



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3 / 4 / 2021

STATION

5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544
Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3.4.21	6:34a	9:35a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:34a	57°	NNW 8 mph	100%	nimbostratus	none
Finish: 9:35a	58°	N 10 mph	100%	nimbostratus	none

Observation Point Information

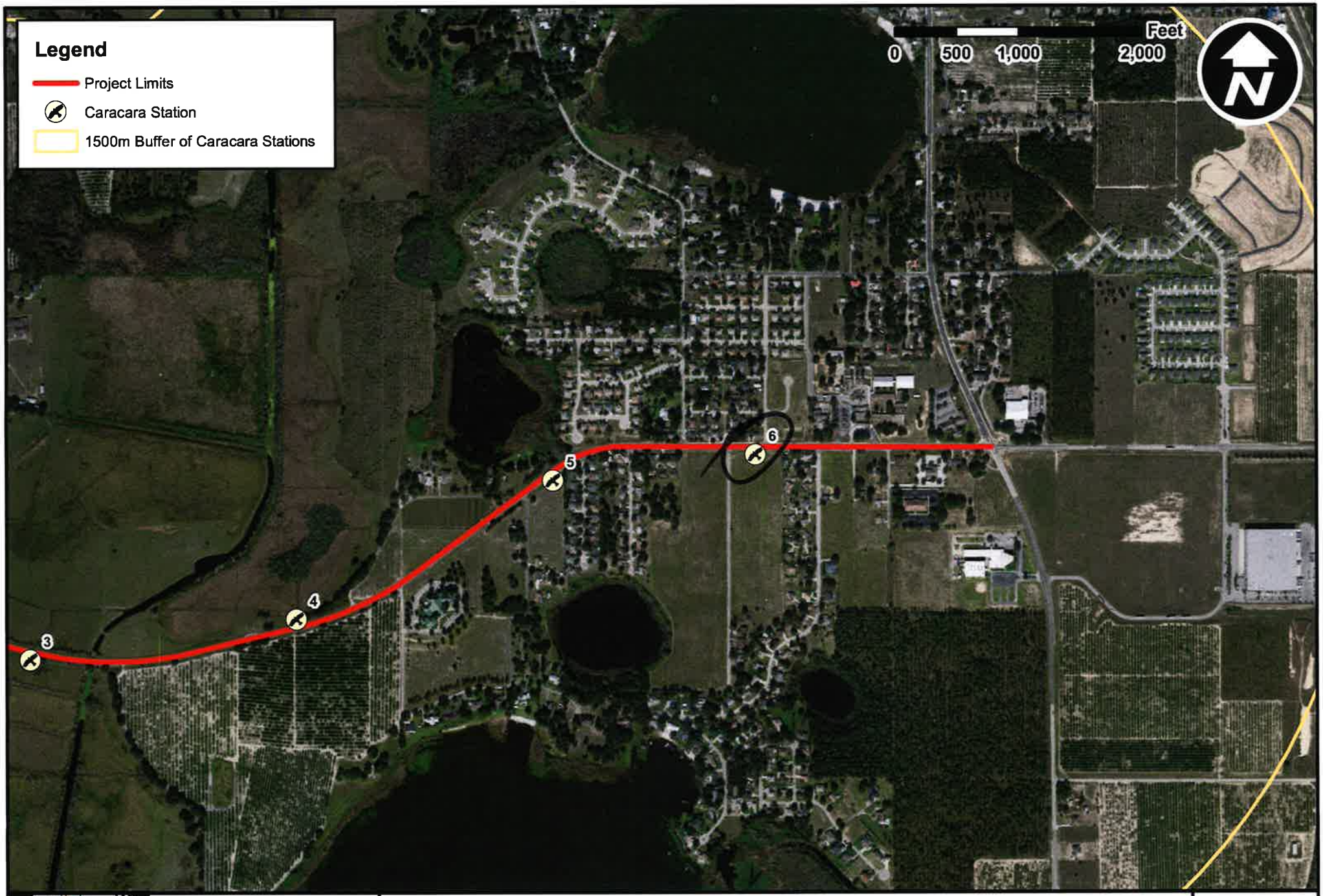
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

observed wildlife: white ibis; American Crow; cattle egret; boat tailed grackle; killdeer; palm warbler; sandhill crane; turkey Vulture; tree swallow; common grackle; mourning dove; turkey vulture;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

No Cara - Cara observed

DATE 3/4/21

STATION

6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/16/21	7:20 am	10:20 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:20am	64°F	S 5 mph	20%	cirrus	N/A
Finish: 10:20am	73°F	S 10 mph	10%	cirrus, cumulus	N/A

Observation Point Information

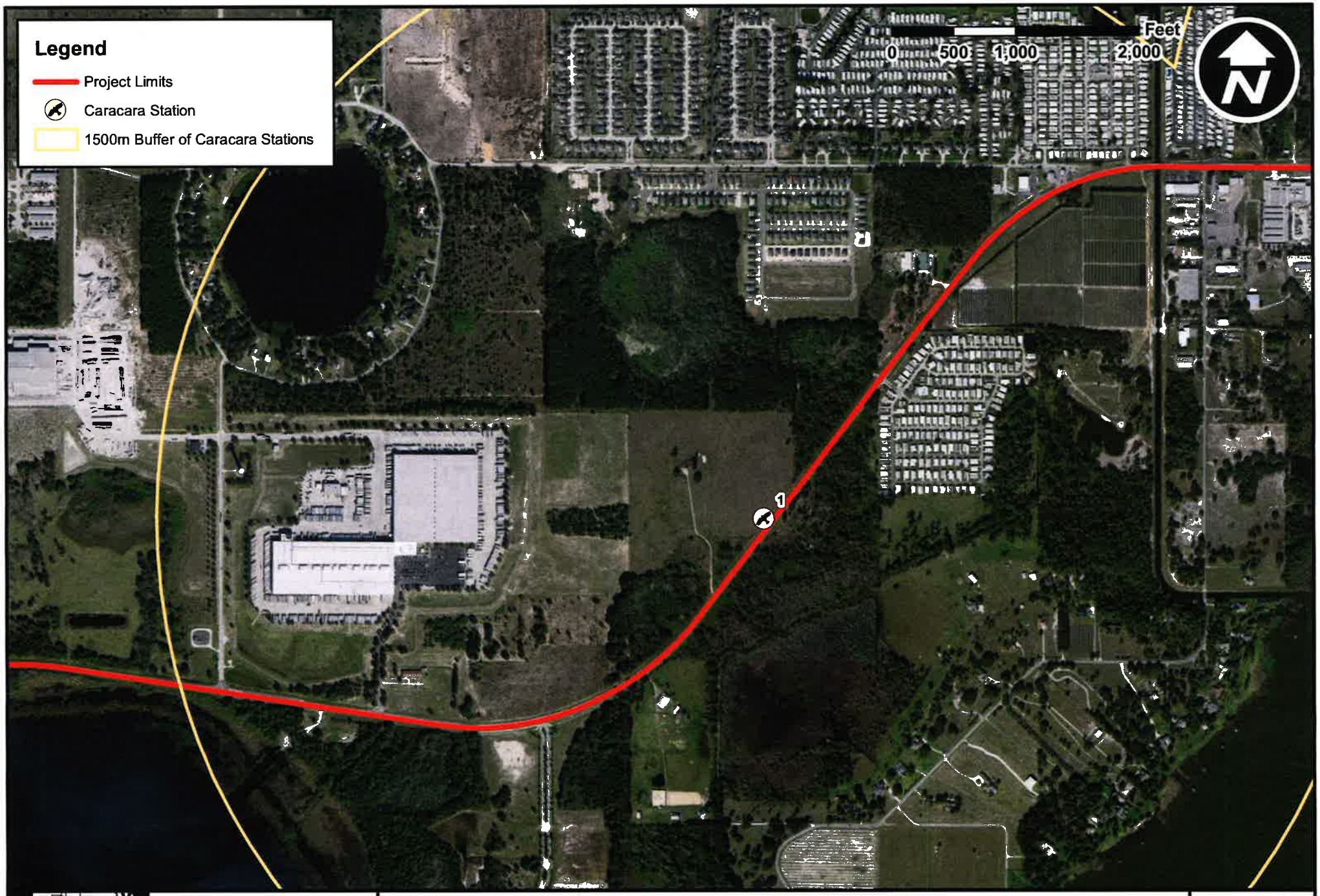
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No Caracara observed

wildlife observed: sandhill crane, white ibis, glossy ibis, American crow, kestrel, osprey, cattle egret, mourning dove, great egret, red-bellied woodpecker, black-bellied whistling-duck, great blue heron, Northern mockingbird, blue jay, black vulture, cormorant, turkey vulture, common grackle



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/16/2021

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/16/21	7:19a	10:21a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:19a	63°	5 mph	5%	cirrus	none
Finish: 10:21a	73°	5/10 mph	15%	cirrus/ cumulus	none

Observation Point Information

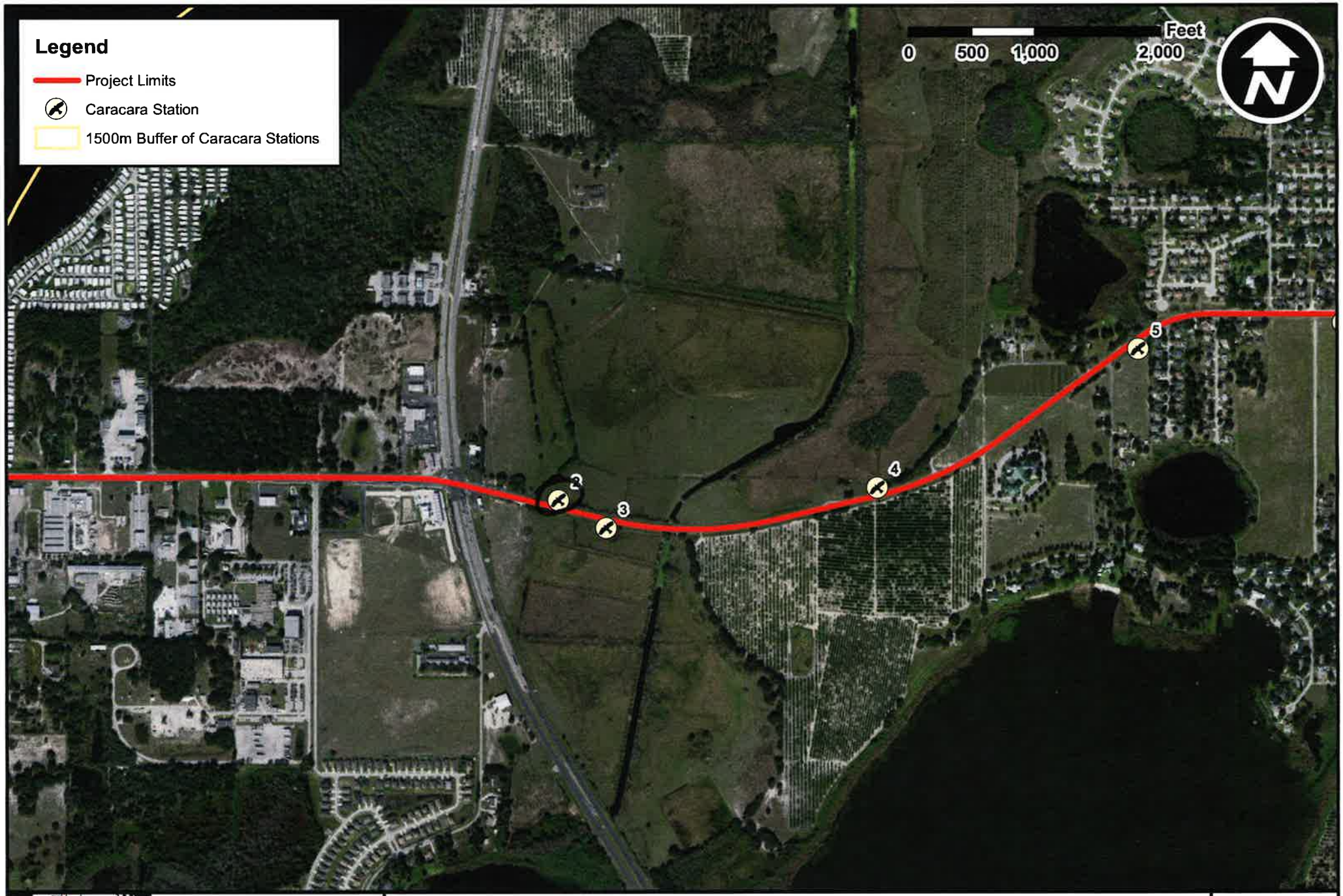
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

observed wildlife: cardinal; palm warbler; fish crow; boat tailed grackle; little blue heron; morning dove; white ibis; redbellied woodpecker; osprey; cormorant; killdeer; cattle egret; sandhill crane.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/16/24

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/17/21	7:18 am	10:18 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:18am	65°F	E 3mph	0%	N/A	light, lifting fog
Finish: 10:18am	75°F	S 13mph	0%	N/A	N/A

Observation Point Information

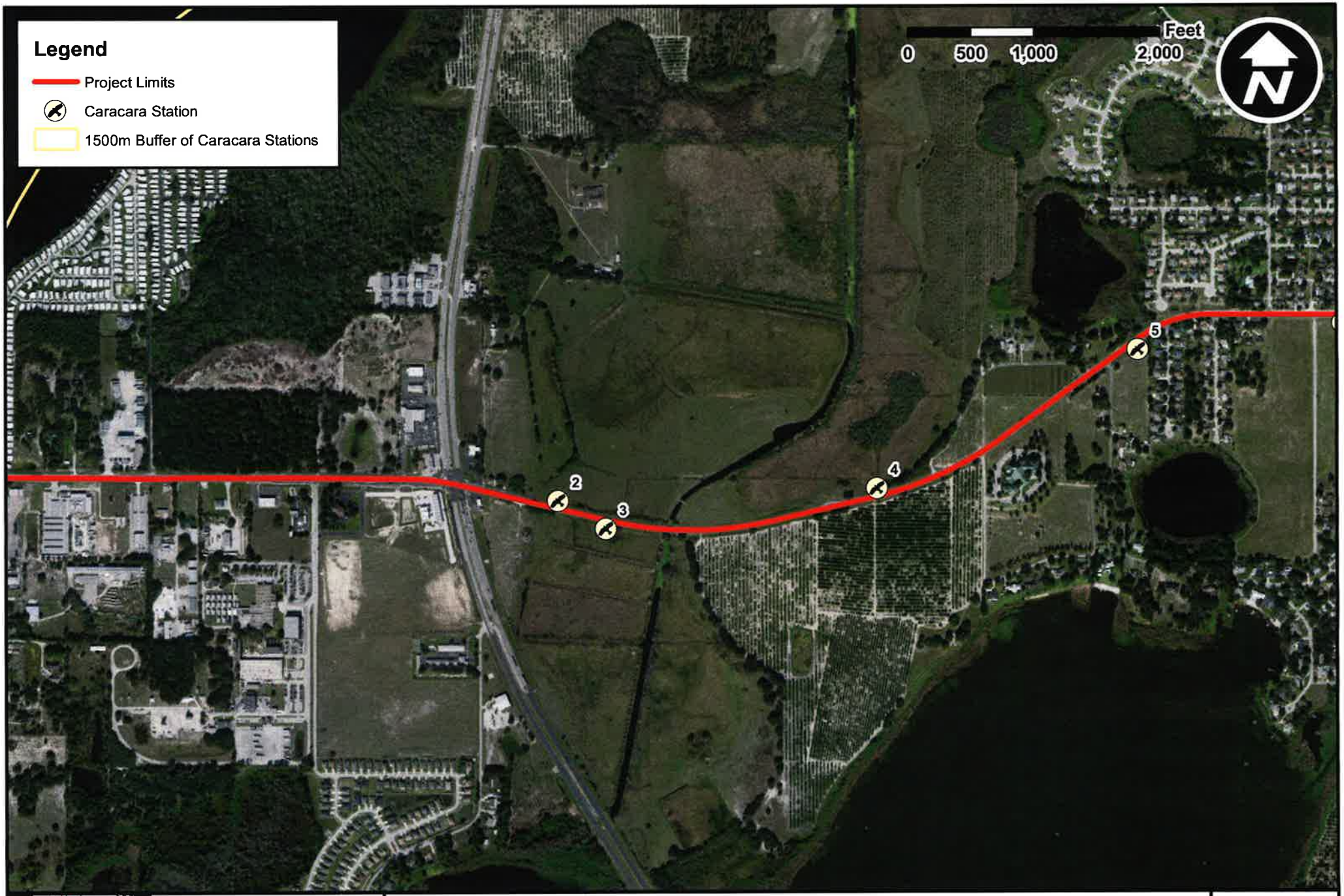
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: osprey, white ibis, cattle egret, tricolor heron, sandhill crane, black vulture, boat-tailed grackle, glossy ibis, red-winged blackbird, great blue heron, eastern bluebird, cormorant, eastern meadowlark, red-bellied woodpecker, mourning dove, great egret, turkey vulture, tree swallow, northern harrier



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3 / 17 / 2021

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/17/21	9:20a	10:23a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 9:20a	63°	E3mph	5%	Cirrus	none
Finish: 10:23a	75°	S14mph	5%	cirrus	none

Observation Point Information

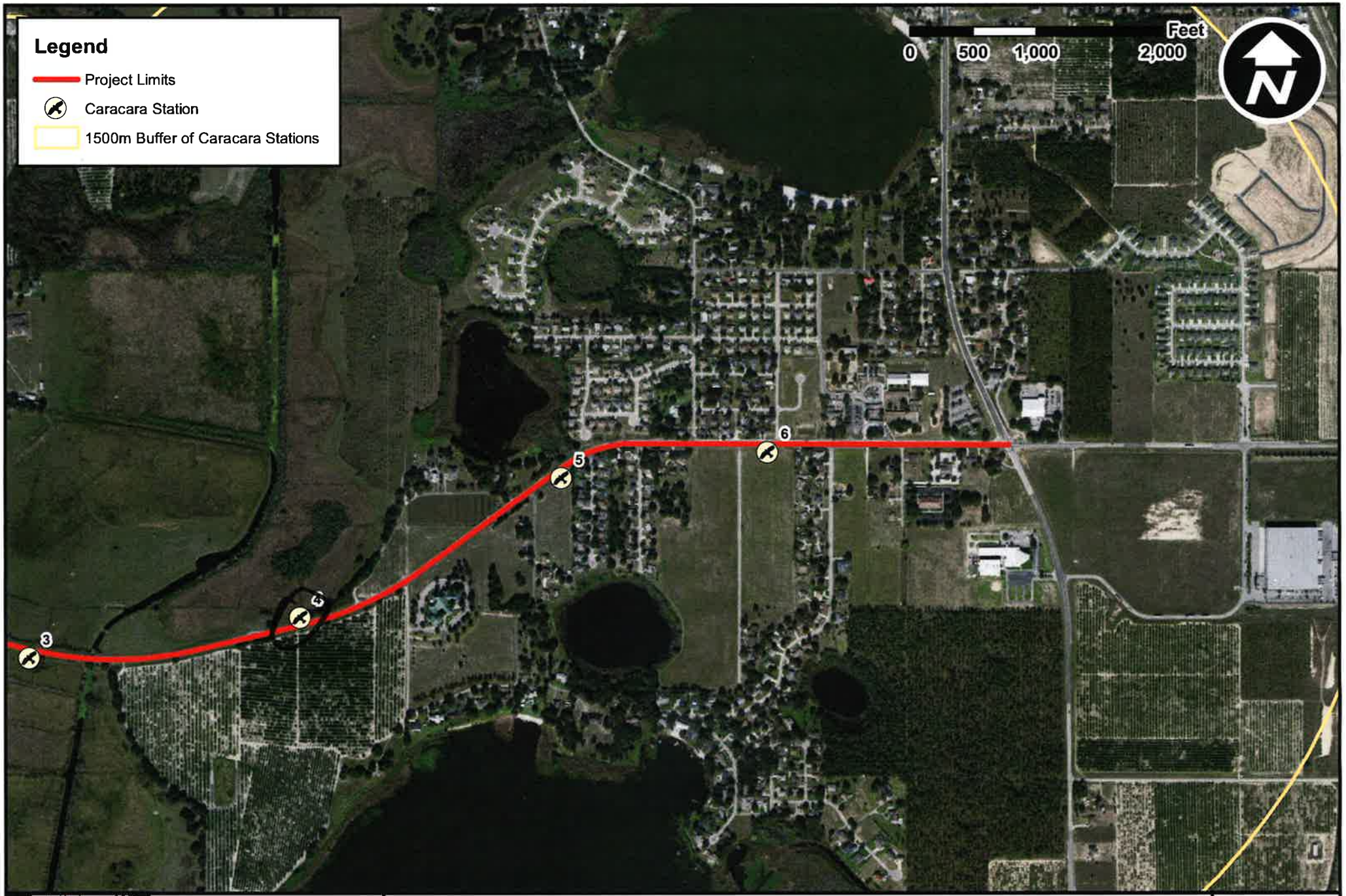
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

observed wildlife: mourning dove; white ibis; cattle egret; boat tailed grackle; osprey; house wren; black vulture; cormorant; mockingbird; red winged blackbird; sandhill crane;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/17/21

STATION

4

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544 PD:E

Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3.18.2021	7:20 AM	10:27 AM	J. Starkhorst

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:20 AM	71°F	5-8 mph S	60%	Stratus	NO
Finish: 10:27 AM	74°F	10 mph SSW	75%	Cumulus Stratus	NO

Observation Point Information

General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			NO Caracara observed

Cormorant, blue jay, white ibis, mourning dove, osprey, black vulture, Cardinal, red bellied w.p., American Crow, Sandhill crane, great egret

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

J. Berkowitz
NO Caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3 / 18 / 2021

STATION

5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/18/2021	7:17am	10:17am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:17am	68°	8mph S	65%	cirrus	n/a
Finish: 10:17am	75°	14mph S	50%	cumulus s	n/a

Observation Point Information

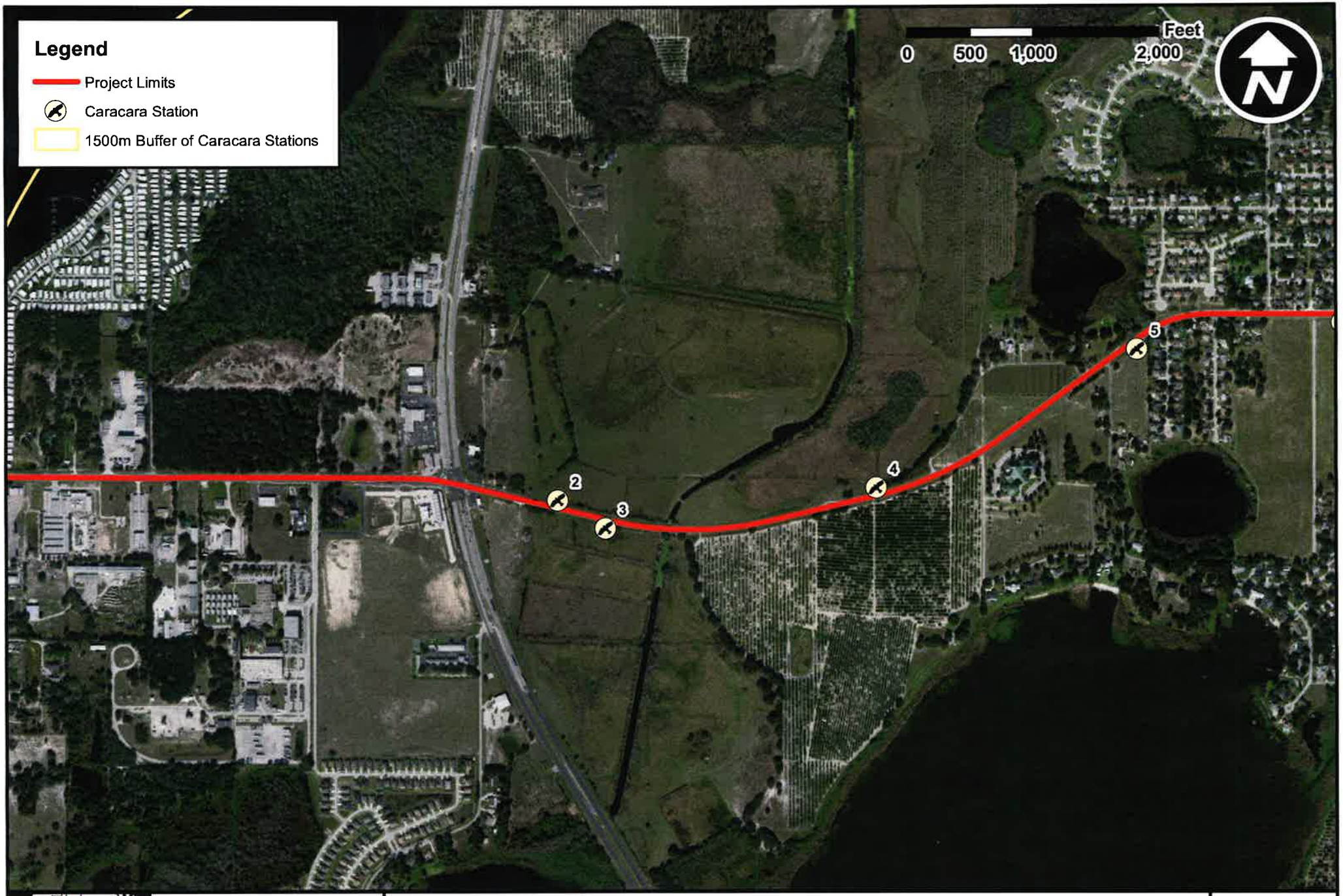
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			n/a no cara cara observed

American crow, blue jay, SE kestrel, boat tail grackle, white ibis, great egret, tree swallow, Cattle egret, sandhill crane, wood duck, red shoulder hawk, Osprey, common grackle, turkey vulture, mourning dove, red bellied woodpecker, belted kingfisher, northern mockingbird, eastern meadowlark, bald eagle (juv.), black vulture,



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/19/21

STATION

6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/30/21	7:05	10:06	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:05	69°	ENE 6 mph	100%	cumulus	none
Finish: 10:06	77°	E 8 mph	75%	cumulus	none

Observation Point Information

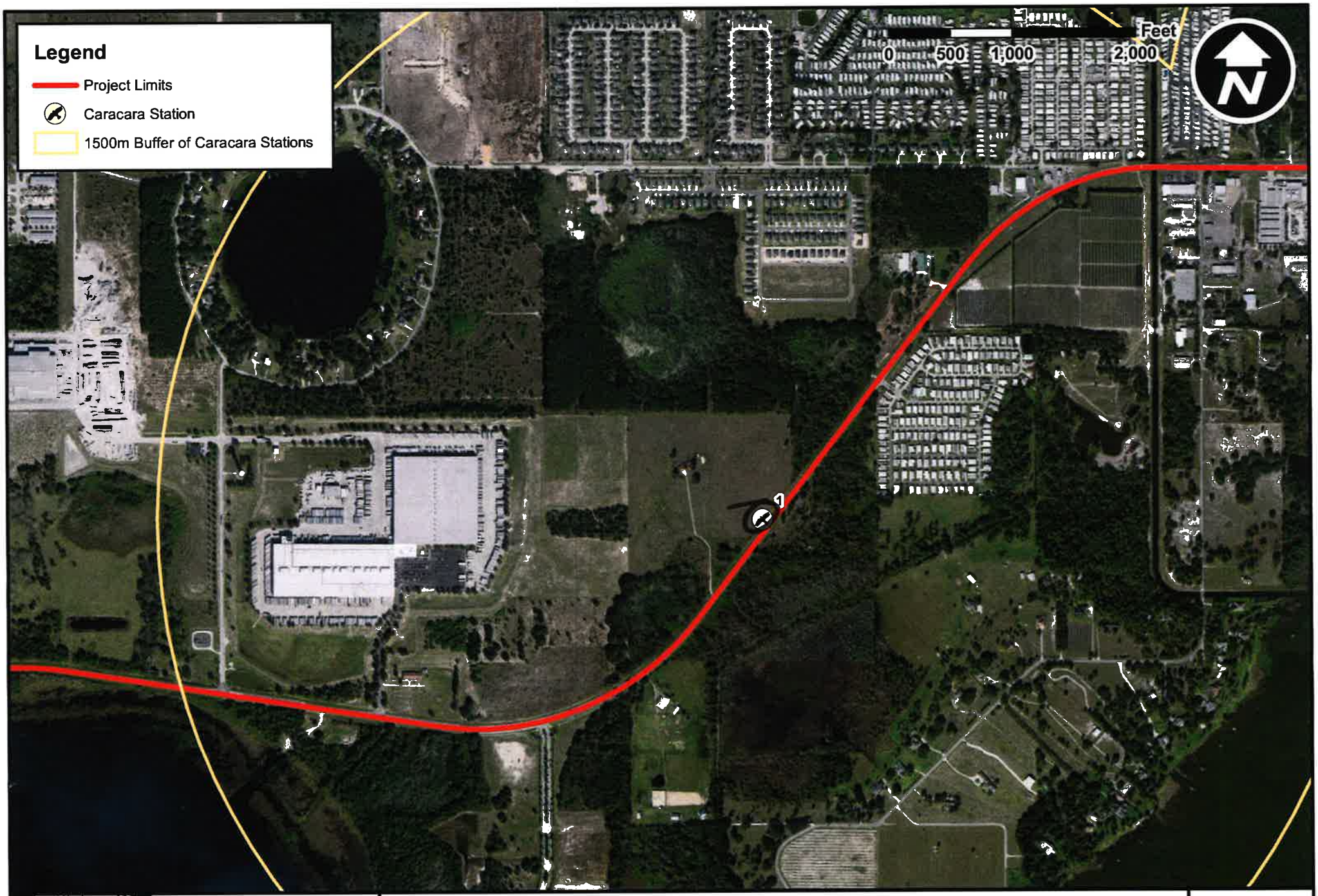
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

Observed wildlife: American crow; boat tailed grackle; white ibis; mourning dove; osprey; bald eagle; mocking bird; cardinal; cattle egret; black vulture; red shouldered hawk; palm warbler;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

No caracara observed

DATE 3/30/21

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/30/21	7:05 am	10:05 am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:05	64°	5mph ENE	98%	cumulous/stratus	n/a
Finish: 10:05	76°	7mph E	85%	stratus/cumulonimbus	n/a

Observation Point Information

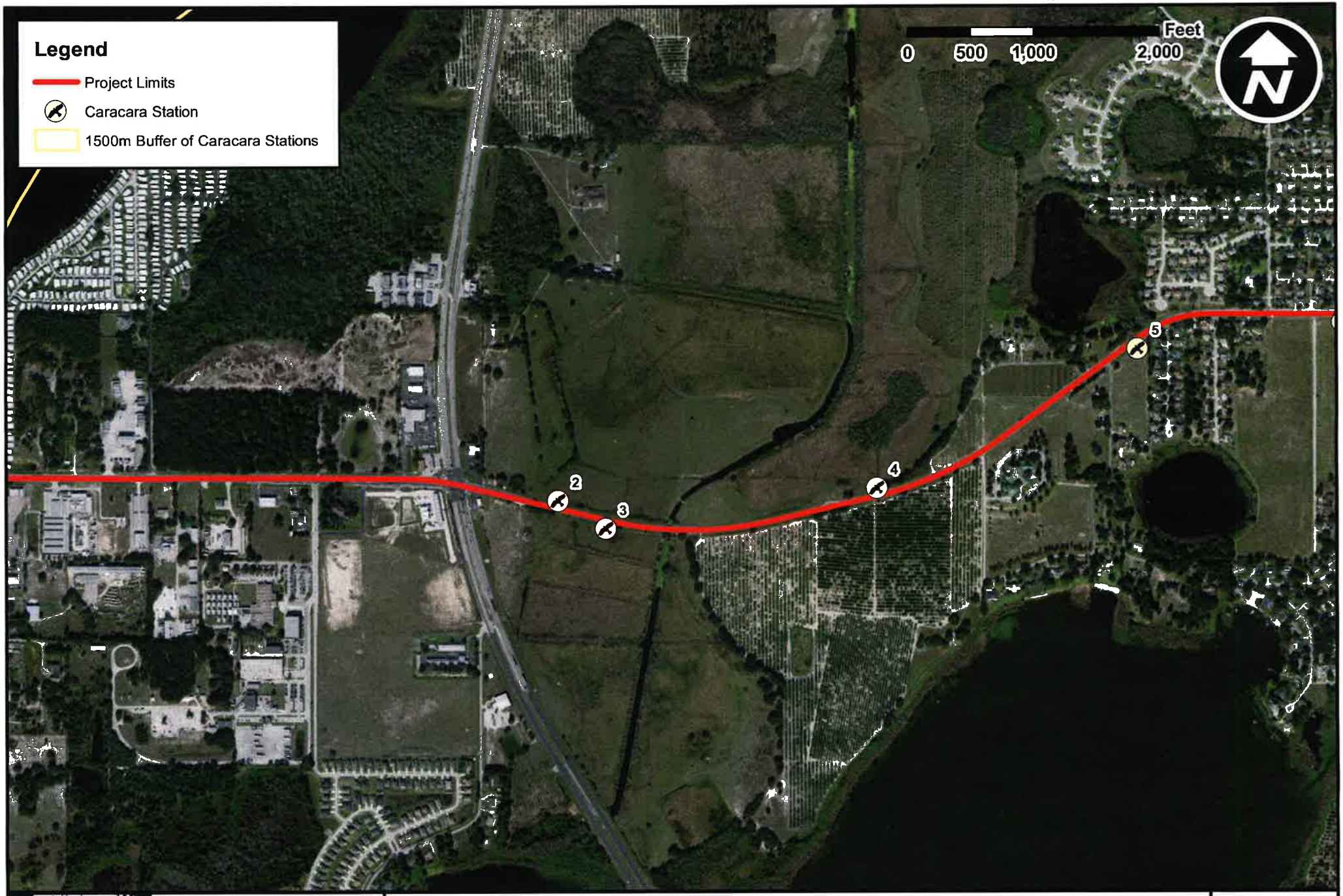
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
n/a			no caracara observed

osprey, great blue heron, white ibis, eastern meadowlark, red-winged blackbird, palm warbler, American crow, cormorant, cattle egret, glossy ibis, common grackle, mockingbird, red bellied woodpecker, eastern bluebird, catbird, cedar waxwing, mourning dove, yellow-rumped warbler, great egret, black vulture, mottled duck,



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/30/21

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/31/21	7:02 am	10:02 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:02am	70°F	SE 2 mph	5%	cirrus	N/A
Finish: 10:02am	78°F	SSE 8 mph	40%	cumulus, cirrus	N/A

Observation Point Information

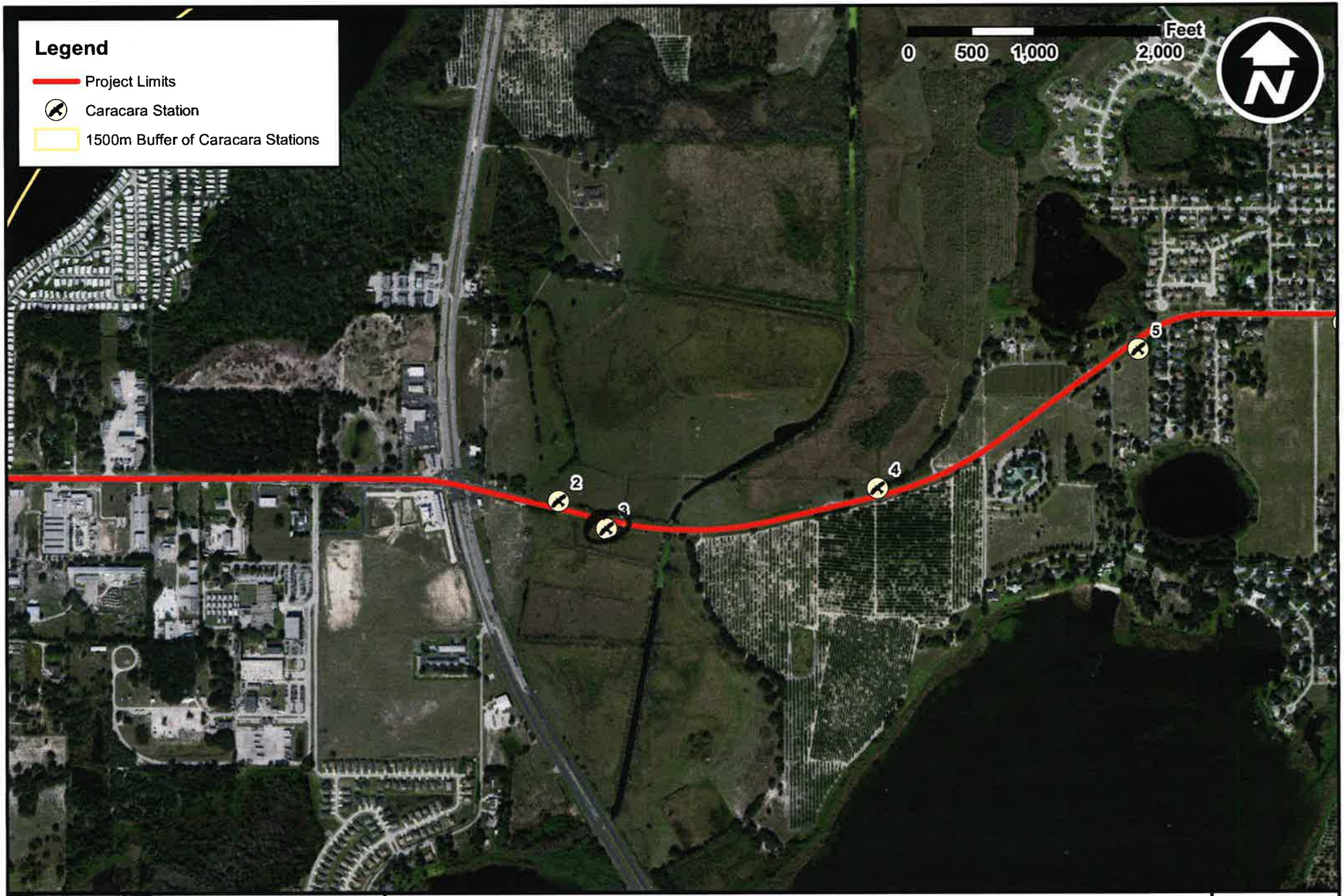
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: white ibis, red-winged blackbird, osprey, black vulture, cattle egret, anhinga, northern harrier, cormorant, eastern meadowlark, great blue heron, glossy ibis, tri color heron, American crow, common grackle, great egret, cedar waxwing, sandhill crane, red-bellied woodpecker, eastern bluebird, little blue heron, bald eagle, turkey vulture



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/24/21

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station ~~#~~ 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
3/31/21	7:02a	10:03a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:02	70°	SE 2 mph	20%	Cirrus	none
Finish: 10:03a	78°	SSE 8 mph	75%	cumulus	none

Observation Point Information

General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

Observed wildlife: white ibis; osprey; American crow; mottled duck; great egret; cormorant; Boat tailed grackle; red bellied woodpecker; red winged blackbird; little blue heron; great heron; turkey vulture; Palm warbler; red tailed hawk; swallow tailed kite; mockingbird; gray fox

District 1

State Road 544 (Lucerne Park Road)
From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 3/31/2021

STATION 4

USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/1/21	7:01 am	10:01 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:01am	69°F	W 4 mph	10 %	cirrus	light, lifting fog
Finish: 10:01am	74°F	NNW 8 mph	70%	cirrocumulus	N/A

Observation Point Information

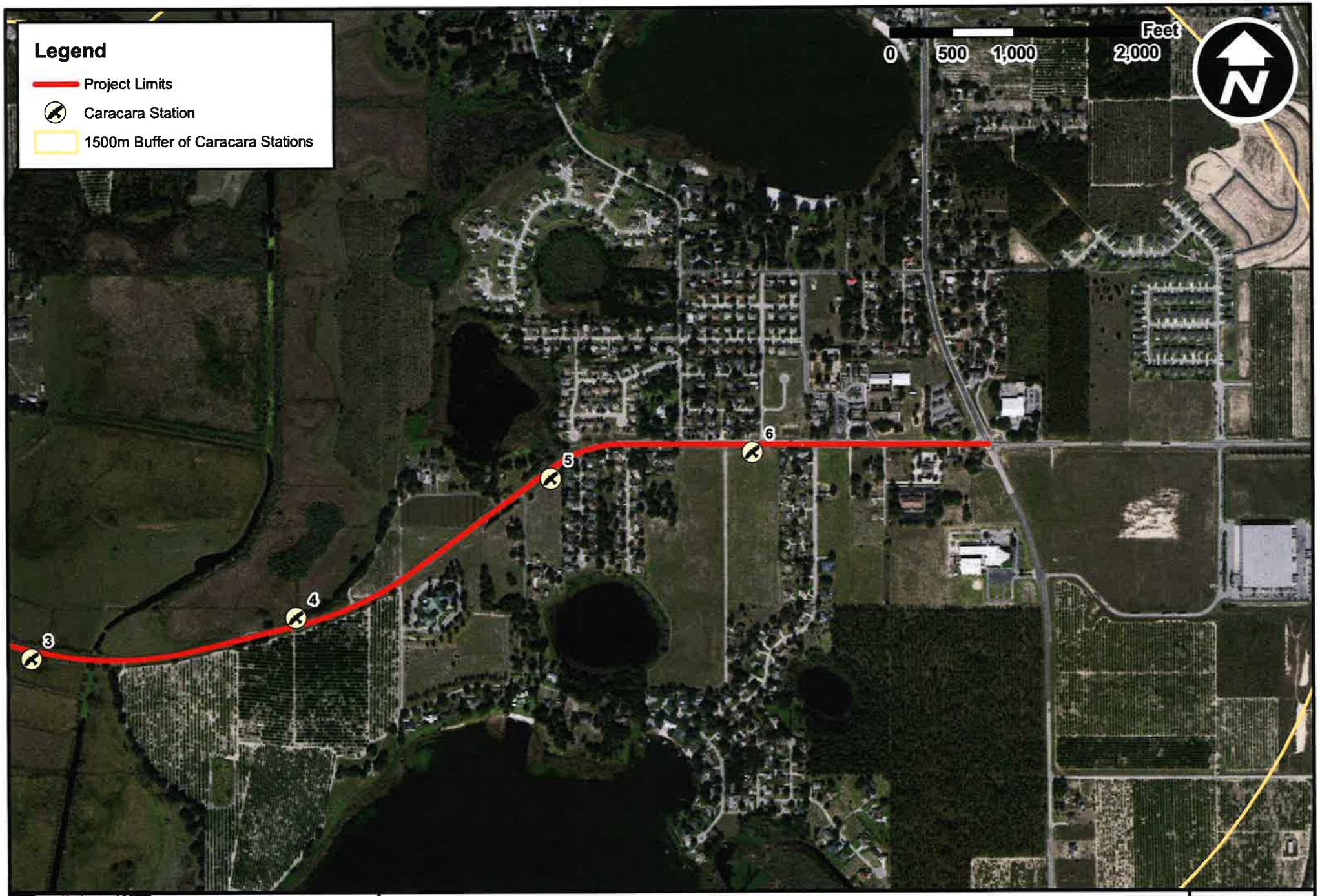
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: blue jay, white ibis, red-shouldered hawk, anhinga, red-bellied woodpecker, cattle egret, wood duck, black-bellied whistling-duck, sandhill crane, American crow, common grackle, eastern gray squirrel, green heron, red-tailed hawk, tree swallow, white-winged dove, osprey, northern cardinal



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4 / 1 / 2021

STATION

5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR541

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/1/21	7:02am	10:02am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 7:02am	69°.	4mph W	10%.	stratus	light fog
Finish: 10:02am	74°.	8mph NNW	50%.	stratus, cumulostratus	n/a

Observation Point Information

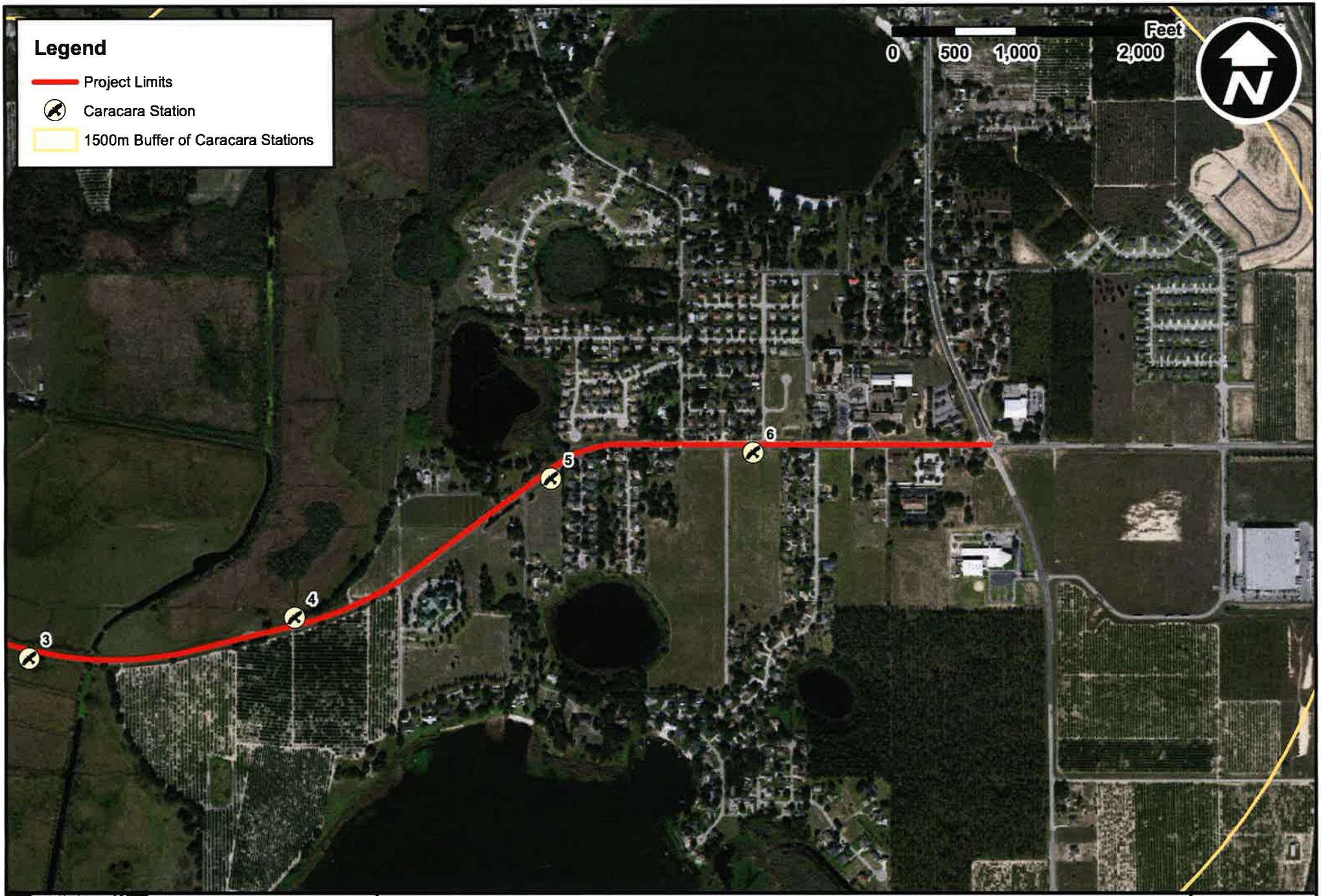
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

American crow, Osprey, White ibis, Great egret, common grackle, boat-tailed grackle, mourning dove, Sandhill crane, black vulture, red shoulder hawk, red-winged blackbird, Cattle egret, red-bellied woodpecker, tree swallow, Cormorant, cedar waxwing, mockingbird, Woodstork, bluejay,



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no Caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/1/21

STATION

6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/13/21	6:50a	9:51a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:50a	60°	WSW 1mph	0%	n/a	none
Finish: 9:51a	73°	NW 6mph	0%	n/a	none

Observation Point Information

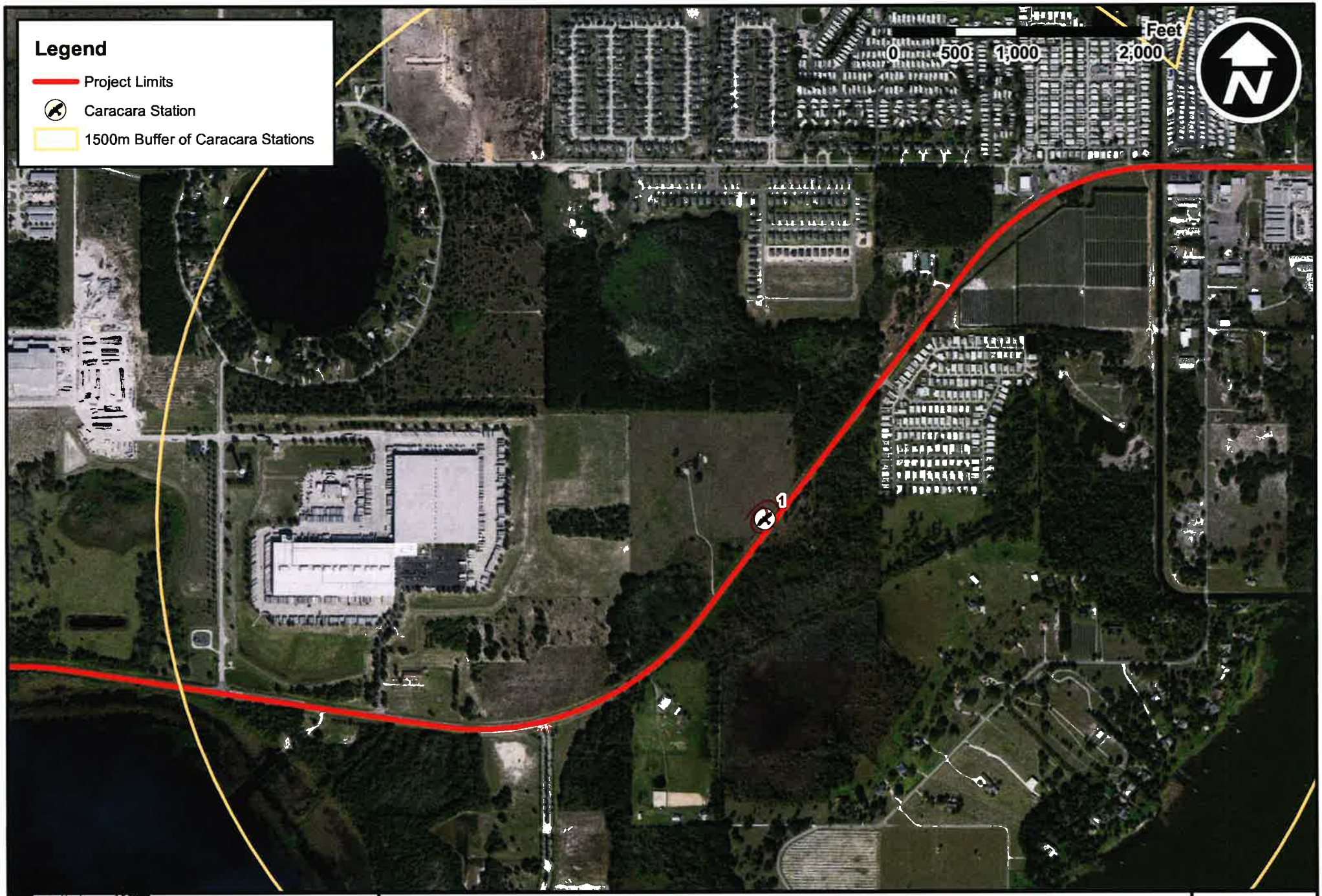
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

Observed wildlife: Osprey; sandhill crane; bald eagle; American Crow; mourning dove; cardinal; boat-tailed grackle; cattle egret; great egret; mockingbird; tree swallow; little blue heron;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No Caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/13/21

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/13/21	6:48am	9:48am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:48a	59°	1 mph W	0%	n/a	light fog
Finish 9:48a	73°	7 mph NNW	0%	n/a	n/a

Observation Point Information

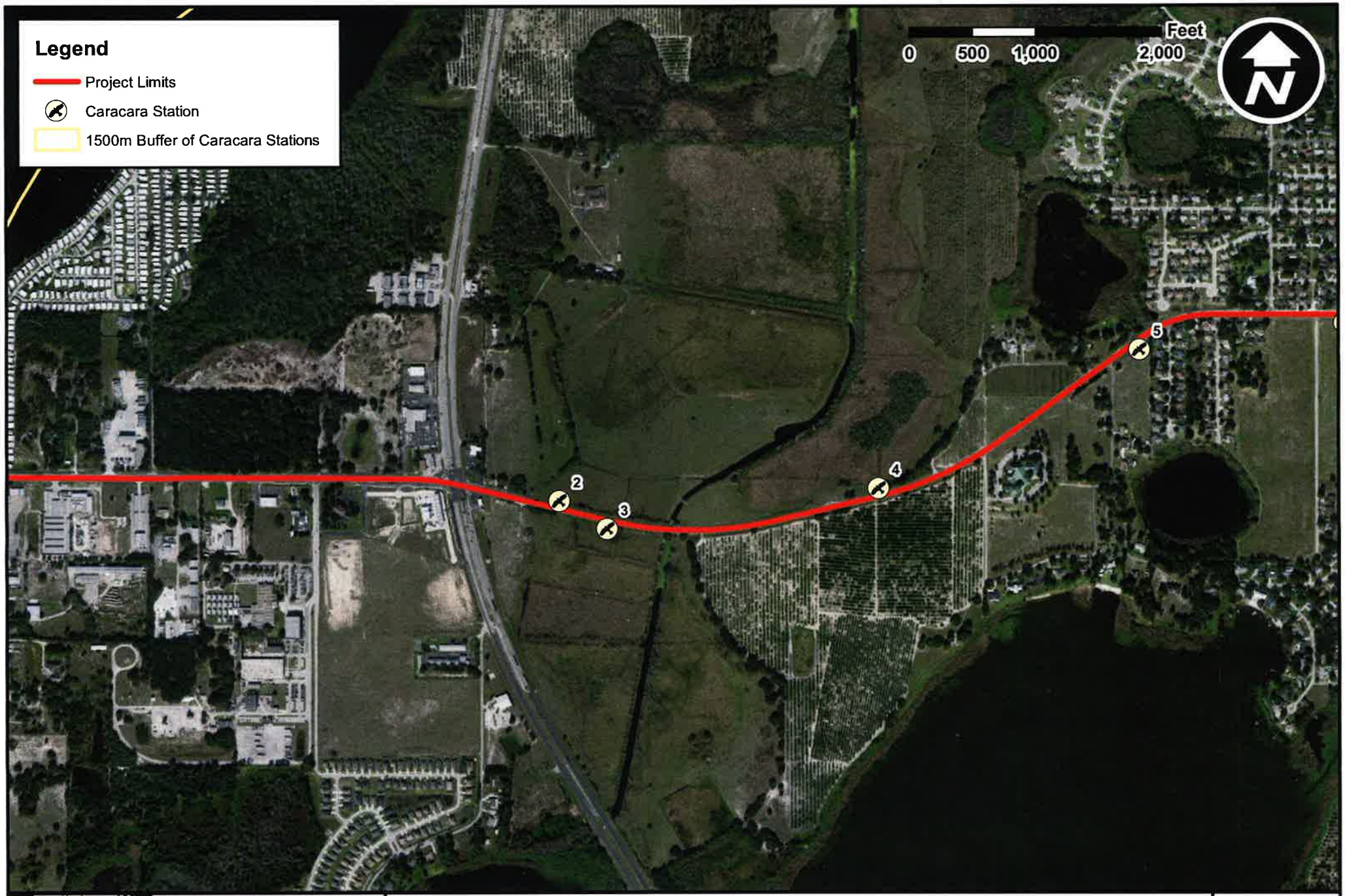
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

Common grackle, meadowlark, white ibis, american coot, great egret, osprey, mottled duck, cattle egret, American crow, red-winged blackbird, great blue heron, cardinal, palm warbler, cormorant, black vulture, Sandhill crane, Cedar waxwing, boat-tailed grackle, black bellied whistling duck, red-bellied woodpecker,



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/13/21

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
6/14/24	6:45a	9:45a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:45a	64°	E 2mph	10%	cirrus	none
Finish: 9:45a	73°	ESE 6mph	20%	cirrus cirrocumulus	none

Observation Point Information

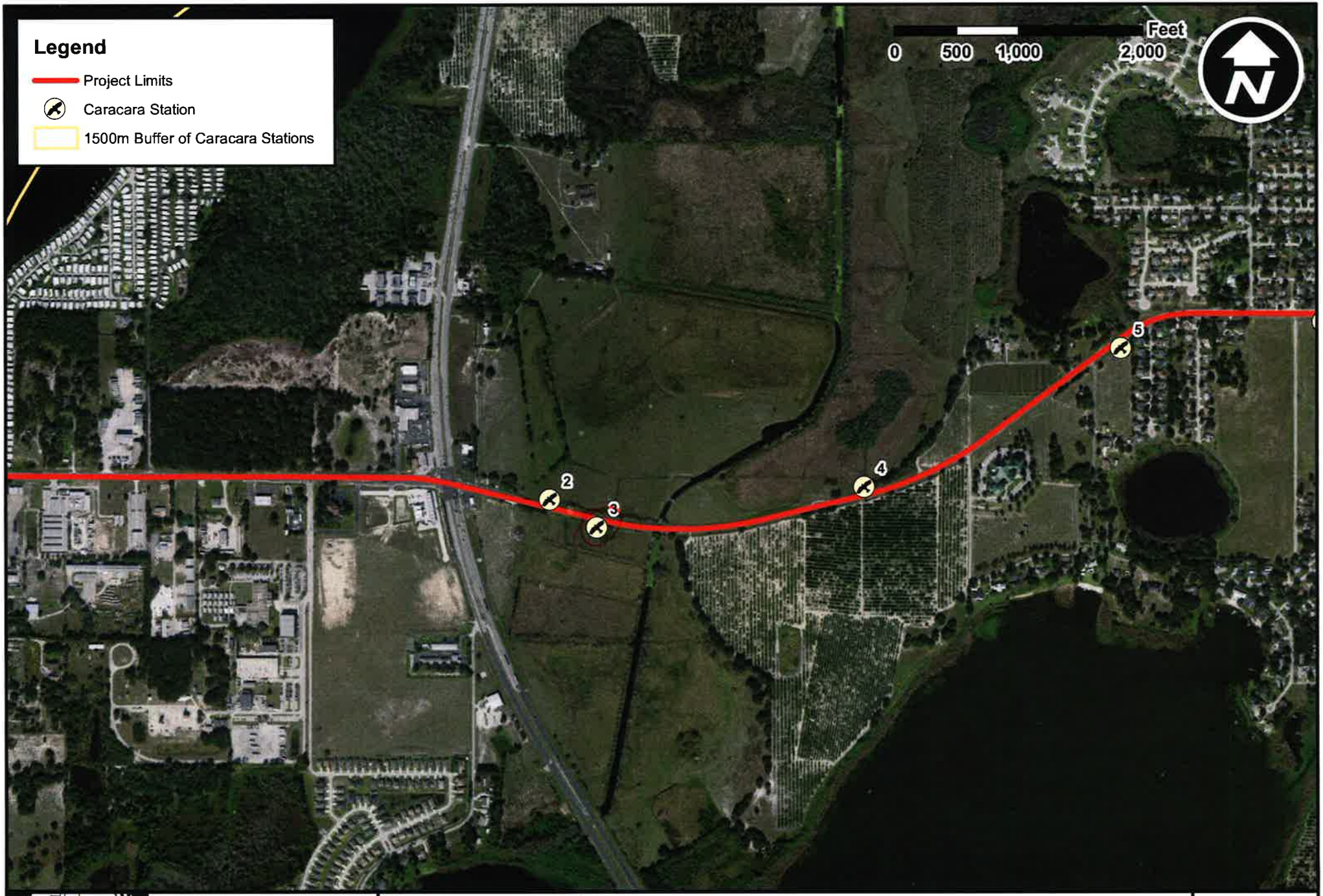
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

wildlife observations: great egret; osprey; meadowlark boattailed grackle; red bellied woodpecker; redwinged blackbird; cormorant; black vulture; white egret; little blue heron; cormorant; blue bird.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/14/21

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/14/21	6:47am	9:47am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:47am	64°	2mph E	10%	cirrus	light fog
Finish: 9:47am	74°	11mph ESE	50%	cirrus	n/a

Observation Point Information

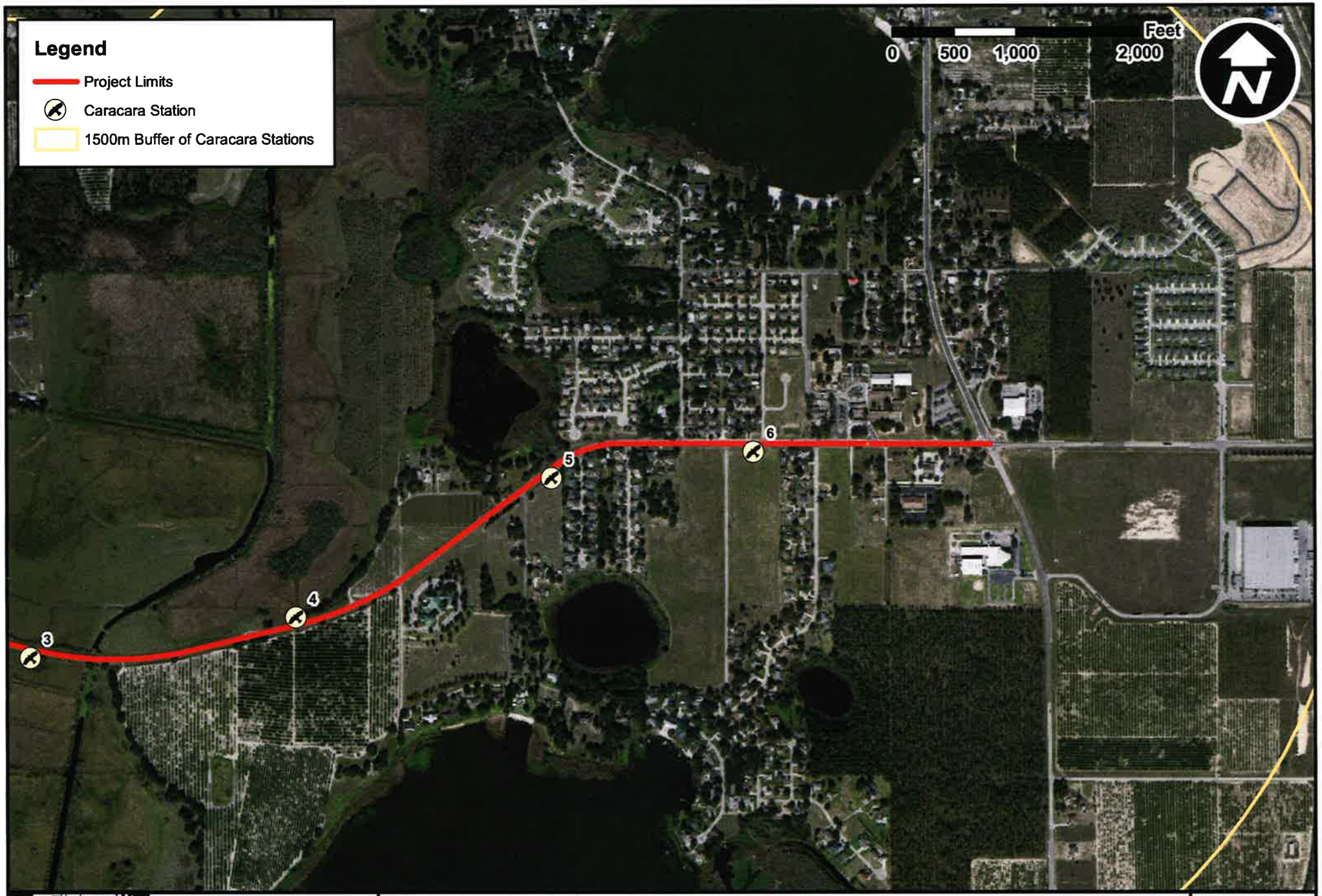
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

osprey, glossy ibis, american crows, red-winged blackbird, great egret, boat-tail grackle, Sandhill crane, Cattle egret, White ibis, Cardinal, meadowlark, black-bellied whistling ducks, northern harrier, black vulture, E.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4 / 15 / 2021

STATION 5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/15/21	6:46 am	9:46 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:46am	65°F	S 5mph	5%	cirrus	N/A
Finish: 9:46am	74°F	S 10 mph	30%	cirrocumulus	N/A

Observation Point Information

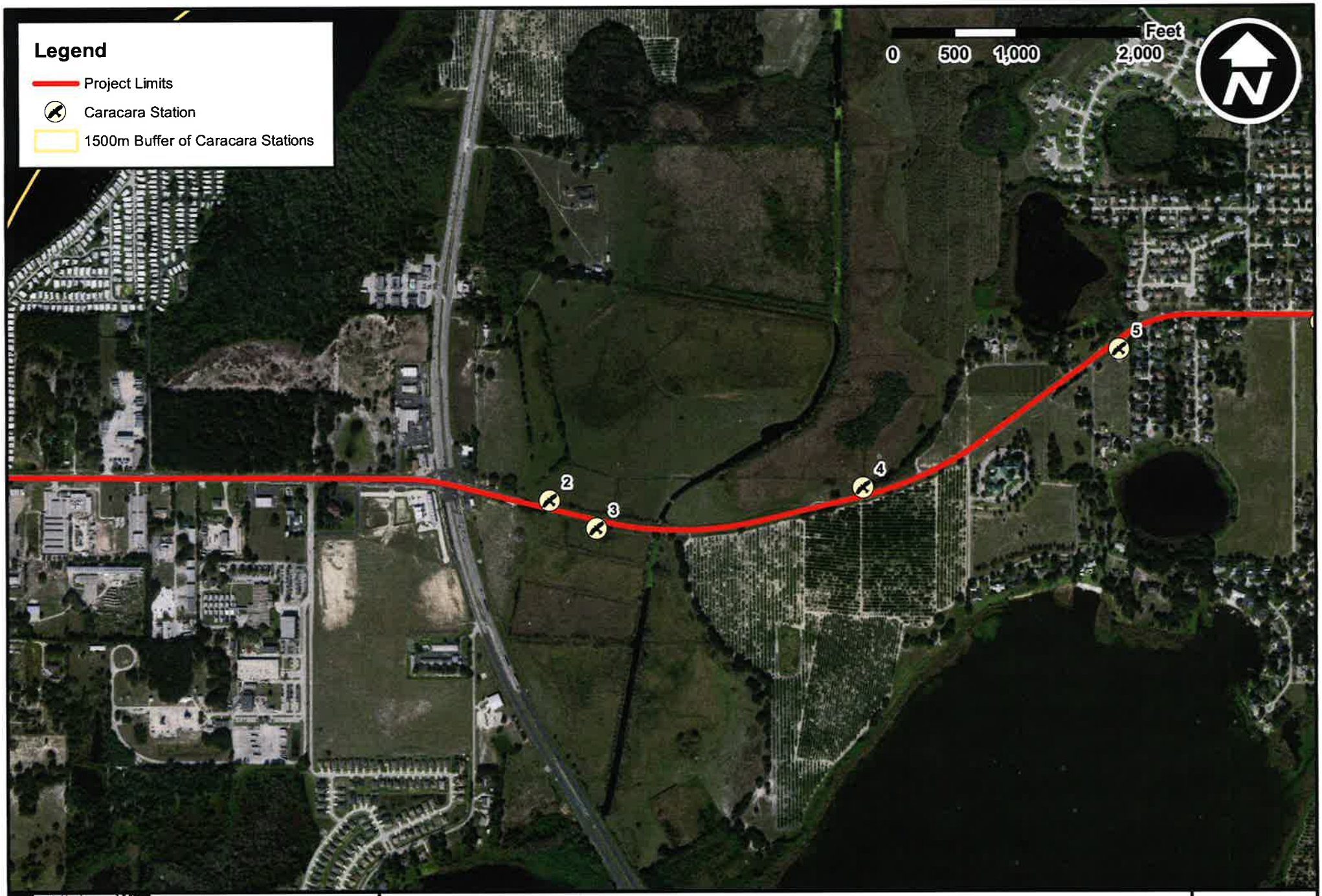
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: fish crow, white ibis, great egret, bluejay, glossy ibis, cattle egret, white-winged dove, osprey, sandhill crane, common grackle, northern cardinal, tree swallow, green heron, great blue heron, black vulture, anhinga, wood duck, eastern gray squirrel, cormorant, American crow, red-bellied woodpecker, red-shouldered hawk, black-bellied whistling-duck, northern mockingbird



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

NB Caracara Eastward

CARACARA SURVEY STATION LOCATION MAP

DATE 4/14/21

STATION 4

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/15/21	6:46am	9:46am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:46am	65	5mph S	10%.	Stratus	n/a
Finish: 9:46am	74°	10mph S	15%.	cumulostratus	n/a

Observation Point Information

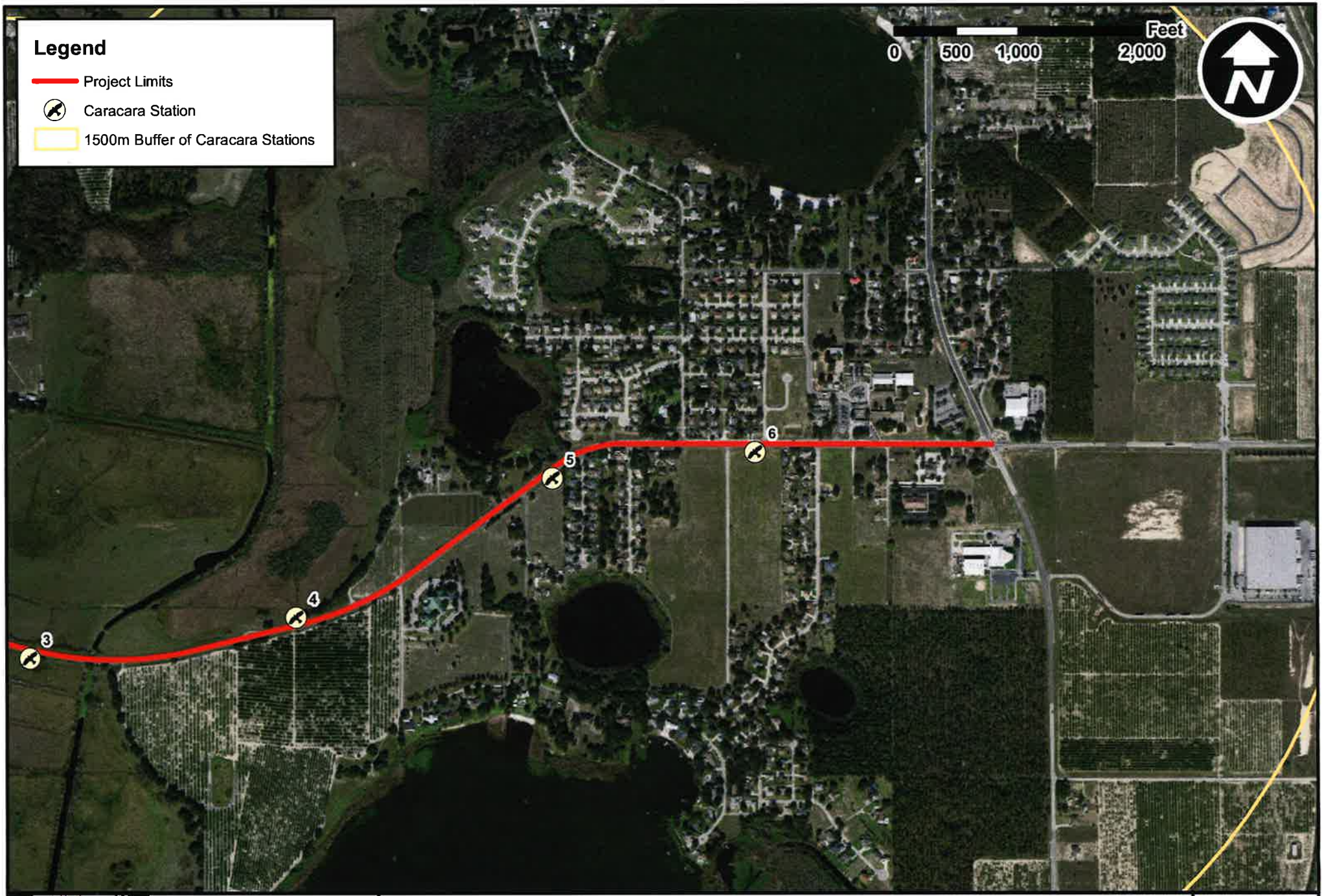
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

cardinal, blue jays, white ibis, American crow, boat-tailed grackle, Osprey, tree Swallow, red-bellied woodpecker, red shoulder hawk, great egret, cattle egret, mourning dove, Sandhill crane, Cedar waxwing, glossy ibis, purple martins, red-wing blackbird, Northern mockingbird, black vulture, Catbird, Woodstork



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

DATE 4 / 15 / 21

STATION

6

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544 PD&E

Location/Observation Block/Lat-Long: Station 1

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4.27.21	6:33AM	9:40 AM	J. Barkerst

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:33AM	65°F	~~25~~ mph ENE	20%	Stratus Stratocumulus	NO
Finish: 9:40AM	75°F	10mp E	<5%	cirrocumulus	NO

Observation Point Information

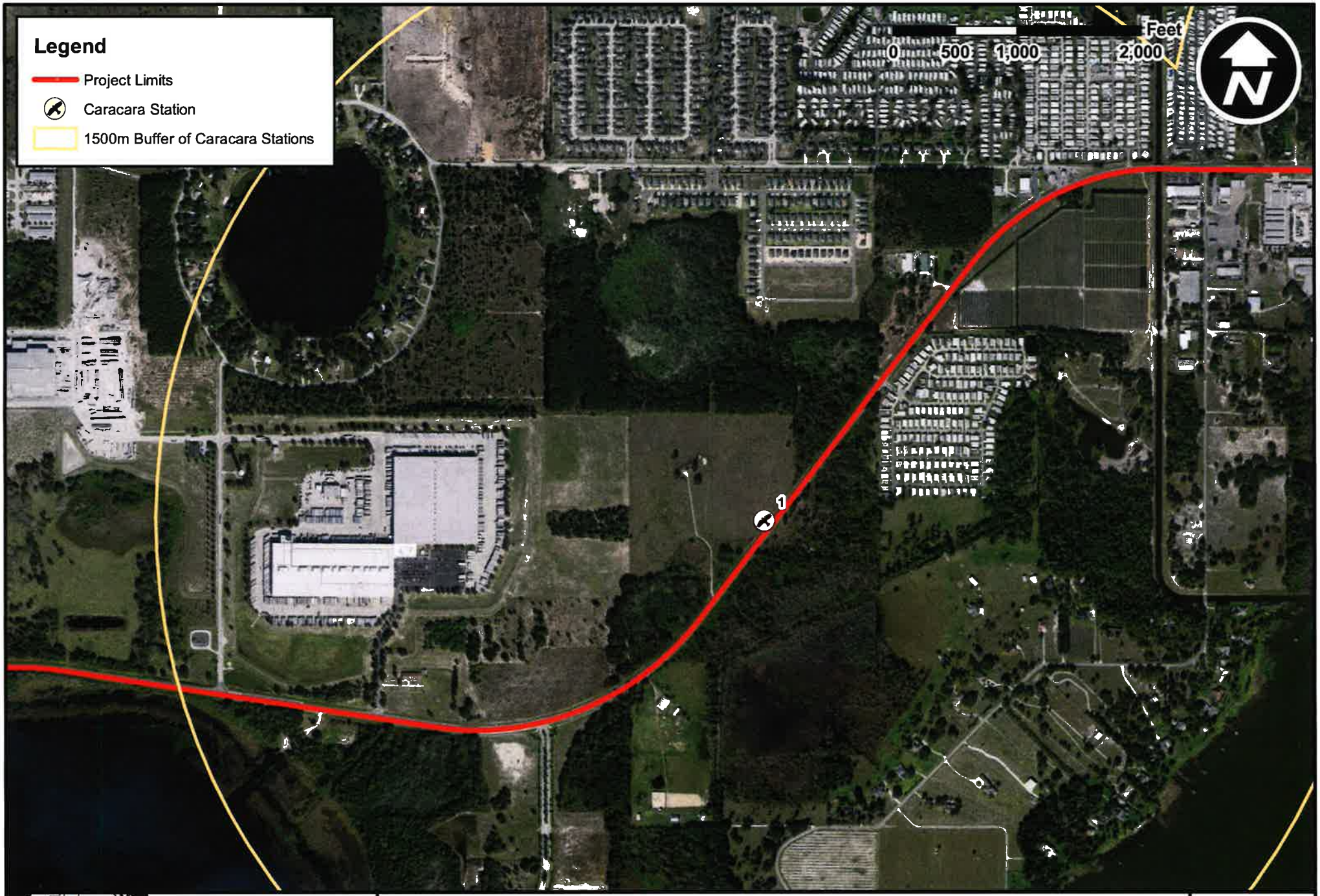
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			NO Caracara Observed

Osprey, cardinal, American crow, boat-tailed grackle
red-shouldered hawk, morning dove, catbird, cormorant
sandhill crane, cattle egret, bluejay, black vulture, great white egret



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

S. Barhorst
No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/27/21

STATION

1

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 2

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/27/21	6:34 am	9:34 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:34	65°F	ENE 5 mph	30%	Cirrus	N/A
Finish: 9:34	73°F	E 10 mph	0%	N/A	N/A

Observation Point Information

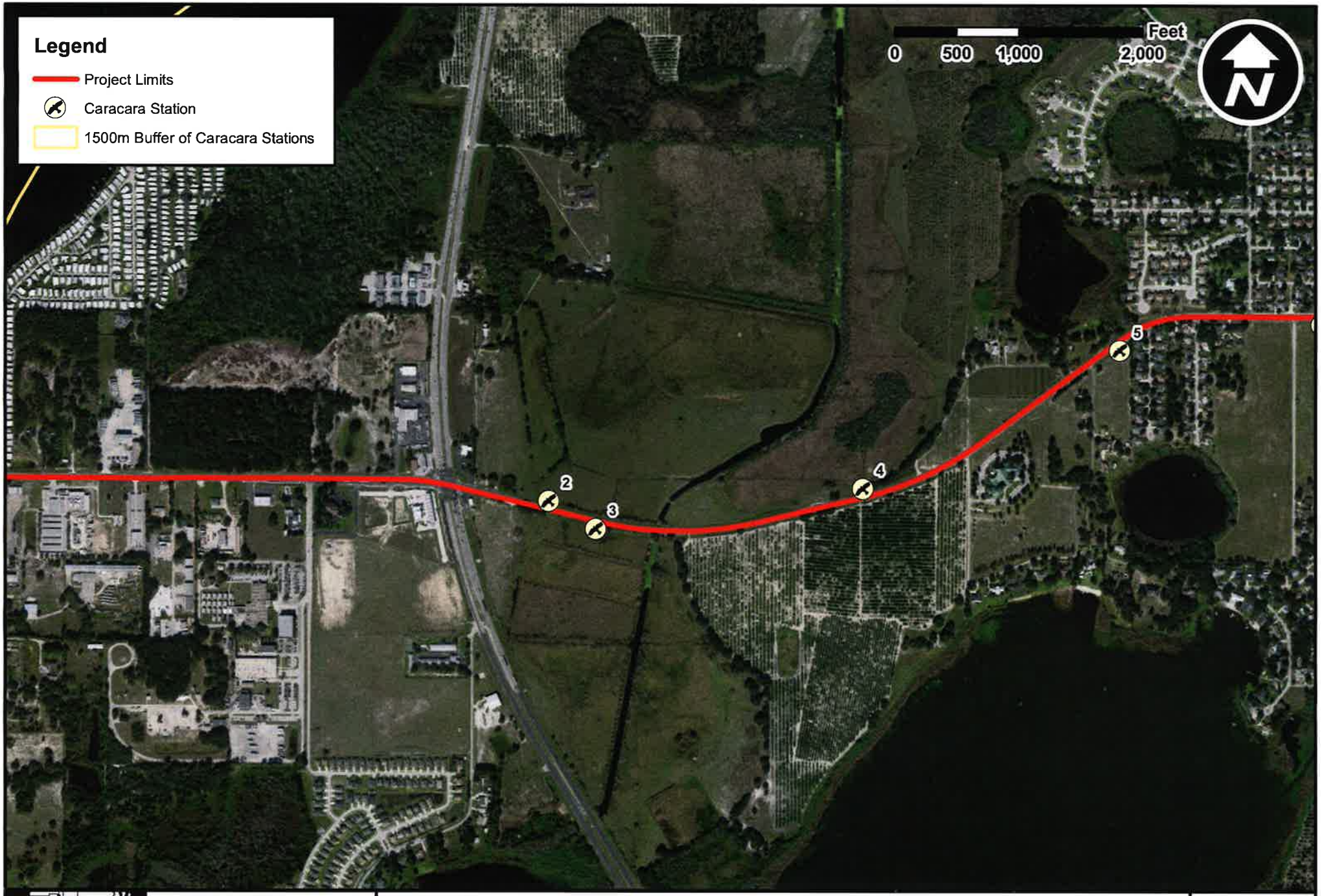
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

wildlife observed: glossy ibis, eastern meadowlark, common grackle, osprey, white ibis, great egret, roseate spoonbill, eastern blue bird, cattle egret, American crow, little blue heron, northern cardinal, boat-tailed grackle, red-winged black bird, red-bellied woodpecker, mourning dove, tricolor heron, anhinga, turkey vulture, great blue heron



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/27/2021

STATION

2

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544
Location/Observation Block/Lat-Long: Station 3

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/28/21	6:32a	9:35a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:32a	64°	E 3 mph	0%	n/a	none
Finish: 9:35a	75°	ESE 9 mph	0%	n/a	none

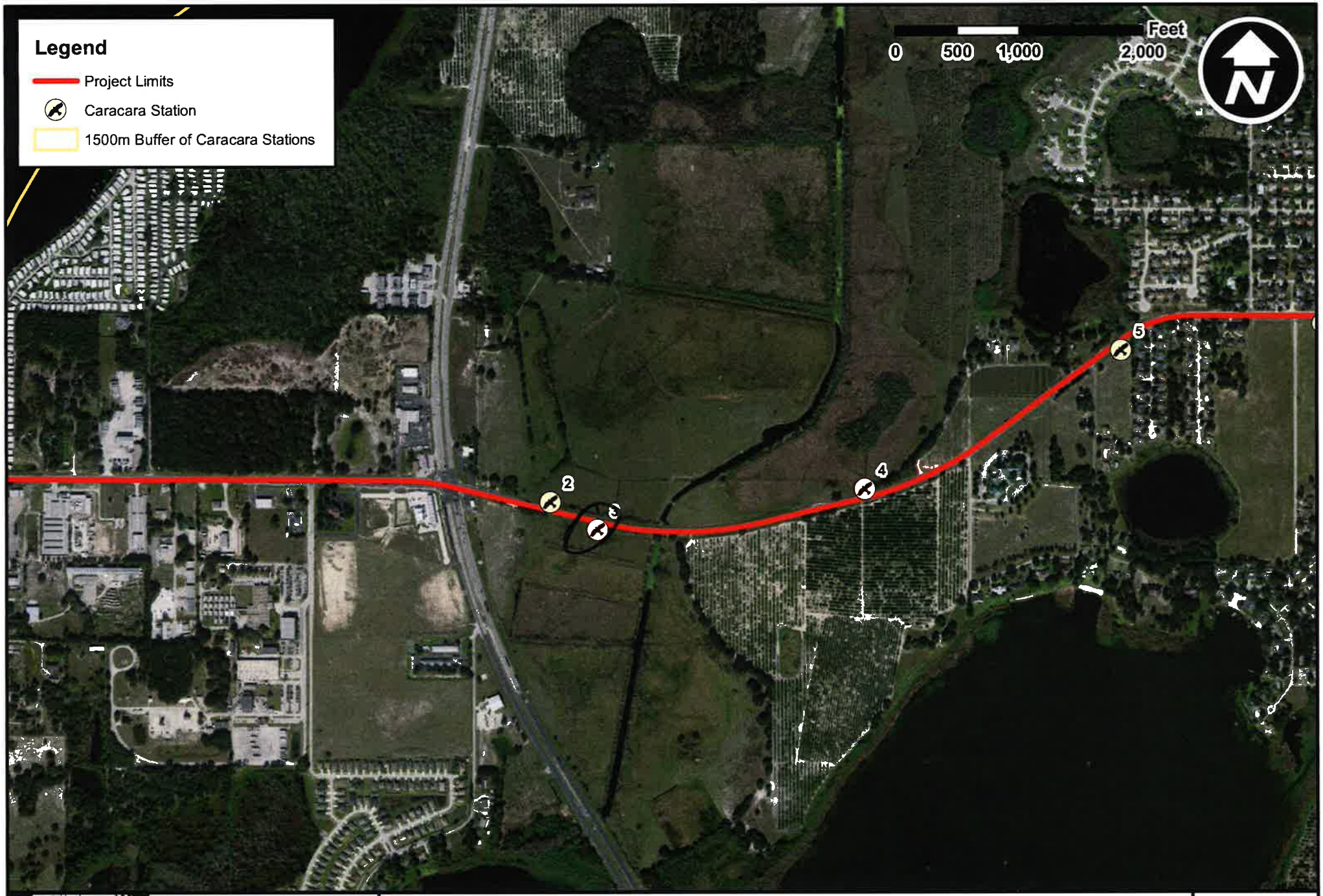
Observation Point Information

General Site and Habitat Conditions; Other Activities in the Area

Observations
(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

observed wildlife: meadowlark; little blue; cattle egret, American crow; black vulture; boat-tailed grackle; whitcibis; bluebird; redwinged blackbird; great egret; glossy ibis; osprey; great blue heron;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

CARACARA SURVEY STATION LOCATION MAP

No Caracara observed

DATE 4/28/21

STATION

3

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR544
Location/Observation Block/Lat-Long: Station 4

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/28/21	6:33am	9:33am	A. Burke

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:33am	65°	3mph E	2%	stratus	n/a
Finish: 9:33am	72°	5mph ESE	0%	n/a	n/a

Observation Point Information

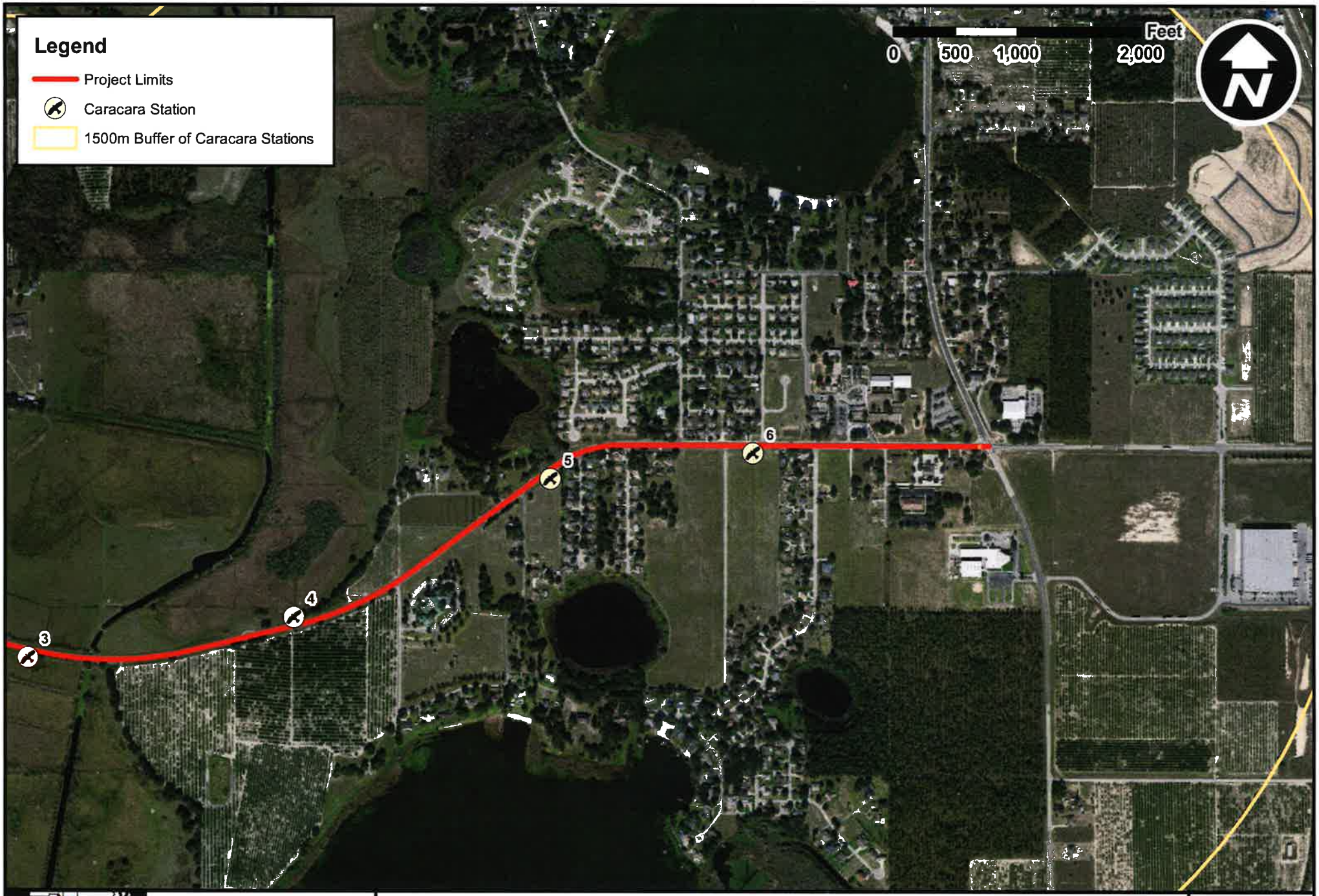
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no caracara observed

White ibis, American crow, red-winged blackbird, cattle egret, osprey, great egret, cedar waxwings, boat-tailed grackle, great blue heron, meadowlark, eastern bluebird, glossy ibis, mourning dove, red-bellied woodpecker, Nicolochaeon. mottled ducks, cormorant, killdeer, snowy egret,



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/28/21

STATION

4

USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 5

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/29/21	6:32 am	9:32 am	R. Scherer

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:32	68°F	E 3 mph	0%	N/A	N/A
Finish: 9:32	75°F	SSE 7 mph	20%	cirrus, cumulus	N/A

Observation Point Information

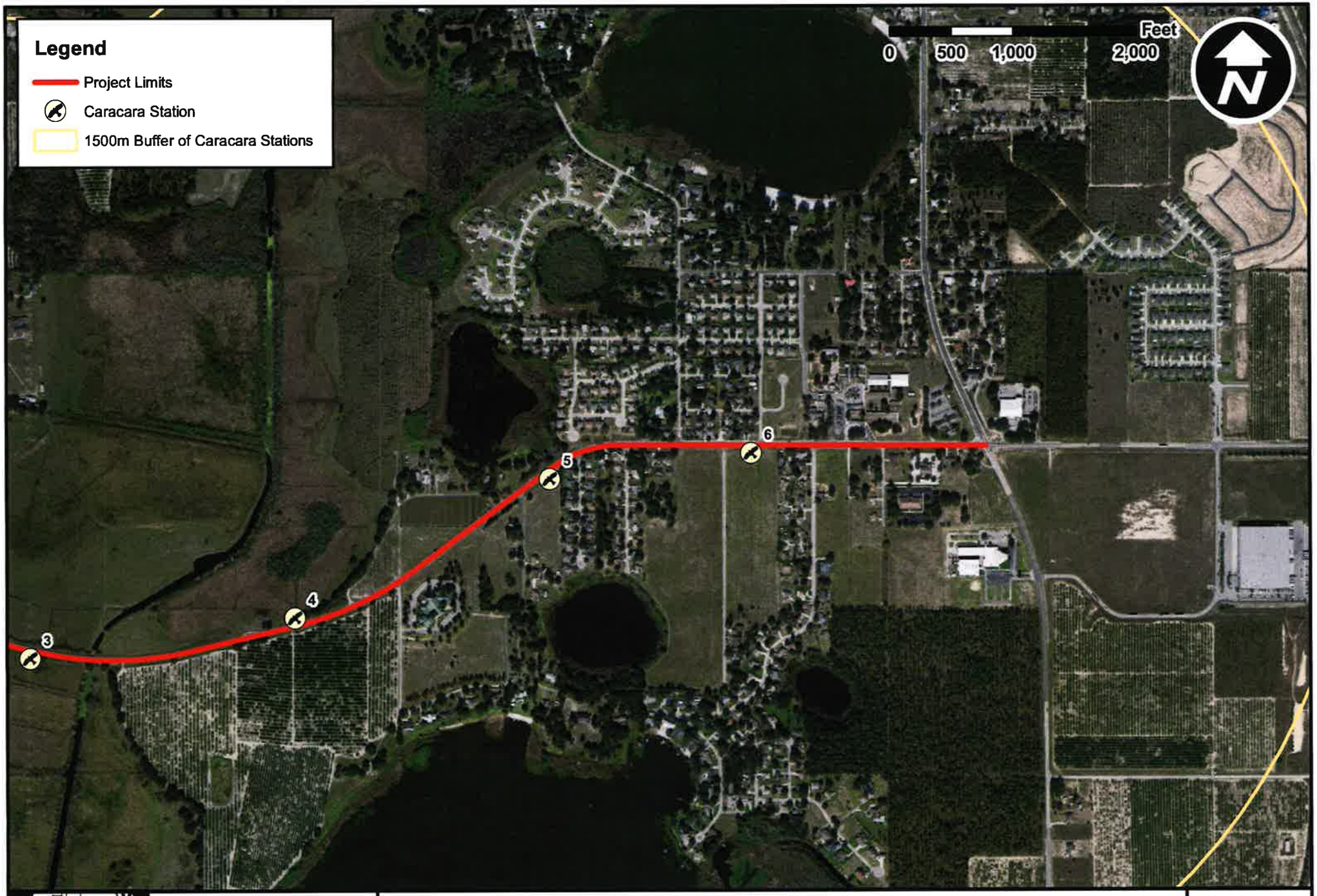
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			No caracara observed

Wildlife observed: fish crow, anhinga, tern spp., white ibis, black-bellied whistling-duck, little blue heron, sandhill crane, cattle egret, northern cardinal, glossy ibis, common grackle, mourning dove, osprey, 8 great blue heron, blue jay, wood duck, red-bellied woodpecker, tricolor heron, green heron, American crow



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/29/2021

STATION

5

USFWS Crested Caracara Draft Survey Protocol –
Additional Guidance (2016-2017 Breeding Season)

Caracara Survey Form (updated 12/9/2016)

Project Name: SR 544

Location/Observation Block/Lat-Long: Station 6

Date	Start Time	Stop Time	Observer Name(s) and Experience Level(s)
4/29/21	6:31a	9:33a	Taylor Mueller

Weather

Time	Air Temp	Wind Speed and Direction	% Cloud Cover	Cloud Type	Rain/Fog
Start: 6:31a	68°	E 3mph	0%	none	none
Finish: 9:33	75°	SSE 7mph	10%	cumulus	none

Observation Point Information

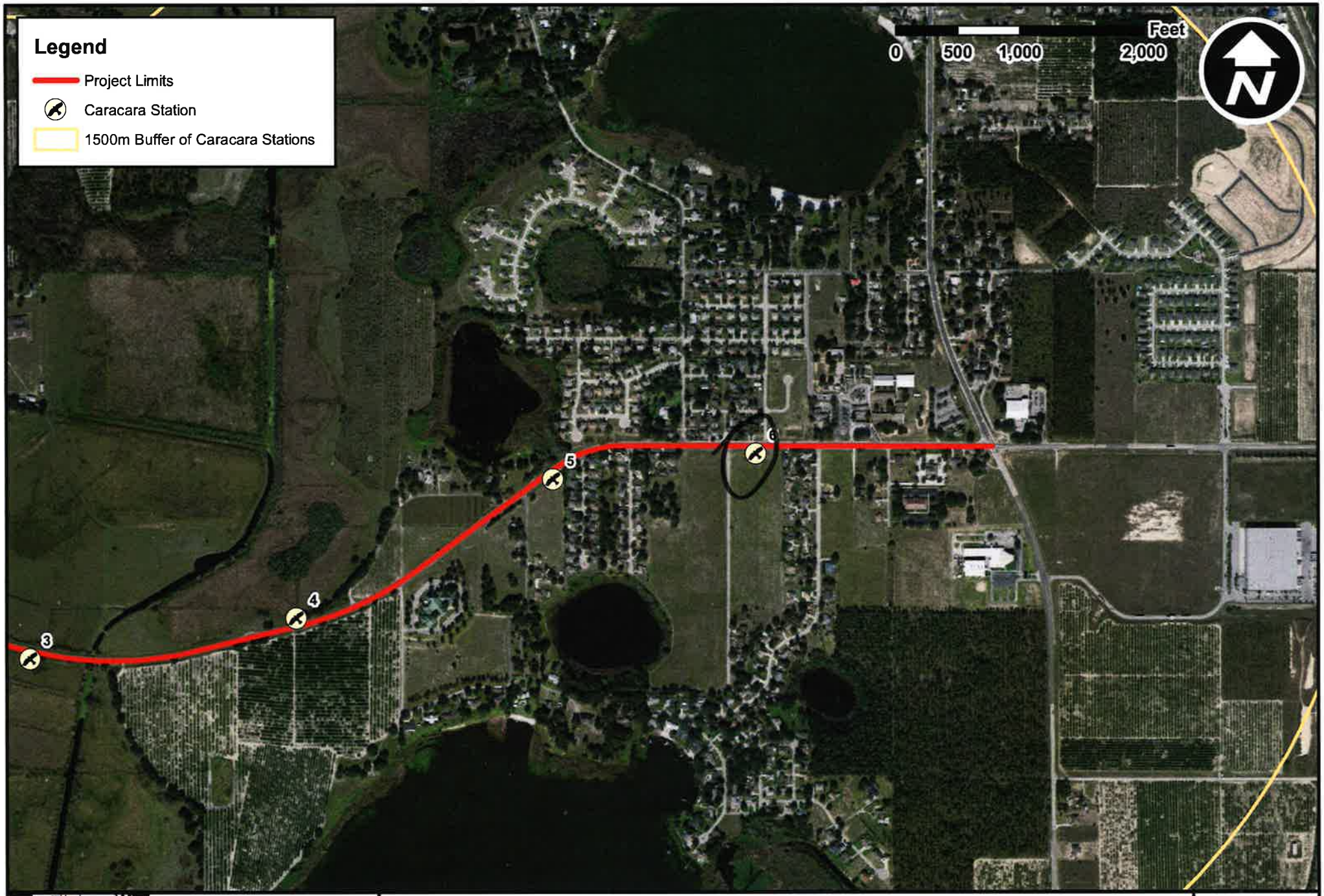
General Site and Habitat Conditions; Other Activities in the Area

Observations

(flight data, perching, preening, courtship, feeding, nest building, incubation, head throwback, diving, reaction to passing planes/traffic/pedestrians, other bird species, etc)

Observer Location	Age A/Im	Time	Description of behavior, flight path, etc
			no cara cara observed

Observed wildlife: white ibis; ~~boat~~ tailed grackle; American Crow; cattle egret; cardinal; mockingbird; osprey; Kestrel; little blue heron;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no caracara observed

CARACARA SURVEY STATION LOCATION MAP

DATE 4/29/21

STATION

6

Photo 1: Representative of habitat facing east of Station 1

Photo 2: Representative of habitat facing north of Station 1

Photo 3: Representative of habitat facing south of Station 1

Photo 4: Representative of habitat facing south of station 1

Photo 5:Representative of habitat facing east of Station 2

Photo 6: Representative of habitat facing south of Station 2

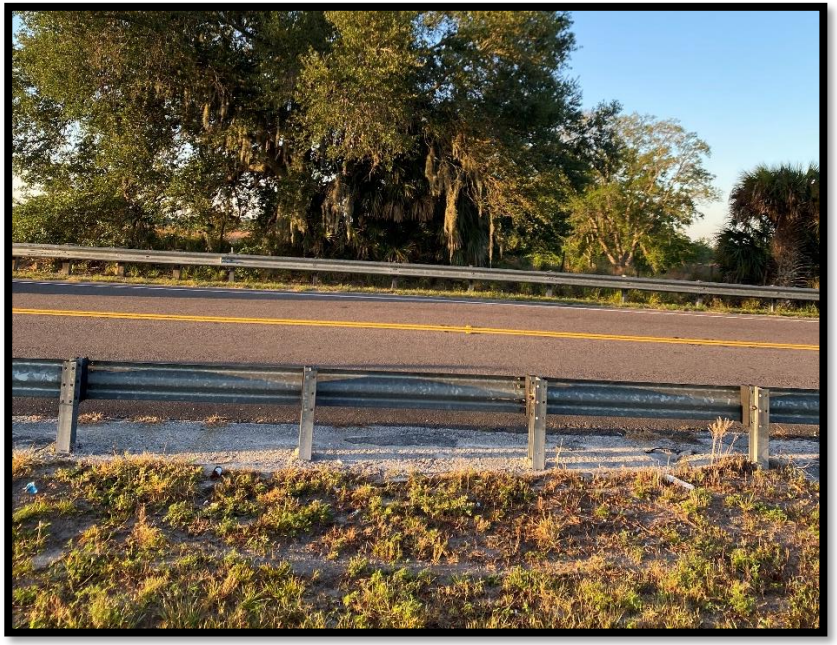


Photo 7: Representative of habitat facing east of Station 2

Photo 8: Representative of habitat facing west of Station 2

Photo 9: Representative of habitat facing north of Station 3

Photo 10: Representative of habitat facing east of Station 3

Photo 11: Representative of habitat facing south of Station 3

Photo 12: Representative of habitat facing west of Station 3

Photo 13: Representative of habitat facing north of Station 4

Photo 14: Representative of habitat facing east of Station 4

Photo 15: Representative of habitat facing south of Station 4

Photo 16: Representative of habitat facing west of Station 4

Photo 17: Representative of habitat facing north of Station 5

Photo 18: Representative of habitat facing east of Station 5

Photo 19: Representative of habitat facing south of Station 5

Photo 20: Representative of habitat facing west of Station 5

Photo 21: Representative of habitat facing north of Station 6

Photo 22: Representative of habitat facing east of Station 6

Photo 23: Representative of habitat facing south of Station 6

Photo 24: Representative of habitat facing west of Station 6

APPENDIX F

Standard Protection Measures for the Eastern Indigo Snake

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE
U.S. Fish and Wildlife Service

March 23, 2021

The eastern indigo snake protection/education plan (Plan) below has been developed by the U.S. Fish and Wildlife Service (USFWS) in Florida and Georgia for use by applicants and their construction personnel. At least **30 days prior** to any clearing/land alteration activities, the applicant shall notify the appropriate USFWS Field Office via e-mail that the Plan will be implemented as described below (North Florida Field Office: jaxregs@fws.gov; South Florida Field Office: verobeach@fws.gov; Panama City Field Office: panamacity@fws.gov; Georgia Field Office: gaes_assistance@fws.gov). As long as the signatory of the e-mail certifies compliance with the below Plan (including use of the attached poster and brochure), no further written confirmation or approval from the USFWS is needed and the applicant may move forward with the project.

If the applicant decides to use an eastern indigo snake protection/education plan other than the approved Plan below, written confirmation or approval from the USFWS that the plan is adequate must be obtained. At least 30 days prior to any clearing/land alteration activities, the applicant shall submit their unique plan for review and approval. The USFWS will respond via e-mail, typically within 30 days of receiving the plan, either concurring that the plan is adequate or requesting additional information. A concurrence e-mail from the appropriate USFWS Field Office will fulfill approval requirements.

The Plan materials should consist of: 1) a combination of posters and pamphlets (see **Poster Information** section below); and 2) verbal educational instructions to construction personnel by supervisory or management personnel before any clearing/land alteration activities are initiated (see **Pre-Construction Activities** and **During Construction Activities** sections below).

POSTER INFORMATION

Posters with the following information shall be placed at strategic locations on the construction site and along any proposed access roads (a final poster for Plan compliance, to be printed on 11 x 17in or larger paper and laminated, is attached):

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat.

These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida and Georgia. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas and often move seasonally between upland and lowland habitats, particularly in the northern portions of its range (North Florida and Georgia). Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Reliance on xeric sandhill habitats throughout the northern portion of the range in northern Florida and Georgia is due to the dependence on gopher tortoise burrows for shelter during winter. Breeding occurs during October through February. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION UNDER FEDERAL AND STATE LAW: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. Taking of eastern indigo snakes is prohibited by the Endangered Species Act without a permit is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

IF YOU SEE A <u>LIVE</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the live eastern indigo snake sufficient time to move away from the site without interference;
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes. Â
- Immediately notify supervisor or the applicants designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A DEAD EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicants designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

Telephone numbers of USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida Field Office: (904) 731-3336
Panama City Field Office: (850) 769-0552
South Florida Field Office: (772) 562-3909
Georgia Field Office: (706) 613-9493

PRE-CONSTRUCTION ACTIVITIES

1. The applicant or designated agent will post educational posters in the construction office and throughout the construction site, including any access roads. The posters must be clearly visible to all construction staff. A sample poster is attached.

2. Prior to the onset of construction activities, the applicant/designated agent will conduct a meeting with all construction staff (annually for multi-year projects) to discuss identification of the snake, its protected status, what to do if a snake is observed within the project area, and applicable penalties that may be imposed if state and/or federal regulations are violated. An educational brochure including color photographs of the snake will be given to each staff member in attendance and additional copies will be provided to the construction superintendent to make available in the onsite construction office (a final brochure for Plan compliance, to be printed double-sided on 8.5 x 11in paper and then properly folded, is attached). Â Photos of eastern indigo snakes may be accessed on USFWS and/or FWC or GADNR websites.

3. Construction staff will be informed that in the event that an eastern indigo snake (live or dead) is observed on the project site during construction activities, all such activities are to cease until the established procedures are implemented according to the Plan, which includes notification of the appropriate USFWS Field Office. The contact information for the USFWS is provided on the referenced posters and brochures.

DURING CONSTRUCTION ACTIVITIES

1. During initial site clearing activities, an onsite observer may be utilized to determine whether habitat conditions suggest a reasonable probability of an eastern indigo snake sighting (example: discovery of snake sheds, tracks, lots of refugia and cavities present in the area of clearing activities, and presence of gopher tortoises and burrows).

2. If an eastern indigo snake is discovered during gopher tortoise relocation activities (i.e. burrow excavation), the USFWS shall be contacted within one business day to obtain further guidance which may result in further project consultation.

3. Periodically during construction activities, the applicants designated agent should visit the project area to observe the condition of the posters and Plan materials, and replace them as needed. Construction personnel should be reminded of the instructions (above) as to what is expected if any eastern indigo snakes are seen.

POST CONSTRUCTION ACTIVITIES

Whether or not eastern indigo snakes are observed during construction activities, a monitoring report should be submitted to the appropriate USFWS Field Office within 60 days of project completion. The report can be sent electronically to the appropriate USFWS e-mail address listed on page one of this Plan.

APPENDIX G

Eastern Indigo Snake Effect Determination Key

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

August 1, 2017

Donnie Kinard
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Eastern Indigo Snake – Revised

Dear Mr. Kinard:

This letter revises and replaces the January 25, 2010, and August 13, 2013, letters to the U.S. Army Corps of Engineers (Corps) regarding the use of the eastern indigo snake programmatic effect determination key (Key) for projects occurring within the South Florida Ecological Service's Office (SFESO) jurisdiction. This revision supersedes all prior versions of the Key in the SFESO area. The purpose of this revision is to clarify portions of the previous keys based on questions we have been asked, specifically related to habitat and refugia used by eastern indigo snakes (*Drymarchon corais couperi*), in the southern portion of their range and within the jurisdiction of the SFESO. This Key is provided pursuant to the Service's authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This Key revision has been assigned Service Consultation Code: 41420-2009-I-0467-R001.

The purpose of this Key is to assist the Corps (or other Federal action agency) in making appropriate effects determinations for the eastern indigo snake under section 7 of the Act, and streamline informal consultation with the SFESO for the eastern indigo snake when the proposed action can be walked through the Key. The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses project size and home ranges of eastern indigo snakes as the basis for making determinations of "may affect, but is not likely to adversely affect" (NLAA) and "may affect. and is likely to adversely affect" (may affect). Suitable habitat for the eastern indigo snake consists of a mosaic of habitats types, most of which occur throughout South Florida. Information on home ranges for individuals is not available in specific habitats in South Florida. Therefore, the SFESO uses the information from a 26-year study conducted by Layne and Steiner (1996) at Archbold Biological Station, Lake Placid, Florida, as the best available

information. Layne and Steiner (1996) determined the average home range size for a female eastern indigo snake was 46 acres and 184 acres for a male.

Projects that would remove/destroy less than 25 acres of eastern indigo snake habitat are expected to result in the loss of a portion of an eastern indigo snakes home range that would not impair the ability of the individual to feed, breed, and shelter. Therefore, the Service finds that take would not be reasonably certain to occur due to habitat loss. However, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take. Consequently, projects less than 25 acres that include the Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and a commitment to excavate underground refugia as part of the proposed action would be expected to avoid take and thus, may affect, but are not likely to adversely affect the species.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range.

Projects that would remove 25 acres or more of eastern indigo snake habitat could remove more than half of a female eastern indigo snakes home range. This loss of habitat within a home range would be expected to significantly impair the ability of that individual to feed, breed, and shelter. Therefore, the Service finds take through habitat loss would be reasonably certain to occur and formal consultation is appropriate. Furthermore, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures* for the *Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take.

Eastern indigo snakes use a variety of habitat and are difficult to detect. Therefore, site specific information on the land use, observations of eastern indigo snakes within the vicinity, as well as other factors, as appropriate, will all be considered by the Service when making a final recommendation on the appropriate effects determination and whether it is appropriate to conclude consultation with the Corps (or other Federal action agency) formally or informally for projects that will impact 25 acres or more of habitat. Accordingly, when the use of the Key results in a determination of "may affect," the Corps (or other Federal action agency) is advised that consultation may be concluded informally or formally, depending on the project specific effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps (or other Federal action agency) desires to proceed with a consultation request prior to receiving

additional technical assistance from the Service, we recommend the agency documents the biological rationale for their determination and proceed with a request accordingly.

If the use of the Key results in a determination of "no effect," no further consultation is necessary with the SFESO. If the use of the Key results in a determination of "NLAA," the SFESO concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake. For "no effect" or "NLAA" determinations, the Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach your no effect or NLAA determination in the project record and proceed with other species analysis as warranted.

Eastern Indigo Snake Programmatic Effect Determination Key
Revised July 2017
South Florida Ecological Service Office

Scope of the Key

This Key should be used only in the review of permit applications for effects determinations for the eastern indigo snake (*Drymarchon corais couperi*) within the South Florida Ecological Service's Office (SFESO) area (Broward, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Lee, Indian River, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota, and St. Lucie Counties). There is no designated critical habitat for the eastern indigo snake.

This Key is subject to revision as the Corps (or other Federal action agency) and Service deem necessary and in particular whenever there is new information on eastern indigo snake biology and effects of proposed projects.

The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

Habitat

Habitat use varies seasonally between upland and wetland areas, especially in the more northern parts of the species' range. In southern parts of their range eastern indigo snakes are habitat generalists which use most available habitat types. Movements between habitat types in northern areas of their range may relate to the need for thermal refugia (protection from cold and/or heat).

In northern areas of their range eastern indigo snakes prefer an interspersion of tortoise-inhabited sandhills and wetlands (Landers and Speake 1980). In these northern regions eastern indigo

snakes most often use forested areas rich with gopher tortoise burrows, hollowed root channels, hollow logs, or the burrows of rodents, armadillos, or land crabs as thermal refugia during cooler seasons (Lawler 1977; Moler 1985a; Layne and Steiner 1996). The eastern indigo snake in the northern region is typically classified as a longleaf pine savanna specialist because here, in the northern four-fifths of its range, the eastern indigo snake is typically only found in vicinity of xeric longleaf pine–turkey oak sandhills inhabited by the gopher tortoise (Means 2006).

In the milder climates of central and southern Florida, comprising the remaining one fifth of its range, thermal refugia such as those provided by gopher tortoise burrows may not be as critical to survival of indigo snakes. Consequently, eastern indigo snakes in these regions use a more diverse assemblage of habitats such as pine flatwoods, scrubby flatwoods, floodplain edges, sand ridges, dry glades, tropical hammocks, edges of freshwater marshes, muckland fields, coastal dunes, and xeric sandhill communities; with highest population concentrations of eastern indigo snakes occurring in the sandhill and pineland regions of northern and central Florida (Service 1999). Eastern indigo snakes have also been found on agricultural lands with close proximity to wetlands (Zeigler 2006).

In south Florida, agricultural sites (*e.g.*, sugar cane fields and citrus groves) are occupied by eastern indigo snakes. The use of sugarcane fields by eastern indigo snakes was first documented by Layne and Steiner in 1996. In these areas there is typically an abundance of wetland and upland ecotones (due to the presence of many ditches and canals), which support a diverse prey base for foraging. In fact, some speculate agricultural areas may actually have a higher density of eastern indigo snakes than natural communities due to the increased availability of prey. Gopher tortoise burrows are absent at these locations but there is an abundance of both natural and artificial refugia. Enge and Endries (2009) reporting on the status of the eastern indigo snake included sugarcane fields and citrus groves in a Global Information Systems (GIS)-base map of potential eastern indigo snake habitat. Numerous sightings of eastern indigo snakes within sugarcane fields have been reported within south Florida (Florida Fish and Wildlife Conservation Commission Indigo Snake Database [Enge 2017]). A recent study associated with the Comprehensive Everglades Restoration Plan (CERP) (A-1 FEB Project formerly A-1 Reservoir; Service code: 41420-2006-F-0477) documented eastern indigo snakes within sugarcane fields. The snakes used artificial habitats such as piles of limerock, construction debris, and pump stations. Recent studies also associated with the CERP at the C-44 Project (Service code: 41420-2009-FA-0314), and C-43 Project (Service code: 41420-2007-F-0589) documented eastern indigo snakes within citrus groves. The snakes used artificial habitats such as boards, sheets of tin, construction debris, pipes, drain pipes in abandoned buildings and septic tanks.

In extreme south Florida (*i.e.*, the Everglades and Florida Keys), eastern indigo snakes also utilize tropical hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats. Though eastern indigo snakes have been found in all available habitats of south Florida it is thought they prefer hammocks and pine forests since most observations occur there and use of these areas is disproportionate compared to the relatively small total area of these habitats (Steiner *et al.* 1983).

Even though thermal stress may not be a limiting factor throughout the year in south Florida, eastern indigo snakes still seek and use underground refugia. On the sandy central ridge of central Florida, eastern indigo snakes use gopher tortoise burrows more (62 percent) than other underground refugia (Layne and Steiner 1996). Other underground refugia used include armadillo (*Dasypus novemcinctus*) burrows near citrus groves, cotton rat (*Sigmodon hispidus*) burrows, and land crab (*Cardisoma guanhumi*) burrows in coastal areas (Layne and Steiner 1996; Wilson and Porras 1983). Natural ground holes, hollows at the base of trees or shrubs, ground litter, trash piles, and crevices of rock-lined ditch walls are also used (Layne and Steiner 1996). These refugia are used most frequently where tortoise burrows are not available, principally in low-lying areas off the central and coastal ridges.

Minimization Measures

The Service developed protection measures for the eastern indigo snake "Standard Protection Measures for the Eastern Indigo Snake" (Service 2013) located at: https://www.fws.gov/verobeach/ReptilesPDFs/20130812_EIS%20Standard%20Protection%20Measures_final.pdf. These protections measures (or the most updated version) are considered a minimization measure for projects proposed within eastern indigo snake habitat.

Determinations

If the use of this Key results in a determination of "**no effect**," no further consultation is necessary with the SFESO.

If the use of this Key results in a determination of "**NLAA**," the SFESO concurs with this determination and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake.

For no effect or NLAA determinations, the Corps (or other Federal action agency) should make a note in the project file indicating the pathway used to reach your no effect or NLAA determination.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the subsequent Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range.

If the use of this Key results in a determination of "**may affect**," consultation may be concluded informally or formally depending on project effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps desires to proceed with a consultation request prior to receiving additional technical assistance from the Service, we recommend the Corps document the biological rationale for their determination and proceed with a request accordingly.

A. Project is not located in open water or salt marsh.....go to B

Project is located solely in open water or salt marsh.....**no effect**

B. Permit will be conditioned for use of the Service's most current guidance for Standard Protection Measures For The Eastern Indigo Snake (currently 2013) during site preparation and project construction.....go to C

Permit will not be conditioned as above for the eastern indigo snake, or it is not known whether an applicant intends to use these measures and consultation with the Service is requested.....**may affect**

C. The project will impact less than 25 acres of eastern indigo snake habitat (*e.g.*, sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....go to D

The project will impact 25 acres or more of eastern indigo snake habitat (*e.g.*, sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....**may affect**

D. The project has no known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and/or injured during project activities.....**NLAA**

The project has known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and /or injured.....go to E

E. Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be excavated prior to site manipulation in the vicinity of the burrow[1]. If an eastern 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 snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an eastern indigo snake, no work will commence until the snake has vacated the vicinity of proposed work.....**NLAA**[2]

Permit will not be conditioned as outlined above.....**may affect**

End Key

---

[1] If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a Florida Fish and Wildlife Conservation Commission Authorized Gopher Tortoise Agent permit. The excavation method selected should also minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the most current Gopher Tortoise Permitting Guidelines found at http://myfwc.com/gophertortoise.

[2] Please note, if the proposed project will impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, NLAA is not the appropriate conclusion. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the eastern indigo snake. Any project that has the potential to affect the eastern indigo snake and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support eastern indigo snake recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3559.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the eastern indigo snake and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions or comments regarding this Key, please contact the SFESO at 772-562-3909.

Sincerely,

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Cc:
Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Angela Ryan, Irene Sadowski, Victoria White, Alisa Zarbo)
Service, Athens, Georgia (Michelle Elmore)
Service, Jacksonville, Florida (Annie Dziergowski)
Service, Panama City, Florida (Sean Blomquist)

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APPENDIX H

Everglade Snail Kite Survey Data

Snail Kite
Survey Data Form

Date: 1/22/2020 Start Time 10:34 Stop Time _____ Monitor Ben Shepherd

Site Name and Location: Station 1

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:34	45	11mph NW	0	10	0

Habitat Data

Emergent Vegetation	None; Canal between Lake Smart and Lake Conine
Perching/Nesting Substrate	Nearby cattails and primrose willow at adjacent boat ramp and residential backyards
Water Depth: Nest Substrate	Controlled lake levels
Distance from Uplands	

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description

Snail Kite
Survey Data Form

Date: 1/22/2020 Start Time 10:20 Stop Time _____ Monitor Ben Shephard

Site Name and Location: Station 9

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:20	45	11 mph NW	0	100	0

Habitat Data

Emergent Vegetation	Cattail, Primrose willow, elderberry, cogon grass, Brazilian pepper
Perching/Nesting Substrate	
Water Depth: Nest Substrate	Controlled lake level
Distance from Uplands	Wetland ~ 30-40 feet from right of way fill

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			None

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

B. Shepherd

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 1 / 22 / 2020

STATION

1/9

Snail Kite
Survey Data Form

Date: 1/22/2020 Start Time 10:43 Stop Time _____ Monitor Ben Shepherd

Site Name and Location: Station 2

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:43	46	12 mph NW	0	100	0

Habitat Data

Emergent Vegetation	Cattail, pickerelweed, various rushes
Perching/Nesting Substrate	
Water Depth: Nest Substrate	Controlled lake level
Distance from Uplands	~10-20 feet from open water

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			None

Snail Kite
Survey Data Form

Date: 1/22/2020 Start Time 10:50 Stop Time _____ Monitor Ben Shepherd

Site Name and Location: Station 3

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:50	48	12mph NW	2	100	0

Habitat Data

Emergent Vegetation	Cattail, ~~Sedge~~ scirpus sp, pickerelweed, water myrtle
Perching/Nesting Substrate	
Water Depth: Nest Substrate	Controlled lake level
Distance from Uplands	~~200 feet~~ wetlands adjacent to open water

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description

Snail Kite
Survey Data Form

Date: 1/22/2020 Start Time 10:57 Stop Time _____ Monitor Ben Shepherd

Site Name and Location: Station 4

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:57	50	12 mph NW	0	100	0

Habitat Data

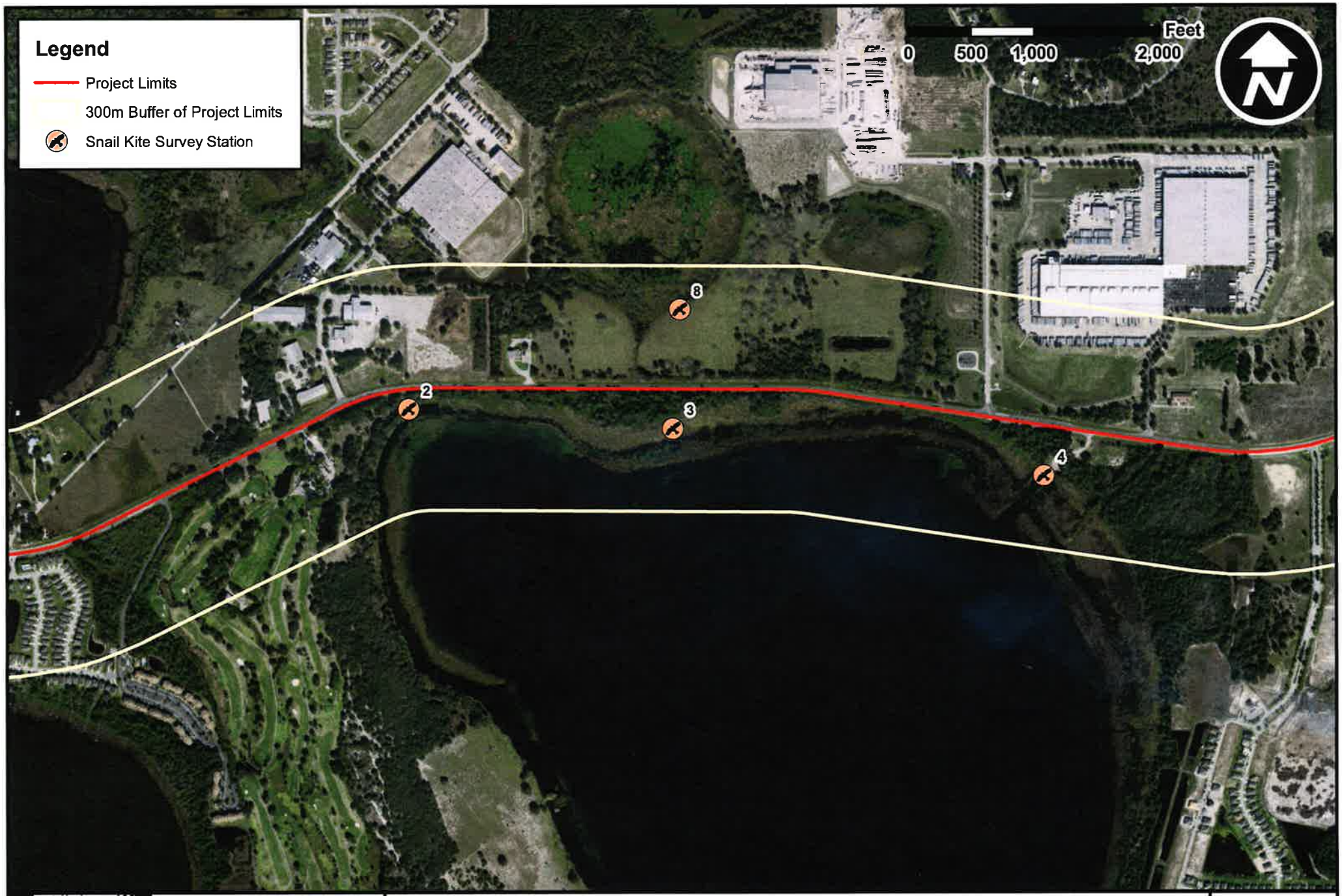
Emergent Vegetation	Cleared channel associated w/ public boat ramp; width of canal bordered by cattail, fragrant water lilly, pickerelweed
Perching/Nesting Substrate	
Water Depth: Nest Substrate	Controlled lake level
Distance from Uplands	uplands immediately adjacent to edge of open water

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			None



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY
STATION LOCATION MAP

STATION

2, 3, 4

DATE 1/22/2020

No Snail Kites Observed B. Shepherd

Snail Kite
Survey Data Form

Date: 10/22/2020 Start Time 10:55a Stop Time 11:00a Monitor: Taylor

Site Name and Location: ~~SR~~ 544 station 6

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:55a	47°	NNW 14mph	0	clear	none

Habitat Data

Emergent Vegetation	cattail; Cuban bulrush
Perching/Nesting Substrate	Red maple
Water Depth: Nest Substrate	
Distance from Uplands	immediately adjacent to upland

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description

wildlife observed: Sandhill cranes; little blue heron

Snail Kite
Survey Data Form

Date: 1/22/20 Start Time 11:08a Stop Time 11:16a Monitor Taylor M.

Site Name and Location: SR 544 Station 7

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:08a	48°	NNW 13 mph	0	clear	none

Habitat Data

Emergent Vegetation	duck potato; torpedo grass; rushes primrose willow
Perching/Nesting Substrate	Red maple; saltbush; Carolina willow
Water Depth: Nest Substrate	
Distance from Uplands	

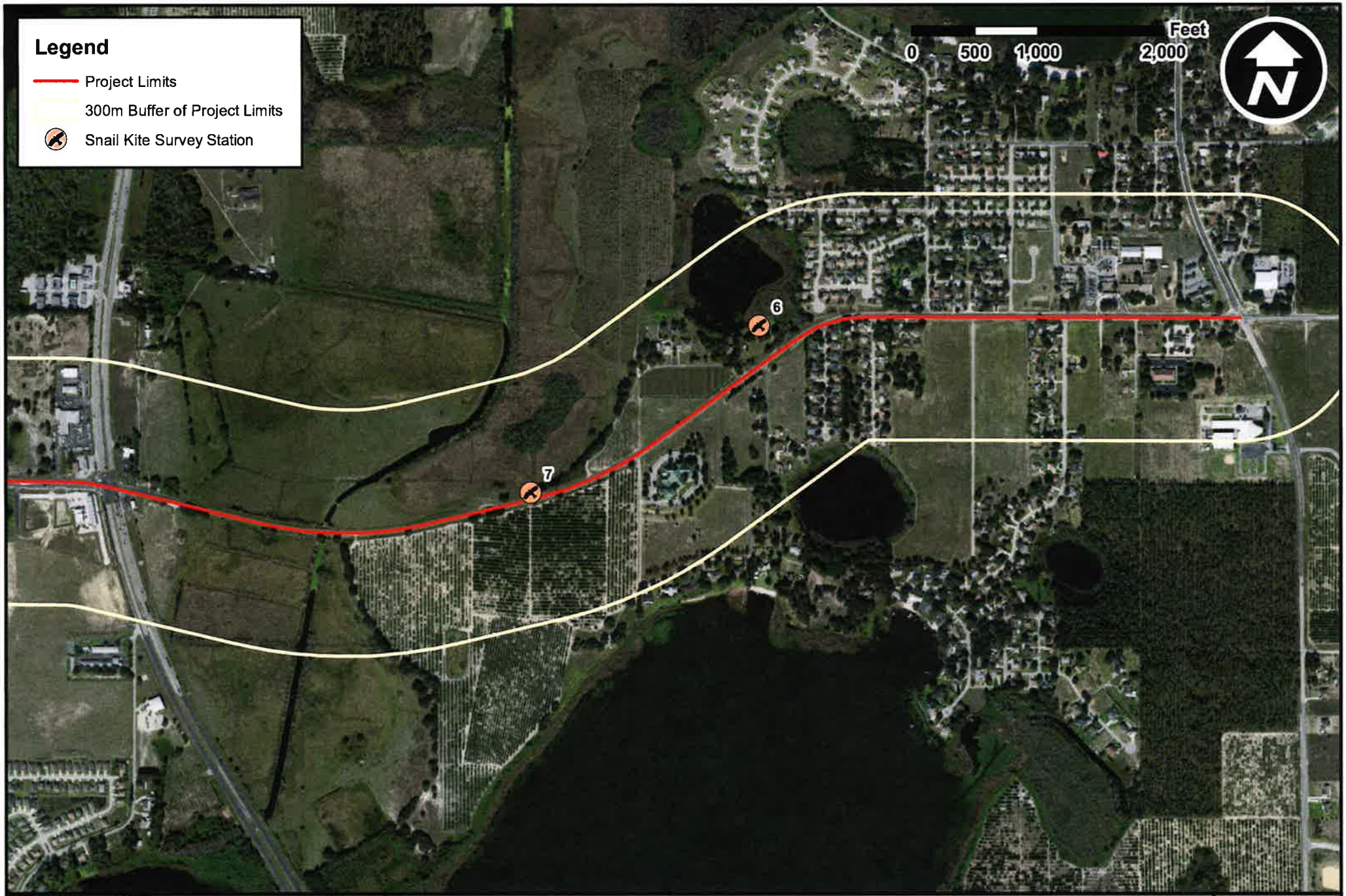
Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description

wildlife observed; common grackle; great blue heron.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no Snail Kite observed T. Mellor

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 1/22/20

STATION

6/7

Snail Kite
Survey Data Form

Date: 1/22/20 Start Time 11:30a Stop Time 11:45a Monitor T. Mueller

Site Name and Location: SR 544 Station 8

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:30a	50°	NNW 13mph	90%	clear	none

Habitat Data

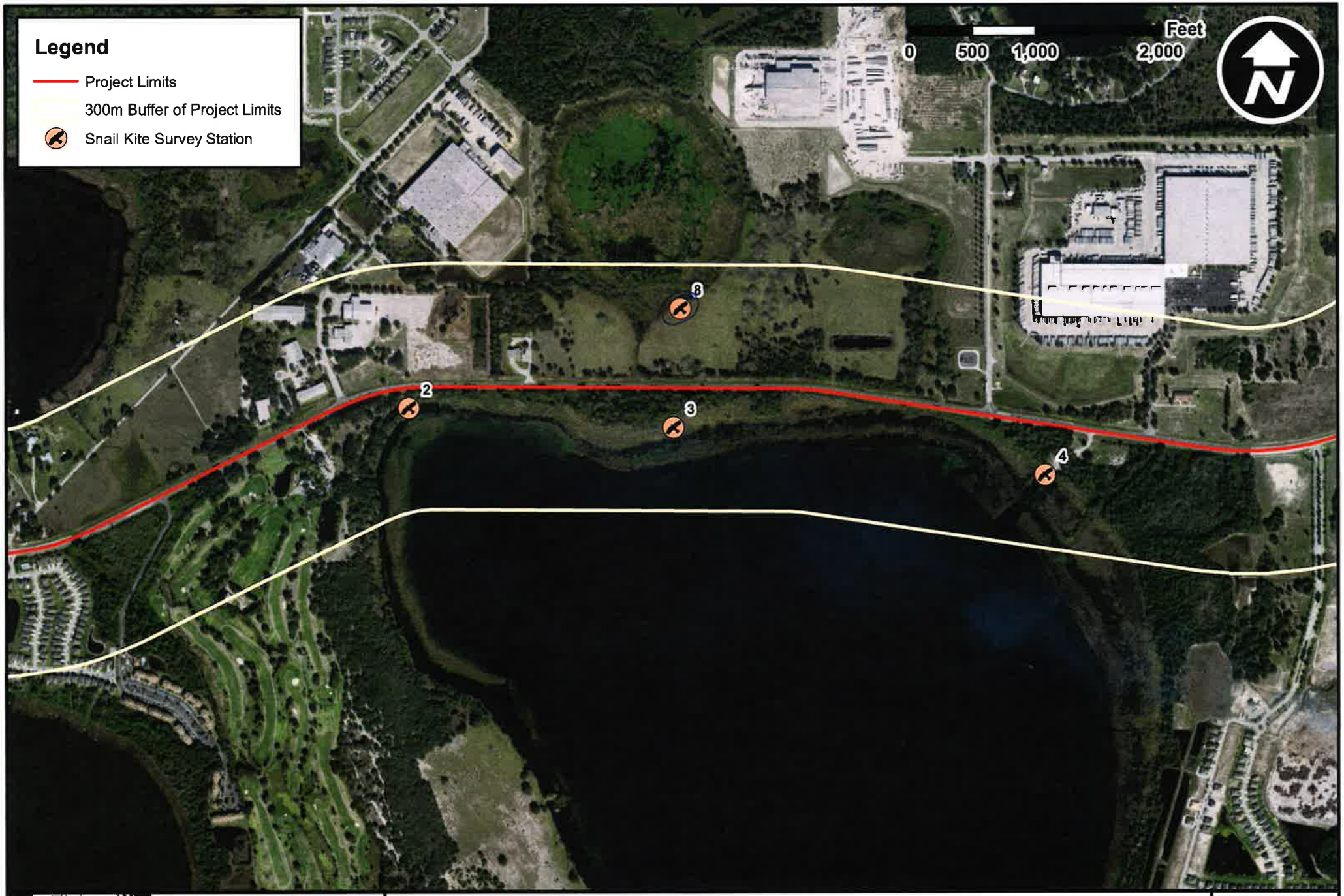
Emergent Vegetation	bulrush; maidencane; torpedo grass; pickerelweed
Perching/Nesting Substrate	Red maple; bay
Water Depth: Nest Substrate	
Distance from Uplands	wetland located w/ pasture

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			Standing water observed w/in pasture. Wildlife observed: little blue heron; white ibis; wood stork; white egret



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

no snail kite observed T. Mueller

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 1/22/20

STATION

8

Snail Kite
Survey Data Form

Date: 2/19/2020 Start Time 10:45am Stop Time 11:00am Monitor J. Barkers

Site Name and Location: SR 544 Stafford

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:43am	78°F	Calm	60%	> 1 mile	no

Habitat Data

Emergent Vegetation	Cattails, Sagittaria, ludwigia octovalvis, ludwigia peruviana
Perching/Nesting Substrate	carolina willow, cypress elderberry
Water Depth: Nest Substrate	0-1 meter along Lake Smart western shoreline, 0-5 along eastern shoreline
Distance from Uplands	0-5 meters along western shoreline. 10-50 meters along eastern shoreline

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			No snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			no apple snails observed

Snail Kite
Survey Data Form

Date: 2-19-2026 Start Time 10:21 AM Stop Time 10:35AM Monitor J. Carlos A

Site Name and Location: SR 544 PDEE Station 9

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:21AM	76°F	NW 0-5mph	75%	> 1 mile	NO

Habitat Data

Emergent Vegetation	Cattail
Perching/Nesting Substrate	Carolina willow, wax myrtle, elderberry, Brazilian pepper
Water Depth: Nest Substrate	
Distance from Uplands	Along Lake Connie Shoreline 5-100 meters

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			NO Snail Kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			NO Apple snails observed

District 1

State Road 544 (Lucerne Park Road)
From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No Snail Kites Observed

SNAIL KITE SURVEY
STATION LOCATION MAP

DATE 2/19/2020

STATION

9, 1

Snail Kite
Survey Data Form

Date: 2-19-2026 Start Time 11:12 AM Stop Time 11:32 AM Monitor J Bartorsa

Site Name and Location: SR 544 Station 2

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:12 AM	80°F	N 0-5 mph	50%	> 1 mile	NO

Habitat Data

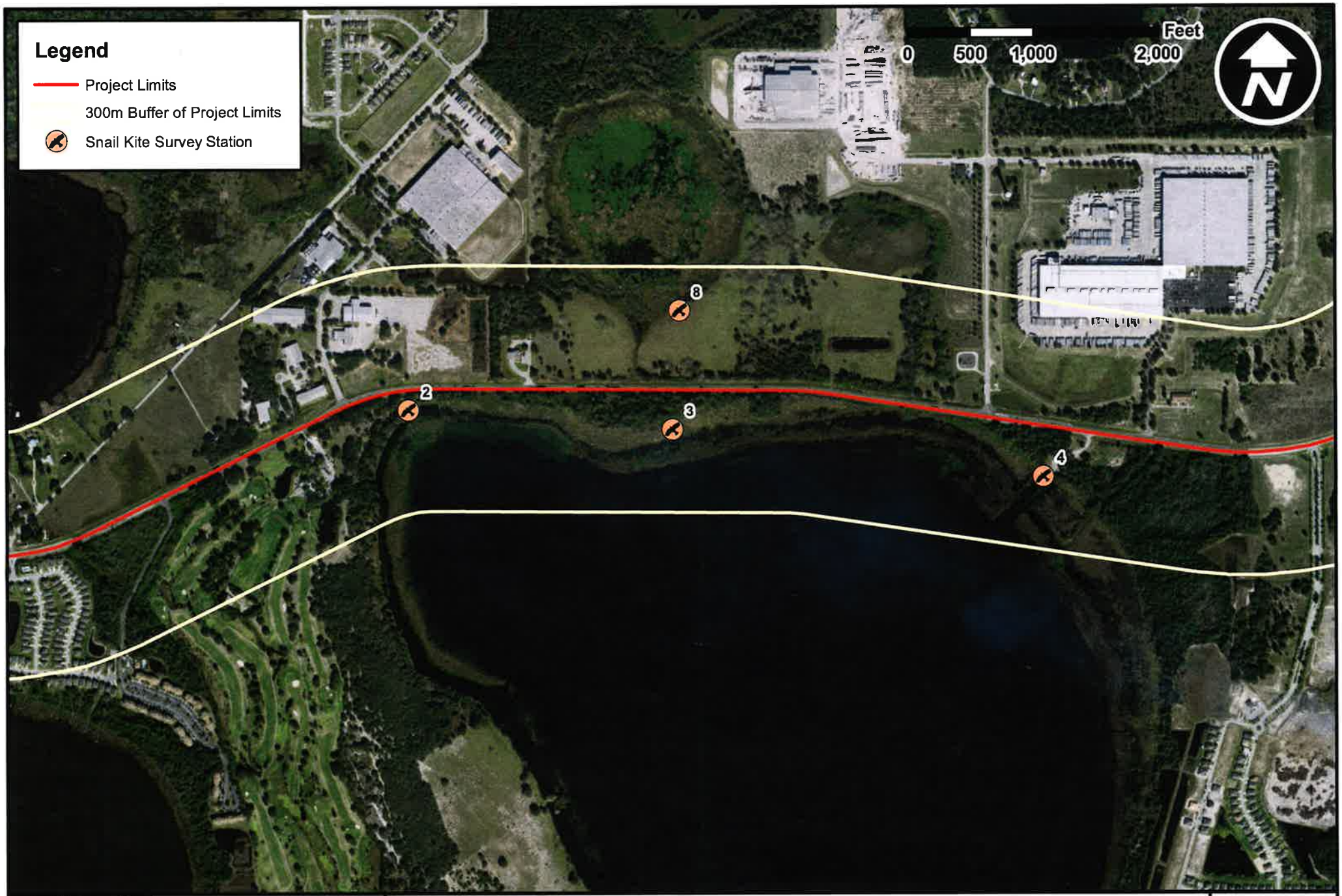
Emergent Vegetation	cattail, pickerel weed, alligator flag, sagittaria, maidencane, Industria water lily
Perching/Nesting Substrate	cypress, carolina willow, red maple
Water Depth: Nest Substrate	0 - 2 meter
Distance from Uplands	5-250 meters depending on station of Lake Hamilton

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			NO snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			NO Apple snails observed



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

NO Snail Kites Observed

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 2/11/2020

STATION

2

Snail Kite
Survey Data Form

Date: 2/9.2020 Start Time 12:03pm Stop Time 12:19pm Monitor J. Barlow

Site Name and Location: SR 544 Station 3

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
12:03pm	81°F	NW 5mph	75%	> 1 mile	NO

Habitat Data

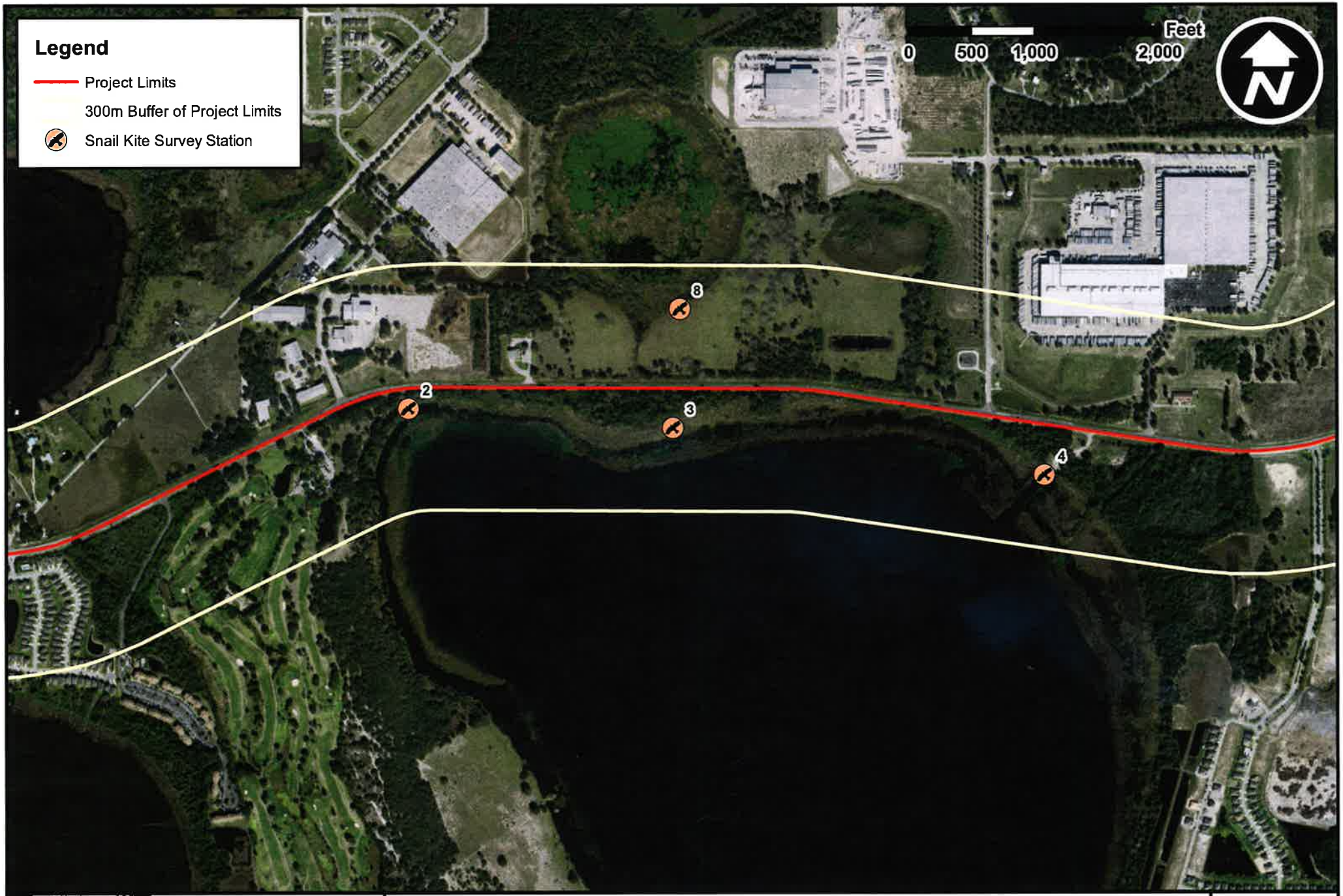
Emergent Vegetation	Cattail, pickerel weed, water lily, Spatterdock
Perching/Nesting Substrate	red maple saplings, sweet bay, Ludwigia, Carolina willow
Water Depth: Nest Substrate	1-2 meters
Distance from Uplands	5-25 meters

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			NO snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			NO apple snails observed



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

No Snail Kites Observed

SNAIL KITE SURVEY
STATION LOCATION MAP

DATE 2 / 19 / 2020

STATION

3

Snail Kite
Survey Data Form

Date: 2/19/20 Start Time 12:10p Stop Time 12:22p Monitor T. Mueller

Site Name and Location: SR 544 Station 4

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
12:10p	81°	NW 5mph	50%	clear	none

Habitat Data

Emergent Vegetation	cattail; primrose willow; carbon bulrush; pickerelweed; elderberry; waterlily
Perching/Nesting Substrate	Bay; red maple; pine; carolina willow; wax myrtle; Braz. Pep.
Water Depth: Nest Substrate	0-5 m
Distance from Uplands	

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			anhinga; bald eagle; brown pelican; common gallinule

Snail Kite
Survey Data Form

Date: 2/19/20 Start Time 12:50p Stop Time _____ Monitor T. Muller
J. Barhorst

Site Name and Location: SR 544 Station 5.

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
12:50p	82°	NW 5 mph	80%	clear	none

Habitat Data

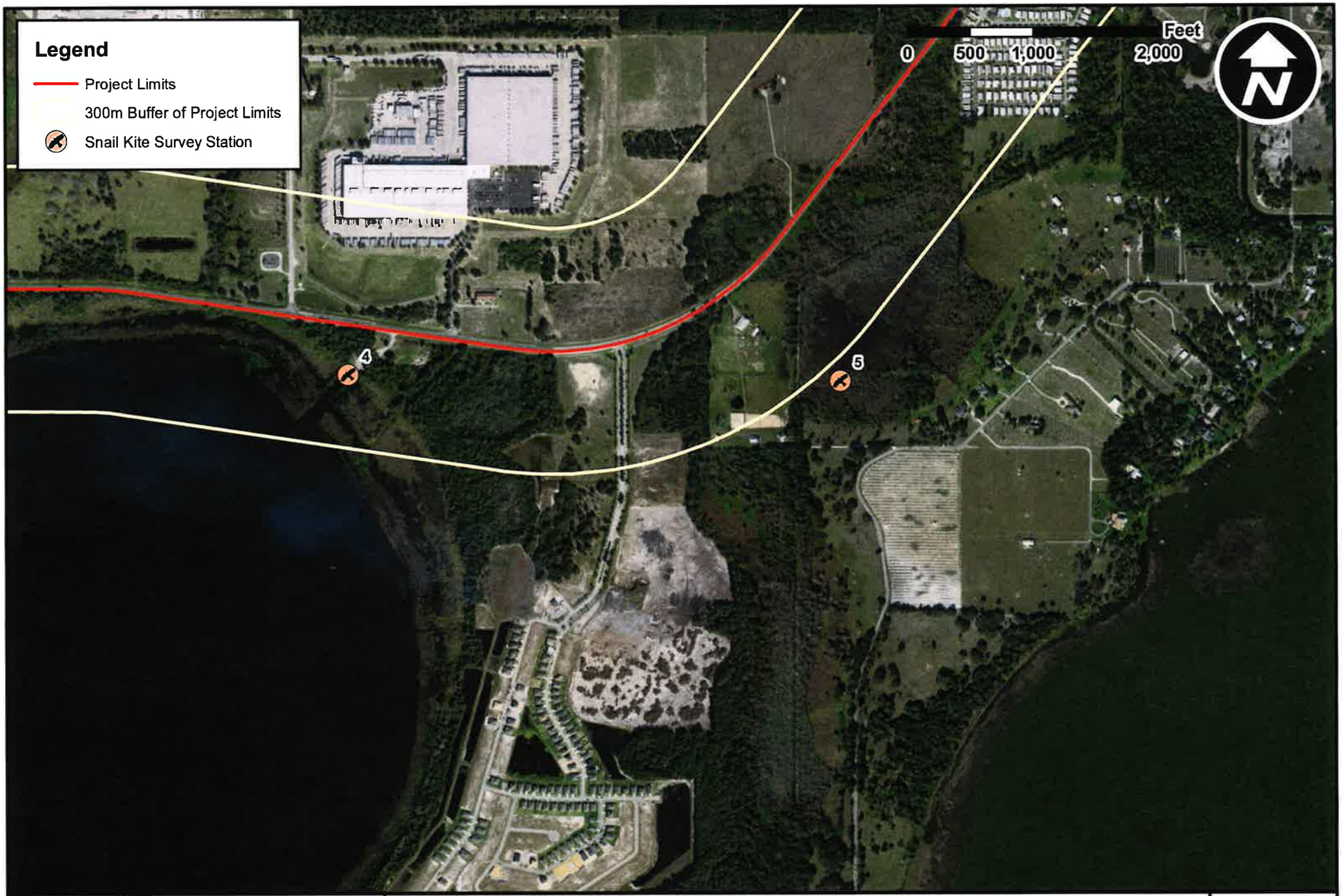
Emergent Vegetation	maidencane; juncus; tapegrass;
Perching/Nesting Substrate	red maple; primrose willow; duckpotato; ferny; carolina willow
Water Depth: Nest Substrate	0 - 2"
Distance from Uplands	

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			little blue; tricolored heron; anhinga; sandhill crane; glossy ibis; great white egret; roseate spoonbill; limpkin;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY
STATION LOCATION MAP

DATE 2/19/20

STATION

4,5

Snail Kite
Survey Data Form

Date: 2/19/20 Start Time 10:25a Stop Time _____ Monitor T. Mueller

Site Name and Location: SR 544 station 6

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:25a	77°	WNW 5mph	80%	Clear	none

Habitat Data

Emergent Vegetation	cattail; cuban bulrush; duck potato; pickerelweed; water lilies
Perching/Nesting Substrate	caroline willow; cypress; red maple; Primrose willow;
Water Depth: Nest Substrate	0-3 m
Distance from Uplands	wetland immediately adjacent to mowed & maintained residential yard.

Nesting Data: Observed Activity

(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed.

Roosting Behavior and General Observations

(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			anhinga; red winged black bird; mockingbird; Sandhill crane;

Snail Kite
Survey Data Form

Date: 2/19/20 Start Time 10:48a Stop Time 11:05a Monitor T. Mueller

Site Name and Location: SR 544 Station 7

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:48	78°	W 4 mph	80%	clear	none

Habitat Data

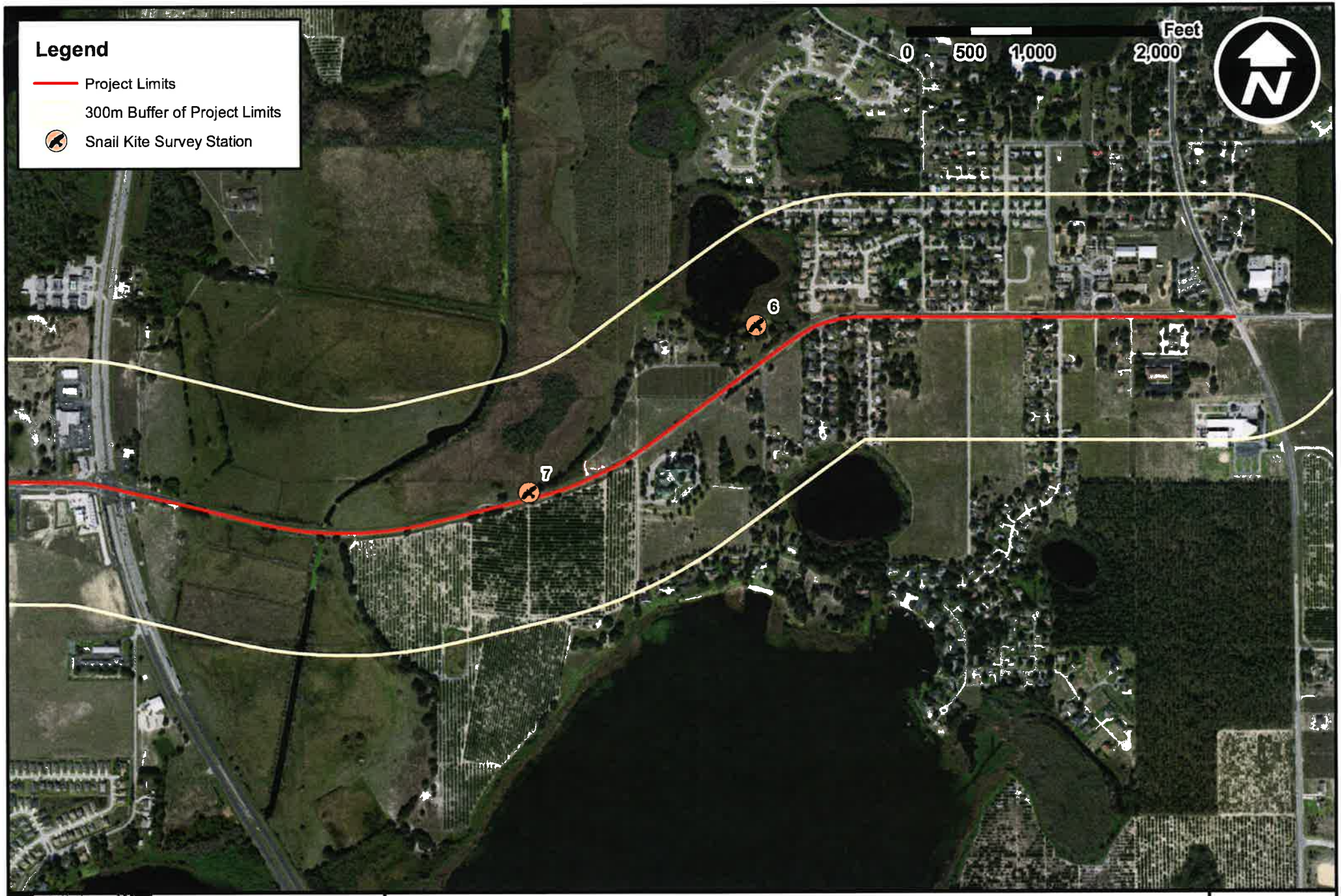
Emergent Vegetation	duck potato; rushes; sedges;
Perching/Nesting Substrate	Carolina willow; red maple; sweetbay; elderberry; primrose willow; Brz. pep.
Water Depth: Nest Substrate	0-2"
Distance from Uplands	adjacent to pasture

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			osprey; red winged blackbird;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY
STATION LOCATION MAP

DATE 2/19/20

STATION

6,7

Snail Kite
Survey Data Form

Date: 2/19/20 Start Time 11:28 Stop Time 11:57 Monitor T. Mudd

Site Name and Location: SR 544 Station 8

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:28	80°	NW 4mph	60%	clear	none

Habitat Data

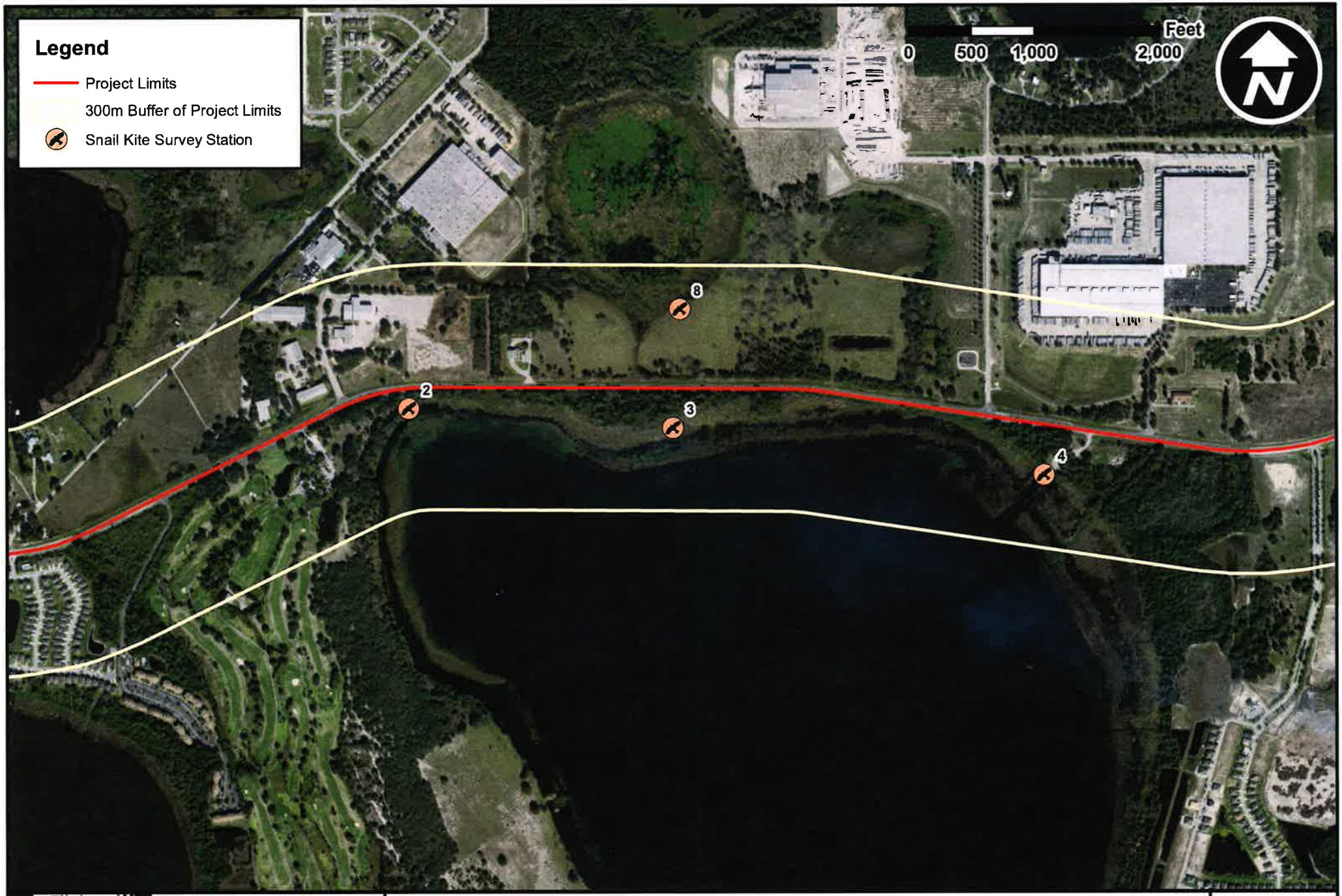
Emergent Vegetation	pickerelweed; torpedo grass; duck potato; juncus; arrowroot.
Perching/Nesting Substrate	Bay; primrose willow; buttonbush
Water Depth: Nest Substrate	0-2"
Distance from Uplands	adjacent to pasture

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kite observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			little blue; woodstork; sandhill crane; Killdeer; redbellied woodpecker; tricolored heron; osprey;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 2/19/20

STATION

8

Snail Kite
Survey Data Form

Date: 4/13/21 Start Time 1108a Stop Time 1124 Monitor T. Mueller A. Burke

Site Name and Location: SR 544 Station 1

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
1108	81°	N 6 mph	0%	clear	none

Habitat Data

Emergent Vegetation	cattail; pickerelweed; primrose willow; eelgrass; torpedo grass; elderberry
Perching/Nesting Substrate	primrose willow
Water Depth: Nest Substrate	controlled lake levels
Distance from Uplands	immediately adjacent

Nesting Data: Observed Activity

(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations

(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			red winged blackbird; cormorant; boat tailed grackle; ibis; bluejay; common gallinule; little blue;
			tricolored heron; osprey. apple snail eggs.

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/13/21

STATION

1

Snail Kite
Survey Data Form

Date: 3/14/21 Start Time 11:30a Stop Time 11:45a Monitor T. Mullis A. Burke

Site Name and Location: SR 544 Station 2

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:30a	82°	N 6mph	0%	clear	none

Habitat Data

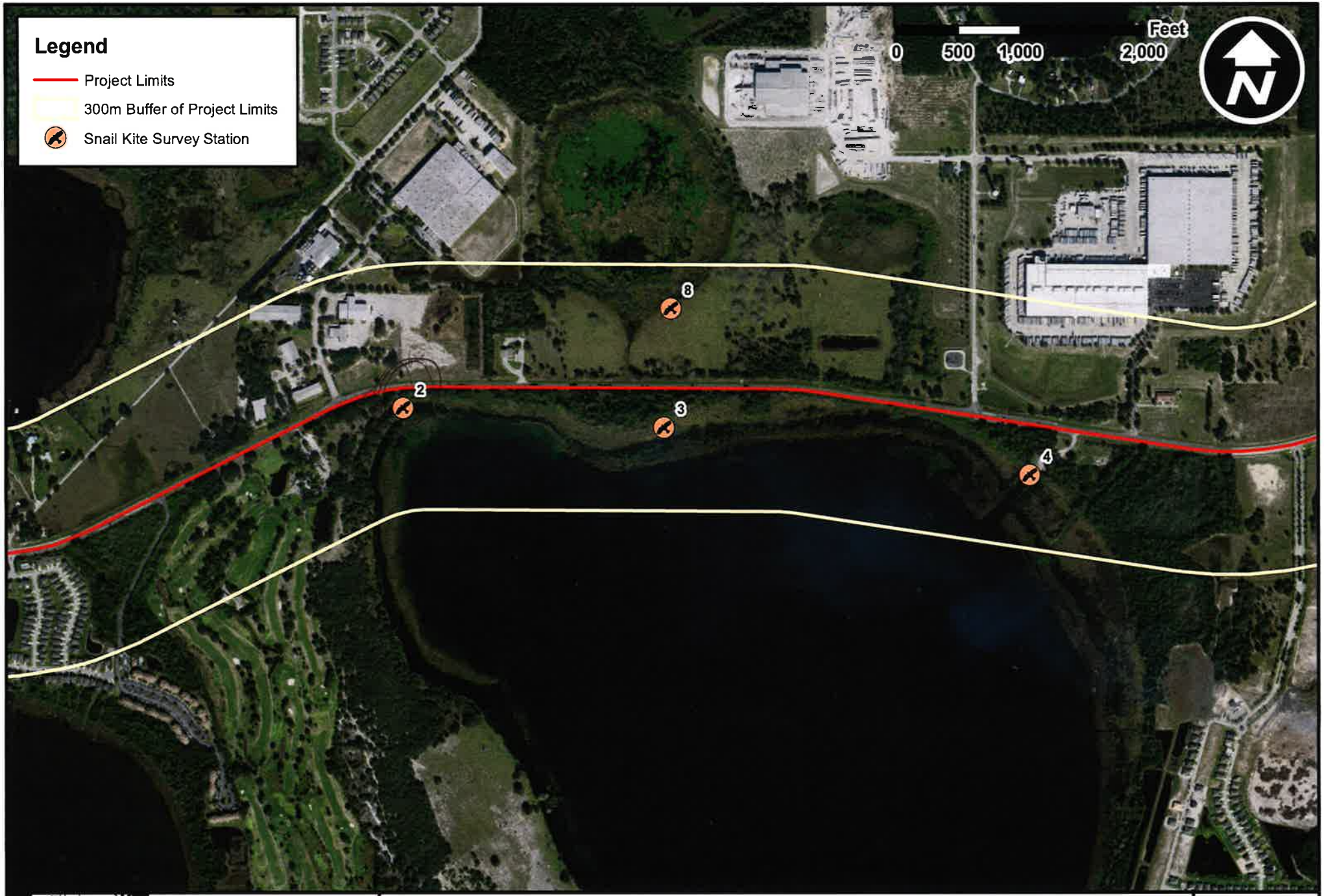
Emergent Vegetation	cattail; pickerel weed; buttonbush; torpedo grass
Perching/Nesting Substrate	
Water Depth: Nest Substrate	controlled lake level
Distance from Uplands	approx 25' to open water

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			Osprey; red winged blackbird; blue jay; common grackle; cormorant;
			great egret; boat tailed grackle; black vulture mockingbird.



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 3/14/21

STATION

2

Snail Kite
Survey Data Form

Date: 4/13/21 Start Time 12:10p Stop Time 12:25p Monitor T. Mueller A. Burke

Site Name and Location: SR 544 Station 3

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
12:10p	84°	N 5mph	0%	clear	none

Habitat Data

Emergent Vegetation	cattail; primrose willow; carolina willow; hydrilla
Perching/Nesting Substrate	primrose willow; caroline willow
Water Depth: Nest Substrate	controlled lake level
Distance from Uplands	approx 15' to open water

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			boat tailed grackle; common gallinule; American crow; mourning dove;
			red winged blackbird; little blue heron; glossy ibis; bald eagle;
			tree swallow; red tailed hawk; cattle egret; wood duck nest box

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/13/21

STATION

3

Snail Kite
Survey Data Form

Date: 4/13/21 Start Time 11:47a Stop Time 12:02p Monitor T. Mueller, A. Burke

Site Name and Location: SR 544 Station 4

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:47	81°	W 6mph	~~clear~~ 0%	clear	none

Habitat Data

Emergent Vegetation	Cuban bulrush; cattails; eelgrass primrose; Carolina willow; buttonbush; spatterdock; pickerelweed
Perching/Nesting Substrate	button bush; red maple; primrose willow; Carolina willow
Water Depth: Nest Substrate	Controlled lake level
Distance from Uplands	immediately adjacent

Nesting Data: Observed Activity

(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations

(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			Common galinule; osprey; yellow eared sliders; black vulture;
			bald eagle; cormorant; great blue heron; red winged blackbird; boat tailed
			grackle; great egret; cattle egret; apple snail; little blue heron
			American crow;

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/13/21

STATION

4

Snail Kite
Survey Data Form

Date: 4/14/21 Start Time 12:10 Stop Time 18:25 Monitor T. Mueller A. Burke

Site Name and Location: SR 544 Station 5

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
12:10	82°	N 6 mph	0%	clear	none

Habitat Data

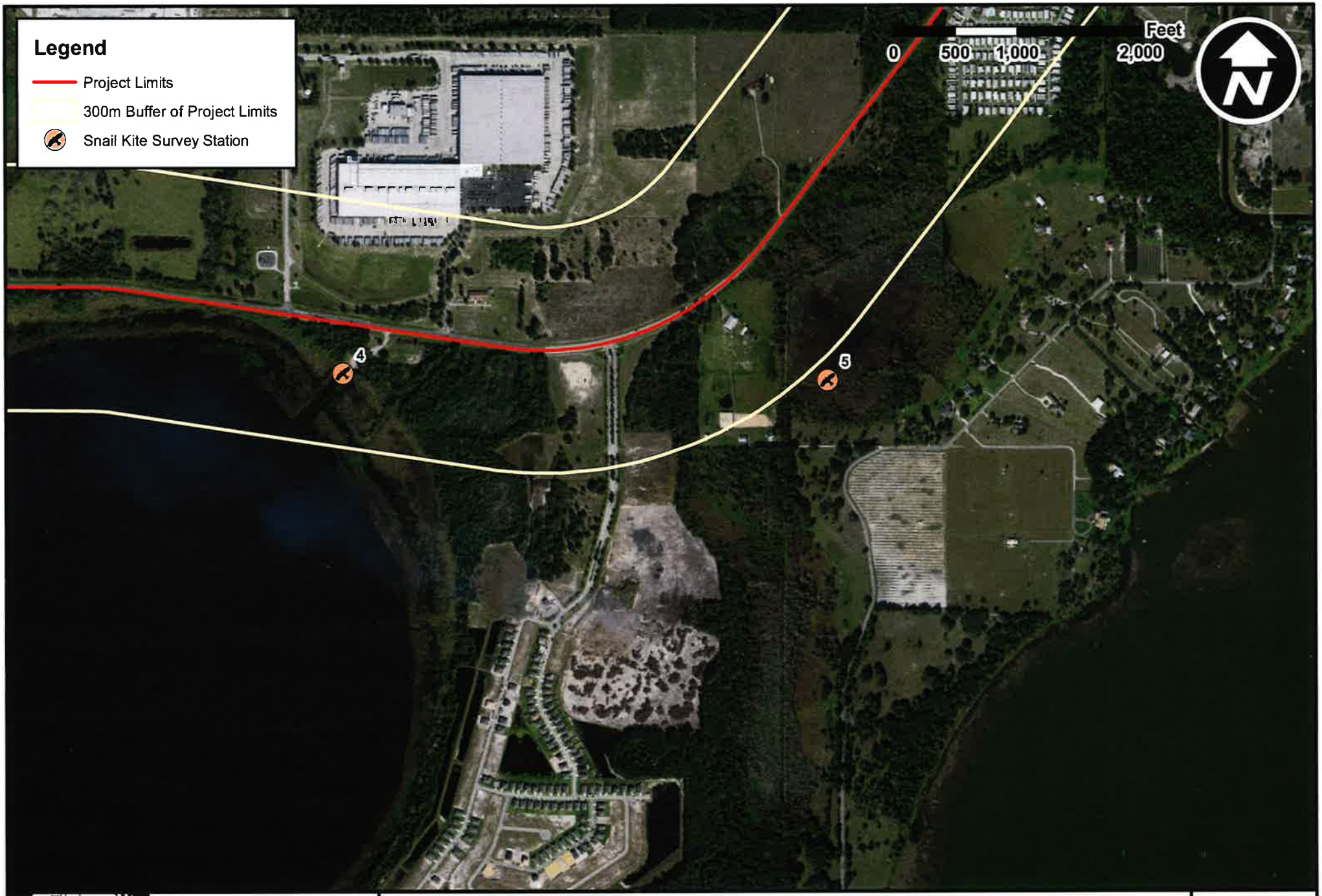
Emergent Vegetation	torpedo grass; maidencane;
Perching/Nesting Substrate	Caroline willow; bay; red maple primrosewillow
Water Depth: Nest Substrate	
Distance from Uplands	

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			anhinga; boattailed grackle; white ibis; little blue;
			black vulture



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/14/21

STATION

5

Snail Kite
Survey Data Form

Date: 4/14/21 Start Time 10:20a Stop Time 10:35 Monitor T. Mueller A. Burke

Site Name and Location: SR 544 Station 6

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:20a	76°	ESE 12mph	10%	clear	none

Habitat Data

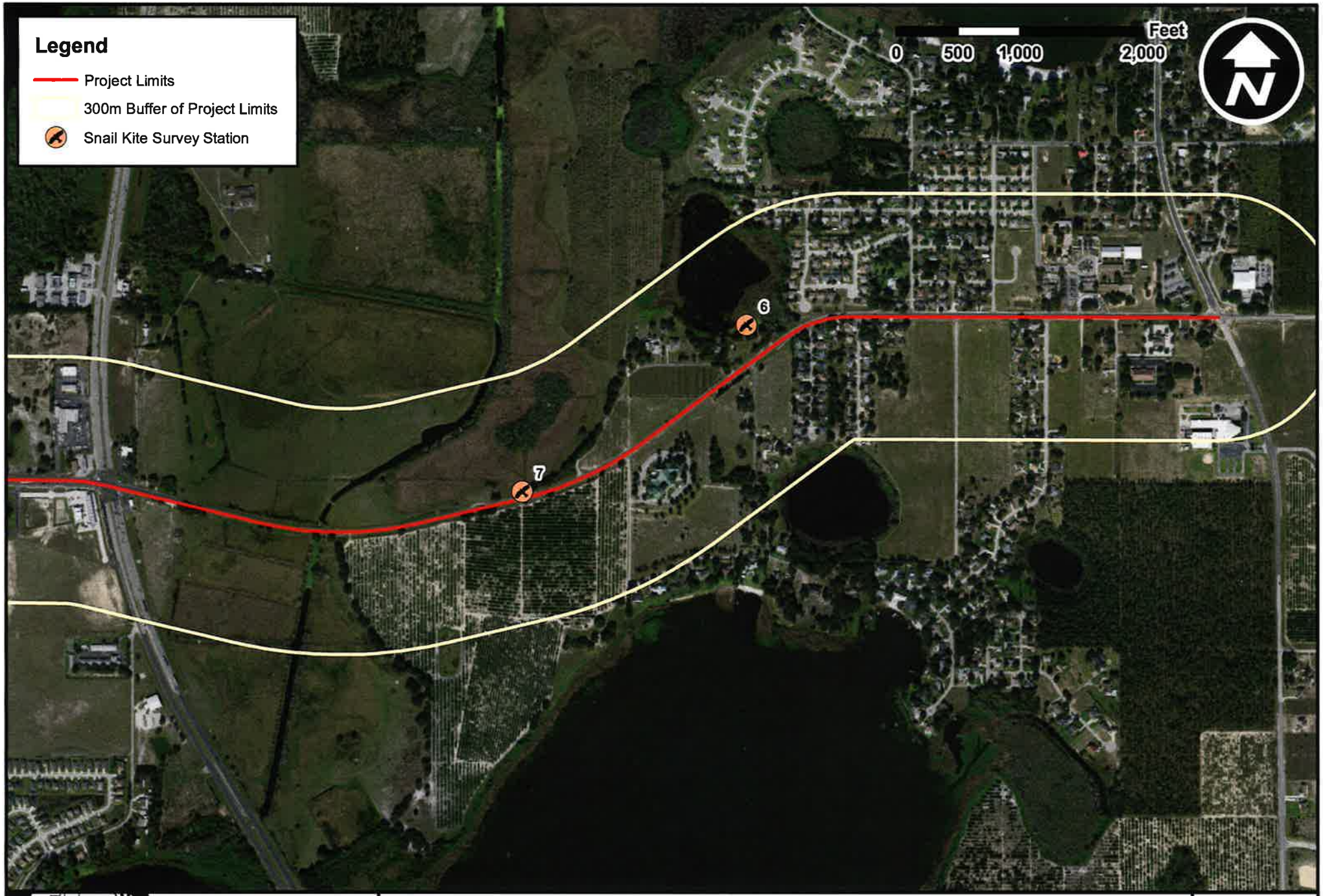
Emergent Vegetation	cattail; duck potato; torpedograss; primrose willow; white water lily; pickerelweed;
Perching/Nesting Substrate	Primrose willow; carolina willow red maple
Water Depth: Nest Substrate	
Distance from Uplands	adjacent to mowed residential lawn

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no Snail Kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			American crow; gray squirrel; red winged blackbird;



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4,14,21

STATION

6

Snail Kite
Survey Data Form

Date: 4/14/21 Start Time 10:40a Stop Time 10:55a Monitor T. Mueller A. Burke

Site Name and Location: SR 544 Section 7

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:40a	76°	ESE 13 mph	5%	clear	none

Habitat Data

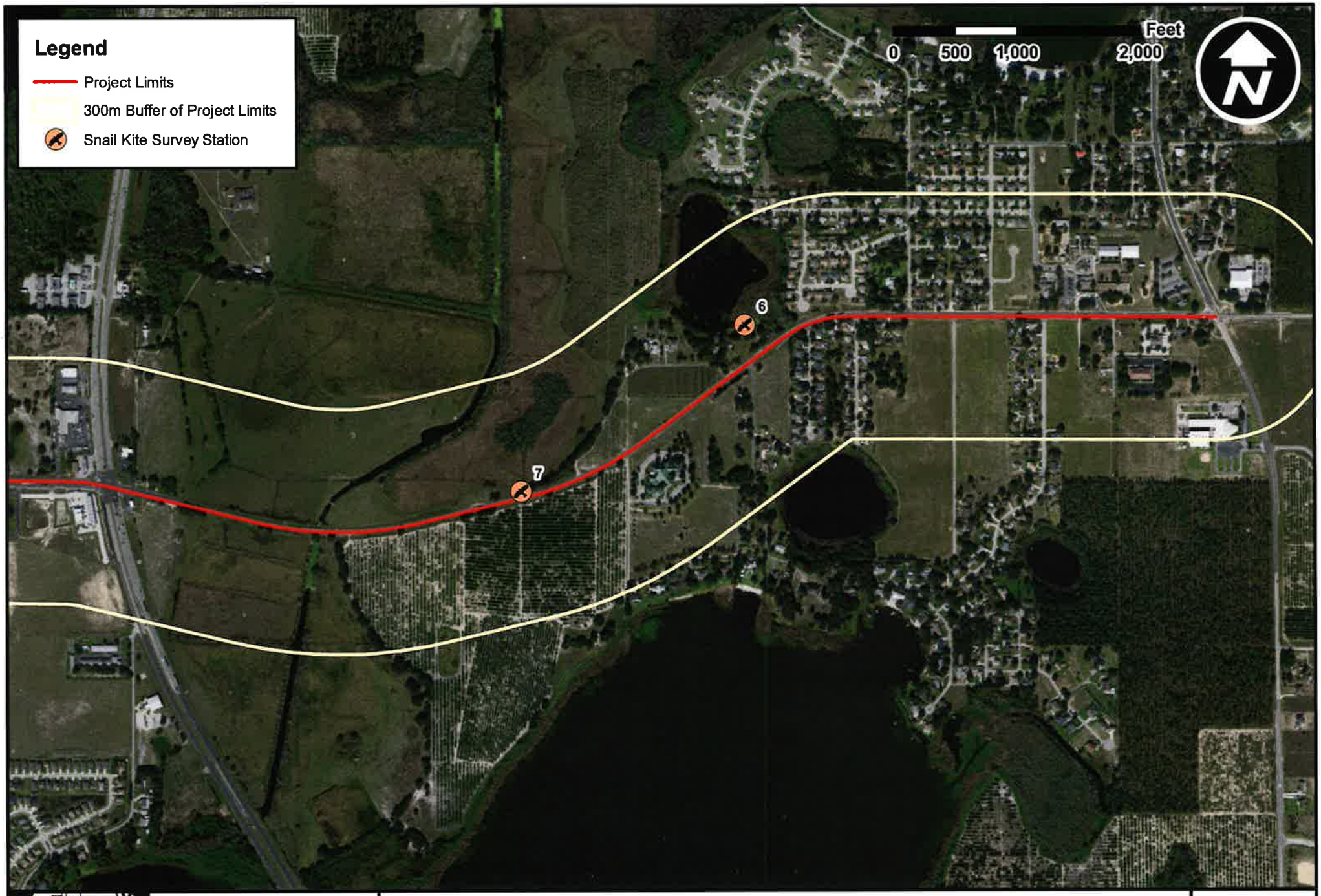
Emergent Vegetation	Duckpotato pickerelweed; juncus; primrose willow
Perching/Nesting Substrate	primrose willow; elderberry
Water Depth: Nest Substrate	
Distance from Uplands	adjacent to pasture

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			cattle egret; cormorant; osprey; little blue heron; American crow
			red winged black bird; great blue heron; glossy ibis; northern harrier



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/14/21

STATION

7

Snail Kite
Survey Data Form

Date: 4/14/21 Start Time 11:05a Stop Time 11:20a Monitor T. Mueller A. Burke

Site Name and Location: SR 544; Station 8

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
11:03a	79°	SE 10mph	5%	clear	none

Habitat Data

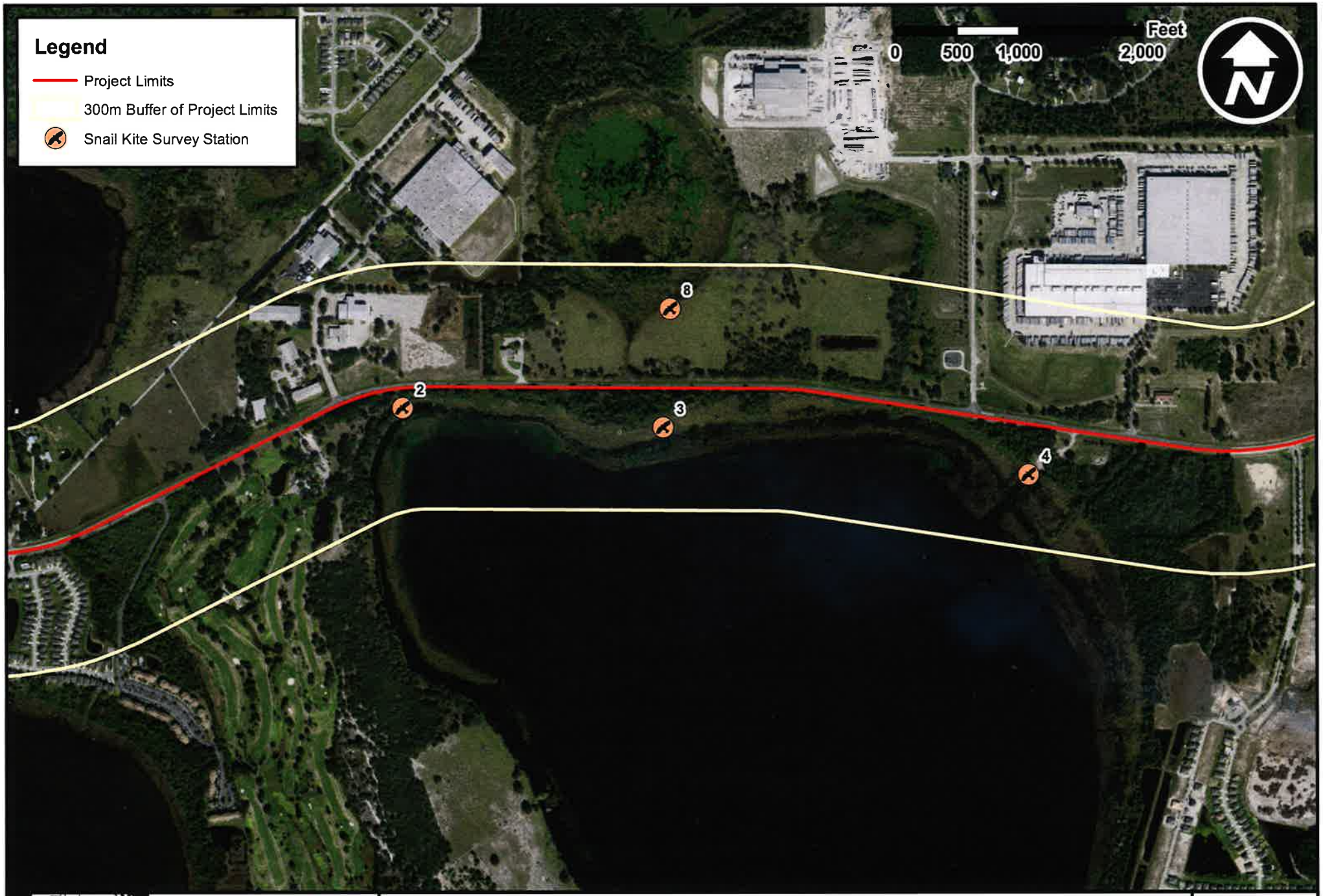
Emergent Vegetation	Pickerelweed, torpedograss, juncus
Perching/Nesting Substrate	bay tree; buttonbush
Water Depth: Nest Substrate	0-2"
Distance from Uplands	immediately adjacent to cattle pasture

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			bald eagle; cattle egret; red shouldered hawk; sandhill crane;
			osprey; black vulture; great egret; boat-tailed grackle; little blue heron;
			American Crow



FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/19/21

STATION

8

Snail Kite
Survey Data Form

Date: 4/13/21 Start Time 10:45a Stop Time 11:00a Monitor T. Mueller A. Burke

Site Name and Location: SR 544 Station 9

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Visibility	Rain
10:45a	79°	WNW 8mph	0%	clear	none

Habitat Data

Emergent Vegetation	cattail; black potato; primrose willow
Perching/Nesting Substrate	Primrose willow; carolina willow
Water Depth: Nest Substrate	
Distance from Uplands	adjacent to R/W

Nesting Data: Observed Activity
(perching, courtship, feeding or carrying apple snails, nest building, incubation, vocalization of adults or begging calls of the young, flight direction of flushed birds: circle up or fly horizontally away)

#	Age	Time	Description
			no snail kites observed.

Roosting Behavior and General Observations
(record roost location information, vegetation types, snail kite reaction to monitor, traffic, other birds, etc.)

#	Age	Time	Description
			common gallinule; common grackle; common tern; anhinga; cormorant;
			little blue heron; red winged blackbird; osprey; boat tailed grackle;
			black vulture; great egret.

FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SNAIL KITE SURVEY STATION LOCATION MAP

DATE 4/13/21

STATION

9

APPENDIX I

Florida Bonneted Bat Survey Report and Supplemental Florida Bonneted Bat Survey Report

FLORIDA BONNETED BAT (EUMOPS FLORIDANUS)
ACOUSTIC SURVEY

SR 544 (Lucerne Park Road) Project Development & Environment (PD&E) Study

From Martin Luther King Boulevard to SR 17
Financial Project Number: 440273-1

Polk County, Florida

Prepared by:

Inwood Consulting Engineers, Inc
3000 Dovera Drive, Suite 200
Oviedo, FL 32765

January 2021

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Appendices

1.0 Introduction

The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) Study to evaluate improvements to SR 544 (Lucerne Park Road) in Polk County. The proposed project is approximately 8 miles long from Martin Luther King Boulevard to SR 17 and is located within Sections 1, 2, 3, 9, 10, 12, 16, 17, Township 28S, Range 26E; Sections 4, 5, 6, Township 28S, Range 27E; and Sections 32, 33 Township 27S, and Range 27E. The **Project Location Map** is shown on **Figure 1**.

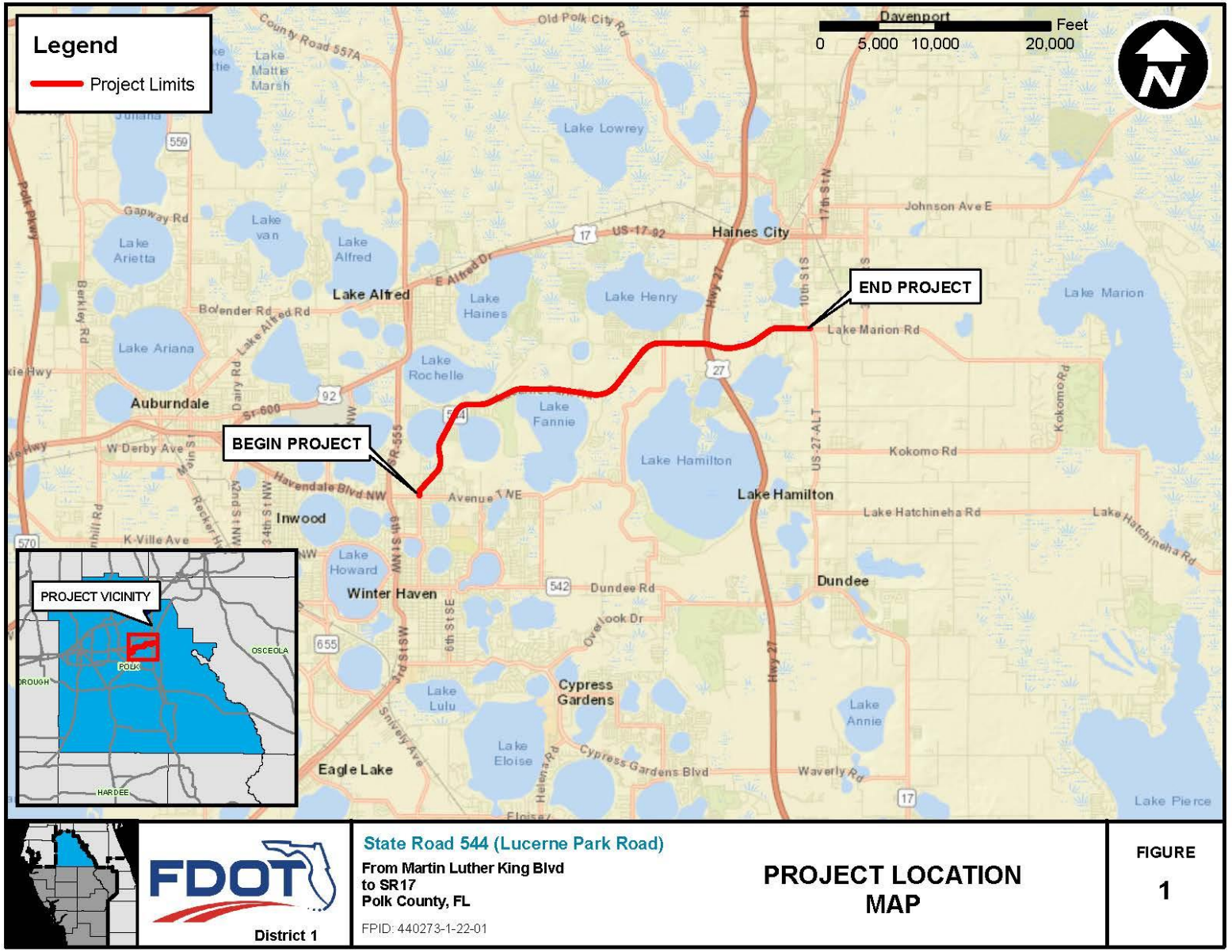
The project is located within the United States Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Florida bonneted bat (*Eumops floridanus*) and potential roosting and foraging habitat was observed within the project corridor. As a result, Inwood Consulting Engineers, Inc. (Inwood) conducted an assessment to determine the potential effects from the proposed project to the Florida bonneted bat. The assessment was prepared in accordance with Section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 et seq.) and included a full acoustic survey and roosting survey of the project corridor. The surveys were conducted from November 2020 through January 2021 and in accordance with the current Florida Bonneted Bat Consultation Guidelines (October 2019) (guidelines).

This report provides the methodology, results, and conclusions of the 2020/2021 Florida bonneted bat survey conducted for the SR 544 PD&E Study along with the anticipated effect determination and is intended to supplement the Natural Resource Evaluation report prepared as part of the PD&E study

2.0 Project Description

This project involves the potential widening of SR 544 from two to four lanes along with the evaluation of eleven stormwater management facilities (ponds). Both the roadway widening and proposed pond sites were included in the survey efforts.

Figure 1: Project Location Map



3.0 Status, Life History and Habitat

3.1 Federal Status

The Florida bonneted bat is a member of the Molossidae family and is the largest bat found in Florida. Previously known as the Florida mastiff bat, Wagner's mastiff bat, and mastiff bat (*Eumpos glaucinus floridanus*), the Florida bonneted bat was found to be a separate species in 2004 (Timm and Genoways 2004). The USFWS listed the Florida bonneted bat as endangered in October 2013 (USFWS 2013). The basis for this listing is due to habitat loss, degradation, and modification, as well as other manmade and natural factors including a small population size with few colonies, restricted range, slow reproductivity and low fecundity. Additional listed considerations included noting that the existing regulatory mechanisms did not adequately protect the Florida bonneted bat from these threats (USFWS 2013).

3.2 Life History

The Florida bonneted bat has short glossy fur consisting of bicolored hairs with a white base. The color is highly variable and ranges from black to brown, to brownish gray or cinnamon brown with the ventral fur paler than the dorsal fur (Belwood 1992, Timm and Genoways 2004). It has large broad ears that project over the eyes and are joined at the midline of the head. This identifying characteristic, along with its larger size, distinguishes it from the Brazilian free-tailed bat (*Tadarida brasiliensis*).

The Florida bonneted bat is a subtropical species that does not hibernate and is active year round. It is thought to have a fairly extensive breeding season during summer months with data suggesting the species might be polyestrous, with a second birthing season in January and February (Timm and Genoways 2004). Females give birth to one offspring per maternity season (USFWS 2013).

This species relies on speed and agility while foraging in open spaces to detect prey roughly 3 to 5 meters (10 to 16 ft) away (Belwood 1992). Bonneted bats are high-flyers, rarely flying below 10 meters (33f ft) (Belwwod 1992) and feed on flying insects including beetles (Coleoptera), flies (Diptera), true bugs (Hemiptera), and moths (Lepidoptera) (Belwood 1981).

3.3 Habitat

Habitat for the Florida bonneted bat consists of foraging areas and roosting sites, including artificial structures. Roosting and foraging varies with species occurring in forested, suburban, and urban areas (Timm and Arroyo-Cabrales 2008).

The guidelines define foraging habitat as relatively open areas that provide sources of prey and drinking water including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland and upland shrub, and agricultural areas. In urban areas, suitable foraging can be found at golf courses, parking lots, and parks.

Potential roosting habitat defined by the guidelines includes forests or other areas with tall or mature trees or other areas with potential roost structures including utility poles and artificial roosts. This includes habitat in which suitable structural features for breeding and sheltering are present. Roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark.

4.0 Methodology

4.1 Preliminary Analysis

Prior to conducting the acoustic and roosting surveys, a preliminary analysis of publicly available documentation and geographic information systems (GIS) data were reviewed to determine the potential occurrence of the Florida bonneted bat within the project corridor. Following the completion of the GIS analysis, Inwood biologists conducted a field review on November 11, 2020 to identify habitats within the project corridor that provide suitable roosting and/or foraging habitat for the Florida bonneted bat and identify optimal acoustic sites.

The guidelines currently require a minimum of five detector nights per 0.6 miles (0.97 km) for linear projects. Based on the suitable habitat occurring within a portion of the approximate eight-mile proposed project length, a minimum of 55 detector nights were required. A total of 12 acoustic monitoring sites were identified, providing 60 detector nights to sufficiently cover the survey requirements based on project length, proposed pond site locations and existing habitats along the project corridor. The monitoring site locations were determined by the surrounding habitats observed during the pre-survey field review. These sites were chosen to survey habitats most suitable for foraging and roosting, while being placed in areas with limited clutter to maximize the effectiveness of the equipment. Based on the preliminary analysis, Inwood developed a Florida Bonneted Bat Survey Methodology for the SR 544 PD&E Study that was submitted to the USFWS on November 16, 2020 (**Appendix A**) that was subsequently approved on November 17, 2020.

The acoustic and roosting surveys, as well as the call data analysis were conducted by a qualified biologist with the required acoustic survey course training and experience.

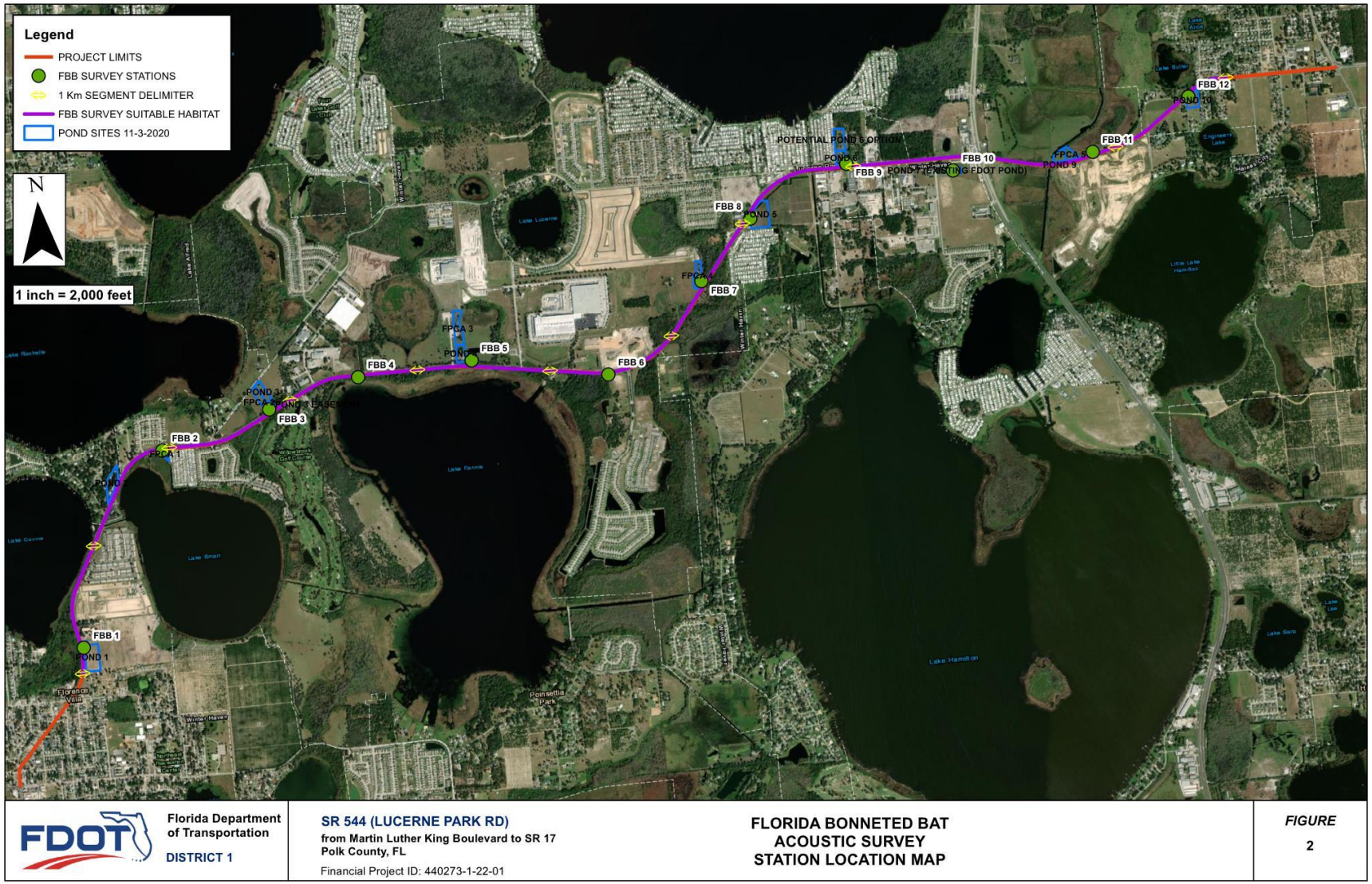
4.2 Acoustic Survey

The acoustic survey was conducted from November 16, 2020 through January 3, 2021. It was conducted in multiple deployments to accommodate weather conditions and equipment utilization including a total of 4 detectors. Photographs of detector deployment and representative habitat are included in **Appendix B**. Detector Deployment Data Forms are provided in **Appendix C**. **Table 1** provides the details of the detector deployment. **Figure 2** provides the location for each acoustic site.

Table 1. Detector Deployment Summary

Site	Detector Number	Latitude	Longitude
FBB1	11535	28°03'11"N	81°43'16"W
FBB2	11537	28°03’57"N	81°42'49"W
FBB3	11534	28°04'04"N	81°21'32"W
FBB4	11536	28°04'10"N	81°41'55"W
FBB5	11534	28°04'21"N	81°41'23"W
FBB6	11537	28°04'04"N	81°40'45"W
FBB7	11535	28°04'26"N	81°40'17"W
FBB8	11536	28°04'39"N	81°40'03"W
FBB9	11534	28°04'51"N	81°39'37"W
FBB10	11536	28°04'46"N	81°39'06"W
FBB11	11535	28°04'49"N	81°38'26"W
FBB12	11537	28°04'58"N	81°37'58"W

Figure 2: Acoustic Survey Station Location Map



Each site consisted of one full spectrum detector (Pettersson DX500) with an omnidirectional microphone and directional cone. The microphones were mounted approximately 20 feet above the ground on metal poles to elevate the microphone above the shrub level. The poles were placed in a four foot tall PVC pipe holder that was hammered into the ground or attached to vegetation to provide stability. The detectors were preset to automatically record at least ½ hour before sunset and ½ hour after sunrise. Each detector and microphone were calibrated in accordance with manufacturer and USFWS guidelines. The equipment was checked daily to ensure proper functioning of the detector and microphone. Survey Data forms are included in **Appendix D**. Each detector was deployed for a minimum of five nights.

Inwood monitored the weather utilizing the nearest National Oceanic Atmospheric Administration (NOAA) National Weather Service Station to ensure the weather conditions complied with the USFWS criteria. The nearest NOAA weather station for the project is located at the Winter Havens Gilbert Airport (Station KGIF) and is approximately 4.5 miles west of the project center. Additionally, biologists document weather conditions during the daily equipment checks and were occasionally on site during survey commencement times. Supporting weather documentation is included in **Appendix E**.

Acoustic sampling efforts were repeated for nights when the weather conditions did not meet the following criteria:

- Temperatures fall below 65°F;
- Precipitation (rain and/or fog) exceeding 30 minutes or continues intermittently; and
- Sustained winds greater than 9 mph for 30 minutes or more.

4.3 Acoustic Data Analysis

Full spectrum data were recorded on 32 gigabyte (GB) SanDisk memory cards. The data were downloaded and analyzed utilizing SonoBat software, version 4.4.5. All calls were analyzed to determine the presence and subsequent identification of species, including the Florida bonneted bat. The results were reviewed and all calls at or below 20kHz are vetted to determine the potential of being a Florida bonneted bat.

4.4 Roost Survey

During the initial field analysis, detector deployments and daily equipment checks, biologists surveyed the area for potential roosts. A 100% pedestrian roost survey was conducted on December 15, 16 and 21, 2020 by two Inwood biologists in accordance with the roost survey protocol outlined in the guidelines. Pedestrian transects were spaced in order to view potential roost structures from multiple angles. All trees/structures with cavities and/or crevices were documented via GPS location. Areas

around each cavity were inspected for evidence of bat activity including guano, staining, chirping. Additionally, potential roosting cavities and crevices were inspected using a wireless camera when possible.

5.0 Results

5.1 Acoustic Survey

Twelve acoustic monitoring sites collected data for a total of 68 detector nights between November 16, 2020 and January 3, 2021. A total of 195,367 files were collected. All raw acoustic data was provided to the USFWS in January 2021. The SonoBat analysis resulted in a total of 13,163 bat call sequences from seven bat species. Bat species identified during the data analysis include:

- Big brown bat (*Eptesicus fuscus*)
- Brazilian free-tailed bat (*Tadarida brasiliensis*)
- Eastern red bat (*Lasiurus borealis*)/Seminole bat (*Lasiurus seminolus*)
- Evening bat (*Nycticeius humeralis*)
- Northern yellow bat (*Lasiurus intermedius*)
- Southeastern Myotis (*Myotis austroriparius)*
- Tri-colored bat (*Perimyotis subflavus*)

No Florida bonneted bat calls were identified as a result of the acoustic survey. SonoBat analysis identified 9 calls as Florida bonneted bat calls. Manual vetting resulted in none of the calls being identified as Florida bonneted bat calls. The 9 calls identified by SonoBat were found to be either noise, other taxa or bat species. The data corresponding to theses 9 calls are provided in **Table 2**.

Table 2. SonoBat File Data of Calls Identified as Florida Bonneted Bat

Date (Parent Night)	Time	WAV File ID	Station	Detector	Manually Vetted Result
21 November 2020	23:29:32	M002348.WAV	FBB 4	11536	Other Taxa
25 November 2020	07:11:48	M003619.WAV	FBB 2	11537	Other Taxa
26 November 2020	01:24:46	M002755.WAV	FBB 2	11537	Noise
26 November 2020	06:36:00	M002336.WAV	FBB 5	11534	Other Taxa
12 December 2020	03:25:53	M001855.WAV	FBB 9	11536	Noise
14 December 2020	03:12:36	M001624.WAV	FBB 9	11534	Noise
14 December 2020	05:58:51	M001269.WAV	FBB 11	11535	*Tadarida brasiliensis*
01 January 2021	20:37:03	M000565.WAV	FBB 10	11536	Noise
01 January 2021	01:37:38	M000754.WAV	FBB 10	11536	Noise

Nightly weather conditions were recorded for each deployment. The survey efforts were repeated for nights that the weather criteria were not met. Weather data is included in **Appendix E**.

5.2 Roost Survey

The 100% roost survey conducted in December 2020 identified 15 potential roost cavities consisting of natural structures. The location of each structure is provided on **Figures 3A-3B**. Each structure was inspected for evidence of roosting such as staining, guano and chirping. **Table 3** provides a summary of the observed structures.

Biologists were able to clearly inspect Cavity 1. No evidence of roosting was observed. Cavities 3 through 15 were inspected using a wireless camera. The scoping of these cavities did not identify bat roosting. Inspection of Cavity 2 via wireless camera was not possible due to access limitations, however, no evidence of roosting was identified during the visual inspection. Photo documentation of the potential roost cavities are provided in **Appendix B**. Based on the roost assessment, no evidence of roosting by Florida bonneted bats or other bats was observed.

Figure 3A: Potential Roost Cavity Location Map

Figure 3B: Potential Roost Cavity Location Map

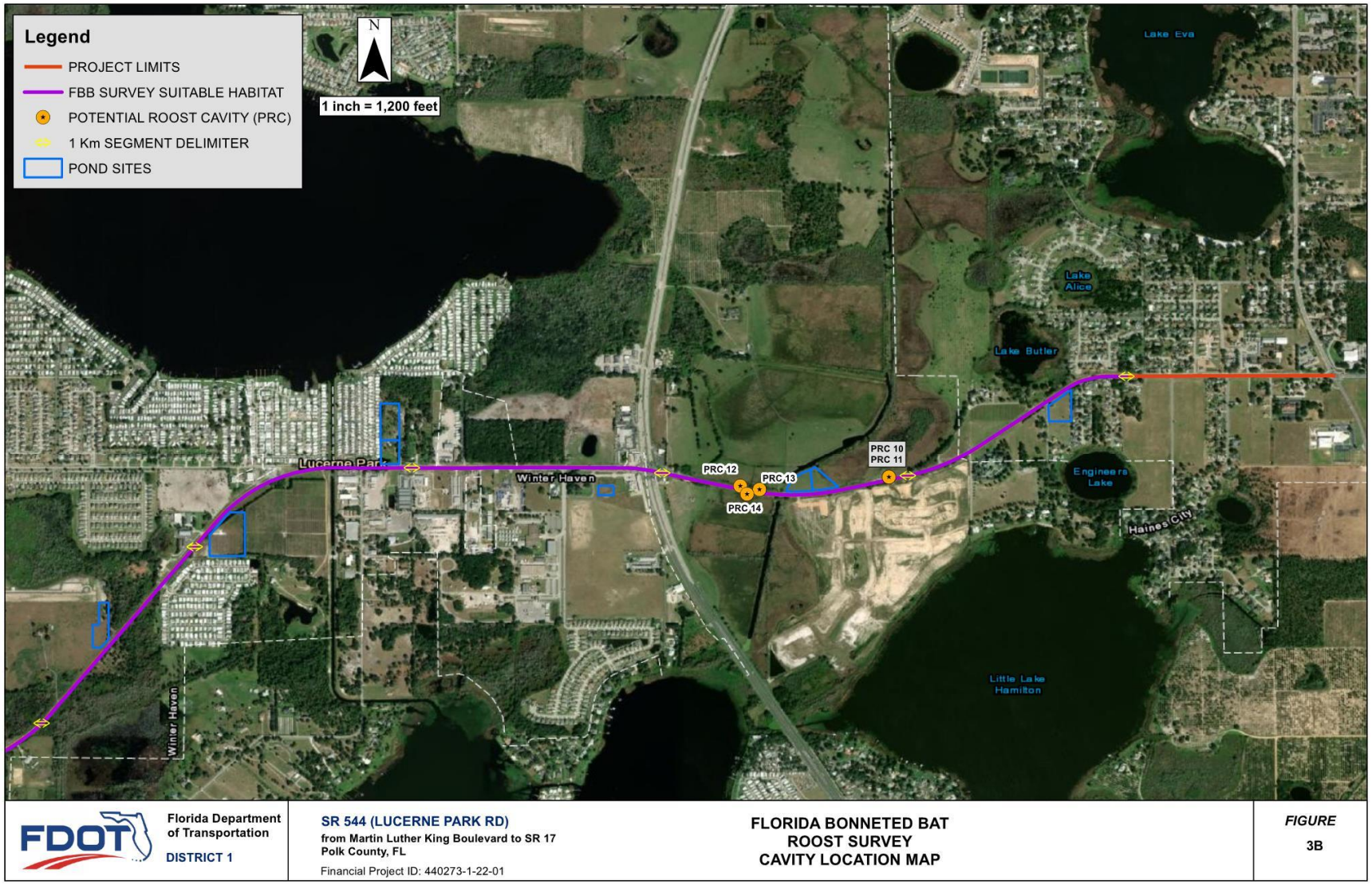


Table 3. Potential Roost Survey Data

Potential Roost Location	Structure Type	Health	Approximate Diameter	Approximate Height of Cavity	Latitude	Longitude	Staining Observed	Guano Observed	Auditory Chirping
1	Oak	Good	15	6'	28° 4' 5.08'' N	81° 42' 17.16 W	No	No	No
2	Oak	Good	24'	15'	28° 4' 5.8'' N	81° 42' 18' W	No	No	No
3	Laurel Cherry	Poor	10'	10'	28° 3' 53'' N	81° 43' 3" W	No	No	No
4	Laurel Cherry	Poor	10'	12'	28° 3' 53'' N	81° 43' 3' W	No	No	No
5	Laurel Cherry	Poor	10'	18'	28° 3' 53'' N	81° 43' 3' W	No	No	No
6	Laurel Oak	Fair	26'	8'	28° 3' 49.9'' N	81° 43' 4' W	No	No	No
7	Laurel Oak	Fair	26'	6'	28° 3' 49.9'' N	81° 43' 4' W	No	No	No
8	Live Oak	Good	24'	12'	28° 3' 50.8'' N	81° 43' 3.9' W	No	No	No
9	Live Oak	Good	24'	15'	28° 3' 50.8'' N	81° 43' 3.9' W	No	No	No
10	Oak	Poor	24'	1'	28° 4' 49.4" N	81° 38' 23.2" W	No	No	No
11	Oak	Poor	24'	8'	28° 4' 49.4" N	81° 38' 23.2" W	No	No	No
12	Chinese Tallow	Poor	10'	2'	28° 4' 48.1" N	81° 38' 44.9" W	No	No	No
13	Chinese Tallow	Poor	13'	6'	28° 4' 47.6" N	81° 38' 42.1" W	No	No	No
14	Live Oak	Fair	12'	20'	28° 4' 46.9" N	81° 38' 43.9" W	Yes	No	No
15	Live Oak	Good	15'	15'	28° 3' 3.9" N	81° 43' 18" W	No	No	No

6.0 Conclusion

Based on the guidelines, it was determined that suitable Florida bonneted bat roosting and foraging habitat occurs within the project corridor. The corridor is highly developed, and the majority of this habitat, particularly potential roosting habitat, is adjacent to the project footprint of the roadway widening and proposed ponds. As a result of the roost and acoustic surveys, no evidence of roosting or foraging was observed.

No Florida bonneted bat calls were detected as a result of the acoustic survey. A "**No Effect**" determination was made utilizing the Florida Bonneted Bat Consultation Key (USFWS 2019) (Appendix F). This effect determination was made using the following sequence from the key: **1a-2a-3b-6b**.

Based on the results of the roost and acoustic surveys, no evidence of roosting or foraging by the Florida bonneted bat within the project corridor was detected. Due to the absence of Florida bonneted bat activity, this project is expected to have "**No Effect**" on the Florida bonneted bat.

Appendix A

Agency Coordination Approved Florida Bonneted Bat Survey Methodology

Jada Barhorst

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Monday, November 16, 2020 4:22 PM
To: john_wrublik@fws.gov
Cc: Turley, David; David Dangel; Jason Houck; Jada Barhorst; Pipkin, Gwen G
Subject: 440273-1 SR 544 from MLK to SR 14 PD&E, ETDM 5873
Attachments: Attachment 1.pdf; Attachment 2.pdf

Mr. Wrublik,

The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) Study to evaluate improvements to SR 544 (Lucerne Park Road). A project location map (Attachment 1) is included as part of this correspondence.
The project area is located within the U.S. Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Florida bonneted bat (FBB) (Eumops floridanus). FDOT is preparing to conduct a full acoustic and roost survey to determine the presence/absence of the FBB in the project area. The current survey protocol for linear projects requires 5 detector nights per 0.6 mile (1 Km). Based on a preliminary field review of the project area, 12 survey sites are proposed to accommodate the linear survey requirement, including pond sites, for a total of 60 survey nights. The survey sites are shown on Attachment 1. These sites have been selected and ground-truthed based on existing habitats within the project area that provide suitable roosting and/or foraging habitat for the FBB, with the primary focus given to roosting habitat that may be lost or modified as a result of the proposed project. Photographs of survey site locations are provided with this correspondence Attachment 2. FDOT will conduct the survey in accordance with current USFWS Florida Bonneted Bat Consultation Guidelines (October 2019) during November and December 2020.

Please review the proposed FBB acoustic survey, the attached figures, and respond that these are acceptable to USFWS. We appreciate your cooperation and look forward to working with you on this project.
Thank you,

Jonathon A. Bennett
Environmental Project Manager
ETDM Coordinator
Florida Department of Transportation District One
801 North Broadway Avenue|Bartow, Florida 33830
PH: (863) 519-2495 EMAIL: Jonathon.Bennett@dot.state.fl.us

Jada Barhorst

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Tuesday, November 17, 2020 6:20 AM
To: Bennett, Jonathon
Cc: Turley, David; David Dangel; Jason Houck; Jada Barhorst; Pipkin, Gwen G
Subject: Re: [EXTERNAL] 440273-1 SR 544 from MLK to SR 14 PD&E, ETDM 5873

Jonathon,

I have reviewed the information provided and the survey protocol proposed to determine the status of Florida bonneted bat on or near the project site is acceptable to the Service.

John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Monday, November 16, 2020 4:22 PM
To: Wrublik, John <john_wrublik@fws.gov>
Cc: Turley, David <David.Turley@dot.state.fl.us>; David Dangel <ddangel@inwoodinc.com>; Jason Houck <jhouck@inwoodinc.com>; Jada Barhorst <jbarhorst@inwoodinc.com>; Pipkin, Gwen G <Gwen.Pipkin@dot.state.fl.us>
Subject: [EXTERNAL] 440273-1 SR 544 from MLK to SR 14 PD&E, ETDM 5873

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Environmental Project Manager
ETDM Coordinator
Florida Department of Transportation District One
801 North Broadway Avenue|Bartow, Florida 33830
PH: (863) 519-2495 EMAIL: Jonathon.Bennett@dot.state.fl.us

Appendix B

Photographs

Photo 1: FBB1 Deployment

Photo 2: FBB2 Deployment

Photo 3: FBB3 Deployment

Photo 4: FBB4 Deployment

Photo 5: FBB5 Deployment

Photo 6: FBB 6 Deployment

Photo 7: FBB7 Deployment

Photo 8: FBB8 Deployment

Photo 9: FBB9 Deployment

Photo 10: FBB10 Deployment

Photo 11: FBB11 Deployment

Photo 12: FBB12 Deployment

Photo 13: Cavity 1

Photo 14: Cavity 2

Photo 15: Tree with Cavities 3,4,5 – All cavities are shallow holes

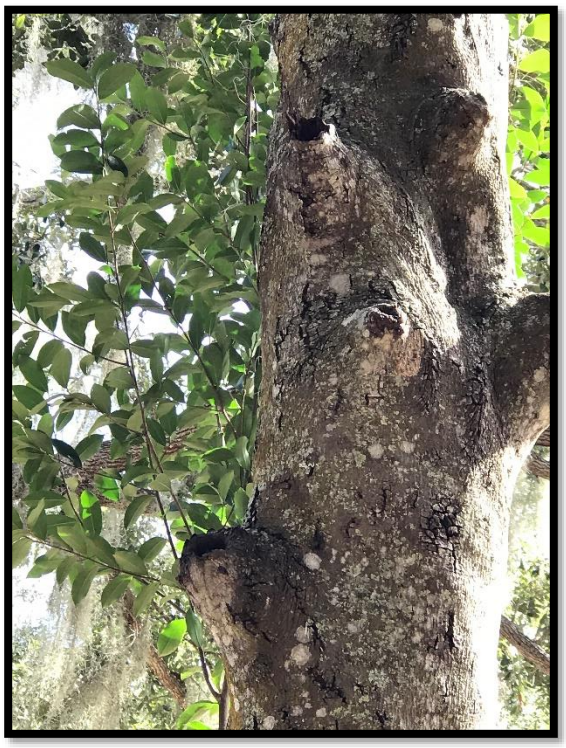

Photo 16: Cavity 6 – shallow cavity

Photo 17: Cavity 7 - Shallow cavity

Photo 18: Cavity 8 - knot with shallow hole

Photo 19: Cavity 9 – very shallow, small hole

Photo 20: Cavity 10 – hollow snag with openings at base of trunk and top

Photo 21: Cavity 11 – second opening in snag structure

Photo 21: Cavity 12 – small hole in Chinese tallow

Photo 22: Cavity 13

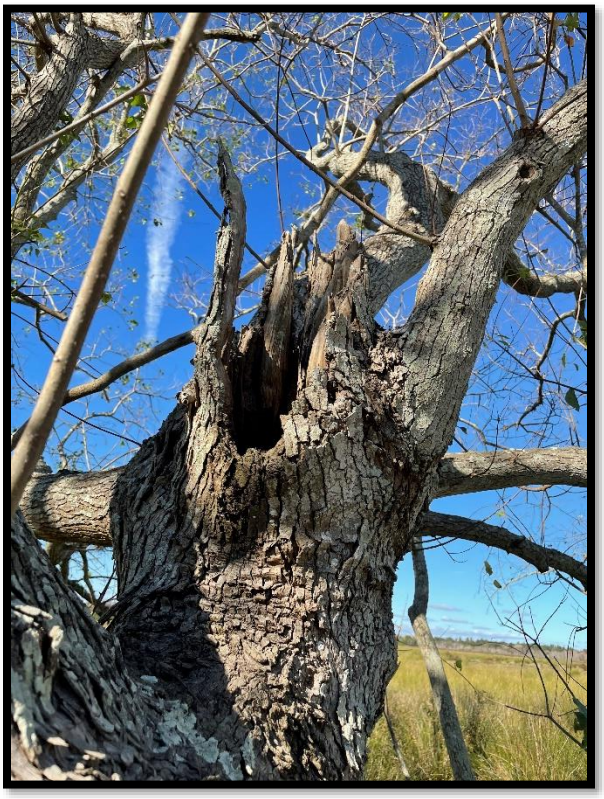

Photo 23: Cavity 13 - opening with standing water

Photo 24: Cavity 14 tree – with knob holes and shallow hollow scar

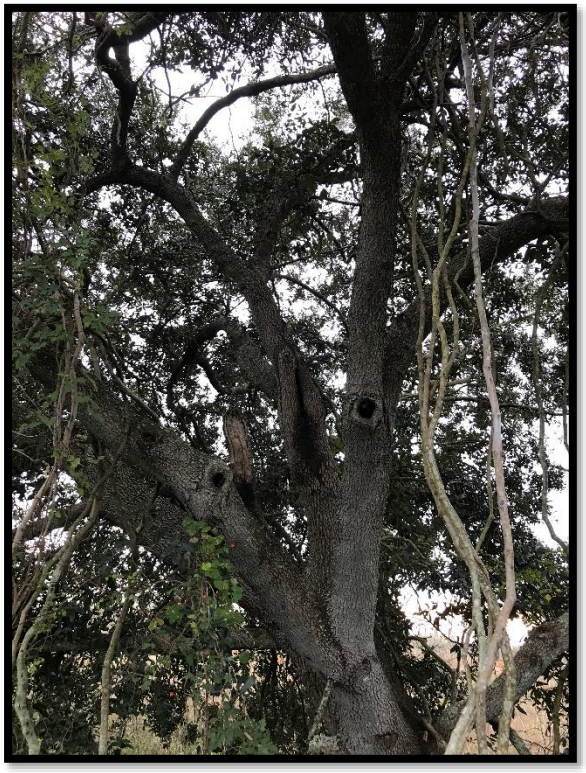

Photo25: Cavity 14 – hollow tree scar

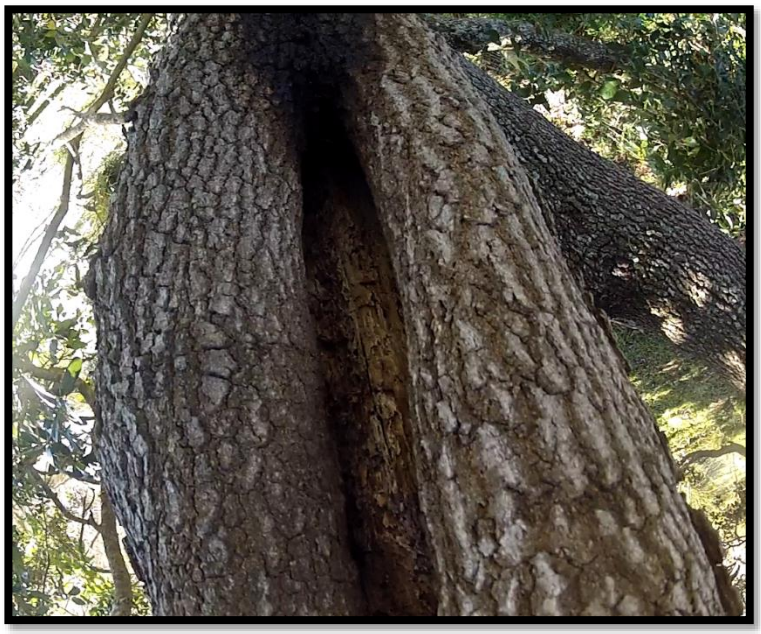

Photo 25: Cavity 15 – broken branch with opening

Appendix C

Detector Deployment Data Forms

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB1	Date: 11/16/20
Biologist: J. Barhorst, R. Scherer, A. Burke		GPS ID: J. Barhorst phone	Camera ID: J. Barhorst phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11535	Pettersson	DX500	Pettersson	Omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 03' 11 N	81° 43 16W	Y	MD	45	med.	NO	17:04	0721

DETECTOR CHECKLIST: Time 1831 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB1 Waypoint #/ID: FBB1

Detector Placement/Site Description:

South side of 544; out of ROW facing pasture along dirt road. Adjacent to med. live oak

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB2	Date: 11/16/2020
Biologist: J. Barhorst, A. Burke, R. Scherer		GPS ID: J. Barhorst Phone		Camera ID: J. Barhorst Phone

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11537	Pettersson	DX 500	Pettersson	omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28 03 57 N	81 42 49 W	yes	edge	45	Med.	no	17:07	07:22

DETECTOR CHECKLIST: Time 14:15 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB 2 Waypoint #/ID: FBB 2

Detector Placement/Site Description:

South side of SR 544; out of right-of-way in fenced, cleared area facing Lake Smart; row of trees to the west

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: SR 544 FBB 3	Date: 11/16/2020
Biologist: J. Barhorst, A. Burke, R. Scherer		GPS ID: J. Barhorst phone	Camera ID: J. Barhorst phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11534	Pettersson	DX500	Pettersson	Omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28 04 04N	81 42 19W	yes	no	45	med	no	1704	0721

DETECTOR CHECKLIST: Time 2:55 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB 3 Waypoint #/ID: FBB3

Detector Placement/Site Description:

north side of 544 within grass row adj. to barbed wire fence & pasture w/ minimal sand live oaks, active cows in pasture

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: SR544 FBB4	Date: 11/16/2020
Biologist: J. Barhorst, A. Burke, R. Scherer		GPS ID: J. Barhorst Phone	Camera ID: J. Barhorst Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11536	Pettersson	DX500	Petterson	Omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28 04 10 N	81 41 55 W	yes	low edge	45	med	no	17:07	01:23

DETECTOR CHECKLIST: Time 15:20 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB4 Waypoint #/ID: FBB4

Detector Placement/Site Description:

south side of SR 544, out of right-of-way at edge of NW corner of Lake Fannie, on edge of emergent vegetation to the south; forested area to the north

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB5	Date: 11.26.20
Biologist: J Barbosa		GPS ID: J.BARBOSA Phone	Camera ID: J.Barbosa Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11534	Pettersson	D500	Pettersson	Omnidirectional	20 ft.	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 21"N	81° 41' 23"W	✓	Edge	45	2-Med	NO	1702 (h)	0729 (h)

DETECTOR CHECKLIST: Time 10:18Am Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB5 Waypoint #/ID: FBB5

Detector Placement/Site Description:

Placed @ fenceline facing N over pasture w/pond. Located on N side of SR 544 @ gate just east of Trucking entrance + west of Lucerne Loop Rd NE.

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB6	Date: 11/29/20
Biologist: J. Barthorst, A. Burke		GPS ID: Jada Phone	Camera ID: Jada Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11537	Pettersson	DX500n	Pettersson	Omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 4 4N	81° 40 45W	yes	edge	45	very low	yes	1703h	0732h

DETECTOR CHECKLIST: Time 1057h Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB6 Waypoint #/ID: FBB6

Detector Placement/Site Description:

grass field; mic adj. to edge w/ grape vine dominating

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB7	Date: 11/29/20
Biologist: J. Barhorst; A. Burke		GPS ID: J. Phone	Camera ID: J. phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11535	Pettersson	D500X	Pettersson	Omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28 04 24	81 40 17	Y	edge	45	very low	YES	1701h	0731h

DETECTOR CHECKLIST: Time 11:20am Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB7 Waypoint #/ID: FBB7

Detector Placement/Site Description:

field; adjacent to fence line with scrub oaks.
~~Approx~~. West of gate entranceway; N. side of 544; east of wildflower drive

Remarks:

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB8	Date: 11/29/20
Biologist: J. Burhorst, A. Burke		GPS ID: Jada phone		Camera ID: Jada Phone

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11536	Pettersson	D500X	Pettersson	Omnidirectional	20'	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 39" N	81° 40' 03" W	yes	edge	45	Very low	yes	1700h	0730h

DETECTOR CHECKLIST: Time 11:52 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB8 Waypoint #/ID: FBB8

Detector Placement/Site Description:

South of 544 along fence line, adjacent to plant nursery. Nursery tree line along fence

Remarks:

tied to landscape tree

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBS9	Date: 12.5.20
Biologist: J. Garhorst, R. Scherer		GPS ID: J. Garhorst phone	Camera ID: J. Garhorst phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11534	Pettersson	D500X	Pettersson external	omnidirection	15 ft.	Hor. Zontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 51"N	81° 39' 37"W	Yes	NO	45	M	Y	1703	0736

DETECTOR CHECKLIST: Time 10:24 AM Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBS9 Waypoint #/ID: FBS9

Detector Placement/Site Description:

Placed at fenceline in the western corner of fence around pond on N side of SR 544 just east of entrance to Lakeside Ranch community

Remarks:

Goats inside fence

45, 200, 0 300 sample f.

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB10	Date: 12.14.20
Biologist: J. Barborst R. Scherer		GPS ID: Barborst Phone		Camera ID: Barborst Phone

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11536	Pettersson	D500X	Pettersson	Omnidirectional	20 ft.	Horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 46" N	81° 35' 06" W	✓	NO	45	Low	NO	1703 (h)	0740 (h)

DETECTOR CHECKLIST: Time 2:52pm Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB10 Waypoint #/ID: FBB10

Detector Placement/Site Description:

Near existing FDOT Pond west of the RaceTrac @ 544 +27
Located on S. side of 544, just east of power pole by Center State Bank. Place on open pasture at fenceline dividing field facing NE

Remarks:

metadata = pettersson
Trig level 200

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FSS11	Date: 12.14.20
Biologist: J. Barhorst, R. Scherer		GPS ID: Barhorst Phone	Camera ID: Barhorst Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11535	Pettersson	D500X	Pettersson	Omnidirectional	20 ft.	Horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 49" N	81° 38' 26" W	Yes	No	45	Low	NO	1704(h)	0742(h)

DETECTOR CHECKLIST: Time 3:50pm Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FSS11 Waypoint #/ID: FSS11

Detector Placement/Site Description:

Placed on N side of SR 544 near the drive at the osprey platform tower. Placed in fenceline @ edge of tree line, facing open pasture/wetland. Mic facing N

Remarks:

f = 300

Trig level = 200

Metadata: Pettersson

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBS12	Date: 12.14.20
Biologist: J. Barhorst, R. Scherer		GPS ID: Barhorst phone		Camera ID: Barhorst Phone

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11537	Pettersson	D500x	Pettersson	omnidirectional	20 ft	Hor. Zenith

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 58" N	81° 37' 58" W	Yes	NO	45	Low	No	1706 (h)	0744 (h)

DETECTOR CHECKLIST: Time 3:24 pm Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBS 12 Waypoint #/ID: FBS12

Detector Placement/Site Description:

South of SR 544 in open lawn area adjacent to Circle Four Dr. Placed near live oak in open lawn. Facing NNW

Remarks:

Pettersson = metadata setting
Trig Level = 160
Sample Fq = 300

Site sketch/photo (label to match BD# above)

Appendix D

Survey Data Forms

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
11/16/20	1:56 pm	FBB 1	11535	17:04	0721	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke, R. Scherer
11/16/20	2:31 pm	FBB 2	11537	17:07	07:22	✓	✓	✓	✓	✓	✓	J. Barhorst, A. Burke, R. Scherer
11/16/20	2:56 pm	FBB 3	11534	17:04	07:21	✓	✓	✓	✓	✓	✓	J. Barhorst, A. Burke, R. Scherer
11/16/20	3:24 pm	FBB 4	11536	17:07	07:23	✓	✓	✓	✓	✓	✓	J. Barhorst, A. Burke, R. Scherer
11/17/20	11:37 AM	FBB 1	11535	17:04	07:21	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11/17/20	11:50 AM	FBB 2	11537	1706	07:23	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11.17.20	12:05 PM	FBB 3	11534	1704	07:21	✓	✓	✓	✓	✓	✓	J Barhorst R. Scherer
11.17.20	12:25 pm	FBB 4	11536	1706	0724	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11.18.20	1:37 pm	FBB 1	11535	1703	0722	✓	✓	✓	✓	✓	✓	J Barhorst J. Hauch
11.18.20	1:53 pm	FBB 2	11537	1706	0724	✓	✓	✓	✓	✓	✓	J. Barhorst J. Hauch
11.18.20	2:11	FBB 3	11534	1704	0722	✓	✓	✓	✓	✓	✓	J. Barhorst J. Hauch
11.16.20	2:23	FBB 4	11536	1706	0725	✓	✓	✓	✓	✓	✓	J. Barhorst J. Hauch
11.19.20	11:37 AM	FBB 3	11534	1703	0723	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11.19.20	11:52 AM	FBB 1	11535	1703	0723	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11.19.20	12:14 pm	FBB 2	11537	1705	0725	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11.19.20	12:22 pm	FBB 4	11536	17:06	07:25	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11/20/20	10:15 am	FBB 3	11534	17:03	07:24	✓	✓	✓	✓	✓	✓	J Barhorst ~~R. Scherer~~ A. Burke
11/20/20	10:29 am	FBB 1	11535	1703	0724	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11.20.20	10:52 AM	FBB 2	11537	1705	0726	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
11/20/20	11:05am	FBB4	11536	17:05	07:24	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11/21/20	10:38am	FBB3	11534	17:03	07:25	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/21/20	10:53am	FBB1	11535	17:03	07:24	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/21/20	11:06	FBB 2	11537	1705	0727	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/21/20	11:20	FBB4	11536	1705	0727	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/22/20	10:41am	FBB1	11535	17:02	07:25	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11/22/20	11:12am	FBB2	11537	17:04	07:27	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11/22/20	11:28am	FBB3	11534	17:02	07:25	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11/22/20	11:42am	FBB4	11536	17:05	07:28	✓	✓	✓	✓	✓	✓	J. Barhorst A Burke
11/23/20	12:18pm	FBB3	11534	17:02	07:26	✓	✓	✓	✓	✓	✓	J Barhorst A Burke R Scherer
11/23/20	2:02pm	FBB2	11535	17:02	07:26	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke R Scherer
11/23/20	2:18pm	FBB2	11537	17:04	07:28	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke, R. Scherer
11/23/20	2:31pm	FBB4	11536	17:04	07:28	✓	✓	✓	✓	✓	✓	J Barhorst A Burke R Scherer
11/24/20	10:30am	FBB 3	11534	17:02	07:27	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/24/20	10:48am	FBB1	11535	17:02	07:27	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/24/20	10:58am	FBB2	11537	17:04	07:29	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11.24.20	11:06am	FBB4	11536	1704	0729	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
11/25/20	10:21am	FBB 3	11534	17:02	07:28	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
11/25/20	10:32am	FBB 1	11535	17:02	07:28	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
11·25·20	10:49 AM	FBB2	11537	1704(h)	0730(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Schever
11·25·20	11:11 AM	FBB4	11536	1704(h)	0730(h)	✓	✓	✓	✓	✓	✓	J. Barlorst R. Schever
11·26·20	8:50 AM	FBB1	11535	1702(h)	0728(h)	✓	✓	✓	✓	✓	✓	J. Barhorst
11·26·20	9:24 AM	FBB2	11537	1704(h)	0731(h)	✓	✓	✓	✓	✓	✓	J. Barhorst
11·26·20	9:40 AM	FBB4	11536	1704(h)	0731(h)	✓	✓	✓	✓	✓	✓	J. Barhorst
11·26·20	10:18 AM	FBB5	11534	1702h	0729h	✓	✓	✓	✓	✓	✓	J. Barhorst
11·27·20	9:20 AM	FBB1	11535	1701h	0729h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·27·20	9:31 AM	FBB2	11537	1704h	0731h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·27·20	9:44 AM	FBB4	11536	1704h	0732h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·27·20	9:56 AM	FBB5	11534	1702h	0729h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·28·20	9:15 AM	FBB1	11535	1701h	0730h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·28·20	9:40 AM	FBB2	11537	1703h	0732h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·28·20	10:01 AM	FBB4	11536	1704h	0732h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11·28·20	10:15 AM	FBB5	11534	1702h	0730h	✓	✓	✓	✓	✓	✓	J. Barhorst J. Houch
11/29/20	10:24 AM	FBB5	11534	1702h	0731h	✓	✓	✓	✓	✓ Low	✓	J. Barhorst A. Burke
11·29·20	10:57 AM	FBB6	11537	1703(h)	0732(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11·29·20	11:20 AM	FBB7	11535	1701(h)	0731(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
11·29·20	11:52 AM	FBB8	11536	1700(h)	0730(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12/3/20	2:01 pm	FBB 7	11535	17:01	07:34	✓	✓	✓	✓	✓	✓	J Barhorst R Schever

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
12/3/20	2:17 pm	FBB5	11534	17:02	07:34	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12/3/20	2:48 pm	FBB6	11537	1703(h)	0735(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
12/4/20	2:54 pm	FBB5	11534	17:02	07:35	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12/4/20	3:03 pm	FBB6	11537	1703(h)	0736	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12.4.20	3:12 pm	FBB7	11535	1701(h)	0734(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
12-4-20	3:27 pm	FBB 8	11536	17:00	07:33	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12.5.20	9:23 AM	FBB7	11535	1701(h)	0735(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. scherer
12.5.20	9:45 AM	FBB6	11537	1703(h)	0737(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
12.5.20	9:57 AM	FBB8	11536	1700(h)	0734(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
12.5.20	10:24 AM	FBB9	11534	1703(h)	0736 h	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12.6.20	9:35 AM	FBB7	11535	1702(h)	0736(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.6.20	9:44 AM	FBB6	11537	1703(h)	0738(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.6.20	9:56 AM	FBB8	11536	1701(h)	0735(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.6.20	10:05 AM	FBB9	11534	1703(h)	0737(h)	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.11.20	12:12 PM	FBB9	11534	1704(h)	0740(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
12.11.20	12:37 pm	FBB8	11536	17:02	07:38	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12.11.20	1:02 pm	FBB7	11535	1703	0739	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer
12.11.20	1:17 pm	FBB6	11537	17:04	07:41	✓	✓	✓	✓	✓	✓	J Barhorst R Scherer
12/2020	11:13 AM	FBB5	11534	1704(h)	0741(h)	✓	✓	✓	✓	✓	✓	J. Barhorst R. Scherer

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
12.12.20	11:24 AM	FBB7	11535	1703(h)	0740(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.12.20	11:34AM	FBB6	11537	1705(h)	0742(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.12.20	11:45AM	FBB8	11536	1702 (h)	0739(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.13.20	10:12AM	FBB9	11534	1704(h)	0742(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.13.20	10:27am	FBB7	11535	17.03	07.40	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.13.20	10:41am	FBB6	11537	17.05	07.42	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.13.20	10.54am	FBB8	11536	17.02	07.40	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.14.20	2.06pm	FBB9	11534	1705(h)	0742(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.14.20	2.52pm	FBB10	11536	1703(h)	0740(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.14.20	3:24pm	FBB12	11537	1706(h)	0744(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.14.20	3:50pm	FBB11	11535	1704(h)	0742(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.15.20	11:15am	FBB9	11534	1705(h)	0743(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst
12.15.20	11:37AM	FBB10	1536	1703(h)	0741(h)	✓	✓	✓	✓	✓	✓	J. Barkhurst
12.15.20	11:52am	FBB12	11537	1706	0744	✓	✓	✓	✓	✓	✓	J. Barkhurst
12.15.20	12:11pm	FBB11	11535	1704	0742	✓	✓	✓	✓	✓	✓	J. Barkhurst
12.16.20	10:14AM	FBB9	11534	1705	0744	✓	✓	✓	✓	✓	✓	J. Barkhurst R. Scherer
12.20.20	11:42AM	FBB9	11534	1707	0746	✓	✓	✓	✓	✓	✓	A. Burke T. Mueller
12.20.20	12:45PM	FBB10	11536	17:09	0744	✓	✓	✓	✓	✓	✓	A. Burke T. Mueller
12.20.20	1:21PM	FBB12	11537	1709	0747	✓	✓	✓	✓	✓	✓	A. Burke T. Mueller

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
12-20-20	1:37pm	FBB11	11535	1706	0745	✓	✓	✓	✓	✓	✓	A. Burke T. Mueller
12-23-20	10:27am	FBB9	11534	1709	0747	✓	✓	✓	✓	✓	✓	A Burke R Scherer
12-23-20	10:44am	FBB10	11536	1707	0745	✓	✓	✓	✓	✓	✓	A Burke R Scherer
12-23-20	11:02am	FBB12	11537	17:10	07:48	✓	✓	✓	✓	✓	✓	A Burke R Scherer
12-23-20	11:16am	FBB11	11535	1708	0746	✓	✓	✓	✓	✓	✓	A Burke R Scherer
12.30.20	10:34AM	FBB9	11534	1713	0750	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.30.20	10:57AM	FBB10	11536	1711	0748	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.30.20	10:17AM	FBB12	11537	1714	0751	✓	✓	✓	✓	✓	✓	J Barhorst A. Burke
12.30.20	11:38AM	FBB11	11535	1712	0749	✓	✓	✓	✓	✓	✓	J. Barhorst A. Burke
12.31.20	9:37AM	FBB10	11536	1712	0748	✓	✓	✓	✓	✓	✓	J. Barhorst T. McPherson
12.31.20	9:50AM	FBB12	11537	1715	0751	✓	✓	✓	✓	✓	✓	J Barhorst T. Mueller
12.31.20	9:59AM	FBB11	11535	1713	0749	✓	✓	✓	✓	✓	✓	J. Barhorst T. Mueller
1/1/21	1:32PM	FBB10	11536	1712	0748	✓	✓	✓	✓	✓	✓	J. Barhorst T. Mueller
1/1/21	1:41PM	FBB12	11537	1716	0752	✓	✓	✓	✓	✓	✓	J. Barhorst T. Mueller
1/1/21	1:48PM	FBB11	11535	1714	0750	✓	✓	✓	✓	✓	✓	J Barhorst T. Mueller
1.2.21	10:59AM	FBB10	11536	1713	0749	✓	✓	✓	✓	✓	✓	J. Barhorst
1.2.21	11:23AM	FBB12	11537	1716	0752	✓	✓	✓	✓	✓	✓	J. Barhorst
1.2.21	11:37AM	FBB11	11535	1714	0750	✓	✓	✓	✓	✓	✓	J. Barhorst

Appendix E

Weather Documentation

weather.gov

Weather observations for the past three days

Winter Havens Gilbert Airport

Enter Your "City, ST" or zip code Go

metric

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
17	08:53	N 9	10.00	Fair	CLR	67	54			63%	NA	NA	30.25	1024.0			
17	07:53	N 8	10.00	Fair	CLR	63	52			68%	NA	NA	30.23	1023.3			
17	06:53	N 10	10.00	Fair	CLR	60	52	67	60	75%	NA	NA	30.21	1022.7			
17	05:53	N 7	10.00	Fair	CLR	61	54			78%	NA	NA	30.20	1022.4			
17	03:53	N 7	10.00	Fair	CLR	64	58			81%	NA	NA	30.19	1022.0			
17	02:53	N 10	10.00	Fair	CLR	65	60			84%	NA	NA	30.18	1021.9			
17	01:53	N 8	10.00	Fair	CLR	66	61			84%	NA	NA	30.19	1022.0			
17	00:53	NE 6	10.00	Fair	CLR	67	63	74	67	87%	NA	NA	30.18	1021.9			
16	23:53	NE 7	10.00	Fair	CLR	68	64			87%	NA	NA	30.18	1021.9			
16	22:53	NE 6	10.00	Fair	CLR	68	65			90%	NA	NA	30.18	1021.7			
16	21:53	NE 7	10.00	Fair	CLR	70	66			87%	NA	NA	30.17	1021.5			
16	20:53	NE 6	10.00	Fair	CLR	70	67			90%	NA	NA	30.17	1021.3			
16	19:53	N 6	10.00	Fair	CLR	72	67			84%	NA	NA	30.16	1021.0			
16	18:53	N 8	10.00	Fair	CLR	74	67	84	74	79%	NA	NA	30.14	1020.5			
16	17:53	N 10	10.00	Fair	CLR	75	68			79%	NA	NA	30.12	1019.8			
16	16:53	N 8	10.00	Fair	CLR	79	68			69%	NA	81	30.10	1019.2			
16	15:53	N 8	10.00	A Few Clouds	FEW029	82	68			63%	NA	85	30.10	1019.1			
16	14:53	N 6	10.00	Fair	CLR	83	69			63%	NA	87	30.10	1019.0			
16	13:53	N 10	10.00	Partly Cloudy	FEW026 SCT030	83	70			65%	NA	87	30.11	1019.2			
16	12:53	NE 9	10.00	Mostly Cloudy	BKN029	81	69	83	72	67%	NA	84	30.13	1020.0			
16	11:53	NE 10	10.00	Mostly Cloudy	BKN028	82	68			63%	NA	85	30.15	1020.7			
16	10:53	N 9	10.00	Fair	CLR	81	68			65%	NA	84	30.16	NA			
16	09:53	N 7	10.00	A Few Clouds	FEW012	78	71			79%	NA	80	30.17	1021.3			
16	08:53	N 7	10.00	Partly Cloudy	SCT006	75	71			88%	NA	NA	30.15	1020.8			
16	07:53	NE 6	10.00	Overcast	OVC007	73	70			90%	NA	NA	30.14	1020.2			
16	06:53	N 9	10.00	Overcast	OVC003	72	70	73	72	94%	NA	NA	30.11	1019.3			
16	05:53	NW 3	10.00	Overcast	OVC070	73	71			94%	NA	NA	30.09	1018.8			
16	04:53	NW 3	10.00	Overcast	OVC060	73	71			94%	NA	NA	30.07	1018.2			
16	03:53	W 3	10.00	Light Rain	OVC055	73	71			94%	NA	NA	30.08	1018.2			
16	02:53	Calm	10.00	Overcast		73	71			94%	NA	NA	30.07	1018.1			

					FEW004 BKN060 OVC075												
16	01:53	N 3	10.00	Overcast	OVC075	73	70			90%	NA	NA	30.09	1018.8			
16	00:53	E 3	10.00	Overcast	FEW004 BKN070 OVC085	73	71			94%	NA	NA	30.10	1018.9			1.21
15	23:53	E 5	10.00	Overcast	BKN006 BKN050 OVC065	74	71			91%	NA	NA	30.11	1019.2	0.01		
15	22:53	NE 6	10.00	Overcast	OVC048	NA	NA			NA	-12	NA	30.11	NA			
15	21:53	NE 9	10.00	Light Rain	OVC041	74	72			94%	NA	NA	30.11	1019.4	0.55	1.20	
15	20:53	NW 8	0.75	Heavy Rain Fog/Mist	OVC019	74	71			91%	NA	NA	30.10	1019.1	0.65		
15	19:53	NW 5	10.00	Overcast	SCT015 BKN039 OVC048	79	73			82%	NA	82	30.08	1018.2			
15	18:53	SE 6	10.00	Mostly Cloudy	FEW048 SCT070 BKN095	80	74	87	80	82%	NA	85	30.06	NA	0.02		0.02
15	17:53	Calm	10.00	Mostly Cloudy	SCT047 BKN060	82	71			69%	NA	86	30.04	1017.0			
15	16:53	Calm	10.00	Partly Cloudy	FEW050 FEW060 SCT120	86	69			57%	NA	90	30.03	1016.6			
15	15:53	Calm	10.00	Mostly Cloudy	FEW044 BKN100	85	70			61%	NA	90	30.04	1016.8			
15	14:53	Calm	10.00	Fair	CLR	87	70			57%	NA	92	30.03	1016.8			
15	13:53	Vrbl 3	10.00	Fair	CLR	87	69			55%	NA	91	30.05	NA			
15	12:53	S 5	10.00	A Few Clouds	FEW065	85	71	87	73	63%	NA	90	30.07	NA			
15	11:53	E 6	10.00	Mostly Cloudy	SCT023 BKN034	85	72			65%	NA	91	30.10	1019.1			
15	10:53	SE 9	10.00	Mostly Cloudy	BKN020	81	71			72%	NA	85	30.11	1019.5			
15	09:53	E 7	10.00	Fair	CLR	80	72			76%	NA	84	30.12	1019.6			
15	08:53	E 5	10.00	Fair	CLR	76	72			88%	NA	76	30.11	1019.5			
15	07:53	NE 3	10.00	A Few Clouds	FEW100	74	71			91%	NA	NA	30.11	1019.3			
15	06:53	Calm	10.00	Mostly Cloudy	FEW049 SCT080 BKN100	NA	NA			NA	NA	NA	30.09	NA			
15	05:53	E 3	10.00	Overcast	BKN080 OVC100	73	71			94%	NA	NA	30.08	1018.3			
15	04:53	E 5	10.00	Overcast	BKN080 OVC100	73	71			94%	NA	NA	30.07	1018.0			
15	03:53	E 5	10.00	Overcast	FEW080 OVC100	73	71			94%	NA	NA	30.07	1018.0			
15	02:53	E 5	10.00	Overcast	OVC085	73	70			90%	NA	NA	30.07	1017.9			
15	01:53	NE 3	10.00	Overcast	OVC090	NA	NA			NA	NA	NA	30.07	NA			

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max. 6 hour	Min. 6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)							Pressure		Precipitation (in.)		
15	00:53	NE 5	10.00	Fair	CLR	NA	NA			NA	-11	NA	30.07	NA			
14	23:53	E 5	10.00	Fair	CLR	72	69			91%	NA	NA	30.08	1018.5			
14	22:53	E 6	10.00	Mostly Cloudy	BKN043	73	70			90%	NA	NA	30.10	1018.9			
14	21:53	E 8	10.00	Overcast	OVC039	73	70			90%	NA	NA	30.10	1019.0			
14	20:53	E 9	10.00	A Few Clouds	FEW021	73	70			90%	NA	NA	30.10	1019.0			
14	19:53	E 10	10.00	Fair	CLR	74	70			88%	NA	NA	30.08	1018.4			
14	18:53	NE 7	10.00	Fair	CLR	76	70	85	76	82%	NA	77	30.07	1018.0			
14	17:53	E 10	10.00	Fair	CLR	77	69			77%	NA	79	30.05	1017.3			
14	16:53	E 13	10.00	Fair	CLR	81	68			65%	NA	84	30.04	1016.9			
14	15:53	E 10	10.00	A Few Clouds	FEW032	84	68			59%	NA	87	30.04	1016.9			
14	14:53	NE 8	10.00	Fair	CLR	85	68			57%	NA	88	30.04	1017.1			
14	13:53	E 8	10.00	A Few Clouds	FEW029	84	67			57%	NA	87	30.05	1017.4			
14	12:53	E 8	10.00	A Few Clouds	FEW035	82	67	84	70	60%	NA	84	30.08	1018.2			
14	11:53	NE 8	10.00	Fair	CLR	82	68			63%	NA	85	30.10	1019.1			
14	10:53	NE 10	10.00	Fair	CLR	80	68			67%	NA	83	30.12	1019.7			
14	09:53	NE 13	10.00	Fair	CLR	78	67			69%	NA	80	30.13	1020.0			

Weather observations for the past three days

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Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour					altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
								Max.	Min.								
23	08:53	N 13 G 20	10.00	Mostly Cloudy	BKN012	72	65			79%	NA	NA	30.11	1019.2			
23	07:53	N 8	10.00	Overcast	BKN010 OVC026	69	64			84%	NA	NA	30.10	1019.0			
23	06:53	N 7	10.00	Overcast	OVC009	NA	NA			NA	-13	NA	30.08	NA			
23	05:53	NE 6	10.00	Overcast	OVC008	NA	NA			NA	-12	NA	30.06	NA			
23	04:53	NE 8	10.00	Overcast	OVC007	NA	NA			NA	-14	NA	30.05	NA			
23	03:53	N 12	10.00	Overcast	OVC008	NA	NA			NA	-17	NA	30.05	NA			
23	02:53	N 9	10.00	Overcast	OVC009	69	66			90%	NA	NA	30.06	1017.8			
23	01:53	N 9	10.00	Overcast	OVC005	70	67			90%	NA	NA	30.07	1018.0			
23	00:53	N 8	10.00	Overcast	OVC003	69	67			93%	NA	NA	30.08	1018.2			
22	23:53	N 9	5.00	Overcast with Haze	OVC003	NA	NA			NA	-15	NA	30.08	NA			
22	22:53	N 7	10.00	Fair	CLR	NA	NA			NA	-13	NA	30.09	NA			
22	21:53	N 6	10.00	Fair	CLR	71	68			90%	NA	NA	30.08	1018.5			
22	20:53	N 5	10.00	Overcast	SCT043 OVC050	72	68			87%	NA	NA	30.08	1018.2			
22	19:53	N 5	10.00	Fair	CLR	72	67			84%	NA	NA	30.06	1017.8			
22	18:53	NE 6	10.00	Mostly Cloudy	BKN034	73	67	82	73	81%	NA	NA	30.05	1017.5			
22	17:53	NE 6	10.00	Mostly Cloudy	SCT033 BKN040	74	67			79%	NA	NA	30.05	1017.2			
22	16:53	E 8	10.00	Mostly Cloudy	BKN028	79	67			67%	NA	81	30.03	1016.7			
22	15:53	NE 6	10.00	A Few Clouds	FEW026	81	67			62%	NA	83	30.02	1016.5			
22	14:53	N 7	10.00	Partly Cloudy	SCT028	80	67			64%	NA	82	30.03	1016.7			
22	13:53	N 6	10.00	Mostly Cloudy	SCT027 BKN070	81	67			62%	NA	83	30.05	1017.2			
22	12:53	Vrbl 6	10.00	Overcast	BKN021 BKN029 OVC110	80	68	80	68	67%	NA	83	30.07	1017.9			
22	11:53	N 8	10.00	Overcast	BKN015 OVC021	77	68			74%	NA	79	30.10	1019.1			

22	10:53	N 6	10.00	Overcast	OVC010	74	68			82%	NA	NA	30.12	1019.9			
22	09:53	NE 7	10.00	Overcast	OVC008	72	68			87%	NA	NA	30.14	1020.3			
22	08:53	N 6	10.00	Overcast	OVC005	71	68			90%	NA	NA	30.13	1020.2			
22	07:53	N 10	10.00	Overcast	OVC003	69	67			93%	NA	NA	30.12	1019.8			
22	06:53	N 7	6.00	Fog/Mist	OVC002	68	66	68	65	93%	NA	NA	30.13	1020.1			
22	05:53	N 7	2.50	Fog/Mist	OVC002	67	65			93%	NA	NA	30.11	1019.3			
22	04:53	N 9	10.00	Partly Cloudy	SCT004 SCT009	66	64			93%	NA	NA	30.11	1019.3			
22	03:53	N 9	10.00	Partly Cloudy	SCT023	65	63			93%	NA	NA	30.11	1019.5			
22	02:53	N 8	10.00	Fair	CLR	66	63			90%	NA	NA	30.13	1020.1			
22	01:53	N 6	10.00	Fair	CLR	66	63			90%	NA	NA	30.14	1020.3			
22	00:53	N 5	10.00	Fair	CLR	65	63	70	65	93%	NA	NA	30.15	1020.7			
21	23:53	NE 6	10.00	Fair	CLR	66	64			93%	NA	NA	30.16	1021.2			
21	22:53	N 6	10.00	Fair	CLR	67	64			91%	NA	NA	30.18	1021.8			
21	21:53	N 7	10.00	Fair	CLR	68	65			90%	NA	NA	30.18	NA			
21	20:53	N 7	10.00	Fair	CLR	68	65			90%	NA	NA	30.18	1021.8			
21	19:53	N 5	10.00	Fair	CLR	69	66			90%	NA	NA	30.17	1021.4			
21	18:53	N 5	10.00	Partly Cloudy	SCT075	70	65	77	70	84%	NA	NA	30.17	1021.5			
21	17:53	NE 8	10.00	Overcast	SCT048 OVC060	72	65			79%	NA	NA	30.17	1021.5			
21	16:53	NE 12	10.00	Overcast	SCT037 OVC049	72	65			79%	NA	NA	30.17	1021.3			
21	15:53	NA	10.00	Overcast	FEW035 OVC047	75	63			66%	NA	NA	30.17	NA			
21	14:53	E 13	10.00	Overcast	OVC045	77	64			64%	NA	79	30.16	1021.0			
21	13:53	NE 17	10.00	Overcast	FEW023 FEW041 OVC049	77	66			69%	NA	79	30.18	1021.6			
21	12:53	NE 12	10.00	Overcast	SCT016 BKN023 OVC047	74	67			79%	NA	NA	30.21	1022.6			0.02
21	11:53	E 16	4.00	Light Rain Fog/Mist	FEW016 BKN038 OVC055	72	68			87%	NA	NA	30.23	1023.5	0.02		
21	10:53	NE 7	10.00	Overcast	FEW017 SCT038 OVC048	74	68			82%	NA	NA	30.25	1024.1			
21	09:53	N 7	10.00	Overcast	SCT009 BKN021 OVC049	NA	NA			NA	-13	NA	30.27	NA			
21	08:53	N 9	7.00	Light Rain	FEW024 BKN037 OVC060	69	66			90%	NA	NA	30.27	1024.6			
21	07:53	N 8	10.00	Partly Cloudy	SCT005	68	65			90%	NA	NA	30.25	1024.2			

21	06:53	N 8	10.00	Partly Cloudy	FEW006 SCT026	67	64			91%	NA	NA	30.24	1023.6			0.02
21	05:53	N 9	10.00	Partly Cloudy	FEW035 SCT060	67	64			91%	NA	NA	30.23	1023.4	0.02		
21	04:53	NE 10	8.00	Overcast	FEW029 BKN036 OVC049	67	64			91%	NA	NA	30.23	1023.4			
21	03:53	N 8	10.00	Fair	CLR	NA	NA			NA	-14	NA	30.23	NA			
21	02:53	N 8	10.00	A Few Clouds	FEW065	67	64			91%	NA	NA	30.25	1024.0			
21	01:53	N 7	10.00	A Few Clouds	FEW029	67	64			91%	NA	NA	30.25	1024.1			
21	00:53	N 8	10.00	Partly Cloudy	SCT060	67	65	70	67	93%	NA	NA	30.26	1024.5			
20	23:53	NE 8	10.00	Light Rain	SCT039 BKN047 OVC055	68	65			90%	NA	NA	30.27	1024.9			
20	22:53	N 8	10.00	Partly Cloudy	FEW031 SCT060	67	64			91%	NA	NA	30.28	1025.2			
20	21:53	N 7	10.00	Fair	CLR	68	64			87%	NA	NA	30.29	1025.4			
20	20:53	NE 7	10.00	Mostly Cloudy	BKN060	69	64			84%	NA	NA	30.29	1025.3			
20	19:53	NE 9	10.00	Overcast	BKN044 OVC060	70	65			84%	NA	NA	30.29	1025.5			
20	18:53	NE 9	10.00	Overcast	FEW019 SCT036 OVC043	70	66	82	70	87%	NA	NA	30.29	1025.5			
20	17:53	NE 9	10.00	Overcast	FEW040 OVC060	71	64			79%	NA	NA	30.29	1025.3			
20	16:53	NE 18	10.00	Overcast	SCT035 OVC045	72	65			79%	NA	NA	30.29	1025.4			
20	15:53	NE 13	10.00	Mostly Cloudy	FEW049 BKN055	77	62			60%	NA	79	30.27	1024.7			
20	14:53	NE 15	10.00	Overcast	FEW040 OVC065	80	61			52%	NA	81	30.27	1024.6			
20	13:53	E 12	10.00	Partly Cloudy	SCT065	81	61			51%	NA	82	30.27	1024.9			
20	12:53	E 15	10.00	Partly Cloudy	SCT043	80	60	82	64	51%	NA	81	30.30	1025.8			
20	11:53	E 13	10.00	Light Rain	SCT034 BKN049 OVC060	75	63			66%	NA	NA	30.34	1027.2			
20	10:53	E 13	10.00	Partly Cloudy	SCT033	78	62			58%	NA	80	30.36	1027.9			
20	09:53	NE 14	10.00	Fair	CLR	75	63			66%	NA	NA	30.37	1028.2			
Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max.	Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)		6 hour					Pressure		Precipitation (in.)		

Weather observations for the past three days

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Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour					altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
								Max.	Min.								
27	15:53	NE 3	10.00	Fair	CLR	81	58			45%	NA	81	30.05	1017.4			
27	14:53	E 3	10.00	Fair	CLR	82	59			46%	NA	82	30.06	1017.6			
27	13:53	E 5	10.00	Fair	CLR	82	59			46%	NA	82	30.07	1017.8			
27	12:53	Calm	10.00	Fair	CLR	81	61	81	65	51%	NA	82	30.09	1018.7			
27	11:53	SE 5	10.00	Fair	CLR	80	61			52%	NA	81	30.13	1019.9			
27	10:53	S 5	10.00	Fair	CLR	77	64			64%	NA	79	30.15	1020.8			
27	09:53	Calm	10.00	Fair	CLR	75	66			74%	NA	NA	30.17	1021.4			
27	08:53	Calm	10.00	Fair	CLR	71	67			87%	NA	NA	30.17	1021.3			
27	07:53	Calm	10.00	Fair	CLR	67	66			97%	NA	NA	30.16	1021.0			
27	06:53	N 3	10.00	Fair	CLR	65	64	71	64	97%	NA	NA	30.14	1020.5			
27	05:53	Calm	8.00	Fair	CLR	66	65			96%	NA	NA	30.12	1019.8			
27	04:53	Calm	2.00	Fog/Mist	CLR	65	64			97%	NA	NA	30.11	1019.3			
27	03:53	Calm	10.00	Fair	CLR	66	64			93%	NA	NA	30.10	1019.1			
27	02:53	Calm	10.00	Fair	CLR	68	65			90%	NA	NA	30.10	1019.1			
27	01:53	Calm	10.00	Fair	CLR	69	65			87%	NA	NA	30.11	1019.4			
27	00:53	S 3	10.00	Fair	CLR	70	65	72	69	84%	NA	NA	30.12	1019.8			
26	23:53	SE 5	10.00	Fair	CLR	71	66			84%	NA	NA	30.13	1019.9			
26	22:53	SE 6	10.00	Fair	CLR	71	66			84%	NA	NA	30.13	1020.1			
26	21:53	E 3	10.00	Fair	CLR	70	65			84%	NA	NA	30.13	1020.2			
26	20:53	Calm	10.00	Fair	CLR	71	64			79%	NA	NA	30.14	1020.4			
26	19:53	Calm	10.00	Fair	CLR	72	63			73%	NA	NA	30.12	1019.8			
26	18:53	NE 3	10.00	Fair	CLR	71	64	82	70	79%	NA	NA	30.11	1019.4			
26	17:53	Calm	10.00	Fair	CLR	75	63			66%	NA	NA	30.09	1018.8			
26	16:53	N 3	10.00	Fair	CLR	79	63			58%	NA	81	30.10	1019.1			
26	14:53	Calm	10.00	Partly Cloudy	SCT055	80	61			52%	NA	81	30.10	1019.2			
26	13:53	Calm	10.00	A Few Clouds	FEW044	79	61			54%	NA	80	30.12	1019.6			
26	12:53	S 8	10.00	A Few Clouds	FEW042	81	62	81	63	53%	NA	82	30.14	1020.3			
26	11:53	S 8	10.00	A Few Clouds	FEW036	80	63			56%	NA	81	30.16	1021.1			

26	10:53	S 10	10.00	A Few Clouds	FEW029	79	64			60%	NA	81	30.18	1021.9			
26	09:53	S 6	10.00	Fair	CLR	76	65			69%	NA	78	30.20	1022.4			
26	08:53	Calm	10.00	Fair	CLR	72	65			79%	NA	NA	30.20	1022.3			
26	07:53	NA	10.00	Fair	CLR	66	66			100%	NA	NA	30.18	1021.9			
26	06:53	Calm	10.00	Fair	CLR	63	62	66	63	97%	NA	NA	30.17	1021.3			
26	05:53	Calm	10.00	Fair	CLR	64	63			96%	NA	NA	30.15	1020.6			
26	04:53	Calm	9.00	Fair	CLR	64	63			96%	NA	NA	30.15	1020.7			
26	03:53	Calm	10.00	Fair	CLR	64	62			93%	NA	NA	30.15	1020.8			
26	02:53	Calm	10.00	Fair	CLR	65	63			93%	NA	NA	30.16	1020.9			
26	01:53	Calm	10.00	Fair	CLR	65	62			90%	NA	NA	30.17	1021.5			
26	00:53	Calm	10.00	Fair	CLR	66	62	74	66	87%	NA	NA	30.18	1021.7			
25	23:53	SE 3	10.00	Fair	CLR	68	63			84%	NA	NA	30.19	1022.1			
25	22:53	Calm	10.00	Fair	CLR	68	62			81%	NA	NA	30.19	1022.1			
25	21:53	E 8	10.00	Fair	CLR	70	62			76%	NA	NA	30.19	1022.2			
25	20:53	E 6	10.00	A Few Clouds	FEW060	71	63			76%	NA	NA	30.21	1022.7			
25	19:53	E 3	10.00	Fair	CLR	72	64			76%	NA	NA	30.21	1022.6			
25	18:53	E 6	10.00	Mostly Cloudy	SCT038 BKN060	74	64	82	74	71%	NA	NA	30.19	1022.1			
25	17:53	E 7	10.00	Overcast	OVC044	76	63			64%	NA	78	30.17	1021.5			
25	16:53	NA	10.00	A Few Clouds	FEW080	78	62			58%	NA	80	30.17	1021.3			
25	15:53	E 8	10.00	Mostly Cloudy	BKN049	81	62			53%	NA	82	30.16	1021.0			
25	14:53	SE 8	10.00	A Few Clouds	FEW046	81	60			49%	NA	82	30.17	1021.3			
25	13:53	SE 12	10.00	Fair	CLR	82	59			46%	NA	82	30.15	1020.8			
25	12:53	SE 10 G 16	10.00	Fair	CLR	81	58	82	63	45%	NA	81	30.19	1022.2			
25	11:53	SE 9	10.00	Overcast	OVC055	81	58			45%	NA	81	30.23	1023.3			
25	10:53	SE 8	10.00	Fair	CLR	79	60			52%	NA	80	30.24	1023.9			
25	09:53	SE 10	10.00	Fair	CLR	76	60			58%	NA	78	30.25	1024.1			
25	08:53	E 7	10.00	Fair	CLR	71	60			68%	NA	NA	30.24	1023.6			
25	07:53	E 3	10.00	Fair	CLR	67	60			79%	NA	NA	30.23	1023.4			
25	06:53	E 5	10.00	Fair	CLR	64	59	69	64	84%	NA	NA	30.21	1022.8			
25	05:53	E 5	10.00	Partly Cloudy	SCT070	65	60			84%	NA	NA	30.20	1022.4			
25	04:53	E 6	10.00	A Few Clouds	FEW070	64	60			87%	NA	NA	30.19	1022.1			
25	03:53	E 6	10.00	Fair	CLR	65	60			84%	NA	NA	30.19	1022.1			
25	02:53	E 6	10.00	Mostly Cloudy	BKN055	67	61			81%	NA	NA	30.20	1022.3			
25	01:53	SE 6	10.00	Overcast	OVC060	69	61			76%	NA	NA	30.20	1022.4			
25	00:53	E 5	10.00	Overcast	OVC060	67	60	72	64	79%	NA	NA	30.20	1022.4			

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max.	Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
								6 hour									
						Temperature (ºF)							Pressure		Precipitation (in.)		
24	23:53	E 6	10.00	Mostly Cloudy	SCT039 BKN055	65	60			84%	NA	NA	30.20	1022.3			
24	22:53	E 3	10.00	Mostly Cloudy	SCT040 BKN055	65	59			81%	NA	NA	30.20	1022.5			
24	21:53	E 5	10.00	Fair	CLR	65	59			81%	NA	NA	30.20	1022.4			
24	20:53	E 7	10.00	A Few Clouds	FEW050	68	59			73%	NA	NA	30.21	1022.8			
24	19:53	E 9	10.00	Mostly Cloudy	BKN050	70	59			68%	NA	NA	30.21	1022.6			
24	18:53	E 9	10.00	Overcast	OVC050	72	59	81	71	64%	NA	NA	30.20	1022.4			
24	17:53	E 7	10.00	A Few Clouds	FEW050	72	56			57%	NA	NA	30.18	1021.9			
24	16:53	E 9	10.00	A Few Clouds	FEW050	76	56			50%	NA	78	30.16	1021.1			
24	15:53	E 10	10:00	A Few Clouds	FEW050	78	57			48%	NA	79	30.16	1021			

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Weather observations for the past three days

Winter Havens Gilbert Airport

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Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour Max.	6 hour Min.				altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
30	10:53	W 12	10.00	Mostly Cloudy	FEW017 BKN041 BKN049	69	63			81%	NA	NA	29.93	1013.1			
30	09:53	NW 15 G 21	5.00	Light Rain Fog/Mist	BKN010 BKN023 OVC050	68	65			90%	NA	NA	29.93	1013.2	0.03	0.62	
30	08:53	SW 13 G 26	1.00	Heavy Rain Fog/Mist	SCT007 BKN012 OVC018	70	69			97%	NA	NA	29.89	1012.0	0.58		
30	07:53	S 10	8.00	Light Rain	SCT011 BKN055 OVC110	71	69			94%	NA	NA	29.87	1011.2	0.01		
30	06:53	S 13	10.00	Fair	CLR	71	68	71	69	90%	NA	NA	29.87	1011.1			
30	05:53	S 10	10.00	Mostly Cloudy	BKN010	71	68			90%	NA	NA	29.86	1011.1			
30	04:53	S 9	10.00	Overcast	OVC009	70	68			93%	NA	NA	29.88	1011.7			
30	03:53	S 9	10.00	Fair	CLR	69	66			90%	NA	NA	29.89	1012.0			
30	02:53	S 13	10.00	Fair	CLR	69	66			90%	NA	NA	29.89	1011.8			
30	01:53	S 8	10.00	Fair	CLR	69	66			90%	NA	NA	29.92	1013.1			
30	00:53	S 9	10.00	Fair	CLR	69	66	74	69	90%	NA	NA	29.95	1014.0			
29	23:53	S 8	10.00	Fair	CLR	70	65			84%	NA	NA	29.97	1014.8			
29	22:53	SW 7	10.00	Fair	CLR	70	64			82%	NA	NA	29.98	1015.1			
29	21:53	S 8	10.00	Partly Cloudy	SCT065	71	63			76%	NA	NA	29.99	1015.4			
29	20:53	S 7	10.00	Fair	CLR	72	63			73%	NA	NA	29.99	1015.2			
29	19:53	S 5	10.00	Fair	CLR	72	64			76%	NA	NA	29.97	1014.8			
29	18:53	S 3	10.00	Fair	CLR	74	64	82	74	71%	NA	NA	29.98	1014.8			
29	17:53	S 3	10.00	Fair	CLR	76	63			64%	NA	78	29.97	1014.6			
29	16:53	S 5	10.00	Fair	CLR	79	62			56%	NA	80	29.97	1014.6			
29	15:53	S 5	10.00	Partly Cloudy	SCT065	80	62			54%	NA	81	29.97	1014.7			
29	14:53	SW 7	10.00	Mostly Cloudy	FEW046 BKN060	81	62			53%	NA	82	29.98	1015.1			
29	13:53	Vrbl 6	10.00	Partly Cloudy	SCT043	82	62			51%	NA	83	29.99	1015.3			
29	12:53	S 6	10.00	Fair	CLR	80	62	81	64	54%	NA	81	30.02	1016.3			
29	11:53	Vrbl 5	10.00	Fair	CLR	78	62			58%	NA	80	30.05	1017.3			
29	10:53	Vrbl 3	10.00	Fair	CLR	77	63			62%	NA	79	30.07	1018.2			

29	09:53	Calm	10.00	Fair	CLR	74	63			69%	NA	NA	30.07	1018.2
29	08:53	N 3	10.00	Fair	CLR	73	64			74%	NA	NA	30.07	1017.9
29	07:53	Calm	10.00	Fair	CLR	68	66			93%	NA	NA	30.04	1017.0
29	06:53	Calm	10.00	Fair	CLR	65	62	68	64	90%	NA	NA	30.04	1016.9
29	05:53	Calm	10.00	Fair	CLR	64	62			93%	NA	NA	30.02	1016.4
29	04:53	E 3	10.00	Fair	CLR	65	63			93%	NA	NA	30.01	1016.1
29	03:53	Calm	10.00	Fair	CLR	67	64			91%	NA	NA	30.01	1016.1
29	02:53	Calm	10.00	Fair	CLR	67	63			87%	NA	NA	30.02	1016.2
29	01:53	Calm	10.00	Fair	CLR	67	63			87%	NA	NA	30.02	1016.4
29	00:53	Calm	10.00	Fair	CLR	68	63	73	68	84%	NA	NA	30.03	1016.6
28	23:53	SW 3	10.00	Fair	CLR	69	63			81%	NA	NA	30.04	1016.9
28	22:53	W 3	10.00	Fair	CLR	69	63			81%	NA	NA	30.04	1017.1
28	21:53	Calm	10.00	Fair	CLR	68	62			81%	NA	NA	30.05	1017.2
28	20:53	NW 5	10.00	Fair	CLR	69	61			76%	NA	NA	30.05	1017.5
28	19:53	NW 6	10.00	Fair	CLR	71	61			71%	NA	NA	30.04	1017.2
28	18:53	NW 6	10.00	Fair	CLR	73	62	83	73	69%	NA	NA	30.04	1016.8
28	17:53	W 6	10.00	Fair	CLR	74	62			67%	NA	NA	30.02	1016.4
28	16:53	W 6	10.00	Partly Cloudy	SCT065	77	61			58%	NA	79	30.01	1016.1
28	15:53	W 7	10.00	A Few Clouds	FEW055	80	60			51%	NA	81	30.01	1015.8
28	14:53	W 9	10.00	Fair	CLR	80	59			49%	NA	81	30.00	1015.7
28	13:53	NW 8	10.00	Overcast	OVC047	82	60			47%	NA	82	30.01	1015.9
28	12:53	SW 7	10.00	Fair	CLR	82	61	82	64	49%	NA	83	30.02	1016.4
28	11:53	SW 7	10.00	Fair	CLR	80	62			54%	NA	81	30.05	1017.3
28	10:53	SW 6	10.00	Fair	CLR	79	64			60%	NA	81	30.08	1018.3
28	09:53	S 6	10.00	Fair	CLR	75	65			71%	NA	NA	30.09	1018.7
28	08:53	Calm	10.00	Fair	CLR	71	67			87%	NA	NA	30.08	1018.4
28	07:53	Calm	10.00	Fair	CLR	68	66			93%	NA	NA	30.08	1018.2
28	06:53	Calm	10.00	Fair	CLR	64	63	67	63	96%	NA	NA	30.06	1017.6
28	05:53	Calm	10.00	Fair	CLR	63	62			97%	NA	NA	30.05	1017.2
28	04:53	Calm	10.00	Fair	CLR	63	61			93%	NA	NA	30.04	1017.0
28	03:53	Calm	10.00	Fair	CLR	65	62			90%	NA	NA	30.04	1016.9
28	02:53	Calm	10.00	Fair	CLR	66	63			90%	NA	NA	30.05	1017.2
28	01:53	SW 3	10.00	Fair	CLR	66	64			93%	NA	NA	30.05	1017.4
28	00:53	Calm	10.00	Fair	CLR	65	63	73	65	93%	NA	NA	30.07	1017.9
27	23:53	S 3	10.00	Fair	CLR	69	63			81%	NA	NA	30.08	1018.4
27	22:53	SE 5	10.00	Fair	CLR	71	64			79%	NA	NA	30.08	1018.4
27	21:53	Calm	10.00	Fair	CLR	70	62			76%	NA	NA	30.07	1018.0
27	20:53	Calm	10.00	Fair	CLR	70	63			79%	NA	NA	30.08	1018.3
27	19:53	Calm	10.00	Fair	CLR	71	62			73%	NA	NA	30.07	1018.0
27	18:53	Calm	10.00	Fair	CLR	73	61	83	72	66%	NA	NA	30.06	1017.8
27	17:53	Calm	10.00	Fair	CLR	76	60			58%	NA	78	30.06	1017.6
27	16:53	E 5	10.00	Fair	CLR	81	58			45%	NA	81	30.06	1017.7

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max.	Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)		6 hour					Pressure		Precipitation (in.)		
27	15:53	NE 3	10.00	Fair	CLR	81	58			45%	NA	81	30.05	1017.4			
27	14:53	E 3	10.00	Fair	CLR	82	59			46%	NA	82	30.06	1017.6			
27	13:53	E 5	10.00	Fair	CLR	82	59			46%	NA	82	30.07	1017.8			
27	12:53	Calm	10.00	Fair	CLR	81	61	81	65	51%	NA	82	30.09	1018.7			
27	11:53	SE 5	10.00	Fair	CLR	80	61			52%	NA	81	30.13	1019.9			

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Southern Region Headquarters
Fort Worth, Texas

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Weather observations for the past three days

Winter Havens Gilbert Airport

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metric

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
07	09:53	N 7	9.00	Overcast	BKN005 OVC011	58	56			93%	NA	NA	29.89	1012.0			
07	08:53	N 7	6.00	Fog/Mist	OVC004	57	55			93%	NA	NA	29.87	1011.4			
07	07:53	N 9	10.00	Overcast	OVC004	58	56			93%	NA	NA	29.86	1011.1			
07	06:53	N 8	9.00	Overcast	OVC005	59	57	59	54	93%	NA	NA	29.84	1010.4	0.01		0.18
07	05:53	W 3	9.00	Light Rain	FEW006 SCT060 SCT120	59	57			93%	NA	NA	29.81	1009.4	0.01		
07	04:53	Calm	10.00	Light Rain	FEW120	58	57			97%	NA	NA	29.82	1009.5	0.01		
07	03:53	S 3	10.00	Light Rain	FEW080 BKN110	58	57			97%	NA	NA	29.82	1009.6	0.02	0.15	
07	02:53	SE 6	10.00	Mostly Cloudy	FEW085 BKN110	55	53			93%	NA	NA	29.87	1011.4	0.03		
07	01:53	E 3	10.00	Light Rain	FEW075 OVC110	54	51			90%	NA	NA	29.91	1012.7	0.10		
07	00:53	E 3	8.00	Light Rain	OVC060	55	53	67	55	93%	NA	NA	29.96	1014.4	0.11		0.17
06	23:53	N 6	6.00	Rain Fog/Mist	BKN050 BKN065 OVC080	55	52			90%	NA	NA	29.99	1015.2	0.06		
06	22:53	NW 10	10.00	Light Rain	OVC075	58	53			84%	NA	NA	30.00	1015.8			
06	21:53	NW 7	10.00	Overcast	OVC080	63	50			63%	NA	NA	30.00	1015.8			
06	20:53	Calm	10.00	Overcast	OVC085	65	50			59%	NA	NA	29.98	1015.1			
06	19:53	N 8	10.00	Overcast	OVC090	66	49			54%	NA	NA	29.98	1015.1			
06	18:53	N 7	10.00	Mostly Cloudy	BKN080	67	53	74	65	61%	NA	NA	29.97	1014.8			
06	17:53	N 5	10.00	Fair	CLR	67	52			59%	NA	NA	29.96	1014.3			
06	16:53	Calm	10.00	Fair	CLR	69	50			51%	NA	NA	29.97	1014.6			
06	15:53	N 3	10.00	Fair	CLR	73	45			37%	NA	NA	29.95	1014.0			
06	14:53	Vrbl 3	10.00	Fair	CLR	73	46			38%	NA	NA	29.96	1014.4			
06	13:53	E 5	10.00	Fair	CLR	71	45			39%	NA	NA	29.95	1014.2			
06	12:53	Calm	10.00	Fair	CLR	70	46	70	50	42%	NA	NA	30.00	1015.7			
06	11:53	Vrbl 5	10.00	Fair	CLR	69	48			47%	NA	NA	30.03	1016.8			
06	10:53	E 8	10.00	Fair	CLR	67	48			51%	NA	NA	30.04	1017.3			
06	09:53	E 5	10.00	Fair	CLR	62	46			56%	NA	NA	30.05	1017.5			
06	08:53	NE 7	10.00	Fair	CLR	58	45			62%	NA	NA	30.04	1016.9			

06	07:53	N 6	10.00	Fair	CLR	53	46			77%	NA	NA	30.05	1017.4
06	06:53	Calm	10.00	Fair	CLR	50	44	55	49	80%	NA	NA	30.05	1017.5
06	05:53	NE 5	10.00	Fair	CLR	49	44			83%	47	NA	30.03	1016.9
06	04:53	NE 3	10.00	Fair	CLR	50	44			80%	NA	NA	30.02	1016.5
06	03:53	NE 5	10.00	Fair	CLR	51	45			80%	NA	NA	30.04	1017.2
06	02:53	N 7	10.00	Fair	CLR	53	46			77%	NA	NA	30.05	1017.5
06	01:53	N 8	10.00	Fair	CLR	54	46			75%	NA	NA	30.05	1017.6
06	00:53	N 6	10.00	Fair	CLR	55	47	63	55	74%	NA	NA	30.06	1017.7
05	23:53	N 5	10.00	Fair	CLR	56	48			75%	NA	NA	30.06	1017.9
05	22:53	N 3	10.00	Fair	CLR	57	46			67%	NA	NA	30.07	1018.2
05	21:53	N 7	10.00	Fair	CLR	59	47			64%	NA	NA	30.08	1018.5
05	20:53	N 6	10.00	Fair	CLR	59	49			69%	NA	NA	30.08	1018.5
05	19:53	N 3	10.00	Fair	CLR	62	50			65%	NA	NA	30.07	1017.9
05	18:53	Calm	10.00	Fair	CLR	63	50	77	62	63%	NA	NA	30.05	1017.5
05	17:53	N 5	10.00	Fair	CLR	65	50			59%	NA	NA	30.04	1017.1
05	16:53	N 6	10.00	Fair	CLR	71	46			41%	NA	NA	30.03	1016.5
05	15:53	N 8	10.00	Fair	CLR	75	46			36%	NA	NA	30.02	1016.2
05	14:53	N 6	10.00	Fair	CLR	76	50			40%	NA	78	30.01	1016.1
05	13:53	N 9	10.00	Fair	CLR	76	54			47%	NA	78	30.02	1016.3
05	12:53	N 5	10.00	Fair	CLR	72	62	72	65	71%	NA	NA	30.04	1017.0
05	11:53	N 8	10.00	Overcast	BKN005 OVC013	67	63			87%	NA	NA	30.08	1018.4
05	10:53	N 9	8.00	Overcast	OVC007	67	64			91%	NA	NA	30.09	1018.8
05	09:53	N 8	10.00	Overcast	OVC008	67	63			87%	NA	NA	30.09	1018.7
05	08:53	N 8	10.00	Overcast	OVC008	67	64			91%	NA	NA	30.07	1018.2
05	07:53	NW 3	10.00	Overcast	OVC011	67	64			91%	NA	NA	30.07	1017.9
05	06:53	NW 7	10.00	Overcast	FEW015 BKN034 OVC050	65	62	67	64	90%	NA	NA	30.06	1017.6
05	05:53	SW 3	10.00	Fair	CLR	64	61			90%	NA	NA	30.04	1017.0
05	04:53	S 7	10.00	Fair	CLR	65	61			87%	NA	NA	30.03	1016.7
05	03:53	SW 5	10.00	Fair	CLR	64	61			90%	NA	NA	30.04	1017.1
05	02:53	SW 6	10.00	Mostly Cloudy	BKN026 BKN034	66	61			84%	NA	NA	30.04	1017.1
05	01:53	SW 6	10.00	Partly Cloudy	SCT036	65	60			84%	NA	NA	30.04	1017.0
05	00:53	S 7	10.00	Fair	CLR	67	61	69	66	81%	NA	NA	30.05	1017.3
04	23:53	S 6	10.00	A Few Clouds	FEW050	66	61			84%	NA	NA	30.06	1017.7
04	22:53	SW 7	10.00	Mostly Cloudy	BKN049	67	60			79%	NA	NA	30.09	1018.8
04	21:53	Calm	10.00	Mostly Cloudy	SCT050 BKN120	68	61			78%	NA	NA	30.10	1018.9
04	20:53	SW 5	10.00	Fair	CLR	67	61			81%	NA	NA	30.09	1018.8
04	19:53	S 3	10.00	A Few Clouds	FEW060	68	62			81%	NA	NA	30.09	1018.7
04	18:53	Calm	10.00		FEW120	68	61	74	68	78%	NA	NA	30.09	1018.7

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max. 6 hour	Min. 6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
				A Few Clouds													
04	17:53	Calm	10.00	A Few Clouds	FEW120	69	61			76%	NA	NA	30.07	1018.3			
04	16:53	NA	10.00	Fair	CLR	73	59			62%	NA	NA	30.07	1018.1			
04	15:53	S 3	10.00	Fair	CLR	73	59			62%	NA	NA	30.06	1017.7			
04	14:53	S 5	10.00	Fair	CLR	73	59			62%	NA	NA	30.08	1018.3			
04	13:53	S 7	10.00	Fair	CLR	73	58			59%	NA	NA	30.09	1018.8			
04	12:53	S 7	10.00	A Few Clouds	FEW110	74	58	75	61	57%	NA	NA	30.11	1019.3			
04	11:53	SE 9	10.00	A Few Clouds	FEW120	73	59			62%	NA	NA	30.14	1020.2			
04	10:53	SE 8	10.00	Fair	CLR	69	58			68%	NA	NA	30.16	1021.0			
						Temperature (ºF)							Pressure		Precipitation (in.)		

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Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
15	13:53	SW 12	10.00	Overcast	OVC019	72	63			73%	NA	NA	29.97	1014.8			
15	12:53	SW 10	10.00	Overcast	OVC014	69	62	69	62	78%	NA	NA	30.00	1015.7			
15	11:53	SW 7	10.00	Overcast	OVC011	68	62			81%	NA	NA	30.03	1016.7			
15	10:53	S 3	9.00	Overcast	OVC010	65	61			87%	NA	NA	30.05	1017.5			
15	09:53	S 3	10.00	Overcast	OVC012	64	60			87%	NA	NA	30.05	1017.5			
15	07:53	Calm	10.00	Overcast	OVC013	62	59			90%	NA	NA	30.03	1016.6			
15	06:53	E 3	10.00	Overcast	OVC014	62	59	65	62	90%	NA	NA	30.02	1016.3			
15	04:53	N 3	10.00	Overcast	OVC014	62	59			90%	NA	NA	30.00	1015.6			
15	03:53	N 5	10.00	Overcast	OVC016	63	60			90%	NA	NA	30.00	1015.7			
15	02:53	N 3	10.00	Mostly Cloudy	SCT016 BKN024	63	60			90%	NA	NA	30.01	1015.9			
15	01:53	N 6	10.00	Mostly Cloudy	BKN022	64	60			87%	NA	NA	30.02	1016.2			
15	00:53	NW 8	10.00	Overcast	OVC014	65	61	71	65	87%	NA	NA	30.02	1016.4			
14	23:53	NW 9	9.00	Overcast	OVC011	66	62			87%	NA	NA	30.04	1016.9			
14	22:53	W 7	10.00	Overcast	OVC010	68	65			90%	NA	NA	30.03	1016.7			
14	21:53	W 6	10.00	Overcast	OVC010	69	66			90%	NA	NA	30.02	1016.3			
14	20:53	W 6	10.00	Mostly Cloudy	FEW010 SCT016 BKN028	70	67			90%	NA	NA	30.02	1016.2			
14	19:53	SW 5	10.00	Fair	CLR	70	67			90%	NA	NA	30.00	1015.6			
14	18:53	SW 7	10.00	Partly Cloudy	SCT035	71	67	78	71	87%	NA	NA	29.99	1015.4			
14	17:53	SW 8	10.00	Fair	CLR	73	67			81%	NA	NA	29.98	1014.8			
14	16:53	SW 8	10.00	Fair	CLR	74	67			79%	NA	NA	29.97	1014.5			
14	15:53	SW 8	10.00	A Few Clouds	FEW044	76	67			74%	NA	77	29.96	1014.4			
14	14:53	SW 10	10.00	A Few Clouds	FEW021	77	67			71%	NA	79	29.96	1014.3			
14	13:53	W 12 G 18	10.00	Fair	CLR	77	67			71%	NA	79	29.98	1015.1			
14	12:53	SW 10	10.00	Overcast	SCT065 BKN095 OVC110	72	66	74	66	82%	NA	NA	30.01	1016.0			0.01
14	11:53	SW 10	10.00	Overcast	BKN070 OVC090	72	68			87%	NA	NA	30.05	1017.2	0.01		

14	10:53	SW 10	10.00	Overcast	FEW037 SCT048 OVC080	74	67			79%	NA	NA	30.05	1017.4
14	09:53	S 10 G 20	10.00	Partly Cloudy	FEW038 SCT070	73	67			81%	NA	NA	30.05	1017.5
14	08:53	S 9	10.00	Partly Cloudy	SCT055	70	67			90%	NA	NA	30.05	1017.4
14	07:53	S 9	10.00	Mostly Cloudy	BKN060	67	66			97%	NA	NA	30.04	1016.9
14	06:53	S 8	10.00	Fair	CLR	66	65	67	64	96%	NA	NA	30.03	1016.7
14	05:53	S 9	10.00	Mostly Cloudy	BKN055 BKN070	67	66			97%	NA	NA	30.03	1016.6
14	04:53	S 9	10.00	A Few Clouds	FEW004 FEW065	66	65			96%	NA	NA	30.02	1016.3
14	03:53	S 9	10.00	Fair	CLR	66	65			96%	NA	NA	30.02	1016.4
14	02:53	S 6	10.00	Fair	CLR	64	63			96%	NA	NA	30.03	1016.5
14	01:53	S 5	10.00	Fair	CLR	65	63			93%	NA	NA	30.04	1016.9
14	00:53	S 7	10.00	Fair	CLR	66	63	70	66	90%	NA	NA	30.05	1017.2
13	23:53	S 7	10.00	Fair	CLR	67	63			87%	NA	NA	30.06	1017.6
13	22:53	SE 6	10.00	Fair	CLR	67	63			87%	NA	NA	30.07	1018.2
13	21:53	S 6	10.00	Fair	CLR	66	63			90%	NA	NA	30.07	1018.1
13	20:53	Calm	10.00	Fair	CLR	67	63			87%	NA	NA	30.08	1018.2
13	19:53	E 3	10.00	Fair	CLR	67	63			87%	NA	NA	30.08	1018.3
13	18:53	Calm	10.00	Fair	CLR	69	64	80	69	84%	NA	NA	30.07	1018.2
13	17:53	Calm	10.00	Fair	CLR	73	64			74%	NA	NA	30.06	1017.8
13	16:53	S 3	10.00	Fair	CLR	78	63			60%	NA	80	30.06	1017.8
13	15:53	S 3	10.00	Fair	CLR	79	63			58%	NA	81	30.06	1017.6
13	14:53	S 6	10.00	Fair	CLR	78	63			60%	NA	80	30.06	1017.7
13	13:53	Vrbl 3	10.00	A Few Clouds	FEW034	78	64			62%	NA	80	30.08	1018.3
13	12:53	S 5	10.00	A Few Clouds	FEW033	77	64	78	58	64%	NA	79	30.11	1019.3
13	11:53	Vrbl 5	10.00	Partly Cloudy	SCT021	76	66			72%	NA	78	30.14	1020.4
13	10:53	Calm	10.00	Fair	CLR	73	66			79%	NA	NA	30.16	1021.1
13	09:53	S 5	10.00	Fair	CLR	70	65			84%	NA	NA	30.16	1021.1
13	08:53	SE 3	10.00	Fair	CLR	65	64			97%	NA	NA	30.15	1020.8
13	07:53	Calm	0.75	Fog/Mist	VV002	61	61			100%	NA	NA	30.13	1020.3
13	06:53	Calm	0.50	Fog	VV002	58	58	61	58	100%	NA	NA	30.12	1019.9
13	05:53	Calm	0.25	Fog	VV002	58	58			100%	NA	NA	30.11	1019.4
13	04:53	Calm	0.25	Fog	VV002	58	58			100%	NA	NA	30.09	1018.9
13	03:53	Calm	0.75	Fog/Mist	OVC001	59	58			96%	NA	NA	30.09	1018.8
13	02:53	Calm	0.25	Fog	VV001	60	60			100%	NA	NA	30.09	1018.8
13	01:53	Calm	0.25	Fog	VV001	60	60			100%	NA	NA	30.09	1018.8
13	00:53	Calm	0.25	Fog	VV001	61	60	68	60	97%	NA	NA	30.10	1019.0
12	23:53	Calm	0.25	Fog	VV002	61	61			100%	NA	NA	30.11	1019.4
12	22:53	Calm	3.00	Fog/Mist	CLR	63	62			97%	NA	NA	30.11	1019.6
12	21:53	Calm	7.00	Fair	CLR	63	63			100%	NA	NA	30.11	1019.5
12	20:53	SE 3	10.00	A Few Clouds	FEW075	64	63			96%	NA	NA	30.10	1019.2

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max. (6 hour)	Min. (6 hour)	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)							Pressure		Precipitation (in.)		
12	19:53	E 3	10.00	Fair	CLR	65	63			93%	NA	NA	30.09	1018.9			
12	18:53	E 6	10.00	Fair	CLR	68	65	72	65	90%	NA	NA	30.08	1018.5			0.03
12	17:53	E 3	10.00	Fair	CLR	68	65			90%	NA	NA	30.07	1018.2			
12	16:53	NA	10.00	Fair	CLR	72	65			79%	NA	NA	30.06	1017.7			
12	15:53	SE 5	10.00	Mostly Cloudy	FEW014 BKN070	72	66			82%	NA	NA	30.07	1017.9		0.03	
12	14:53	E 6	10.00	Mostly Cloudy	BKN070	70	66			87%	NA	NA	30.07	1018.0			

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Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
02	12:53	SW 10	10.00	Mostly Cloudy	FEW027 SCT046 BKN060	79	67	81	67	67%	NA	81	30.12	1019.7			
02	11:53	S 9	10.00	A Few Clouds	FEW021 FEW048	78	68			71%	NA	80	30.14	1020.5			
02	10:53	S 14	10.00	Mostly Cloudy	SCT016 SCT028 BKN034	77	69			77%	NA	79	30.15	1020.8			
02	09:53	S 10	10.00	Overcast	OVC009	73	69			87%	NA	NA	30.17	1021.3			
02	08:53	S 7	10.00	Overcast	OVC006	70	69			97%	NA	NA	30.17	1021.2			
02	07:53	S 7	4.00	Fog/Mist	BKN003 OVC020	68	67			96%	NA	NA	30.13	1020.1			
02	06:53	SE 7	1.50	Fog/Mist	OVC002	67	67	70	66	100%	NA	NA	30.12	1019.8			
02	05:53	S 7	1.25	Fog/Mist	OVC002	67	66			97%	NA	NA	30.12	1019.7			
02	04:53	Calm	8.00	Overcast	FEW005 OVC018	67	66			97%	NA	NA	30.12	1019.8			
02	03:53	S 3	10.00	Mostly Cloudy	BKN023	68	66			93%	NA	NA	30.12	1019.9			
02	02:53	SE 5	10.00	Overcast	OVC024	69	66			90%	NA	NA	30.13	1019.9			
02	01:53	S 5	10.00	A Few Clouds	FEW022	69	66			90%	NA	NA	30.14	1020.3			
02	00:53	S 8	10.00	Fair	CLR	69	66	76	69	90%	NA	NA	30.13	1020.2			
01	23:53	S 8	10.00	Fair	CLR	69	65			87%	NA	NA	30.14	1020.5			
01	22:53	S 7	10.00	Fair	CLR	71	65			81%	NA	NA	30.15	1020.8			
01	21:53	S 8	10.00	Fair	CLR	73	65			76%	NA	NA	30.15	1020.8			
01	20:53	S 6	10.00	Mostly Cloudy	BKN044	74	65			74%	NA	NA	30.16	1021.1			
01	19:53	S 7	10.00	Partly Cloudy	SCT043 SCT050	75	64			69%	NA	NA	30.14	1020.3			
01	18:53	S 7	10.00	Mostly Cloudy	BKN045	76	64	83	76	67%	NA	78	30.14	1020.4			
01	17:53	SE 7	10.00	A Few Clouds	FEW070	78	65			64%	NA	80	30.12	1019.7			
01	16:53	SE 6	10.00	Mostly Cloudy	FEW045 SCT055 BKN065	81	65			58%	NA	83	30.12	1019.8			
01	15:53	SE 9	10.00	Mostly Cloudy	BKN043 BKN050	82	65			56%	NA	84	30.11	1019.5			
01	14:53	S 12	10.00	A Few Clouds	FEW041 FEW060	82	65			56%	NA	84	30.10	1019.2			
01	13:53	SE 10	10.00	Mostly Cloudy	BKN037 BKN049	82	67			60%	NA	84	30.12	1019.7			
01	12:53	S 12	10.00	Partly Cloudy	FEW034 SCT044	82	67	82	69	60%	NA	84	30.15	1020.6			

01	11:53	S 13 G 22	10.00	Mostly Cloudy	BKN029	79	67			67%	NA	81	30.17	1021.4		
01	10:53	S 14	10.00	A Few Clouds	FEW023	79	67			67%	NA	81	30.19	1022.1		
01	09:53	SE 10	10.00	Fair	CLR	75	68			79%	NA	NA	30.21	1022.8		
01	08:53	S 10	10.00	Fair	CLR	71	67			87%	NA	NA	30.21	1022.7		
01	07:53	SE 10	10.00	Fair	CLR	70	66			87%	NA	NA	30.19	1022.0		
01	06:53	SE 9	10.00	Fair	CLR	70	66	70	67	87%	NA	NA	30.17	1021.3		
01	05:53	SE 12	10.00	A Few Clouds	FEW026	69	66			90%	NA	NA	30.15	1020.8		
01	04:53	SE 7	10.00	A Few Clouds	FEW023	69	66			90%	NA	NA	30.15	1020.8		
01	03:53	SE 7	10.00	Fair	CLR	68	66			93%	NA	NA	30.14	1020.3		
01	02:53	SE 6	10.00	Fair	CLR	68	66			93%	NA	NA	30.14	1020.5		
01	01:53	SE 7	8.00	Fair	CLR	67	65			93%	NA	NA	30.14	1020.3		
01	00:53	E 6	7.00	Fair	CLR	67	65	74	66	93%	NA	NA	30.14	1020.4		
31	23:53	E 6	10.00	Fair	CLR	67	64			91%	NA	NA	30.15	1020.6		
31	22:53	E 3	10.00	Fair	CLR	68	64			87%	NA	NA	30.14	1020.5		
31	21:53	E 8	10.00	Fair	CLR	70	64			82%	NA	NA	30.12	1019.8		
31	20:53	SE 7	10.00	A Few Clouds	FEW046	73	64			74%	NA	NA	30.13	1020.1		
31	19:53	SE 12	10.00	Fair	CLR	74	63			69%	NA	NA	30.11	1019.4		
31	18:53	SE 8	10.00	Fair	CLR	73	63	82	73	71%	NA	NA	30.09	1018.5		
31	17:53	SE 9	10.00	A Few Clouds	FEW049	75	62			64%	NA	NA	30.07	1018.1		
31	16:53	SE 12 G 22	10.00	Partly Cloudy	SCT055	79	61			54%	NA	80	30.07	1018.2		
31	15:53	SE 12 G 21	10.00	Fair	CLR	80	60			51%	NA	81	30.07	1017.9		
31	14:53	SE 10	10.00	A Few Clouds	FEW045	81	62			53%	NA	82	30.07	1017.9		
31	13:53	S 13 G 23	10.00	Fair	CLR	80	61			52%	NA	81	30.08	1018.3		
31	12:53	SE 15 G 22	10.00	Fair	CLR	79	63	79	67	58%	NA	81	30.09	1018.7		
31	10:53	S 13 G 24	10.00	Partly Cloudy	SCT021	76	67			74%	NA	77	30.15	1020.7		
31	09:53	SE 9	10.00	Fair	CLR	71	66			84%	NA	NA	30.16	1021.1		
31	08:53	SE 7	10.00	Fair	CLR	68	65			90%	NA	NA	30.14	1020.5		
31	07:53	E 7	10.00	Fair	CLR	67	64			91%	NA	NA	30.12	1019.8		
31	06:53	SE 8	10.00	Fair	CLR	67	64	67	65	91%	NA	NA	30.10	1019.1		0.01
31	05:53	SE 9	10.00	Partly Cloudy	SCT041	66	63			90%	NA	NA	30.09	1018.8		
31	04:53	SE 9	10.00	Mostly Cloudy	BKN041	67	63			87%	NA	NA	30.10	1018.9		
31	03:53	E 9	10.00	Mostly Cloudy	FEW024 SCT034 BKN050	65	63			93%	NA	NA	30.10	1019.1	0.01	0.01

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max.	Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)		6 hour					Pressure		Precipitation (in.)		
31	02:53	E 7	10.00	Light Rain	BKN025 BKN038 OVC048	65	63			93%	NA	NA	30.12	1019.6			
31	01:53	E 7	8.00	Light Rain	SCT026 BKN031 OVC050	66	62			87%	NA	NA	30.13	1019.9			
31	00:53	SE 6	10.00	Overcast	SCT023 BKN028 OVC065	66	62	70	66	87%	NA	NA	30.13	1020.1	0.01		0.01
30	23:53	E 7	10.00	Overcast	FEW033 BKN048 OVC070	66	62			87%	NA	NA	30.14	1020.3			
30	22:53	SE 10	10.00	Overcast	SCT049 OVC060	70	60			71%	NA	NA	30.15	1020.7			
30	21:53	SE 9	10.00	Overcast	OVC065	70	59			68%	NA	NA	30.16	1020.9			
30	20:53	E 7	10.00	Overcast	FEW055 OVC070	69	59			70%	NA	NA	30.15	1020.7			
30	19:53	E 6	10.00	Overcast	SCT050 OVC070	69	58			68%	NA	NA	30.15	1020.9			
30	18:53	E 8	10.00	Overcast	OVC065	70	57	79	70	64%	NA	NA	30.15	1020.8			
30	17:53	SE 10	10.00	Overcast	BKN055 OVC070	72	57			59%	NA	NA	30.15	1020.9			
30	16:53	E 10	10.00	Mostly Cloudy	BKN060	74	57			56%	NA	NA	30.15	1020.7			
30	15:53	E 13	10.00	A Few Clouds	FEW060	76	56			50%	NA	78	30.14	1020.5			
30	14:53	E 8	10.00	Mostly Cloudy	BKN060	75	54			48%	NA	NA	30.16	1021.0			
30	13:53	E 13	10.00	Mostly Cloudy	BKN060	76	56			50%	NA	78	30.17	1021.3			

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Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
04	05:53	NW 6	10.00	Fair	CLR	49	46			90%	46	NA	30.08	1018.4			
04	04:53	N 6	10.00	Fair	CLR	51	48			89%	NA	NA	30.06	1017.9			
04	03:53	N 10	10.00	Fair	CLR	53	49			86%	NA	NA	30.07	1018.0			
04	02:53	NW 8	10.00	Fair	CLR	53	50			89%	NA	NA	30.06	1017.7			
04	01:53	NW 8	10.00	Mostly Cloudy	BKN110	55	51			87%	NA	NA	30.06	1017.9			
04	00:53	NW 8	10.00	Fair	CLR	56	51	63	56	84%	NA	NA	30.06	1017.7			
03	23:53	NW 9	10.00	Partly Cloudy	SCT120	57	52			83%	NA	NA	30.06	1017.9			
03	22:53	NW 7	10.00	Overcast	OVC120	59	50			72%	NA	NA	30.07	1018.3			
03	21:53	W 5	10.00	A Few Clouds	FEW110	60	50			70%	NA	NA	30.08	1018.3			
03	20:53	NW 6	10.00	Overcast	OVC120	60	52			75%	NA	NA	30.07	1018.1			
03	19:53	NW 6	10.00	Mostly Cloudy	BKN120	61	50			67%	NA	NA	30.07	1018.1			
03	18:53	NW 8	10.00	Overcast	BKN036 OVC120	63	50	67	63	63%	NA	NA	30.07	1017.9			
03	17:53	W 6	10.00	Overcast	OVC030	65	55			70%	NA	NA	30.05	1017.4			
03	16:53	W 6	10.00	Overcast	OVC030	67	57			71%	NA	NA	30.05	1017.2			
03	15:53	W 6	10.00	Overcast	OVC031	67	58			73%	NA	NA	30.04	1016.9			
03	14:53	W 5	10.00	Overcast	OVC028	66	57			73%	NA	NA	30.03	1016.5			
03	13:53	NW 5	10.00	Overcast	OVC022	65	57			76%	NA	NA	30.05	1017.2			
03	12:53	NW 6	10.00	Overcast	OVC022	64	59	70	59	84%	NA	NA	30.07	1018.0			0.03
03	11:53	N 7	10.00	Overcast	OVC017	61	59			93%	NA	NA	30.09	1018.8	0.01		
03	10:53	N 12	5.00	Light Rain Fog/Mist	OVC012	60	56			86%	NA	NA	30.12	1019.6	0.01		
03	09:53	NW 10	6.00	Light Rain Fog/Mist	OVC009	65	63			93%	NA	NA	30.11	1019.3	0.01	0.01	
03	08:53	S 9	10.00	Overcast	FEW010 BKN027 OVC070	70	66			87%	NA	NA	30.08	1018.5			
03	07:53	S 8	10.00	Overcast	SCT031 OVC065	68	66			93%	NA	NA	30.07	1017.9			
03	06:53	S 8	10.00	Overcast	OVC012	68	65	69	67	90%	NA	NA	30.05	1017.5			
03	05:53	S 8	10.00	Overcast	OVC075	68	65			90%	NA	NA	30.04	1017.0			

03	04:53	S 8	10.00	Partly Cloudy	SCT085	67	65			93%	NA	NA	30.04	1017.0
03	03:53	S 5	10.00	Mostly Cloudy	BKN075	67	66			97%	NA	NA	30.05	1017.2
03	02:53	S 6	10.00	Fair	CLR	68	66			93%	NA	NA	30.05	1017.4
03	01:53	S 8	10.00	Fair	CLR	69	66			90%	NA	NA	30.05	1017.4
03	00:53	S 8	10.00	Partly Cloudy	FEW009 SCT016	69	67	74	69	93%	NA	NA	30.07	1018.2
02	23:53	S 10	10.00	Fair	CLR	70	67			90%	NA	NA	30.08	1018.3
02	22:53	S 12	10.00	Fair	CLR	71	68			90%	NA	NA	30.07	1018.0
02	21:53	SW 8	10.00	Fair	CLR	71	68			90%	NA	NA	30.10	1019.1
02	20:53	SW 7	10.00	Fair	CLR	71	67			87%	NA	NA	30.11	1019.5
02	19:53	SW 8	10.00	Fair	CLR	72	66			82%	NA	NA	30.10	1019.0
02	18:53	SW 7	10.00	Fair	CLR	74	65	83	74	74%	NA	NA	30.10	1019.0
02	17:53	S 6	10.00	A Few Clouds	FEW070	75	66			74%	NA	NA	30.07	1018.1
02	16:53	S 6	10.00	A Few Clouds	FEW035 FEW070	78	67			69%	NA	80	30.06	1017.8
02	15:53	S 12	10.00	Partly Cloudy	SCT037 SCT070	78	66			67%	NA	80	30.07	1018.0
02	14:53	S 10	10.00	Fair	CLR	81	64			57%	NA	83	30.07	1018.1
02	13:53	S 13	10.00	Mostly Cloudy	FEW033 FEW042 BKN060	82	66			58%	NA	84	30.09	1018.7
02	12:53	SW 10	10.00	Mostly Cloudy	FEW027 SCT046 BKN060	79	67	81	67	67%	NA	81	30.12	1019.7
02	11:53	S 9	10.00	A Few Clouds	FEW021 FEW048	78	68			71%	NA	80	30.14	1020.5
02	10:53	S 14	10.00	Mostly Cloudy	SCT016 SCT028 BKN034	77	69			77%	NA	79	30.15	1020.8
02	09:53	S 10	10.00	Overcast	OVC009	73	69			87%	NA	NA	30.17	1021.3
02	08:53	S 7	10.00	Overcast	OVC006	70	69			97%	NA	NA	30.17	1021.2
02	07:53	S 7	4.00	Fog/Mist	BKN003 OVC020	68	67			96%	NA	NA	30.13	1020.1
02	06:53	SE 7	1.50	Fog/Mist	OVC002	67	67	70	66	100%	NA	NA	30.12	1019.8
02	05:53	S 7	1.25	Fog/Mist	OVC002	67	66			97%	NA	NA	30.12	1019.7
02	04:53	Calm	8.00	Overcast	FEW005 OVC018	67	66			97%	NA	NA	30.12	1019.8
02	03:53	S 3	10.00	Mostly Cloudy	BKN023	68	66			93%	NA	NA	30.12	1019.9
02	02:53	SE 5	10.00	Overcast	OVC024	69	66			90%	NA	NA	30.13	1019.9
02	01:53	S 5	10.00	A Few Clouds	FEW022	69	66			90%	NA	NA	30.14	1020.3
02	00:53	S 8	10.00	Fair	CLR	69	66	76	69	90%	NA	NA	30.13	1020.2
01	23:53	S 8	10.00	Fair	CLR	69	65			87%	NA	NA	30.14	1020.5
01	22:53	S 7	10.00	Fair	CLR	71	65			81%	NA	NA	30.15	1020.8
01	21:53	S 8	10.00	Fair	CLR	73	65			76%	NA	NA	30.15	1020.8

Date	Time (est)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)							Pressure		Precipitation (in.)		
01	20:53	S 6	10.00	Mostly Cloudy	BKN044	74	65			74%	NA	NA	30.16	1021.1			
01	19:53	S 7	10.00	Partly Cloudy	SCT043 SCT050	75	64			69%	NA	NA	30.14	1020.3			
01	18:53	S 7	10.00	Mostly Cloudy	BKN045	76	64	83	76	67%	NA	78	30.14	1020.4			
01	17:53	SE 7	10.00	A Few Clouds	FEW070	78	65			64%	NA	80	30.12	1019.7			
01	16:53	SE 6	10.00	Mostly Cloudy	FEW045 SCT055 BKN065	81	65			58%	NA	83	30.12	1019.8			
01	15:53	SE 9	10.00	Mostly Cloudy	BKN043 BKN050	82	65			56%	NA	84	30.11	1019.5			
01	14:53	S 12	10.00	A Few Clouds	FEW041 FEW060	82	65			56%	NA	84	30.10	1019.2			
01	13:53	SE 10	10.00	Mostly Cloudy	BKN037 BKN049	82	67			60%	NA	84	30.12	1019.7			
01	12:53	S 12	10.00	Partly Cloudy	FEW034 SCT044	82	67	82	69	60%	NA	84	30.15	1020.6			
01	11:53	S 13 G 22	10.00	Mostly Cloudy	BKN029	79	67			67%	NA	81	30.17	1021.4			
01	10:53	S 14	10.00	A Few Clouds	FEW023	79	67			67%	NA	81	30.19	1022.1			
01	09:53	SE 10	10.00	Fair	CLR	75	68			79%	NA	NA	30.21	1022.8			
01	08:53	S 10	10.00	Fair	CLR	71	67			87%	NA	NA	30.21	1022.7			
01	07:53	SE 10	10.00	Fair	CLR	70	66			87%	NA	NA	30.19	1022.0			
01	06:53	SE 9	10.00	Fair	CLR	70	66	70	67	87%	NA	NA	30.17	1021.3			

National Weather Service
Southern Region Headquarters
Fort Worth, Texas
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Appendix F

Florida Bonneted Bat Programmatic Key 2019

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
October 22, 2019

Shawn Zinszer
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Florida bonneted bat; 04EF2000-2014-I-0320-R001

Dear Mr. Zinszer:

This letter replaces the December 2013, Florida bonneted bat guidelines provided to the U.S. Army Corps of Engineers (Corps) to assist your agency with effect determinations within the range of the Florida bonneted bat (*Eumops floridanus*). This October 2019 revision supersedes all prior versions. The enclosed *Florida Bonneted Bat Consultation Guidelines* and incorporated *Florida Bonneted Bat Consultation Key* (Key) are provided pursuant to the U.S. Fish and Wildlife Service's (Service) authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This letter, guidelines, and Key have been assigned Service Consultation Code: 41420- 04EF2000-2014-I-0320-R001.

The purpose of the guidelines and Key is to aid the Corps (or other Federal action agency) in making appropriate effect determinations for the Florida bonneted bat under section 7 of the Act, and streamline informal consultation with the Service for the Florida bonneted bat when the proposed action is consistent with the Key. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key, applicants do not wish to implement the identified survey or best management practices, or if there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiate traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses type of habitat (*i.e*, roosting or foraging), survey results, and project size as the basis for making determinations of "may affect, but is not likely to adversely affect" (MANLAA) and "may affect, and is likely to adversely affect" (LAA). The Key is structured to focus on the type(s) of habitat that will be affected by a project. When proposed project areas provide features that could support roosting of Florida bonneted bats, it is considered roosting habitat. If evaluation of roosting habitat determines that roosting is not likely, then the area is subsequently evaluated for its value to the species as foraging habitat.

Roosting habitat

The guidelines describe the features of roosting habitat. When a project is proposed in roosting habitat, the likelihood that roosting is occurring is evaluated through surveys (*i.e.*, full acoustic or limited roost). When a roost is expected and the proposed activity will affect that roost, formal consultation is required. This is because the proposed activity is expected to take individuals through the destruction of the roost and the appropriate determination is that the project may affect, and is likely to adversely affect (LAA) the species. When roosting is expected, but all impacts to the roost can be avoided, and only foraging habitat (without roost structure) will be affected, the Service finds that it is reasonable to conclude that the proposed action is not likely to impair feeding, breeding, or sheltering. Thus, the proposed project may affect, but is not likely to affect the Florida bonneted bat (MANLAA).

The exception to this logic path is if the proposed action will affect more than 50 acres of foraging habitat in proximity to the roost. Under this scenario, we anticipate that the loss of the larger amount of foraging habitat near the roost could significantly impair feeding of young and overall breeding (*i.e.*, LAA). Consequently, these projects would require formal consultation to analyze the effect of the incidental take.

If the roost surveys demonstrate that roosting is not likely, the project is then evaluated for its effects to foraging habitat. Our evaluation of these actions is described below. The exception is for projects less than or equal to 5 acres if a limited roost survey is conducted. Limited roost surveys rely on peeping and visual surveys to determine whether roosting is likely. On these small projects, this survey strategy is believed to be more economical and is considered a reasonable effort to evaluate the potential for roosting. The Service acknowledges that this approach is less reliable in evaluating the likelihood of roosting when it is not combined with acoustic surveys. Therefore, when limited roost surveys are conducted for projects that are less than or equal to 5 acres in size and the determination is that roosting is not likely, we conclude that the proposed project may affect, but is not likely to adversely affect the species (MANLAA).

Foraging habitat

The guidelines describe the features of foraging habitat. Data informing the home range size of the Florida bonneted bats is limited. Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (BWWMA) found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). At BWWMA, researchers found that most individual locations were within one mile of the roost (point of capture) (Ober 2015). Additional data collected during the month of December documented the mean maximum distance Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b).

The Service recognizes that the movement information comes from only one site (BWWMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in

habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Regardless, we use these studies as our best available information to evaluate when changes to foraging habitat may have an effect on the species ability to feed, breed, and shelter and subsequently result in incidental take. When considering where most of the nightly activity was observed, we calculate a foraging area centered on a roost with a 1 mile radius would include approximately 2,000 acres, and a foraging area centered on a 9.5 mile radius would encompass approximately 181,000 acres, on any given night.

Given the Service's limited understanding of how the Florida bonneted bat moves throughout its home range and selects foraging areas, we choose to use 50 acres of habitat as a conservative estimate to when loss of foraging habitat may affect the fitness of an individual to the extent that it would impair feeding and breeding. Projects that would remove, destroy or convert less than 50 acres of Florida bonneted bat foraging habitat are expected to result in a loss of foraging opportunities; however, this decrease is not expected to significantly impair the ability of the individual to feed and breed. Consequently, projects impacting less than 50 acres of foraging habitat that implement the identified best management practices in the Key would be expected to avoid take, and the appropriate determination is that the project may affect, but is not likely to adversely affect the species (MANLAA).

Next, the Service incorporated the level of bat activity into our Key to evaluate when a foraging area may have greater value to the species. When surveys document high bat activity, we deduce that this area has increased value and importance to the species. Thus, when high bat activity is detected in parcels with greater than 50 acres of foraging habitat, we anticipate that the loss, destruction, or conversion of this habitat could significantly impair the ability of an individual to feed and breed (*i.e.*, LAA); thus formal consultation is warranted.

If surveys do not indicate high bat activity, we anticipate that loss of this additional foraging habitat may affect, but is not likely to adversely affect the species (MANLAA). This is because although the acreage is large, the area does not appear to be important at the landscape scale of nightly foraging. Therefore, its loss is not anticipated to significantly impair the ability of an individual to feed or breed.

The exception to this approach is for projects greater than 50 acres when they occur in potential roosting habitat that is not found to support roosting or high bat activity. Under this scenario, the Service concludes that the loss of the large acreage of suitable roosting habitat has the potential to significantly impair the ability of an individual to breed or shelter (*i.e.*, LAA) because the species is cavities for roosting are expected to be limited range wide and the project will impair these limited opportunities for roosting.

Determinations

The Corps (or other Federal action agency) may reach one of several determinations when using this Key. Regardless of the determination, when acoustic bat surveys have been conducted, the Service requests that these survey results are provided to our office to increase our knowledge of

the species and improve our consultation process. Surveys results and reports should be transmitted to the Service at FBBsurveyreport@fws.gov or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. When formal consultation is requested, survey results and reports should be submitted with the consultation request to verobeach@fws.gov.

No effect: If the use of the Key results in a determination of "no effect," no further consultation is necessary with the Service. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.

May Affect, Not Likely to Adversely Affect (MANLAA): In this Key we have identified two ways that consultation can conclude informally, MANLAA-P and MANLAA-C.

> **MANLAA-P**: If the use of the Key results in a determination of "MANLAA- P," the Service concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the Florida bonneted bat. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.
>
> **MANLAA-C**: If the use of the Key results in a determination of MANLAA-C, further consultation with the Service is required to confirm that the Key has been used properly, and the Service concurs with the evaluation of the survey results. Survey results should be submitted with the consultation request.

May Affect, Likely to Adversely Affect (LAA) - When the determination in the Key is "LAA" technical assistance with the Service and modifications to the proposed action may enable the project to be reevaluated and conclude with a MANLAA-C determination. Under other circumstance, "LAA" determinations will require formal consultation.

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the Florida bonneted bat. Any project that has the potential to affect the Florida bonneted bat and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support Florida bonneted bat recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3909.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the Florida bonneted bat and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended. We have established an email address to collect comments on the Key and the survey protocols at: FBBguidelines@fws.gov.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions regarding this Key, please contact the South Florida Ecological Services Office at 772-562-3909.

Sincerely,

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Enclosure

Cc: electronic only
Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Alisa Zarbo, Melinda Charles-Hogan, Susan Kaynor, Krista Sabin, John Fellows)

LITERATURE CITED

Ober, H. 2015. Annual report to USFWS for calendar year 2015. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida.

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Webb, E.N. 2018b. Presentation given at Florida bonneted bat working group meeting at The Conservancy of Southwest Florida. University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. May 24, 2016.

U.S. Fish and Wildlife Service
South Florida Ecological Services Office

FLORIDA BONNETED BAT CONSULTATION GUIDELINES

October - 2019

The U.S. Fish and Wildlife Service's South Florida Ecological Services Field Office (Service) developed the Florida Bonneted Bat Consultation Guidelines (Guidelines) to assist in avoiding and minimizing potential negative effects to roosting and foraging habitat, and assessing effects to the Florida bonneted bat (*Eumops floridanus*) from proposed projects. The Consultation Key within the Guidelines assists applicants in evaluating their proposed projects and identifying the appropriate consultation paths under sections 7 and 10 of the Endangered Species Act of 1973 (Act), as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). These Guidelines are primarily for use in evaluating regulatory projects where development and land conversions are anticipated. These Guidelines focus on conserving roosting structures in natural and semi-natural environments. The following Consultation Area map (Figure 1 and Figure 2, Appendix A), Consultation Flowchart (Figure 3), Consultation Key, Survey Framework (Appendices B-C), and **Best Management Practices (BMPs)** (Appendix D) are based upon the best available scientific information. As more information is obtained, these Guidelines will be revised as appropriate. If you have comments, or suggestions on these Guidelines or the Survey Protocols (Appendix B and C), please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Terms in **bold** are further defined in the Glossary.

Wherever possible, proposed development projects within the Consultation Area should be designed to avoid and minimize take of Florida bonneted bats and to retain their habitat. Applicants are encouraged to enter into early technical assistance/consultation with the Service so we may provide recommendations for avoiding and minimizing adverse effects. Although these Guidelines focus on the effects of a proposed action (*e.g.*, development) on natural habitat, (*i.e.*, non-urban), Appendix E also provides Best Management Practices for Land Management Projects.

If you are renovating an existing artificial structure (*e.g.*, building) within the urban environment with or without additional ground disturbing activities, these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance.

The final listing rule for the Florida bonneted bat (Service 2013) describes threats identified for the species. Habitat loss and degradation, as well as habitat modification, have historically affected the species. Florida bonneted bats are different from most other Florida bat species because they are reproductively active through most of the year, and their large size makes them capable of foraging long distances from their roost (Ober *et al.* 2016). Consequently, this species is vulnerable to disturbances around the roost during a greater portion of the year and considerations about foraging habitat extend further than the localized roost.

Use of Consultation Area, Flowchart, and Key

Figure 1 shows the Consultation Area for the Florida bonneted bat where this consultation guidance applies. For information on how the Consultation Area was delineated see Appendix A. The Consultation Flowchart (Figure 3) and Consultation Key direct project proponents through a series of couplets that will provide a conclusion or determination for potential effects to the Florida bonneted bat. *Please Note: If additional listed species, or candidate or proposed species, or designated or proposed critical habitat may be affected, a separate evaluation will be needed for these species/critical habitats.*

Currently, the Consultation Flowchart (Figure 3) and Consultation Key cannot be used for actions proposed within the urban development boundary in Miami-Dade and Broward County. The urban development boundary is part of the Consultation Area, but it is excluded from these Guidelines because Florida bonneted bats use this area differently (roosting largely in artificial structures), and small natural foraging areas are expected to be important. Applicants with projects in this area should contact the Service for further guidance and individual consultation.

Determinations may be either "no effect," "may affect, but is not likely to adversely affect" (**MANLAA**), or "may affect, and is likely to adversely affect" (**LAA**). An applicant's willingness and ability to alter project designs could sufficiently minimize effects to Florida bonneted bats and allow for a **MANLAA** determination for this species (informal consultation). The Service is available for early technical assistance/consultation to offer recommendations to assist in project design that will minimize effects. When take cannot be avoided, applicants and action agencies are encouraged to incorporate compensation to offset adverse effects. The Service can assist with identifying compensation options (*e.g.,* conservation on site, conservation off-site, contributions to the Service's Florida bonneted bat conservation fund, *etc*.).

Using the Key and Consultation Flowchart

- "No effect" determinations do not need Service concurrence.
- "May affect, but is not likely to adversely affect" **MANLAA**. Applicants will be expected to incorporate the appropriate BMPs to reach a **MANLAA** determination.
    - **MANLAA-P** (in blue in Consultation Flowchart) have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results.
    - **MANLAA-C** (in black in Consultation Flowchart) determinations require further consultation with the Service.
- "May affect, and is likely to adversely affect" (**LAA**) determinations require consultation with the Service. Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA**. When take cannot be avoided, **LAA** determinations will require a biological opinion.
- The Service requests copies of surveys used to support all determinations. If a survey is required by the Consultation Key and the final determination is "no effect" or "MANLAA-P", send the survey to FBBsurveyreport@fws.gov , or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. If a survey is required by the Consultation Key and the determination is "MANLAA-C" or "LAA", submit the survey in the consultation request.

For the purpose of making a decision at Couplet 2: If any potential roosting structure is present, then the habitat is classified as **potential roosting habitat**, and the left half of the flowchart should be followed (see Figure 3). We recognize that roosting habitat may also be used by Florida bonneted bats for foraging. If the project site only consists of **foraging habitat** (*i.e.*, no suitable roosting structures), then the right side of the flowchart should be followed beginning at step 13.

For couplets 11 and 12: **Potential roosting habitat** is considered **Florida bonneted bat foraging habitat** when a determination is made that roosting is not likely.

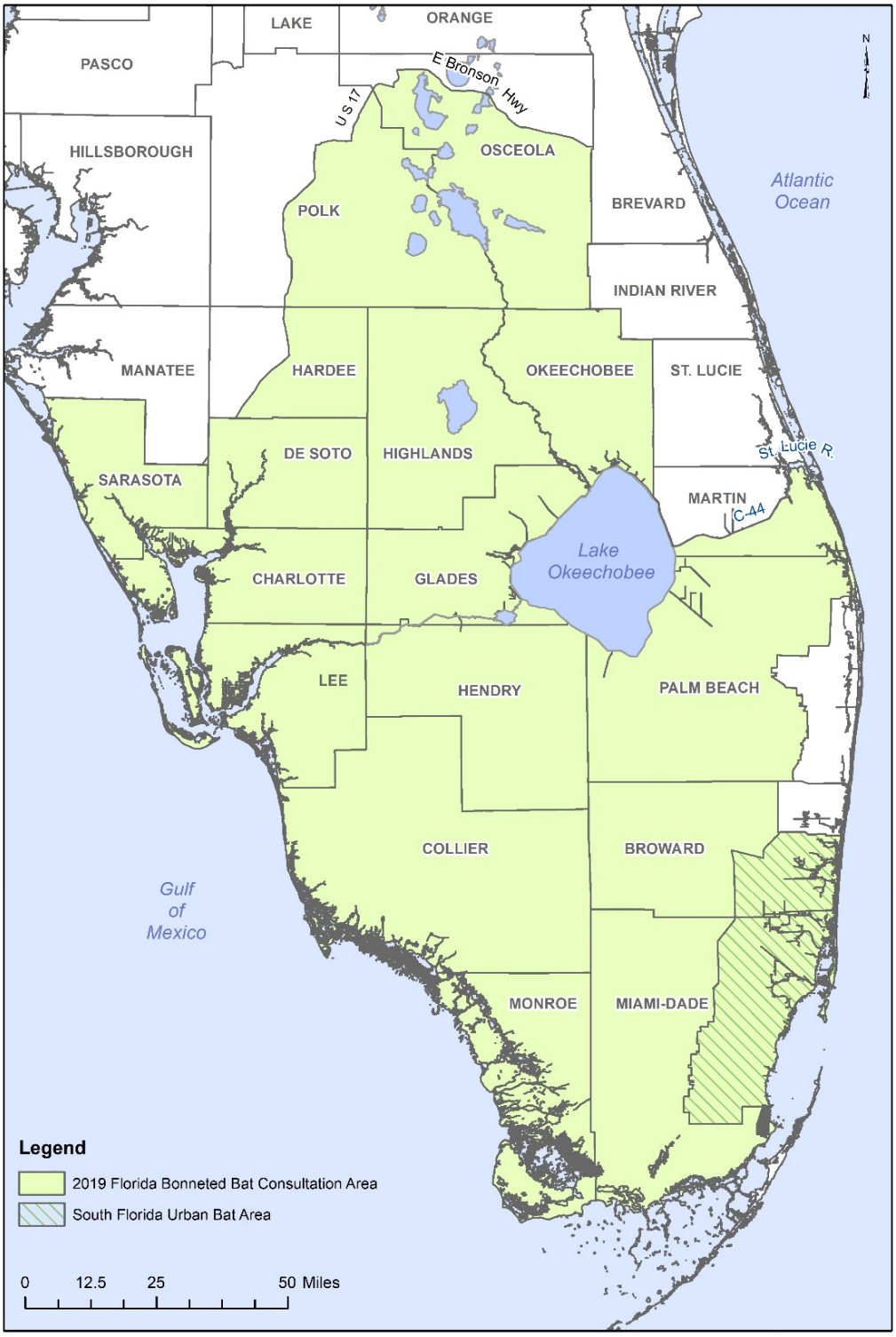

Figure 1. Florida Bonneted Bat Consultation Area. Hatched area (Figure 2) identifies the urban development boundary in Miami-Dade and Broward County. Applicants with projects in this area should contact the Service for specific guidance addressing this area and individual consultation. The Consultation Key should not be used for projects in this area.

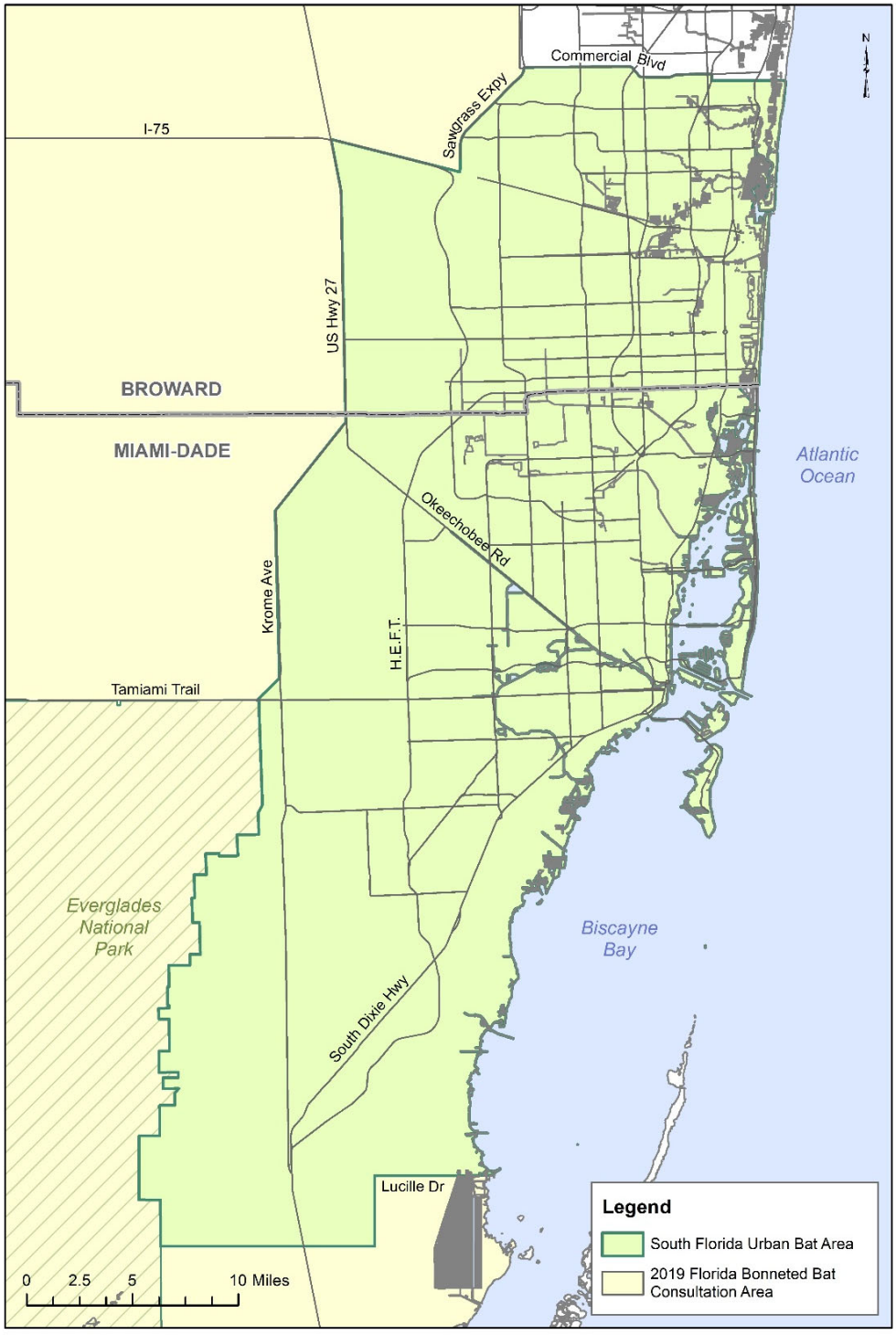

Figure 2. Urban development boundary in Miami-Dade and Broward County. The Consultation Key should not be used for projects in this area. Applicants with projects in this South Florida Urban Bat Area should contact the Service for specific guidance addressing this area and individual consultation.

Florida Bonneted Bat Consultation Key[#]

Use the following key to evaluate potential effects to the Florida bonneted bat (FBB) from the proposed project. Refer to the Glossary as needed.

1a. Proposed project or land use change is partially or wholly within the Consultation Area (Figure 1).....**Go to 2**
1b. Proposed project or land use change is wholly outside of the Consultation Area (Figure 1).....**No Effect**

2a. Potential FBB roosting habitat exists within the project area.....**Go to 3**
2b. No potential FBB roosting habitat exists within the project area.....**Go to 13**

3a. Project size/footprint* ≤ 5 acres (2 hectares)..... **Conduct Limited Roost Survey (Appendix C)** then **Go to 4**
3b. Project size/footprint* > 5 acres (2 hectares).....**Conduct Full Acoustic/Roost Surveys (Appendix B)** then **Go to 6**

4a. Results show FBB roosting is likely .....**Go to 5**
4b. Results do not show FBB roosting is likely.....**MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

5a. Project will affect roosting habitat.....**LAA[+] Further consultation with the Service required.**
5b. Project will not affect roosting habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

6a. Results show some FBB activity.....**Go to 7**
6b. Results show no FBB activity.....**No Effect**

7a. Results show FBB roosting is likely.....**Go to 8**
7b. Results do not show FBB roosting is likely.....**Go to 10**

8a. Project will not affect roosting habitat.....**Go to 9**
8b. Project will affect roosting habitat.....**LAA[+] Further consultation with the Service required.**

9a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of foraging habitat.....**LAA[+] Further consultation with the Service required.**
9b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of foraging habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

10a. Results show high FBB activity/use.....**Go to 11**
10b. Results do not show high FBB activity/use.....**Go to 12**

11a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging).....**LAA[+] Further consultation with the Service required.**
11b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging)..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

12a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of FBB habitat.....**LAA[+] Further consultation with the Service required.**
12b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat..... **MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

13a. FBB foraging habitat exists within the project area and foraging habitat will be affected…..……..**Go to 14**

13b. FBB foraging habitat exists within the project area and foraging habitat will not be affected **OR** no FBB foraging habitat exists within the project area…..……..**No Effect**

14a. Project size* > 50 acres (20 hectares) (wetlands and uplands) ……..…….....**Go to 15**

14b. Project size* ≤ 50 acres (20 hectares) (wetlands and uplands) ……...….. **MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**

15a. Project is within 8 miles (12.9 kilometers) of high quality potential roosting areas^……..……**Conduct Full Acoustic Survey (Appendix B) and Go to 16**

15b. Project is not within 8 miles (12.9 kilometers) of high quality potential roosting area^…….....….**MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**

16a. Results show some FBB activity……...…….....**Go to 17**

16b. Results show no FBB activity……..…….…....**No Effect**

17a. Results show high FBB activity/use……...…...…....**LAA[+] Further consultation with the Service required.**

17b. Results do not show high FBB activity/use……....…….. **MANLAA-P if BMPs (Appendix D) used and survey reports submitted. Programmatic concurrence.**

[#] If you are within the urban environment and you are renovating an existing artificial structure (with or without additional ground disturbing activities), these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance

*****Includes wetlands and uplands that are going to be altered along with a 250- foot (76.2- meter) buffer around these areas if the parcel is larger than the altered area.

[+]Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations.

^Determining if **high quality potential roosting areas** are within 8 mi (12.9 km) of a project is intended to be a desk-top exercise looking at most recent aerial imagery, not a field exercise.

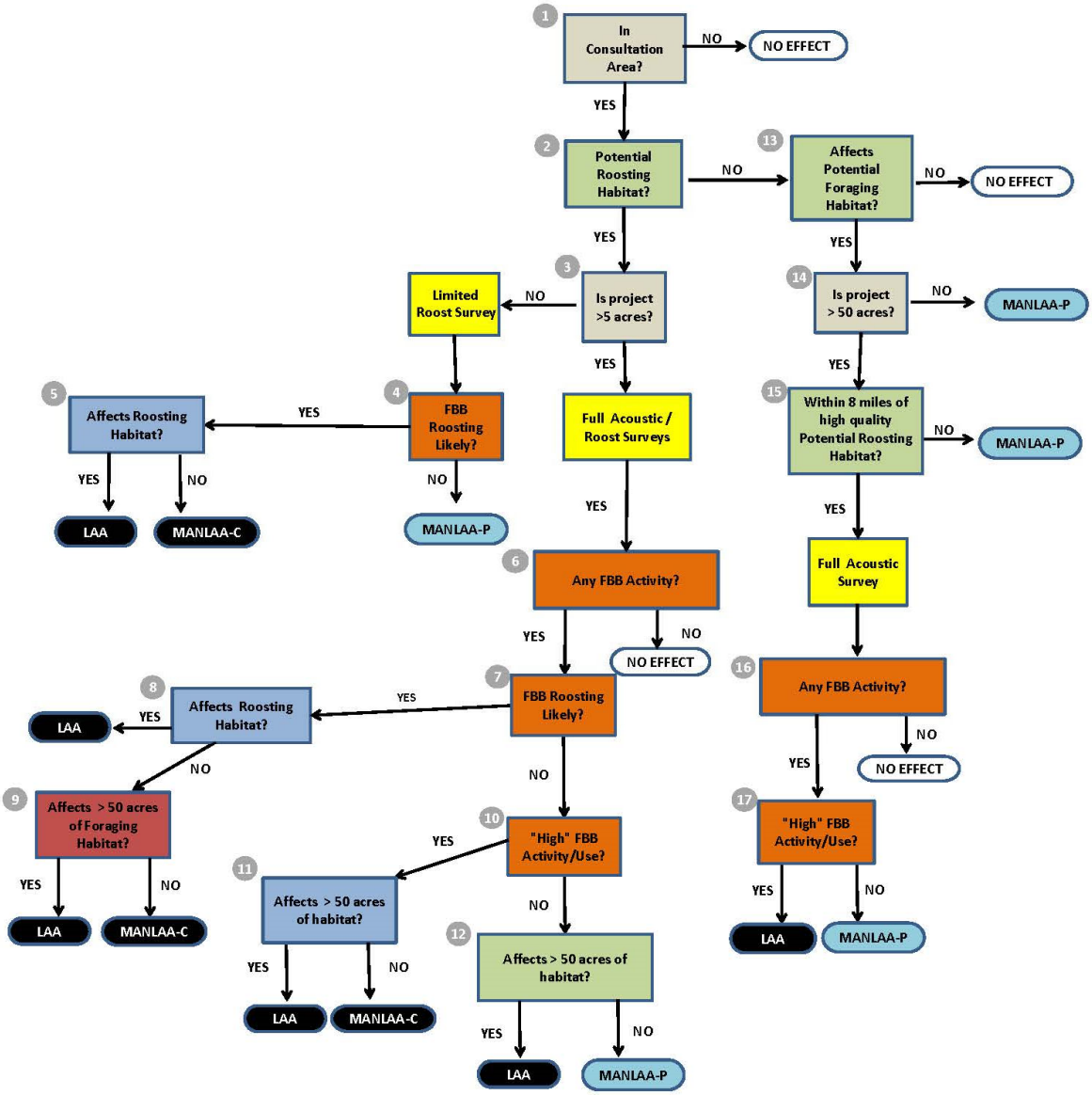

Figure 3. Florida bonneted bat Consultation Flowchart. "**No effect**" determinations do not need Service concurrence. "May affect, but not likely to adversely affect", **MANLAA-P,** in blue have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results. **MANLAA-C** determinations in black require further consultation with the Service. Applicants are expected to incorporate the appropriate **BMPs** to reach a **MANLAA** determination. "May affect, and is likely to adversely affect", **LAA, (**also in black) determinations require consultation with the Service. Further consultation with the Service may identify project modifications that could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations. The Service requests Florida bonneted bat survey reports for all determinations.

GLOSSARY

BMPs – Best Management Practices. Recommendations for actions to conserve roosting and foraging habitat to be implemented before, during, and after proposed development, land use changes, and land management activities.

FBB Activity – Florida bonneted bat (FBB) activity is when any Florida bonneted bat calls are recorded during an acoustic survey or human observers see or hear Florida bonneted bats on a site.

FORAGING HABITAT - Comprised of relatively open (*i.e.,* uncluttered or reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment) areas to find and catch prey, and sources of drinking water. In order to find and catch prey, Florida bonneted bats forage in areas with a reduced number of obstacles. This includes: open fresh water, permanent or seasonal freshwater wetlands, within and above wetland and upland forests, wetland and upland shrub, and agricultural lands (Bailey *et al.* 2017). In urban and residential areas drinking water, prey base, and suitable foraging can be found at golf courses, parking lots, and parks in addition to relatively small patches of natural habitat.

FULL ACOUSTIC/ROOST SURVEY - This is a comprehensive survey that will involve systematic acoustic surveys (*i.e.,* surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple consecutive nights). Depending upon acoustic results and habitat type, targeted roost searches through thorough visual inspection using a tree-top camera system or observations at emergence (*e.g.,* looking and listening for bats to come out of tree cavities around sunset) or more acoustic surveys may be necessary. See Appendix B for a full description.

HIGH FBB ACTIVITY/USE - High Florida bonneted bat (FBB) activity/use or importance of an area can be defined using several parameters (*e.g*., types of calls, numbers of calls). An area will be considered to have high FBB activity/use if **ANY** of the following are found: (a) multiple FBB feeding buzzes are detected; (b) FBB social calls are recorded; (c) large numbers of Florida bonneted bat calls (9 or more) are recorded throughout one night. Each of these parameters is considered to indicate that an area is actively used and important to FBBs, however, the Service will further evaluate the activity/use of the area within the context of the site (*i.e.,* spatial distribution of calls, site acreage, habitat on site, as well as adjacent habitat) and provide additional guidance.

HIGH QUALITY POTENTIAL ROOSTING AREAS - Sizable areas (>50 acres) [20 hectares] that contain large amounts of high-quality, natural roosting structure – (*e.g.,* predominantly native, mature trees; especially pine flatwoods or other areas with a large number of cavity trees, tree hollows, or high woodpecker activity).

LAA - May Affect, and is Likely to Adversely Affect. The appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or

beneficial [see definition of "may affect, but is not likely to adversely affect" (**MANLAA**)]. In the event the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action is "likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" (**LAA**) determination should be made. An "is likely to adversely affect" determination requires the initiation of formal section 7 consultation.

LIMITED ROOST SURVEY - This is a reduced survey that may include the following methods: acoustics, observations at emergence (*e.g.,* looking and listening for bats to come out of tree cavities around sunset), and visual inspection of trees with cavities or loose bark using tree-top cameras (or combination of these methods). Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting structures on site. See also Appendix C for a full description.

MANLAA - May Affect, but is Not Likely to Adversely Affect. The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. To use these Guidelines and Consultation Key applicants must incorporate the appropriate **BMPs** (Appendix D) to reach a **MANLAA** determination.

In this Consultation Key we have identified two ways that consultation can conclude informally, **MANLAA-P and MANLAA-C**:

> **MANLAA-P**: programmatic concurrence is provided through the transmittal letter of these Guidelines, no additional consultation is required with the Service for Florida bonneted bats. All survey results must be submitted to Service.
>
> **MANLAA-C**: further consultation with the Service is required to confirm that the Consultation Key has been used properly, and the Service concurs with the evaluation of the survey results. Request for consultation must include survey results.

NO EFFECT - The appropriate conclusion when the action agency determines its proposed action will not affect listed species or designated critical habitat.

POTENTIAL ROOSTING HABITAT - Includes forest and other areas with tall, mature trees or other areas with suitable roost structures (*e.g.,* utility poles, artificial structures). Forest is defined as all types including: pine flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed or hardwood hammocks, cypress, sand pine scrub, or other forest types. (Forrest types currently include exotic forests such as melaleuca, please contact the Service for additional guidance as needed). More specifically, this includes habitat in which suitable structural features for breeding and sheltering are present. In general, roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. Structural characteristics are of primary importance.

Florida bonneted bats have been found roosting in habitat with the following structural features, but may also occur outside of these parameters:

- trees greater than 33 feet (10 meters) in height, greater than 8 inches (20 centimeters) in diameter at breast height (DBH), with cavity elevations higher than 16 feet (5 meters) above ground level (Braun de Torrez 2019);
- areas with a high incidence of large or mature live trees with various deformities (*e.g.,* large cavities, hollows, broken tops, loose bark, and other evidence of decay) (*e.g.,* pine flatwoods);
- rock crevices (*e.g.,* limestone in Miami-Dade County); and/or
- artificial structures, mimicking natural roosting conditions (*e.g.,* bat houses, utility poles, buildings), situated in natural or semi-natural habitats.

In order for a building to be considered a roosting structure, it should be a minimum of 15 feet high and contain one or more of the following features: chimneys, gaps in soffits, gaps along gutters, or other structural gaps or crevices (outward entrance approximately 1 inch (2.5 centimeters) in size or greater. Structures similar to the above (*e.g.,* bridges, culverts, minimum of 15 feet high) are expected to also provide roosting habitat, based upon the species' morphology and behavior (Keeley and Tuttle 1999). Florida bonneted bat roosts will be situated in areas with sufficient open space for these bats to fly (*e.g.,* open or semi-open canopy, canopy gaps, above the canopy, and edges which provide relatively uncluttered conditions [*i.e.,* reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment]).

For the purpose of this Consultation Key*: Roosting habitat refers to habitat with structures that can be used for daytime and maternity roosting. Roosting at night between periods of foraging can occur in a broader range of structure types. For the purposes of this guidance we are focusing on day roosting habitat.*

ROOSTING IS LIKELY– Determining likelihood of roosting is challenging. The Service has provided the following definition for the express purpose of these Guidelines. Researchers use additional cues to assist in locating roosts. As additional indicators are identified and described we expect our Guidelines will be improved.

In this Consultation Key the Service will consider the following evidence indicative that roosting is likely nearby (*i.e.,* reasonably certain to occur) if **ANY** of the following are documented: (a) Florida bonneted bat calls are recorded within 30 minutes before sunset to 1½ hours following sunset or within 1½ hours before sunrise; (b) emergence calls are recorded; (c) human observers see (or hear) Florida bonneted bats flying from or to potential roosts; (d) human observers see and identify Florida bonneted bats within a natural roost or artificial roost; and/or (e) other bat sign (*e.g*., guano, staining, etc.) is found that is identified to be Florida bonneted bat through additional follow-up.

In addition to the aforementioned events, researchers consider roosting likely in an area when (1) large numbers of Florida bonneted bat calls are recorded throughout the night (*e.g.,* ≥ 25 files per night at a single acoustic station when 5 second file lengths are recorded); (2) large numbers of FBB calls are recorded over multiple nights (*e.g.,* an average of ≥ 20 files per night from a single detector when 5 second file lengths are recorded); or (3) social calls are recorded. Because social calls and large numbers of calls recorded over one or more nights can be indicative of high

FBB activity/use or when roosting is likely, the Service is choosing not to use these as indicators to make the determination that roosting is likely. Instead we are relying on the indicators that are only expected to occur at or very close to a roost location [(a)-(e) above].

TAKE - to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. [50 CFR §17.3].

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Appendix A. Delineation and Justification for Consultation Area

The Consultation Area (Figure 1) represents the general range of the species. The Consultation Area represents the area within which consideration should be given to potential effects to Florida bonneted bats from proposed projects or actions. Coordination and consultation with the Service helps to determine whether proposed actions and activities may affect listed species. This Consultation Area defines the area where proposed actions and activities may affect the Florida bonneted bat.

This area was delineated using confirmed presence data, key habitat features, reasonable flight distances and home range sizes. Where data were lacking, we used available occupancy models that predict probability of occurrence (Bailey *et al.* 2017). Below we describe how each one of these data sources was used to determine the overall Consultation Area.

Presence data: Presence data included locations for: (1) confirmed Florida bonneted bat acoustic detections; (2) known roost sites (occupied or formerly occupied; includes natural roosts, bat houses, and utility poles); (3) live Florida bonneted bats observed or found injured; (4) live Florida bonneted bats captured during research activities; and (5) Florida bonneted bats reported as dead. The Geographic Information Systems (GIS) dataset incorporates information from January 2003 to May 2019.

The vast majority of the presence data came from acoustic surveys. The species' audible, low frequency, distinct, echolocation calls are conducive for acoustic surveys. However, there are limitations in the range of detection from ultrasonic devices, and the fast, high-flying habits of this species can confound this. Overall, detection probabilities for Florida bonneted bats are generally considered to be low. For example, in one study designed to investigate the distribution and environmental associations of Florida bonneted bat, Bailey *et al.* 2017 found overall nightly detection probability was 0.29. Based on the estimated detection probabilities in that study, it would take 9 survey nights (1 detector per night) to determine with 95% certainty whether Florida bonneted bat are present at a sampling point. Positive acoustic detection data are extremely valuable. However, it is important to recognize that there are issues with false negatives due to limitations of equipment, low detection probabilities, difference in detection due to prey availability and seasonal movement over the landscape, and in some circumstances improperly conducted surveys (*i.e.,* short duration or in unsuitable weather conditions).

Key habitat features: We considered important physical and biological features with a focus on potential roosting habitat and applied key concepts of bat conservation (*i.e*., need to conserve roosting habitat, foraging habitat, and prey base). To date, all known natural Florida bonneted bat roosts (n=19 have been found in live trees and snags of the following types: slash pine, longleaf pine, royal palm, and cypress (Braun de Torrez 2018). Several of the recent roost discoveries are located in fire-maintained vegetation communities, and it appears that Florida bonneted bats are fire-adapted and can benefit from prescribed burn regimes that closely mimic historical fire patterns (Ober *et al.* 2018).

From a landscape and roosting perspective, we consider key habitat features to include forested areas and other areas with mature trees, wetlands, areas used by red-cockaded woodpeckers

(*Picoides borealis*; RCW), and fire-managed and other conservation areas. However, recent work suggests that Florida bonneted bats do not use pinelands more than other land cover types (Bailey *et al.* 2017). In fact, Bailey *et al.* 2017 detected Florida bonneted bats in all land cover types investigated in their study (e.g., agricultural, developed, upland, and wetland). For the purposes of these consultation guidelines, we are focusing on the conservation of potential roosting habitats across the species' range. However, we also recognize the need for comprehensive consideration of foraging habitats, habitat connectivity, and long-term suitability.

Flight distances and home range sizes: Like most bats, Florida bonneted bats are colonial central-place foragers that exploit distant and scattered resources (Rainho and Palmeirim 2011). Morphological characteristics (narrow wings, high wing-aspect ratio) make *Eumops* spp. well-adapted for efficient, low-cost, swift, and prolonged flight in open areas (Findley *et al*. 1972, Norberg and Rayner 1987). Other Eumops including Underwood's mastiff bat (*Eumops underwoodi*), and Greater mastiff bat or Western mastiff bat (*Eumops perotis*) are known to forage and/or travel distances ranging from 6.2 miles to 62 miles from the roost with multiple studies documenting flight distances approximately 15- 18 miles from the roost (Tibbitts *et al* 2002, Vaugh 1959 as cited in Best *et al*. 1996, Siders *et al.* 1999, Siders 2005, Vaughan 1959 as cited in Siders 2005.)

Like other *Eumops,* Florida bonneted bats are strong fliers, capable of travelling long distances (Belwood 1992). Recent Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they also move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (WMA), found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). Additional data collected during the month of December documented the mean maximum distance of Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b). The Service recognizes that the movement information comes from only one site (Babcock-Webb WMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Consequently, because Babcock-Webb WMA provides high quality roosting habitat, this movement data could represent the low end of individual flight distances from a roost.

Given the species' morphology and habits (*e.g*., central-place forager) and considering available movement data from other *Eumops* and Florida bonneted bats discussed above, we opted to use 15 miles (24 km) as a reasonable estimate of the distance Florida bonneted bats would be expected to travel from a roost on any given night. For the purposes of delineating a majority of the Consultation Area, we used available confirmed presence point location data and extended out 15 miles (24 km), with modifications for habitat features (as described above). As more movement data are obtained and made available, this distance estimate may change in the future.

Occupancy model – Research by Bailey *et al.* (2017) indicates the species' range is larger than previously known. Their model performed well across a large portion of the previously known

range when considering confirmed Florid bonneted bat locations; thus it is anticipated to be useful where limited information is available for the species.

We used the model output from Bailey *et al.* (2017) to more closely examine areas where we are data-deficient (*i.e.,* areas where survey information is particularly lacking). We considered 0.27 probability of occurrence a filter for high likelihood of occurrence because 0.27 was the model output for Babcock-Webb WMA, an area where Florida bonneted bats are known to occupy and heavily use. Large portions of Sarasota, Martin, and Palm Beach counties were identified as having probability of occurrence of 0.27. The consultation area should include areas where the species has a high likelihood of occurring. Based on this reasoned approach, all of Sarasota County, portions of Martin County, and greater parts of Palm Beach County were included in the Consultation Area.

We recognize that there are areas in the northern portion of the range where the model is less successful predicting occurrence based on the known Florida bonneted bat locations (*i.e*., the model predicts low likelihood of occurrence on Avon Park Air Force range, where the species is known to roost). Consequently, the Service is proactively working with partners to conduct surveys in the areas added based on the model to confirm that inclusion of these portions of the aforementioned counties is appropriate. The Consultation Area may be adjusted based on changes in this information.

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Appendix B: Full Acoustic / Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting or using the site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, project proponents may be able to retain suspected roosts or conserve roosting and foraging habitats. Changing the timing or nature of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females. If properly conducted, acoustic surveys are the most effective way to determine presence and assess habitat use. If the applicant is unable to follow or does not want to follow the Full Acoustic/Roost Survey framework when recommended according to the Key, the Corps (or other Action Agency) will not be able to use these Guidelines and will need to provide a biologically supported rational using the best available information for their determination in their request for consultation.

General Description: This is a *comprehensive survey effort*, and robust acoustic surveys (*i.e.,* surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple nights) are a fundamental component of the approach. Depending upon acoustic results and habitat type, it may also include: observations at emergence (*e.g.,* emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), visual inspection of trees/snags (*i.e.,* those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, or follow-up targeted acoustic surveys. Methods are dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting and foraging habitats on site.

General Survey Protocol:

[Note: The Service will provide more information in separate detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is intended for project sites > 5 acres (2 hectares).
- For sites containing roosting habitat, acoustic surveys should primarily focus on assessing roosting habitat within the project site that will be lost or modified (*i.e.,* areas that will not be conserved), and locations on the property within 250 feet (76.2 meters) of areas that will not be conserved. This will help avoid or minimize the loss of an active roost and individuals. Secondarily, since part of the purpose is to determine if Florida bonneted bats are using the site, acoustic devices should also be placed near open water and wetlands to maximize chances of detection and aid in assessing foraging habitat that may be lost.
- For sites that do not contain ANY roosting habitat, but do contain foraging habitat (see Figure 3 - Consultation Flowchart and Key, Step 2 [no], Step 13 [yes]), efforts should focus on assessing foraging habitat within the project site that will be lost or modified (*i.e.,* areas that will not be conserved).
- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving,

analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).

- Due to the variation in the quality of recordings, the influence of clutter, the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).
- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- The number of acoustic survey sites and nights needed for the assessment is dependent upon the overall acreage of suitable habitat proposed to be impacted by the action.
    - For non-linear projects, a minimum of 16 detector nights per 20 acres of suitable habitat expected to be impacted is recommended.
    - For linear projects (*e.g.,* roadways, transmission lines), a minimum of five detector nights per 0.6 mi (0.97 km) is recommended. Detectors can be moved to multiple locations within each kilometer surveyed, but must remain in a single location throughout any given night.
    - For any site, and in particular for sites > 250 acres, please contact the Service to assist in designing an appropriate approach.
- If results of acoustic surveys show **high Florida bonneted bat activity** or **Florida bonneted bat roosting likely** (*e.g.,* high activity early in the evening) (see definitions in Glossary), follow-up methods such as emergence surveys, visual inspection of the roosting structures, or follow-up acoustic surveys are recommended to locate potential roosts. Using a combination of methods may be helpful.

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as above) are suitable. Surveyors should be quietly stationed 30 minutes before sunset so they are ready to look and listen for emerging FBBs from sunset to 1½ hours after sunset. When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Visual inspection of trees with cavities and loose bark during the day may be helpful. Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).
- Visual inspection alone is not recommended due to the potential for roosts to be too high for cameras to reach, too small for cameras to fit, or shaped in a way that contents are out of view (Braun de Torrez *et al.* 2016).
- If roosting is suspected on site, use tree-top cameras during the day to search those trees/snags or other structures that have potential roost features (*i.e.,* cavities, hollows, crevices, or other structure for permanent shelter). If unsuccessful (*e.g.,* cannot see entire contents within a given cavity, cannot reach cavity, cannot see full extent of cavity) OR occupied roosts are found with the tree-top camera within the area in which high Florida bonneted bat activity/likely Florida bonneted bats roosting were identified, we recommend emergence surveys and/or acoustics to verify occupancy and/or identify bat species.
- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bats (*e.g.,* # of calls, time of calls, and station number) organized by the date on which the data were collected. Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov. Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as "all raw data" and "all raw data with signatures at or below 20kHz". Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey.

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix B

Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. Journal of Mammalogy. 98:1586-1593.

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Loeb, S.C., T.J. Rodhouse, L.E. Ellison, C.L. Lausen, J.D. Reichard, K.M. Irvine, T.E. Ingersoll, J.T.H. Coleman, W.E. Thogmartin, J.R. Sauer, C.M. Francis, M.L. Bayless, T.R. Stanley, and D.H. Johnson. 2015. A plan for the North American bat monitoring program (NABat). United States Department of Agriculture. Forest Service. Research & Development, Southern Research Station. General Technical Report SRS-208.

Ober, H.K., E.C. Braun de Torrez, J.A. Gore, A.M. Bailey, J.K. Myers, K.N. Smith, and R.A. McCleery. 2016. Social organization of an endangered subtropical species, Eumops floridanus, the Florida bonneted bat. Mammalia 2016:1-9.

U.S. Fish and Wildlife Service. 2018. Range-wide Indiana bat survey guidelines. https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf

Appendix C: Limited Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting within suitable structures on-site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, applicants and partners may be able to retain the suspected roosts or conserve roosting and foraging habitats. Changing the timing of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females.

General Description: This is a *reduced survey effort* that may include the following methods: visual inspection of trees/snags (*i.e.,* those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, observations at emergence (*e.g.,* emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), acoustic surveys, or a combination of these methods. Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting habitat on site.

General Survey Protocol:

[Note: The Service will provide more information in separate, detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is **intended only for small project sites** (*i.e.,* sites ≤ 5 acres [2 hectares]).
- Efforts should focus on assessing potential roosting structures within the project site that will be lost or modified (*i.e.,* areas that will not be conserved), or are located on the property within 250 feet (76.2 meters) of areas that will not be conserved.

Identification of potential roost structures

- This step is necessary prior to any of the methods that follow.
- Run line transects through roosting habitat close enough that all trees and snags are easily inspected. Transect spacing will vary with habitat structure and season from a maximum of 91 m (300 ft) between transects in very open pine stands to 46 m (150 ft) or less in areas with dense mid-story. Transects should be oriented north to south, to optimize cavity detectability because many RCW cavity entrances are oriented in a westerly direction (Service 2004).
- Visually inspect all trees and snags or other structures for evidence of cavities, hollows, crevices that can be used for permanent shelter. Using binoculars, examine structures for cavities, loose bark, hollows, or other crevices that are large enough for Florida bonneted bats (diameter of opening > or = to 1 inch (2.5 cm) (Braun de Torrez *et al*. 2016).
- When potential roosting structures are found, record their location in the field using a Global Positioning System (GPS) unit.

Visual Inspection of trees and snags with tree-top cameras

- Visually inspect all cavities using a video probe (peeper) and assess the cavity contents.

Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).

- Visual inspection alone is valid only when the entire cavity is observed and the contents can be identified. Typically, acoustics at emergence will also be needed to definitively identify bat species, if bats are present or suspected.
- If bats are suspected, or if contents cannot be determined, or if the entire cavity cannot be observed with the video probe; follow methods for an Acoustic Survey or an Emergence Survey (below). If the Corps (or other action agency) or applicant does not wish to conduct acoustic or emergence surveys, the Corps (or other action agency) cannot use the key and must request formal consultation with the Service.
- Record tree species or type of cavity structure, tree diameter and height, cavity height, cavity orientation and cavity contents.

Emergence Surveys

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as described below in Acoustic Surveys) are suitable.
- Surveyors should be quietly stationed 30 minutes prior to sunset so they are ready to look and listen for emerging Florida bonneted bats from sunset to 1½ hours after sunset.
- When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Record number of bats that emerged, the time of emergence, and if bat calls were heard.

Acoustic surveys

- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving, analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).
- Due to the variation in the quality of recordings, the influence of clutter, and the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on

warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).

- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- Acoustic surveys should be conducted over a minimum of four nights.
- If acoustic devices cannot be left in place for the entire night for multiple nights as above, then a combination of short acoustic surveys (from sunset and extending for 1½ hours), stationed observers for emergence surveys or visual inspection of trees/snags with tree-top cameras may be acceptable. Contact the Service for guidance under this circumstance.

Reporting

- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bat by date (*e.g.,* # of calls, time of calls). Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov. Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as "all raw data" and "all raw data with signatures at or below 20kHz". Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix C

Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. Journal of Mammalogy. 98:1586-1593.

Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2016. Use of a multi-tactic approach to locate and endangered Florida bonneted bat roost. Southeastern Naturalist 15(2):235-242.

Loeb, S.C., T.J. Rodhouse, L.E. Ellison, C.L. Lausen, J.D. Reichard, K.M. Irvine, T.E. Ingersoll, J.T.H. Coleman, W.E. Thogmartin, J.R. Sauer, C.M. Francis, M.L. Bayless, T.R. Stanley, and D.H. Johnson. 2015. A plan for the North American bat monitoring program (NABat). United States Department of Agriculture. Forest Service. Research & Development, Southern Research Station. General Technical Report SRS-208.

Ober, H.K., E.C. Braun de Torrez, J.A. Gore, A.M. Bailey, J.K. Myers, K.N. Smith, and R.A. McCleery. 2016. Social organization of an endangered subtropical species, Eumops floridanus, the Florida bonneted bat. Mammalia 2016:1-9.

U.S. Fish and Wildlife Service. 2004. South Florida Ecological Services Office DRAFT July 12, 2004 Species Conservation Guidelines South Florida Red-cockaded Woodpecker. Appendix A. Red-cockaded Woodpecker South Florida Survey Protocol. July 12, 2004. South Florida Ecological Service Office, Vero Beach Florida. https://www.fws.gov/verobeach/BirdsPDFs/200407SlopesCompleteRedCockadedWoodpecker.pdf

U.S. Fish and Wildlife Service. 2018. Range-wide Indiana bat survey guidelines. https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf

Appendix D: Best Management Practices (BMPs) for Development Projects

Ongoing research and monitoring will continue to increase the understanding of the Florida bonneted bat and its habitat needs and will continue to inform habitat and species management recommendations. These BMPs incorporate what is known about the species and also include recommendations that are beneficial to all bat species in Florida. These BMPs are intended to provide recommendations for improving conditions for use by Florida bonneted bats, and to help conserve Florida bonneted bats that may be foraging or roosting in an area.

The BMPs required to reach a "may affect, but is not likely to adversely affect" (MANLAA) determination vary depending on the couplet from the Consultation Key used to reach that particular MANLAA. The requirements for each couplet are provided below followed by the list of BMPs. If the applicant is unable or does not want to do the required BMPs, then the Corps (or other Action Agency) will not be able to use this Guidance and formal consultation with the Service is required.

Couplet Number for MANLAA from Consultation Key	Required BMPs
4b	BMP number 1 if more than 3 months has occurred between the survey and start of the project, and any 3 BMPs out of BMPs 4 through 13
5b	BMP number 2, and any 3 BMPs out of BMPs 3 through 13
9b	BMPs number 2 and 3, and any 4 BMPs out of BMPs 5 through 13
11b	BMPs number 1 and 4, and any 4 BMPs out of BMPs 5 through 13
12b	BMP number 1, and any 3 BMPs out of BMPs 3 through 13
14b	Any 2 BMPs out of BMPs 3 through 13
15b	Any 3 BMPs out of BMPs 3 through 13
17b	Any 4 BMPs out of BMPs 3 through 13

BMPs for development, construction, and other general activities:

1. If potential roost trees or structures need to be removed, check cavities for bats within 30 days prior to removal of trees, snags, or structures. When possible, remove structure outside of breeding season (*e.g.*, January 1 – April 15). If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.
2. When using heavy equipment, establish a 250 foot (76 m) buffer around known or suspected roosts to limit disturbance to roosting bats.
3. For every 5 acres of impact, retain a minimum of 1.0 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained.
4. For every 5 acres of impact, retain a minimum of 0.25 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained..
5. Conserve open freshwater and wetland habitats to promote foraging opportunities and avoid impacting water quality. Created/restored habitat should be designed to replace the function of native habitat.

6. Conserve and/or enhance riparian habitat. A 50-ft (15.2 m) buffer is recommended around water bodies and stream edges. In cases where artificial water bodies (*i.e.,* stormwater ponds) are created, enhance edges with native plantings especially in cases in which wetland habitat was affected.
7. Avoid or limit widespread application of insecticides (*e.g.,* mosquito control, agricultural pest control) in areas where Florida bonneted bats are known or expected to forage or roost.
8. Conserve natural vegetation to promote insect diversity, availability, and abundance. For example, retain or restore 25% of the parcel in native contiguous vegetation.
9. Retain mature trees and snags that could provide roosting habitat. These may include live trees of various sizes and dead or dying trees with cavities, hollows, crevices, and loose bark. See "Roosting Habitat" in "Background" above.
10. Protect known Florida bonneted bat roost trees, snags or structures and trees or snags that have been historically used by Florida bonneted bats for roosting, even if not currently occupied, by retaining a 250 foot (76 m) disturbance buffer around the roost tree, snag, or structure to ensure that roost sites remain suitable for use in the future.
11. Avoid and minimize the use of artificial lighting, retain natural light conditions, and install wildlife friendly lighting (*i.e*., downward facing and lowest lumens possible). Avoid permanent night-time lighting to the greatest extent practicable.
12. Incorporate engineering designs that discourage bats from using buildings or structures. If Florida bonneted bats take residence within a structure, contact the Service and Florida Fish and Wildlife Conservation Commission prior to attempting removal or when conducting maintenance activities on the structure.
13. Use or allow prescribed fire to promote foraging habitat.

Appendix E: Additional Best Management Practices (BMPs) for Land Management Projects

Ecological Land Management

The Service reviews and develops Ecological Land Management projects that use land management activities to restore and maintain native, natural communities that are beneficial to bats. These activities include prescribed fire, mechanical treatments to reduce vegetation densities, timber thinning to promote forest health, trail maintenance, and the treatment of exotic vegetation. The following BMPs provide recommendations for conserving Florida bonneted bat roosting and foraging habitat during ecological land management activities. The Service recommends incorporating these BMP into ecological land management plans.

If potential roost trees need to be removed, check cavities for bats prior to removal of trees or snags. If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.

Ecological Land Management BMPs:

- Protect potential roosting habitat during ecological land management activities, if feasible. Avoid removing trees or snags with cavities.
- Rake and/or manually clear vegetation around the base of known or suspected roost trees to remove fuel prior to prescribed burning.
- If possible, use ignition techniques such as spot fires or backing fire to limit the intensity of fire around the base of the tree or snag containing the roost. The purpose of this action is to prevent the known or suspected roost tree or snag from catching fire and also to attempt to limit the exposure of the roosting bats to heat and smoke. A 250-ft (76 m) buffer is recommended.
- If prescribed fire is being implemented to benefit Florida bonneted bats, Braun de Torrez et al. (2018) noted that fire in the dry/spring season could be most beneficial.
- When creating firebreaks or conducting fire-related mechanical treatment, mark and avoid any known or suspected bat roosts.
- When using heavy equipment, establish a buffer of 250 feet (76 m) around known roosts to limit disturbance to roosting bats.
- Establish forest management efforts to maintain tree species and size class diversity to ensure long-term supply of potential roost sites.
- For every 5 acres (2 hectares) of timber that is harvested, retain a clump of trees 1-2 acres (0.4 - 0.8 hectare) in size containing potential roost trees, especially pines and royal palms (live or dead). Additionally, large snags in open canopy should be preserved.

Literature Cited – Appendix E

Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2018. Activity of an Endangered Bat Increases Immediately Following Prescribed Fire. The Journal of Wildlife Management.

FLORIDA BONNETED BAT (*EUMOPS FLORIDANUS*) SUPPLEMENTAL ACOUSTIC SURVEY REPORT

Florida Department of Transportation

District One

SR 544 (Lucerne Park Road) Project Development and Environment (PD&E) Study

Limits of Project: Martin Luther King Boulevard to SR 17

Polk County, Florida

Financial Management Number: 440273-1

ETDM Number: 5873

Date: January 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration (FHWA) and FDOT.

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Appendices

1.0 Introduction

The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) Study to evaluate improvements to SR 544 (Lucerne Park Road) in Polk County. The proposed project is approximately 8 miles long from Martin Luther King Boulevard to SR 17 and is located within Sections 1, 2, 3, 9, 10, 12, 16, 17, Township 28S, Range 26E; Sections 4, 5, 6, Township 28S, Range 27E; and Sections 32, 33 Township 27S, and Range 27E. The **Project Location Map** is shown in **Figure 1**.

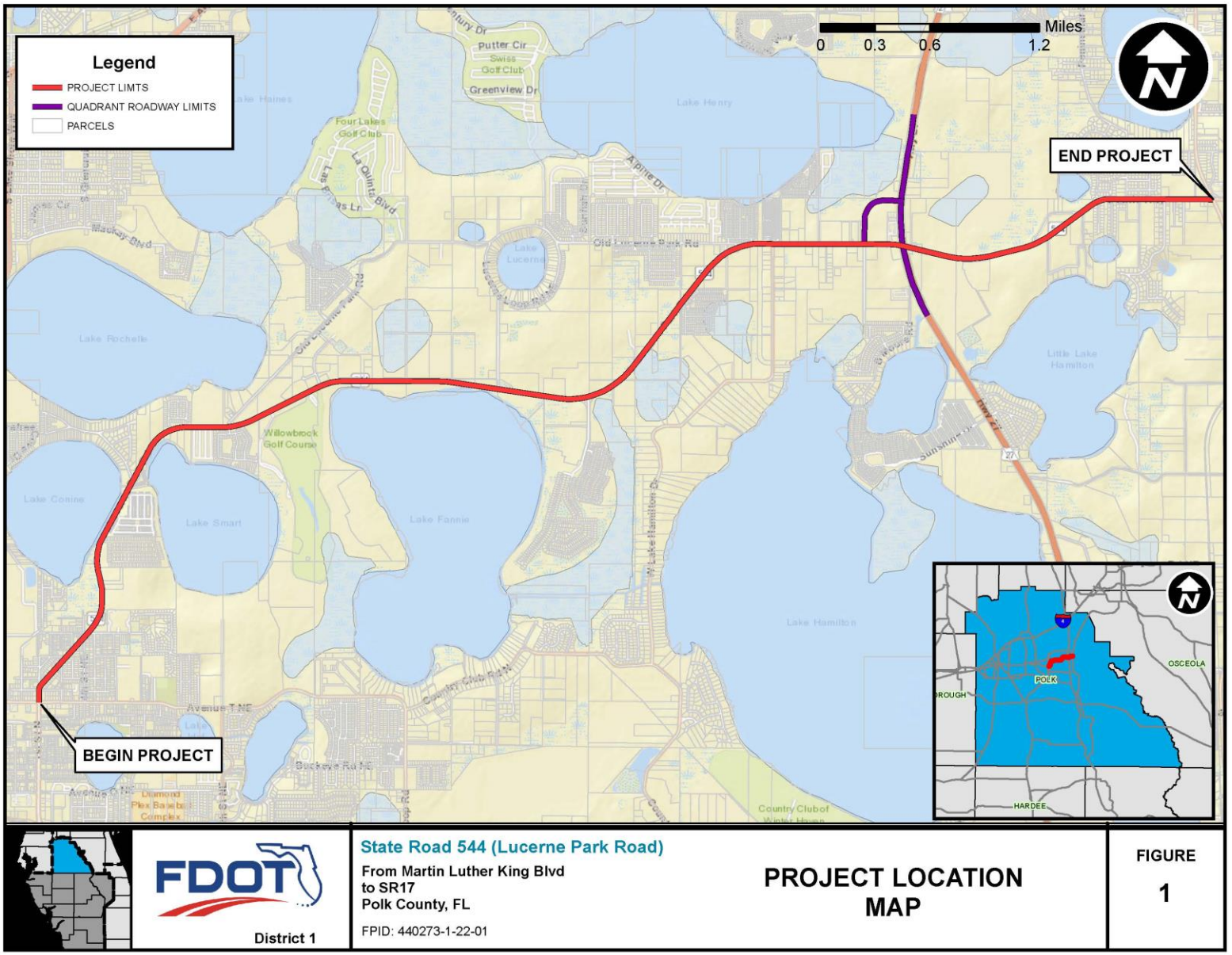
The project is located within the United States Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Florida bonneted bat (*Eumops floridanus*), and potential roosting and foraging habitat was observed within the project corridor. Inwood Consulting Engineers, Inc. (Inwood) conducted an acoustic and roost survey of the project in November and December 2020 and January of 2021. The acoustic survey consisted of 12 survey sites for a total of 60 survey nights, and was conducted in accordance with the current USFWS Florida Bonneted Bat Consultation Guidelines (October 2019) (Guidelines). No FBB calls were detected as a result of the acoustic survey, and no evidence of roosting or foraging was observed. Based on the absence of FBB activity, the project was expected to have "No Effect" on the FBB.

Changes have been made to the project limits since the 2020/2021 FBB acoustic survey was conducted. These changes include the addition of a quadrant roadway alternative and updated pond site locations. Inwood conducted an acoustic survey and roost survey in October 2022 to determine the status of the FBB in this additional project area. This report provides the methodology, results, and conclusions of the 2022 FBB survey along with the anticipated effect determination and is intended to supplement the Natural Resource Evaluation report prepared as part of the PD&E study.

2.0 Project Description

The project involves the potential widening of SR 544 from two to four lanes along with the evaluation of eleven stormwater management facilities (ponds). The updated project area includes a proposed quadrant roadway alternative in the northwest quadrant of the intersection between SR 544 and US 27, as well as new pond site locations. Both the roadway widening and proposed pond sites were included in the 2020/2021 survey efforts, with the exception of one pond site and one Floodplain Compensation (FPC) site. The project area surveyed in the 2022 Supplemental FBB survey includes the quadrant roadway, Pond Site 5, and FPC Site 4.

Figure 1: Project Location Map



3.0 Status, Life History, and Habitat

3.1 Federal Status

The Florida bonneted bat is a member of the Molossidae family and is the largest bat found in Florida. Previously known as the Florida mastiff bat, Wagner's mastiff bat, and mastiff bat (*Eumpos glaucinus floridanus*), the Florida bonneted bat was found to be a separate species in 2004 (Timm and Genoways 2004). The USFWS listed the Florida bonneted bat as endangered in October 2013 (USFWS 2013). The basis for this listing is due to habitat loss, degradation, and modification, as well as other manmade and natural factors including a small population size with few colonies, restricted range, slow reproductivity, and low fecundity (USFWS 2013).

3.2 Life History

The Florida bonneted bat has short glossy fur consisting of bicolored hairs with a white base. The color is highly variable and ranges from black to brown, to brownish gray or cinnamon brown, with the ventral fur paler than the dorsal fur (Belwood 1992, Timm and Genoways 2004). It has large, broad ears that project over the eyes and are joined at the midline of the head. This identifying characteristic, along with its larger size, distinguishes it from the Brazilian free-tailed bat (*Tadarida brasiliensis*).

The Florida bonneted bat is a subtropical species that does not hibernate and is active year-round. It is thought to have a fairly extensive breeding season during summer months, with data suggesting the species might be polyestrous, with a second birthing season in January and February (Timm and Genoways 2004). Females give birth to one offspring per maternity season (USFWS 2013).

This species relies on speed and agility while foraging in open spaces to detect prey roughly 3 to 5 meters (10 to 16 ft) away (Belwood 1992). Bonneted bats are high-flyers, rarely flying below 10 meters (33f ft) (Belwwod 1992), and feed on flying insects, including beetles (Coleoptera), flies (Diptera), true bugs (Hemiptera), and moths (Lepidoptera) (Belwood 1981).

3.3 Habitat

Habitat for the Florida bonneted bat consists of foraging areas and roosting sites, including artificial structures. Roosting and foraging vary with species occurring in forested, suburban, and urban areas (Timm and Arroyo-Cabrales 2008).

The Guidelines define foraging habitat as relatively open areas that provide sources of prey and drinking water, including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland and upland shrub, and agricultural areas. In urban areas, suitable foraging can be found at golf courses, parking lots, and parks.

Potential roosting habitats defined by the Guidelines include forests or other areas with tall or mature trees or other areas with potential roost structures, including utility poles

and artificial roosts. This includes habitat in which suitable structural features for breeding and sheltering are present. Roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark.

4.0 Methodology

4.1 Preliminary Analysis

Prior to conducting the acoustic and roosting surveys, a preliminary analysis of publicly available documentation and geographic information systems (GIS) data were reviewed to determine the potential occurrence of the Florida bonneted bat within the quadrant roadway area. Based on the results of the GIS analysis and preliminary fieldwork conducted by Inwood biologists, it was determined that this additional project area provides suitable roosting and/or foraging habitat for the Florida bonneted bat.

The Guidelines currently require a minimum of five detector nights per 0.6 miles (0.97 km) for linear projects. Based on the suitable roosting habitat occurring within the additional area of the quadrant roadway footprint, a minimum of 10 detector nights were required. Four acoustic monitoring sites were selected, providing 20 detector nights to sufficiently accommodate the survey requirements based on project length and existing habitats along the project corridor, including a new pond site location. The monitoring site locations were determined by the surrounding habitats and the location of the 2020/2021 survey stations. These sites were chosen to survey habitats most suitable for roosting and foraging, while being placed in areas with limited clutter to maximize the effectiveness of the equipment. Based on the preliminary analysis, Inwood developed a Florida Bonneted Bat Supplemental Survey Methodology for the SR 544 PD&E Study that was submitted to the USFWS and subsequently approved on October 5, 2022 (**Appendix A**).

The acoustic and roosting surveys, as well as the call data analysis, were conducted by a qualified biologist with the required acoustic survey course training and experience.

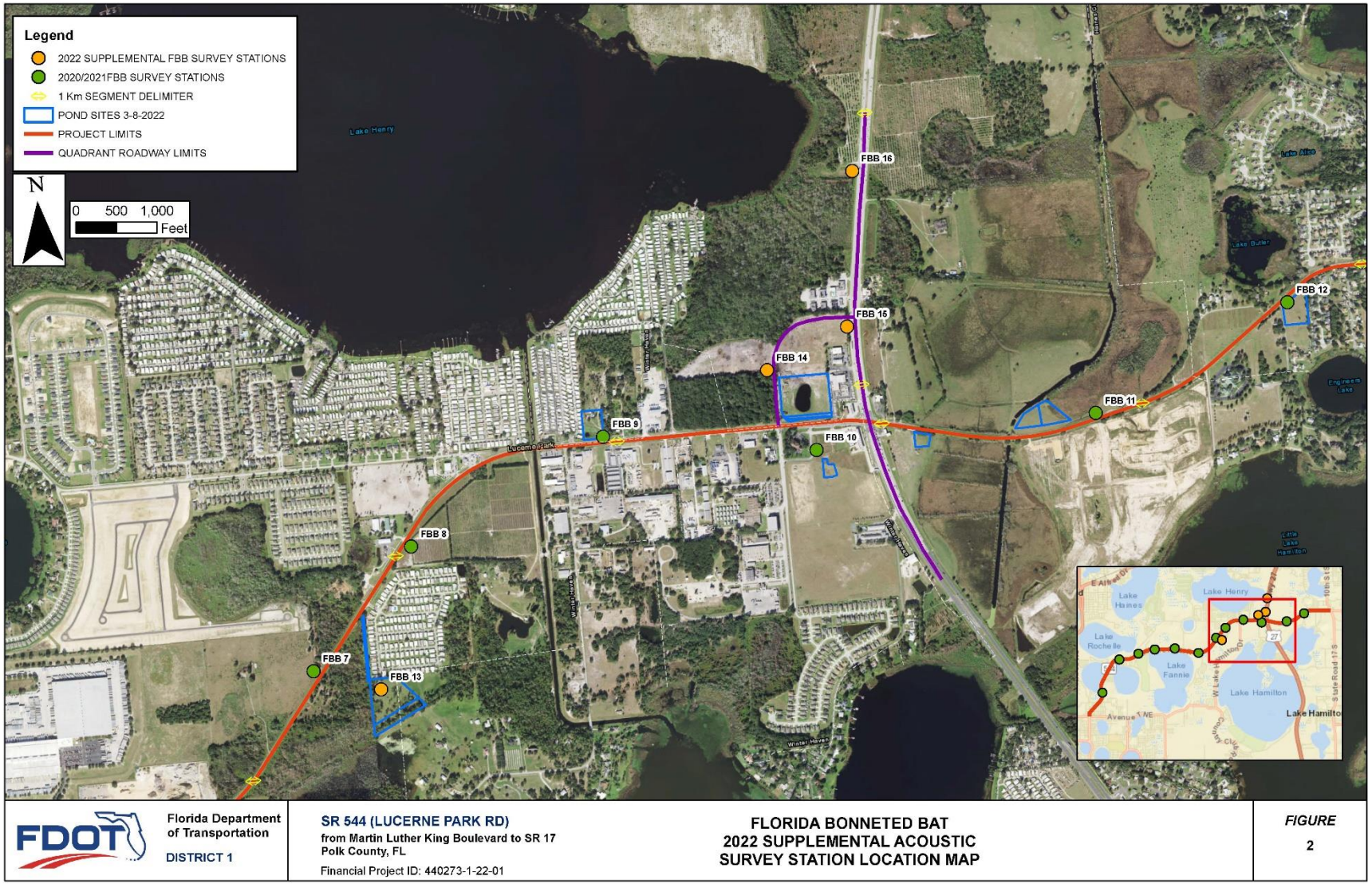
4.2 Acoustic Survey

The acoustic survey was conducted from October 10, 2022, through October 16, 2022. It was conducted in one deployment to accommodate weather conditions and equipment utilization including a total of 4 detectors. Photographs of detector deployment and representative habitat are included in **Appendix B**. Detector Deployment Data Forms are provided in **Appendix C**. **Table 1** provides the details of the detector deployment. **Figure 2** provides the location for each acoustic site.

Table 1. Detector Deployment Summary

Site	Detector Number	Latitude	Longitude
FBB 13	11536	28°04'22"N	81°40'09"W
FBB 14	11534	28°04’54"N	81°39'11"W
FBB 15	11535	28°05'03"N	81°39'00"W
FBB 16	11537	28°05'22"N	81°38'59"W

Figure 2: Acoustic Survey Station Location Map



Each site consisted of one full spectrum detector (Pettersson DX500) with an omnidirectional microphone and directional cone. The microphones were mounted approximately 20 feet above the ground on metal poles to elevate the microphone above the shrub level. The poles were placed in a four-foot tall PVC pipe holder that was hammered into the ground to provide stability. The detectors were preset to automatically record at least ½ hour before sunset and ½ hour after sunrise. Each detector and microphone were calibrated in accordance with manufacturer and USFWS guidelines. The equipment was checked daily to ensure proper functioning of the detector and microphone. Survey Data forms are included in **Appendix D**. Each detector was deployed for a minimum of five nights.

Inwood monitored the weather utilizing the nearest National Oceanic Atmospheric Administration (NOAA) National Weather Service Station to ensure the weather conditions complied with the USFWS criteria. The nearest NOAA weather station for the project is located at the Winter Havens Gilbert Airport (Station KGIF) and is approximately 6.5 miles west of the quadrant roadway. Additionally, biologists document weather conditions during the daily equipment checks. Supporting weather documentation is included in **Appendix E**.

Acoustic sampling efforts were repeated for nights when the weather conditions did not meet USFWS survey criteria and included any of the following conditions:

- Temperatures fall below 65°F;
- Precipitation (rain and/or fog) exceeding 30 minutes or continues intermittently; and
- Sustained winds greater than 9 mph for 30 minutes or more.

4.3 Acoustic Data Analysis

Full spectrum data were recorded on 32 gigabyte (GB) SanDisk memory cards. The data were downloaded and analyzed utilizing SonoBat software, version 4.4.5. All calls were analyzed to determine species' presence and subsequent identification, including the Florida bonneted bat. The results were reviewed and all calls at or below 20kHz were vetted to determine the potential of being a Florida bonneted bat.

4.4 Roost Survey

During the initial field analysis, detector deployments and daily equipment checks, biologists surveyed the area for potential roosts. A 100% pedestrian roost survey was conducted on October 16, 2022 by two Inwood biologists in accordance with the roost survey protocol outlined in the Guidelines. Pedestrian transects were spaced in order to view potential roost structures from multiple angles. All trees/structures with cavities and/or crevices were documented via GPS location. Areas around each cavity were inspected for evidence of bat activity including guano, staining, and chirping.

5.0 Results

5.1 Acoustic Survey

Four acoustic monitoring sites collected data for a total of 28 detector nights between October 10 and October 16, 2022. A total of 28,434 files were collected. All raw acoustic data was provided to the USFWS in February 2023. The SonoBat analysis resulted in a total of 13,163 bat call sequences from seven bat species. Bat species identified during the data analysis include:

- Big brown bat (*Eptesicus fuscus*)
- Brazilian free-tailed bat (*Tadarida brasiliensis*)
- Eastern red bat (*Lasiurus borealis*)/Seminole bat (*Lasiurus seminolus*)
- Evening bat (*Nycticeius humeralis*)
- Northern yellow bat (*Lasiurus intermedius*)
- Southeastern Myotis (*Myotis austroriparius)*
- Tri-colored bat (*Perimyotis subflavus*)

No Florida bonneted bat calls were identified as a result of the acoustic survey. SonoBat analysis identified five calls as Florida bonneted bat calls. Manual vetting resulted in none of the calls being identified as Florida bonneted bat calls. The five calls identified by SonoBat were found to be either noise or other bat species. The data corresponding to these five calls are provided in **Table 2**.

Table 2. SonoBat File Data of Calls Identified as Florida Bonneted Bat

Date (Parent Night)	Time	WAV File ID	Station	Detector	Manually Vetted Result
11 October 2022	02:52:02	M000093.WAV	FBB 13	11536	Noise
16 October 2022	23:41:11	M000050.WAV	FBB 13	11536	*Tadarida brasiliensis*
10 October 2022	23:55:28	M001102.WAV	FBB 15	11535	Noise
15 October 2022	06:36:00	M000682.WAV	FBB 15	11535	*Tadarida brasiliensis*
16 October 2022	20:06:52.	M000397.WAV	FBB 15	11535	Noise

Nightly weather conditions were recorded for each deployment. The survey efforts were repeated for nights when the weather criteria were not met, resulting in a total of seven survey nights per station. Weather data is included in **Appendix E**.

5.2 Roost Survey

The 100% roost survey conducted on October 16, 2022, identified 14 potential roost cavities consisting of natural structures. The location of each structure is provided in **Figures 3A-3B**. Each structure was inspected for evidence of roosting such as staining, guano and chirping. **Table 3** provides a summary of the observed structures.

Biologists were unable to access Cavities 1 and 14 due to surrounding water, but were able to get a clear view of the cavity using binoculars. No evidence of roosting was

observed. Cavities 2, 3, and 8 were easily inspected due to the height of the cavities. The remaining cavity trees were accessible for a visual inspection and utilized binoculars to clearly view the cavities due to the height of the cavities. No evidence of roosting was identified during the visual inspection. Photo documentation of the potential roost trees and cavities is provided in **Appendix B**. Based on the roost assessment, no evidence of roosting by Florida bonneted bats or other bats was observed.

Figure 3A: Potential Roost Cavity Location Map

Figure 3B: Potential Roost Cavity Location Map

Table 3. Potential Roost Survey Data

Potential Roost Location	Structure Type	Health	Approximate DBH*	Approximate Height of Cavity	Latitude	Longitude	Staining Observed	Guano Observed	Auditory Chirping
1	Sweet Bay	Good	7	20’	28° 5’ 17.07’’ N	81° 38’ 58.40” W	No	No	No
2	Laurel Oak	Poor	10	12’	28° 5’ 3.4’’ N	81° 38’ 59.8’ W	No	No	No
3	Black Cherry	Good	8	10’	28° 4’ 58.4’’ N	81° 39’ 11” W	No	No	No
4	Slash Pine Snag	Dead	10	25’	28° 4’ 23.9’’ N	81° 40’ 9.2’ W	No	No	No
5	Slash Pine (3)	Dead	<10	30’	28° 4’ 21.3’’ N	81° 40’ 3.7’ W	No	No	No
6	Slash Pine	Dead	<10	25’	28° 4’ 21.3’’ N	81° 40’ 3.6’ W	No	No	No
7	Slash Pine	Good	<10	20’	28° 4’ 21.4’’ N	81° 40’ 3.5’ W	No	No	No
8	Sweet Bay	Poor	7	3’	28° 4’ 19.4’’ N	81° 40’ 3.5’ W	No	No	No
9	Slash Pine	Dead	<10	30’	28° 4’ 20.1’’ N	81° 40’ 6.2’ W	No	No	No
10	Slash Pine	Dead	<10	50’	28° 4’ 21.5” N	81° 40’ 4.8” W	No	No	No
11	Slash Pine (2)	Dead	<10	30’	28° 4’ 22.4” N	81° 40’ 6.7” W	No	No	No
12	Slash Pine Snag	Dead	<10	20’	28° 4’ 21.9” N	81° 40’ 6.9” W	No	No	No
13	Slash Pine	Dead	<10	30’	28° 4’ 20.4” N	81° 40’ 7.5” W	No	No	No
14	Slash Pine Snag	Dead	<10	25’	28° 4’ 18.3” N	81° 40’ 8.6” W	No	No	No

*DBH – Diameter at Breast Height

6.0 Conclusion

Based on the Guidelines, it was determined that suitable Florida bonneted bat roosting and foraging habitat occurs within the quadrant roadway project area. The majority of this habitat, particularly potential roosting habitat, is adjacent to the project footprint of the roadway widening and proposed ponds. As a result of the roost and acoustic surveys, no evidence of roosting or foraging was observed.

No Florida bonneted bat calls were detected as a result of the acoustic survey. A "**No Effect**" determination was made utilizing the Florida Bonneted Bat Consultation Key (USFWS 2019) (**Appendix F**). This effect determination was made using the following sequence from the key: **1a-2a-3b-6b**.

Based on the results of the roost and acoustic surveys, no evidence of roosting or foraging by the Florida bonneted bat within the project corridor was detected. Due to the absence of Florida bonneted bat activity, this project is expected to have "**No Effect**" on the Florida bonneted bat.

7.0 References

Belwood, J.J. 1981. Wagner's mastiff bat, *Eumops glaucinus floridanus* (Molossidae) in southwestern Florida. Journal of Mammalogy 62:411-413.

Belwood, J.J. 1992. Florida mastiff bat *Eumops glaucinus* floridanus. Pages 216-233 in S.R. Humphrey (ed), Rare and endangered biota of Florida. Vol. I. Mammals. University Press of Florida. Gainsville, Florida.

Timm, R. and J.Arroyo-Cabrales. 2008. Eumops floridanus. In:IUCN 2011, IUCN Red List of Threatened Species. Version 2011.2 http://iucnredlist.org/.

Timm, R. M. and H. H. Genoways. 2004. The Florida bonnet bat, *Eumops floridanus* (Chiroptera: Molossidae): distribution, morphometrics, systematics, and ecology. Journal of Mammology 85:852-865.

USFWS. 2013. Endangered and threatened wildlife and plants; endangered species status for the Florida bonneted bat; Final Rule. Federal Register 78:61004.

USFWS, South Florida Ecological Services Office. 2019. Florida Bonneted Bat Consultation Guidelines.

Appendix A

Agency Coordination Approved Florida Bonneted Bat Survey Methodology

Jada Barhorst

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Wednesday, October 5, 2022 11:19 AM
To: Bennett, Jonathon
Cc: Jada Barhorst; Jason Houck; Turley, David; David Dangel
Subject: Re: [EXTERNAL] 440273-1 SR 544 Lucerne Pkwy - FBB Supplemental Survey Methodology

Jonathan,

I have reviewed the documented provided and the find that the Florida bonneted bat survey protocol proposed is acceptable to the Service.

Sincerely

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

From: Bennett, Jonathon <Jonathon.Bennett@dot.state.fl.us>
Sent: Wednesday, October 5, 2022 8:39 AM
To: Wrublik, John <john_wrublik@fws.gov>
Cc: Jada Barhorst <jbarhorst@inwoodinc.com>; Jason Houck <jhouck@inwoodinc.com>; Turley, David <David.Turley@dot.state.fl.us>; David Dangel <ddangel@inwoodinc.com>
Subject: [EXTERNAL] 440273-1 SR 544 Lucerne Pkwy - FBB Supplemental Survey Methodology

John,

Please see attached Florida Bonneted Bat Methodology Memo, we have additional area that was not included in the prior surveys to look at for 440273-1 SR 544 PD&E.

Hope all is well.
Thanks,

Jonathon A. Bennett
Environmental Project Manager

ETDM Coordinator
Florida Department of Transportation|District One
801 North Broadway Avenue|Bartow, Florida 33830
PH: (863) 519-2495 EMAIL: Jonathon.Bennett@dot.state.fl.us

TRANSPORTATION
WATER RESOURCES
PLANNING / PD&E
ECOLOGY
STRUCTURES
UTILITIES

October 5, 2022

Mr. John Wrublik
Planning and Resource Conservation
U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
john_wrublik@fws.gov

Subject: SR 544 Project Development and Environment (PD&E) Study
from MLK Boulevard to SR 17
Florida Bonneted Bat Supplemental Acoustic/Roost Survey Methodology Memorandum
Financial Project Number: 440273-1
Polk County, Florida

Dear Mr. Wrublik,

The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) Study to evaluate improvements to SR 544 (Lucerne Park Road). This project involves the potential widening of SR 544 from two to four lanes from Martin Luther King Boulevard to SR 17 in Polk County. The proposed project is approximately 8 miles and is located within Sections 1, 2, 3, 9, 10, 12, 16, 17, Township 28S, Range 26E; Sections 4, 5, 6, Township 28S, Range 27E; and Sections 32, 33 Township 27S, and Range 27E. A project location map (**Figure 1**) is included as part of this correspondence.

The project is located within the U.S. Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Florida Bonneted Bat (FBB) (*Eumops floridanus*). Inwood Consulting Engineers, Inc. (Inwood) conducted an acoustic and roost survey of the project in November and December of 2020 and January of 2021. The acoustic survey consisted of 12 survey sites for a total of 60 survey nights, and was conducted in accordance with the current USFWS Florida Bonneted Bat Consultation Guidelines (October 2019). No FBB calls were detected as a result of the acoustic survey, and no evidence of roosting or foraging was observed. Based on the absence of FBB activity, the project was expected to have "No Effect" on the FBB. The methodology memorandum for the original FBB acoustic and roost survey is enclosed.

Changes have been made to the project limits since the 2020/2021 FBB acoustic survey was conducted. This includes the addition of a quadrant roadway in the northwest quadrant of the intersection between SR 544 and US 27, as well as additional pond sites. Inwood is preparing to conduct a full acoustic survey to

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www.inwoodinc.com

determine the presence/absence of the FBB in this additional project area. This survey will supplement the original survey from 2020/2021. The survey sites from the previous acoustic survey are shown in **Figure 2**. The current survey protocol for linear projects requires 5 detector nights per 0.6 mile (1 Km). Based on previous field reviews and aerial analysis of the project area, Inwood is proposing 4 survey sites to accommodate the linear requirement, including pond sites, for a total of 20 survey nights. The proposed supplemental survey sites are shown in **Figure 3**. These sites have been selected based on existing habitats within the project area that provide suitable roosting and/or foraging habitat for the FBB. Potential roosting habitat for the FBB includes forests or other areas with tall or mature trees or other areas with potential roost structures including utility poles and artificial roosts. Potential foraging habitat consists of relatively open areas that provide sources of prey and drinking water including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland and upland shrub, and agricultural areas. Once the survey sites have been confirmed in the field, GPS points will be taken at each site.

Inwood will conduct the survey in accordance with current USFWS Florida Bonneted Bad Consultation Guidelines (October 2019) during October of 2022. A pedestrian roost survey will be conducted to identify and inspect potential roosts for evidence of bats, including natural and artificial structures, within the project footprint. The acoustic survey will be conducted by a qualified biologist who has acoustic survey experience and taken the required acoustic survey course. A full spectrum detector (Pettersson DX500) with an omnidirectional microphone mounted a minimum of 10 feet above the ground will be deployed at each survey site. The detectors will be preset to automatically record at least ½ hour before sunset and ½ hour after sunrise. Each detector will be deployed for five consecutive nights. Inwood will monitor the weather utilizing the nearest NOAA National Weather Service Station to ensure the weather conditions meet the USFWS criteria. Additional survey nights may be necessary if any of the following weather conditions occur within the first five hours of the survey:

- Temperatures fall below 65°F;
- Precipitation (rain and/or fog) exceeding 30 minutes or continues intermittently; and
- Sustained winds greater than 9 mph for 30 minutes or more.

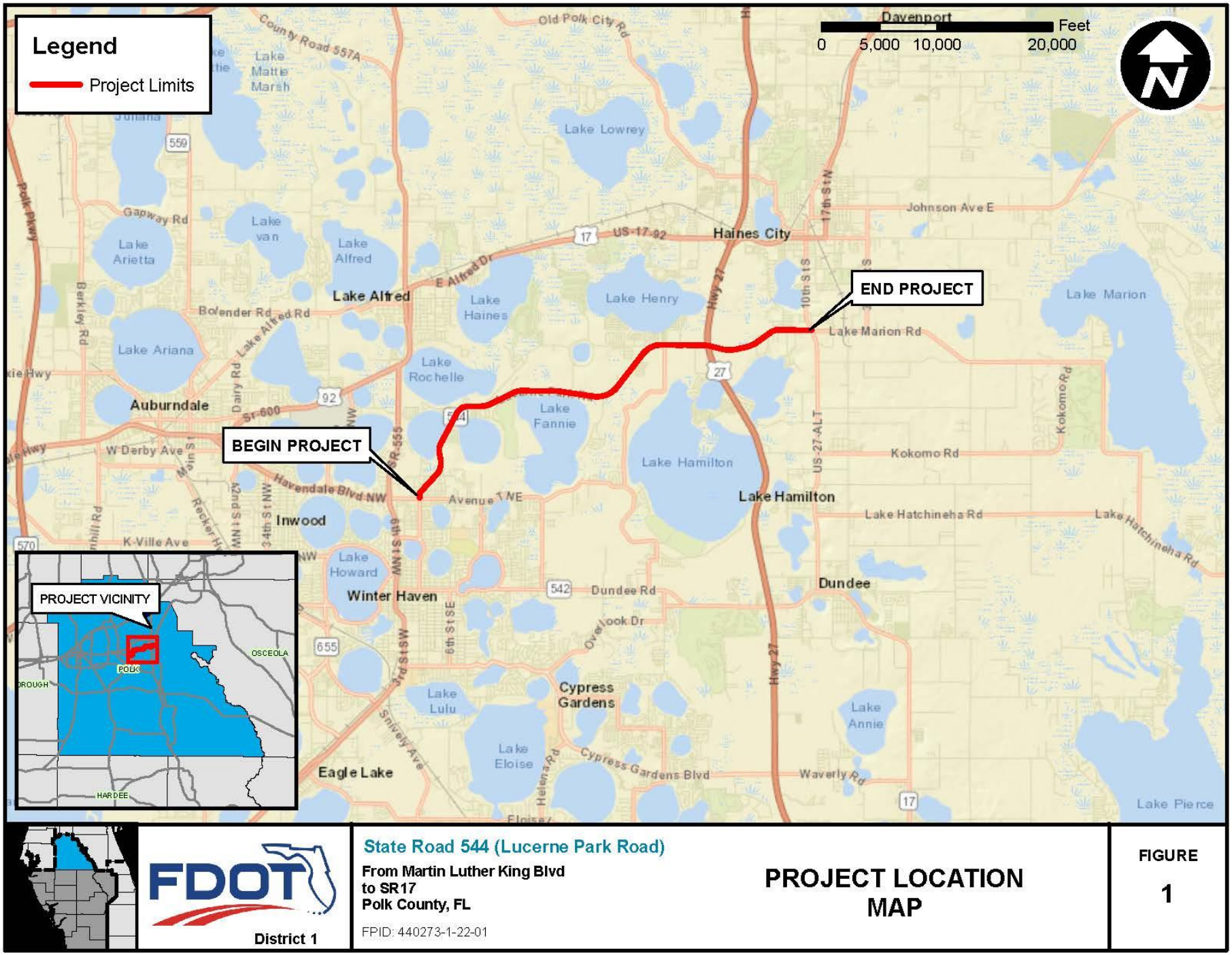
SonoBat software will be utilized to analyze the recordings. Additionally, the results will be reviewed and all calls at and below 20kHz will be manually vetted by experienced personnel. All data will be provided to USFWS upon completion of the study.

Please review the proposed FBB acoustic survey, above, and the attached figures, and provide concurrence that these are acceptable to USFWS. We appreciate your cooperation and look forward to working with you on this project.

Sincerely,

Jason Houck, GISP, PWS
Associate Principal – Ecological Services Manager

cc: Jonathon Bennett, David Turley, David Dangel, and Jada Barhorst
Enclosures: Figures and 2020 Survey Methodology Memorandum

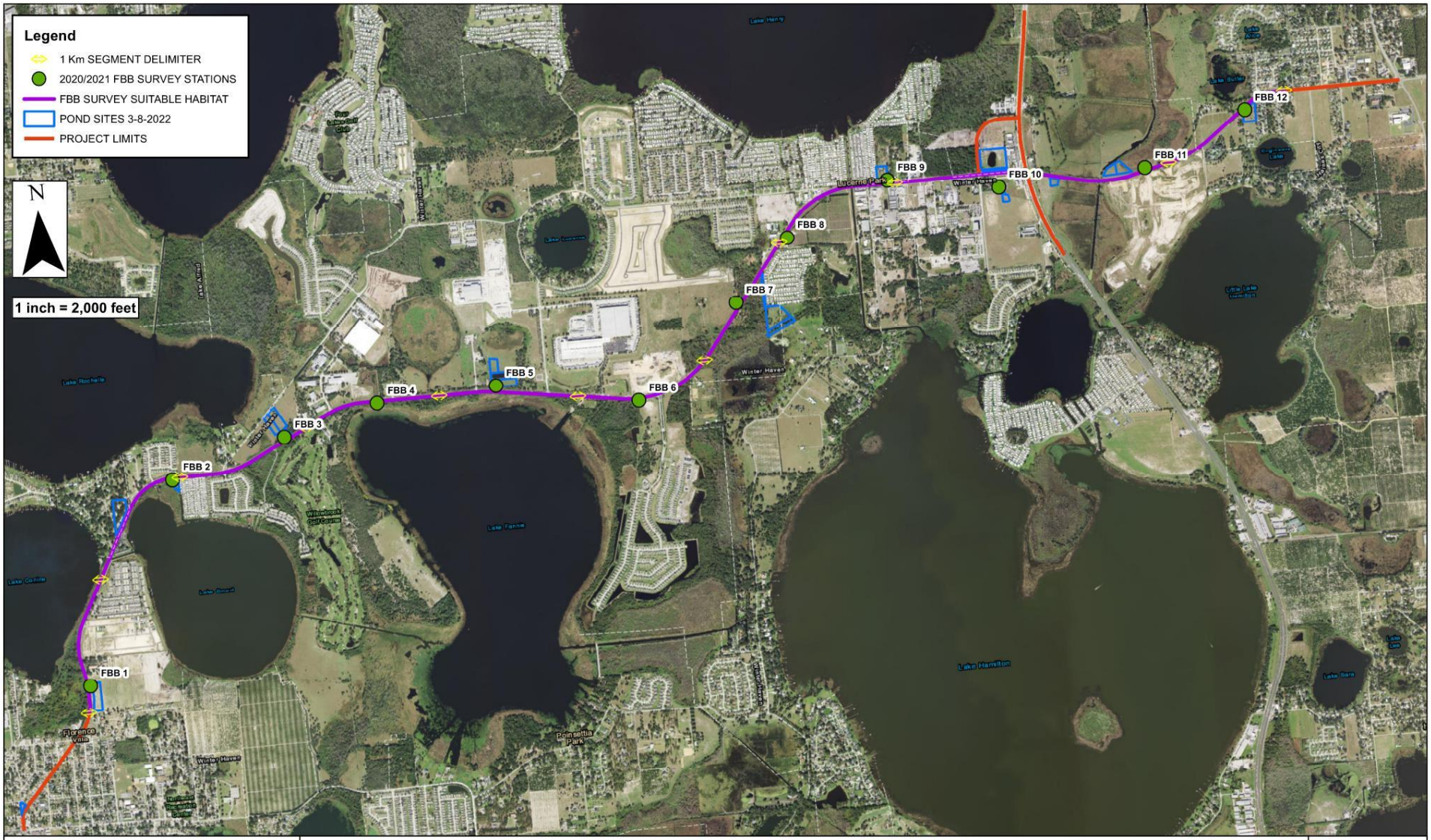


FDOT
District 1

State Road 544 (Lucerne Park Road)
From Martin Luther King Blvd
to SR17
Polk County, FL
FPID: 440273-1-22-01

PROJECT LOCATION MAP

FIGURE
1



Florida Department of Transportation

DISTRICT 1

SR 544 (LUCERNE PARK RD)

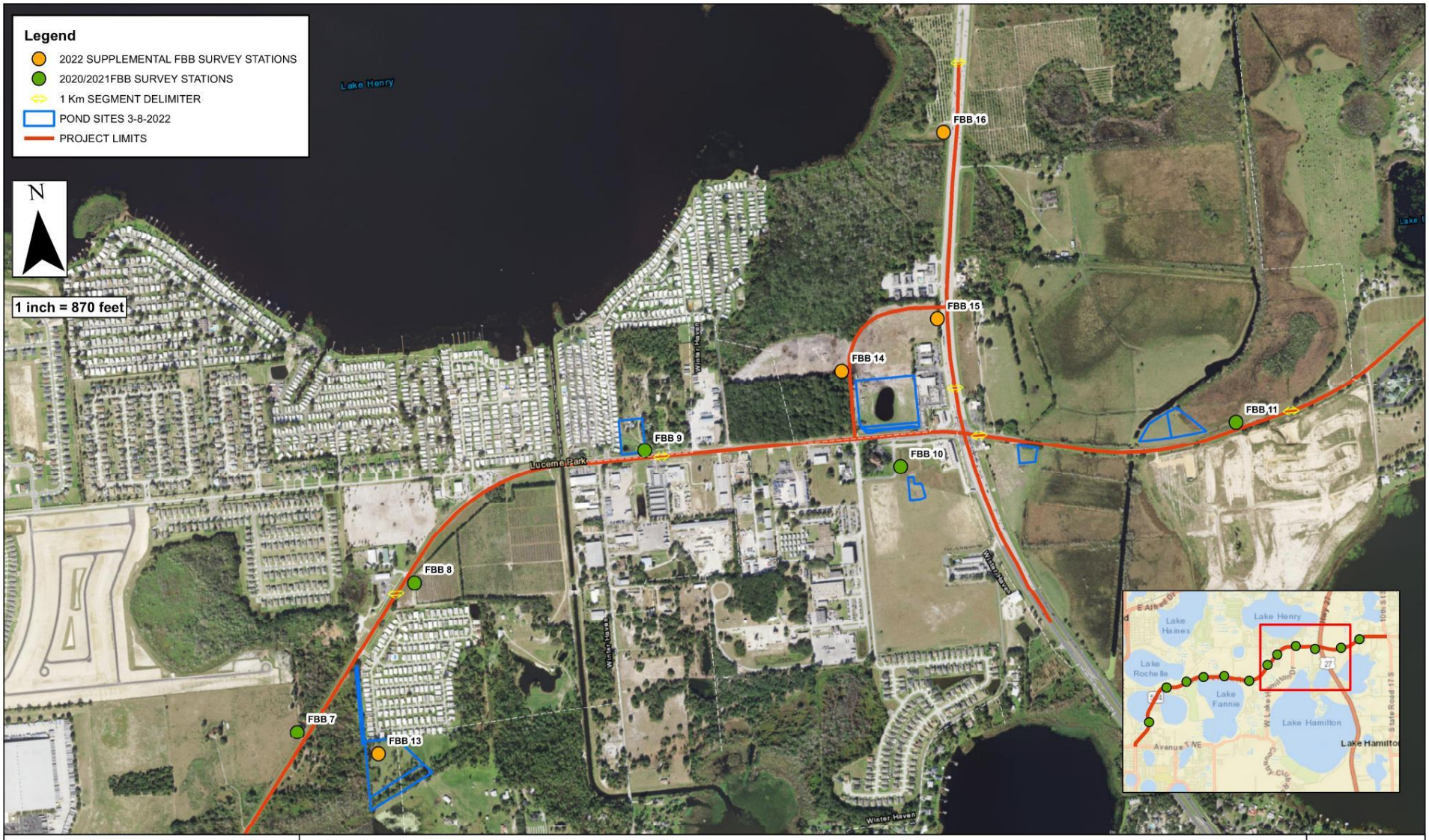
from Martin Luther King Boulevard to SR 17
Polk County, FL

Financial Project ID: 440273-1-22-01

FLORIDA BONNETED BAT
2020/2021 ACOUSTIC SURVEY
STATION LOCATION MAP

FIGURE

2



FDOT

Florida Department of Transportation

DISTRICT 1

SR 544 (LUCERNE PARK RD)

from Martin Luther King Boulevard to SR 17
Polk County, FL

Financial Project ID: 440273-1-22-01

FLORIDA BONNETED BAT
2022 SUPPLEMENTAL ACOUSTIC
SURVEY STATION LOCATION MAP

FIGURE

3

TRANSPORTATION
WATER RESOURCES
PLANNING / PD&E
ECOLOGY
STRUCTURES
UTILITIES

November 11, 2020

Mr. John Wrublik
Planning and Resource Conservation
U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
john_wrublik@fws.gov

Subject: SR 544 Project Development and Environment (PD&E) Study
from MLK Boulevard to SR 17
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The project area is located within the U.S. Fish and Wildlife Service's (USFWS) Consultation Area (CA) for the Florida bonneted bat (FBB) (*Eumops floridanus*). Inwood Consulting Engineers, Inc. (Inwood) is preparing to conduct a full acoustic and roost survey to determine the presence/absence of the FBB in the project area. The current survey protocol for linear projects requires 5 detector nights per 0.6 mile (1 Km). Based on a preliminary field review of the project area, Inwood is proposing 12 survey sites to accommodate the linear survey requirement, including pond sites, for a total of 60 survey nights. The survey sites are shown on **Figure 2.** These sites have been selected and ground-truthed based on existing habitats within the project area that provide suitable roosting and/or foraging habitat for the FBB, with the primary focus given to roosting habitat that may be lost or modified as a result of the proposed project. Potential roosting habitat for the FBB includes forests or other areas with tall or mature trees or other areas with potential roost structures including utility poles and artificial roosts. Potential foraging habitat consists of relatively open areas that provide sources of prey and drinking water including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland

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and upland shrub, and agricultural areas. Photographs of survey site locations are provided with this correspondence.

Inwood will conduct the survey in accordance with current USFWS Florida Bonneted Bat Consultation Guidelines (October 2019) during November and December 2020. A pedestrian roost survey will be conducted to identify and inspect potential roosts for evidence of bats, including natural and artificial structures, within the project footprint. The acoustic survey will be conducted by a qualified biologist who has acoustic survey experience and taken the required acoustic survey course. A full spectrum detector (Pettersson DX500) with an omnidirectional microphone mounted a minimum of 10 feet above the ground will be deployed at each survey site. The detectors will be preset to automatically record at least ½ hour before sunset and ½ hour after sunrise. Each detector will be deployed for five consecutive nights. Inwood will monitor the weather utilizing the nearest NOAA National Weather Service Station to ensure the weather conditions meet the USFWS criteria. Additional survey nights may be necessary if any of the following weather conditions occur within the first five hours of the survey:

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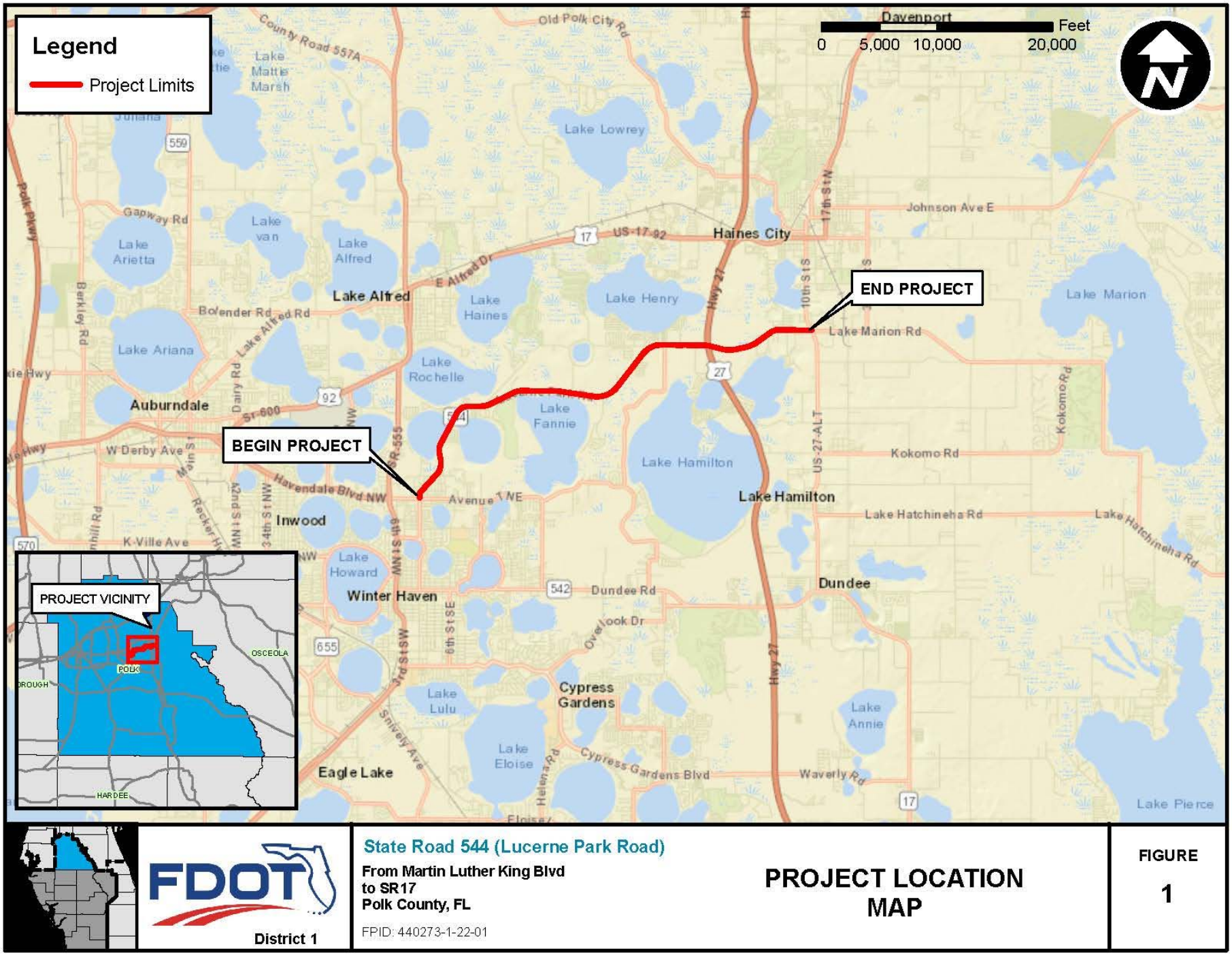
Sincerely,

Jason Houck, GISP, PWS
Associate Principal – Ecological Services Manager

cc: Jonathon Bennett, David Turley, David Dangel, and Jada Barhorst
Enclosures: Figures and Photo Document

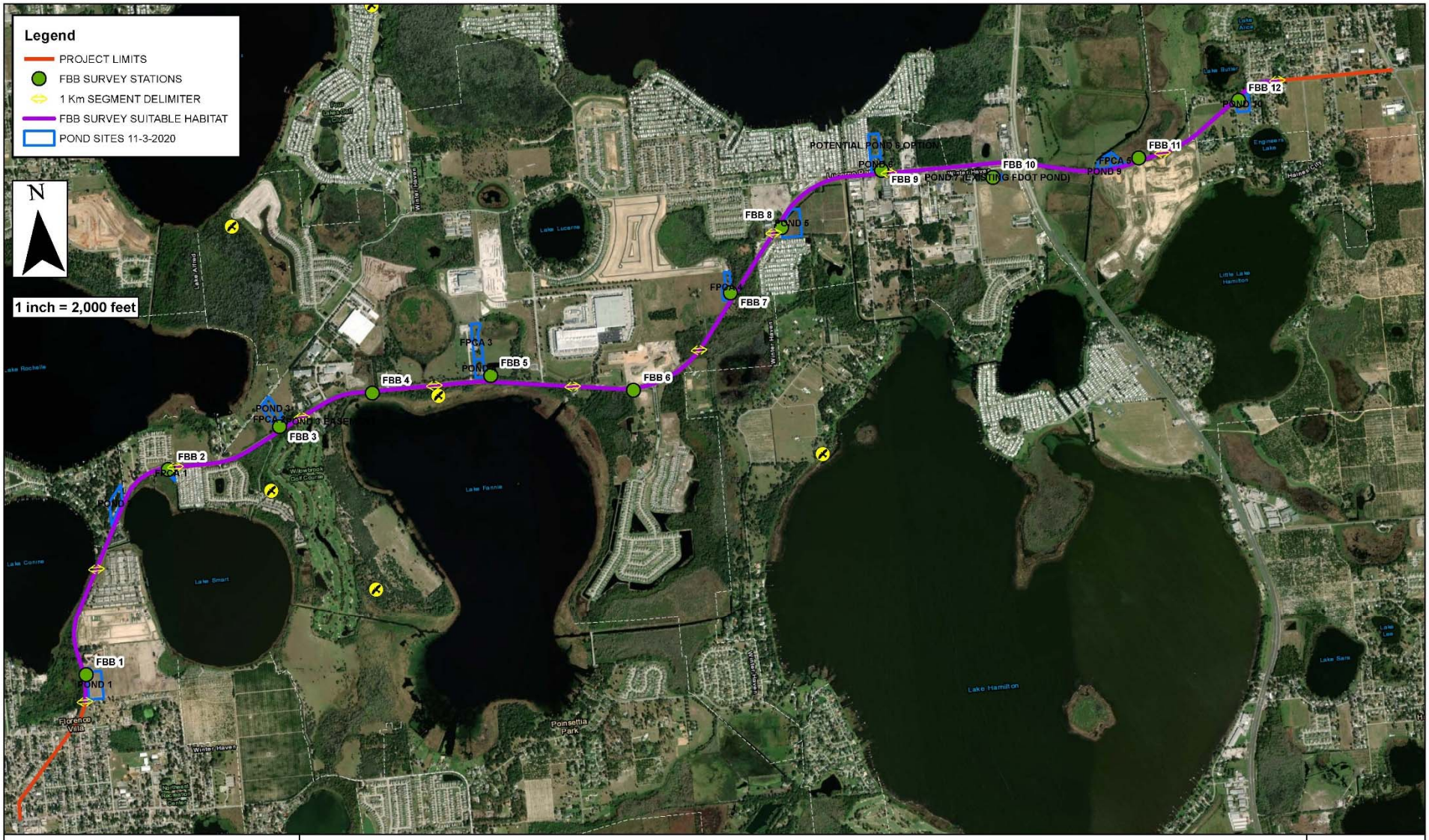


FDOT
District 1

State Road 544 (Lucerne Park Road)
From Martin Luther King Blvd
to SR17
Polk County, FL
FPID: 440273-1-22-01

PROJECT LOCATION MAP

FIGURE
1



Florida Department of Transportation DISTRICT 1	**SR 544 (LUCERNE PARK RD)** from Martin Luther King Boulevard to SR 17 Polk County, FL Financial Project ID: 440273-1-22-01	**FLORIDA BONNETED BAT ACOUSTIC SURVEY STATION LOCATION MAP**

FIGURE
2

Station FBB 1

Station FBB2

Station FBB 3

Station FBB 4

Station FBB 5

Station FBB 6

Station FBB 7

Station FBB 8

Station FBB9

Station FBB 10

Station FBB 11

Station FBB 12

Appendix B

Photographs

Photo 1: FBB 13 Deployment area facing east

Photo 2: FBB 14 Deployment area facing east

Photo 3: FBB 15 Deployment area facing west

Photo 4: FBB 16 Deployment area facing SSE

Photo 5: Cavity 1

Photo 6: Cavity 2

Photo 7: Cavity 3

Photo 8: Cavity 4

Photo 9: Cavity 5 group of three pine snags

Photo 10: Cavity 5

Photo 11: Cavity 6

Photo 12: Cavity 7

Photo 13: Cavity 8

Photo 14: Cavity 9

Photo 15: Cavity 10

Photo 16: Cavity 11 group of 2 pine snags

Photo 17: Cavity 11

Photo 18: Cavity 12

Photo 19: Cavity 13

Photo 20: Cavity 14

Appendix C

Detector Deployment Data Forms

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB13	Date: 10/10/2022
Biologist: R. Scherer, J. Barhorst		GPS ID: Inwood GPS Phone	Camera ID: Inwood GPS Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11536	Pettersson	D500X	Pettersson	omnidirectional	25 ft	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 22" N	81° 40' 09" W	yes	minimal edge	45	low (to very low)	No	18:33	07:55

DETECTOR CHECKLIST: Time 3:10 pm Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB 13 Waypoint #/ID: FBB 13

Detector Placement/Site Description:

W in pond site, S of SR 544

&

adjacent to active cattle pasture containing scattered pines & shags

Remarks: 10.11.22 - changed TS to very low due to #flies and battery life

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB 14	Date: 10/10/2022
Biologist: R. Scherer, J. Earhorst		GPS ID: Inwood GPS Phone	Camera ID: Inwood GPS Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11534	Pettersson	D500X	Pettersson	omnidirectional	20 ft	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 04' 54" N	81° 39' 11" W	yes	Edge	45	Low (to Very low)	NO	18:33	07:55

DETECTOR CHECKLIST: Time 12:53 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB 14 Waypoint #/ID: ~~FBB~~ FBB 14

Detector Placement/Site Description:

in NW quadrant of intersection between US 27 & SR 544 adjacent to active livestock pasture ~~of~~ containing a pond to the E; forested area to the W

Remarks: 10.11.22 - changed TS to Very low due to # files + battery life

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB15	Date: 10/10/2022
Biologist: R. Scherer, J. Barhorst		GPS ID: Inwood GPS Phone	Camera ID: Inwood GPS Phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11535	Pettersson	D500X	Pettersson	omnidirectional	15 ft	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 05' 03" N	81° 39' 00" W	yes	minimal edge	45	Low (to ~1/sec)	NO	18:32	07:54

DETECTOR CHECKLIST: Time 11:46 am Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB15 Waypoint #/ID: FBB15

Detector Placement/Site Description:

W side of US 27, N of intersection w/ SR 544 & S of FBB16 facing into openfield that lacks vegetation, treeline around edge of open area

Remarks: 10.11.22 - changed TS to VCM low due to H files collected + battery life

10.14.22 - TS changed to Low

Site sketch/photo (label to match BD# above)

Detector Deployment Data Form

Project: SR 544 PD&E	State: FL	County: Polk	Site: FBB 16	Date: 10/10/2022
Biologist: R. Scherer, J. Barhorst		GPS ID: Inwood GPS Phone	Camera ID: Inwood GPS phone	

DETECTOR DATA

Detector ID	Detector Make	Detector Model	Microphone Make	Microphone Type	Microphone Height	Microphone Orientation
11537	Pettersson	D500X	Pettersson	omnidirectional	15-20 ft	horizontal

Latitude	Longitude	Horn	Clutter	Gain	Trigger Sensitivity	HP filter	Start Time	Stop Time
28° 05' 22"N	81° 38' 59"W	yes	none	45	Low (to lengthen)	NO	18:36	07:58

DETECTOR CHECKLIST: Time 11:02 Mic Test ✓ Mic Placement ✓ Battery Check ✓ CF Card ✓ Weatherproof ✓

Detector/Gear Working and Armed ✓ Photo #/ID: FBB 16 Waypoint #/ID: FBB 16

Detector Placement/Site Description:

Placed on W side of US 27, N of intersection w/ SR 544

Citrus grove N of detector, bee boxes nearby (to the SW), facing into open field w/ some shrubs

Remarks: 10.11.22 changed TS to very low due to battery life and files collected

10.12. Installed 2:43 Simcard

10.13. TS to low

Site sketch/photo (label to match BD# above)

Appendix D

Survey Data Forms

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
10/10/22	11:02am	FBB16	11537	18:36	07:58	✓	✓	✓	✓H	✓	✓	R. Scherer J. Barhorst
10/10/22	11:46am	FBB15	11535	18:32	07:54	✓	✓	✓	✓G	✓	✓	R. Scherer J. Barhorst
10/10/22	12:53pm	FBB14	11534	18:33	07:55	✓	✓	✓	✓F	✓	✓	R. Scherer J. Barhorst
10/10/22	3:10 pm	FBB13	11536	18:33	07:55	✓	✓	✓	✓E	✓	✓	R. Scherer J. Barhorst
10/11/22	9:17am	FBB16	11537	18:35	07:58	✓	✓	✓	✓A	✓ very low TS	✓	J. Barhorst R. Scherer
10/11/22	9:30Am	FBB15	11535	18:31	07:54	✓	✓	✓	✓B	✓ very low TS	✓	J. Barhorst R. Scherer
10/11/22	9:45Am	FBB14	11534	18:32	07:55	✓	✓	✓	✓C	✓ very low TS	✓	J. Barhorst R. Scherer
10.11.22	10:04Am	FBB13	11536	18:32	07:55	✓	✓	✓	✓D	✓ very low TS	✓	J. Barhorst R. Scherer
10.12.22	9:05AM	FBB16	11537	18:34	07:59	✓	✓	✓	✓E	✓	✓	J. Barhorst R. Scherer
10.12.22	9:27AM	FBB15	11535	18:30	07:55	✓	✓	✓	✓F	✓	✓	J. Barhorst R. Scherer
10.12.22	9:43AM	FBB14	11534	18:31	07:56	✓	✓	✓	✓G	✓	✓	J. Barhorst R. Scherer
10.12.22	10:08AM	FBB13	11536	18:31	07:56	✓	✓	✓	✓H	✓	✓	J. Barhorst R. Scherer
10.13.22	10:13AM	FBB16	11537	18:33	07:59	✓	✓	✓	✓A	✓ TS low	✓	J. Barhorst R. Scherer
10.13.22	10:30AM	FBB15	11535	18:29	07:56	✓	✓	✓	✓B	✓	✓	J. Barhorst R. Scherer
10.13.22	10:51AM	FBB14	11534	18:30	07:56	✓	✓	✓	✓C	✓	✓	J. Barhorst R. Scherer
10.13.22	11:13am	FBB13	11536	18:30	07:56	✓	✓	✓	✓D	✓	✓	J. Barhorst R. Scherer
10.14.22	8:54AM	FBB16	11537	18:32	08:00	✓	✓	✓	✓E	✓	✓	J. Barhorst R. Scherer
10.14.22	9:04AM	FBB15	11535	18:28	07:56	✓	✓	✓	✓F	✓ TS low	✓	J. Barhorst R. Scherer
10.14.22	9:16AM	FBB14	11534	18:29	07:57	✓	✓	✓	✓G	✓	✓	J. Barhorst R. Scherer

Bat Survey Data

Project: SR 544 PD&E						State: FL			County: POLK			
Date	Time	Site #	Detector #	Start Time	End Time	Mic Test	Mic Placement	CF Card	Battery	Detector/Gear working/armed	Weather	Biologist
10.14.22	9:34AM	FBB13	11536	18:29	07:57	✓	✓	✓	✓H	✓	✓	J. Barhorst R. Scherer
10.15.22	8:49AM	FBB16	11537	18:31	08:01	✓	✓	✓	✓A	✓	✓	J. Barhorst R. Scherer
10.15.22	9:10AM	FBB15	11535	18:27	07:57	✓	✓	✓	✓B	✓	✓	J. Barhorst R. Scherer
10.15.22	9:27AM	FBB14	11534	18:28	07:57	✓	✓	✓	✓C	✓	✓	J. Barhorst R. Scherer
10.15.22	9:45AM	FBB13	11536	18:28	07:57	✓	✓	✓	✓D	✓	✓	J. Barhorst R. Scherer
10.16.22	8:44am	FBB16	11537	18:30	08:01	✓	✓	✓	✓E	✓	✓	J. Barhorst R. Scherer
10.16.22	8:52AM	FBB15	11535	18:26	07:57	✓	✓	✓	✓F	✓	✓	J. Barhorst R. Scherer
10.16.22	9:04AM	FBB14	11534	18:27	07:58	✓	✓	✓	✓G	✓	✓	J. Barhorst R. Scherer
10.16.22	9:24AM	FBB13	11536	18:27	07:58	✓	✓	✓	✓H	✓	✓	J. Barhorst R. Scherer

Appendix E

Weather Documentation

Weather observations for the past three days

Winter Havens Gilbert Airport

Enter Your "City, ST" or zip code Go

metric

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour Max.	6 hour Min.				altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
12	10:53	E 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.12	NA			
12	09:53	E 5	10.00	Fair	CLR	91	74			57%	NA	100	30.12	1019.7			
12	08:53	E 5	10.00	Fair	CLR	86	73			65%	NA	93	30.10	1018.9			
12	07:53	Calm	10.00	Fair	CLR	78	72	82	76	82%	NA	80	30.09	1018.6			
12	06:53	N 5	10.00	Fair	CLR	77	72			85%	NA	78	30.10	1019.0			
12	05:53	NE 3	10.00	Fair	CLR	76	72			88%	NA	76	30.09	1018.8			
12	04:53	NE 3	10.00	Fair	CLR	76	72			88%	NA	76	30.09	1018.5			
12	03:53	N 3	10.00	Fair	CLR	76	72			88%	NA	76	30.09	1018.7			
12	02:53	E 5	10.00	Fair	CLR	79	72			79%	NA	82	30.10	1018.9			
12	01:53	E 6	10.00	Fair	CLR	81	72	91	79	74%	NA	85	30.11	1019.4			
12	00:53	E 3	10.00	Fair	CLR	80	72			76%	NA	84	30.13	1020.0			
11	23:53	E 6	10.00	Fair	CLR	85	72			65%	NA	91	30.14	1020.4			
11	22:53	E 8	10.00	Fair	CLR	83	71			67%	NA	88	30.14	1020.3			
11	21:53	E 9	10.00	Fair	CLR	85	71			63%	NA	90	30.13	1019.8			
11	20:53	E 8	10.00	Fair	CLR	86	72			63%	NA	92	30.11	1019.4			
11	19:53	E 8	10.00	Overcast	OVC044	91	72	105	88	54%	NA	99	30.11	1019.2			
11	18:53	E 10	10.00	Mostly Cloudy	BKN047	91	71			52%	NA	98	30.09	1018.6			
11	17:53	NE 9	10.00	Mostly Cloudy	BKN045 BKN090	91	70			50%	NA	97	30.09	1018.6			
11	16:53	E 6	10.00	Partly Cloudy	SCT080	99	69			38%	NA	106	30.09	1018.4			
11	15:53	Vrbl 3	10.00	Partly Cloudy	SCT090	99	70			39%	NA	106	30.09	1018.6			
11	14:53	NA	10.00	A Few Clouds	FEW034	101	71			38%	NA	110	30.11	1019.4			
11	13:53	E 6	10.00	Fair	CLR	101	71	101	74	38%	NA	110	30.14	1020.4			
11	12:53	E 6	10.00	Fair	CLR	99	71			41%	NA	108	30.17	1021.2			
11	11:53	E 8	10.00	Fair	CLR	94	71			48%	NA	102	30.18	1021.5			
11	10:53	E 9	10.00	Fair	CLR	93	70			47%	NA	99	30.18	1021.7			
11	09:53	NE 8	10.00	Fair	CLR	89	70			53%	NA	94	30.17	1021.4			
11	08:53	NE 8	10.00	Mostly Cloudy	BKN080	83	70			65%	NA	87	30.15	1020.7			
11	07:53	NE 6	10.00	Fair	CLR	74	70	78	74	88%	NA	NA	30.14	1020.2			
11	06:53	NE 5	10.00	Fair	CLR	74	69			85%	NA	NA	30.12	1019.9			
11	05:53	NE 5	10.00	Fair	CLR	74	69			85%	NA	NA	30.11	1019.3			
11	04:53	N 5	10.00	Fair	CLR	74	69			85%	NA	NA	30.10	1019.1			
11	03:53	NE 5	10.00	Fair	CLR	75	69			82%	NA	NA	30.10	1019.0			
11	02:53	NE 6	10.00	Overcast	OVC085	78	70			76%	NA	80	30.11	1019.2			

11	01:53	NE 6	10.00	Overcast	OVC085	77	70	88	76	79%	NA	79	30.13	1019.8
11	00:53	NE 6	10.00	Fair	CLR	78	70			76%	NA	80	30.13	1019.9
10	23:53	NE 7	10.00	Fair	CLR	81	71			72%	NA	85	30.14	1020.4
10	22:53	NE 8	10.00	Fair	CLR	82	71			69%	NA	86	30.14	1020.2
10	21:53	NE 8	10.00	A Few Clouds	FEW080	83	71			67%	NA	88	30.12	1019.8
10	20:53	E 12	10.00	Overcast	BKN039 OVC047	85	71			63%	NA	90	30.12	1019.5
10	19:53	E 14	10.00	Overcast	BKN023 BKN030 OVC039	88	72	98	88	59%	NA	95	30.09	NA
10	18:53	E 10	10.00	Mostly Cloudy	FEW039 SCT047 BKN060	90	71			54%	NA	96	30.06	NA
10	17:53	NE 8	10.00	Partly Cloudy	SCT041 SCT070	91	70			50%	NA	97	30.06	NA
10	16:53	N 7	10.00	Mostly Cloudy	FEW039 BKN070	91	70			50%	NA	97	30.06	NA
10	15:53	N 8	10.00	Mostly Cloudy	FEW036 BKN070	90	70			52%	NA	96	30.06	1017.7
10	14:53	Vrbl 7	10.00	Mostly Cloudy	FEW035 BKN044 BKN080	92	71			51%	NA	99	30.07	1018.0
10	13:53	N 5	10.00	Overcast	BKN034 BKN041 OVC075	90	70			52%	NA	96	30.10	1019.0
10	12:53	N 7	10.00	Mostly Cloudy	BKN075	89	70			53%	NA	94	30.12	1019.6
10	11:53	N 10	10.00	A Few Clouds	FEW070	90	70			52%	NA	96	30.14	1020.2
10	10:53	N 7	10.00	Mostly Cloudy	BKN050	86	69			57%	NA	90	30.15	1020.5
10	09:53	N 9	10.00	A Few Clouds	FEW095	83	68			61%	NA	86	30.13	1020.0
10	08:53	N 8	10.00	NA	NA	76	68			77%	NA	77	30.12	1019.6
10	03:53	NA	NA	NA	NA	75	68			79%	NA	NA	30.06	1017.7
10	02:53	N 6	10.00	Mostly Cloudy	BKN090	75	68			79%	NA	NA	30.08	1018.2
10	01:53	N 7	10.00	Overcast	OVC080	76	68	87	76	77%	NA	77	30.09	1018.7
10	00:53	N 3	10.00	Mostly Cloudy	BKN075	76	68			77%	NA	77	30.11	1019.2
09	23:53	NE 6	10.00	Overcast	OVC070	77	68			74%	NA	79	30.12	1019.5
09	22:53	NE 7	10.00	Partly Cloudy	SCT065	82	68			63%	NA	85	30.11	1019.3
09	21:53	NE 8	10.00	Fair	CLR	82	69			65%	NA	85	30.11	1019.2
09	20:53	NE 8	10.00	Partly Cloudy	SCT070	84	69			61%	NA	88	30.09	1018.8
09	19:53	E 9	10.00	Partly Cloudy	SCT070	86	69	99	86	57%	NA	90	30.08	NA
09	18:53	E 10	10.00	Partly Cloudy	FEW043 SCT070 SCT080	88	69			54%	NA	93	30.07	NA
09	17:53	NE 13	10.00	Overcast	FEW049 BKN060 OVC075	88	69			54%	NA	93	30.06	NA

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max.	Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)		6 hour					Pressure		Precipitation (in.)		
09	16:53	E 9	10.00	Overcast	OVC040	94	70			46%	NA	100	30.06	1017.5			
09	15:53	NE 7	10.00	Overcast	BKN075 OVC090	95	69			43%	NA	101	30.06	1017.8			
09	14:53	NE 5	10.00	Mostly Cloudy	SCT085 BKN100	95	69			43%	NA	101	30.08	1018.5			
09	13:53	E 9	10.00	Mostly Cloudy	BKN037 BKN095	93	69	98	70	46%	NA	98	30.11	1019.4			
09	12:53	NE 12	10.00	Overcast	FEW048 OVC085	95	69			43%	NA	101	30.14	1020.2			
09	11:53	NA	10.00	NA	NA	92	68			46%	NA	96	30.14	1020.5			

Weather observations for the past three days

Winter Havens Gilbert Airport

Enter Your "City, ST" or zip code Go

metric

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
14	10:53	NE 9	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.98	NA			
14	09:53	NE 10	10.00	Mostly Cloudy	BKN048	NA	NA			NA	NA	NA	29.98	NA			
14	08:53	NE 6	10.00	A Few Clouds	FEW007	NA	NA			NA	NA	NA	29.96	NA			
14	07:53	N 5	10.00	NA	NA	NA	NA			NA	NA	NA	29.94	NA			
14	02:53	W 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.90	NA			
14	01:53	Calm	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.90	NA			
14	00:53	NW 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.91	NA			
13	23:53	W 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.91	NA			
13	22:53	W 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.91	NA			
13	21:53	SW 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.91	NA			
13	20:53	W 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.90	NA			
13	19:53	S 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.87	NA			
13	18:53	W 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.85	NA			
13	17:53	NW 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.84	NA			
13	16:53	W 7	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.84	NA			
13	15:53	SW 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.85	NA			
13	14:53	S 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.86	NA			
13	13:53	Calm	10.00	Mostly Cloudy	SCT024 BKN029	NA	NA			NA	NA	NA	29.88	NA			
13	12:53	Calm	10.00	Partly Cloudy	SCT023 SCT028	NA	NA			NA	NA	NA	29.90	NA			
13	11:53	NE 3	10.00	Partly Cloudy	SCT120	NA	NA			NA	NA	NA	29.92	NA			
13	10:53	Calm	10.00	Mostly Cloudy	BKN110	NA	NA			NA	NA	NA	29.95	NA			
13	09:53	N 6	10.00	A Few Clouds	FEW110	NA	NA			NA	NA	NA	29.93	NA			
13	08:53	Calm	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.92	NA			
13	07:53	Calm	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.92	NA			
13	06:53	Calm	10.00	Partly Cloudy	SCT100	NA	NA			NA	NA	NA	29.92	NA			
13	05:53	N 5	10.00	Overcast	OVC110	NA	NA			NA	NA	NA	29.93	NA			
13	04:53	Calm	10.00	A Few Clouds	FEW120	NA	NA			NA	NA	NA	29.92	NA			
13	03:53	SE 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.92	NA			
13	02:53	Calm	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.94	NA			
13	01:53	W 7	10.00	A Few Clouds	FEW110	NA	NA			NA	NA	NA	29.98	NA			0.06
13	00:53	NW 3	10.00	Light Rain	SCT110	NA	NA			NA	NA	NA	29.99	NA	0.01		

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max. 6 hour	Min. 6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)							Pressure		Precipitation (in.)		
12	23:53	SW 5	10.00	Mostly Cloudy	BKN100	NA	NA			NA	NA	NA	30.01	NA			
12	22:53	S 9	10.00	Mostly Cloudy	BKN037 BKN110	NA	NA			NA	NA	NA	30.02	NA			0.05
12	21:53	Calm	10.00	Overcast	OVC080	NA	NA			NA	NA	NA	30.04	NA			
12	20:53	S 8	9.00	Thunderstorm Light Rain	FEW020 BKN041 OVC090	NA	NA			NA	NA	NA	30.01	NA	0.05		
12	19:53	E 7	10.00	A Few Clouds	FEW041	NA	NA			NA	NA	NA	30.00	NA			
12	18:53	Calm	10.00	A Few Clouds	FEW100	NA	NA			NA	NA	NA	30.00	NA			
12	17:53	E 7	10.00	A Few Clouds	FEW042	NA	NA			NA	NA	NA	29.99	NA			
12	16:53	NE 5	10.00	A Few Clouds	FEW033	NA	NA			NA	NA	NA	29.99	NA			
12	15:53	S 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.00	NA			
12	14:53	SE 7	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.01	NA			
12	13:53	E 6	10.00	A Few Clouds	FEW034	NA	NA			NA	NA	NA	30.05	NA			
12	12:53	SE 7	10.00	Partly Cloudy	SCT032	NA	NA			NA	NA	NA	30.09	NA			
12	11:53	NE 3	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.10	NA			
12	10:53	E 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.12	NA			
12	09:53	E 5	10.00	Fair	CLR	91	74			57%	NA	100	30.12	1019.7			
12	08:53	E 5	10.00	Fair	CLR	86	73			65%	NA	93	30.10	1018.9			
12	07:53	Calm	10.00	Fair	CLR	78	72	82	76	82%	NA	80	30.09	1018.6			
12	06:53	N 5	10.00	Fair	CLR	77	72			85%	NA	78	30.10	1019.0			
12	05:53	NE 3	10.00	Fair	CLR	76	72			88%	NA	76	30.09	1018.8			
12	04:53	NE 3	10.00	Fair	CLR	76	72			88%	NA	76	30.09	1018.5			
12	03:53	N 3	10.00	Fair	CLR	76	72			88%	NA	76	30.09	1018.7			
12	02:53	E 5	10.00	Fair	CLR	79	72			79%	NA	82	30.10	1018.9			
12	01:53	E 6	10.00	Fair	CLR	81	72	91	79	74%	NA	85	30.11	1019.4			
12	00:53	E 3	10.00	Fair	CLR	80	72			76%	NA	84	30.13	1020.0			
11	23:53	E 6	10.00	Fair	CLR	85	72			65%	NA	91	30.14	1020.4			
11	22:53	E 8	10.00	Fair	CLR	83	71			67%	NA	88	30.14	1020.3			
11	21:53	E 9	10.00	Fair	CLR	85	71			63%	NA	90	30.13	1019.8			
11	20:53	E 8	10.00	Fair	CLR	86	72			63%	NA	92	30.11	1019.4			
11	19:53	E 8	10.00	Overcast	OVC044	91	72	105	88	54%	NA	99	30.11	1019.2			
11	18:53	E 10	10.00	Mostly Cloudy	BKN047	91	71			52%	NA	98	30.09	1018.6			
11	17:53	NE 9	10.00	Mostly Cloudy	BKN045 BKN090	91	70			50%	NA	97	30.09	1018.6			
11	16:53	E 6	10.00	Partly Cloudy	SCT080	99	69			38%	NA	106	30.09	1018.4			
11	15:53	Vrbl 3	10.00	Partly Cloudy	SCT090	99	70			39%	NA	106	30.09	1018.6			
11	14:53	NA	10.00	A Few Clouds	FEW034	101	71			38%	NA	110	30.11	1019.4			
11	13:53	E 6	10.00	Fair	CLR	101	71	101	74	38%	NA	110	30.14	1020.4			
11	12:53	E 6	10.00	Fair	CLR	99	71			41%	NA	108	30.17	1021.2			
11	11:53	E 8	10.00	Fair	CLR	94	71			48%	NA	102	30.18	1021.5			

Weather observations for the past three days

Winter Havens Gilbert Airport

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metric

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	6 hour Max.	6 hour Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	Pressure sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
16	03:53	NE 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.06	NA			
16	02:53	NE 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.07	NA			
16	01:53	NE 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.07	NA			
16	00:53	NE 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.09	NA			
15	23:53	NE 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.10	NA			
15	22:53	NE 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.10	NA			
15	21:53	NE 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.11	NA			
15	20:53	E 6	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.09	NA			
15	19:53	E 8	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.07	NA			
15	18:53	E 13	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.04	NA			
15	17:53	E 15 G 21	10.00	A Few Clouds	FEW060	NA	NA			NA	NA	NA	30.04	NA			
15	16:53	NE 16 G 24	10.00	Partly Cloudy	SCT048	NA	NA			NA	NA	NA	30.03	NA			
15	15:53	E 13	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.03	NA			
15	14:53	E 12	10.00	A Few Clouds	FEW070	NA	NA			NA	NA	NA	30.04	NA			
15	13:53	E 14	10.00	Light Rain	FEW035 BKN044 OVC070	NA	NA			NA	NA	NA	30.07	NA			
15	12:53	NE 13 G 23	10.00	Mostly Cloudy	FEW027 SCT045 BKN055	NA	NA			NA	NA	NA	30.08	NA			
15	11:53	E 8	10.00	Overcast	FEW024 FEW044 OVC080	NA	NA			NA	NA	NA	30.10	NA			
15	10:53	E 9	10.00	Overcast	SCT023 BKN030 OVC080	NA	NA			NA	NA	NA	30.10	NA			
15	09:53	E 12	10.00	Overcast	OVC080	NA	NA			NA	NA	NA	30.09	NA			
15	08:53	NE 6	10.00	Overcast	OVC080	NA	NA			NA	NA	NA	30.07	NA			
15	07:53	NE 7	10.00	Overcast	FEW028 OVC080	NA	NA			NA	NA	NA	30.05	NA			
15	06:53	NE 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.04	NA			
15	05:53	NE 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.02	NA			
15	04:53	NE 5	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.01	NA			
15	03:53	N 5	10.00	A Few Clouds	FEW120	NA	NA			NA	NA	NA	30.01	NA			
15	02:53	NE 3	10.00	Mostly Cloudy	BKN110	NA	NA			NA	NA	NA	30.01	NA			
15	01:53	NE 6	10.00	Partly Cloudy	SCT110	NA	NA			NA	NA	NA	30.01	NA			
15	00:53	NE 5	10.00	Partly Cloudy	SCT090	NA	NA			NA	NA	NA	30.02	NA			

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max.	Min.	6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (ºF)								Pressure		Precipitation (in.)		
14	23:53	Calm	10.00	Mostly Cloudy	BKN110	NA	NA				NA	NA	NA	30.02	NA			
14	22:53	E 9	10.00	Overcast	OVC110	NA	NA				NA	NA	NA	30.02	NA			
14	21:53	E 9	10.00	Overcast	OVC065	NA	NA				NA	NA	NA	30.01	NA			
14	20:53	E 8	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.98	NA			
14	19:53	E 7	10.00	A Few Clouds	FEW050 FEW075	NA	NA				NA	NA	NA	29.97	NA			
14	18:53	E 9	10.00	Unknown Precip	BKN050 BKN080 OVC110	NA	NA				NA	NA	NA	29.93	NA			
14	17:53	E 5	10.00	Thunderstorm	CLR	NA	NA				NA	NA	NA	29.92	NA			
14	16:53	SE 3	10.00	A Few Clouds	FEW080 FEW120	NA	NA				NA	NA	NA	29.92	NA			
14	15:53	NA	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.92	NA			
14	14:53	E 5	10.00	A Few Clouds	FEW120	NA	NA				NA	NA	NA	29.93	NA			
14	13:53	E 7	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.95	NA			
14	12:53	E 9	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.97	NA			
14	11:53	E 9	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.97	NA			
14	10:53	NE 9	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.98	NA			
14	09:53	NE 10	10.00	Mostly Cloudy	BKN048	NA	NA				NA	NA	NA	29.98	NA			
14	08:53	NE 6	10.00	A Few Clouds	FEW007	NA	NA				NA	NA	NA	29.96	NA			
14	07:53	N 5	10.00	NA	NA	NA	NA				NA	NA	NA	29.94	NA			
14	02:53	W 3	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.90	NA			
14	01:53	Calm	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.90	NA			
14	00:53	NW 3	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.91	NA			
13	23:53	W 3	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.91	NA			
13	22:53	W 3	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.91	NA			
13	21:53	SW 5	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.91	NA			
13	20:53	W 5	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.90	NA			
13	19:53	S 5	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.87	NA			
13	18:53	W 3	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.85	NA			
13	17:53	NW 5	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.84	NA			
13	16:53	W 7	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.84	NA			
13	15:53	SW 5	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.85	NA			
13	14:53	S 6	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.86	NA			
13	13:53	Calm	10.00	Mostly Cloudy	SCT024 BKN029	NA	NA				NA	NA	NA	29.88	NA			
13	12:53	Calm	10.00	Partly Cloudy	SCT023 SCT028	NA	NA				NA	NA	NA	29.90	NA			
13	11:53	NE 3	10.00	Partly Cloudy	SCT120	NA	NA				NA	NA	NA	29.92	NA			
13	10:53	Calm	10.00	Mostly Cloudy	BKN110	NA	NA				NA	NA	NA	29.95	NA			
13	09:53	N 6	10.00	A Few Clouds	FEW110	NA	NA				NA	NA	NA	29.93	NA			
13	08:53	Calm	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.92	NA			
13	07:53	Calm	10.00	Fair	CLR	NA	NA				NA	NA	NA	29.92	NA			

Weather observations for the past three days

Winter Havens Gilbert Airport

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metric

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour Max.	6 hour Min.				altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
19	12:53	N 10	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.07	NA			
19	11:53	N 14	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.09	NA			
19	10:53	NW 14	10.00	A Few Clouds	FEW110	NA	NA			NA	NA	NA	30.10	NA			
19	09:53	NW 13	10.00	A Few Clouds	FEW100	NA	NA			NA	NA	NA	30.08	NA			
19	08:53	N 12	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.05	NA			
19	07:53	NW 10	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.04	NA			
19	06:53	N 12	10.00	Fair	CLR	NA	NA			NA	NA	NA	30.01	NA			
19	05:53	NW 15	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.98	NA			
19	04:53	NW 12 G 24	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.96	NA			
19	03:53	N 17	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.96	NA			
19	02:53	N 15 G 23	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.95	NA			
19	01:53	N 16	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.95	NA			
19	00:53	NW 12	10.00	Fair	CLR	NA	NA			NA	NA	NA	29.95	NA			
18	23:53	NW 10	10.00	Partly Cloudy	SCT045	NA	NA			NA	NA	NA	29.94	NA			
18	22:53	NW 10	10.00	Partly Cloudy	SCT041	NA	NA			NA	NA	NA	29.92	NA			
18	21:53	NW 9	10.00	Mostly Cloudy	BKN100	NA	NA			NA	NA	NA	29.90	NA			
18	20:53	NW 14	10.00	Overcast	OVC100	NA	NA			NA	NA	NA	29.88	NA			

18	19:53	NW 8	10.00	Partly Cloudy	FEW040 SCT120	NA	NA	NA	NA	NA	NA	29.84	NA
18	18:53	NW 12	10.00	Overcast	OVC042	NA	NA	NA	NA	NA	NA	29.82	NA
18	17:53	NW 12	10.00	A Few Clouds	FEW043	NA	NA	NA	NA	NA	NA	29.81	NA
18	16:53	W 10	10.00	Mostly Cloudy	FEW042 SCT060 BKN080	NA	NA	NA	NA	NA	NA	29.81	NA
18	15:53	W 9 G 20	10.00	A Few Clouds	FEW037 FEW048	NA	NA	NA	NA	NA	NA	29.81	NA
18	14:53	NW 12	10.00	Partly Cloudy	SCT042	NA	NA	NA	NA	NA	NA	29.81	NA
18	13:53	NW 8 G 20	10.00	Mostly Cloudy	FEW030 SCT036 BKN045	NA	NA	NA	NA	NA	NA	29.83	NA
18	12:53	N 8	10.00	Overcast	OVC090	NA	NA	NA	NA	NA	NA	29.85	NA
18	11:53	NW 8	10.00	A Few Clouds	FEW031	NA	NA	NA	NA	NA	NA	29.86	NA
18	10:53	W 6	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.87	NA
18	09:53	NW 7	10.00	Overcast	SCT013 BKN020 OVC032	NA	NA	NA	NA	NA	NA	29.86	NA
18	08:53	W 6	9.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.84	NA
18	07:53	W 3	6.00	A Few Clouds with Haze	FEW015	NA	NA	NA	NA	NA	NA	29.83	NA
18	06:53	W 5	9.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.81	NA
18	05:53	SW 5	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.81	NA
18	04:53	SW 3	8.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.80	NA
18	03:53	SW 5	9.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.81	NA
18	02:53	SW 5	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.82	NA
18	00:53	SW 3	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.85	NA
17	23:53	SW 3	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.86	NA
17	22:53	W 3	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.87	NA
17	21:53	W 6	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.86	NA
17	20:53	W 3	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.86	NA
17	19:53	W 3	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.84	NA
17	18:53	NW 5	10.00	Fair	CLR	NA	NA	NA	NA	NA	NA	29.83	NA
17	17:53	NW 8	10.00	A Few Clouds	FEW040	NA	NA	NA	NA	NA	NA	29.83	NA
17	16:53	N 7	10.00	Mostly	FEW021	NA	NA	NA	NA	NA	NA	29.84	NA

				Cloudy	SCT038 BKN050										
17	15:53	SW 6	10.00	Thunderstorm in Vicinity	FEW044 SCT055	NA	NA		NA	NA	NA	29.83	NA		
17	14:53	S 7	10.00	Thunderstorm Light Rain	FEW042 SCT060 BKN100	NA	NA		NA	NA	NA	29.85	NA		
17	13:53	SW 3	10.00	Mostly Cloudy	FEW039 SCT070 BKN110	NA	NA		NA	NA	NA	29.89	NA		
17	12:53	S 3	10.00	Overcast	SCT029 OVC035	NA	NA		NA	NA	NA	29.92	NA		
17	11:53	S 6	10.00	Mostly Cloudy	BKN075	NA	NA		NA	NA	NA	29.94	NA		
17	10:53	SE 8	NA	NA	NA	NA	NA		NA	NA	NA	29.96	NA		
17	08:53	S 5	10.00	A Few Clouds	FEW120	NA	NA		NA	NA	NA	29.96	NA		
16	17:53	E 9	10.00	Partly Cloudy	SCT060	NA	NA		NA	NA	NA	29.98	NA		
16	16:53	E 9	10.00	Partly Cloudy	SCT055	NA	NA		NA	NA	NA	29.99	NA		
16	15:53	E 10	10.00	Fair	CLR	NA	NA		NA	NA	NA	30.00	NA		
16	14:53	E 9	10.00	Fair	CLR	NA	NA		NA	NA	NA	30.00	NA		
16	13:53	Vrbl 6	10.00	Fair	CLR	NA	NA		NA	NA	NA	30.03	NA		

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (ºF) Air	Dwpt	Max. / Min. 6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in.)	sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr

The National Weather Service site did not provide the recorded weather conditions. Based on site observations and the projected forecast, the weather conditions on 10/16/2022 were within the acceptable range of the survey criteria. The projected forecast is included below.

National Weather Service
Southern Region Headquarters
Fort Worth, Texas
Disclaimer

Back to previous page

Last Modified: Febuary, 7 2012

Point Forecast: 2 Miles SW Haines City FL
28.07N 81.64W (Elev. 118 ft)

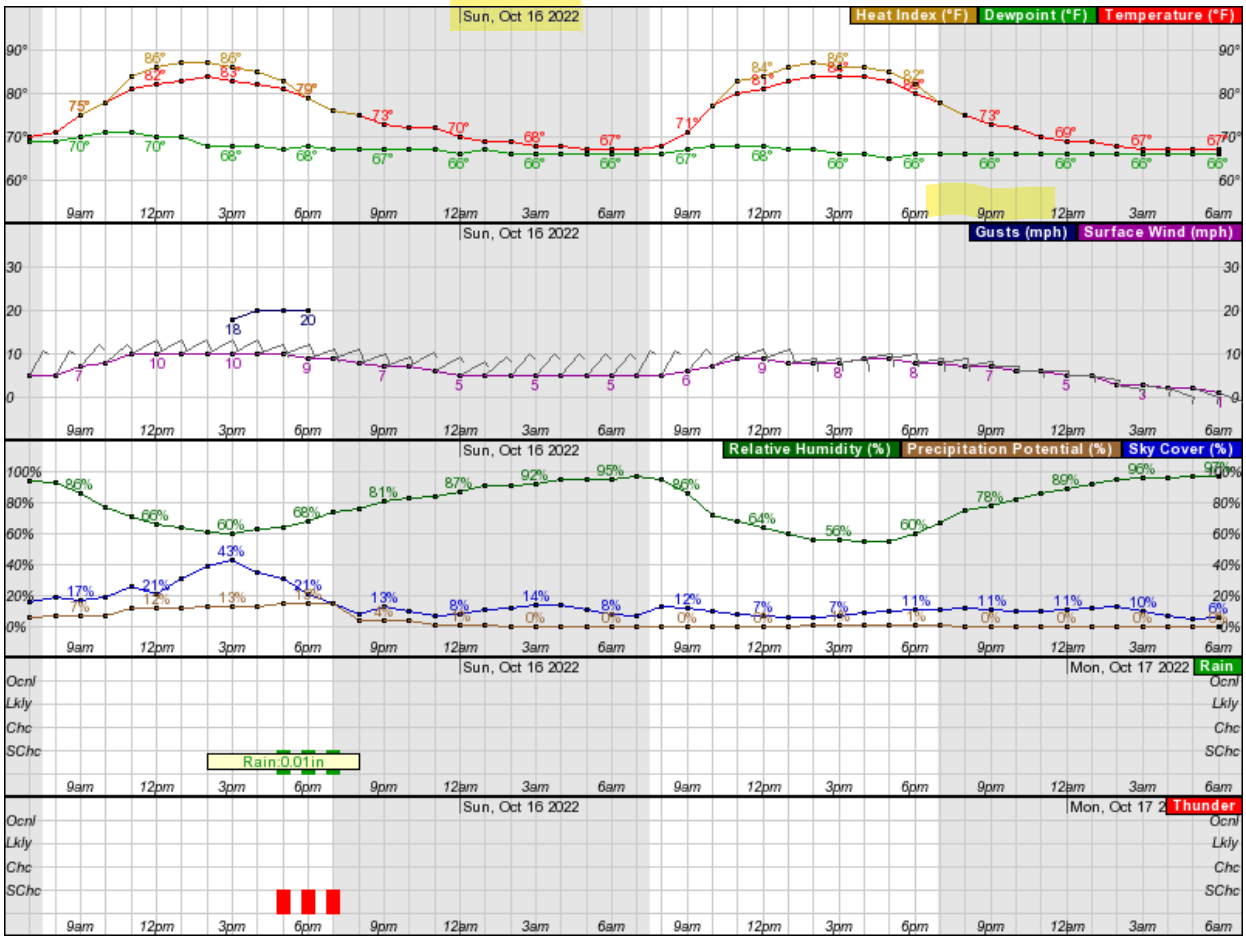
Last Update: 3:43 am EDT Oct 15, 2022

Hourly Weather Forecast Graph

[dashes/dots] | [b/w] | [hide menu] XML

Weather Elements	Weather/Precipitation	Fire Weather
☑ Temperature (°F) ☑ Dewpoint (°F) ☑ Heat Index (°F) ☑ Surface Wind mph ☑ Sky Cover (%) ☑ Precipitation Potential (%) ☑ Relative Humidity (%)	☑ Rain ☑ Thunder ☐ Fog	☐ Mixing Height x100ft ☐ Lightning Activity Level ☐ Trans. Wind mph ☐ 20ft Wind mph ☐ Dispersion Index ☐ Low Visibility Occurrence Risk Index

48-Hour Period Starting: 7am Sat, Oct 15 2022 Submit Back 2 Days Forward 2 Days



Sunday, October 16 at 7am
Temperature: 67 °F Dewpoint: 66 °F Heat Index: N/A Surface Wind: NNE 5mph
Sky Cover (%): 7% Precipitation Potential (%): 0% Relative Humidity (%): 97%
Rain: <10% Thunder: <10%

Additional Forecasts & Information

International System of Units
Forecast Discussion
7-Day Forecast
Tabular Forecast

Appendix F

Florida Bonneted Bat Programmatic Key 2019

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
October 22, 2019

Shawn Zinszer
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Florida bonneted bat; 04EF2000-2014-I-0320-R001

Dear Mr. Zinszer:

This letter replaces the December 2013, Florida bonneted bat guidelines provided to the U.S. Army Corps of Engineers (Corps) to assist your agency with effect determinations within the range of the Florida bonneted bat (*Eumops floridanus*). This October 2019 revision supersedes all prior versions. The enclosed *Florida Bonneted Bat Consultation Guidelines* and incorporated *Florida Bonneted Bat Consultation Key* (Key) are provided pursuant to the U.S. Fish and Wildlife Service's (Service) authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This letter, guidelines, and Key have been assigned Service Consultation Code: 41420- 04EF2000-2014-I-0320-R001.

The purpose of the guidelines and Key is to aid the Corps (or other Federal action agency) in making appropriate effect determinations for the Florida bonneted bat under section 7 of the Act, and streamline informal consultation with the Service for the Florida bonneted bat when the proposed action is consistent with the Key. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key, applicants do not wish to implement the identified survey or best management practices, or if there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiate traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses type of habitat (*i.e*, roosting or foraging), survey results, and project size as the basis for making determinations of "may affect, but is not likely to adversely affect" (MANLAA) and "may affect, and is likely to adversely affect" (LAA). The Key is structured to focus on the type(s) of habitat that will be affected by a project. When proposed project areas provide features that could support roosting of Florida bonneted bats, it is considered roosting habitat. If evaluation of roosting habitat determines that roosting is not likely, then the area is subsequently evaluated for its value to the species as foraging habitat.

Roosting habitat

The guidelines describe the features of roosting habitat. When a project is proposed in roosting habitat, the likelihood that roosting is occurring is evaluated through surveys (*i.e.*, full acoustic or limited roost). When a roost is expected and the proposed activity will affect that roost, formal consultation is required. This is because the proposed activity is expected to take individuals through the destruction of the roost and the appropriate determination is that the project may affect, and is likely to adversely affect (LAA) the species. When roosting is expected, but all impacts to the roost can be avoided, and only foraging habitat (without roost structure) will be affected, the Service finds that it is reasonable to conclude that the proposed action is not likely to impair feeding, breeding, or sheltering. Thus, the proposed project may affect, but is not likely to affect the Florida bonneted bat (MANLAA).

The exception to this logic path is if the proposed action will affect more than 50 acres of foraging habitat in proximity to the roost. Under this scenario, we anticipate that the loss of the larger amount of foraging habitat near the roost could significantly impair feeding of young and overall breeding (*i.e.*, LAA). Consequently, these projects would require formal consultation to analyze the effect of the incidental take.

If the roost surveys demonstrate that roosting is not likely, the project is then evaluated for its effects to foraging habitat. Our evaluation of these actions is described below. The exception is for projects less than or equal to 5 acres if a limited roost survey is conducted. Limited roost surveys rely on peeping and visual surveys to determine whether roosting is likely. On these small projects, this survey strategy is believed to be more economical and is considered a reasonable effort to evaluate the potential for roosting. The Service acknowledges that this approach is less reliable in evaluating the likelihood of roosting when it is not combined with acoustic surveys. Therefore, when limited roost surveys are conducted for projects that are less than or equal to 5 acres in size and the determination is that roosting is not likely, we conclude that the proposed project may affect, but is not likely to adversely affect the species (MANLAA).

Foraging habitat

The guidelines describe the features of foraging habitat. Data informing the home range size of the Florida bonneted bats is limited. Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (BWWMA) found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). At BWWMA, researchers found that most individual locations were within one mile of the roost (point of capture) (Ober 2015). Additional data collected during the month of December documented the mean maximum distance Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b).

The Service recognizes that the movement information comes from only one site (BWWMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in

habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Regardless, we use these studies as our best available information to evaluate when changes to foraging habitat may have an effect on the species ability to feed, breed, and shelter and subsequently result in incidental take. When considering where most of the nightly activity was observed, we calculate a foraging area centered on a roost with a 1 mile radius would include approximately 2,000 acres, and a foraging area centered on a 9.5 mile radius would encompass approximately 181,000 acres, on any given night.

Given the Service's limited understanding of how the Florida bonneted bat moves throughout its home range and selects foraging areas, we choose to use 50 acres of habitat as a conservative estimate to when loss of foraging habitat may affect the fitness of an individual to the extent that it would impair feeding and breeding. Projects that would remove, destroy or convert less than 50 acres of Florida bonneted bat foraging habitat are expected to result in a loss of foraging opportunities; however, this decrease is not expected to significantly impair the ability of the individual to feed and breed. Consequently, projects impacting less than 50 acres of foraging habitat that implement the identified best management practices in the Key would be expected to avoid take, and the appropriate determination is that the project may affect, but is not likely to adversely affect the species (MANLAA).

Next, the Service incorporated the level of bat activity into our Key to evaluate when a foraging area may have greater value to the species. When surveys document high bat activity, we deduce that this area has increased value and importance to the species. Thus, when high bat activity is detected in parcels with greater than 50 acres of foraging habitat, we anticipate that the loss, destruction, or conversion of this habitat could significantly impair the ability of an individual to feed and breed (*i.e.*, LAA); thus formal consultation is warranted.

If surveys do not indicate high bat activity, we anticipate that loss of this additional foraging habitat may affect, but is not likely to adversely affect the species (MANLAA). This is because although the acreage is large, the area does not appear to be important at the landscape scale of nightly foraging. Therefore, its loss is not anticipated to significantly impair the ability of an individual to feed or breed.

The exception to this approach is for projects greater than 50 acres when they occur in potential roosting habitat that is not found to support roosting or high bat activity. Under this scenario, the Service concludes that the loss of the large acreage of suitable roosting habitat has the potential to significantly impair the ability of an individual to breed or shelter (*i.e.*, LAA) because the species is cavities for roosting are expected to be limited range wide and the project will impair these limited opportunities for roosting.

Determinations

The Corps (or other Federal action agency) may reach one of several determinations when using this Key. Regardless of the determination, when acoustic bat surveys have been conducted, the Service requests that these survey results are provided to our office to increase our knowledge of

the species and improve our consultation process. Surveys results and reports should be transmitted to the Service at FBBsurveyreport@fws.gov or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. When formal consultation is requested, survey results and reports should be submitted with the consultation request to verobeach@fws.gov.

No effect: If the use of the Key results in a determination of "no effect," no further consultation is necessary with the Service. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.

May Affect, Not Likely to Adversely Affect (MANLAA): In this Key we have identified two ways that consultation can conclude informally, MANLAA-P and MANLAA-C.

> **MANLAA-P**: If the use of the Key results in a determination of "MANLAA- P," the Service concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the Florida bonneted bat. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.
>
> **MANLAA-C**: If the use of the Key results in a determination of MANLAA-C, further consultation with the Service is required to confirm that the Key has been used properly, and the Service concurs with the evaluation of the survey results. Survey results should be submitted with the consultation request.

May Affect, Likely to Adversely Affect (LAA) - When the determination in the Key is "LAA" technical assistance with the Service and modifications to the proposed action may enable the project to be reevaluated and conclude with a MANLAA-C determination. Under other circumstance, "LAA" determinations will require formal consultation.

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the Florida bonneted bat. Any project that has the potential to affect the Florida bonneted bat and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support Florida bonneted bat recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3909.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the Florida bonneted bat and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended. We have established an email address to collect comments on the Key and the survey protocols at: FBBguidelines@fws.gov.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions regarding this Key, please contact the South Florida Ecological Services Office at 772-562-3909.

Sincerely,

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Enclosure

Cc: electronic only
Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Alisa Zarbo, Melinda Charles-Hogan, Susan Kaynor, Krista Sabin, John Fellows)

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U.S. Fish and Wildlife Service
South Florida Ecological Services Office

FLORIDA BONNETED BAT CONSULTATION GUIDELINES

October - 2019

The U.S. Fish and Wildlife Service's South Florida Ecological Services Field Office (Service) developed the Florida Bonneted Bat Consultation Guidelines (Guidelines) to assist in avoiding and minimizing potential negative effects to roosting and foraging habitat, and assessing effects to the Florida bonneted bat (*Eumops floridanus*) from proposed projects. The Consultation Key within the Guidelines assists applicants in evaluating their proposed projects and identifying the appropriate consultation paths under sections 7 and 10 of the Endangered Species Act of 1973 (Act), as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). These Guidelines are primarily for use in evaluating regulatory projects where development and land conversions are anticipated. These Guidelines focus on conserving roosting structures in natural and semi-natural environments. The following Consultation Area map (Figure 1 and Figure 2, Appendix A), Consultation Flowchart (Figure 3), Consultation Key, Survey Framework (Appendices B-C), and **Best Management Practices (BMPs)** (Appendix D) are based upon the best available scientific information. As more information is obtained, these Guidelines will be revised as appropriate. If you have comments, or suggestions on these Guidelines or the Survey Protocols (Appendix B and C), please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Terms in **bold** are further defined in the Glossary.

Wherever possible, proposed development projects within the Consultation Area should be designed to avoid and minimize take of Florida bonneted bats and to retain their habitat. Applicants are encouraged to enter into early technical assistance/consultation with the Service so we may provide recommendations for avoiding and minimizing adverse effects. Although these Guidelines focus on the effects of a proposed action (*e.g.*, development) on natural habitat, (*i.e.*, non-urban), Appendix E also provides Best Management Practices for Land Management Projects.

If you are renovating an existing artificial structure (*e.g.*, building) within the urban environment with or without additional ground disturbing activities, these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance.

The final listing rule for the Florida bonneted bat (Service 2013) describes threats identified for the species. Habitat loss and degradation, as well as habitat modification, have historically affected the species. Florida bonneted bats are different from most other Florida bat species because they are reproductively active through most of the year, and their large size makes them capable of foraging long distances from their roost (Ober *et al.* 2016). Consequently, this species is vulnerable to disturbances around the roost during a greater portion of the year and considerations about foraging habitat extend further than the localized roost.

Use of Consultation Area, Flowchart, and Key

Figure 1 shows the Consultation Area for the Florida bonneted bat where this consultation guidance applies. For information on how the Consultation Area was delineated see Appendix A. The Consultation Flowchart (Figure 3) and Consultation Key direct project proponents through a series of couplets that will provide a conclusion or determination for potential effects to the Florida bonneted bat. *Please Note: If additional listed species, or candidate or proposed species, or designated or proposed critical habitat may be affected, a separate evaluation will be needed for these species/critical habitats.*

Currently, the Consultation Flowchart (Figure 3) and Consultation Key cannot be used for actions proposed within the urban development boundary in Miami-Dade and Broward County. The urban development boundary is part of the Consultation Area, but it is excluded from these Guidelines because Florida bonneted bats use this area differently (roosting largely in artificial structures), and small natural foraging areas are expected to be important. Applicants with projects in this area should contact the Service for further guidance and individual consultation.

Determinations may be either "no effect," "may affect, but is not likely to adversely affect" (**MANLAA**), or "may affect, and is likely to adversely affect" (**LAA**). An applicant's willingness and ability to alter project designs could sufficiently minimize effects to Florida bonneted bats and allow for a **MANLAA** determination for this species (informal consultation). The Service is available for early technical assistance/consultation to offer recommendations to assist in project design that will minimize effects. When take cannot be avoided, applicants and action agencies are encouraged to incorporate compensation to offset adverse effects. The Service can assist with identifying compensation options (*e.g.,* conservation on site, conservation off-site, contributions to the Service's Florida bonneted bat conservation fund, *etc*.).

Using the Key and Consultation Flowchart

- "No effect" determinations do not need Service concurrence.
- "May affect, but is not likely to adversely affect" **MANLAA**. Applicants will be expected to incorporate the appropriate BMPs to reach a **MANLAA** determination.
    - **MANLAA-P** (in blue in Consultation Flowchart) have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results.
    - **MANLAA-C** (in black in Consultation Flowchart) determinations require further consultation with the Service.
- "May affect, and is likely to adversely affect" (**LAA**) determinations require consultation with the Service. Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA**. When take cannot be avoided, **LAA** determinations will require a biological opinion.
- The Service requests copies of surveys used to support all determinations. If a survey is required by the Consultation Key and the final determination is "no effect" or "MANLAA-P", send the survey to FBBsurveyreport@fws.gov , or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. If a survey is required by the Consultation Key and the determination is "MANLAA-C" or "LAA", submit the survey in the consultation request.

For the purpose of making a decision at Couplet 2: If any potential roosting structure is present, then the habitat is classified as **potential roosting habitat**, and the left half of the flowchart should be followed (see Figure 3). We recognize that roosting habitat may also be used by Florida bonneted bats for foraging. If the project site only consists of **foraging habitat** (*i.e.*, no suitable roosting structures), then the right side of the flowchart should be followed beginning at step 13.

For couplets 11 and 12: **Potential roosting habitat** is considered **Florida bonneted bat foraging habitat** when a determination is made that roosting is not likely.

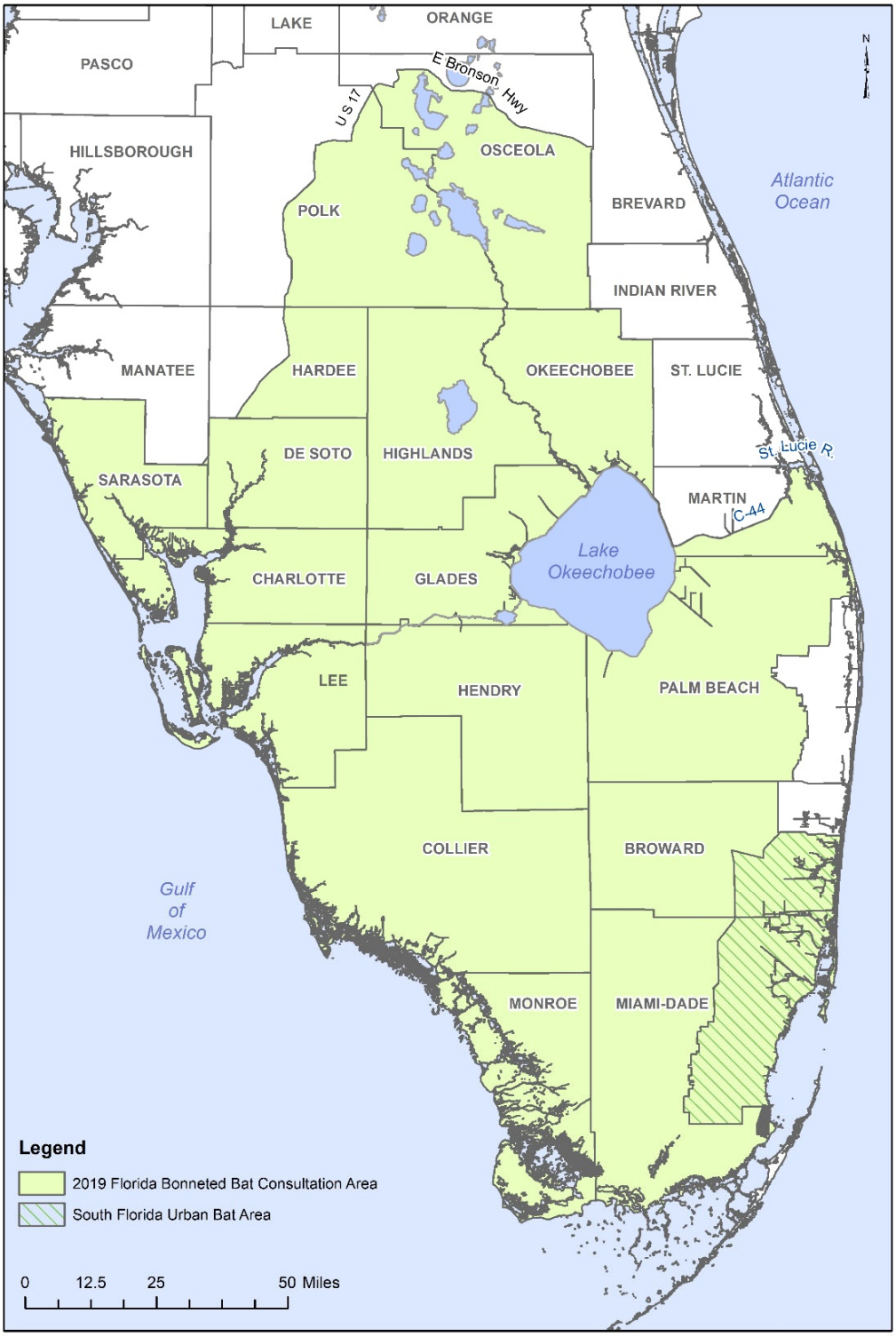

Figure 1. Florida Bonneted Bat Consultation Area. Hatched area (Figure 2) identifies the urban development boundary in Miami-Dade and Broward County. Applicants with projects in this area should contact the Service for specific guidance addressing this area and individual consultation. The Consultation Key should not be used for projects in this area.

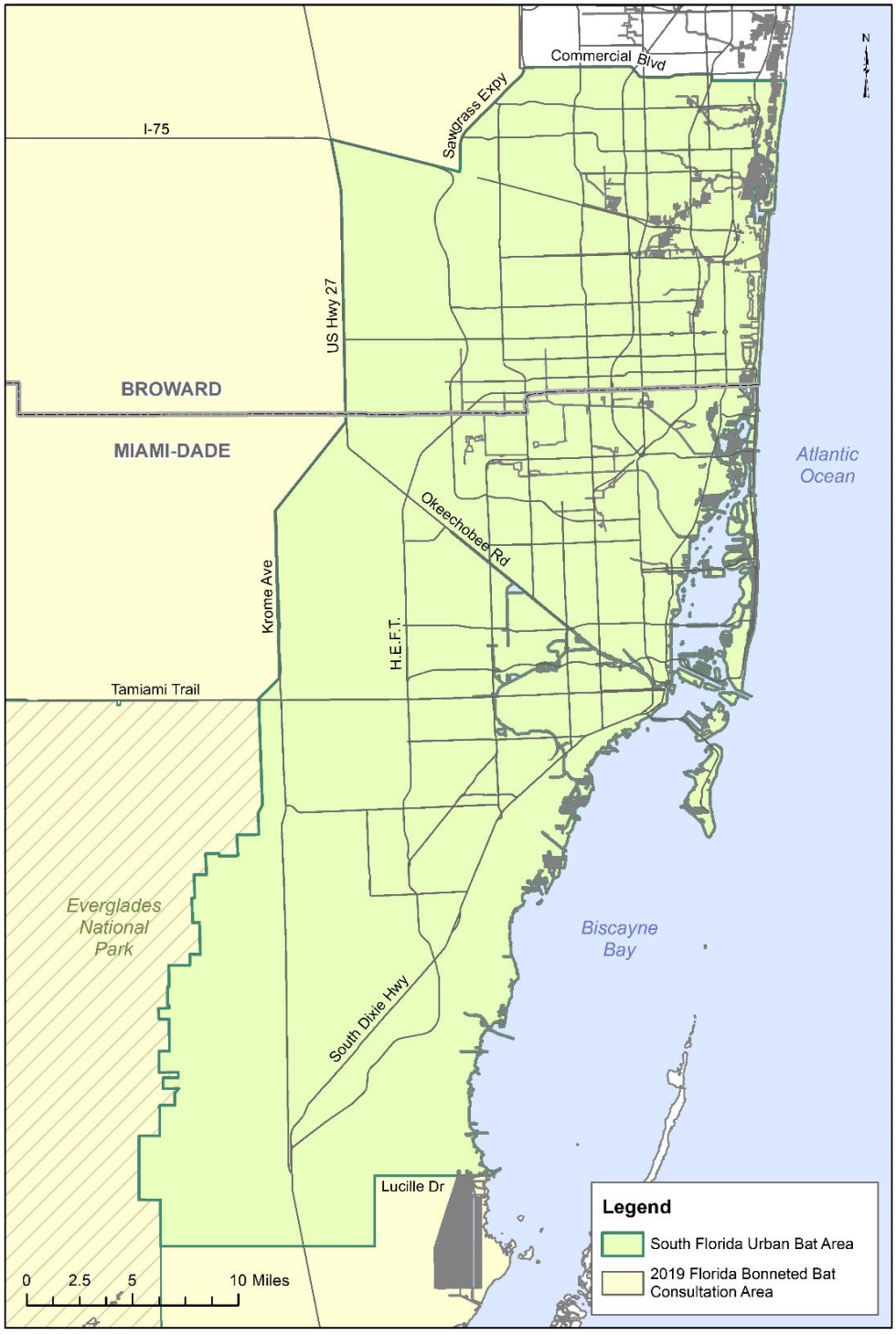

Figure 2. Urban development boundary in Miami-Dade and Broward County. The Consultation Key should not be used for projects in this area. Applicants with projects in this South Florida Urban Bat Area should contact the Service for specific guidance addressing this area and individual consultation.

Florida Bonneted Bat Consultation Key[#]

Use the following key to evaluate potential effects to the Florida bonneted bat (FBB) from the proposed project. Refer to the Glossary as needed.

1a. Proposed project or land use change is partially or wholly within the Consultation Area (Figure 1).....**Go to 2**
1b. Proposed project or land use change is wholly outside of the Consultation Area (Figure 1).....**No Effect**

2a. Potential FBB roosting habitat exists within the project area.....**Go to 3**
2b. No potential FBB roosting habitat exists within the project area.....**Go to 13**

3a. Project size/footprint* ≤ 5 acres (2 hectares)..... **Conduct Limited Roost Survey (Appendix C)** then **Go to 4**
3b. Project size/footprint* > 5 acres (2 hectares).....**Conduct Full Acoustic/Roost Surveys (Appendix B)** then **Go to 6**

4a. Results show FBB roosting is likely .....**Go to 5**
4b. Results do not show FBB roosting is likely.....**MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

5a. Project will affect roosting habitat.....**LAA[+] Further consultation with the Service required.**
5b. Project will not affect roosting habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

6a. Results show some FBB activity.....**Go to 7**
6b. Results show no FBB activity.....**No Effect**

7a. Results show FBB roosting is likely.....**Go to 8**
7b. Results do not show FBB roosting is likely.....**Go to 10**

8a. Project will not affect roosting habitat.....**Go to 9**
8b. Project will affect roosting habitat.....**LAA[+] Further consultation with the Service required.**

9a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of foraging habitat.....**LAA[+] Further consultation with the Service required.**
9b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of foraging habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

10a. Results show high FBB activity/use.....**Go to 11**
10b. Results do not show high FBB activity/use.....**Go to 12**

11a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging).....**LAA[+] Further consultation with the Service required.**
11b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging)..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

12a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of FBB habitat.....**LAA[+] Further consultation with the Service required.**
12b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat..... **MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

13a. FBB foraging habitat exists within the project area and foraging habitat will be affected…..……..**Go to 14**

13b. FBB foraging habitat exists within the project area and foraging habitat will not be affected **OR** no FBB foraging habitat exists within the project area…..……..**No Effect**

14a. Project size* > 50 acres (20 hectares) (wetlands and uplands) ……..…….....**Go to 15**

14b. Project size* ≤ 50 acres (20 hectares) (wetlands and uplands) ……...….. **MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**

15a. Project is within 8 miles (12.9 kilometers) of high quality potential roosting areas^……..……**Conduct Full Acoustic Survey (Appendix B) and Go to 16**

15b. Project is not within 8 miles (12.9 kilometers) of high quality potential roosting area^…….....….**MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**

16a. Results show some FBB activity……...…….....**Go to 17**

16b. Results show no FBB activity……..…….…....**No Effect**

17a. Results show high FBB activity/use……...…...…....**LAA[+] Further consultation with the Service required.**

17b. Results do not show high FBB activity/use……....…….. **MANLAA-P if BMPs (Appendix D) used and survey reports submitted. Programmatic concurrence.**

[#] If you are within the urban environment and you are renovating an existing artificial structure (with or without additional ground disturbing activities), these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance

*****Includes wetlands and uplands that are going to be altered along with a 250- foot (76.2- meter) buffer around these areas if the parcel is larger than the altered area.

[+]Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations.

^Determining if **high quality potential roosting areas** are within 8 mi (12.9 km) of a project is intended to be a desk-top exercise looking at most recent aerial imagery, not a field exercise.

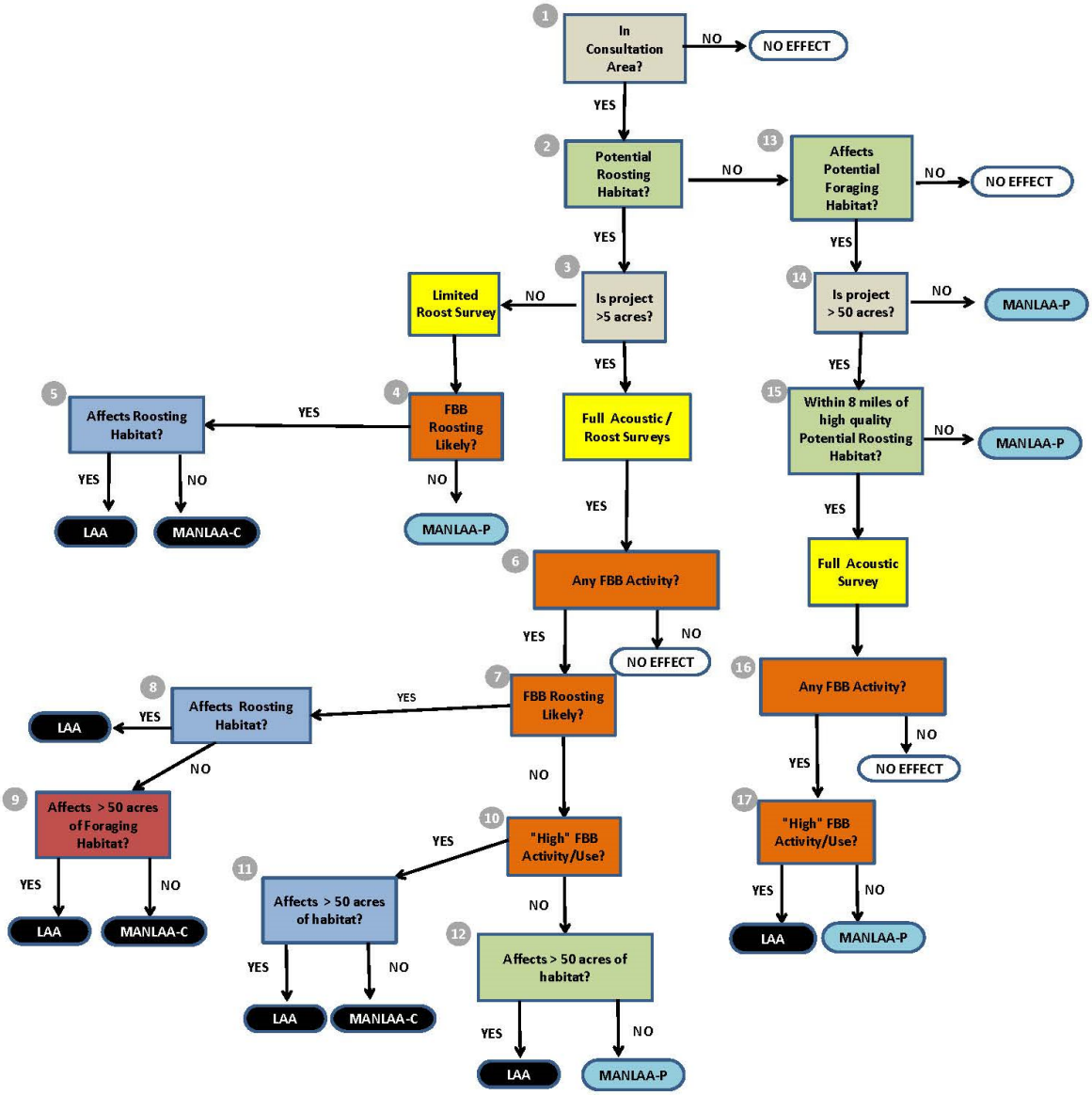

Figure 3. Florida bonneted bat Consultation Flowchart. "**No effect**" determinations do not need Service concurrence. "May affect, but not likely to adversely affect", **MANLAA-P,** in blue have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results. **MANLAA-C** determinations in black require further consultation with the Service. Applicants are expected to incorporate the appropriate **BMPs** to reach a **MANLAA** determination. "May affect, and is likely to adversely affect", **LAA, (**also in black) determinations require consultation with the Service. Further consultation with the Service may identify project modifications that could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations. The Service requests Florida bonneted bat survey reports for all determinations.

GLOSSARY

BMPs – Best Management Practices. Recommendations for actions to conserve roosting and foraging habitat to be implemented before, during, and after proposed development, land use changes, and land management activities.

FBB Activity – Florida bonneted bat (FBB) activity is when any Florida bonneted bat calls are recorded during an acoustic survey or human observers see or hear Florida bonneted bats on a site.

FORAGING HABITAT - Comprised of relatively open (*i.e.,* uncluttered or reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment) areas to find and catch prey, and sources of drinking water. In order to find and catch prey, Florida bonneted bats forage in areas with a reduced number of obstacles. This includes: open fresh water, permanent or seasonal freshwater wetlands, within and above wetland and upland forests, wetland and upland shrub, and agricultural lands (Bailey *et al.* 2017). In urban and residential areas drinking water, prey base, and suitable foraging can be found at golf courses, parking lots, and parks in addition to relatively small patches of natural habitat.

FULL ACOUSTIC/ROOST SURVEY - This is a comprehensive survey that will involve systematic acoustic surveys (*i.e.,* surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple consecutive nights). Depending upon acoustic results and habitat type, targeted roost searches through thorough visual inspection using a tree-top camera system or observations at emergence (*e.g.,* looking and listening for bats to come out of tree cavities around sunset) or more acoustic surveys may be necessary. See Appendix B for a full description.

HIGH FBB ACTIVITY/USE - High Florida bonneted bat (FBB) activity/use or importance of an area can be defined using several parameters (*e.g*., types of calls, numbers of calls). An area will be considered to have high FBB activity/use if **ANY** of the following are found: (a) multiple FBB feeding buzzes are detected; (b) FBB social calls are recorded; (c) large numbers of Florida bonneted bat calls (9 or more) are recorded throughout one night. Each of these parameters is considered to indicate that an area is actively used and important to FBBs, however, the Service will further evaluate the activity/use of the area within the context of the site (*i.e.,* spatial distribution of calls, site acreage, habitat on site, as well as adjacent habitat) and provide additional guidance.

HIGH QUALITY POTENTIAL ROOSTING AREAS - Sizable areas (>50 acres) [20 hectares] that contain large amounts of high-quality, natural roosting structure – (*e.g.,* predominantly native, mature trees; especially pine flatwoods or other areas with a large number of cavity trees, tree hollows, or high woodpecker activity).

LAA - May Affect, and is Likely to Adversely Affect. The appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or

beneficial [see definition of "may affect, but is not likely to adversely affect" (**MANLAA**)]. In the event the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action is "likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" (**LAA**) determination should be made. An "is likely to adversely affect" determination requires the initiation of formal section 7 consultation.

LIMITED ROOST SURVEY - This is a reduced survey that may include the following methods: acoustics, observations at emergence (*e.g.,* looking and listening for bats to come out of tree cavities around sunset), and visual inspection of trees with cavities or loose bark using tree-top cameras (or combination of these methods). Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting structures on site. See also Appendix C for a full description.

MANLAA - May Affect, but is Not Likely to Adversely Affect. The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. To use these Guidelines and Consultation Key applicants must incorporate the appropriate **BMPs** (Appendix D) to reach a **MANLAA** determination.

In this Consultation Key we have identified two ways that consultation can conclude informally, **MANLAA-P and MANLAA-C**:

> **MANLAA-P**: programmatic concurrence is provided through the transmittal letter of these Guidelines, no additional consultation is required with the Service for Florida bonneted bats. All survey results must be submitted to Service.
>
> **MANLAA-C**: further consultation with the Service is required to confirm that the Consultation Key has been used properly, and the Service concurs with the evaluation of the survey results. Request for consultation must include survey results.

NO EFFECT - The appropriate conclusion when the action agency determines its proposed action will not affect listed species or designated critical habitat.

POTENTIAL ROOSTING HABITAT - Includes forest and other areas with tall, mature trees or other areas with suitable roost structures (*e.g.,* utility poles, artificial structures). Forest is defined as all types including: pine flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed or hardwood hammocks, cypress, sand pine scrub, or other forest types. (Forrest types currently include exotic forests such as melaleuca, please contact the Service for additional guidance as needed). More specifically, this includes habitat in which suitable structural features for breeding and sheltering are present. In general, roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. Structural characteristics are of primary importance.

Florida bonneted bats have been found roosting in habitat with the following structural features, but may also occur outside of these parameters:

- trees greater than 33 feet (10 meters) in height, greater than 8 inches (20 centimeters) in diameter at breast height (DBH), with cavity elevations higher than 16 feet (5 meters) above ground level (Braun de Torrez 2019);
- areas with a high incidence of large or mature live trees with various deformities (*e.g.,* large cavities, hollows, broken tops, loose bark, and other evidence of decay) (*e.g.,* pine flatwoods);
- rock crevices (*e.g.,* limestone in Miami-Dade County); and/or
- artificial structures, mimicking natural roosting conditions (*e.g.,* bat houses, utility poles, buildings), situated in natural or semi-natural habitats.

In order for a building to be considered a roosting structure, it should be a minimum of 15 feet high and contain one or more of the following features: chimneys, gaps in soffits, gaps along gutters, or other structural gaps or crevices (outward entrance approximately 1 inch (2.5 centimeters) in size or greater. Structures similar to the above (*e.g.,* bridges, culverts, minimum of 15 feet high) are expected to also provide roosting habitat, based upon the species' morphology and behavior (Keeley and Tuttle 1999). Florida bonneted bat roosts will be situated in areas with sufficient open space for these bats to fly (*e.g.,* open or semi-open canopy, canopy gaps, above the canopy, and edges which provide relatively uncluttered conditions [*i.e.,* reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment]).

For the purpose of this Consultation Key*: Roosting habitat refers to habitat with structures that can be used for daytime and maternity roosting. Roosting at night between periods of foraging can occur in a broader range of structure types. For the purposes of this guidance we are focusing on day roosting habitat.*

ROOSTING IS LIKELY– Determining likelihood of roosting is challenging. The Service has provided the following definition for the express purpose of these Guidelines. Researchers use additional cues to assist in locating roosts. As additional indicators are identified and described we expect our Guidelines will be improved.

In this Consultation Key the Service will consider the following evidence indicative that roosting is likely nearby (*i.e.,* reasonably certain to occur) if **ANY** of the following are documented: (a) Florida bonneted bat calls are recorded within 30 minutes before sunset to 1½ hours following sunset or within 1½ hours before sunrise; (b) emergence calls are recorded; (c) human observers see (or hear) Florida bonneted bats flying from or to potential roosts; (d) human observers see and identify Florida bonneted bats within a natural roost or artificial roost; and/or (e) other bat sign (*e.g*., guano, staining, etc.) is found that is identified to be Florida bonneted bat through additional follow-up.

In addition to the aforementioned events, researchers consider roosting likely in an area when (1) large numbers of Florida bonneted bat calls are recorded throughout the night (*e.g.,* ≥ 25 files per night at a single acoustic station when 5 second file lengths are recorded); (2) large numbers of FBB calls are recorded over multiple nights (*e.g.,* an average of ≥ 20 files per night from a single detector when 5 second file lengths are recorded); or (3) social calls are recorded. Because social calls and large numbers of calls recorded over one or more nights can be indicative of high

FBB activity/use or when roosting is likely, the Service is choosing not to use these as indicators to make the determination that roosting is likely. Instead we are relying on the indicators that are only expected to occur at or very close to a roost location [(a)-(e) above].

TAKE - to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. [50 CFR §17.3].

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Appendix A. Delineation and Justification for Consultation Area

The Consultation Area (Figure 1) represents the general range of the species. The Consultation Area represents the area within which consideration should be given to potential effects to Florida bonneted bats from proposed projects or actions. Coordination and consultation with the Service helps to determine whether proposed actions and activities may affect listed species. This Consultation Area defines the area where proposed actions and activities may affect the Florida bonneted bat.

This area was delineated using confirmed presence data, key habitat features, reasonable flight distances and home range sizes. Where data were lacking, we used available occupancy models that predict probability of occurrence (Bailey *et al.* 2017). Below we describe how each one of these data sources was used to determine the overall Consultation Area.

Presence data: Presence data included locations for: (1) confirmed Florida bonneted bat acoustic detections; (2) known roost sites (occupied or formerly occupied; includes natural roosts, bat houses, and utility poles); (3) live Florida bonneted bats observed or found injured; (4) live Florida bonneted bats captured during research activities; and (5) Florida bonneted bats reported as dead. The Geographic Information Systems (GIS) dataset incorporates information from January 2003 to May 2019.

The vast majority of the presence data came from acoustic surveys. The species' audible, low frequency, distinct, echolocation calls are conducive for acoustic surveys. However, there are limitations in the range of detection from ultrasonic devices, and the fast, high-flying habits of this species can confound this. Overall, detection probabilities for Florida bonneted bats are generally considered to be low. For example, in one study designed to investigate the distribution and environmental associations of Florida bonneted bat, Bailey *et al.* 2017 found overall nightly detection probability was 0.29. Based on the estimated detection probabilities in that study, it would take 9 survey nights (1 detector per night) to determine with 95% certainty whether Florida bonneted bat are present at a sampling point. Positive acoustic detection data are extremely valuable. However, it is important to recognize that there are issues with false negatives due to limitations of equipment, low detection probabilities, difference in detection due to prey availability and seasonal movement over the landscape, and in some circumstances improperly conducted surveys (*i.e.,* short duration or in unsuitable weather conditions).

Key habitat features: We considered important physical and biological features with a focus on potential roosting habitat and applied key concepts of bat conservation (*i.e*., need to conserve roosting habitat, foraging habitat, and prey base). To date, all known natural Florida bonneted bat roosts (n=19 have been found in live trees and snags of the following types: slash pine, longleaf pine, royal palm, and cypress (Braun de Torrez 2018). Several of the recent roost discoveries are located in fire-maintained vegetation communities, and it appears that Florida bonneted bats are fire-adapted and can benefit from prescribed burn regimes that closely mimic historical fire patterns (Ober *et al.* 2018).

From a landscape and roosting perspective, we consider key habitat features to include forested areas and other areas with mature trees, wetlands, areas used by red-cockaded woodpeckers

(*Picoides borealis*; RCW), and fire-managed and other conservation areas. However, recent work suggests that Florida bonneted bats do not use pinelands more than other land cover types (Bailey *et al.* 2017). In fact, Bailey *et al.* 2017 detected Florida bonneted bats in all land cover types investigated in their study (e.g., agricultural, developed, upland, and wetland). For the purposes of these consultation guidelines, we are focusing on the conservation of potential roosting habitats across the species' range. However, we also recognize the need for comprehensive consideration of foraging habitats, habitat connectivity, and long-term suitability.

Flight distances and home range sizes: Like most bats, Florida bonneted bats are colonial central-place foragers that exploit distant and scattered resources (Rainho and Palmeirim 2011). Morphological characteristics (narrow wings, high wing-aspect ratio) make *Eumops* spp. well-adapted for efficient, low-cost, swift, and prolonged flight in open areas (Findley *et al*. 1972, Norberg and Rayner 1987). Other Eumops including Underwood's mastiff bat (*Eumops underwoodi*), and Greater mastiff bat or Western mastiff bat (*Eumops perotis*) are known to forage and/or travel distances ranging from 6.2 miles to 62 miles from the roost with multiple studies documenting flight distances approximately 15- 18 miles from the roost (Tibbitts *et al* 2002, Vaugh 1959 as cited in Best *et al*. 1996, Siders *et al.* 1999, Siders 2005, Vaughan 1959 as cited in Siders 2005.)

Like other *Eumops,* Florida bonneted bats are strong fliers, capable of travelling long distances (Belwood 1992). Recent Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they also move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (WMA), found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). Additional data collected during the month of December documented the mean maximum distance of Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b). The Service recognizes that the movement information comes from only one site (Babcock-Webb WMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Consequently, because Babcock-Webb WMA provides high quality roosting habitat, this movement data could represent the low end of individual flight distances from a roost.

Given the species' morphology and habits (*e.g*., central-place forager) and considering available movement data from other *Eumops* and Florida bonneted bats discussed above, we opted to use 15 miles (24 km) as a reasonable estimate of the distance Florida bonneted bats would be expected to travel from a roost on any given night. For the purposes of delineating a majority of the Consultation Area, we used available confirmed presence point location data and extended out 15 miles (24 km), with modifications for habitat features (as described above). As more movement data are obtained and made available, this distance estimate may change in the future.

Occupancy model – Research by Bailey *et al.* (2017) indicates the species' range is larger than previously known. Their model performed well across a large portion of the previously known

range when considering confirmed Florid bonneted bat locations; thus it is anticipated to be useful where limited information is available for the species.

We used the model output from Bailey *et al.* (2017) to more closely examine areas where we are data-deficient (*i.e.,* areas where survey information is particularly lacking). We considered 0.27 probability of occurrence a filter for high likelihood of occurrence because 0.27 was the model output for Babcock-Webb WMA, an area where Florida bonneted bats are known to occupy and heavily use. Large portions of Sarasota, Martin, and Palm Beach counties were identified as having probability of occurrence of 0.27. The consultation area should include areas where the species has a high likelihood of occurring. Based on this reasoned approach, all of Sarasota County, portions of Martin County, and greater parts of Palm Beach County were included in the Consultation Area.

We recognize that there are areas in the northern portion of the range where the model is less successful predicting occurrence based on the known Florida bonneted bat locations (*i.e*., the model predicts low likelihood of occurrence on Avon Park Air Force range, where the species is known to roost). Consequently, the Service is proactively working with partners to conduct surveys in the areas added based on the model to confirm that inclusion of these portions of the aforementioned counties is appropriate. The Consultation Area may be adjusted based on changes in this information.

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Appendix B: Full Acoustic / Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting or using the site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, project proponents may be able to retain suspected roosts or conserve roosting and foraging habitats. Changing the timing or nature of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females. If properly conducted, acoustic surveys are the most effective way to determine presence and assess habitat use. If the applicant is unable to follow or does not want to follow the Full Acoustic/Roost Survey framework when recommended according to the Key, the Corps (or other Action Agency) will not be able to use these Guidelines and will need to provide a biologically supported rational using the best available information for their determination in their request for consultation.

General Description: This is a *comprehensive survey effort*, and robust acoustic surveys (*i.e.,* surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple nights) are a fundamental component of the approach. Depending upon acoustic results and habitat type, it may also include: observations at emergence (*e.g.,* emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), visual inspection of trees/snags (*i.e.,* those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, or follow-up targeted acoustic surveys. Methods are dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting and foraging habitats on site.

General Survey Protocol:

[Note: The Service will provide more information in separate detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is intended for project sites > 5 acres (2 hectares).
- For sites containing roosting habitat, acoustic surveys should primarily focus on assessing roosting habitat within the project site that will be lost or modified (*i.e.,* areas that will not be conserved), and locations on the property within 250 feet (76.2 meters) of areas that will not be conserved. This will help avoid or minimize the loss of an active roost and individuals. Secondarily, since part of the purpose is to determine if Florida bonneted bats are using the site, acoustic devices should also be placed near open water and wetlands to maximize chances of detection and aid in assessing foraging habitat that may be lost.
- For sites that do not contain ANY roosting habitat, but do contain foraging habitat (see Figure 3 - Consultation Flowchart and Key, Step 2 [no], Step 13 [yes]), efforts should focus on assessing foraging habitat within the project site that will be lost or modified (*i.e.,* areas that will not be conserved).
- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving,

analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).

- Due to the variation in the quality of recordings, the influence of clutter, the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).
- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- The number of acoustic survey sites and nights needed for the assessment is dependent upon the overall acreage of suitable habitat proposed to be impacted by the action.
    - For non-linear projects, a minimum of 16 detector nights per 20 acres of suitable habitat expected to be impacted is recommended.
    - For linear projects (*e.g.,* roadways, transmission lines), a minimum of five detector nights per 0.6 mi (0.97 km) is recommended. Detectors can be moved to multiple locations within each kilometer surveyed, but must remain in a single location throughout any given night.
    - For any site, and in particular for sites > 250 acres, please contact the Service to assist in designing an appropriate approach.
- If results of acoustic surveys show **high Florida bonneted bat activity** or **Florida bonneted bat roosting likely** (*e.g.,* high activity early in the evening) (see definitions in Glossary), follow-up methods such as emergence surveys, visual inspection of the roosting structures, or follow-up acoustic surveys are recommended to locate potential roosts. Using a combination of methods may be helpful.

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as above) are suitable. Surveyors should be quietly stationed 30 minutes before sunset so they are ready to look and listen for emerging FBBs from sunset to 1½ hours after sunset. When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Visual inspection of trees with cavities and loose bark during the day may be helpful. Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).
- Visual inspection alone is not recommended due to the potential for roosts to be too high for cameras to reach, too small for cameras to fit, or shaped in a way that contents are out of view (Braun de Torrez *et al.* 2016).
- If roosting is suspected on site, use tree-top cameras during the day to search those trees/snags or other structures that have potential roost features (*i.e.,* cavities, hollows, crevices, or other structure for permanent shelter). If unsuccessful (*e.g.,* cannot see entire contents within a given cavity, cannot reach cavity, cannot see full extent of cavity) OR occupied roosts are found with the tree-top camera within the area in which high Florida bonneted bat activity/likely Florida bonneted bats roosting were identified, we recommend emergence surveys and/or acoustics to verify occupancy and/or identify bat species.
- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bats (*e.g.,* # of calls, time of calls, and station number) organized by the date on which the data were collected. Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov. Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as "all raw data" and "all raw data with signatures at or below 20kHz". Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey.

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix B

Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. Journal of Mammalogy. 98:1586-1593.

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Appendix C: Limited Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting within suitable structures on-site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, applicants and partners may be able to retain the suspected roosts or conserve roosting and foraging habitats. Changing the timing of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females.

General Description: This is a *reduced survey effort* that may include the following methods: visual inspection of trees/snags (*i.e.,* those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, observations at emergence (*e.g.,* emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), acoustic surveys, or a combination of these methods. Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting habitat on site.

General Survey Protocol:

[Note: The Service will provide more information in separate, detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is **intended only for small project sites** (*i.e.,* sites ≤ 5 acres [2 hectares]).
- Efforts should focus on assessing potential roosting structures within the project site that will be lost or modified (*i.e.,* areas that will not be conserved), or are located on the property within 250 feet (76.2 meters) of areas that will not be conserved.

Identification of potential roost structures

- This step is necessary prior to any of the methods that follow.
- Run line transects through roosting habitat close enough that all trees and snags are easily inspected. Transect spacing will vary with habitat structure and season from a maximum of 91 m (300 ft) between transects in very open pine stands to 46 m (150 ft) or less in areas with dense mid-story. Transects should be oriented north to south, to optimize cavity detectability because many RCW cavity entrances are oriented in a westerly direction (Service 2004).
- Visually inspect all trees and snags or other structures for evidence of cavities, hollows, crevices that can be used for permanent shelter. Using binoculars, examine structures for cavities, loose bark, hollows, or other crevices that are large enough for Florida bonneted bats (diameter of opening > or = to 1 inch (2.5 cm) (Braun de Torrez *et al*. 2016).
- When potential roosting structures are found, record their location in the field using a Global Positioning System (GPS) unit.

Visual Inspection of trees and snags with tree-top cameras

- Visually inspect all cavities using a video probe (peeper) and assess the cavity contents.

Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).

- Visual inspection alone is valid only when the entire cavity is observed and the contents can be identified. Typically, acoustics at emergence will also be needed to definitively identify bat species, if bats are present or suspected.
- If bats are suspected, or if contents cannot be determined, or if the entire cavity cannot be observed with the video probe; follow methods for an Acoustic Survey or an Emergence Survey (below). If the Corps (or other action agency) or applicant does not wish to conduct acoustic or emergence surveys, the Corps (or other action agency) cannot use the key and must request formal consultation with the Service.
- Record tree species or type of cavity structure, tree diameter and height, cavity height, cavity orientation and cavity contents.

Emergence Surveys

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as described below in Acoustic Surveys) are suitable.
- Surveyors should be quietly stationed 30 minutes prior to sunset so they are ready to look and listen for emerging Florida bonneted bats from sunset to 1½ hours after sunset.
- When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Record number of bats that emerged, the time of emergence, and if bat calls were heard.

Acoustic surveys

- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving, analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).
- Due to the variation in the quality of recordings, the influence of clutter, and the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on

warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).

- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- Acoustic surveys should be conducted over a minimum of four nights.
- If acoustic devices cannot be left in place for the entire night for multiple nights as above, then a combination of short acoustic surveys (from sunset and extending for 1½ hours), stationed observers for emergence surveys or visual inspection of trees/snags with tree-top cameras may be acceptable. Contact the Service for guidance under this circumstance.

Reporting

- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bat by date (*e.g.,* # of calls, time of calls). Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov. Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as "all raw data" and "all raw data with signatures at or below 20kHz". Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix C

Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. Journal of Mammalogy. 98:1586-1593.

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Appendix D: Best Management Practices (BMPs) for Development Projects

Ongoing research and monitoring will continue to increase the understanding of the Florida bonneted bat and its habitat needs and will continue to inform habitat and species management recommendations. These BMPs incorporate what is known about the species and also include recommendations that are beneficial to all bat species in Florida. These BMPs are intended to provide recommendations for improving conditions for use by Florida bonneted bats, and to help conserve Florida bonneted bats that may be foraging or roosting in an area.

The BMPs required to reach a "may affect, but is not likely to adversely affect" (MANLAA) determination vary depending on the couplet from the Consultation Key used to reach that particular MANLAA. The requirements for each couplet are provided below followed by the list of BMPs. If the applicant is unable or does not want to do the required BMPs, then the Corps (or other Action Agency) will not be able to use this Guidance and formal consultation with the Service is required.

Couplet Number for MANLAA from Consultation Key	Required BMPs
4b	BMP number 1 if more than 3 months has occurred between the survey and start of the project, and any 3 BMPs out of BMPs 4 through 13
5b	BMP number 2, and any 3 BMPs out of BMPs 3 through 13
9b	BMPs number 2 and 3, and any 4 BMPs out of BMPs 5 through 13
11b	BMPs number 1 and 4, and any 4 BMPs out of BMPs 5 through 13
12b	BMP number 1, and any 3 BMPs out of BMPs 3 through 13
14b	Any 2 BMPs out of BMPs 3 through 13
15b	Any 3 BMPs out of BMPs 3 through 13
17b	Any 4 BMPs out of BMPs 3 through 13

BMPs for development, construction, and other general activities:

1. If potential roost trees or structures need to be removed, check cavities for bats within 30 days prior to removal of trees, snags, or structures. When possible, remove structure outside of breeding season (*e.g.*, January 1 – April 15). If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.
2. When using heavy equipment, establish a 250 foot (76 m) buffer around known or suspected roosts to limit disturbance to roosting bats.
3. For every 5 acres of impact, retain a minimum of 1.0 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained.
4. For every 5 acres of impact, retain a minimum of 0.25 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained..
5. Conserve open freshwater and wetland habitats to promote foraging opportunities and avoid impacting water quality. Created/restored habitat should be designed to replace the function of native habitat.

6. Conserve and/or enhance riparian habitat. A 50-ft (15.2 m) buffer is recommended around water bodies and stream edges. In cases where artificial water bodies (*i.e.,* stormwater ponds) are created, enhance edges with native plantings especially in cases in which wetland habitat was affected.
7. Avoid or limit widespread application of insecticides (*e.g.,* mosquito control, agricultural pest control) in areas where Florida bonneted bats are known or expected to forage or roost.
8. Conserve natural vegetation to promote insect diversity, availability, and abundance. For example, retain or restore 25% of the parcel in native contiguous vegetation.
9. Retain mature trees and snags that could provide roosting habitat. These may include live trees of various sizes and dead or dying trees with cavities, hollows, crevices, and loose bark. See "Roosting Habitat" in "Background" above.
10. Protect known Florida bonneted bat roost trees, snags or structures and trees or snags that have been historically used by Florida bonneted bats for roosting, even if not currently occupied, by retaining a 250 foot (76 m) disturbance buffer around the roost tree, snag, or structure to ensure that roost sites remain suitable for use in the future.
11. Avoid and minimize the use of artificial lighting, retain natural light conditions, and install wildlife friendly lighting (*i.e*., downward facing and lowest lumens possible). Avoid permanent night-time lighting to the greatest extent practicable.
12. Incorporate engineering designs that discourage bats from using buildings or structures. If Florida bonneted bats take residence within a structure, contact the Service and Florida Fish and Wildlife Conservation Commission prior to attempting removal or when conducting maintenance activities on the structure.
13. Use or allow prescribed fire to promote foraging habitat.

Appendix E: Additional Best Management Practices (BMPs) for Land Management Projects

Ecological Land Management

The Service reviews and develops Ecological Land Management projects that use land management activities to restore and maintain native, natural communities that are beneficial to bats. These activities include prescribed fire, mechanical treatments to reduce vegetation densities, timber thinning to promote forest health, trail maintenance, and the treatment of exotic vegetation. The following BMPs provide recommendations for conserving Florida bonneted bat roosting and foraging habitat during ecological land management activities. The Service recommends incorporating these BMP into ecological land management plans.

If potential roost trees need to be removed, check cavities for bats prior to removal of trees or snags. If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.

Ecological Land Management BMPs:

- Protect potential roosting habitat during ecological land management activities, if feasible. Avoid removing trees or snags with cavities.
- Rake and/or manually clear vegetation around the base of known or suspected roost trees to remove fuel prior to prescribed burning.
- If possible, use ignition techniques such as spot fires or backing fire to limit the intensity of fire around the base of the tree or snag containing the roost. The purpose of this action is to prevent the known or suspected roost tree or snag from catching fire and also to attempt to limit the exposure of the roosting bats to heat and smoke. A 250-ft (76 m) buffer is recommended.
- If prescribed fire is being implemented to benefit Florida bonneted bats, Braun de Torrez et al. (2018) noted that fire in the dry/spring season could be most beneficial.
- When creating firebreaks or conducting fire-related mechanical treatment, mark and avoid any known or suspected bat roosts.
- When using heavy equipment, establish a buffer of 250 feet (76 m) around known roosts to limit disturbance to roosting bats.
- Establish forest management efforts to maintain tree species and size class diversity to ensure long-term supply of potential roost sites.
- For every 5 acres (2 hectares) of timber that is harvested, retain a clump of trees 1-2 acres (0.4 - 0.8 hectare) in size containing potential roost trees, especially pines and royal palms (live or dead). Additionally, large snags in open canopy should be preserved.

Literature Cited – Appendix E

Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2018. Activity of an Endangered Bat Increases Immediately Following Prescribed Fire. The Journal of Wildlife Management.

APPENDIX J

Florida Bonneted Bat Consultation Key

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
October 22, 2019

Shawn Zinszer
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Florida bonneted bat; 04EF2000-2014-I-0320-R001

Dear Mr. Zinszer:

This letter replaces the December 2013, Florida bonneted bat guidelines provided to the U.S. Army Corps of Engineers (Corps) to assist your agency with effect determinations within the range of the Florida bonneted bat (*Eumops floridanus*). This October 2019 revision supersedes all prior versions. The enclosed *Florida Bonneted Bat Consultation Guidelines* and incorporated *Florida Bonneted Bat Consultation Key* (Key) are provided pursuant to the U.S. Fish and Wildlife Service's (Service) authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This letter, guidelines, and Key have been assigned Service Consultation Code: 41420- 04EF2000-2014-I-0320-R001.

The purpose of the guidelines and Key is to aid the Corps (or other Federal action agency) in making appropriate effect determinations for the Florida bonneted bat under section 7 of the Act, and streamline informal consultation with the Service for the Florida bonneted bat when the proposed action is consistent with the Key. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key, applicants do not wish to implement the identified survey or best management practices, or if there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiate traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses type of habitat (*i.e*, roosting or foraging), survey results, and project size as the basis for making determinations of "may affect, but is not likely to adversely affect" (MANLAA) and "may affect, and is likely to adversely affect" (LAA). The Key is structured to focus on the type(s) of habitat that will be affected by a project. When proposed project areas provide features that could support roosting of Florida bonneted bats, it is considered roosting habitat. If evaluation of roosting habitat determines that roosting is not likely, then the area is subsequently evaluated for its value to the species as foraging habitat.

Roosting habitat

The guidelines describe the features of roosting habitat. When a project is proposed in roosting habitat, the likelihood that roosting is occurring is evaluated through surveys (*i.e.*, full acoustic or limited roost). When a roost is expected and the proposed activity will affect that roost, formal consultation is required. This is because the proposed activity is expected to take individuals through the destruction of the roost and the appropriate determination is that the project may affect, and is likely to adversely affect (LAA) the species. When roosting is expected, but all impacts to the roost can be avoided, and only foraging habitat (without roost structure) will be affected, the Service finds that it is reasonable to conclude that the proposed action is not likely to impair feeding, breeding, or sheltering. Thus, the proposed project may affect, but is not likely to affect the Florida bonneted bat (MANLAA).

The exception to this logic path is if the proposed action will affect more than 50 acres of foraging habitat in proximity to the roost. Under this scenario, we anticipate that the loss of the larger amount of foraging habitat near the roost could significantly impair feeding of young and overall breeding (*i.e.*, LAA). Consequently, these projects would require formal consultation to analyze the effect of the incidental take.

If the roost surveys demonstrate that roosting is not likely, the project is then evaluated for its effects to foraging habitat. Our evaluation of these actions is described below. The exception is for projects less than or equal to 5 acres if a limited roost survey is conducted. Limited roost surveys rely on peeping and visual surveys to determine whether roosting is likely. On these small projects, this survey strategy is believed to be more economical and is considered a reasonable effort to evaluate the potential for roosting. The Service acknowledges that this approach is less reliable in evaluating the likelihood of roosting when it is not combined with acoustic surveys. Therefore, when limited roost surveys are conducted for projects that are less than or equal to 5 acres in size and the determination is that roosting is not likely, we conclude that the proposed project may affect, but is not likely to adversely affect the species (MANLAA).

Foraging habitat

The guidelines describe the features of foraging habitat. Data informing the home range size of the Florida bonneted bats is limited. Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (BWWMA) found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). At BWWMA, researchers found that most individual locations were within one mile of the roost (point of capture) (Ober 2015). Additional data collected during the month of December documented the mean maximum distance Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b).

The Service recognizes that the movement information comes from only one site (BWWMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in

habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Regardless, we use these studies as our best available information to evaluate when changes to foraging habitat may have an effect on the species ability to feed, breed, and shelter and subsequently result in incidental take. When considering where most of the nightly activity was observed, we calculate a foraging area centered on a roost with a 1 mile radius would include approximately 2,000 acres, and a foraging area centered on a 9.5 mile radius would encompass approximately 181,000 acres, on any given night.

Given the Service's limited understanding of how the Florida bonneted bat moves throughout its home range and selects foraging areas, we choose to use 50 acres of habitat as a conservative estimate to when loss of foraging habitat may affect the fitness of an individual to the extent that it would impair feeding and breeding. Projects that would remove, destroy or convert less than 50 acres of Florida bonneted bat foraging habitat are expected to result in a loss of foraging opportunities; however, this decrease is not expected to significantly impair the ability of the individual to feed and breed. Consequently, projects impacting less than 50 acres of foraging habitat that implement the identified best management practices in the Key would be expected to avoid take, and the appropriate determination is that the project may affect, but is not likely to adversely affect the species (MANLAA).

Next, the Service incorporated the level of bat activity into our Key to evaluate when a foraging area may have greater value to the species. When surveys document high bat activity, we deduce that this area has increased value and importance to the species. Thus, when high bat activity is detected in parcels with greater than 50 acres of foraging habitat, we anticipate that the loss, destruction, or conversion of this habitat could significantly impair the ability of an individual to feed and breed (*i.e.*, LAA); thus formal consultation is warranted.

If surveys do not indicate high bat activity, we anticipate that loss of this additional foraging habitat may affect, but is not likely to adversely affect the species (MANLAA). This is because although the acreage is large, the area does not appear to be important at the landscape scale of nightly foraging. Therefore, its loss is not anticipated to significantly impair the ability of an individual to feed or breed.

The exception to this approach is for projects greater than 50 acres when they occur in potential roosting habitat that is not found to support roosting or high bat activity. Under this scenario, the Service concludes that the loss of the large acreage of suitable roosting habitat has the potential to significantly impair the ability of an individual to breed or shelter (*i.e.*, LAA) because the species is cavities for roosting are expected to be limited range wide and the project will impair these limited opportunities for roosting.

Determinations

The Corps (or other Federal action agency) may reach one of several determinations when using this Key. Regardless of the determination, when acoustic bat surveys have been conducted, the Service requests that these survey results are provided to our office to increase our knowledge of

the species and improve our consultation process. Surveys results and reports should be transmitted to the Service at FBBsurveyreport@fws.gov or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. When formal consultation is requested, survey results and reports should be submitted with the consultation request to verobeach@fws.gov.

No effect: If the use of the Key results in a determination of "no effect," no further consultation is necessary with the Service. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.

May Affect, Not Likely to Adversely Affect (MANLAA): In this Key we have identified two ways that consultation can conclude informally, MANLAA-P and MANLAA-C.

> **MANLAA-P**: If the use of the Key results in a determination of "MANLAA- P," the Service concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the Florida bonneted bat. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.
>
> **MANLAA-C**: If the use of the Key results in a determination of MANLAA-C, further consultation with the Service is required to confirm that the Key has been used properly, and the Service concurs with the evaluation of the survey results. Survey results should be submitted with the consultation request.

May Affect, Likely to Adversely Affect (LAA) - When the determination in the Key is "LAA" technical assistance with the Service and modifications to the proposed action may enable the project to be reevaluated and conclude with a MANLAA-C determination. Under other circumstance, "LAA" determinations will require formal consultation.

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the Florida bonneted bat. Any project that has the potential to affect the Florida bonneted bat and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support Florida bonneted bat recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3909.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the Florida bonneted bat and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended. We have established an email address to collect comments on the Key and the survey protocols at: FBBguidelines@fws.gov.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions regarding this Key, please contact the South Florida Ecological Services Office at 772-562-3909.

Sincerely,

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Enclosure

Cc: electronic only
Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Alisa Zarbo, Melinda Charles-Hogan, Susan Kaynor, Krista Sabin, John Fellows)

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Ober, H. 2015. Annual report to USFWS for calendar year 2015. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida.

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Webb, E.N. 2018a. Email to Paula Halupa *et al.* University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. April 1, 2018.

Webb, E.N. 2018b. Presentation given at Florida bonneted bat working group meeting at The Conservancy of Southwest Florida. University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. May 24, 2016.

U.S. Fish and Wildlife Service
South Florida Ecological Services Office

FLORIDA BONNETED BAT CONSULTATION GUIDELINES

October - 2019

The U.S. Fish and Wildlife Service's South Florida Ecological Services Field Office (Service) developed the Florida Bonneted Bat Consultation Guidelines (Guidelines) to assist in avoiding and minimizing potential negative effects to roosting and foraging habitat, and assessing effects to the Florida bonneted bat (*Eumops floridanus*) from proposed projects. The Consultation Key within the Guidelines assists applicants in evaluating their proposed projects and identifying the appropriate consultation paths under sections 7 and 10 of the Endangered Species Act of 1973 (Act), as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). These Guidelines are primarily for use in evaluating regulatory projects where development and land conversions are anticipated. These Guidelines focus on conserving roosting structures in natural and semi-natural environments. The following Consultation Area map (Figure 1 and Figure 2, Appendix A), Consultation Flowchart (Figure 3), Consultation Key, Survey Framework (Appendices B-C), and **Best Management Practices (BMPs)** (Appendix D) are based upon the best available scientific information. As more information is obtained, these Guidelines will be revised as appropriate. If you have comments, or suggestions on these Guidelines or the Survey Protocols (Appendix B and C), please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Terms in **bold** are further defined in the Glossary.

Wherever possible, proposed development projects within the Consultation Area should be designed to avoid and minimize take of Florida bonneted bats and to retain their habitat. Applicants are encouraged to enter into early technical assistance/consultation with the Service so we may provide recommendations for avoiding and minimizing adverse effects. Although these Guidelines focus on the effects of a proposed action (*e.g.*, development) on natural habitat, (*i.e.*, non-urban), Appendix E also provides Best Management Practices for Land Management Projects.

If you are renovating an existing artificial structure (*e.g.*, building) within the urban environment with or without additional ground disturbing activities, these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance.

The final listing rule for the Florida bonneted bat (Service 2013) describes threats identified for the species. Habitat loss and degradation, as well as habitat modification, have historically affected the species. Florida bonneted bats are different from most other Florida bat species because they are reproductively active through most of the year, and their large size makes them capable of foraging long distances from their roost (Ober *et al.* 2016). Consequently, this species is vulnerable to disturbances around the roost during a greater portion of the year and considerations about foraging habitat extend further than the localized roost.

Use of Consultation Area, Flowchart, and Key

Figure 1 shows the Consultation Area for the Florida bonneted bat where this consultation guidance applies. For information on how the Consultation Area was delineated see Appendix A. The Consultation Flowchart (Figure 3) and Consultation Key direct project proponents through a series of couplets that will provide a conclusion or determination for potential effects to the Florida bonneted bat. *Please Note: If additional listed species, or candidate or proposed species, or designated or proposed critical habitat may be affected, a separate evaluation will be needed for these species/critical habitats.*

Currently, the Consultation Flowchart (Figure 3) and Consultation Key cannot be used for actions proposed within the urban development boundary in Miami-Dade and Broward County. The urban development boundary is part of the Consultation Area, but it is excluded from these Guidelines because Florida bonneted bats use this area differently (roosting largely in artificial structures), and small natural foraging areas are expected to be important. Applicants with projects in this area should contact the Service for further guidance and individual consultation.

Determinations may be either "no effect," "may affect, but is not likely to adversely affect" (**MANLAA**), or "may affect, and is likely to adversely affect" (**LAA**). An applicant's willingness and ability to alter project designs could sufficiently minimize effects to Florida bonneted bats and allow for a **MANLAA** determination for this species (informal consultation). The Service is available for early technical assistance/consultation to offer recommendations to assist in project design that will minimize effects. When take cannot be avoided, applicants and action agencies are encouraged to incorporate compensation to offset adverse effects. The Service can assist with identifying compensation options (*e.g.,* conservation on site, conservation off-site, contributions to the Service's Florida bonneted bat conservation fund, *etc*.).

Using the Key and Consultation Flowchart

- "No effect" determinations do not need Service concurrence.
- "May affect, but is not likely to adversely affect" **MANLAA**. Applicants will be expected to incorporate the appropriate BMPs to reach a **MANLAA** determination.
    - **MANLAA-P** (in blue in Consultation Flowchart) have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results.
    - **MANLAA-C** (in black in Consultation Flowchart) determinations require further consultation with the Service.
- "May affect, and is likely to adversely affect" (**LAA**) determinations require consultation with the Service. Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA**. When take cannot be avoided, **LAA** determinations will require a biological opinion.
- The Service requests copies of surveys used to support all determinations. If a survey is required by the Consultation Key and the final determination is "no effect" or "MANLAA-P", send the survey to FBBsurveyreport@fws.gov , or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. If a survey is required by the Consultation Key and the determination is "MANLAA-C" or "LAA", submit the survey in the consultation request.

For the purpose of making a decision at Couplet 2: If any potential roosting structure is present, then the habitat is classified as **potential roosting habitat**, and the left half of the flowchart should be followed (see Figure 3). We recognize that roosting habitat may also be used by Florida bonneted bats for foraging. If the project site only consists of **foraging habitat** (*i.e.*, no suitable roosting structures), then the right side of the flowchart should be followed beginning at step 13.

For couplets 11 and 12: **Potential roosting habitat** is considered **Florida bonneted bat foraging habitat** when a determination is made that roosting is not likely.

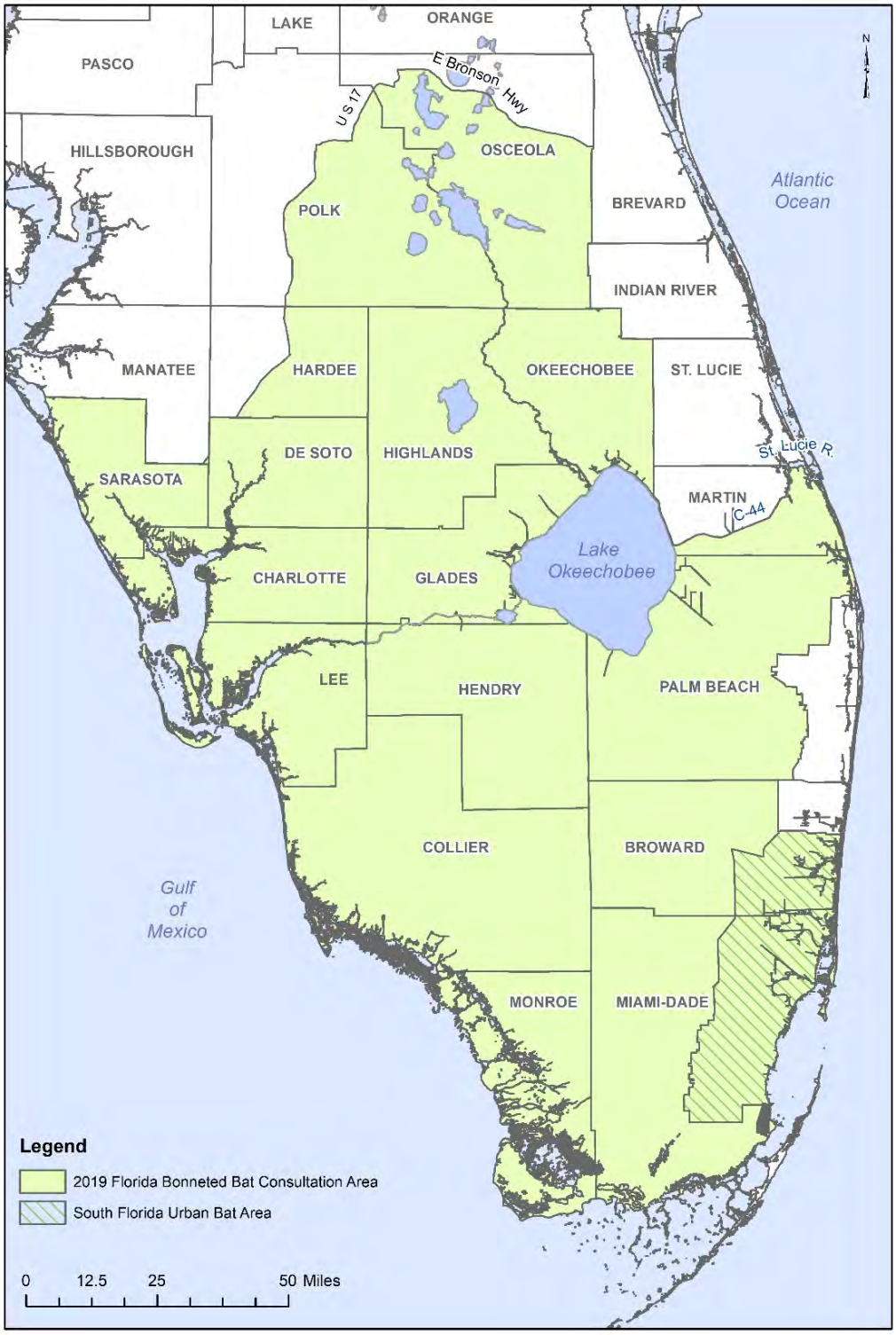

Figure 1. Florida Bonneted Bat Consultation Area. Hatched area (Figure 2) identifies the urban development boundary in Miami-Dade and Broward County. Applicants with projects in this area should contact the Service for specific guidance addressing this area and individual consultation. The Consultation Key should not be used for projects in this area.

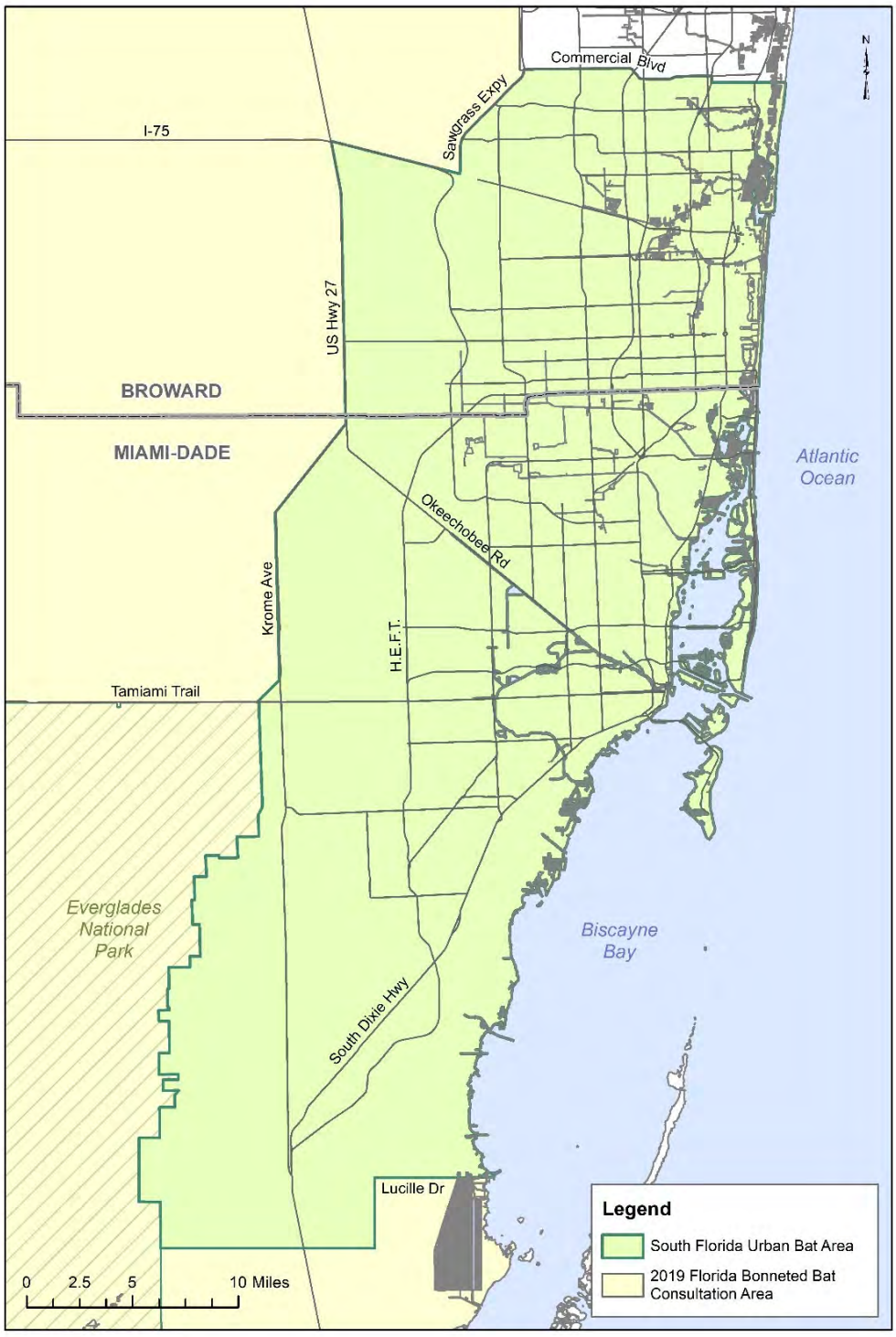

Figure 2. Urban development boundary in Miami-Dade and Broward County. The Consultation Key should not be used for projects in this area. Applicants with projects in this South Florida Urban Bat Area should contact the Service for specific guidance addressing this area and individual consultation.

Florida Bonneted Bat Consultation Key[#]

Use the following key to evaluate potential effects to the Florida bonneted bat (FBB) from the proposed project. Refer to the Glossary as needed.

1a. Proposed project or land use change is partially or wholly within the Consultation Area (Figure 1).....**Go to 2**
1b. Proposed project or land use change is wholly outside of the Consultation Area (Figure 1).....**No Effect**

2a. Potential FBB roosting habitat exists within the project area.....**Go to 3**
2b. No potential FBB roosting habitat exists within the project area.....**Go to 13**

3a. Project size/footprint* ≤ 5 acres (2 hectares)..... **Conduct Limited Roost Survey (Appendix C)** then **Go to 4**
3b. Project size/footprint* > 5 acres (2 hectares).....**Conduct Full Acoustic/Roost Surveys (Appendix B)** then **Go to 6**

4a. Results show FBB roosting is likely .....**Go to 5**
4b. Results do not show FBB roosting is likely.....**MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

5a. Project will affect roosting habitat.....**LAA⁺ Further consultation with the Service required.**
5b. Project will not affect roosting habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

6a. Results show some FBB activity.....**Go to 7**
6b. Results show no FBB activity.....**No Effect**

7a. Results show FBB roosting is likely.....**Go to 8**
7b. Results do not show FBB roosting is likely.....**Go to 10**

8a. Project will not affect roosting habitat.....**Go to 9**
8b. Project will affect roosting habitat.....**LAA⁺ Further consultation with the Service required.**

9a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of foraging habitat.....**LAA⁺ Further consultation with the Service required.**
9b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of foraging habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

10a. Results show high FBB activity/use.....**Go to 11**
10b. Results do not show high FBB activity/use.....**Go to 12**

11a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging)..... **LAA⁺ Further consultation with the Service required.**
11b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging)..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

12a. Project will affect* > 50 acres (20 hectares) (wetlands and uplands) of FBB habitat..... **LAA⁺ Further consultation with the Service required.**
12b. Project will affect* ≤ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat..... **MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

13a. FBB foraging habitat exists within the project area and foraging habitat will be affected…..……..**Go to 14**

13b. FBB foraging habitat exists within the project area and foraging habitat will not be affected **OR** no FBB foraging habitat exists within the project area…..……..**No Effect**

14a. Project size* > 50 acres (20 hectares) (wetlands and uplands) ……..…….**Go to 15**

14b. Project size* ≤ 50 acres (20 hectares) (wetlands and uplands) ……...….. **MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**

15a. Project is within 8 miles (12.9 kilometers) of high quality potential roosting areas^……..……**Conduct Full Acoustic Survey (Appendix B) and Go to 16**

15b. Project is not within 8 miles (12.9 kilometers) of high quality potential roosting area^…….....….**MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**

16a. Results show some FBB activity……...…….....**Go to 17**

16b. Results show no FBB activity……..…….…....**No Effect**

17a. Results show high FBB activity/use……...…...…....**LAA[+] Further consultation with the Service required.**

17b. Results do not show high FBB activity/use……..……... **MANLAA-P if BMPs (Appendix D) used and survey reports submitted. Programmatic concurrence.**

[#] If you are within the urban environment and you are renovating an existing artificial structure (with or without additional ground disturbing activities), these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance

*****Includes wetlands and uplands that are going to be altered along with a 250- foot (76.2- meter) buffer around these areas if the parcel is larger than the altered area.

[+]Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations.

^Determining if **high quality potential roosting areas** are within 8 mi (12.9 km) of a project is intended to be a desk-top exercise looking at most recent aerial imagery, not a field exercise.

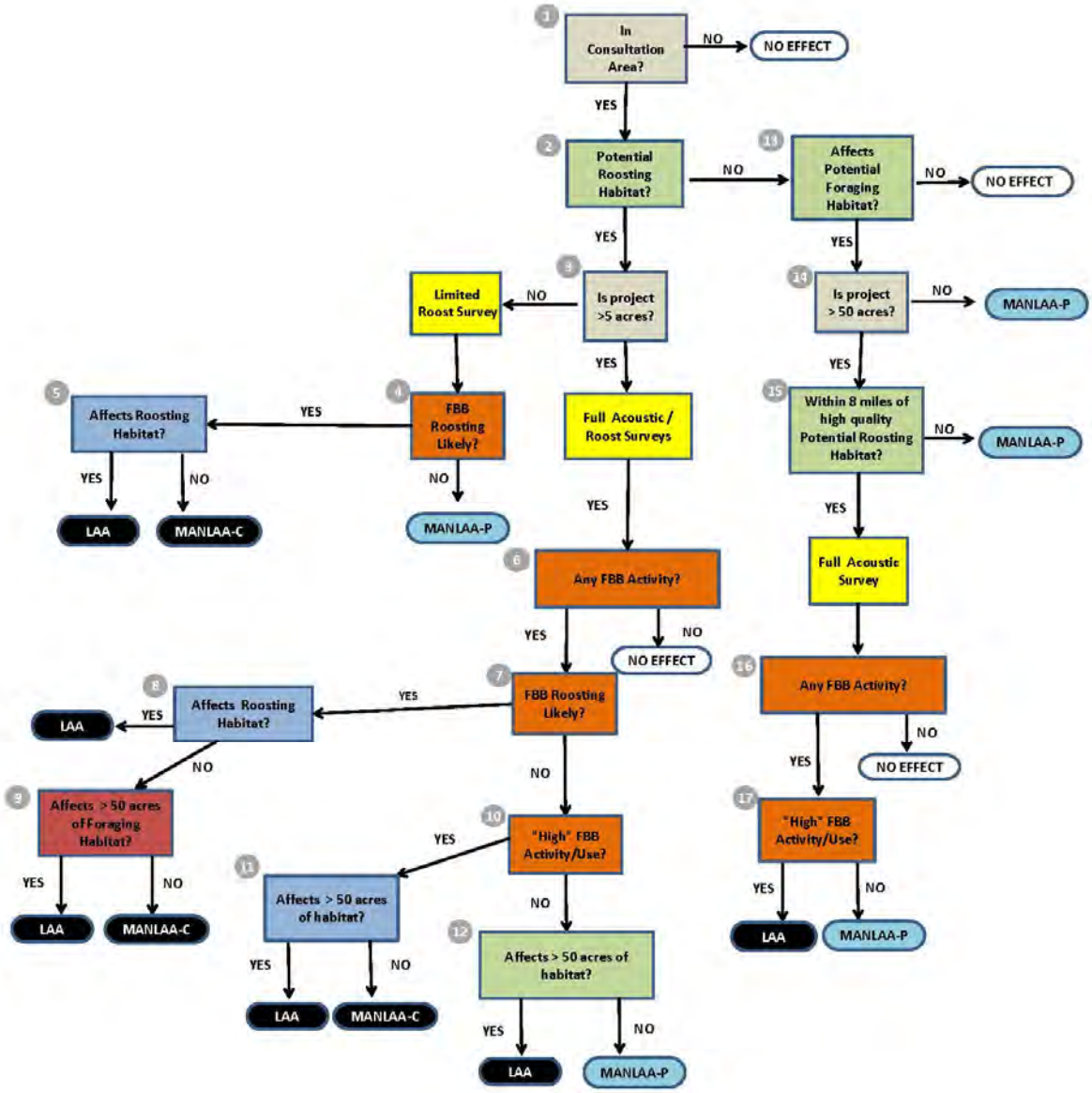

Figure 3. Florida bonneted bat Consultation Flowchart. "**No effect**" determinations do not need Service concurrence. "May affect, but not likely to adversely affect", **MANLAA-P,** in blue have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results. **MANLAA-C** determinations in black require further consultation with the Service. Applicants are expected to incorporate the appropriate **BMPs** to reach a **MANLAA** determination. "May affect, and is likely to adversely affect", **LAA, (**also in black) determinations require consultation with the Service. Further consultation with the Service may identify project modifications that could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations. The Service requests Florida bonneted bat survey reports for all determinations.

GLOSSARY

BMPs – Best Management Practices. Recommendations for actions to conserve roosting and foraging habitat to be implemented before, during, and after proposed development, land use changes, and land management activities.

FBB Activity – Florida bonneted bat (FBB) activity is when any Florida bonneted bat calls are recorded during an acoustic survey or human observers see or hear Florida bonneted bats on a site.

FORAGING HABITAT - Comprised of relatively open (*i.e.,* uncluttered or reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment) areas to find and catch prey, and sources of drinking water. In order to find and catch prey, Florida bonneted bats forage in areas with a reduced number of obstacles. This includes: open fresh water, permanent or seasonal freshwater wetlands, within and above wetland and upland forests, wetland and upland shrub, and agricultural lands (Bailey *et al.* 2017). In urban and residential areas drinking water, prey base, and suitable foraging can be found at golf courses, parking lots, and parks in addition to relatively small patches of natural habitat.

FULL ACOUSTIC/ROOST SURVEY - This is a comprehensive survey that will involve systematic acoustic surveys (*i.e.,* surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple consecutive nights). Depending upon acoustic results and habitat type, targeted roost searches through thorough visual inspection using a tree-top camera system or observations at emergence (*e.g.,* looking and listening for bats to come out of tree cavities around sunset) or more acoustic surveys may be necessary. See Appendix B for a full description.

HIGH FBB ACTIVITY/USE - High Florida bonneted bat (FBB) activity/use or importance of an area can be defined using several parameters (*e.g*., types of calls, numbers of calls). An area will be considered to have high FBB activity/use if **ANY** of the following are found: (a) multiple FBB feeding buzzes are detected; (b) FBB social calls are recorded; (c) large numbers of Florida bonneted bat calls (9 or more) are recorded throughout one night. Each of these parameters is considered to indicate that an area is actively used and important to FBBs, however, the Service will further evaluate the activity/use of the area within the context of the site (*i.e.,* spatial distribution of calls, site acreage, habitat on site, as well as adjacent habitat) and provide additional guidance.

HIGH QUALITY POTENTIAL ROOSTING AREAS - Sizable areas (>50 acres) [20 hectares] that contain large amounts of high-quality, natural roosting structure – (*e.g.,* predominantly native, mature trees; especially pine flatwoods or other areas with a large number of cavity trees, tree hollows, or high woodpecker activity).

LAA - May Affect, and is Likely to Adversely Affect. The appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or

beneficial [see definition of "may affect, but is not likely to adversely affect" (**MANLAA**)]. In the event the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action is "likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" (**LAA**) determination should be made. An "is likely to adversely affect" determination requires the initiation of formal section 7 consultation.

LIMITED ROOST SURVEY - This is a reduced survey that may include the following methods: acoustics, observations at emergence (*e.g.,* looking and listening for bats to come out of tree cavities around sunset), and visual inspection of trees with cavities or loose bark using tree-top cameras (or combination of these methods). Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting structures on site. See also Appendix C for a full description.

MANLAA - May Affect, but is Not Likely to Adversely Affect. The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. To use these Guidelines and Consultation Key applicants must incorporate the appropriate **BMPs** (Appendix D) to reach a **MANLAA** determination.

In this Consultation Key we have identified two ways that consultation can conclude informally, **MANLAA-P and MANLAA-C**:

> **MANLAA-P**: programmatic concurrence is provided through the transmittal letter of these Guidelines, no additional consultation is required with the Service for Florida bonneted bats. All survey results must be submitted to Service.
>
> **MANLAA-C**: further consultation with the Service is required to confirm that the Consultation Key has been used properly, and the Service concurs with the evaluation of the survey results. Request for consultation must include survey results.

NO EFFECT - The appropriate conclusion when the action agency determines its proposed action will not affect listed species or designated critical habitat.

POTENTIAL ROOSTING HABITAT - Includes forest and other areas with tall, mature trees or other areas with suitable roost structures (*e.g.,* utility poles, artificial structures). Forest is defined as all types including: pine flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed or hardwood hammocks, cypress, sand pine scrub, or other forest types. (Forrest types currently include exotic forests such as melaleuca, please contact the Service for additional guidance as needed). More specifically, this includes habitat in which suitable structural features for breeding and sheltering are present. In general, roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. Structural characteristics are of primary importance.

Florida bonneted bats have been found roosting in habitat with the following structural features, but may also occur outside of these parameters:

- trees greater than 33 feet (10 meters) in height, greater than 8 inches (20 centimeters) in diameter at breast height (DBH), with cavity elevations higher than 16 feet (5 meters) above ground level (Braun de Torrez 2019);
- areas with a high incidence of large or mature live trees with various deformities (*e.g.,* large cavities, hollows, broken tops, loose bark, and other evidence of decay) (*e.g.,* pine flatwoods);
- rock crevices (*e.g.,* limestone in Miami-Dade County); and/or
- artificial structures, mimicking natural roosting conditions (*e.g.,* bat houses, utility poles, buildings), situated in natural or semi-natural habitats.

In order for a building to be considered a roosting structure, it should be a minimum of 15 feet high and contain one or more of the following features: chimneys, gaps in soffits, gaps along gutters, or other structural gaps or crevices (outward entrance approximately 1 inch (2.5 centimeters) in size or greater. Structures similar to the above (*e.g.,* bridges, culverts, minimum of 15 feet high) are expected to also provide roosting habitat, based upon the species' morphology and behavior (Keeley and Tuttle 1999). Florida bonneted bat roosts will be situated in areas with sufficient open space for these bats to fly (*e.g.,* open or semi-open canopy, canopy gaps, above the canopy, and edges which provide relatively uncluttered conditions [*i.e.,* reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment]).

For the purpose of this Consultation Key*: Roosting habitat refers to habitat with structures that can be used for daytime and maternity roosting. Roosting at night between periods of foraging can occur in a broader range of structure types. For the purposes of this guidance we are focusing on day roosting habitat.*

ROOSTING IS LIKELY– Determining likelihood of roosting is challenging. The Service has provided the following definition for the express purpose of these Guidelines. Researchers use additional cues to assist in locating roosts. As additional indicators are identified and described we expect our Guidelines will be improved.

In this Consultation Key the Service will consider the following evidence indicative that roosting is likely nearby (*i.e.,* reasonably certain to occur) if **ANY** of the following are documented: (a) Florida bonneted bat calls are recorded within 30 minutes before sunset to 1½ hours following sunset or within 1½ hours before sunrise; (b) emergence calls are recorded; (c) human observers see (or hear) Florida bonneted bats flying from or to potential roosts; (d) human observers see and identify Florida bonneted bats within a natural roost or artificial roost; and/or (e) other bat sign (*e.g*., guano, staining, etc.) is found that is identified to be Florida bonneted bat through additional follow-up.

In addition to the aforementioned events, researchers consider roosting likely in an area when (1) large numbers of Florida bonneted bat calls are recorded throughout the night (*e.g.,* ≥ 25 files per night at a single acoustic station when 5 second file lengths are recorded); (2) large numbers of FBB calls are recorded over multiple nights (*e.g.,* an average of ≥ 20 files per night from a single detector when 5 second file lengths are recorded); or (3) social calls are recorded. Because social calls and large numbers of calls recorded over one or more nights can be indicative of high

FBB activity/use or when roosting is likely, the Service is choosing not to use these as indicators to make the determination that roosting is likely. Instead we are relying on the indicators that are only expected to occur at or very close to a roost location [(a)-(e) above].

TAKE - to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. [50 CFR §17.3].

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Appendix A. **Delineation and Justification for Consultation Area**

The Consultation Area (Figure 1) represents the general range of the species. The Consultation Area represents the area within which consideration should be given to potential effects to Florida bonneted bats from proposed projects or actions. Coordination and consultation with the Service helps to determine whether proposed actions and activities may affect listed species. This Consultation Area defines the area where proposed actions and activities may affect the Florida bonneted bat.

This area was delineated using confirmed presence data, key habitat features, reasonable flight distances and home range sizes. Where data were lacking, we used available occupancy models that predict probability of occurrence (Bailey *et al.* 2017). Below we describe how each one of these data sources was used to determine the overall Consultation Area.

Presence data: Presence data included locations for: (1) confirmed Florida bonneted bat acoustic detections; (2) known roost sites (occupied or formerly occupied; includes natural roosts, bat houses, and utility poles); (3) live Florida bonneted bats observed or found injured; (4) live Florida bonneted bats captured during research activities; and (5) Florida bonneted bats reported as dead. The Geographic Information Systems (GIS) dataset incorporates information from January 2003 to May 2019.

The vast majority of the presence data came from acoustic surveys. The species' audible, low frequency, distinct, echolocation calls are conducive for acoustic surveys. However, there are limitations in the range of detection from ultrasonic devices, and the fast, high-flying habits of this species can confound this. Overall, detection probabilities for Florida bonneted bats are generally considered to be low. For example, in one study designed to investigate the distribution and environmental associations of Florida bonneted bat, Bailey *et al.* 2017 found overall nightly detection probability was 0.29. Based on the estimated detection probabilities in that study, it would take 9 survey nights (1 detector per night) to determine with 95% certainty whether Florida bonneted bat are present at a sampling point. Positive acoustic detection data are extremely valuable. However, it is important to recognize that there are issues with false negatives due to limitations of equipment, low detection probabilities, difference in detection due to prey availability and seasonal movement over the landscape, and in some circumstances improperly conducted surveys (*i.e.,* short duration or in unsuitable weather conditions).

Key habitat features: We considered important physical and biological features with a focus on potential roosting habitat and applied key concepts of bat conservation (*i.e*., need to conserve roosting habitat, foraging habitat, and prey base). To date, all known natural Florida bonneted bat roosts (n=19 have been found in live trees and snags of the following types: slash pine, longleaf pine, royal palm, and cypress (Braun de Torrez 2018). Several of the recent roost discoveries are located in fire-maintained vegetation communities, and it appears that Florida bonneted bats are fire-adapted and can benefit from prescribed burn regimes that closely mimic historical fire patterns (Ober *et al.* 2018).

From a landscape and roosting perspective, we consider key habitat features to include forested areas and other areas with mature trees, wetlands, areas used by red-cockaded woodpeckers

(*Picoides borealis*; RCW), and fire-managed and other conservation areas. However, recent work suggests that Florida bonneted bats do not use pinelands more than other land cover types (Bailey *et al.* 2017). In fact, Bailey *et al.* 2017 detected Florida bonneted bats in all land cover types investigated in their study (e.g., agricultural, developed, upland, and wetland). For the purposes of these consultation guidelines, we are focusing on the conservation of potential roosting habitats across the species' range. However, we also recognize the need for comprehensive consideration of foraging habitats, habitat connectivity, and long-term suitability.

Flight distances and home range sizes: Like most bats, Florida bonneted bats are colonial central-place foragers that exploit distant and scattered resources (Rainho and Palmeirim 2011). Morphological characteristics (narrow wings, high wing-aspect ratio) make *Eumops* spp. well-adapted for efficient, low-cost, swift, and prolonged flight in open areas (Findley *et al*. 1972, Norberg and Rayner 1987). Other Eumops including Underwood's mastiff bat (*Eumops underwoodi*), and Greater mastiff bat or Western mastiff bat (*Eumops perotis*) are known to forage and/or travel distances ranging from 6.2 miles to 62 miles from the roost with multiple studies documenting flight distances approximately 15- 18 miles from the roost (Tibbitts *et al* 2002, Vaugh 1959 as cited in Best *et al*. 1996, Siders *et al.* 1999, Siders 2005, Vaughan 1959 as cited in Siders 2005.)

Like other *Eumops,* Florida bonneted bats are strong fliers, capable of travelling long distances (Belwood 1992). Recent Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they also move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (WMA), found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). Additional data collected during the month of December documented the mean maximum distance of Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b). The Service recognizes that the movement information comes from only one site (Babcock-Webb WMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Consequently, because Babcock-Webb WMA provides high quality roosting habitat, this movement data could represent the low end of individual flight distances from a roost.

Given the species' morphology and habits (*e.g*., central-place forager) and considering available movement data from other *Eumops* and Florida bonneted bats discussed above, we opted to use 15 miles (24 km) as a reasonable estimate of the distance Florida bonneted bats would be expected to travel from a roost on any given night. For the purposes of delineating a majority of the Consultation Area, we used available confirmed presence point location data and extended out 15 miles (24 km), with modifications for habitat features (as described above). As more movement data are obtained and made available, this distance estimate may change in the future.

Occupancy model – Research by Bailey *et al.* (2017) indicates the species' range is larger than previously known. Their model performed well across a large portion of the previously known

range when considering confirmed Florid bonneted bat locations; thus it is anticipated to be useful where limited information is available for the species.

We used the model output from Bailey *et al.* (2017) to more closely examine areas where we are data-deficient (*i.e.,* areas where survey information is particularly lacking). We considered 0.27 probability of occurrence a filter for high likelihood of occurrence because 0.27 was the model output for Babcock-Webb WMA, an area where Florida bonneted bats are known to occupy and heavily use. Large portions of Sarasota, Martin, and Palm Beach counties were identified as having probability of occurrence of 0.27. The consultation area should include areas where the species has a high likelihood of occurring. Based on this reasoned approach, all of Sarasota County, portions of Martin County, and greater parts of Palm Beach County were included in the Consultation Area.

We recognize that there are areas in the northern portion of the range where the model is less successful predicting occurrence based on the known Florida bonneted bat locations (*i.e*., the model predicts low likelihood of occurrence on Avon Park Air Force range, where the species is known to roost). Consequently, the Service is proactively working with partners to conduct surveys in the areas added based on the model to confirm that inclusion of these portions of the aforementioned counties is appropriate. The Consultation Area may be adjusted based on changes in this information.

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Appendix B: Full Acoustic / Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting or using the site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, project proponents may be able to retain suspected roosts or conserve roosting and foraging habitats. Changing the timing or nature of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females. If properly conducted, acoustic surveys are the most effective way to determine presence and assess habitat use. If the applicant is unable to follow or does not want to follow the Full Acoustic/Roost Survey framework when recommended according to the Key, the Corps (or other Action Agency) will not be able to use these Guidelines and will need to provide a biologically supported rational using the best available information for their determination in their request for consultation.

General Description: This is a *comprehensive survey effort*, and robust acoustic surveys (*i.e.,* surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple nights) are a fundamental component of the approach. Depending upon acoustic results and habitat type, it may also include: observations at emergence (*e.g.,* emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), visual inspection of trees/snags (*i.e.,* those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, or follow-up targeted acoustic surveys. Methods are dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting and foraging habitats on site.

General Survey Protocol:

[Note: The Service will provide more information in separate detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is intended for project sites > 5 acres (2 hectares).
- For sites containing roosting habitat, acoustic surveys should primarily focus on assessing roosting habitat within the project site that will be lost or modified (*i.e.,* areas that will not be conserved), and locations on the property within 250 feet (76.2 meters) of areas that will not be conserved. This will help avoid or minimize the loss of an active roost and individuals. Secondarily, since part of the purpose is to determine if Florida bonneted bats are using the site, acoustic devices should also be placed near open water and wetlands to maximize chances of detection and aid in assessing foraging habitat that may be lost.
- For sites that do not contain ANY roosting habitat, but do contain foraging habitat (see Figure 3 - Consultation Flowchart and Key, Step 2 [no], Step 13 [yes]), efforts should focus on assessing foraging habitat within the project site that will be lost or modified (*i.e.,* areas that will not be conserved).
- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving,

analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).

- Due to the variation in the quality of recordings, the influence of clutter, the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).
- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- The number of acoustic survey sites and nights needed for the assessment is dependent upon the overall acreage of suitable habitat proposed to be impacted by the action.
    - For non-linear projects, a minimum of 16 detector nights per 20 acres of suitable habitat expected to be impacted is recommended.
    - For linear projects (*e.g.,* roadways, transmission lines), a minimum of five detector nights per 0.6 mi (0.97 km) is recommended. Detectors can be moved to multiple locations within each kilometer surveyed, but must remain in a single location throughout any given night.
    - For any site, and in particular for sites > 250 acres, please contact the Service to assist in designing an appropriate approach.
- If results of acoustic surveys show **high Florida bonneted bat activity** or **Florida bonneted bat roosting likely** (*e.g.,* high activity early in the evening) (see definitions in Glossary), follow-up methods such as emergence surveys, visual inspection of the roosting structures, or follow-up acoustic surveys are recommended to locate potential roosts. Using a combination of methods may be helpful.

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as above) are suitable. Surveyors should be quietly stationed 30 minutes before sunset so they are ready to look and listen for emerging FBBs from sunset to 1½ hours after sunset. When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Visual inspection of trees with cavities and loose bark during the day may be helpful. Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).
- Visual inspection alone is not recommended due to the potential for roosts to be too high for cameras to reach, too small for cameras to fit, or shaped in a way that contents are out of view (Braun de Torrez *et al.* 2016).
- If roosting is suspected on site, use tree-top cameras during the day to search those trees/snags or other structures that have potential roost features (*i.e.,* cavities, hollows, crevices, or other structure for permanent shelter). If unsuccessful (*e.g.,* cannot see entire contents within a given cavity, cannot reach cavity, cannot see full extent of cavity) OR occupied roosts are found with the tree-top camera within the area in which high Florida bonneted bat activity/likely Florida bonneted bats roosting were identified, we recommend emergence surveys and/or acoustics to verify occupancy and/or identify bat species.
- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bats (*e.g.,* # of calls, time of calls, and station number) organized by the date on which the data were collected. Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov. Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as "all raw data" and "all raw data with signatures at or below 20kHz". Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey.

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

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Appendix C: Limited Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting within suitable structures on-site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, applicants and partners may be able to retain the suspected roosts or conserve roosting and foraging habitats. Changing the timing of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females.

General Description: This is a *reduced survey effort* that may include the following methods: visual inspection of trees/snags (*i.e.,* those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, observations at emergence (*e.g.,* emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), acoustic surveys, or a combination of these methods. Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting habitat on site.

General Survey Protocol:

[Note: The Service will provide more information in separate, detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is **intended only for small project sites** (*i.e.,* sites ≤ 5 acres [2 hectares]).
- Efforts should focus on assessing potential roosting structures within the project site that will be lost or modified (*i.e.,* areas that will not be conserved), or are located on the property within 250 feet (76.2 meters) of areas that will not be conserved.

Identification of potential roost structures

- This step is necessary prior to any of the methods that follow.
- Run line transects through roosting habitat close enough that all trees and snags are easily inspected. Transect spacing will vary with habitat structure and season from a maximum of 91 m (300 ft) between transects in very open pine stands to 46 m (150 ft) or less in areas with dense mid-story. Transects should be oriented north to south, to optimize cavity detectability because many RCW cavity entrances are oriented in a westerly direction (Service 2004).
- Visually inspect all trees and snags or other structures for evidence of cavities, hollows, crevices that can be used for permanent shelter. Using binoculars, examine structures for cavities, loose bark, hollows, or other crevices that are large enough for Florida bonneted bats (diameter of opening > or = to 1 inch (2.5 cm) (Braun de Torrez *et al*. 2016).
- When potential roosting structures are found, record their location in the field using a Global Positioning System (GPS) unit.

Visual Inspection of trees and snags with tree-top cameras

- Visually inspect all cavities using a video probe (peeper) and assess the cavity contents.

Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).

- Visual inspection alone is valid only when the entire cavity is observed and the contents can be identified. Typically, acoustics at emergence will also be needed to definitively identify bat species, if bats are present or suspected.
- If bats are suspected, or if contents cannot be determined, or if the entire cavity cannot be observed with the video probe; follow methods for an Acoustic Survey or an Emergence Survey (below). If the Corps (or other action agency) or applicant does not wish to conduct acoustic or emergence surveys, the Corps (or other action agency) cannot use the key and must request formal consultation with the Service.
- Record tree species or type of cavity structure, tree diameter and height, cavity height, cavity orientation and cavity contents.

Emergence Surveys

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as described below in Acoustic Surveys) are suitable.
- Surveyors should be quietly stationed 30 minutes prior to sunset so they are ready to look and listen for emerging Florida bonneted bats from sunset to 1½ hours after sunset.
- When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Record number of bats that emerged, the time of emergence, and if bat calls were heard.

Acoustic surveys

- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving, analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).
- Due to the variation in the quality of recordings, the influence of clutter, and the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on

warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).

- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- Acoustic surveys should be conducted over a minimum of four nights.
- If acoustic devices cannot be left in place for the entire night for multiple nights as above, then a combination of short acoustic surveys (from sunset and extending for 1½ hours), stationed observers for emergence surveys or visual inspection of trees/snags with tree-top cameras may be acceptable. Contact the Service for guidance under this circumstance.

Reporting

- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bat by date (*e.g.*, # of calls, time of calls). Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov. Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as "all raw data" and "all raw data with signatures at or below 20kHz". Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix C

Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. Journal of Mammalogy. 98:1586-1593.

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U.S. Fish and Wildlife Service. 2004. South Florida Ecological Services Office DRAFT July 12, 2004 Species Conservation Guidelines South Florida Red-cockaded Woodpecker. Appendix A. Red-cockaded Woodpecker South Florida Survey Protocol. July 12, 2004. South Florida Ecological Service Office, Vero Beach Florida. https://www.fws.gov/verobeach/BirdsPDFs/200407SlopesCompleteRedCockadedWoodpecker.pdf

U.S. Fish and Wildlife Service. 2018. Range-wide Indiana bat survey guidelines. https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf

Appendix D: Best Management Practices (BMPs) for Development Projects

Ongoing research and monitoring will continue to increase the understanding of the Florida bonneted bat and its habitat needs and will continue to inform habitat and species management recommendations. These BMPs incorporate what is known about the species and also include recommendations that are beneficial to all bat species in Florida. These BMPs are intended to provide recommendations for improving conditions for use by Florida bonneted bats, and to help conserve Florida bonneted bats that may be foraging or roosting in an area.

The BMPs required to reach a "may affect, but is not likely to adversely affect" (MANLAA) determination vary depending on the couplet from the Consultation Key used to reach that particular MANLAA. The requirements for each couplet are provided below followed by the list of BMPs. If the applicant is unable or does not want to do the required BMPs, then the Corps (or other Action Agency) will not be able to use this Guidance and formal consultation with the Service is required.

Couplet Number for MANLAA from Consultation Key	Required BMPs
4b	BMP number 1 if more than 3 months has occurred between the survey and start of the project, and any 3 BMPs out of BMPs 4 through 13
5b	BMP number 2, and any 3 BMPs out of BMPs 3 through 13
9b	BMPs number 2 and 3, and any 4 BMPs out of BMPs 5 through 13
11b	BMPs number 1 and 4, and any 4 BMPs out of BMPs 5 through 13
12b	BMP number 1, and any 3 BMPs out of BMPs 3 through 13
14b	Any 2 BMPs out of BMPs 3 through 13
15b	Any 3 BMPs out of BMPs 3 through 13
17b	Any 4 BMPs out of BMPs 3 through 13

BMPs for development, construction, and other general activities:

1. If potential roost trees or structures need to be removed, check cavities for bats within 30 days prior to removal of trees, snags, or structures. When possible, remove structure outside of breeding season (*e.g.*, January 1 – April 15). If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.
2. When using heavy equipment, establish a 250 foot (76 m) buffer around known or suspected roosts to limit disturbance to roosting bats.
3. For every 5 acres of impact, retain a minimum of 1.0 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained.
4. For every 5 acres of impact, retain a minimum of 0.25 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained..
5. Conserve open freshwater and wetland habitats to promote foraging opportunities and avoid impacting water quality. Created/restored habitat should be designed to replace the function of native habitat.

6. Conserve and/or enhance riparian habitat. A 50-ft (15.2 m) buffer is recommended around water bodies and stream edges. In cases where artificial water bodies (*i.e.,* stormwater ponds) are created, enhance edges with native plantings especially in cases in which wetland habitat was affected.
7. Avoid or limit widespread application of insecticides (*e.g.,* mosquito control, agricultural pest control) in areas where Florida bonneted bats are known or expected to forage or roost.
8. Conserve natural vegetation to promote insect diversity, availability, and abundance. For example, retain or restore 25% of the parcel in native contiguous vegetation.
9. Retain mature trees and snags that could provide roosting habitat. These may include live trees of various sizes and dead or dying trees with cavities, hollows, crevices, and loose bark. See "Roosting Habitat" in "Background" above.
10. Protect known Florida bonneted bat roost trees, snags or structures and trees or snags that have been historically used by Florida bonneted bats for roosting, even if not currently occupied, by retaining a 250 foot (76 m) disturbance buffer around the roost tree, snag, or structure to ensure that roost sites remain suitable for use in the future.
11. Avoid and minimize the use of artificial lighting, retain natural light conditions, and install wildlife friendly lighting (*i.e*., downward facing and lowest lumens possible). Avoid permanent night-time lighting to the greatest extent practicable.
12. Incorporate engineering designs that discourage bats from using buildings or structures. If Florida bonneted bats take residence within a structure, contact the Service and Florida Fish and Wildlife Conservation Commission prior to attempting removal or when conducting maintenance activities on the structure.
13. Use or allow prescribed fire to promote foraging habitat.

Appendix E: Additional Best Management Practices (BMPs) for Land Management Projects

Ecological Land Management

The Service reviews and develops Ecological Land Management projects that use land management activities to restore and maintain native, natural communities that are beneficial to bats. These activities include prescribed fire, mechanical treatments to reduce vegetation densities, timber thinning to promote forest health, trail maintenance, and the treatment of exotic vegetation. The following BMPs provide recommendations for conserving Florida bonneted bat roosting and foraging habitat during ecological land management activities. The Service recommends incorporating these BMP into ecological land management plans.

If potential roost trees need to be removed, check cavities for bats prior to removal of trees or snags. If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.

Ecological Land Management BMPs:

- Protect potential roosting habitat during ecological land management activities, if feasible. Avoid removing trees or snags with cavities.
- Rake and/or manually clear vegetation around the base of known or suspected roost trees to remove fuel prior to prescribed burning.
- If possible, use ignition techniques such as spot fires or backing fire to limit the intensity of fire around the base of the tree or snag containing the roost. The purpose of this action is to prevent the known or suspected roost tree or snag from catching fire and also to attempt to limit the exposure of the roosting bats to heat and smoke. A 250-ft (76 m) buffer is recommended.
- If prescribed fire is being implemented to benefit Florida bonneted bats, Braun de Torrez et al. (2018) noted that fire in the dry/spring season could be most beneficial.
- When creating firebreaks or conducting fire-related mechanical treatment, mark and avoid any known or suspected bat roosts.
- When using heavy equipment, establish a buffer of 250 feet (76 m) around known roosts to limit disturbance to roosting bats.
- Establish forest management efforts to maintain tree species and size class diversity to ensure long-term supply of potential roost sites.
- For every 5 acres (2 hectares) of timber that is harvested, retain a clump of trees 1-2 acres (0.4 - 0.8 hectare) in size containing potential roost trees, especially pines and royal palms (live or dead). Additionally, large snags in open canopy should be preserved.

Literature Cited – Appendix E

Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2018. Activity of an Endangered Bat Increases Immediately Following Prescribed Fire. The Journal of Wildlife Management.

APPENDIX K

Peninsular Florida Species Conservation Guidelines for Sand and Blue-tailed Mole Skink

July 31, 2020

Peninsular Florida
Species Conservation and Consultation Guide

Sand Skink and Blue-tailed (Bluetail) Mole Skink

This guide for sand skink (*Plestiodon* [*Neoseps*] *reynoldsi)* and blue-tailed mole skink (*Plestiodon* [*Eumeces*] *egregius lividus*) conservation and Endangered Species Act (ESA) consultation is intended to assist project proponents to determine if or how a proposed action may affect sand skinks or blue-tailed mole skinks.

The sand skink and blue-tailed mole skink are listed as threatened pursuant to the ESA. The ESA prohibits the unauthorized "take"[a] of threatened and endangered species. Individuals and entities intending to conduct projects that may affect listed species may lawfully incidentally take those species after consulting with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 or 10 of the ESA. When a project is conducted, funded, or authorized by a Federal agency, listed species consultation occurs through section 7 of the ESA. When there is no Federal nexus (*e.g.,* Federal authorization or funding), a non-Federal entity who wishes to conduct an activity may legally "take" listed species after obtaining an Incidental Take[b] Permit (ITP) from the Service in accordance with section 10 of the ESA.

In this guide, we first summarize sand skink and blue-tailed mole skink status, life history, distribution, habitat, and threats. Then we discuss the consultation steps, including: assessing the effects of the proposed action, making effect determinations, and incorporating conservation measures into proposed actions to maximize beneficial effects and to avoid or minimize negative effects to listed skinks and their habitat. Appendix A provides a recommended skink survey protocol, Appendix B provides a method for estimating skink habitat use based upon movement data and survey results, Appendix C provides a variety of possible Conservation Measures, including conservation, compensation, and mitigation guidance, and Appendix D provides a Habitat Equivalency Analysis calculator. The current guide will be updated as new information becomes available and will be posted on the Service's South Florida website at http://www.fws.gov/verobeach/.

For more information on sand skink and blue-tailed mole skink biology, habitat needs, threats, taxonomy, and recovery criteria and goals, see the Bluetail Mole Skink and Sand Skink 5-Year

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[a] "Take" is defined as harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. The term "harm" includes any act which actually kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish and wildlife. The term "harass" is defined as any act that creates the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include but may not be limited to breeding, feeding, or sheltering.

[b] "Incidental Take" is defined as take that results from, but is not the purpose of, carrying out an otherwise lawful activity.

Status Review (Service 2007) and the South Florida Multi-Species Recovery Plan (Service 1999). Published literature as well as unpublished reports, information, and data referenced in the skink conservation and consultation guide are available at the Service's South Florida Ecological Services Office (SFESO) in Vero Beach, Florida (by phone at 772-562-3909 or by mail at 1339 20th Street, Vero Beach, Florida 32960-3559).

Status

The Service listed the sand skink and the blue-tailed mole skink as threatened under the ESA in 1987 primarily due to modification and destruction of xeric upland communities in central Florida. Habitat loss, habitat fragmentation, and changes in land use still threaten sand skinks and blue-tailed mole skinks. In addition, lack of habitat management, competition from non-native and invasive plant species, and loss of genetic diversity threaten sand skink and blue-tailed mole skink existence (Service 1999; 2007).

Life History

Little is known about sand skink and blue-tailed mole skink population or reproduction ecology. Both sand skinks and blue-tailed mole skinks are difficult to detect and study due to their small size and semi-fossorial to fossorial habits. Sand skinks and blue-tailed mole skinks generally partition rather than compete with one another for resources. Sand skinks are primarily fossorial; they move or "swim" below the surface of the ground in sandy soils and take prey below the surface. Blue-tailed mole skinks are semi-fossorial; they hunt at the soil surface and consume mostly terrestrial arthropods (Smith 1977).

No data are available on sand skink or blue-tailed mole skink home ranges, or blue-tailed mole skink dispersal. Information on sand skink dispersal and movement patterns is limited. Sand skink studies in the early 2000s documented several instances where movement distances exceeded 460 feet (ft) (140 meters [m]) (Mushinsky et al. 2001; Penney 2001; Penney et al. 2001) and one instance where an adult male moved over 780 ft (240 m) (Penney 2001). Other studies suggested that some individual sand skinks may move more than 3,280 ft (1 kilometer [km]) and up to 26,250 ft (8 km) where suitable soils are contiguous with no natural or manmade barriers to movement, but some data points in this dataset could not be verified (Mushinsky et al. 2011). Schrey et al. (2011) conducted a genetic analysis of sand skinks (n = 470) within 25 m of each other, and reported "the Florida sand skink occurs with higher genetic similarity than expected by chance within 25 m (82 ft)". Although dispersal data are not available for blue-tailed mole skinks, Schrey et al. (2012) found no genetic evidence of long-distance dispersal. Penney (2001) reported translocated sand skinks moved a median distance of 25.6 m (84 ft; n = 64). Perry and Garland (2002) reviewed literature and examined home range as a function of snout-vent length in lizards. Of the 489 data sets they examined, 108 met their criteria for their analysis. Lizards of the Autarchoglossa (the clade that contains all skink species) with snout-vent lengths ranging from 30 millimeters (mm) to 100 mm (i.e., the range representative of sand skinks) had home ranges of approximately 10 m^2 to approximately 1,700 m^2. A 1,700 m^2 area has a radius of 23 m (75 ft). After reviewing this information, the Service has determined that sand skinks are reasonably certain to feed, breed, and shelter within 80 ft of a track when the

habitat is suitable. Currently, a multi-year study on home range sizes and/or movement distance is being conducted. If additional scientific information is obtained, data will be evaluated and changes to these guidelines may be necessary at that time.

Distribution

Reptile research and incidental observations to date indicate blue-tailed mole skinks typically occur with sand skinks. Only sand skinks leave visible signs, or tracks, on sandy soil surfaces. Therefore, sand skink occurrence is used as an indicator of blue-tailed mole skink occurrence where the two species overlap in distribution. Blue-tailed mole skink genetic studies indicate that conservation actions for sand skinks will also likely benefit blue-tailed mole skinks (Schrey et al. 2012).

Both sand skinks and blue-tailed mole skinks are endemic to, which means they occur only on, the sandy ridges of central Florida. Skink distribution is defined by three factors: county, elevation, and soil types. Primary populations of sand skinks occur on the Lake Wales, Winter Haven, and Mt. Dora Ridges in Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam Counties. Blue-tailed mole skinks are restricted to the Lake Wales Ridge in Highlands, Polk, and Osceola Counties.

Skinks are generally found at elevations 82 ft above sea level and higher (Florida Natural Areas Inventory 2007). Recent skink occurrences documented at 70 ft above sea level indicate skinks occur at lower elevations where suitable soil conditions for skinks continue down slope (Service unpubl. data).

Skinks occur in excessively drained, well-drained, and moderately well-drained sandy soils that include the Apopka, Arredondo, Archbold, Astatula, Basinger, Candler, Daytona, Duette, Florahome, Gainesville, Hague, Immokalee, Kendrick, Lake, Millhopper, Orsino, Paola, Placid, Pomello, Pompano, Satellite, Samsula, Smyrna, St. Lucie, Urban land (when open sandy soils persist and remnant scrub remains), Tavares, Zolfo and Zuber soil series, referred to as "skink soils" in this guide. Soil series maps are available online (https://sdmdataaccess.nrcs.usda.gov/and through county extension offices.

Habitat

Skink habitat identified in this guide includes skink soils at and above 82 ft above sea level. Skink searches or surveys following a standardized protocol (Appendix A) should be conducted in all skink soils above 82 ft elevation or in projects areas that are directly adjacent to suitable habitat. Additional skink surveys, monitoring, and observations will likely improve knowledge of skink occurrence and distribution, as well as understanding of skink habitat use.

Skink soils typically support scrub, sandhill, or xeric hammock natural ecological communities, such as oak-dominated scrub, turkey oak (*Quercus laevis*) barrens, high pine, and xeric hammocks. Typical upland habitat for both sand skinks and blue-tailed mole skinks consists of sand pine (*Pinus clausa*)-rosemary (*Ceratiola ericoides*) scrub or longleaf pine (*Pinus palustris*)-

turkey oak/sand live oak (*Quercus geminate*) association. Sand skinks have also been documented in skink soils where natural vegetative cover has been altered for human uses such as pine plantations, active or inactive citrus groves, pastures, and residential developments, as well as neglected vegetative cover like old fields and overgrown scrub, especially in areas with overgrown or remnant scrub adjacent (Pike et al. 2008). Blue-tailed mole skinks occur in habitat similar to that used by sand skinks. Habitat condition or vegetative cover alone cannot be used to exclude areas that might be used by sand skinks or blue-tailed mole skinks.

Both sand skinks and blue-tailed mole skinks typically occur in areas that contain a mosaic of open sandy patches interspersed with forbs, shrubs, and trees. Sand skink tracks are usually observed in open sandy areas, yet both skink species use a variety of micro-habitats within xeric vegetative communities. Sand skink tracks appear most abundant in the ecotone, or edges, between areas with abundant leaf litter and vegetative cover and adjacent open sands. Blue-tailed mole skinks are typically found under leaf litter, logs, palmetto fronds, and other ground debris (Christman 1992).

Specific physical structures of habitat that sustain sand skink populations, and likely blue-tailed mole skink populations as well, include a well-defined leaf litter layer on the ground surface and shade from either a tree canopy or a shrub layer, but not both. Leaf litter likely provides important skink foraging opportunities. Shade provided by a tree canopy or a shrub layer likely helps skinks regulate body temperature to prevent overheating. However, having both a tree canopy and a shrub layer appears to be detrimental to skinks (McCoy 2011, University of South Florida, pers. comm.).

Either natural fires started by lightning or prescribed burns are necessary to maintain habitat in natural scrub ecosystems. However, if fire occurs too frequently, leaf litter might not build up sufficiently to support skink populations. At Archbold Biological Station, sand skinks appear to be most abundant after 10 years of leaf litter development. The ideal fire frequency to maintain optimal leaf litter development for skinks likely varies by site and other environmental conditions (Mushinsky 2011, University of South Florida, pers. comm.).

Threats

Habitat loss, fragmentation, and changes in land use continue to threaten sand skinks and blue-tailed mole skinks. Development and agricultural conversion have resulted in the loss of approximately 85 percent of the scrub and sandhill habitats on the Lake Wales Ridge (Turner et al. 2006). Habitat degradation and fragmentation also continue to affect populations, even on protected lands. Active management is necessary to maintain suitable habitat for skinks. Much of the remaining habitat occurs in small, isolated patches surrounded by residential areas or citrus groves, making the suitable habitat patches and connections between patches difficult to protect and manage. Many habitat patches are overgrown and in need of restoration, but vegetation restoration and management programs are costly and depend upon availability of funding. Privately-owned sites remain at risk of being developed, and destruction or habitat modification due to improper or lack of management remains a concern. Conversion of rural lands to urban use in central Florida where skinks occur is projected to continue over the next 50

years. In addition, fire suppression, improper stand management, competition from invasive plant species, and loss of genetic diversity continue to threaten the existence of the sand skink and blue-tailed mole skink.

Critical Habitat

Critical habitat has not been designated for either sand skinks or blue-tailed mole skinks.

Consultation Area

The Service delineated a consultation area (Figure 1 and Figure 2) to assist project proponents to determine if a proposed action might affect sand skinks or blue-tailed mole skinks (skinks). The consultation area is intended to guide project proponents of both Federal and non-Federal actions. Some locations inside the consultation area may not contain appropriate soils and elevation to support skinks. The consultation area includes: (1) known skink locations, (2) skink soils at appropriate elevations defined as skink habitat, and (3) natural and developed ecosystems that are known to support skinks. Experts cannot determine the location of each skink throughout the year, or the exact areas that support skink feeding, breeding, and sheltering, even if extensive continuous year-long research is conducted in central Florida. Therefore, the consultation area outlines a geographic landscape with a higher likelihood of skink habitat use than the landscape outside of the consultation area.

In general, proposed actions inside the consultation area are more likely to affect skinks, and proposed actions outside the consultation area are less likely to affect skinks. Though the consultation area provides an initial analysis tool, users evaluating a proposed action should not consider the consultation area as the only factor in deciding whether or not consultation is required. The consultation area is based on best available information to date. We expect that more information will improve and refine our knowledge of skink occurrence in the future. Consultation is required if proposed actions outside the delineated consultation area may affect skinks. Similarly, consultation may not be required if proposed actions inside the consultation area will not affect skinks (*e.g.,* if the project location is not within the appropriate elevation or does not contain suitable skink soils).

Consultation

Federal and non-Federal project proponents have different responsibilities for conducting consultations to ensure compliance with the ESA. This section outlines a stepwise process to guide consultation for skinks. All project proponents should follow Steps 1 and 2 regardless of whether they are consulting on Federal actions through section 7 or seeking technical assistance through section 10. Federal project proponents should continue with Steps 3 and 4. Non-Federal project proponents seeking incidental take authorization through section 10 of the ESA should contact the Service at 772-562-3909 in South Florida or 904-731-3336 in North Florida for additional information.

Federal Action Agencies

In addition to this guide, the ESA section 7 Consultation Handbook (Services 1998), and the Service's consultation checklist provide information on consultation for Federal actions. The Guide to a Complete Initiation Package (Service 2004b) and checklist provide details on how to prepare a complete consultation initiation package.

Non-Federal Entities

When an action, such as clearing vegetation, conducting development activities, or permitting of such activities, is proposed within the Skink Consultation Area and there is no Federal nexus, we recommend that non-Federal entities (*i.e.;* private land owners; businesses; state, county, or local municipalities) request technical assistance from the Service under section 10 of the ESA prior to initiating or authorizing the proposed activity. The Service will review the information provided to assess if the action has the potential to result in take of skinks or other listed animal or plant species. If the proposed action is likely to take listed species, the Service recommends that the non-Federal entity apply for an Incidental Take Permit (ITP) to ensure compliance with the ESA and to minimize the risk of third party lawsuits. As part of the ITP application, applicants develop a Habitat Conservation Plan (HCP). Among other things, the HCP describes the actions that the applicant will implement to minimize and mitigate negative effects to listed species, demonstrates that there will be no appreciable reduction in the survival of the species, and demonstrates that there is adequate funding and other assurances to ensure the plan will be fully implemented. For more information, contact the Service at 772-562-3909 in South Florida or 904-731-3336 in North Florida. Additional information on section 10 consultation can be found on the Service's national website (http://www.fws.gov/endangered/what-we-do/hcp-overview.html) and the South Florida Ecological Services (SFESO) website (http://www.fws.gov/verobeach/).

Step 1: Describe the Proposed Action

Fully describe all features and activities related to the proposed action, such as: proposed project purpose; all aspects of proposed construction, including road access, staging areas, and any associated land clearing and filling; information on surveys and monitoring; and anticipated post-project operations, maintenance, and management. Describe the project location, habitat, soil types, and elevations affected. Develop and provide maps of all project locations, boundaries, county lines, soil types, elevation, and habitat. On the maps, delineate project boundaries, map suitable soils and elevations, and quantify the acreage of proposed impact. On the maps, also designate those areas that are not considered habitat (*e.g.*, existing paved surfaces, water bodies, existing structures, etc.).

Consequences of the action should be considered. Consequences are a result or effect of an action, and we apply the two-part test to determine whether a given consequence should be considered an effect of the proposed action that is under consultation. An example is constructing a road to access a proposed action site. The access road would not be necessary but for the proposed action. Interdependent activities have no independent utility apart from the

proposed action. An example is annual maintenance of the access road. Maintenance would not be necessary but for continued need for access to the proposed action.

More information on complete proposed action descriptions can be found in the Species Conservation Guidance Introduction of this document. Early coordination with the Service can reduce requests for additional information and reduce consultation time frames.

Step 2: Determine and Describe Species, Habitat, or Critical Habitat that May Be Affected. Note: Because no critical habitat has been designated for skinks, it will not be addressed further in this guidance.

2a: Species Location by County. Check to determine if the proposed action is in a county where skinks occur. Skink habitat typically supports federally listed plants and other species that should be consulted on, as well (See Figure 1 or the Service's website at http://ecos.fws.gov/ipac/).

2b: Consultation Area. If the proposed action is in a county where skinks generally occur, check the skink consultation area map (Figure 1 and Figure 2) to see if the proposed action is in or close to the delineated consultation area. Keep in mind that a proposed action may affect skinks whether or not it is within the consultation area boundary (*e.g.,* where skink soils are found or skinks or skink sign are detected outside of the boundary). Additional analysis may be needed.

2c: Species Occurrence by Habitat. If the proposed action is in the consultation area or otherwise might affect skinks, determine if skink habitat may be affected. Potential skink habitat includes all areas with skink soils (Refer to *Distribution*). Skink habitat consists of natural xeric vegetative cover and areas altered for human uses, including but not limited to: pine plantations, active or inactive citrus groves, pastures, residential developments, and neglected vegetative cover like old fields and overgrown scrub.

Check the natural community maps to determine if the proposed action is in or might affect natural ecological communities that traditionally indicated skink habitat. Because of the cumulative conversion of natural xeric communities for human uses, remaining natural xeric scrub is particularly important to maintain and support remaining skink populations.

This concludes the desktop analysis of the proposed action. However, site-specific assessments of parcels proposed for modification are necessary to determine if the proposed action may affect skink habitat.

2d: Early coordination. The Service highly recommends that applicants and their representatives contact the Service early in the planning process to determine if surveys are recommended or if methodology is sufficient to detect presence. Early coordination will also assist in determining mitigation or minimization needs at the beginning of the consultation process.

In situations where projects meet soil, elevation, and habitat criteria, the Service recommends surveying the project site to indicate whether skinks occur within the project area, or if present, what extent of the project area they are utilizing. Prior to coverboard surveys, pedestrian surveys may be used to detect skink presence. However, pedestrian surveys may not be used to determine absence. See Appendix A for the Service's recommended survey protocol. Survey procedures should be followed closely and surveyors should have qualifications that include prior skink survey experience to increase the probability of detecting listed skinks where they occur. As stated in the protocol, the Service strongly recommends that project proponents contact us prior to initiating surveys.

If skinks are confirmed to occur within all or part of a proposed action area, whether inside or outside of the consultation area (Figure 1 and Figure 2), the site where skinks occur is considered occupied where habitat is suitable. The proposed action must be evaluated to determine if it may affect skinks.

The risk of a proposed action affecting occupied skink habitat does not depend solely on whether or not the action is located within known occupied skink habitat. Additional analysis (as described in Step 3a-b below) is needed to determine if project activities might affect skinks. A project may be so benign as to not affect skinks. If an analysis indicates a project presents only insignificant (small in size) or discountable (extremely unlikely to occur) negative risks to skinks, the applicant may consider incorporating conservation measures (see Step 3c and Appendix C), as appropriate, into the project design to further avoid or minimize direct or indirect negative effects to skinks. If a project will adversely affect skinks, it may be necessary to incorporate compensation or mitigation into the project design (Appendix C) to help offset anticipated incidental take.

Contact the Service or other sources early in the project planning and development process for more information on skinks and their habitat that may be affected by a proposed action.

Step 3: Evaluate Effects of the Proposed Action and Incorporate Conservation Measures.

3a: Describe potential effects of the proposed action, as well as consequences of the action, which may affect skinks. Proposed actions that would alter sites occupied by skinks could potentially affect skinks (*e.g.,* ground-disturbing or soil-compacting activities; clearing; construction, access, and staging activities; operation and maintenance activities; chemical applications; etc.)(Figure 1 and Figure 2).

3b: Describe potential cumulative effects which are the effects of future State or private activities, not involving Federal activities, which are reasonably certain to occur within the action area of the Federal action subject to consultation. These include effects that result in abiotic disturbances like chemical, radiation, or temperature changes and biotic disturbances like water quality, soil condition, vegetation cover, or topographic changes.

3c: Describe conservation measures incorporated into the project plan to avoid or minimize negative effects, in particular avoidance or minimization of adverse effects to skinks or their habitat. Describe conservation measures applied to compensate for anticipated incidental take. See more on Conservation Measures in Appendix C.

Contact the Service early in the consultation process for assistance in evaluating effects of the proposed action on skinks.

Step 4: Document methods, evidence, analyses, and reasoning and make a determination; prepare and submit a complete consultation initiation package that includes:

4a. A complete description of the proposed action.

4b. A complete description of federally listed resources (listed species and, if applicable, designated critical habitats) that may be affected.

4c. A complete description of potential direct (caused by the action, likely to affect listed resources, reasonably certain to occur), indirect (similar to direct effects but occur later in time), and cumulative (non-Federal actions reasonably certain to occur in the action area) effects and conservation measures incorporated to avoid, minimize, or compensate for adverse effects. Provide a complete description of conservation measures applied to avoid, minimize, or compensate for adverse effects anticipated to result in incidental take. Adverse effects may be either permanent or temporary in nature. See Appendix C for guidance on how to determine the nature of the adverse effects and calculate compensation for each.

4d. Reasoning or logic statements that connect the proposed action, affected listed resources, potential effects, and conservation measures; the reasoning should provide logical support and justification for the effect determinations.

4e. (An) effect determination(s), or a conclusion(s), and further coordination with the Service. Three effect determinations are possible:

i. "No effect" - If the proposed action is 1) outside the consultation area and contains no suitable habitat, or 2) inside the consultation area but contains no suitable habitat, then the action will not affect skinks, and the proposed action determination should be "no effect."

ii. "May affect, not likely to adversely affect" - If the proposed action is in the consultation area and contains suitable habitat, elevation, and soils, the Service recommends proceeding with surveys within the project area (see Step 2). If skinks or their sign are detected and the proposed action will have only beneficial, insignificant, or discountable effects on skinks, the proposed action determination should be "may affect, not likely to adversely affect." The Service will concur with this determination unless

survey protocols were not followed. Clearly document your survey methods and results, effects analyses, and reasoning so that we can evaluate your findings to prepare the Service's written concurrence, which is required for a "may affect, not likely to adversely affect" determination.

iii. "May affect, likely to adversely affect" – If sand skinks or their sign have been detected within the project area and if all avoidance and minimization measures have been incorporated into the design of your project and the remaining adverse effects to skinks are not insignificant or discountable, the determination for the proposed project should be "may affect, likely to adversely affect" skinks. This is true if skinks have been documented to occur, are detected, whether or not the proposed action is within or outside of the consultation area. Formal consultation with the Service is required. The Service may be contacted early for technical assistance to help identify additional conservation measures to minimize adverse effects to skinks. For guidance on when to seek an incidental take permit, see memo 067674.

Reinitiation of Consultation

While the issuance of the Service's biological opinion or concurrence letter concludes consultation, reinitiation of consultation is required if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals the action may affect listed species or critical habitat in a manner or to an extent not considered; (3) the action is modified which causes an effect not previously considered; or (4) a new species is listed or critical habitat designated that may be affected by the action. Any operation causing incidental take which exceeds the amount or extent anticipated must cease, and the Service must be contacted immediately.

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GIS Data

Sand_Skink_Consultation_Area_20200528 Consultation Area for sand skinks

Blue-Tail_Mole_Skink_Consultation Area_20200528 Consultation Area for blue-tailed mole skinks

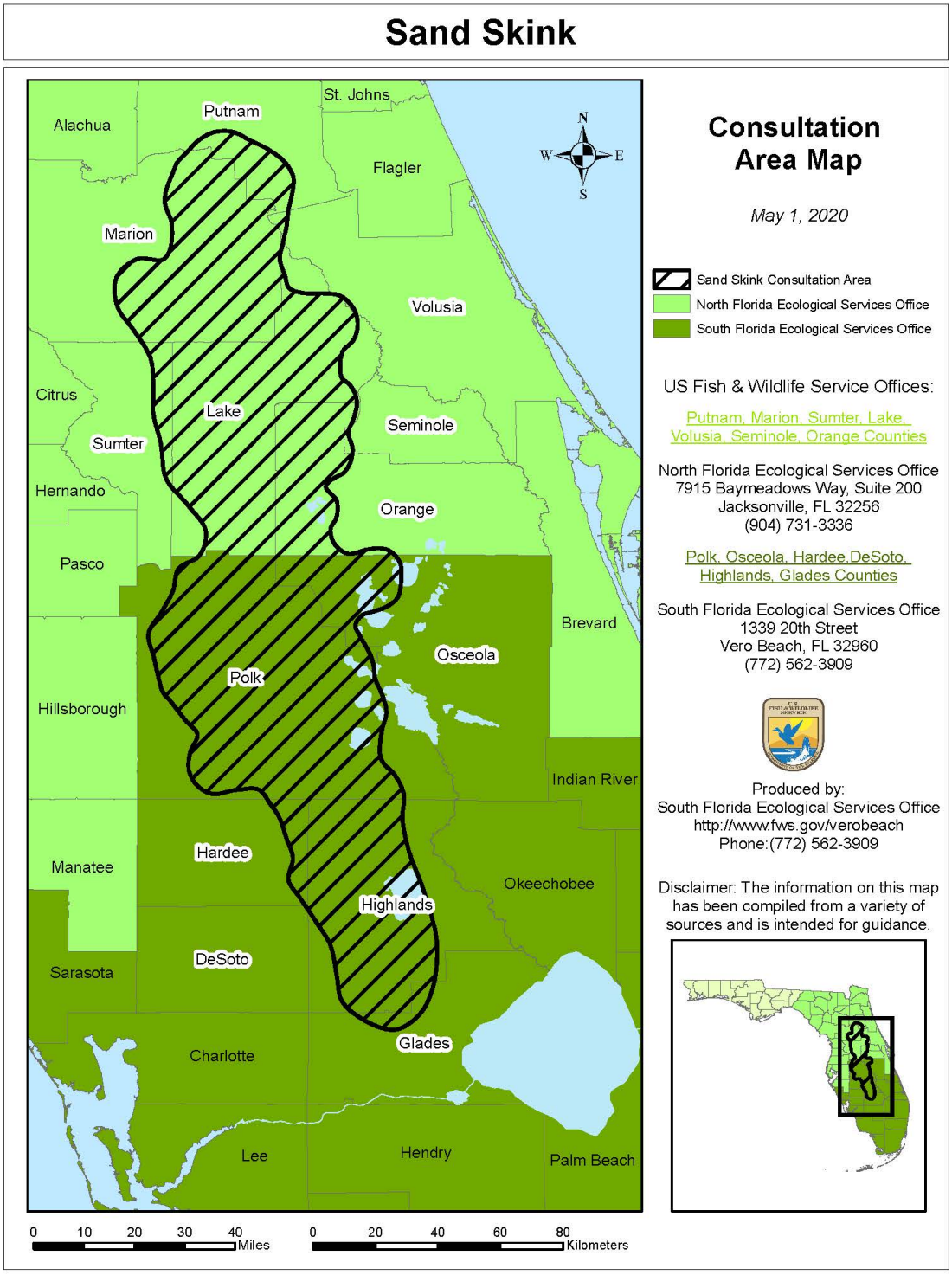

Figure 1. Sand skink consultation area. County names depicted in shadowed bold text indicate the counties where skinks are known to occur.

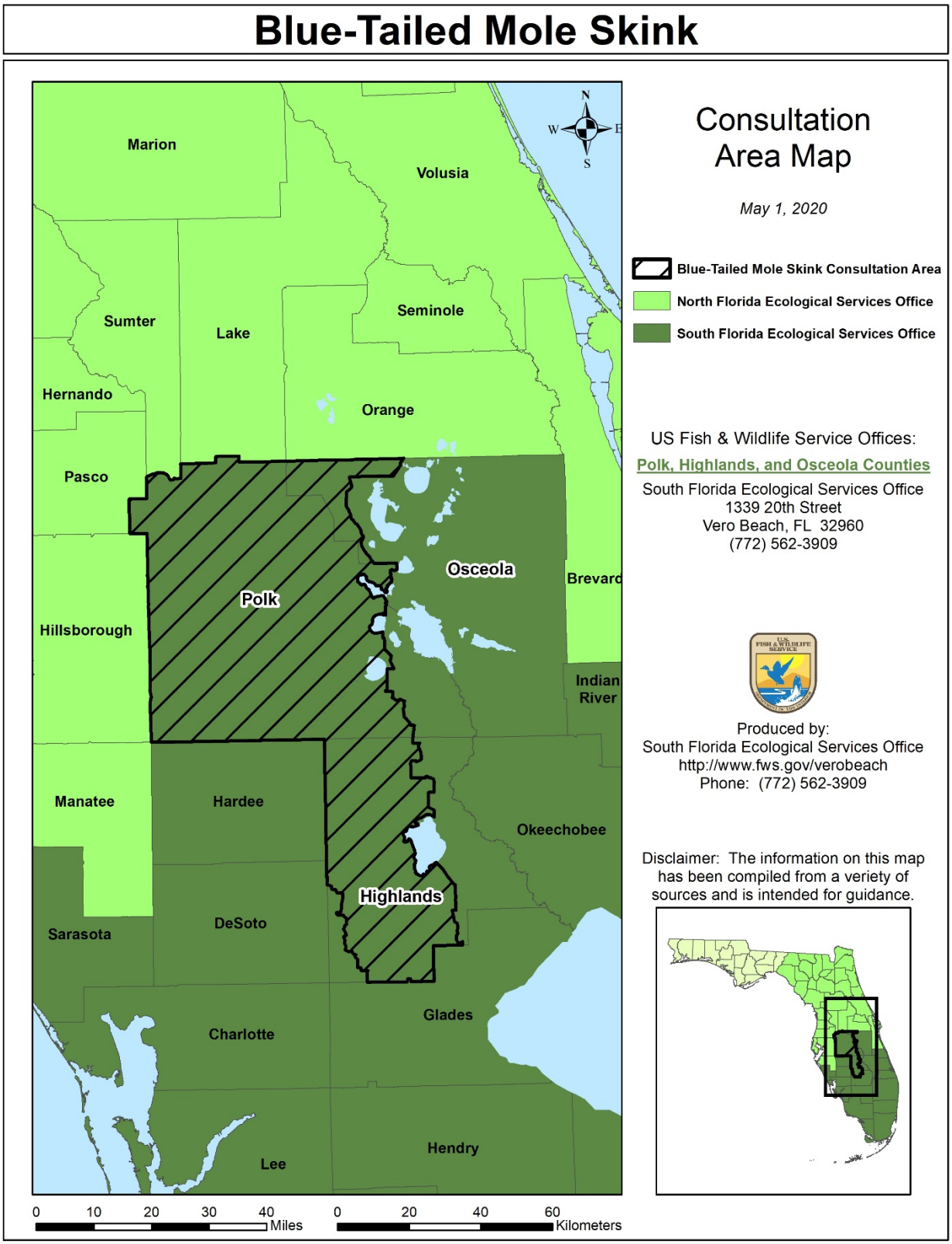

Figure 2. Blue-tailed mole skink consultation area. County names depicted in shadowed bold text indicate the counties where skinks are known to occur

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Appendix A

Sand Skinks and Blue-tailed Mole Skinks

Survey Protocol
Peninsular Florida

The U.S. Fish and Wildlife Service (Service) provides this revised skink survey protocol for all counties in Florida in which the sand skink (*Plestiodon* [*Neoseps*] *reynoldsi*) and blue-tailed (bluetail) mole skink (*Plestiodon* [*Eumeces*] *egregius lividus*) occur based on the 5-year status review of the two species (Service 2007) and our assessment of skink surveys to date. The purpose of this recommended survey protocol is to standardize survey and data collection procedures among project proponents to ensure consistent and comparable information that may improve our knowledge of the species' occurrence and habitat use over space and time. The current guidance will be updated as new information becomes available.

The three most important factors in determining the likelihood of presence of skinks are location, elevation, and suitable soils. Sand skinks occur on sandy ridges of interior central Florida. The extant range of the sand skink includes Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam Counties (Christman 1988; Telford 1998). Principal populations occur on the Lake Wales Ridge, Winter Haven Ridge, and Mount Dora Ridge (Christman 1970; Christman 1992; Mushinsky and McCoy 1995). Blue-tailed mole skinks are only known to occur on the Lake Wales Ridge in Highlands, Osceola, and Polk Counties (Mount 1965; Christman 1978). Both skink species are found in this geographic area typically at elevations 82 feet (ft) (25 meters [m]) above sea level or higher (Florida Natural Areas Inventory 2007). A reference maps depicting the consultation area can be found along with this protocol on our webpage (www.fws.gov/verobeach). Sand skinks are more numerous, broadly distributed, and easily detected than blue-tailed mole skinks. As such, sand skinks will be used as a proxy for both species in the counties in which they co-occur (See Skink Conservation and Consultation Guide for additional information).

Within appropriate geographic area and elevation, skinks are found in excessively drained, well-drained, and moderately well-drained sandy soils. Suitable soil types include: Apopka, Arredondo, Archbold, Astatula, Basinger, Candler, Daytona, Duette, Florahome, Gainesville, Hague, Immokalee, Kendrick, Lake, Millhopper, Orsino, Paola, Placid, Pomello, Pompano, Samsula, Satellite, Smyrna, St. Lucie, Tavares, Urband land (when open sandy soils persist and remnant scrub remains), Zolfo, and Zuber. These soil types typically support scrub, sandhill, or xeric hammock natural communities, although they may be degraded by human impacts to overgrown scrub, pine plantation, citrus grove, old field, or pasture. Skinks have been found in all these degraded conditions where soil types are suitable regardless of vegetative cover (Pike et al. 2008a). Thus, habitat condition is of secondary importance in determining whether a site is occupied by skinks. If a site has suitable soils at the appropriate elevation, vegetation does not preclude coverboard placement, does not have a thick duff layer, and is within the counties

where skinks are known to occur, there is a likelihood of presence, and potential effects to skinks should be considered.

When the location, elevation, and soil type are suitable and the proposed action may disturb the soils on-site, then a skink survey is necessary to determine if the site is occupied.

Surveys can be conducted in a two-tiered approach to determine presence of skinks. A visual pedestrian survey to detect skink tracks should be conducted first. This survey can be performed at any time of the year, but tracks are most detectable in the spring (March through May) and fall (October through November) (Ashton and Telford 2006; Pike et al. 2008b). We recommend a thorough pedestrian survey be completed during one of these periods prior to proceeding with a more intensive coverboard survey. Sand skinks leave a sinusoidal ("S"-shaped) track (Figure 1) at the surface that can be readily identified through a visual pedestrian survey. All open, exposed sandy areas on the property should be surveyed. The survey route (preferably global positioning system [GPS] based) should be recorded and depicted in map form with all locations of skink sign (skinks or skink tracks) marked. A photo documentation log of the skink signs should also be provided.

If the pedestrian survey is negative on some or all portions of the site, then a coverboard survey, with boards regularly dispersed across suitable soils, is necessary on those portions with negative pedestrian survey results. Prior to initiating coverboard surveys, we strongly encourage you to contact a Service biologist in the appropriate field office (Figure 2) to confirm survey dates, obtain guidance on placement of the boards across the landscape, and determine if a site visit is needed to verify sampling protocol. Note: Until additional research is conducted to determine the likelihood of detection of skinks in dense bahiagrass fields, the Service biologist will need to make a decision on a site-by-site basis as to whether surveys will be required in dense bahiagrass.

Coverboard surveys should be conducted from March 1st through May 15th (Gianopulos 2001, Mushinsky et al. 2001, Rizkalla et. al 2015). This time period was selected using the best available science and is intended to account for yearly temperature fluctuations. Negative results obtained outside this period of time are not considered adequate to presume absence of skinks. Surveys should be conducted a minimum of four times during four consecutive weeks within the survey time period to presume that skinks are not present. Coverboards must be lifted and checked for tracks a minimum of once per week over the four consecutive weeks. It is important to conduct surveys when survey conditions are suitable for detecting skinks (*i.e.,* the surrounding soil is not compacted as a result of rainfall or other events that may preclude skink movement, such as atypical weather conditions).

Coverboards should be placed within suitable soil types at a minimum density of 100 coverboards per hectare (40 per acre). Coverboards should be located in areas of bare sand or sparse vegetation adjacent to leaf litter or detritus. Carefully rake or grade the soil to ensure full contact of the coverboard with the soil surface. Removal of soil from surrounding areas and

placement under coverboards may be necessary where stems or roots preclude full contact of the coverboard with the soil surface. The additional soil must be deep enough to allow skinks to move through it and for tracks from their movements to be detectable (5 centimeters [cm]). Certain conditions (overgrown scrub, old fields, pastures) may require vegetation to be removed under specific coverboards to place a sufficient number of boards. Xeric scrub habitat where skinks occur may also be occupied by rare, State and federally listed plants. While setting up coverboard surveys, minimize effects to rare plant communities (For more information on plants, see (http://www.archbold-station.org/html/linkpgs/archlistedsp.html).

Coverboards should be 61 cm by 61 cm (2 ft by 2 ft) in dimension and may be constructed of 1.2 cm (0.5 in) or greater thick plywood, masonite, rigid insulation board (without metallic sheathing), carpet, or other rigid material of the same dimensions. Record the geographic coordinates of all coverboards. Coverboards should be allowed to acclimate for 7 days before the first sampling event. Therefore, the latest date that one could deploy coverboards and complete the survey according to protocol in a given year is April 17.

Survey Season Begins	**Latest Date to Deploy Coverboards**	**Survey Season Ends**
March 1	April 17	May 15

Check for tracks upon lifting each coverboard. The use of gloves during sampling is highly recommended as coverboards often attract venomous insects and reptiles. We recommend lifting the coverboards from the edge farthest from you to keep the coverboard between you and any potential threats. After checking for tracks and skinks, carefully smooth the soil surface with the edge of the coverboard and replace the coverboard. During each site visit, look for and record tracks in sandy patches between coverboard locations.

A survey report that includes the following, as applicable, should then be forwarded to the Service:

1. Project description of the action including site-specific habitat and vegetative descriptions, habitat structure (*i.e.,* the extent of canopy, understory, and ground cover, etc.), non-habitat structure (*i.e.*, the extent of existing paved surfaces, existing structures, and water bodies, etc.), and fire history, if available.

2. Soil map over a topographical map or aerial photograph of the project area including the path of the pedestrian surveys, coverboard locations, and locations of skinks and skink signs.

3. Photo documentation of tracks. All tracks resembling sand skink tracks should be submitted for review to ensure that Peninsular mole skink tracks are not mistakenly identified as sand skink tracks.

4. Field data sheets that include:

A. Survey dates with starting and ending times of all surveys conducted and personnel conducting surveys;
B. Weather conditions during all surveys, including average temperature, wind speed and direction, visibility, and precipitation;
C. Total number of skink tracks observed; and
D. All skink observations.

5. The following ArcGIS layer files in shapefile format that include accurate metadata (the preferred projection is Florida Albers NAD83 in meters):
   A. Project boundary;
   B. GPS locations of survey routes;
   C. Coverboard locations; and
   D. Skink and skink track/sign locations.

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Figure 1. Typical “S”-shaped track of the sand skink (photographs courtesy of Randy Mejeur; Glatting Jackson Kercher Anglin Lopez Rinehart, Inc; 2000).

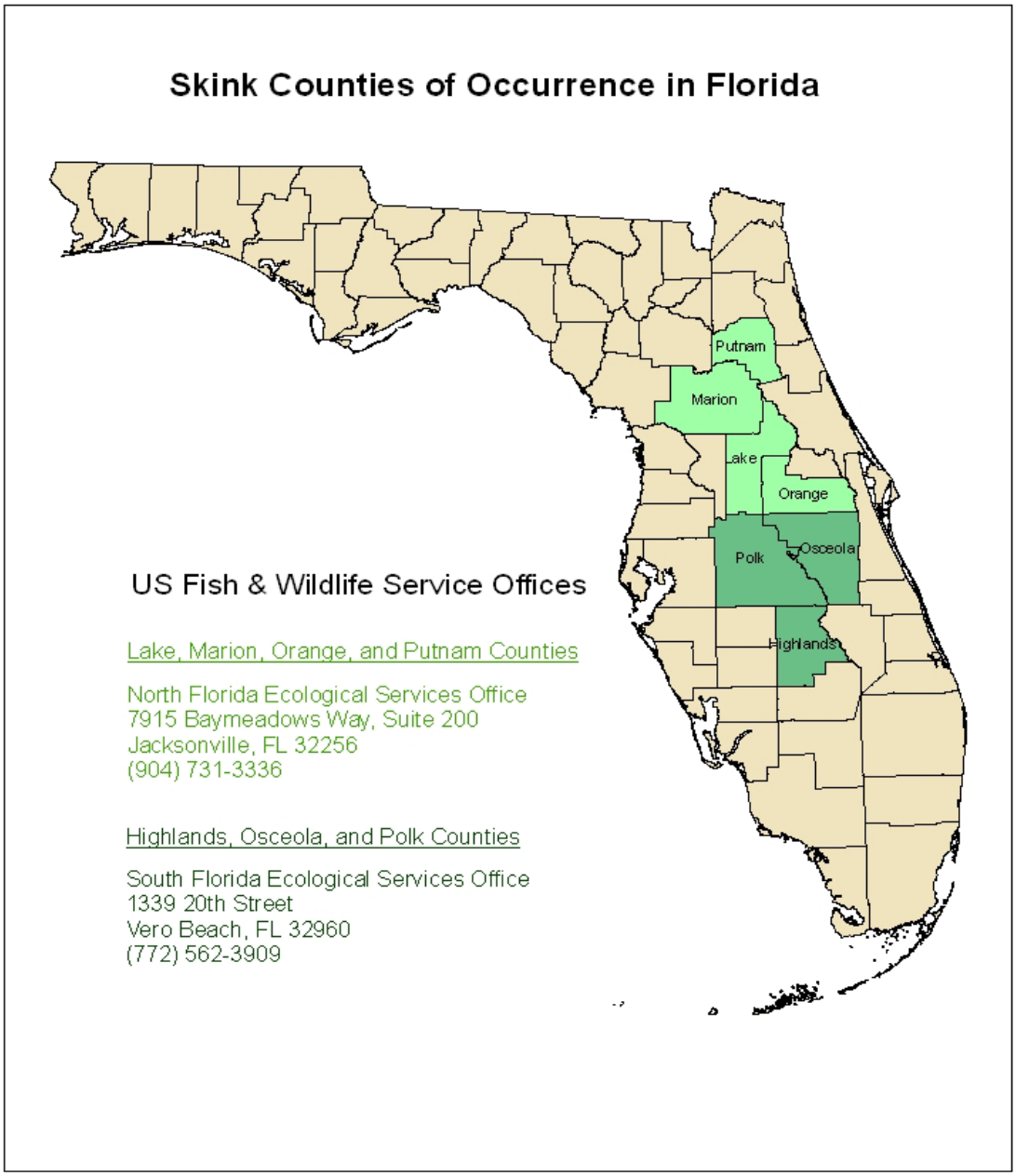

Figure 2. Sand skink and blue-tailed mole skink survey protocol: US Fish and Wildlife Service areas of responsibility.

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Appendix B

Sand Skinks and Blue-tailed Mole Skinks

Estimating Skink Habitat Use on a Project Site
Peninsular Florida

The results of the surveys can be used to estimate how much of the total area is likely occupied by skinks. In the absence of data to estimate the average home range size of skinks, data on movement distances is being used to approximate usage of habitat around positive skink detections. It is the Service's opinion that any suitable habitat within 80 ft of a sand skink track is reasonably certain to be occupied, and any activities that occur within that radius which are reasonably certain to harm sand skinks would be considered incidental take as defined by the Endangered Species Act. The information that supports 80 ft as the radius includes: 1) Penney (2001), who reported translocated sand skinks moved a median distance of 25.6 m (84 ft; n = 64); 2) Schrey et al. (2011), who conducted a genetic analysis of sand skinks (n = 470) within 25 m of each other, and reported "the Florida sand skink occurs with higher genetic similarity than expected by chance within 25 m (82 ft)"; and 3) Perry and Garland (2002), who reviewed the literature and examined home range as a function of snout-vent length in lizards. Of the 489 data sets they examined, 108 met their criteria for their analysis. Lizards of the Autarchoglossa (the clade that contains all skink species) with snout-vent lengths ranging from 30 millimeters (mm) to 100 mm (i.e., the range representative of sand skinks) had home ranges of approximately 10 m^2 to approximately 1,700 m^2. A 1,700 m^2 area has a radius of 23 m (75 ft).

To estimate habitat use, the project proponent should follow the steps below:

Step 1. Using the results of fully-implemented coverboard surveys, pedestrian surveys, and any incidental observations of skinks or their sign, map the positive survey hits/tracks, etc. Note: Pedestrian surveys may not be used solely to estimate habitat use but still may be used prior to coverboard surveys to potentially narrow down the number of coverboards needing to be deployed.

Step 2. Using mapping software, generate a buffer with a radius of 80 feet (24.4 meters) around each positive survey hit/track from all coverboard and pedestrian surveys, as well as incidental observations, to estimate the area of habitat use. Although this may result in some buffers that come close to each other but do not overlap, the applicant will have the option (but not be required) to connect circles to better depict the total area of use by the skink population on site.

Step 3. When drawing the 80-foot radius around positive skink survey hits/tracks, the area of habitat use for compensation will be determined by calculating the total area of suitable soils within the circle(s). If areas within the circle(s) are unsuitable (i.e., paved road, not one of the suitable skink soils), then these specific portions may be subtracted from the total area of habitat use for compensation calculation. Note that evaluation of dense bahiagrass is on a case-by-case basis until further studies can provide better guidance.

Step 4. If a portion of the circle(s) is outside of the project footprint, it will need to be evaluated for impacts from the project, as well, if it falls within the action area (all areas, whether inside or outside of the project footprint that will be affected by the proposed action). If the action area for the proposed project extends beyond the project boundary, then any portion of the circle(s) drawn outside of the project boundary but within the action area should be included in the compensation calculation. If the action area is fully contained within the project boundary, then portions of the circle(s) outside of the project boundary will require no compensation, and the area may be subtracted from that circle(s). If the buffers of multiple positive skink hits/tracks overlap, then the sum total of the areas of those circles will be used to determine the occupied area(s) (Figure 1).

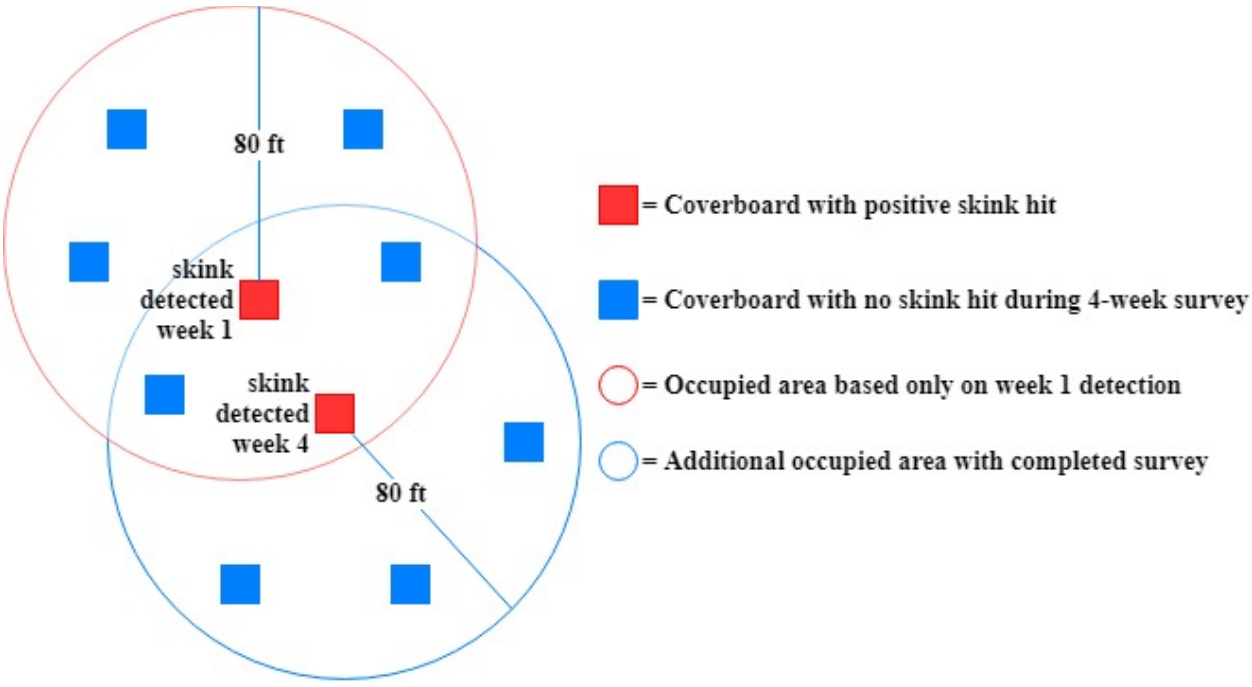

Figure 1. Diagram of habitat use estimation using buffered coverboard survey results with skink detections over 4-week survey period. Note: The number of coverboards represented within each 80-foot buffer is not to scale. Estimated skink habitat use = the entire area within the red circle + the area within the blue circle that falls outside of the red circle.

Step 5. To obtain the total area of habitat being used by skinks on the project site, add the area of all the circles drawn around positive skink survey hits/tracks and subtract the area of the footprint of any features (non-suitable soils, paved roads, buildings, water bodies, etc.) within the circles that are not considered by this guide to be skink habitat. This information should be mapped and provided to the Service to show how the final number of acres for compensation were derived.

Step 6. See Appendix C for potential conservation measures that project proponents may incorporate into their projects in order to avoid, minimize, compensate, and mitigate the effects of those projects on listed skinks.

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Appendix C

Sand Skinks and Blue-tailed Mole Skinks

Avoidance, Minimization, Conservation, and Mitigation Measures
Peninsular Florida

The purpose of this document is to provide a suite of potential conservation measures that project proponents may incorporate into their projects in order to avoid, minimize, compensate, and mitigate the effects of those projects on listed skinks. Federal project proponents are required to ensure proposed actions are not likely to jeopardize the continued existence of federally listed species by avoiding and minimizing the potential negative effects of their projects. Non-Federal project proponents developing a Habitat Conservation Plan (HCP) for an Incidental Take Permit for federally listed species are required to minimize and mitigate impacts to the maximum extent practicable. The best opportunity to avoid and minimize the potential impacts of a proposed project on listed species, including skinks, is during project planning and design. Project proponents should describe what conservation measures they are incorporating into their projects when preparing Biological Assessments or HCPs for submittal to the U.S. Fish and Wildlife Service (Service). Contact the Service early for additional assistance when planning or designing projects.

The most effective way to minimize the potential effects of a project on skinks is to avoid impacting occupied skink habitat. This includes avoiding both direct impacts to the habitat (*e.g.,* minimizing the project footprint), and indirect impacts to the habitat (*e.g.,* altering the hydrology of a site through modifications on- or off-site). Project proponents should consider limiting the impacts of all project components on skinks including, but not limited to, access and staging areas, land clearing and filling, construction, road building, landscaping, and anticipated project operations, maintenance and management.

In addition to avoiding skink habitat, the following avoidance and minimization measures should be considered:

- Limit roads, lanes, or other paths accessed by heavy equipment in and around skink habitat.

- Limit activities likely to disturb or compact soil in and around skink habitat (*e.g.,* disking, roller-chopping, use of heavy equipment, material storage, etc.).

- Limit black pavement that builds up heat during the day and increases air temperatures. Break up larger expanses of pavement to provide natural drainage and water filtration and to provide shade for paved areas.

- Incorporate green spaces using native vegetation and connectors into residential, residential-recreation, and other multi-use-residential developments.

- Set mower height at greater than 4 inches to avoid or minimize adverse effects to ground-dwelling wildlife.

    - Implement appropriate best management practices (*e.g.,* https://floridadep.gov/sites/default/files/npdes-pollution-prevention-2-4-16.pdf).

- Limit use of chemicals, if practicable, and follow all product labels when applying chemicals such as fertilizers, herbicides, and pesticides.

- Landscape with local and appropriate native plant species (for examples, see county extension websites).

- Designate any areas to be avoided as environmentally sensitive, delineate with temporary fencing or flagging to prevent accidental disturbance during project activities, and mark with signs (signs need to include information regarding the presence of listed skinks and any other federally protected species).

In some situations, it will not be possible to avoid taking skinks through the destruction or conversion of their habitat. In those cases, project proponents should propose appropriate compensation or mitigation to offset potential adverse impacts to skinks and their habitat. Compensation or mitigation will be determined based upon the nature of impacts from the proposed project (either permanent or temporary).

Temporary impacts refer to habitat damage and are the effects of actions which are short-term events and that result in the return of the habitat to suitable conditions for skinks within a reasonable amount of time (*e.g.*, powerline rights-of-way, pipeline projects). Temporary impacts to habitat include the following actions: trenching (if suitable soils are returned), pipe installation (if top of pipe ≥1 ft. below ground), soil piling/soil return (equipment vibrations, soil disruption, piling materials), foot traffic (if repetitive and/or destructive), vehicle traffic (if no fill is added, soil is not compacted, is repetitive and/or destructive), grading/site preparation (if horizon soils are saved and restored), mulching/vegetation removal (if discontinued after construction), maintenance mowing, radar surveys, and deep tillage (if used to restore construction-compacted soils).

Compensation or mitigation for temporary impacts to habitat will be determined using a Habitat Equivalency Analysis (HEA), which is a method for quantifying natural resource service losses and determining appropriate compensation for such losses. The skink HEA is based upon the time it will take the habitat to be restored to complete functionality for skinks. See Appendix D for HEA calculator. Impacts not defined as temporary by the above definition are considered to be permanent impacts. Compensation or mitigation for permanent impacts will be calculated at a ratio of 2:1 (area of compensation or mitigation: area of impact).

An analysis of how the compensation or mitigation will offset the habitat loss as a result of the proposed action will be required. If compensation or mitigation is proposed off-site, the order of preference for location is: first, on the same ridge as the impact (preferably within the same genetic unit[a]); second, on the ridge adjacent to the impact; and third, elsewhere in the range of the listed skink being affected by the proposed action.

The following compensation or mitigation options may be available and are presented in priority order:

1. In the case of a project that is covered by a regional HCP, mitigate consistent with the HCP.

2. If credits are available at a Service-approved conservation bank whose service area covers the proposed project, mitigate or compensate by purchasing the appropriate number of credits from the bank.

3. Protect, restore, and perpetually manage occupied skink habitat that is off-site and adjacent to existing conservation lands acceptable to the Service. In some instances, a parcel that is shown occupied by skinks but is not adjacent to existing conservation lands could be a suitable option, if large enough and managed appropriately.

4. In rare cases, on-site compensation or mitigation may be acceptable to the Service. On-site conservation of occupied skink habitat may be appropriate when: none of the previous options are available, it is adjacent to existing conservation lands, it provides a connection among populations, or is otherwise desirable under the recovery plan. While skinks can persist on small parcels, on-site lands that are isolated by development have not been demonstrated to consistently support long-term viability of skink populations and are difficult to manage and maintain.

Requirements for compensation and mitigation areas (both on- and off-site)

If project compensation or mitigation involves skink habitat protection, restoration (if needed), and management, then the following are needed to ensure the habitat is protected and managed in perpetuity:

- Permanent site protection: A conservation easement that is granted to a Service-approved non-profit entity (government or non-government) and allows the Service third-party rights of enforcement is the Service's preferred mechanism of permanent site protection. The non-profit entity should have experience in habitat conservation, be independent of the applicant,

[a] Emerging research (e.g., Mushinsky et al. 2011) indicates that there are different sand skink genetic units that should be considered in conservation priorities. Project proponents should work with Service staff regarding genetic considerations for proposed compensation or mitigation.

and be willing to monitor the easement annually and report its findings to the Service. The easement should be recorded in the county in which the protected property is located. Other site protection measures, such as deed restrictions and restrictive covenants, are considered on a case-by-case basis.

- Restoration: A detailed restoration plan, including a thorough budget, is required if the mitigation or compensation parcel requires restoration. The project proponent should describe how they will fund the restoration and provide funding assurances upfront. The preferred funding mechanism is the establishment of a Trust Fund to be held by a non-profit entity with experience in managing money for conservation purposes and to be drawn upon as restoration activities are conducted. Other funding mechanisms, such as a letter of credit or a bond, are considered on a case-by-case basis.

- Long-term management: A detailed Habitat Management Plan that includes a burn plan, invasive species management, skink monitoring, vegetation monitoring, and reporting of all results is required. In addition, an entity that is willing to manage the compensation or mitigation parcel and has demonstrated their ability to manage skink habitat should be identified. A management agreement with this entity is recommended when the applicant is not the manager. Additional information regarding Habitat Management Plans is provided below.

- Funding for management activities in perpetuity: A non-wasting Trust Fund (a fund in which only the interest generated is used to fund management activities) held by a non-profit entity with experience in managing money for conservation purposes is the Service's preferred method to secure permanent management funding. The non-profit entity should be independent of the applicant. The principal amount placed in the Trust Fund should take into account all costs associated with the compensation or mitigation parcel, the fee charged by the Trust Fund holder, and the interest and inflation that are expected to occur after the money is deposited. Other funding mechanisms, such as a letter of credit or a bond, are considered on a case-by-case basis.

Habitat Management Plans

A Habitat Management Plan should be created to support any on- or off-site compensation or mitigation. A Habitat Management Plan includes a detailed description of how the habitat will be managed; what steps will be taken to improve the habitat, how it will be maintained over time, and funding mechanisms to ensure beneficial management in perpetuity. The plan should also include any survey reports and any land preservation covenants. If habitat improvements or restoration are proposed, the management plan needs to include a habitat monitoring component.

Research indicates overgrown scrub to be less suitable or unsuitable for skinks. Management practices beneficial to skinks may include, but are not limited to:

- Prescribed burns (not more than once every 10 years) or other activities that mimic natural disturbances in xeric scrub habitat,

- Non-native or invasive wildlife and vegetation removal, and

- Native vegetation restoration.

Structural characteristics of scrub habitat that can be managed to benefit skinks include a well-defined litter layer and shade in the form of a scattered shrub or tree overstory, but having both shrub and tree overstory can be detrimental to skinks. These structural characteristics are necessary for skinks to be able to regulate their body temperature. See the Habitat section in the main text of the *Skink Conservation and Consultation Guide* for more information on skink habitat characteristics.

Where monitoring is incorporated into the habitat management plan, a coverboard survey should be carried out once per year for 5 years during the appropriate period, then once every 5 years in perpetuity (see Appendix A for survey protocol). A survey report should be sent to the Skink Lead Biologist, South Florida Ecological Services Office, 1339 20th Street, Vero Beach, Florida 32960. Other observations of skinks, skink sign, and other listed species should be included in the survey report.

Additional items to consider for inclusion in a Habitat Management Plan for skinks include, but are not limited to:

- Implementing the avoidance and minimization measures beginning on page 1,

- Controlling overgrowth and managing overgrown scrub by thinning, burning, mowing, or other techniques to reduce vegetative density and create patchy, sandy open areas,

- Protecting habitat from detrimental off-road vehicle traffic and commercial forestry practices,

- Controlling domestic predators, such as cats, using traps or other deterrents,

- Developing and incorporating listed species conservation strategies, such as natural history kiosks and brochures, and

- Reporting land management activities and natural disturbances (*e.g.,* wildfire, controlled burns, etc.).

Literature Cited

Mushinsky, H.R., E.D. McCoy, A. Catenazzi, E. Britt, A. Schrey, and J.S. Godley. 2011. Research to benefit the conservation of the Florida sand skink. Final report submitted to U.S. Fish and Wildlife Service. Vero Beach, Florida.

July 31, 2020

APPENDIX D

Sand Skinks and Blue-tailed Mole Skinks

Habitat Equivalency Analysis (HEA)
Peninsular Florida

Sand skink
HEA19April2016_App

APPENDIX L

Sand Skink Soil Investigation Report

SKINK SOILS INVESTIGATION REPORT

SR 544
Polk County, Florida

Financial Project Identification (FPID) Number:

Prepared for:

Florida Department of Transportation
District One Environmental Management Office
801 North Broadway
P.O. Box 1249
Bartow, Florida 33831

Prepared by:

Atkins North America, Inc.
482 South Keller Road
Orlando, Florida 32810

February XX , 2021

Field Investigation Dates: January 13 through January 15, 2021.

Project / Location: Sand skink (*Neoseps reynoldsi*) Soils Investigation /SR 544, Polk County, Florida.

Client: Florida Department of Transportation (FDOT), District One.

Qualifications and Experience: This soils investigation was directed, and the report prepared by Terry Zable, an Atkins soil scientist and project manager. Mr. Zable earned a B.S.A. in Soil Science from the University of Florida, and an MPA in Public Administration from the University of Central Florida. He has 35 years of professional experience as a soil scientist which includes 16 years with the State of Florida, three years with the Florida Department of Health performing soils evaluations in the OSDS program; followed by 12 years with the Florida Department of Environmental Protection (FDEP), performing hydric soils jurisdictional investigations for the FDEP's Environmental Resource Program and Jurisdictional Wetlands Team. Mr. Zable joined Atkins in 2001 and has been involved with soils investigations for various projects including hydric soils determinations, seasonal high groundwater evaluations, soil subsidence investigations related to groundwater withdrawals, sand skink suitable soils investigations, and soils evaluations for mitigation projects. He has been accepted as an expert witness in the area of environmental permitting and soil science in administrative hearings (Florida Division of Administrative Hearings) as well as civil cases and criminal court cases.

Project Footprint: The project begins at the intersection of 1st Street N. (SR 544) and Palmetto Ave N.E. in Winter Haven and continues in a north then east direction along both the north and south right-of-way (ROW) of SR 544 and terminates at approximately 100 feet east of the intersection of SR 544 and Depot Way, Polk County, Florida. Project construction impacts are confined to the project ROW along both sides of SR 544, **Exhibit 1** provides the overall project location, and **Exhibit 2**, details the individual study areas and the habitat soils mapped.

Introduction

At the client's request, the project site as described above was investigated to identify areas that have been mapped in the Polk County Soil Survey by the US Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS) as containing soils that have been determined by the US Fish and Wildlife Service (USFWS) to provide suitable habitat for the sand skink and blue-tailed mole skink. The investigation focused on identifying if the soils mapped exist within the project study area, and if the soils have been subject to past soil alterations (construction, filling, excavation, or mixing) which may have sufficiently altered the soils such that they no longer exhibit surface or shallow surface characteristics required to meet the NRCS soil map unit criteria for the soil series that have been identified as providing suitable habitat for the sand skink and blue-tailed mole skink. The soil series and map units identified by the USFWS as potentially providing suitable sand skink habitat soils that have been mapped by the USDA – NRCS as occurring within the ROW of the project area consists of the Candler, Candler-Urban land Complex, Immokalee fine sand, Millhopper fine sand, Pompano fine sand, St. Lucie fine sand, Smyrna and Myakka fine sands, Tavares fine sand, Tavares Urban Land Complex, Urban land, and Zolfo fine sand. In addition to these soils, the project area also contains small areas of Basinger mucky fine sand, depressional, and Samsula muck. These two soils map units are identified, as

very poorly drained often hydric soils, which would not provide habitat for the sand skink and blue-tailed mole skink because of inundation or saturation to the surface during most months of the year. Discussion with USFWS staff indicated that areas supporting these soils that do not provide suitable habitat for either the sand skink or blue-tailed mole skink should not be included as suitable habitats. Although unsuitable, areas supporting these soils have been included for completeness. The suitable sand skink soils are described below.

The Candler Soil series (Hyperthermic, uncoated Lamellic Quartzipsamments) consists of very deep, excessively drained, very rapidly to rapidly permeable soils on uplands of Southern Florida Flatwoods, Central Florida Ridge, and they formed in thick beds of eolian or sandy marine deposits. Many of these areas are used for citrus crops and tame pasture, as well supporting commercial and residential structures.

Candler-Urban land complex map unit consists of approximately 55 percent Candler soils and 45 percent urban lands. This map unit is generally found in highly urbanized areas and supports roadways, walkways, structures, fill, and other manmade features. Areas not supporting structures or development support altered and unaltered Candler soils. Drainage in this map unit is variable and dependent upon urban impacts and drainage improvements.

The Immokalee soil series (Sandy, siliceous, hyperthermic, Arenic Alaquods) consists of very deep, very poorly and poorly drained soils that formed in sandy marine sediments. Immokalee soils are found within flatwoods and low broad flats on marine terraces. Slopes range from 0 to 2 percent. Under natural conditions Immokalee soils are used for water quality, forestry, and wildlife habitat. Large areas with adequate water management are used for citrus, truck crops, pastureland, and range. Potential native vegetation consists of longleaf pine (*Pinus palustris*) and slash pine (*Pinus elliottii*) with an undergrowth of saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), wax myrtle (*Morella cerifera*), and pineland threeawn (*Aristida sp.*). In depressions, water tolerant plants such as cypress (*Taxodium sp.*), loblolly bay (*Gordonia lasianthus*), red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), maidencane (*Panicum hemitomon*), blue maidencane (*Amphicarpum muehlenbergianum*), chalky bluestem (*Andropogon virginicus var. glaucus*), sand cordgrass (*Spartina bakeri*) and bluejoint panicum (*Coleataenia tenera*) are more common.

The Millhopper soil series (Loamy, siliceous, semiactive, hyperthermic, Grossarenic Paleudults) consists of very deep, moderately well drained, moderately permeable soils that formed in thick beds of sandy and loamy marine sediments. They occur in central and southern Florida. Slopes range from 0 to 8 percent. Many areas are cleared and used for improved pasture or for cultivated crops. Native vegetation consists of live oak (*Quercus virginiana*), laurel oak (*Quercus laurifolia*), post oak (*Quercus stellata*), water oak (*Quercus nigra*), sweetgum (*Liquidambar styraciflua*), cherry laurel (*Prunus caroliniana*), hickory (*Carya sp.*), slash pine (*Pinus elliottii*), and longleaf pine (*Pinus palustris*). The understory is chiefly lopsided indian grass (*Sorghastrum secundum*), hairy panicum (*Coleataenia sp.*), low panicum (*Coleataenia sp.)*, greenbrier (*Smilax sp.*), hawthorn (*Crataegus sp.*), persimmon (*Diospyros sp.*), fringeleaf paspalum (*Paspalum sp.*), chalky bluestem (*Andropogon virginicus var. glaucus*),creeping bluestem (*Schizachyrium stoloniferum*), and pineland threeawn (*Aristida sp.*).The Pompano series (Siliceous, hyperthermic, Typic Psammaquents) consists of very deep, very poorly and poorly drained soils that formed in thick beds of sandy marine sediments. Pompano soils are found within flatwoods, in low broad flats, and to a lesser extent, depressions, drainageways, and flood plains, on marine terraces. Slopes

range from 0 to 2 percent. Mean annual precipitation is about 1270 millimeters (50 inches) and the mean annual temperature is about 23 degrees C (73 degrees F). Under natural conditions Pompano soils are used for water quality, rangeland, and wildlife habitat. Where drained, it is used for truck crops, citrus fruits, and improved pasture. Native vegetation of flatwoods consists of slash pine (*Pinus elliottii*), south Florida slash pine (*Pinus elliottii* var. *densa*), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), wax myrtle (*Morella cerifera*), chalky bluestem (*Andropogon virginicus var. glaucus*), and pineland threeawn (*Aristida sp.*). Forested depressions are dominated by bald cypress (*Taxodium distichum*), pond cypress *(Taxodium ascendens*), blackgum (*Nyssa sylvatica*), and red maple (*Acer rubrum*). Herbaceous depressions are dominated by sedges, rushes, and sawgrass (*Cladium sp.*).

The St. Lucie series (Hyperthermic, uncoated Typic Quartzipsamments) consists of very deep, excessively drained soils that formed in sandy marine and/or eolian deposits. St. Lucie soils are on dunes, ridges, and knolls on marine terraces. Slopes range from linear to convex and range from 0 to 20 percent. Under natural conditions St. Lucie soils are used for forestry and wildlife habitat, some areas are used for building sites and as a source of sand for concrete. Potential native vegetation consists of sand live oak (*Quercus geminata*), sand pine (*Pinus clausa*), dwarf willow (*Salix humilis*), saw palmetto (*Serenoa repens*), rosemary (*Conradina sp.*), prickly pear cactus (*Opuntia sp.*), and lichens.

Smyrna and Myakka fine sands map unit is composed of 41 percent Smyrna and 39 percent Myakka and similar soils. Approximately 15 percent of this map unit is hydric, and the soils are found on flatwoods and marine terraces. The soil is classified as poorly drained, with an average depth to water table of 6 to 18 inches.

The Tavares soil series (Hyperthermic, uncoated Typic Quartzipsamments) mainly occurs in South Central Florida Ridge, and to a lesser extent in Southern Florida Flatwoods. These soils consist of very deep, moderately well drained soils that formed in sandy marine or aeolian deposits. Tavares soils are on hills, ridges and knolls of the lower Coastal Plain, and support natural forested landscapes and residential structures.

Tavares-Urban land complex, this map unit is composed of approximately 75 percent of the Tavares soil series and 25 percent urban land. This map unit is composed of moderately well drained soils that are situated on hills, ridges and knolls. Areas supporting urban uses support roadways, structures, and other common urban improvements.

The Zolfo series (Sandy, siliceous, hyperthermic Oxyaquic Alorthods) consists of very deep, somewhat poorly drained soils that formed in sandy marine sediments. Zolfo soils are on ridges, rises, and knolls within adjacent flatwoods on marine terraces. Slopes are linear to convex and range from 0 to 5 percent. Under natural conditions Zolfo soils are used for water quality and wildlife habitat with many areas having been used for citrus crops. Potential native vegetation consists of scattered turkey oak (*Quercus laevis*), laurel oak (*Quercus laurifolia*), or water oaks (*Quercus nigra*); long leaf pine (*Pinus palustris*) or slash pine (*Pinus elliottii*)with an understory of pineland threeawn (*Aristida sp.*), bluestem (*Andropogon sp.*), lopsided Indian grass (*Sorghastrum secundum*), gallberry (*Ilex glabra*), native weeds, and saw palmetto (*Serenoa repens*).

Methodology

The project area is located between the north and southbound FDOT ROW of SR 544 from the intersection of 1st Street N. (SR 544) and Palmetto Ave. in Winter Haven to just east of the intersection of SR 544 and Depot Way. The project area (distance between the ROW limits) is not consistent and varies with location throughout the project length. The entire project area was field-reviewed and soil borings and/or soil probes were collected to both verify the mapped soils, and to determine where soils in particular areas have been previously altered due to excavation (slope cuts, swales, ditches,), fill (road beds, driveways, structures, intersections), or mixing due to roadway alterations, stormwater conveyances, underground utilities, lighting, signalization, signage features, or other underground construction activities. In addition, soil borings or soil probes were also collected to verify areas where natural, unaltered suitable soils were mapped, and where road construction activities appear to have not impacted the soil surface. In addition to the soil borings and probes, representative photographs were taken within each study area. The photographs are labeled by photopoint and are found in the map and photo log of **Exhibit 3.**

The boring locations were selected utilizing these criteria through inspections of aerial photographs and field review. Soil borings were conducted for each of the soil map units within the project area utilizing a hand bucket auger and were excavated to a depth of six (6) feet, or refusal. The borings were field analysed as they were conducted for soil texture, soil color, and soil horizonation to confirm that the soil mapped conforms to the mapped soil series criteria. In addition to the hand auger bores, hand soil probes were conducted at regular intervals to determine the limits of natural soil surface characteristics. The hand soil probes all begin at either the project boundary, or in areas supporting natural landscapes and then continue into the project area to the roadway. The soil probes were repeated, at intervals not exceeding several feet in the direction of the roadway until the surface feature characterizing one of the identified sand skink suitable soils were no longer observed because of soil disturbance. The surface disturbance commonly identified included fill material (lime rock, gravel, clay, asphalt, fill dirt), excavation (exposed subsurface horizons, organic material accumulation, evidence of wetness), or structures (driveways, curbs, buildings, signal or utility lines or equipment). The location of soil boring and the soil probes was recorded utilizing a Trimble Global Positioning System (GPS) unit. In most locations, numerous hand probes were completed in the process of delineation of the limits of natural soil. The individual probes undertaken to identify the limits of the natural soils were not GPS recorded. Sections supporting natural and altered soils (Potential Sand Skink Habitat) are shown in **Exhibit 4**. These sections are also highlighted in red in the photo log of **Exhibit 3**.

Study Areas:

Study Area 1 – This study area begins at the intersection of 1st Street N. (SR 544) and Palmetto Ave. in Winter Haven and travels north approximately 1,350 ft. within both the east and west ROW of SR 544 until reaching the intersection of Avenue S NE. Study Area 1 is located within the Winter Haven urban area and has been developed with roads, driveways, drainage structures, overhead and underground utility lines, and signage. These disturbances extend from the limits of the east and west ROW and have impacted all the Candler-Urban soil that is mapped within this area. Because of the urban development activities implemented in this study area, there were no remaining areas of undisturbed natural soils or suitable habitat soils found. (**Exhibit 2A)**.

Study Area 2 – This study area is comprised of both the north and south bound ROW of SR 544 commencing at the intersection of SR 544 and Ave. S NE, and continuing north approximately 1,050 ft. to the intersection of SR 544 and Ave. U NE. Study Area 2 is located within the Winter Haven urban area and has been subject to urban development activities and supports roads, driveways, drainage structures, structures, overhead and underground utilities, and signage. These urban improvements extend the width of the ROW and have impacted the Candler, Candler-Urban, St. Lucie, Tavares-Urban and Urban soils that are mapped within this area. Because of the urban development activities implemented within this study area, there were no remaining areas of undisturbed soils, or suitable habitat soils found. (**Exhibit 2A-B)**.

Study Area 3 – This study area is comprised of both the north and southbound ROW of SR 544 located between the intersection of SR 544 and Avenue U NE and the intersection of Avenue Y NE, approximately 2,110 ft. Study Area 3 is located within the Winter Haven urban area and has been subject to urban development activities and supports roads, driveways, drainage structures, structures, overhead and underground utilities, and signage. These urban improvements extend the width of the ROW and have impacted the Candler, and Tavares-Urban soils that are mapped within this area. Because of the urban development activities implemented within this study area, there are no remaining areas of undisturbed soils, or suitable habitat soils found. (**Exhibit 2B-C)**.

Study Area 4 – This study area includes both the north and southbound ROW of SR 544 between the intersection of Avenue Y NE and the intersection of Winter Ridge Drive, approximately 3,700 ft. Study Area 4 supports approximately 720 linear feet of ROW that are mapped and support Candler soils, while other remaining portions of the study area were not mapped as, nor were confirmed to contain suitable habitat soils. The area of Candler soil is located approximately 405 ft. southwest of the intersection of SR 544 and Winter Ridge Drive. The overall study area is generally rural, however recent development activities are converting the study area to a suburban condition, with new driveways, access roads, sidewalks, and utilities within ROW of SR 544, and adjacent areas outside of the ROW. The project area within this study area mapped as Candler soil has been impacted by roadway and development activities to such an extent that no areas of undisturbed of Candler, or other suitable habitat soils are remaining. (**Exhibit 2C-E)**.

Study Area 5 – This study area begins at the intersection of SR 544 and Winter Ridge Drive and travels northeast approximately 13,730 ft. to the intersection of the access driveway to Lake Fannie Boat Ramp. This study area contains four areas that have been mapped as containing soils which have been identified as potential suitable sand skink soils (**Exhibit 2E-K)**.

The first area of mapped suitable soil is located approximately 650 feet northeast of Winter Ridge Drive and is mapped as Smyrna and Myakka fine sands; covering approximately 615 linear ft. of ROW. Investigation of this area showed no areas where soils provide suitable habitat for sand skinks.

The second area mapped as supporting potential suitable soils consists of the Candler and Candler-Urban land map units. This area begins approximately 365 ft. west of the intersection SR 544 and Gardenia Drive and continues east and terminates approximately 160 ft. west Ixora Drive. The northern portion of this study area is mapped as Candler soil and contains suitable sand skink soils,

which have been labeled as Section A. Section A is approximately 720ft. in length and encompasses 0.09 acres and is comprised of Candler sand 0-5% slopes. Moving from west to east, the latitude and longitude start/end points for Section A are 81°42'47.95" W, 28°3'57.82" N (Start), 81°42'39.88" W, 28°3'57.83" N (End). The area located south of the mapped Candler soil is mapped as Candler-Urban land and does not contain suitable habitat soils. (**Exhibit 4A**).

The third area mapped with potential sand skink soils is located along the southern ROW of SR 554 and begins approximately 510 ft. east of the intersection of SR 544 and Bert Schultz Drive. This area is mapped as Placid and Myakka fine sand depressional. This area is approximately 1,420 ft. in length and does not support soils suitable as sand skink habitat.

The fourth area mapped with potential suitable sand skink soils is located along the southern ROW of SR 544 approximately 710 ft. west of the entrance to Lake Fannie Boat ramp. This area comprises approximately 1,630 linear ft. of ROW and is mapped as Placid and Myakka fine sands depressional. The soil identified at this location does not provide suitable habitat for sand skinks.

Study Area 6 – This study area begins at the intersection of SR 544 and the access roadway to Lake Fannie Boat Ramp and travels east and northeast approximately 5,808 feet just past the intersection of SR 544 and Jacaranda Ave. This study area contains four areas that are mapped as potential suitable sand skink soils, the remaining portions of this study area are not mapped as supporting sand skink soils and suitable soils were not identified outside of the four mapped sand skink suitable soils. (**Exhibit 2K-N**).

The first area is located along the southern ROW of 544 and begins immediately at the Lake Fannie Boat Ramp access road and travels east approximately 1,200 linear ft. This area is mapped as Pompano fine sand, however because of roadway fill, swale cuts, and utility installations there are no areas of undisturbed soil that would support sand skinks located within the ROW.

A second area of potential suitable soils mapped as Tavares, Zolfo and Immokalee sand begins approximately 340 ft. west of Landslide Landings Blvd. These soils are found within both southern and northern ROW and continue approximately 1,440 linear ft. east. Because of recent excavation and land clearing, driveway and sidewalk construction, utility installations, and the placement of road fill and swale cuts, there were no areas of undisturbed sand skink habitat soils identified within this area.

The third area begins approx. 1,660 feet southwest of the intersection of SR 544 and Jacaranda Ave. This area is approximately 550 linear ft. long and located on the north and south sides of the road and is mapped as Millhopper fine sand. This area contains habitat with suitable sand skink soils on the north side, which have been labeled as Section B, and are shown on Exhibit 4B. The South side has been excluded from the suitable soil area due to filling and is heavily vegetated with cogongrass. Section B is comprised of Millhopper fine sand 0-5% slopes, and is approximately 525 ft. in length and encompasses 0.2 acres. Moving from west to east, the latitude and longitude start/end points for Section B are 81°40'21.12" W, 28°4'20.99" N (Start), 81°40'17.73" W, 28°4'25.24" N (End) (**Exhibit 4B**).

The fourth and last area within this study area begins approximately 460 ft. southeast of the intersection of SR 544 and Jacaranda Ave. This area is mapped as Immokalee sand and comprises both the northern and southern ROW area, with the northern ROW area extending slightly (approx. 175 ft.) northeast beyond Jacaranda Ave. The soil within this area has been impacted by filling for roadway construction, soil excavation for swales, and maintenance activities, and as a result no areas of sand skink suitable soils were identified.

Study Area 7 – This study area begins at the intersection of SR 544 and Jacaranda Ave. and travels northeast and east approximately 6,900 ft. to the intersection of SR 544 and the west side of the intersection of SR 544 and US Highway 27. This study area contains two areas composed of several potential sand skink suitable soil map units (**Exhibit 2N-P**).

The first area of potential suitable soils begins approximately 125 ft. east of the intersection of SR 544 and Old Lucerne Park Road, includes the full ROW and travels east approximately 850 linear ft. This area is mapped as Zolfo fine sand, because of roadway construction fill, and swale cuts. As a result, no areas of undisturbed soil that would support sand skinks are located within the ROW.

The second area of potentially suitable soils includes the full ROW area and begins approximately 445 ft. east of Sunset Drive. This area extends approximately 3,225 ft. east until reaching the eastern limits of the area at US Highway 27. The map units identified in this area include Candler, Smyrna and Myakka, Tavares, Zolfo, and Basinger which is a depressional hydric soil and has been excluded as a sand skink suitable soil. The project area within this area has been impacted by both roadway construction and maintenance, the placement of fill for the roadbed, and excavation for swales and underground drainage, as well as adjacent development activities which have significantly impacted the area. As a result, no areas of natural undisturbed, or suitable habitat soils remain.

Study Area 8 – This study area begins at the east side of the intersection of SR 544 and US Highway 27 and travels east approximately 11,600 ft. to the project terminus (approximately 100 ft.) east of the intersection of SR 544 and Depot Way. This study area is composed of an almost continues series of mapped potential suitable sand skink soils. There is approximately 650 ft. of the ROW that is within a low-lying area and does not support potential suitable soils. This low-lying area is located approximately 945 ft. east of US Highway 27. The remaining areas of this study area are mapped as Candler, Symrna and Myakka, Tavares, and Samsula Muck which is a hydric soil and has been excluded as a sand skink suitable soil. Where these soils are mapped, they encompass the full ROW. Many areas of this study area have been impacted by the placement of road fill, excavation for roadside drainage, sidewalks, and utility installations. However there are three sections that support habitat suitable soils and they are identified as Sections C, D and E. These sections are shown on (**Exhibit 2P-U**).

Section C is comprised of Tavares fine sand 0-5% slopes and Smyrna and Myakka fine sands and is approximately 2,300 ft. in length and encompasses 0.36 acres. Moving from west to east, the latitude and longitude start/end points for Section C are 81°38’36.19” W, 28°4’46.32” N (Start), 81°38’11.63” W, 28°4’52.37” N (End) (**Exhibit 4C**).

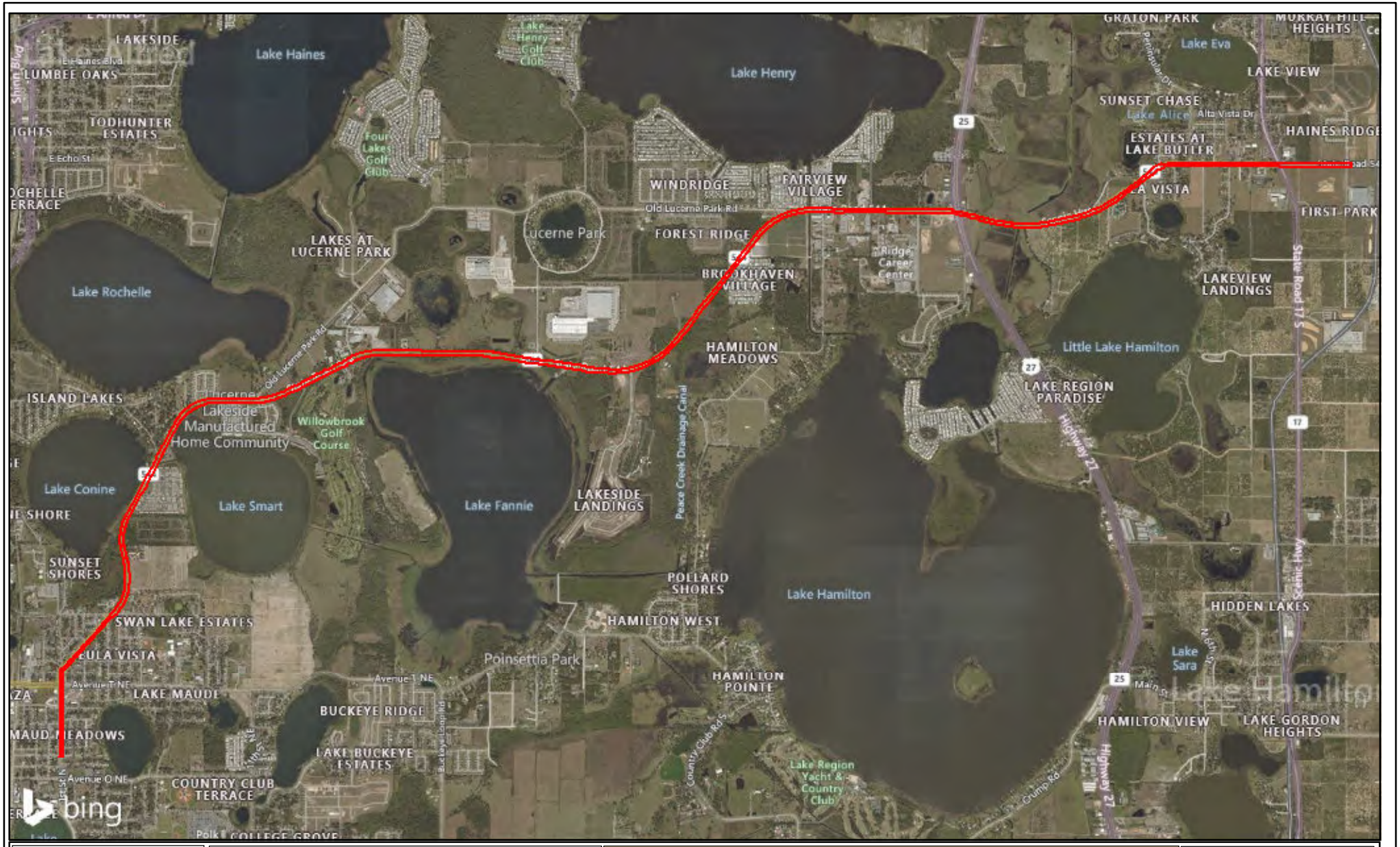
Section D is comprised of Tavares fine sand 0-5% slopes and is approximately 440 ft. in length and encompasses 0.2 acres. Moving from west to east, the latitude and longitude start/end points for Section D are 81°38'15.51" W, 28°4'51.67" N (Start), 81°38'11.25" W, 28°4'53.72" N (End) (**Exhibit 4D**).

Section E is comprised of Candler sand 0-5% slopes and is approximately 995 ft. in length and encompasses 0.15 acres. Moving from west to east, the latitude and longitude start/end points for Section E are 81°37'9.06" W, 28°5'4.58" N (Start), 81°36'57.97" W, 28°5'4.61" N (End) (**Exhibit 4E**).

Results

From the completed field work and soil borings it can generally be assumed that the areas immediately adjacent to paved road surfaces, depending upon location, have been impacted by the construction of the roadway, roadway shoulders, swales and drainage, driveways and access roads, construction of sidewalks, the installation of utilities, and roadway signage and lighting.

These activities have resulted in paved areas and filled soil profiles, truncated soil profiles from excavation, surface/subsurface alterations and compaction from utility installation, and high organic material content or evidence of wetness from standing water. In some areas the mixing of the natural soils with lime rock, gravel, fine texture materials such as clay or other similar road bedding material was visible at the surface. Often adjacent areas located outside of the project area (ROW) exhibit intact soil profiles and suitable habitat soils, however the natural soil conditions degrade within the ROW and closer to the roadway foundation/system (**Exhibit 4 (4A-4F).**



Soil Site Investigation
Project Location Map

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Path:

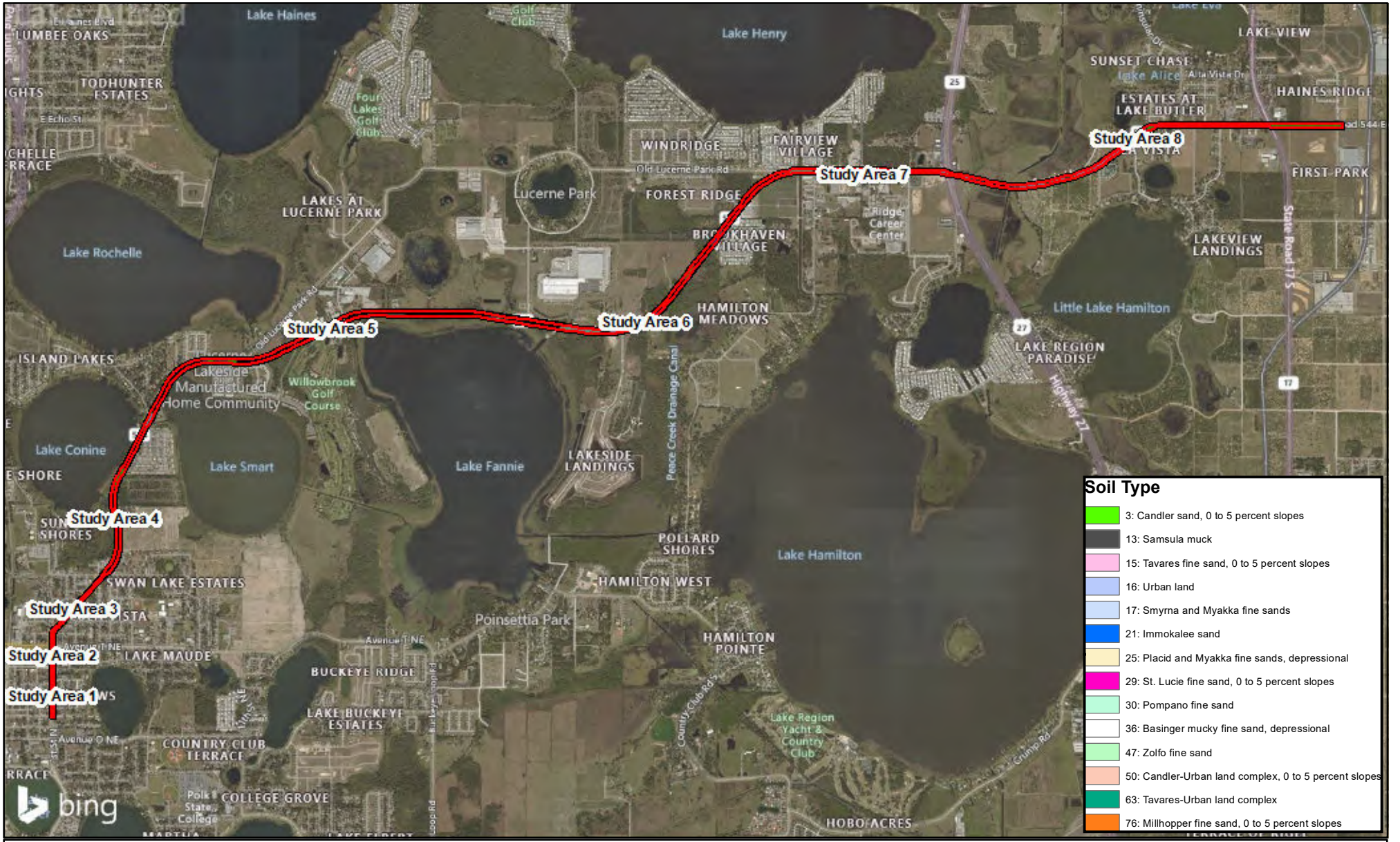
Project Right-of-Way

Exhibit 1

1 inch equals 0.7 miles

Date: 1/25/2021

SNC·LAVALIN ATKINS



Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

Exhibit 2

1 inch equals 0.7 miles

Date: 2/1/2021

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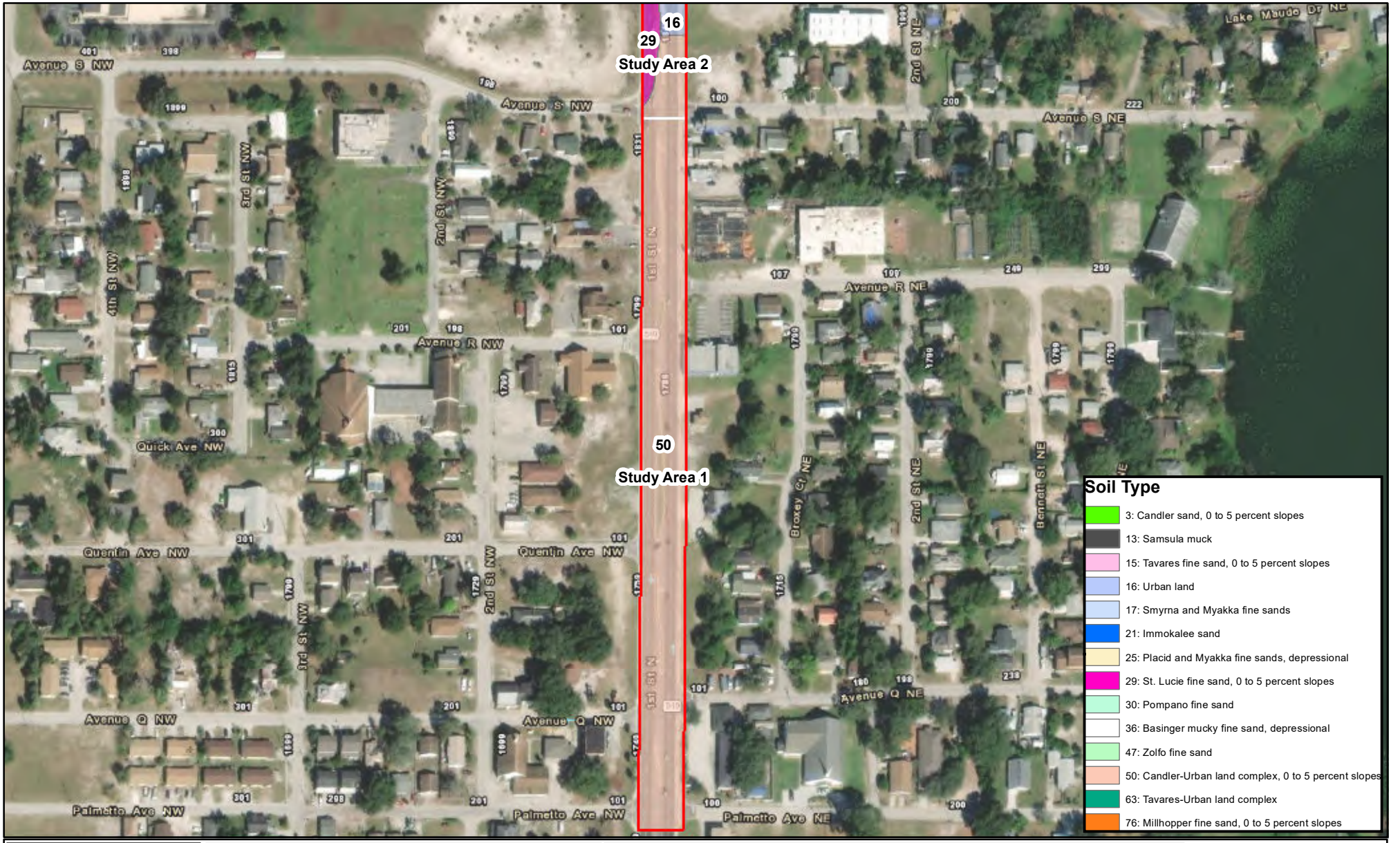

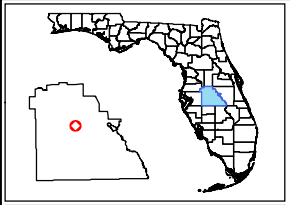

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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

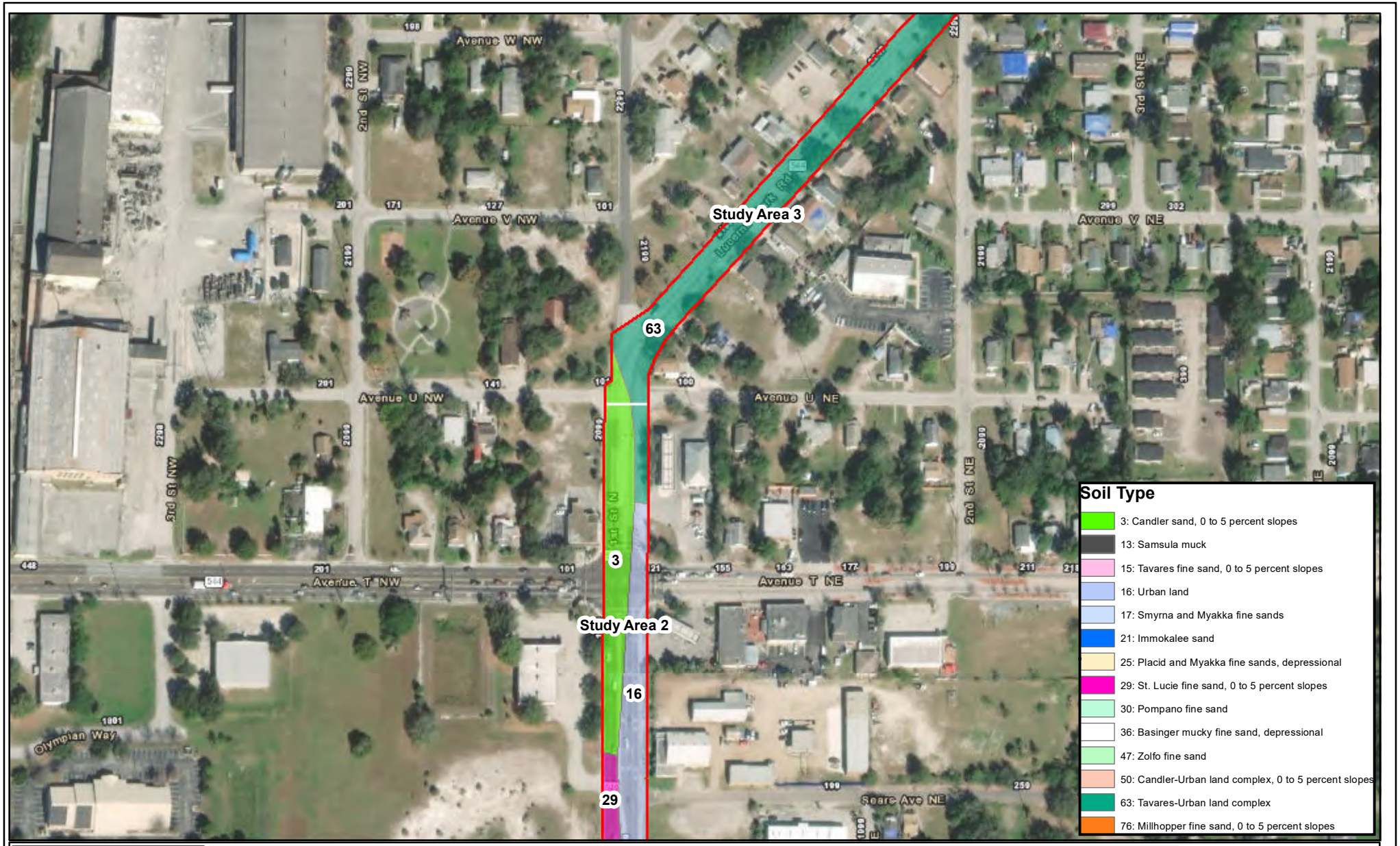
SR544 Soil Survey Areas

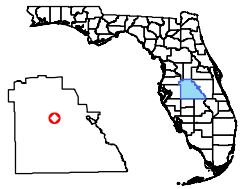
Exhibit 2A

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

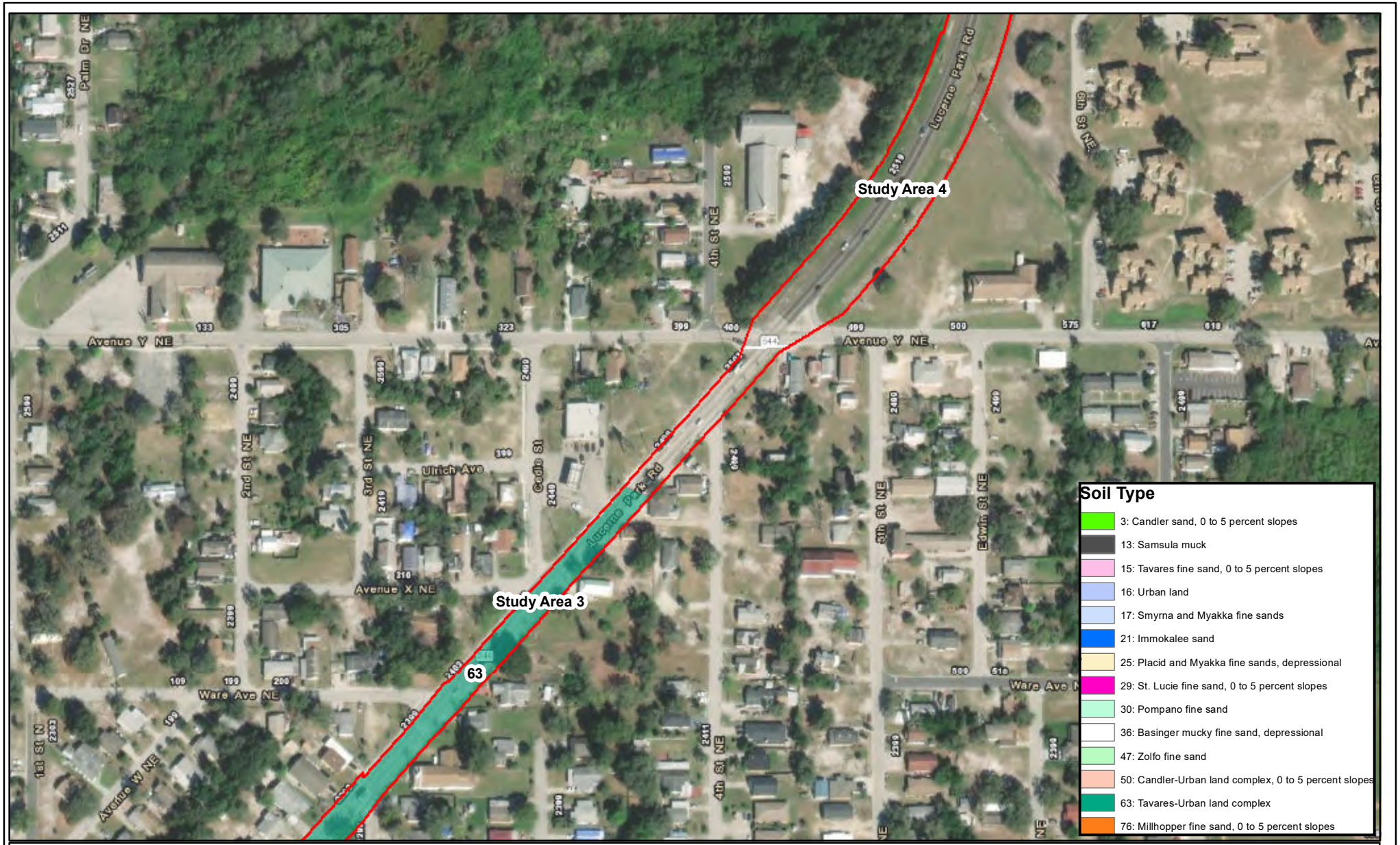
SR544 Soil Survey Areas

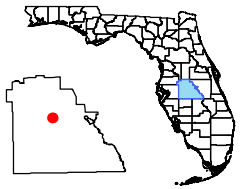
Exhibit 2B

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

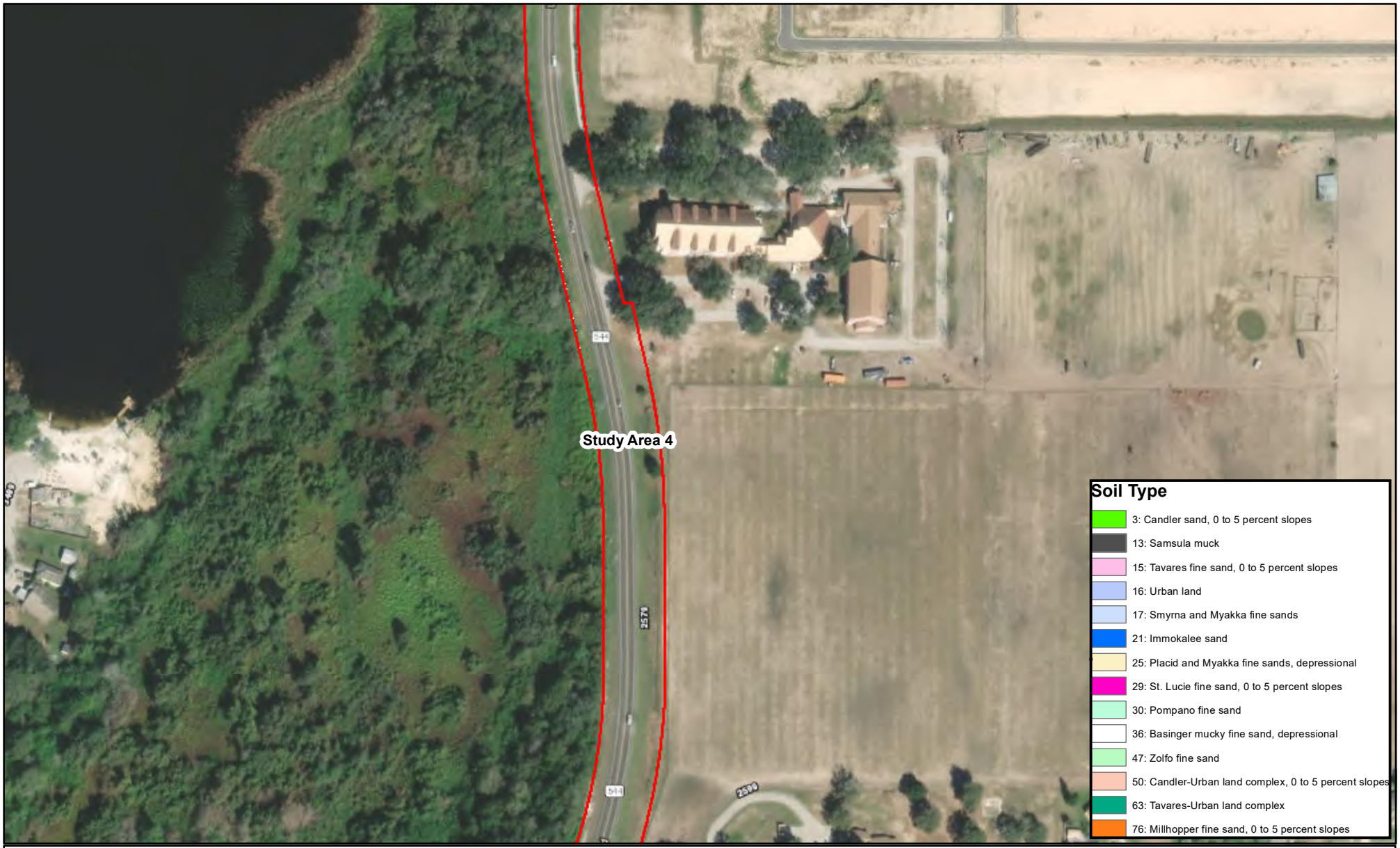
SR544 Soil Survey Areas

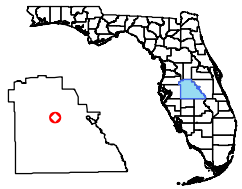
Exhibit 2C

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

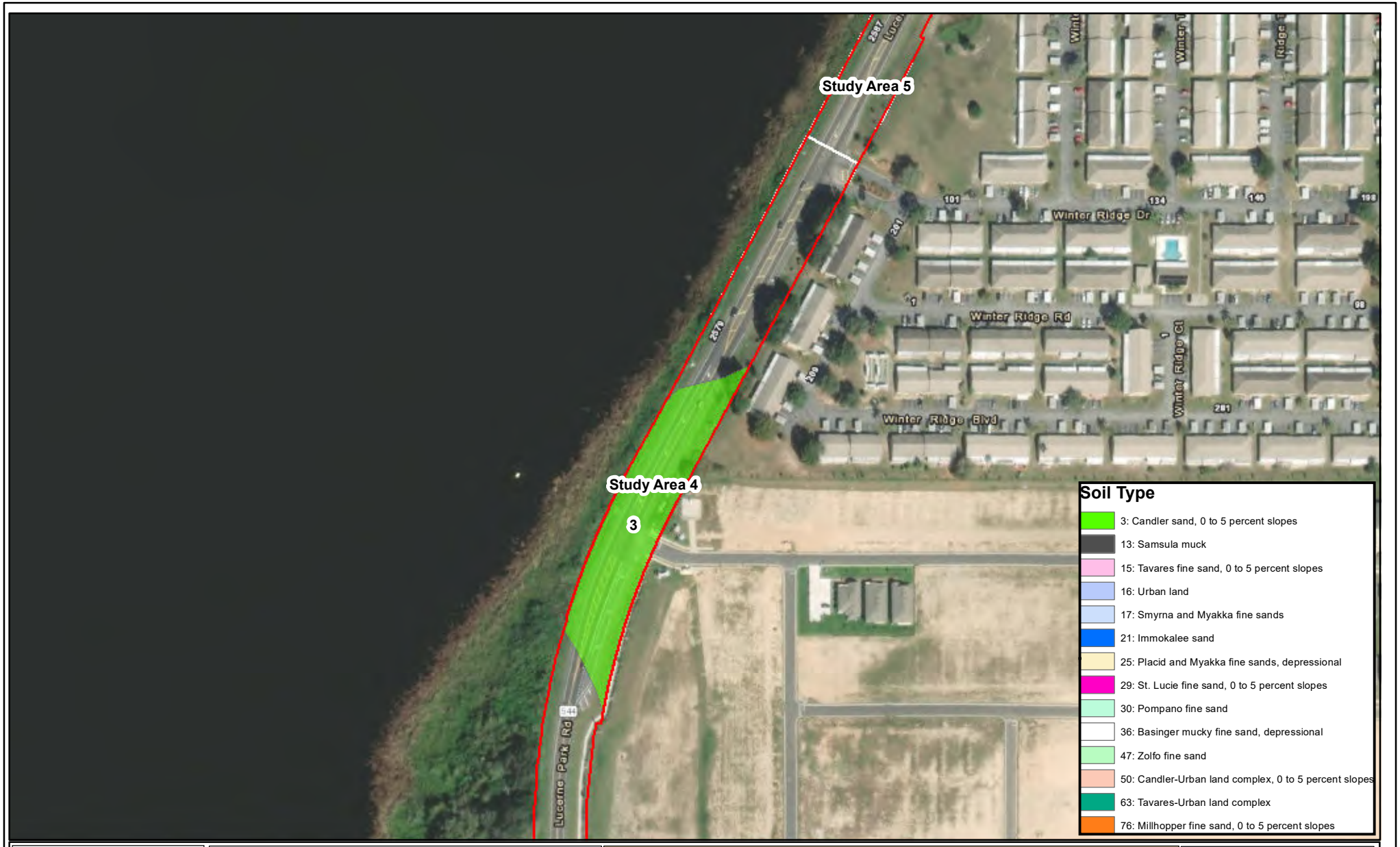
SR544 Soil Survey Areas

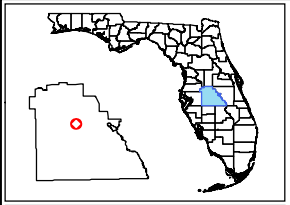
Exhibit 2D

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

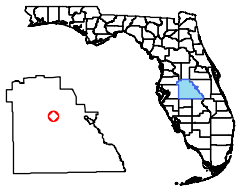
SR544 Soil Survey Areas

Exhibit 2E

1 in = 250 ft

Date: 2/1/2021

N



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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

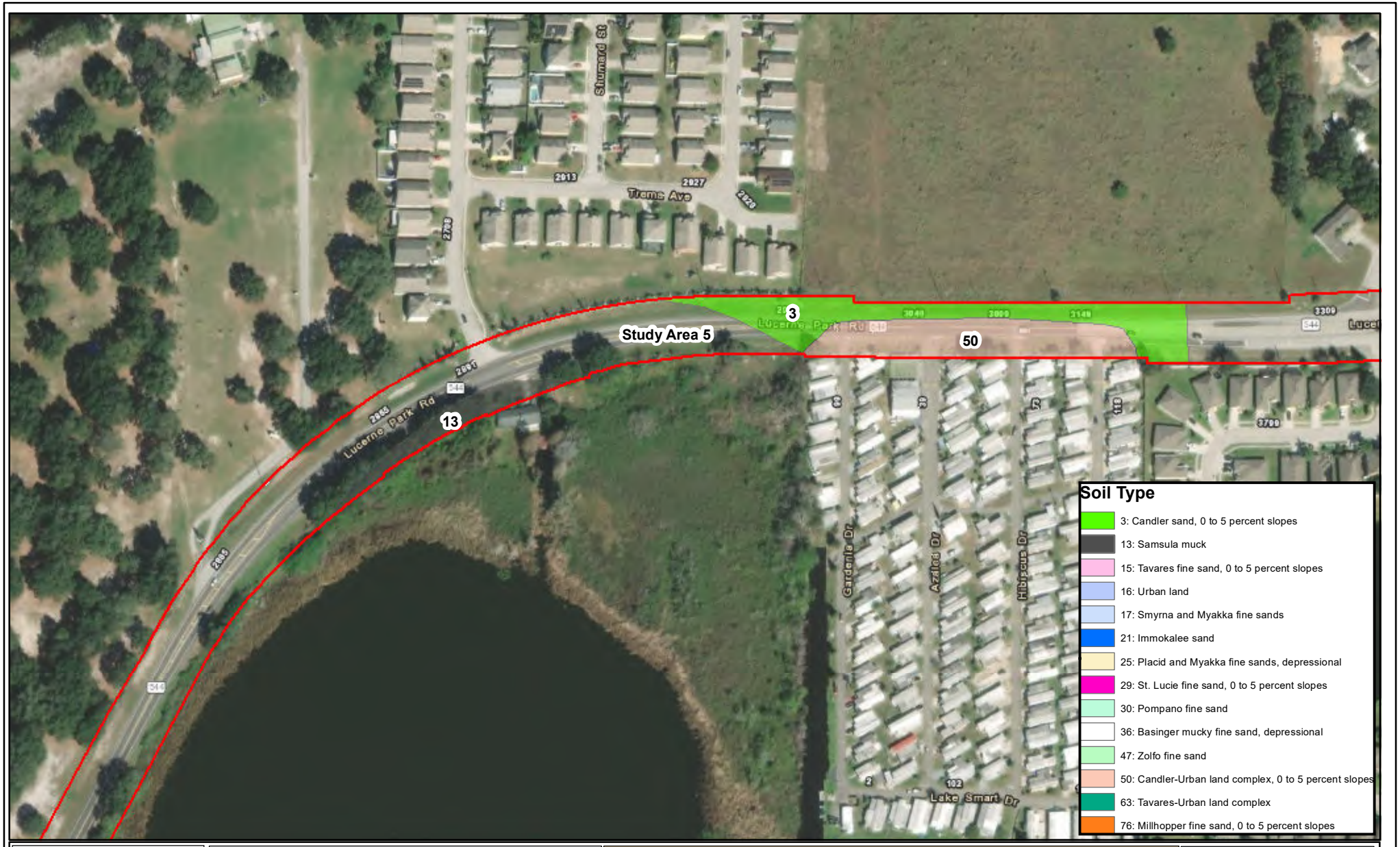
Project Right-of-Way

SR544 Soil Survey Areas

Exhibit 2F

1 in = 250 ft

Date: 2/1/2021



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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

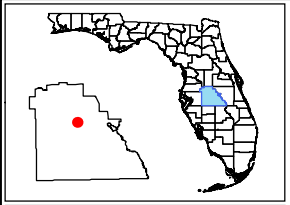
Project Right-of-Way

SR544 Soil Survey Areas

Exhibit 2G

1 in = 250 ft

Date: 2/1/2021



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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

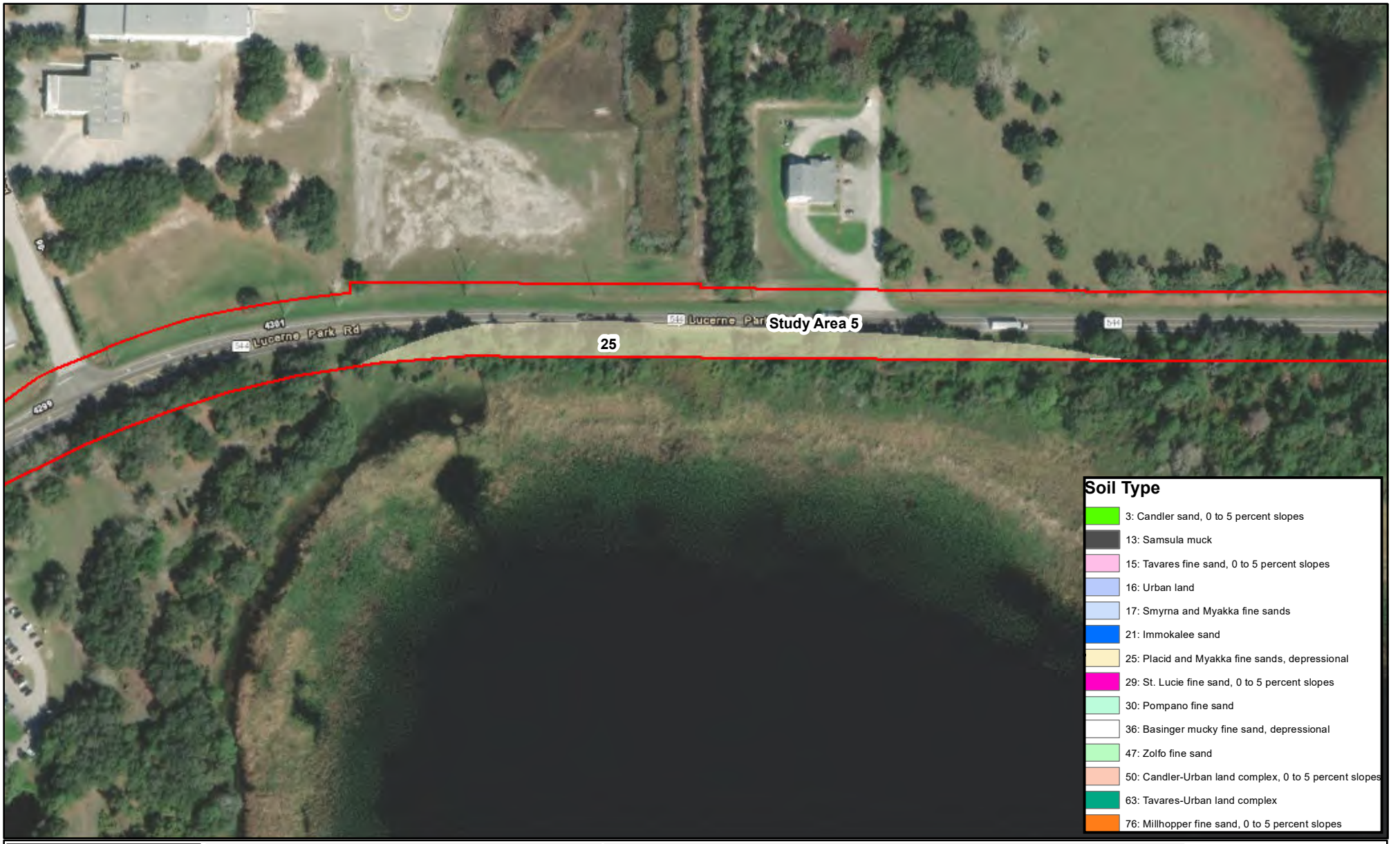
SR544 Soil Survey Areas

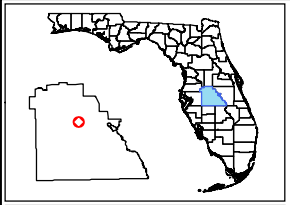
Exhibit 2H

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

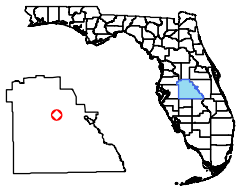
SR544 Soil Survey Areas

Exhibit 2I

1 in = 250 ft

Date: 2/1/2021

N



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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

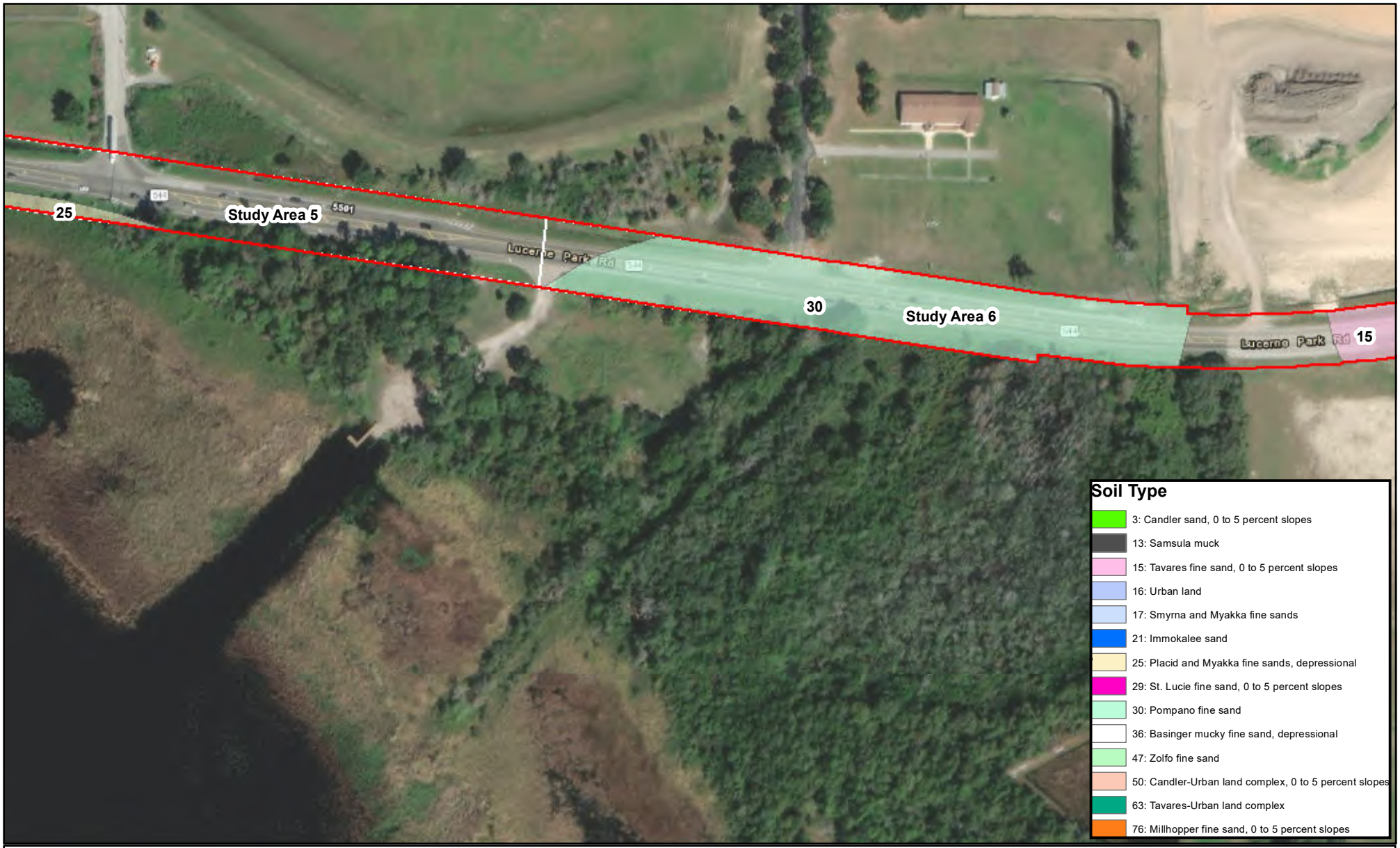
SR544 Soil Survey Areas

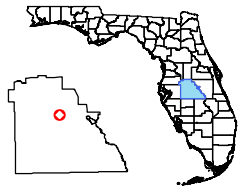
Exhibit 2J

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

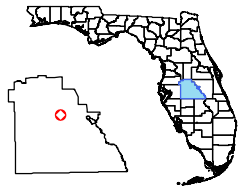
Project Right-of-Way

SR544 Soil Survey Areas

Exhibit 2K

1 in = 250 ft

Date: 2/1/2021



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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

SR544 Soil Survey Areas

Exhibit 2L

1 in = 250 ft

Date: 2/1/2021

N

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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

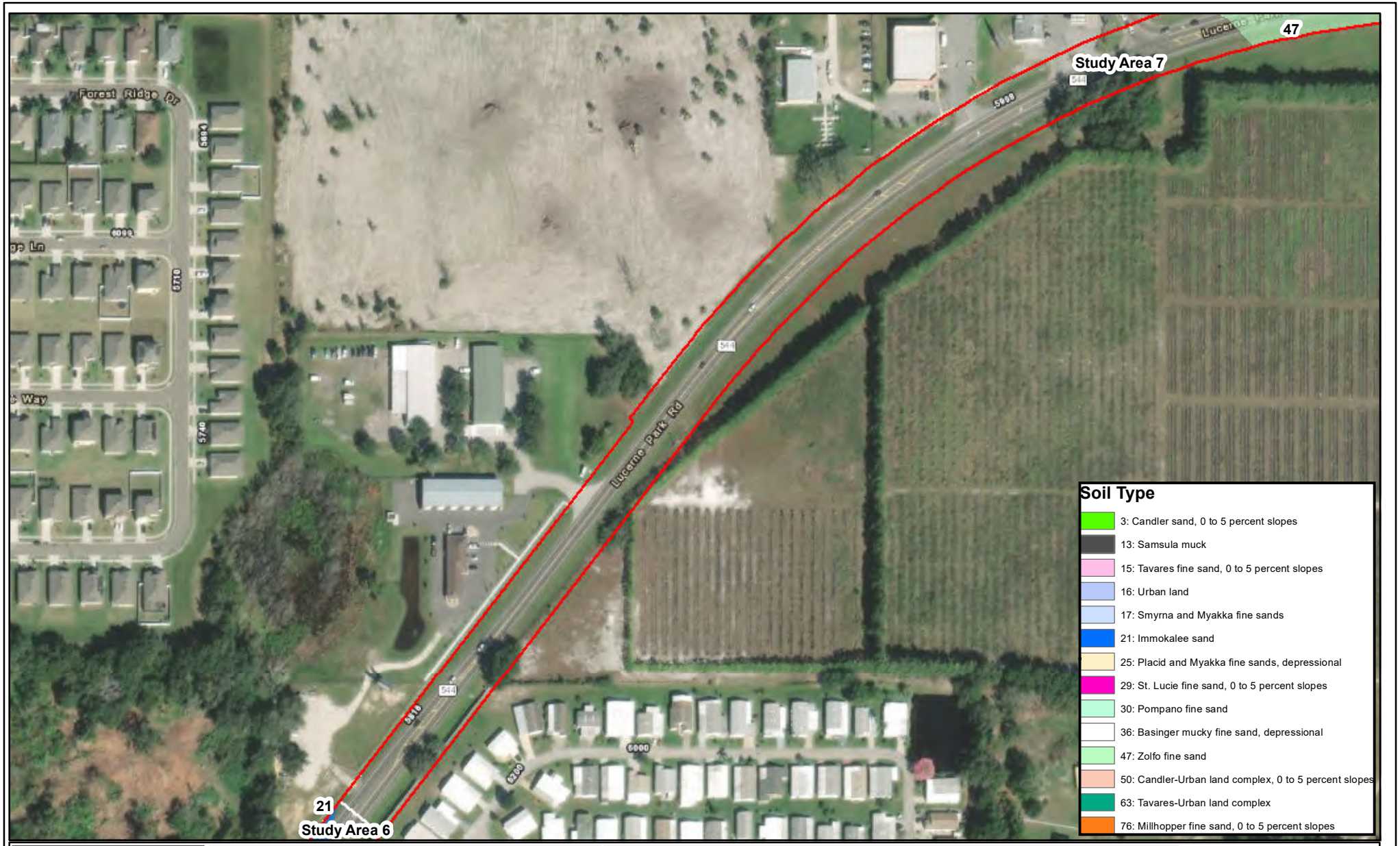
SR544 Soil Survey Areas

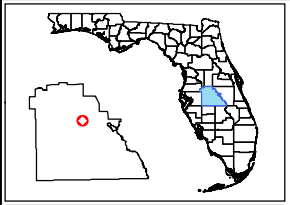
Exhibit 2M

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

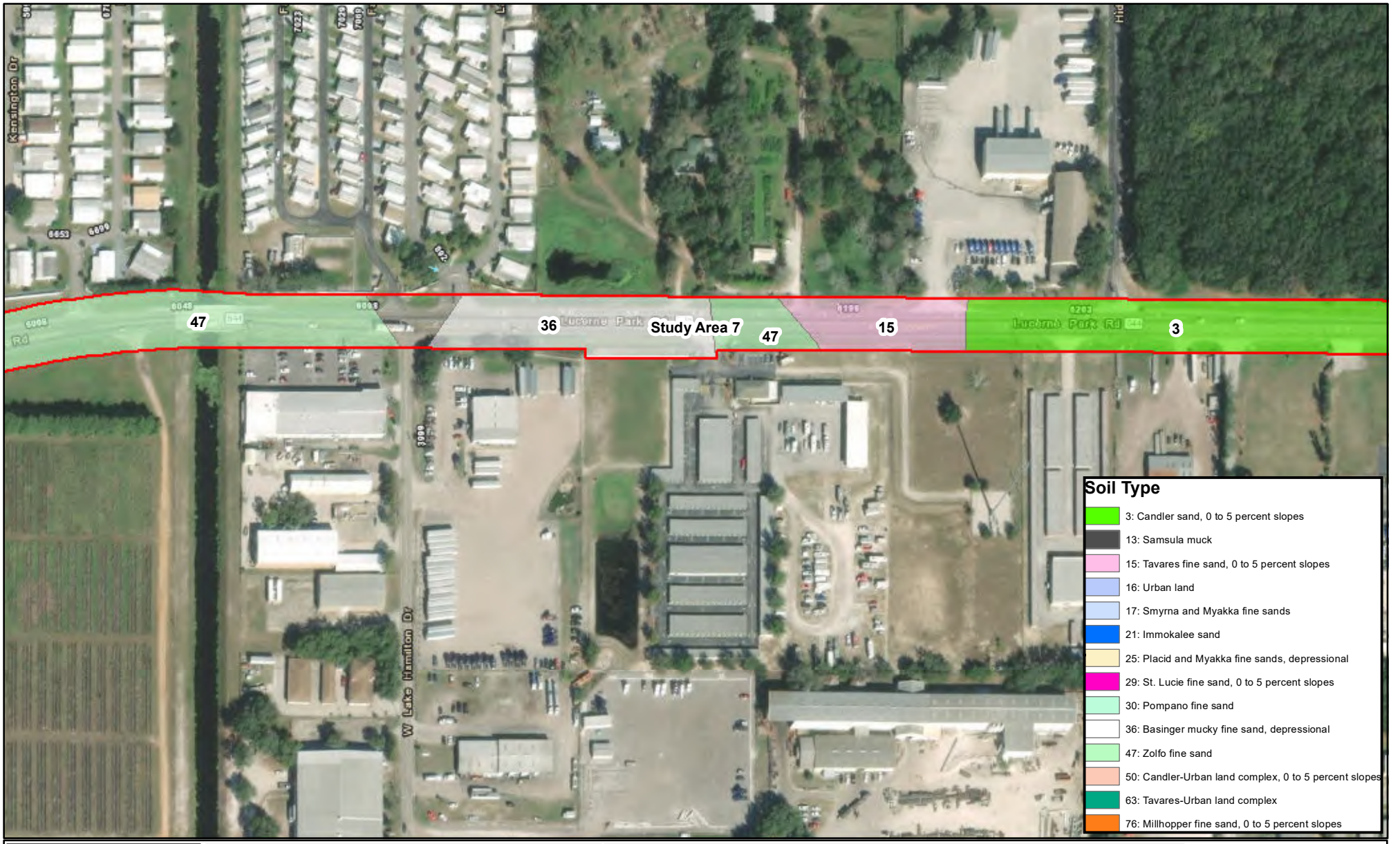
SR544 Soil Survey Areas

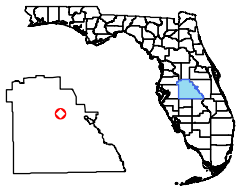
Exhibit 2N

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

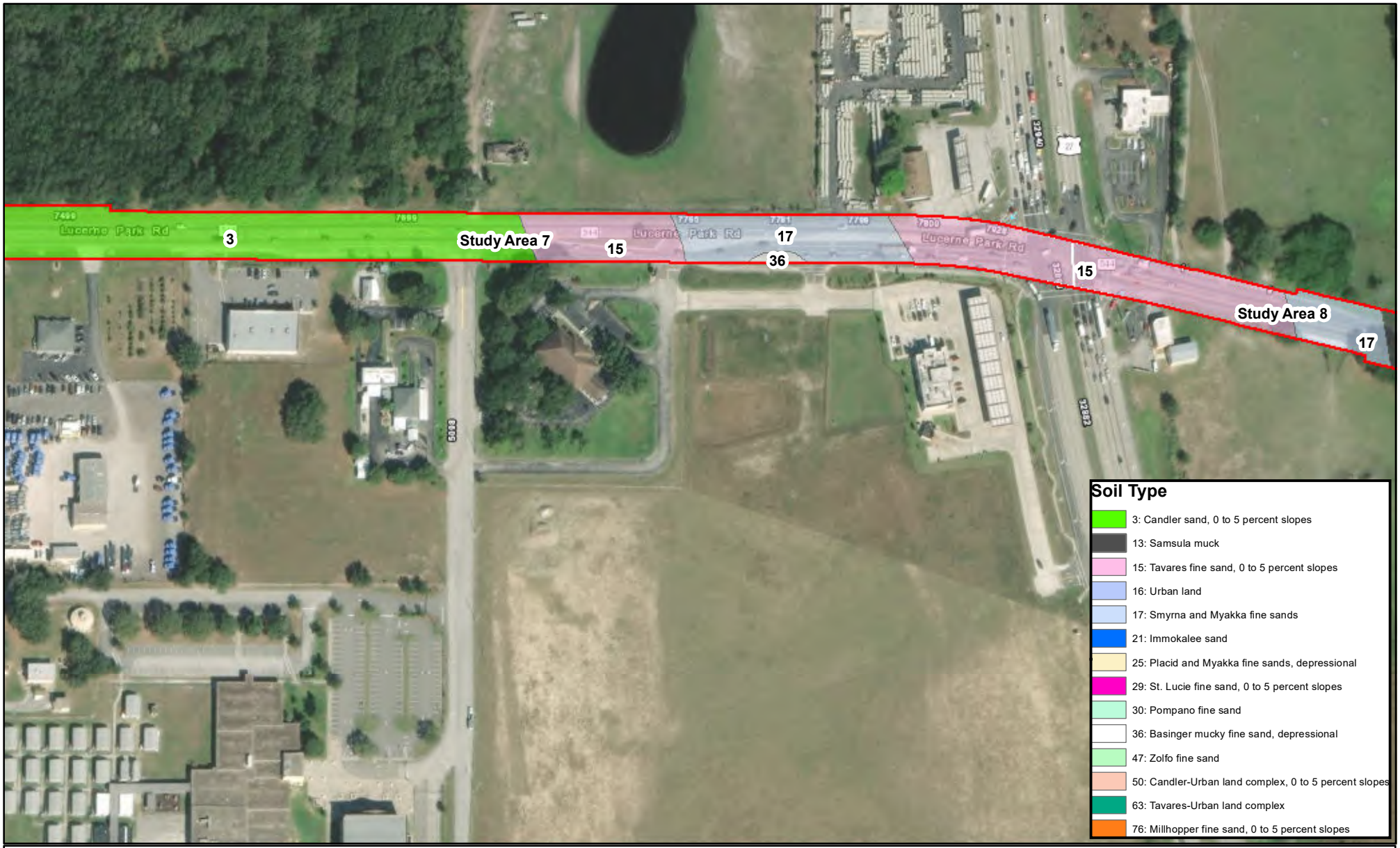
SR544 Soil Survey Areas

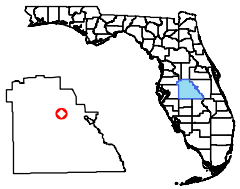
Exhibit 2O

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

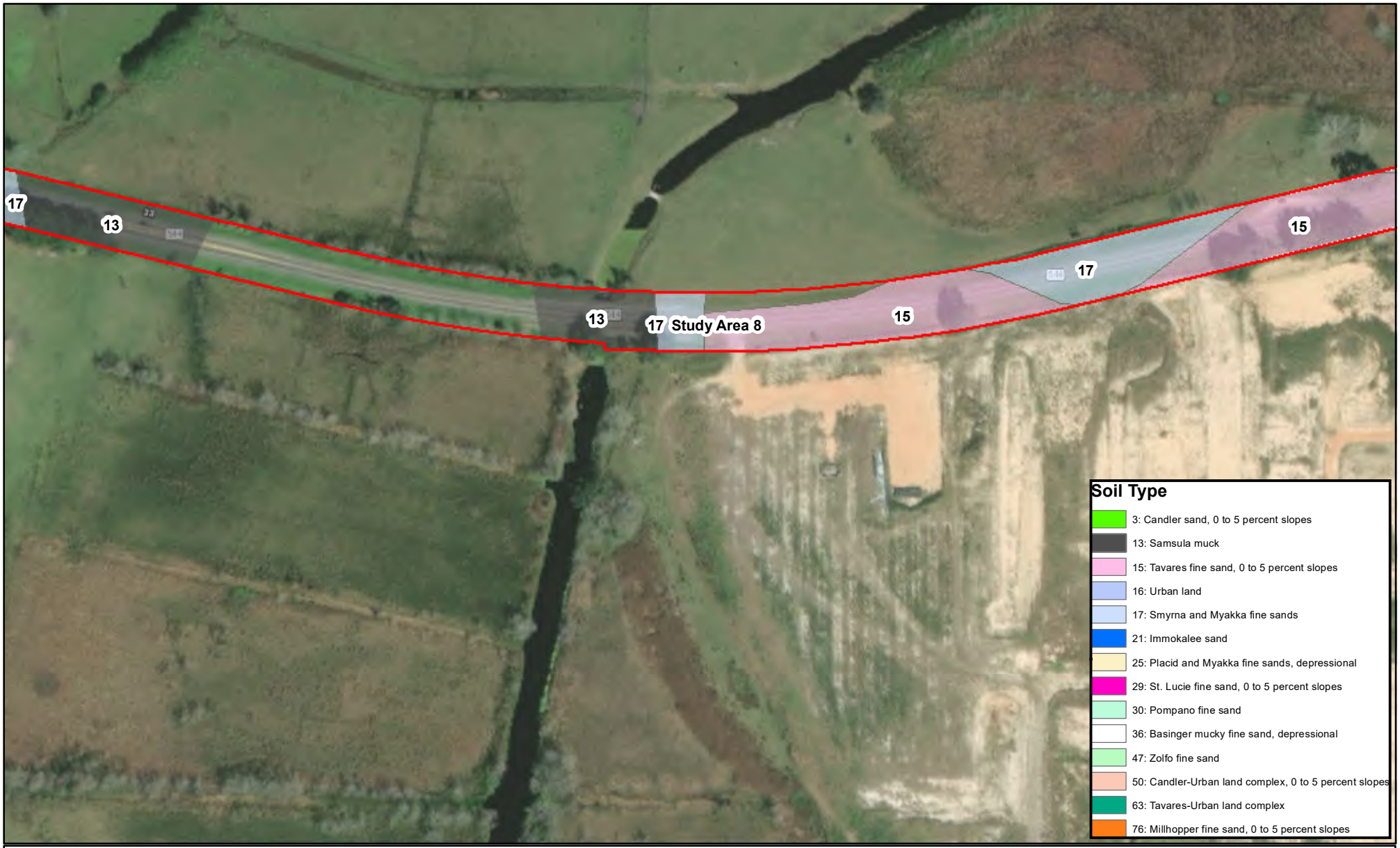
SR544 Soil Survey Areas

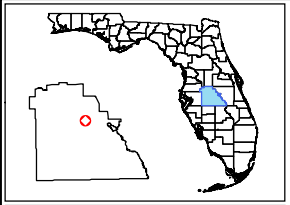
Exhibit 2P

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

SR544 Soil Survey Areas

Exhibit 2Q

1 in = 250 ft

Date: 2/1/2021

N

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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

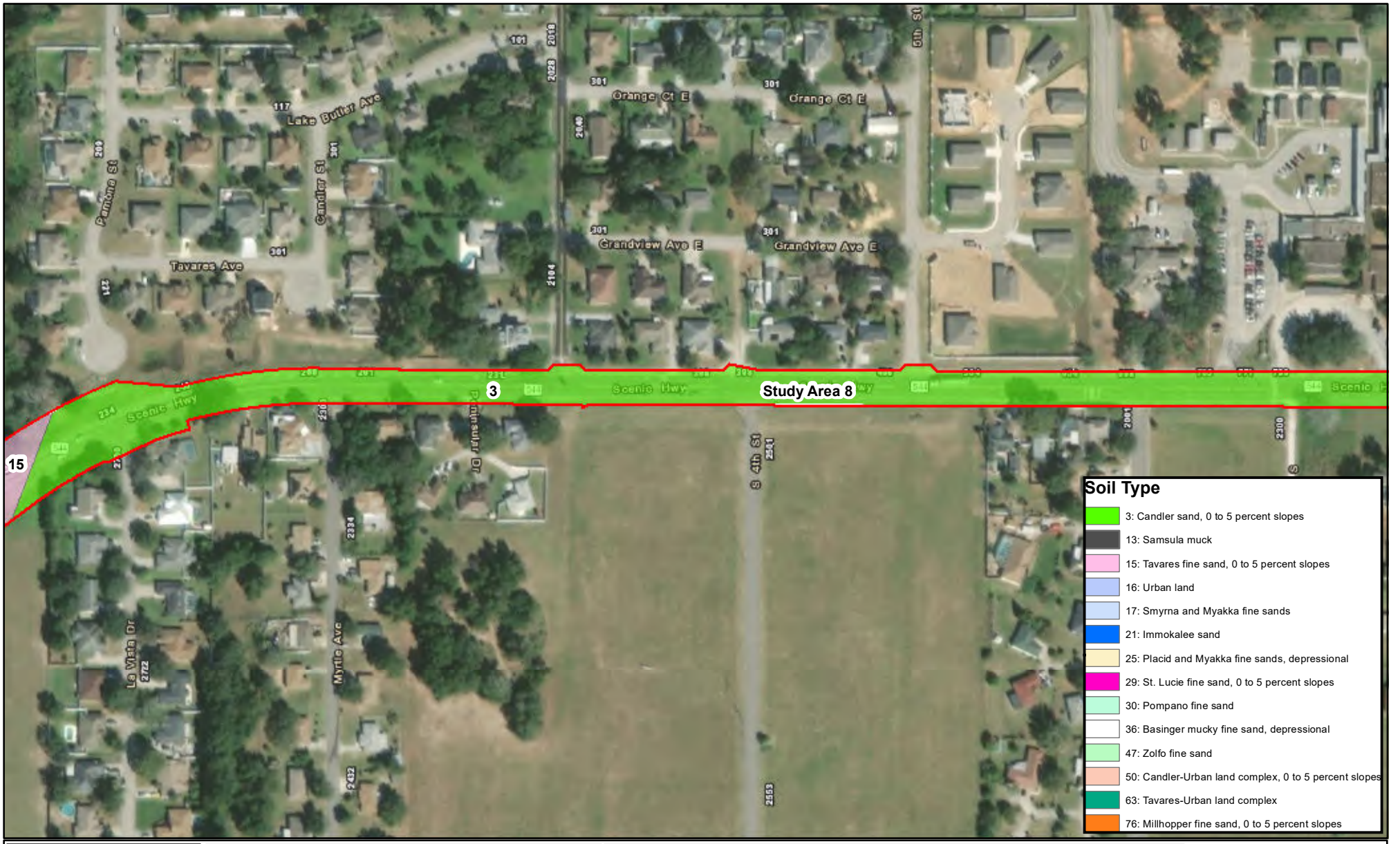
SR544 Soil Survey Areas

Exhibit 2R

1 in = 250 ft

Date: 2/1/2021

N



Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

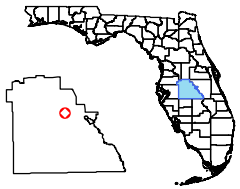
SR544 Soil Survey Areas

Exhibit 2S

1 in = 250 ft

Date: 2/1/2021

SNC·LAVALIN ATKINS



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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

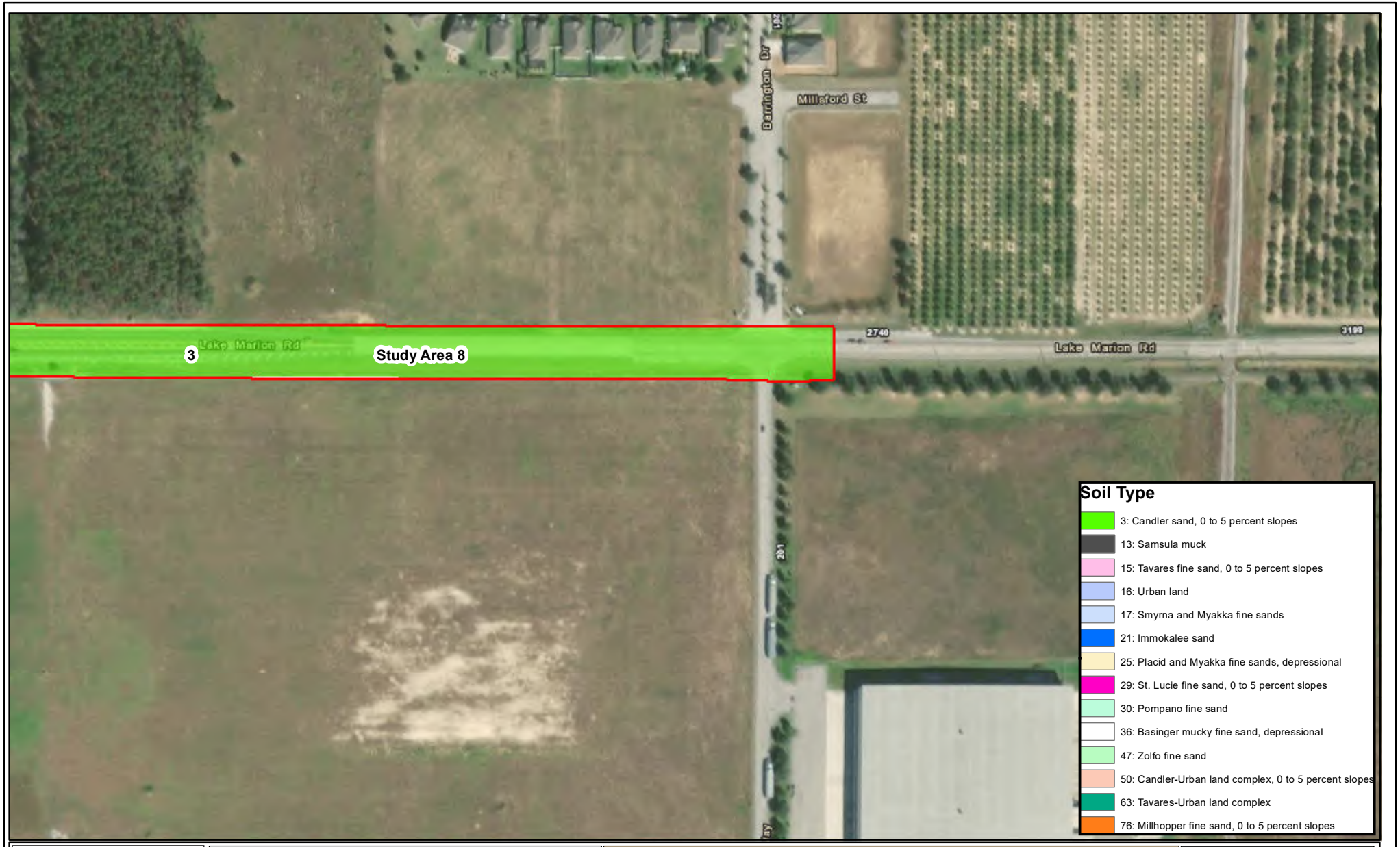
SR544 Soil Survey Areas

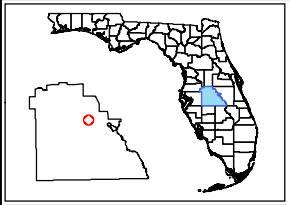
Exhibit 2T

1 in = 250 ft

Date: 2/1/2021

N





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Soil Survey Areas
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Project Right-of-Way

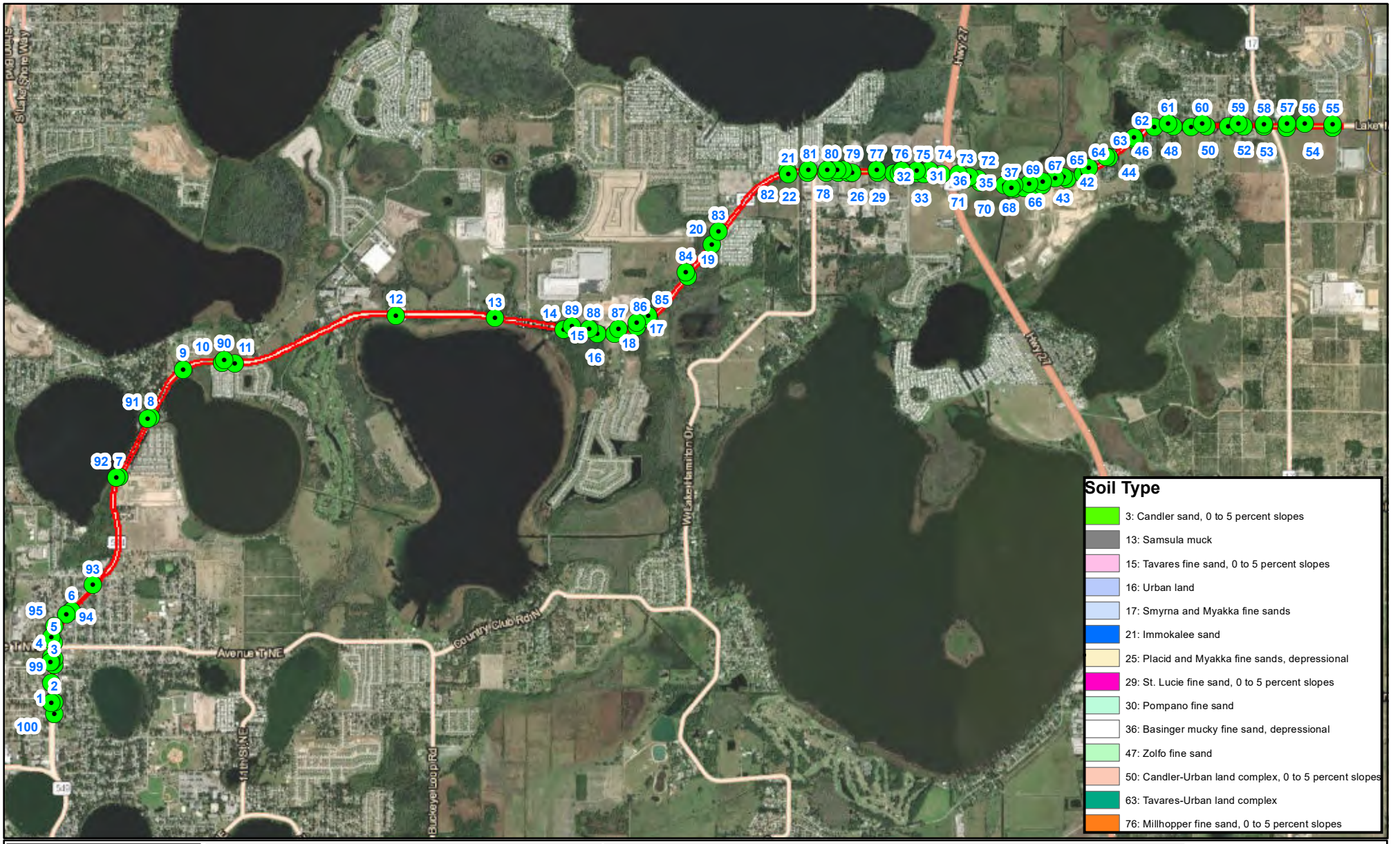
SR544 Soil Survey Areas

Exhibit 2U

1 in = 250 ft

Date: 2/1/2021

N



Photopoint Location Map
Sand Skink Soil Site Investigation

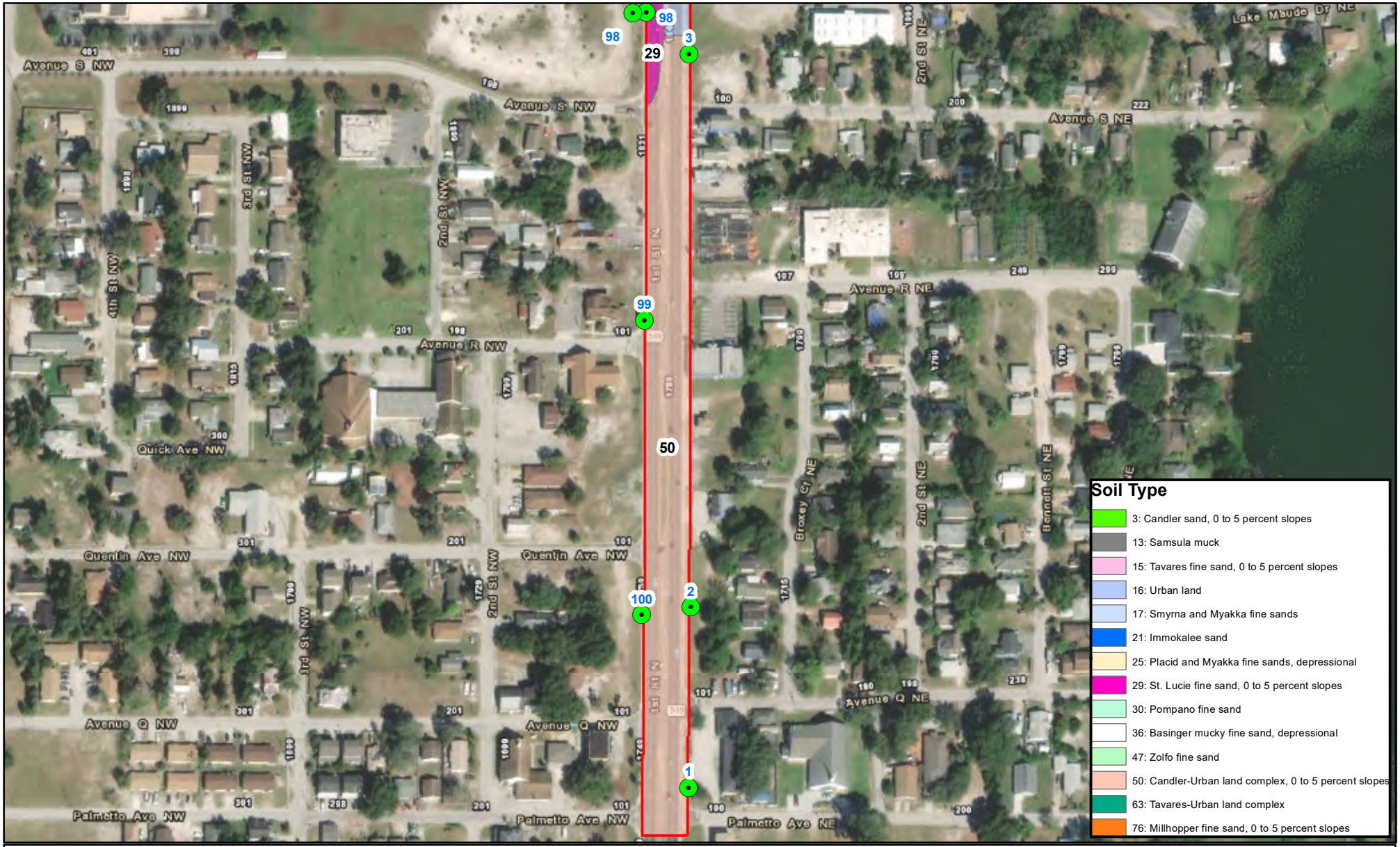
Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

SNC·LAVALIN ATKINS

Exhibit 3

1 inch equals 0.7 miles

Date: 2/1/2021



SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

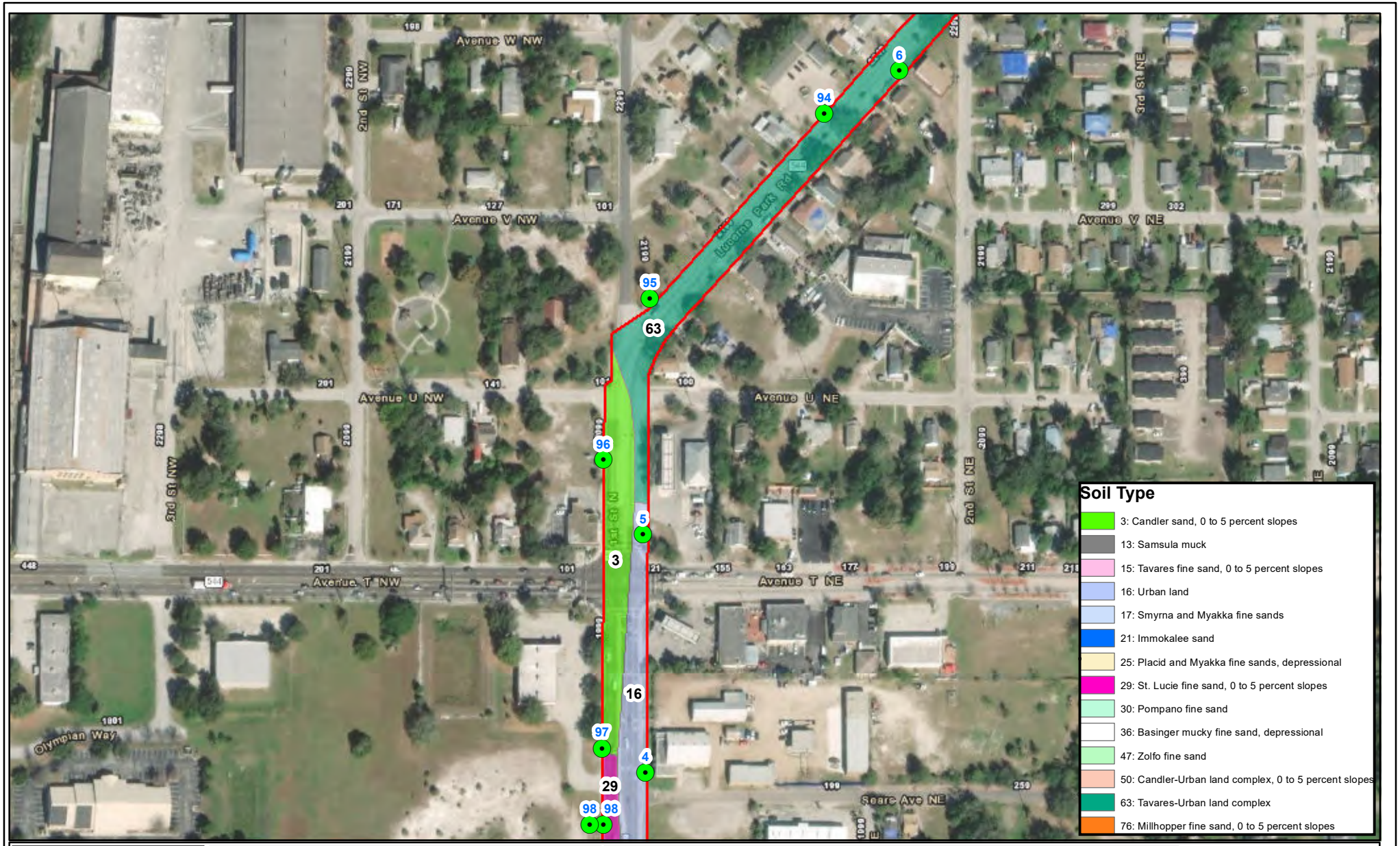
Project Right-of-Way

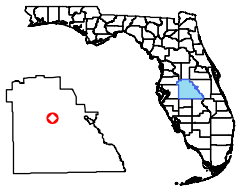
Exhibit 3A

1 in = 250 ft

Date: 2/1/2021

N





SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

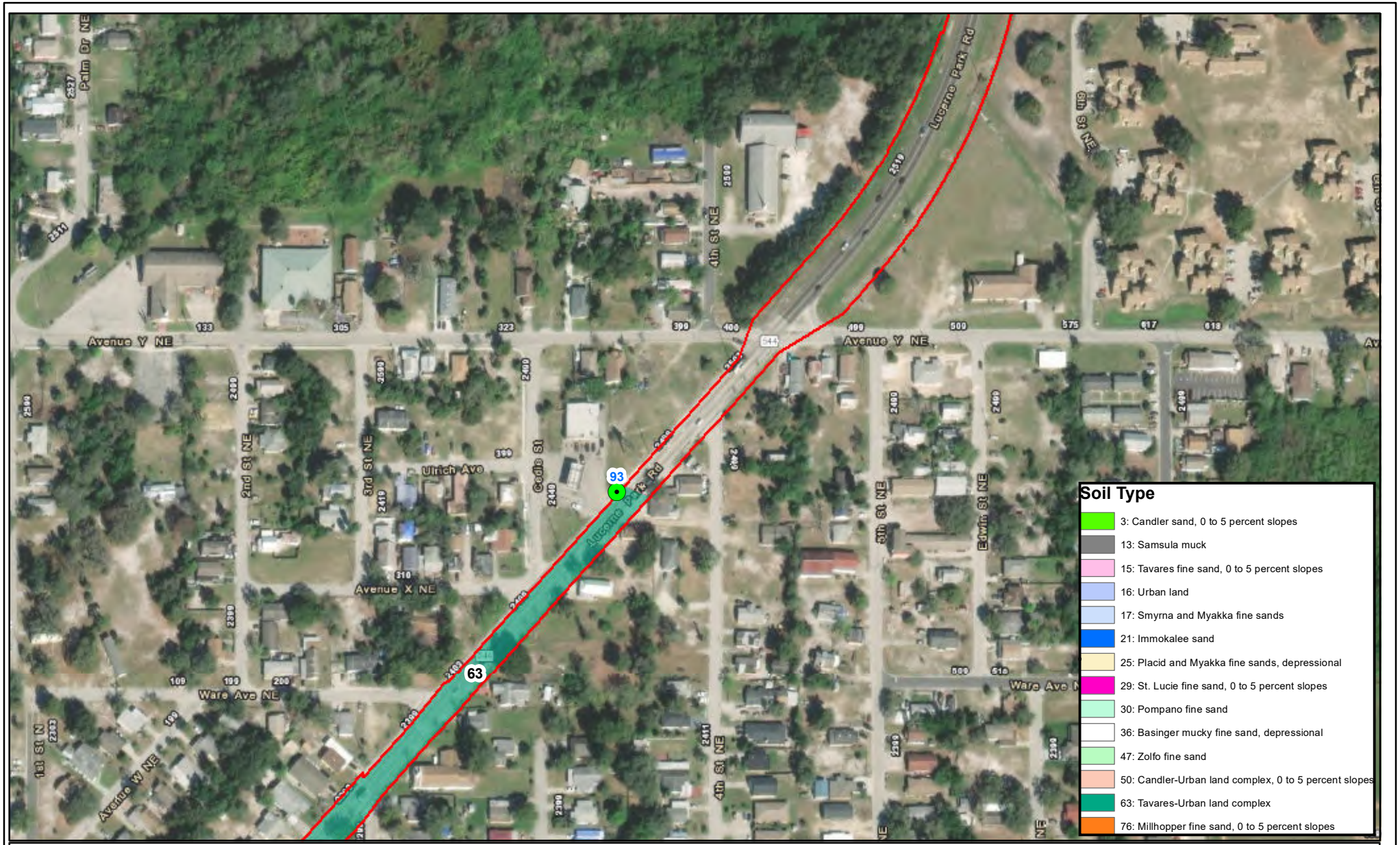
Project Right-of-Way

Exhibit 3B

1 in = 250 ft

Date: 2/1/2021

N



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

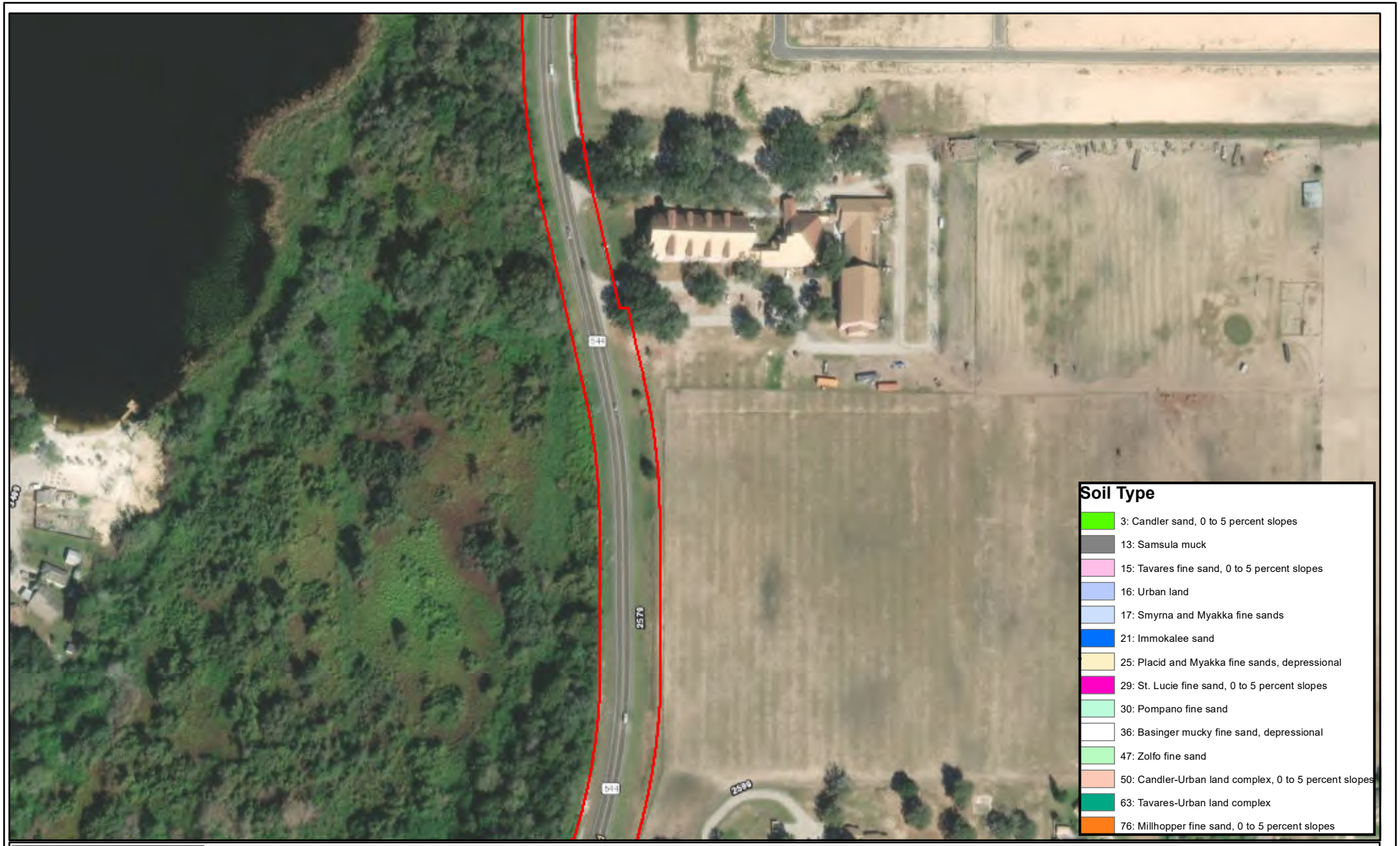
Project Right-of-Way

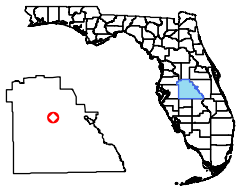
Exhibit 3C

1 in = 250 ft

Date: 2/1/2021

N





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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

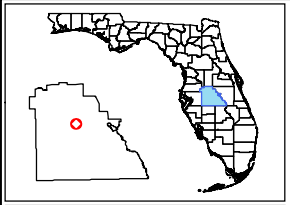
Project Right-of-Way

Exhibit 3D

1 in = 250 ft

Date: 2/1/2021

N



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

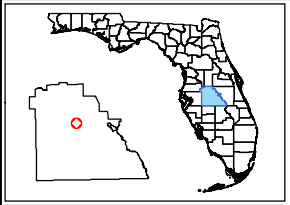
Photopoints

Project Right-of-Way

Exhibit 3E

1 in = 250 ft

Date: 2/1/2021



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

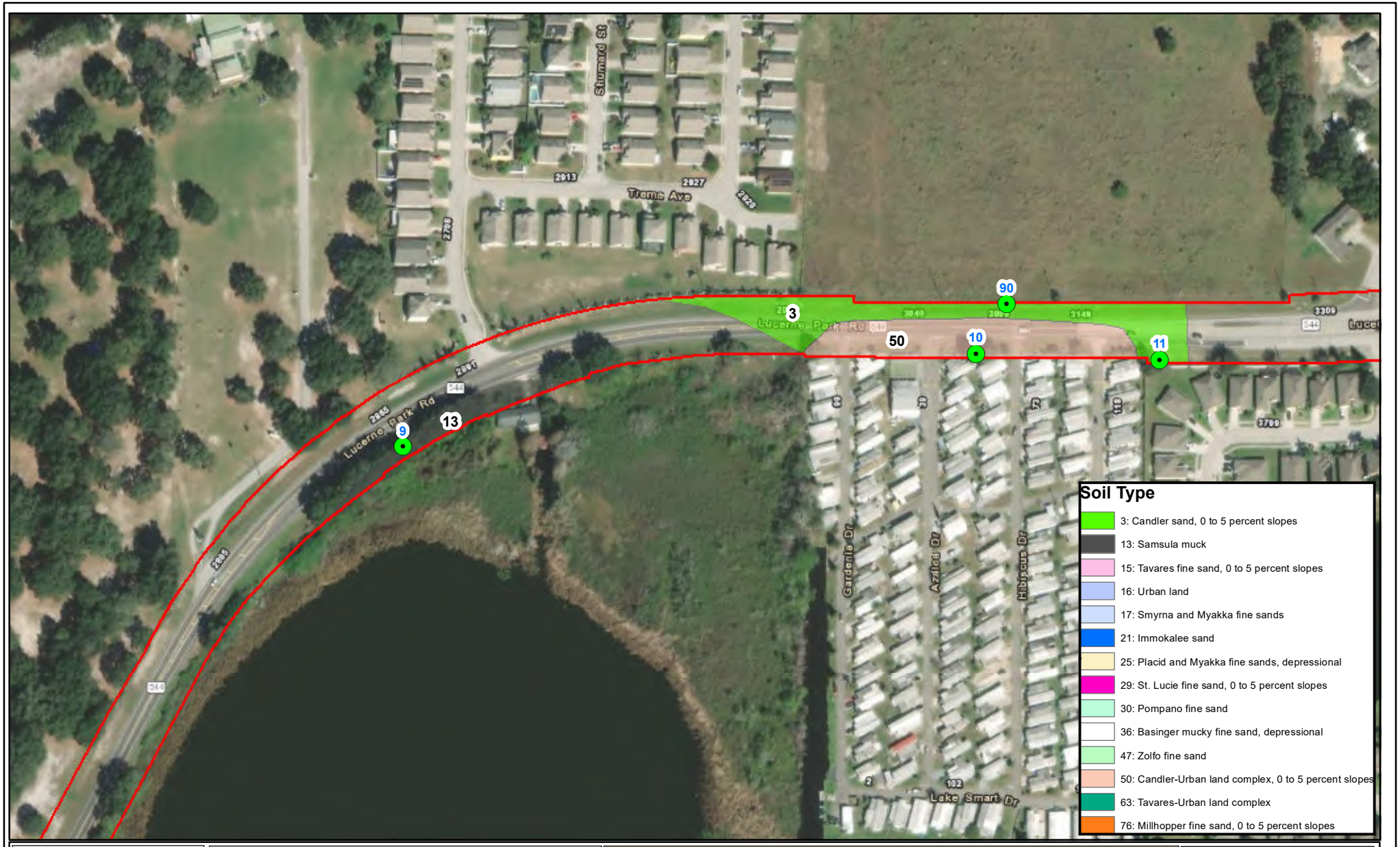
Photopoints

Project Right-of-Way

Exhibit 3F

1 in = 250 ft

Date: 2/1/2021



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

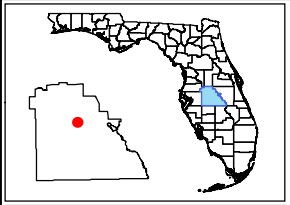
Photopoints

Project Right-of-Way

Exhibit 3G

1 in = 250 ft

Date: 2/1/2021



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

Project Right-of-Way

Exhibit 3H

1 in = 250 ft

Date: 2/1/2021

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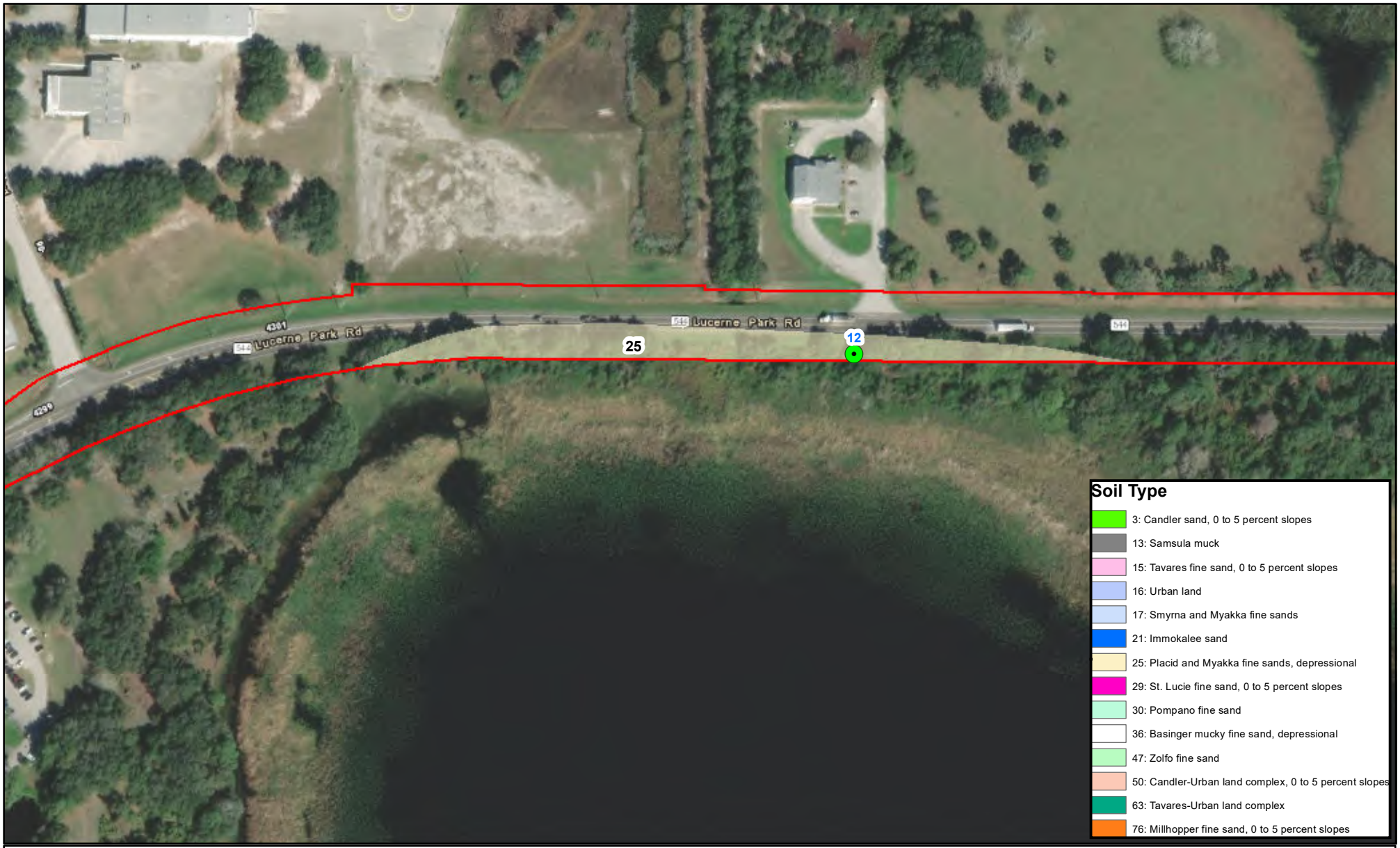

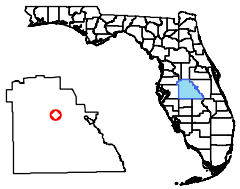

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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

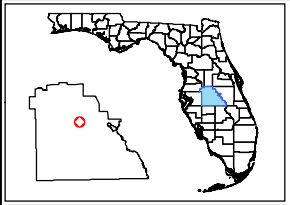
Project Right-of-Way

Exhibit 3I

1 in = 250 ft

Date: 2/1/2021

N



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

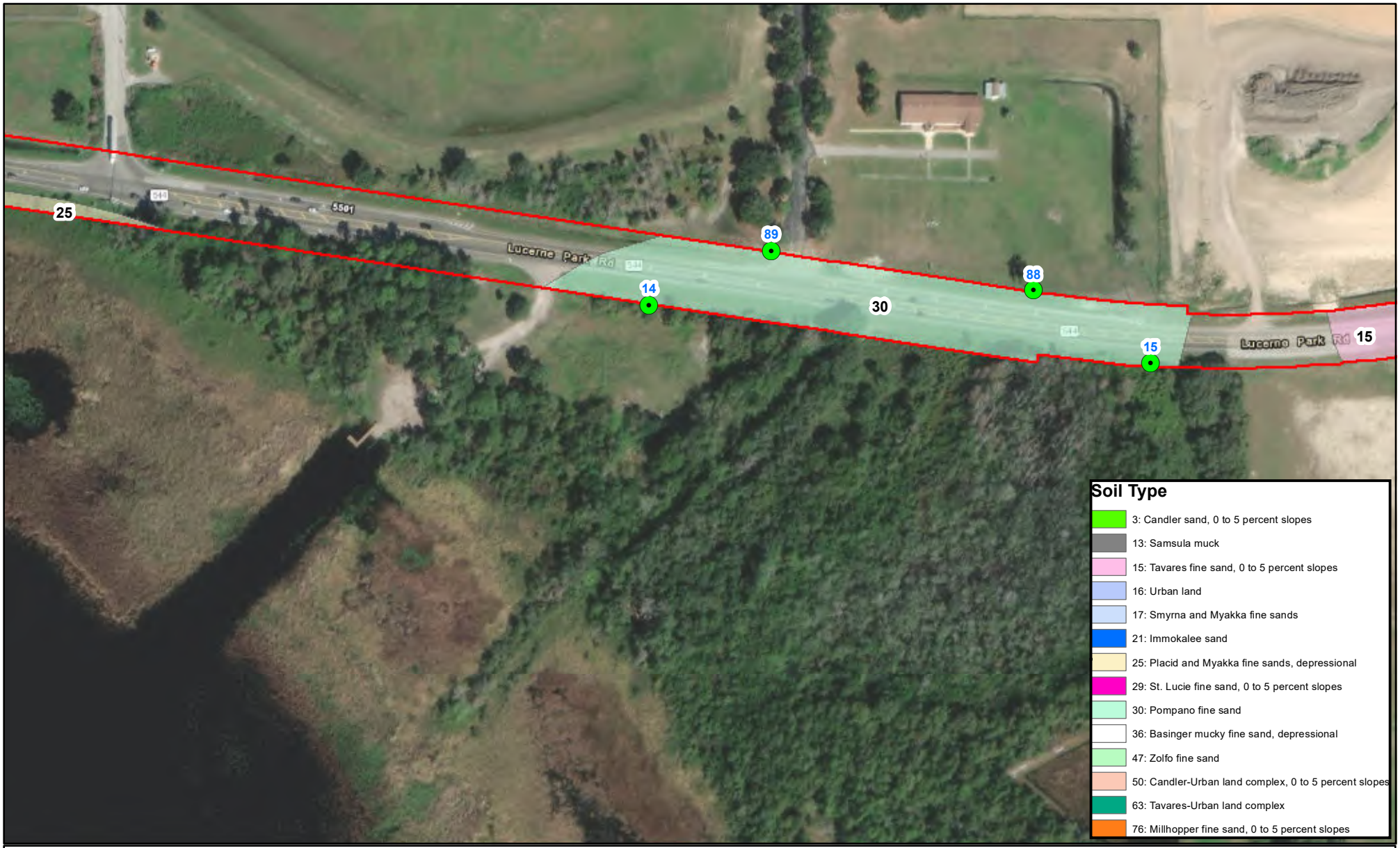
Project Right-of-Way

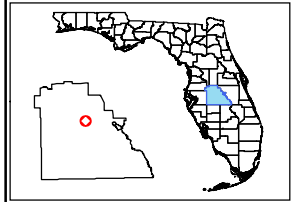
Exhibit 3J

1 in = 250 ft

Date: 2/1/2021

N





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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

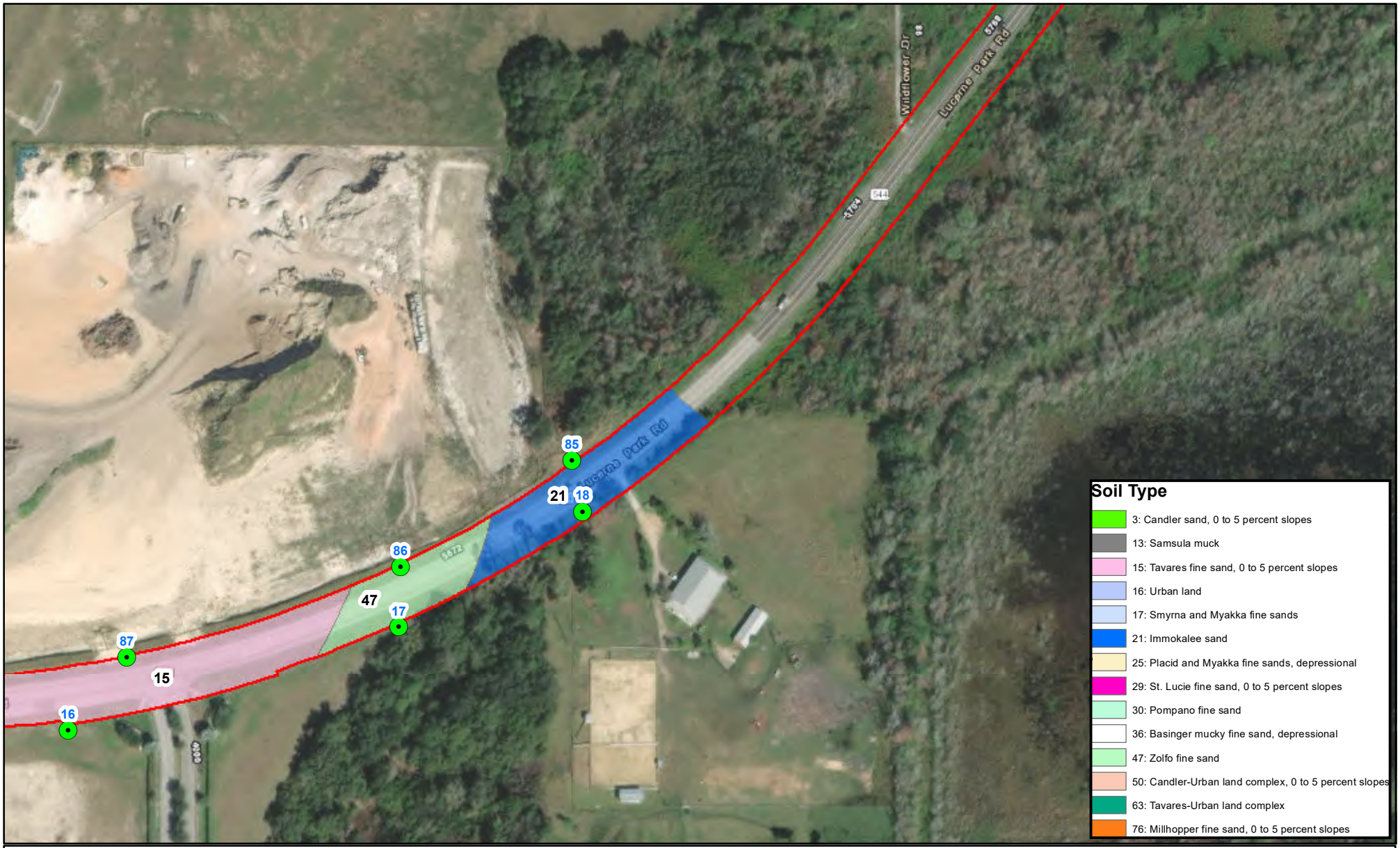
Project Right-of-Way

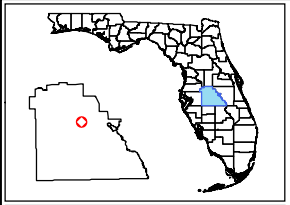
Exhibit 3K

1 in = 250 ft

Date: 2/1/2021

N





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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

Project Right-of-Way

Exhibit 3L

1 in = 250 ft

Date: 2/1/2021

N

SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

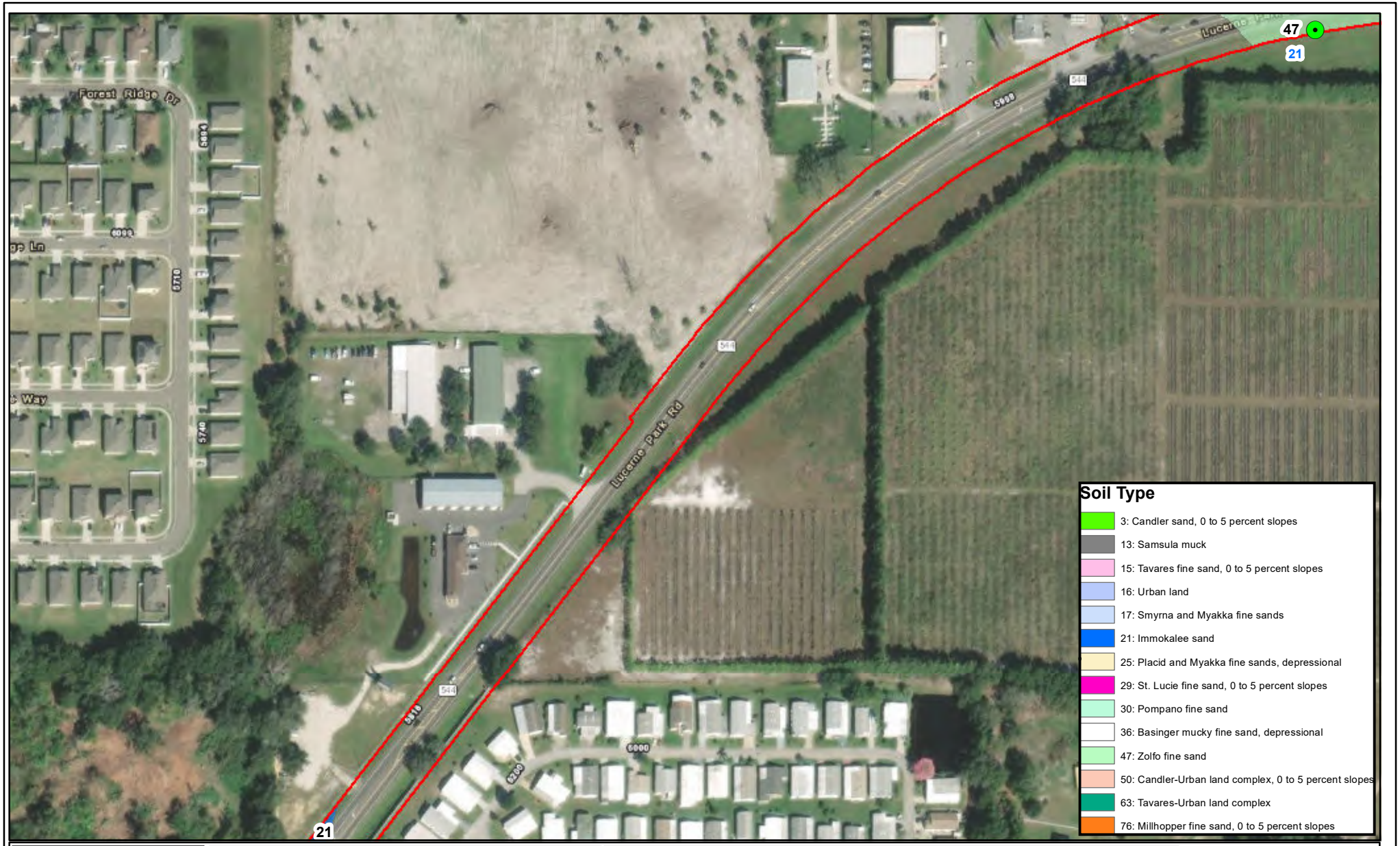
Project Right-of-Way

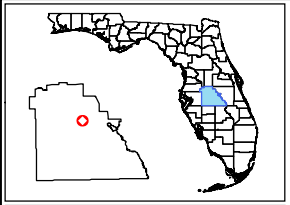
Exhibit 3M

1 in = 250 ft

Date: 2/1/2021

N





SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

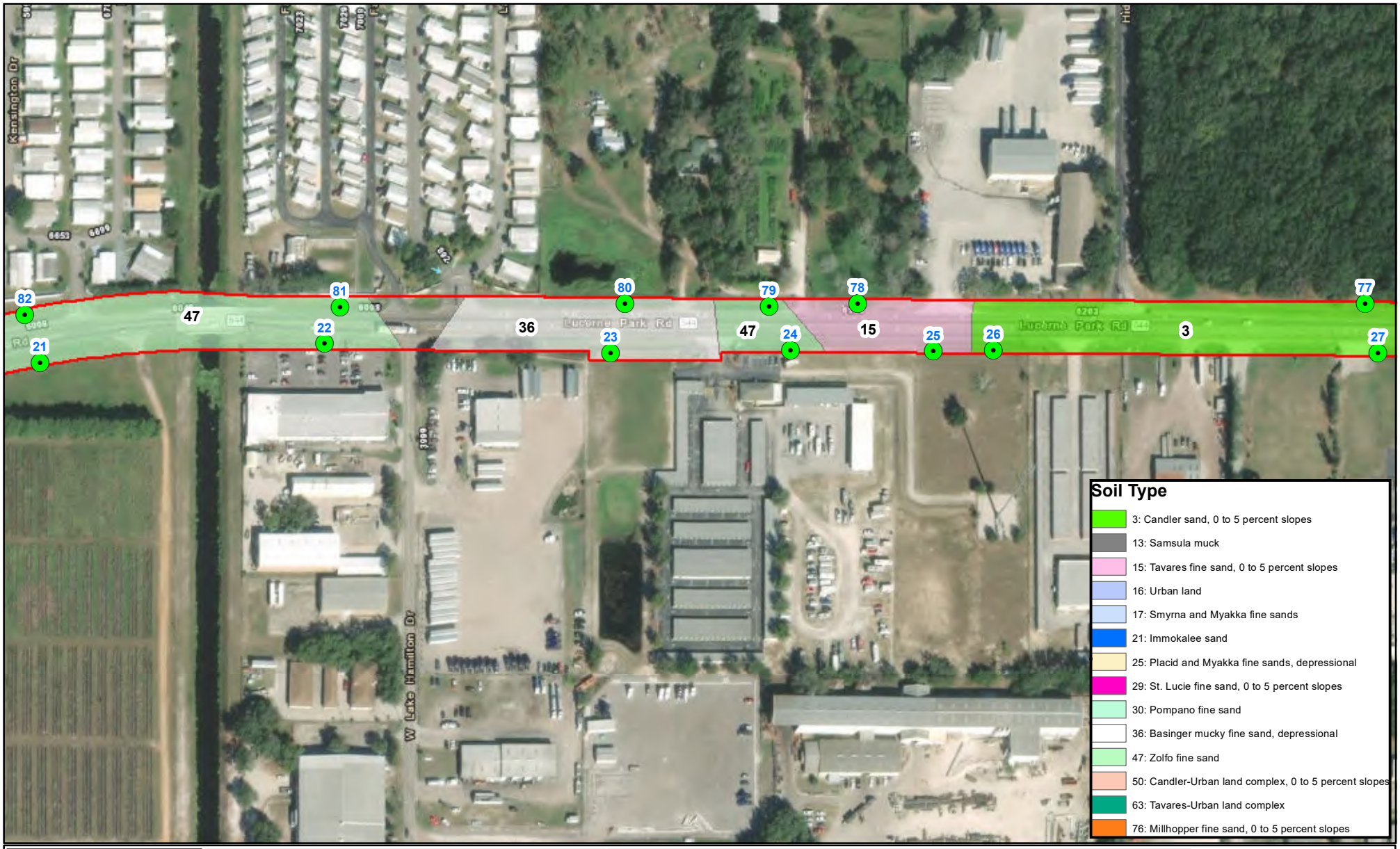
Project Right-of-Way

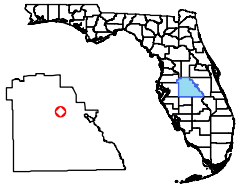
Exhibit 3N

1 in = 250 ft

Date: 2/1/2021

N





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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

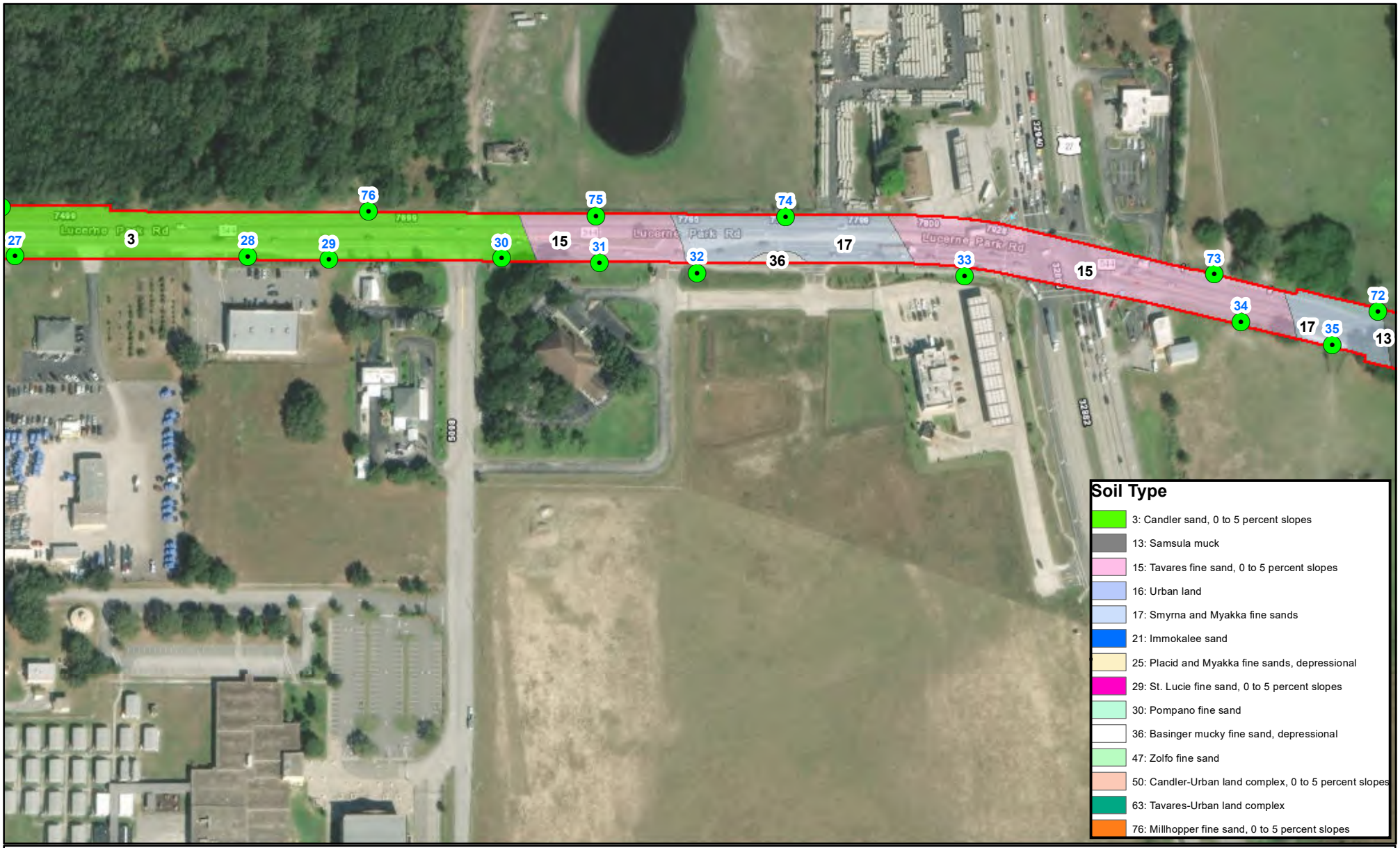
Project Right-of-Way

Exhibit 3O

1 in = 250 ft

Date: 2/1/2021

N



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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

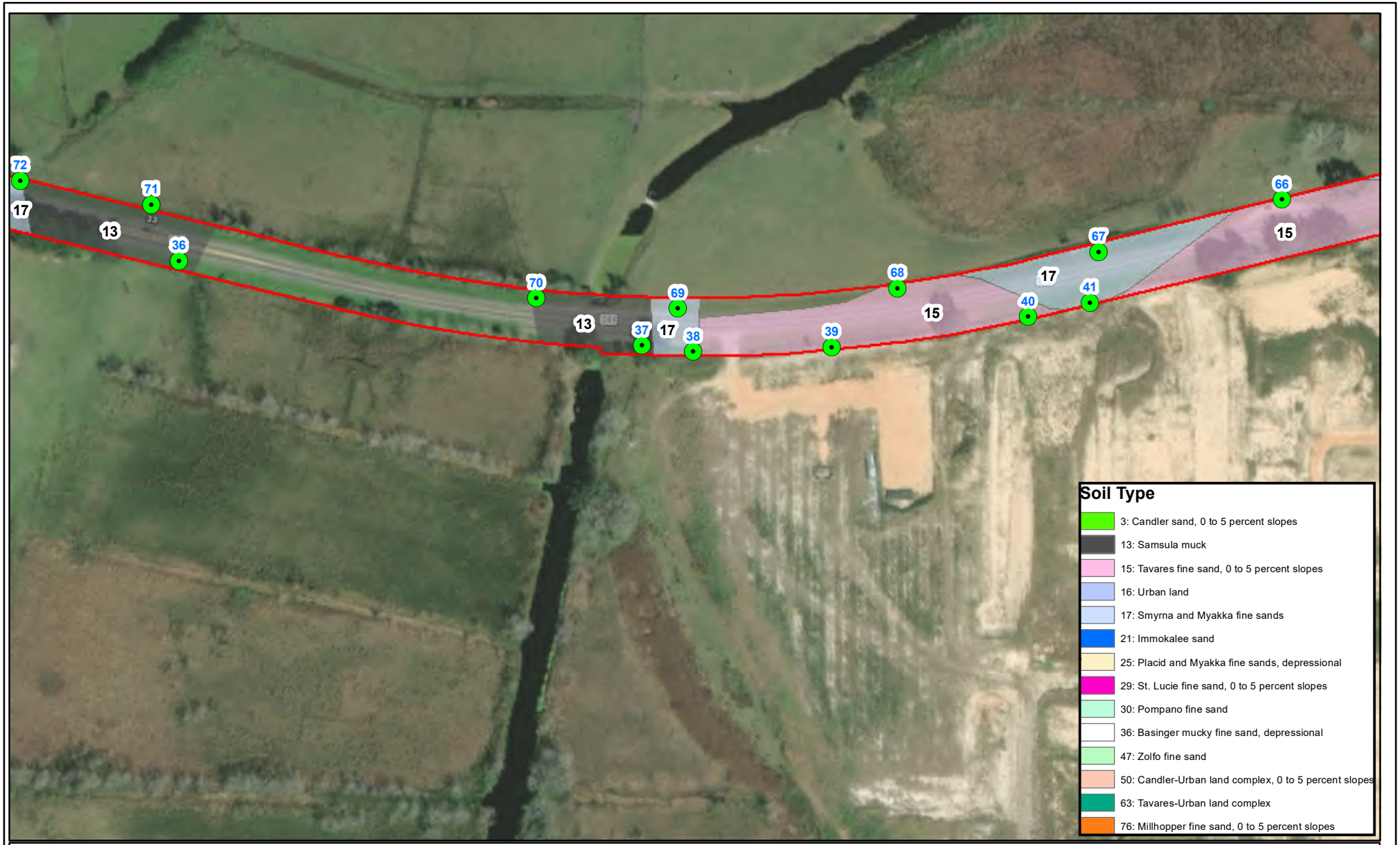
Project Right-of-Way

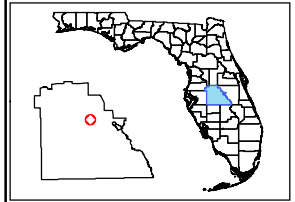
Exhibit 3P

1 in = 250 ft

Date: 2/1/2021

N





SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

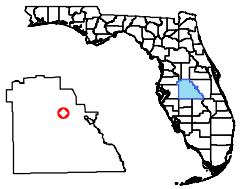
Project Right-of-Way

Exhibit 3Q

1 in = 250 ft

Date: 2/1/2021

N



SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

Project Right-of-Way

Exhibit 3R

1 in = 250 ft

Date: 2/1/2021

N

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

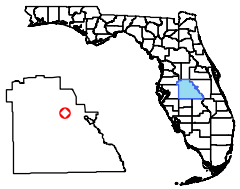
Project Right-of-Way

Exhibit 3S

1 in = 250 ft

Date: 2/1/2021

SNC·LAVALIN ATKINS



SNC·LAVALIN ATKINS

Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

Project Right-of-Way

Exhibit 3T

1 in = 250 ft

Date: 2/1/2021

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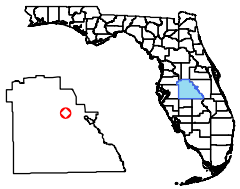

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Photopoint Location Map
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Photopoints

Project Right-of-Way

Exhibit 3U

1 in = 250 ft

Date: 2/1/2021

N

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 1 – Looking North (Study Area 1)

Photo 2 – Looking South (Study Area 1)

Photo 3 - Looking South (Study Area 2)

Photo 4 - Looking North (Study Area 2)

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 5 – Looking North (Study Area 2)

Photo 6 – Looking Northeast (Study Area 3)

Photo 7 - Looking Northeast (Study Area 4)

Photo 8 - Looking Northeast (Study Area 5)

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 9 – Looking Southwest (Study Area 5)

Photo 10 – Looking West (Study Area 5)

Photo 11 - Looking East (Study Area 5)

Photo 12 - Looking East (Study Area 5)

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 13 – Looking West (Study Area 5)

Photo 14 – Looking East (Study Area 6)

Photo 15 - Looking West (Study Area 6)

Photo 16 - Looking East-Northeast (Study Area 6)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 17 – Looking Southwest (Study Area 6)

Photo 18 – Looking Southwest (Study Area 6)

Photo 19 - Looking Southwest (Study Area 6)

Photo 20 - Looking Northeast (Study Area 6)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 21 – Looking West (Study Area 7)

Photo 22 – Looking West (Study Area 7)

Photo 23 - Looking West (Study Area 7)

Photo 24 - Looking West (Study Area 7)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 25 – Looking West (Study Area 7)

Photo 26 – Looking West (Study Area 7)

Photo 27 - Looking West (Study Area 7)

Photo 28 - Looking West (Study Area 7)

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 29 – Looking West (Study Area 7)

Photo 30 – Looking East (Study Area 7)

Photo 31 - Looking East (Study Area 7)

Photo 32 - Looking East (Study Area 7)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 33 – Looking East (Study Area 7)

Photo 34 – Looking West (Study Area 8)

Photo 35 - Looking West-Northwest (Study Area 8)

Photo 36 - Looking East (Study Area 8)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 37 – Looking West (Study Area 8)

Photo 38 – Looking West (Study Area 8)

Photo 39 - Looking East (Study Area 8 - Section C)

Photo 40 - Looking East (Study Area 8 - Section C)

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 41 – Looking West (Study Area 8 - Section C)

Photo 42 – Looking East (Study Area 8 - Section C)

Photo 43 - Looking East-Northeast (Study Area 8 - Section C)

Photo 44 - Looking Northeast (Study Area 8)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 45 – Looking Northeast (Study Area 8)

Photo 46 – Looking East (Study Area 8)

Photo 47 - Looking East (Study Area 8)

Photo 48 - Looking East (Study Area 8)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 49 – Looking West (Study Area 8)

Photo 50 – Looking West (Study Area 8)

Photo 51 - Looking East (Study Area 8)

Photo 52 - Looking East (Study Area 8)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 53 – Looking West (Study Area 8)

Photo 54 – Looking West (Study Area 8)

Photo 55 - Looking West (Study Area 8 - Section E)

Photo 56 - Looking West (Study Area 8 - Section E)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 57 – Looking East (Study Area 8)

Photo 58 – Looking West (Study Area 8)

Photo 59 - Looking East (Study Area 8)

Photo 60 - Looking East (Study Area 8)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 61 – Looking West (Study Area 8)

Photo 62 – Looking Southwest (Study Area 8)

Photo 63 - Looking Southwest (Study Area 8)

Photo 64 - Looking West (Study Area 8 - Section D)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 65 – Looking East (Study Area 8)

Photo 66 – Looking West (Study Area 8)

Photo 67 - Looking West (Study Area 8)

Photo 68 - Looking West (Study Area 8)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 69 – Looking West (Study Area 8)

Photo 70 – Looking East (Study Area 8)

Photo 71 - Looking West (Study Area 8)

Photo 72 - Looking West (Study Area 8)

Photolog

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 73 – Looking West (Study Area 8)

Photo 74 – Looking West (Study Area 7)

Photo 75 - Looking West (Study Area 7)

Photo 76 - Looking West (Study Area 7)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 77 – Looking East (Study Area 7)

Photo 78 – Looking West (Study Area 7)

Photo 79 - Looking West (Study Area 7)

Photo 80 - Looking East (Study Area 7)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 81 – Looking West (Study Area 7)

Photo 82 – Looking East (Study Area 7)

Photo 83 - Looking Southwest (Study Area 6)

Photo 84 - Looking Northeast (Study Area 6 - Section B)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 85 – Looking Northeast (Study Area 6)

Photo 86 – Looking Southwest (Study Area 6)

Photo 87 - Looking West (Study Area 6)

Photo 88 - Looking West (Study Area 6)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 89 – Looking West (Study Area 6)

Photo 90 – Looking West (Study Area 5 - Section A)

Photo 91 - Looking Southwest (Study Area 5)

Photo 92 - Looking Southwest (Study Area 4)

FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 93 – Looking Northeast (Study Area 3)

Photo 94 – Looking Northeast (Study Area 3)

Photo 95 - Looking Northeast (Study Area 3)

Photo 96 - Looking North (Study Area 2)

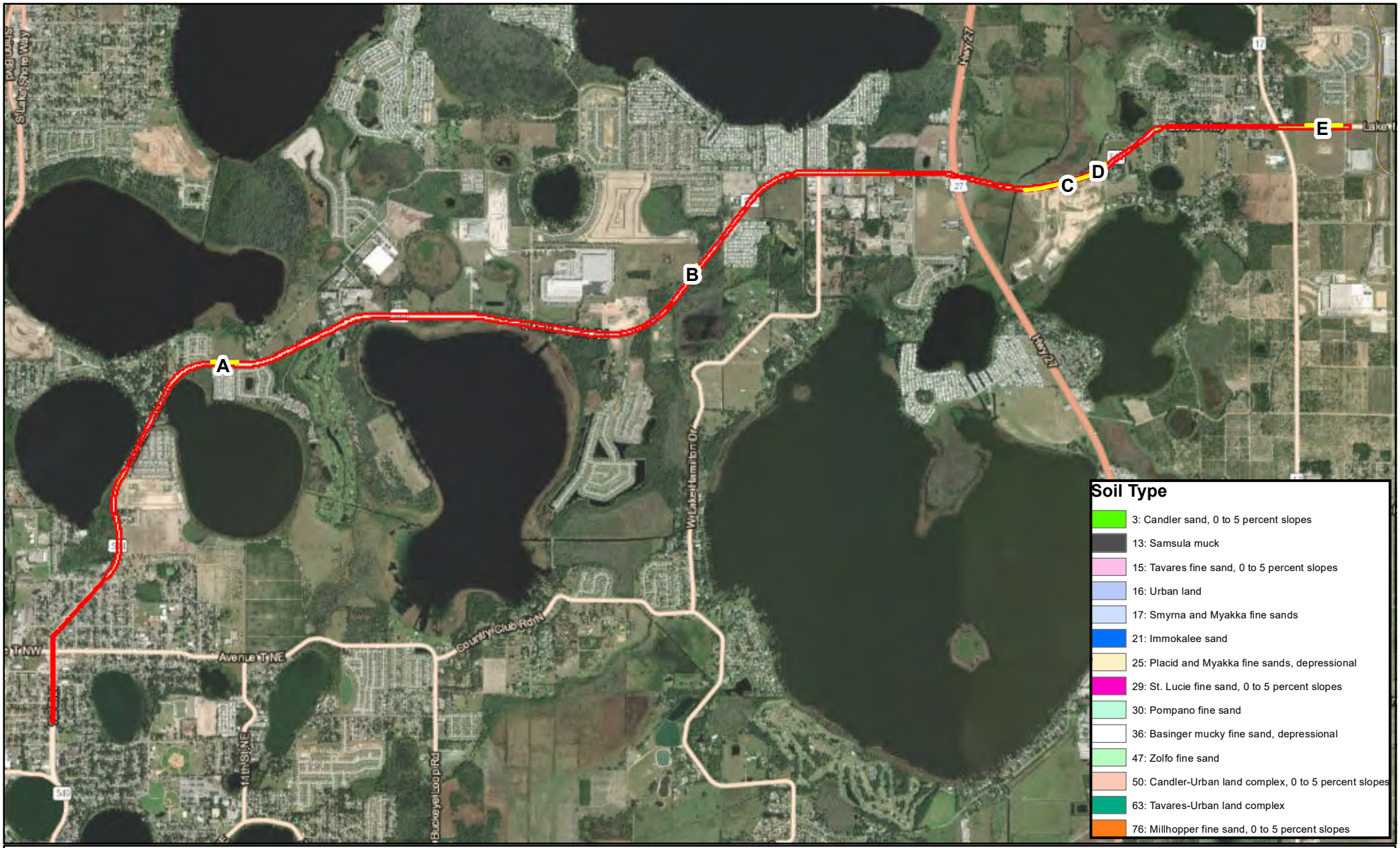
FDOT D1 SR544 (Lucerne Park Road) Sand Skink Soils Evaluation

Photo 97 – Looking North (Study Area 2)

Photo 98 – Looking South (Study Area 2)

Photo 99 - Looking North (Study Area 1)

Photo 100 - Looking South (Study Area 1)



Potential Sand Skink Soil Sections
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

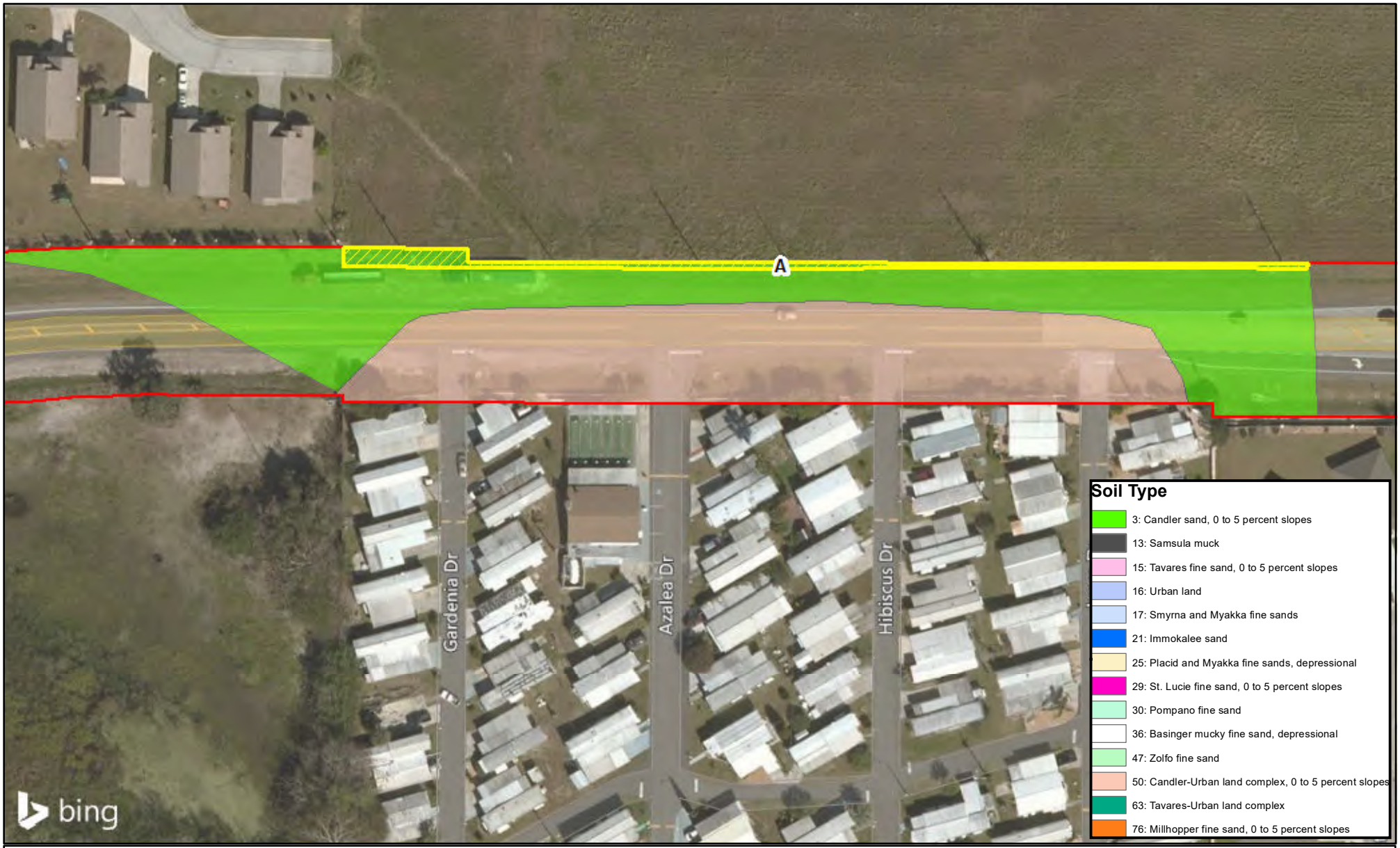
Potential Sand Skink Soil Section

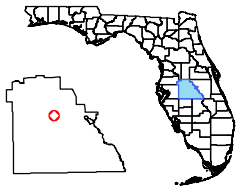
Project Right-of-Way

Exhibit 4

1 inch equals 0.7 miles

Date: 2/1/2021





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Potential Sand Skink Soil Sections
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Potential Sand Skink Soil Section

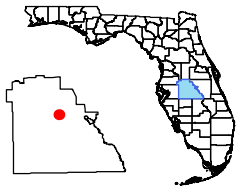
Project Right-of-Way

Exhibit 4A

1 in = 100 ft

Date: 2/1/2021

N



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Potential Sand Skink Soil Sections
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Potential Sand Skink Soil Section

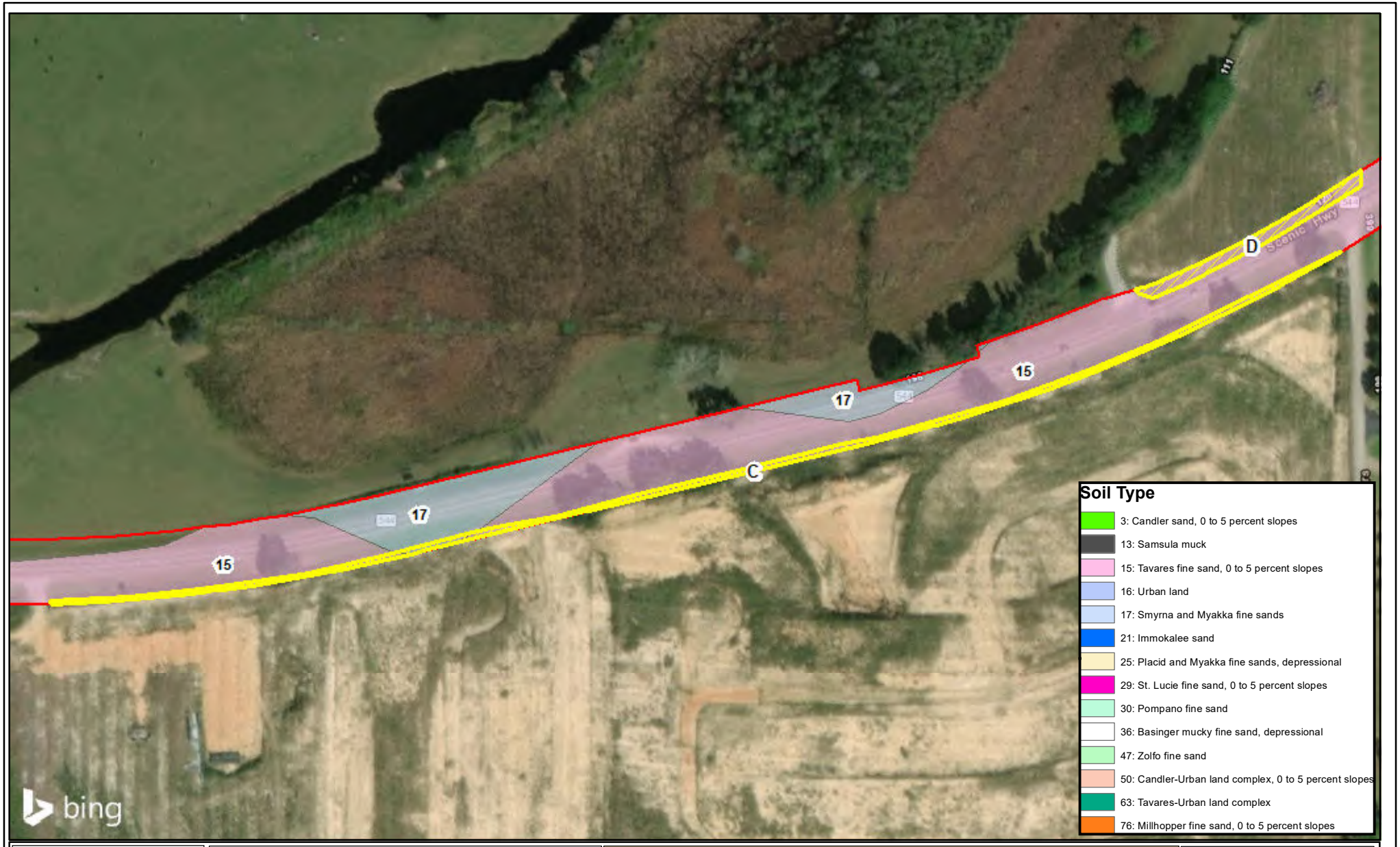
Project Right-of-Way

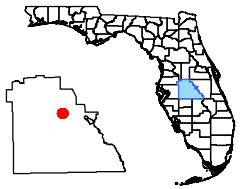
Exhibit 4B

1 in = 100 ft

Date: 2/1/2021

N





SNC·LAVALIN ATKINS

Potential Sand Skink Soil Sections
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Potential Sand Skink Soil Section

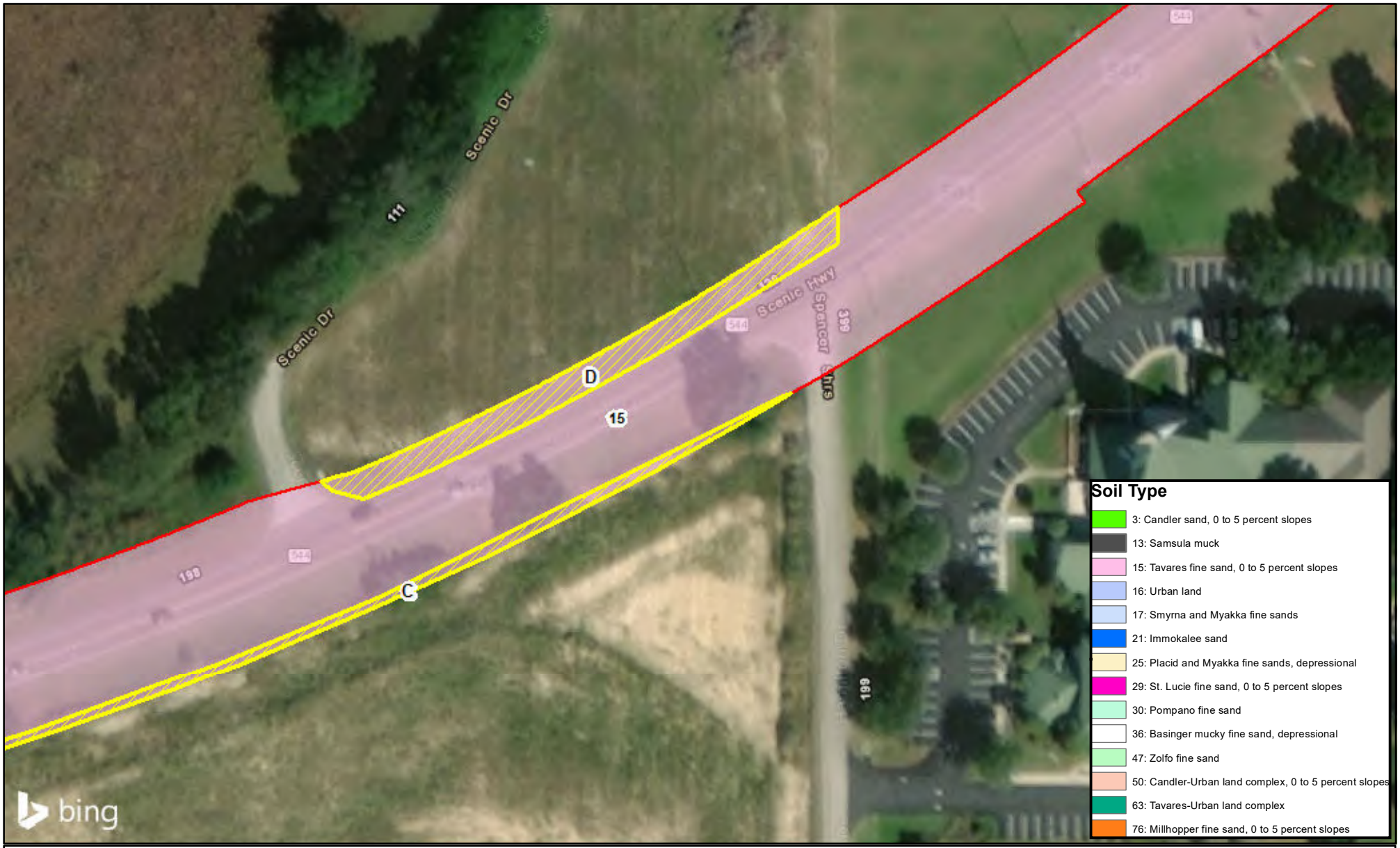
Project Right-of-Way

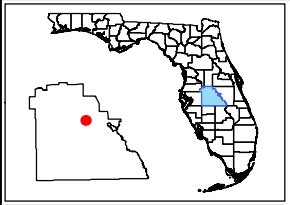
Exhibit 4C

1 in = 225 ft

Date: 2/1/2021

N





SNC·LAVALIN ATKINS

Potential Sand Skink Soil Sections
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Potential Sand Skink Soil Section

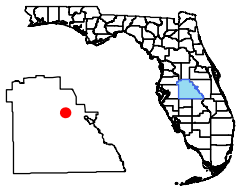
Project Right-of-Way

Exhibit 4D

1 in = 100 ft

Date: 2/1/2021

N



SNC·LAVALIN ATKINS

Potential Sand Skink Soil Sections
Sand Skink Soil Site Investigation

Lucerne Park Road (SR 544)
from MLK Blvd. to SR17
Florida Department of Transportation
District 1
Polk County, Florida

Potential Sand Skink Soil Section

Project Right-of-Way

Exhibit 4E

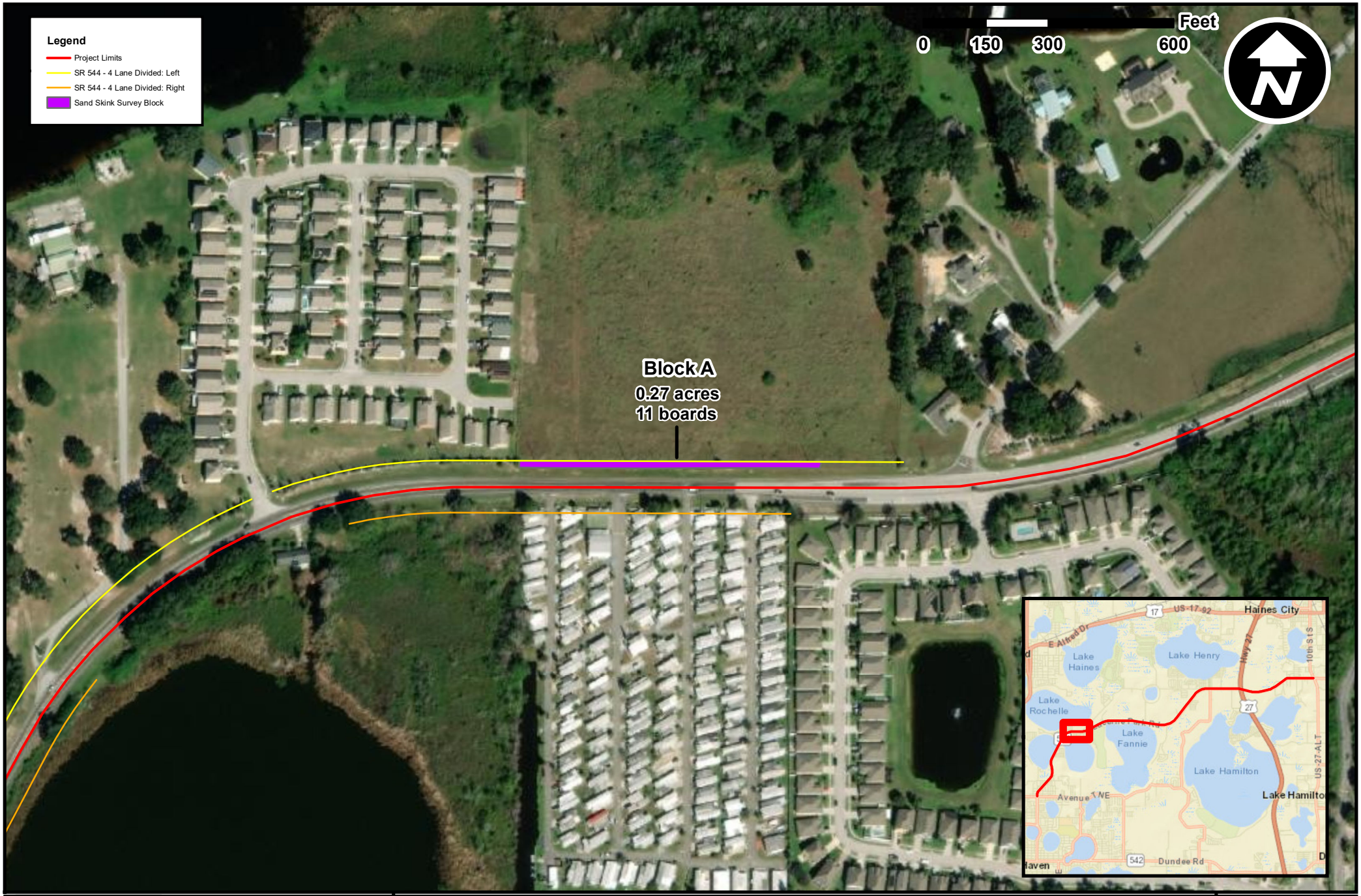
1 in = 100 ft

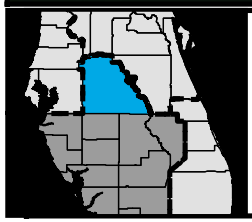
Date: 2/1/2021

N

APPENDIX M

Sand Skink Survey Data





FDOT

District 1

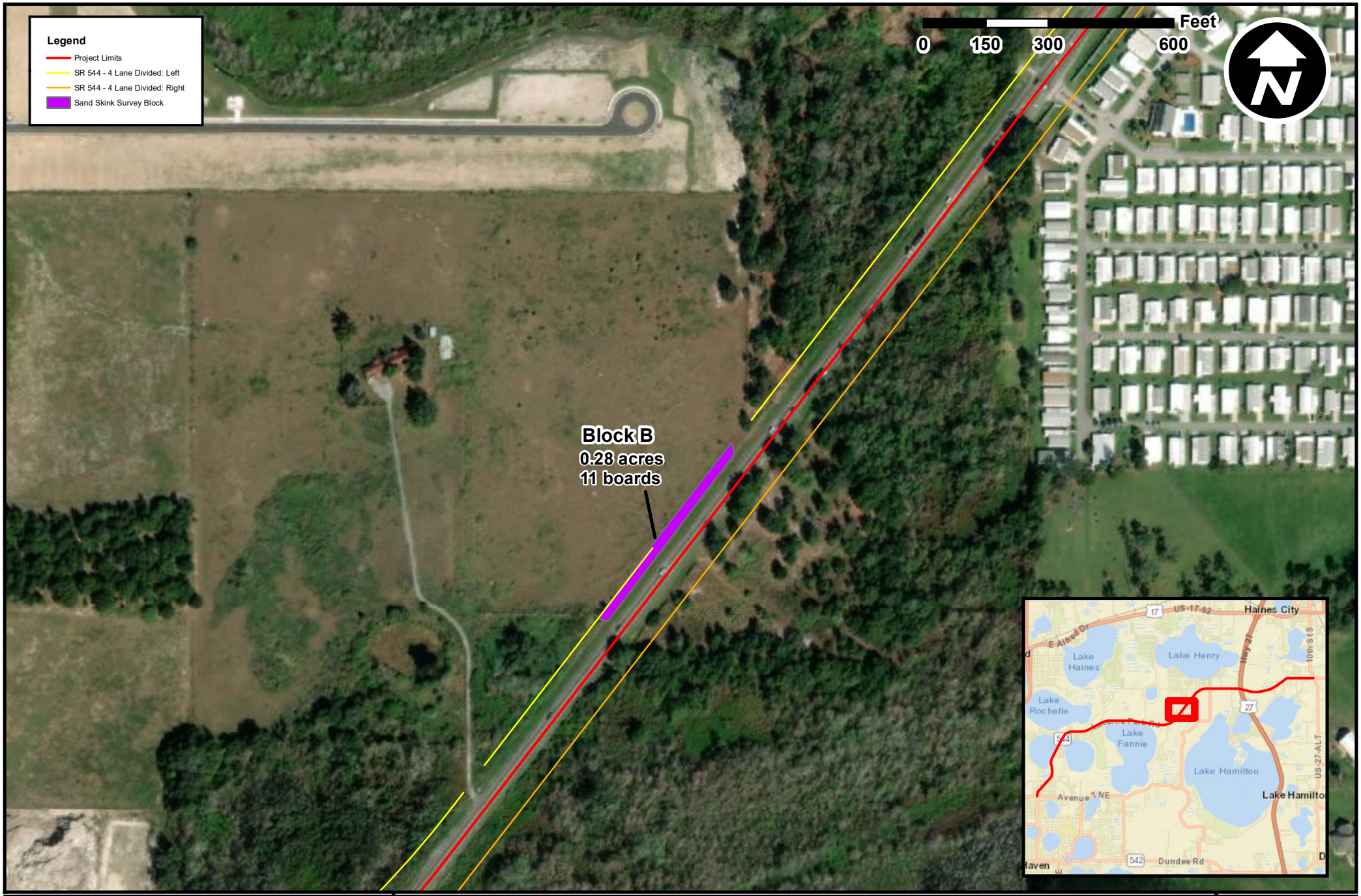
State Road 544 (Lucerne Park Road)

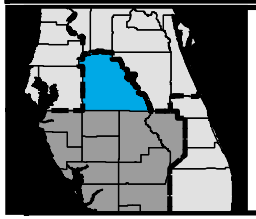
From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SAND SKINK SURVEY BLOCK MAP

FIGURE





FDOT

District 1

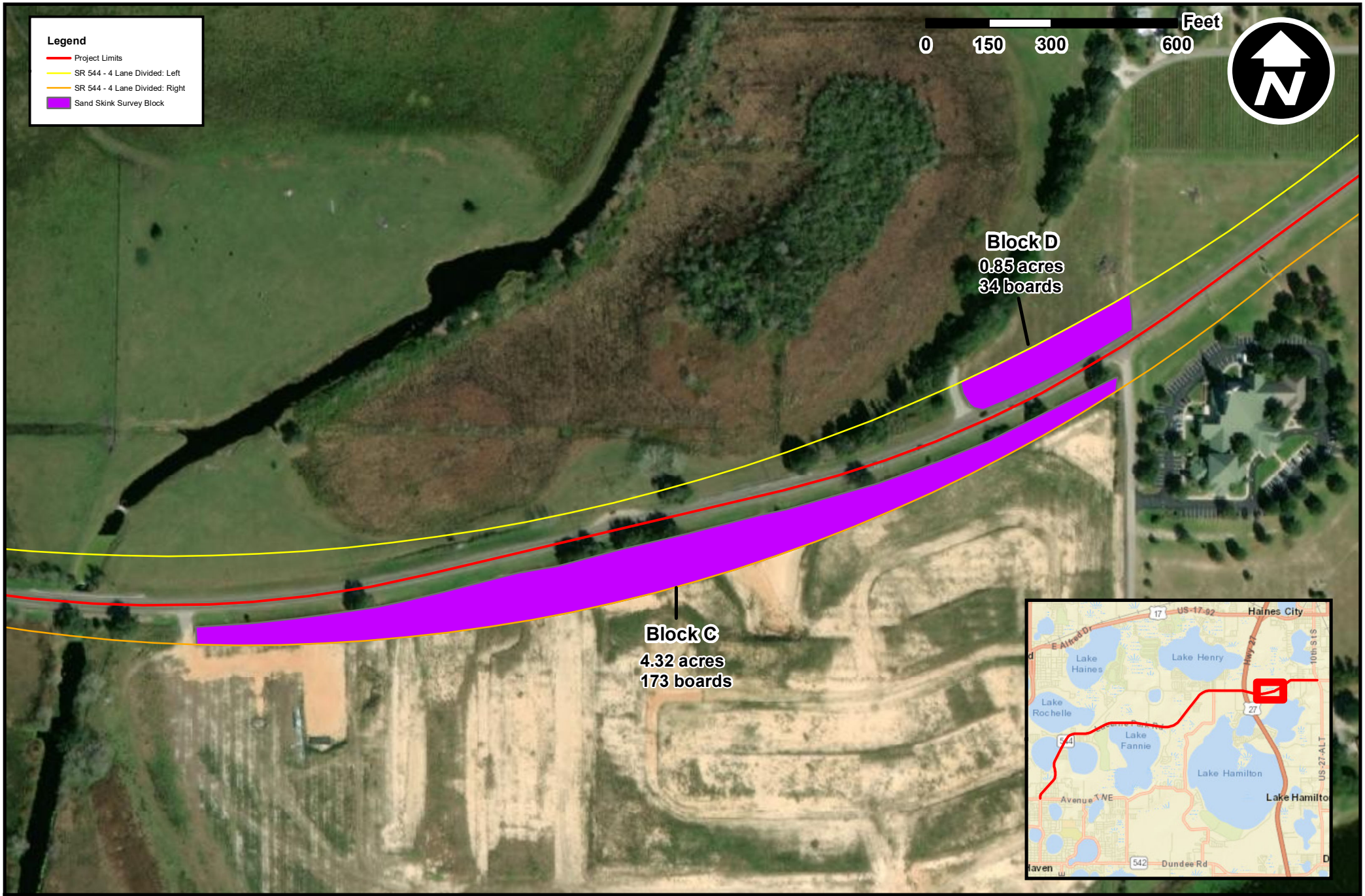
State Road 544 (Lucerne Park Road)

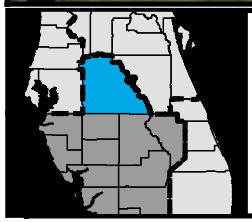
From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SAND SKINK SURVEY BLOCK MAP

FIGURE





FDOT

District 1

State Road 544 (Lucerne Park Road)

From Martin Luther King Blvd
to SR17
Polk County, FL

FPID: 440273-1-22-01

SAND SKINK SURVEY BLOCK MAP

FIGURE

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/18/24 Start Time:_____ End Time:_____ Monitor: J. Bachorski

Site Name: SR544 Survey Area: Block A

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

Other General Notes/Observations:

* no observations to report

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/18/21 Start Time:_____ End Time:_____ Monitor: J. Barhorst

Site Name: SR544 Survey Area: Block B

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
4044							Narrow mouth toad
443							Ants
1723							Crickets

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/18/21 Start Time: _____ End Time: _____ Monitor: J. Barhorst

Site Name: SR 544 Survey Area: Block C

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
2055							
1188							Ant lion trap
95							Cricket
1496							Ants
1053							Ant lion
848							six lined race runner
4309							~~4309~~ Ants

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/18/21 Start Time: _____ End Time: _____ Monitor: J. Borhorst

Site Name: SR 544 Survey Area: Block D

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
1909							Australian ter
7001							cricket

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/25/21 Start Time: 150p End Time: 215p Monitor: R. Scherer

Site Name: SR 544 Survey Area: Block A

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
638			71°	10mph	95%	no	ant lion traps
814			71°	10mph	95%	no	small reptile burrow

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/25/21 Start Time: 1:50p End Time: 2:15p Monitor: J. Berhorst

Site Name: SR 544 Survey Area: Block B

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
443			87°		0%		Ants
3060			87°		0%		Crickets
824			87°		0%		Ants

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/25/20 Start Time: 10:30a End Time: 1:35p Monitor: J Barhorst / R Scherer

Site Name: SR 544 Survey Area: Block C

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
1526			71°	10 mph SSE	95%	no	Ants
192			71°	10 mph SSE	95%	no	Ants
3051			71°	10 mph SSE	95%	no	Arrowmouth toad
1548			71°	10 mph SSE	95%	no	Ants
3159			71°	10 mph SSE	95%	no	Ants
1810			71°	10 mph SSE	95%	no	Crickets
4309			71°	10 mph SSE	95%	no	Ants and Ant trails
2588			71°	10 mph SSE	95%	no	lizard tracks
3055			71°	10 mph SSE	95%	no	lizard tracks
6029			71°	10 mph SSE	95%	no	reptile burrow
6020			71°	10 mph SSE	95%	no	reptile track
6045			71°	10 mph SSE	95%	no	crickets
4248			71°	10 mph SSE	95%	no	lizard tracks
6044			71°	10 mph SSE	95%	no	Crickets
3140			71°	10 mph SSE	95%	no	reptile burrow / liz. tracks
1812			71°	10 mph SSE	95%	no	Ant lion trap
1906			71°	10 mph SSE	95%	no	lizard tracks
6052			71°	10 mph SSE	95%	no	reptile burrow
1760			71°	10 mph SSE	95%	no	lizard tracks
154			71°	10 mph SSE	95%	no	small burrow
3135			71°	10 mph SSE	95%	no	lizard tracks

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 3/25/21 Start Time: 9:45a End Time: 10:15a Monitor: J. Barhorst / R. Scharer

Site Name: SR 544 Survey Area: Block D

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
7007			71°	10mph SSE	95%	no	Cricket
1809			71°	10mph SSE	95%	no	Cricket
1904			71°	10mph SSE	95%	no	Ants
1464			71°	10mph SSE	95%	no	Antlion trap/reptile tracks
344			71°	10mph SSE	95%	no	Ants/reptile tracks
1782			71°	10mph SSE	95%	no	lizard tracks
3111			71°	10mph SSE	95%	no	Six lined racerunner

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/1/21 Start Time: _____ End Time: _____ Monitor: R. Scherer

Site Name: SR 574 Survey Area: Block A

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
638							Ant lion trap
617							lizard tracks

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/1/21 Start Time: _____ End Time: _____ Monitor: R. Scherer

Site Name: SR 544 Survey Area: Block B

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
604							reptile burrows
3115							beetle
189							snake tracks
242							lizard tracks

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/1/21 Start Time: _____ End Time: _____ Monitor: A. Burke

Site Name: SR 544 Survey Area: Block C

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
3179							gecko
3140							snake
243							six lined racerunner
331							mammal burrows
210							six lined racerunner
3159							Ants
1473							Ants

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/1/21 Start Time: _____ End Time: _____ Monitor: R. Scherer

Site Name: SR 544 Survey Area: Block D

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
1489							Ant lion tracks
3046							Ant lion tracks
116							lizard tracks
2069							lizard tracks
1782							Small burrows
1269							lizard tracks
174							Ant lion tracks
344							lizard tracks/six lined racerunner
1909							lizard tracks/small burrows
1291							six lined racerunner
1672							six lined racerunner/burrow
215							lizard tracks/small burrows
1669							lizard tracks/six lined racerunner
3111							lizard tracks/small burrows
1450							

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/8/21 Start Time:_____ End Time:_____ Monitor: A. Burke

Site Name: SR 544 Survey Area: Block A

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

Other General Notes/Observations:

* no observations to report

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/8/21 Start Time:_____ End Time:_____ Monitor: A. Burke

Site Name: SR 544 Survey Area: Block B

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

Other General Notes/Observations:

* no observations to report

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/8/21 Start Time:_____ End Time:_____ Monitor: A. Burke

Site Name: SR. 544 Survey Area: Block C

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
1731							six lined race runner tracks
33							ant lion trap
333							six lined race runner
1473							Ants
1978							Ant lion
1489							ant lion / six lined race runner

Other General Notes/Observations:

Sand/Blue-Tailed Mole Skink Monitoring
Coverboard Survey
Field Data Form

Date: 4/8/21 Start Time: _____ End Time: _____ Monitor: A. Burke / R. Scherer

Site Name: SR 544 Survey Area: Block D

	Sand Skink Data		Weather Data				Other Wildlife Observations
Cover Board No.	No. of Tracks	No. of Individuals	Average Temp. (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
213							Ant lion
1669							six lined racerunner tracks
3055							lizard tracks
1802							liz tracks / small burrows / ant lion
1892							ant lion tracks / crickets
1619							liz tracks / six lined racerunner
613							lizard track / small burrow
1589							lizard track / small burrow
6065							lizard tracks
270							lizard tracks
4309							small burrows
388							lizard tracks / small burrows

Other General Notes/Observations:

Photo 1: Representative sand skink coverboard in Block A

Photo 2: Representative sand skink coverboard in Block A

Photo 3: Representative sand skink coverboard in Block B

Photo 4: Representative sand skink coverboard in Block B

Photo 5: Representative sand skink coverboard in Block C

Photo 6: Representative sand skink coverboard in Block C

Photo 7: Representative sand skink coverboards in Block C

Photo 8: Representative of uncovered sand skink coverboard in Block C

Photo 9: Representative of uncovered sand skink coverboard in Block D

Photo 10: Representative sand skink coverboard in Block D

Photo 11: Ant lion tracks observed beneath an uncovered sand skink coverboard in Block D

APPENDIX N

Wood Stork Effect Determination Key

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

May 18, 2010

Donnie Kinard
Chief, Regulatory Division
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2007-FA-1494
Service Consultation Code: 41420-2007-I-0964
Subject: South Florida Programmatic Concurrence
Species: Wood Stork

Dear Mr. Kinard:

This letter addresses minor errors identified in our January 25, 2010, wood stork key and as such, supplants the previous key. The key criteria and wood stork biomass foraging assessment methodology have not been affected by these minor revisions.

The Fish and Wildlife Service's (Service) South Florida Ecological Services Office (SFESO) and the U.S. Army Corps of Engineers Jacksonville District (Corps) have been working together to streamline the consultation process for federally listed species associated with the Corps' wetland permitting program. The Service provided letters to the Corps dated March 23, 2007, and October 18, 2007, in response to a request for a multi-county programmatic concurrence with a criteria-based determination of "may affect, not likely to adversely affect" (NLAA) for the threatened eastern indigo snake (*Drymarchon corais couperi*) and the endangered wood stork (*Mycteria americana*) for projects involving freshwater wetland impacts within specified Florida counties. In our letters, we provided effect determination keys for these two federally listed species, with specific criteria for the Service to concur with a determination of NLAA.

The Service has revisited these keys recently and believes new information provides cause to revise these keys. Specifically, the new information relates to foraging efficiencies and prey base assessments for the wood stork and permitting requirements for the eastern indigo snake. This letter addresses the wood stork key and is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The eastern indigo snake key will be provided in a separate letter.

Wood stork

Habitat

The wood stork is primarily associated with freshwater and estuarine habitats that are used for nesting, roosting, and foraging. Wood storks typically construct their nests in medium to tall

trees that occur in stands located either in swamps or on islands surrounded by relatively broad expanses of open water (Ogden 1991, 1996; Rodgers et al. 1996). Successful colonies are those that have limited human disturbance and low exposure to land-based predators. Nesting colonies protected from land-based predators are characterized as those surrounded by large expanses of open water or where the nest trees are inundated at the onset of nesting and remain inundated throughout most of the breeding cycle. These colonies have water depths between 0.9 and 1.5 meters (3 and 5 feet) during the breeding season.

Successful nesting generally involves combinations of average or above-average rainfall during the summer rainy season and an absence of unusually rainy or cold weather during the winter-spring breeding season (Kahl 1964; Rodgers et al. 1987). This pattern produces widespread and prolonged flooding of summer marshes, which maximize production of freshwater fishes, followed by steady drying that concentrate fish during the season when storks nest (Kahl 1964). Successful nesting colonies are those that have a large number of foraging sites. To maintain a wide range of foraging sites, a variety of wetland types should be present, with both short and long hydroperiods. The Service (1999) describes a short hydroperiod as a 1 to 5-month wet/dry cycle, and a long hydroperiod as greater than 5 months. During the wet season, wood storks generally feed in the shallow water of the short-hydroperiod wetlands and in coastal habitats during low tide. During the dry season, foraging shifts to longer hydroperiod interior wetlands as they progressively dry-down (though usually retaining some surface water throughout the dry season).

Wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the wood stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside and agricultural ditches, narrow tidal creeks and shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs. Because of their specialized feeding behavior, wood storks forage most effectively in shallow-water areas with highly concentrated prey. Through tactolocation, or grope feeding, wood storks in south Florida feed almost exclusively on fish between 2 and 25 centimeters [cm] (1 and 10 inches) in length (Ogden et al. 1976). Good foraging conditions are characterized by water that is relatively calm, uncluttered by dense thickets of aquatic vegetation, and having a water depth between 5 and 38 cm (5 and 15 inches) deep, although wood storks may forage in other wetlands. Ideally, preferred foraging wetlands would include a mosaic of emergent and shallow open-water areas. The emergent component provides nursery habitat for small fish, frogs, and other aquatic prey and the shallow, open-water areas provide sites for concentration of the prey during seasonal dry-down of the wetland.

Conservation Measures

The Service routinely concurs with the Corps' "may affect, not likely to adversely affect" determination for individual project effects to the wood stork when project effects are insignificant due to scope or location, or if assurances are given that wetland impacts have been avoided, minimized, and adequately compensated such that there is no net loss in foraging potential. We utilize our *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Service 1990) (Enclosure 1) (HMG) in project evaluation. The HMG is currently under review and once final will replace the enclosed HMG. There is no designated critical habitat for the wood stork.

The SFESO recognizes a 29.9 kilometer [km] (18.6-mile) core foraging area (CFA) around all known wood stork colonies in south Florida. Enclosure 2 (to be updated as necessary) provides locations of colonies and their CFAs in south Florida that have been documented as active within the last 10 years. The Service believes loss of suitable wetlands within these CFAs may reduce foraging opportunities for the wood stork. To minimize adverse effects to the wood stork, we recommend compensation be provided for impacts to foraging habitat. The compensation should consider wetland type, location, function, and value (hydrology, vegetation, prey utilization) to ensure that wetland functions lost due to the project are adequately offset. Wetlands offered as compensation should be of the same hydroperiod and located within the CFAs of the affected wood stork colonies. The Service may accept, under special circumstances, wetland compensation located outside the CFAs of the affected wood stork nesting colonies. On occasion, wetland credits purchased from a "Service Approved" mitigation bank located outside the CFAs could be acceptable to the Service, depending on location of impacted wetlands relative to the permitted service area of the bank, and whether or not the bank has wetlands having the same hydroperiod as the impacted wetland.

In an effort to reduce correspondence in effect determinations and responses, the Service is providing the Wood Stork Effect Determination Key below. If the use of this key results in a Corps determination of "no effect" for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination[1]. This Key is subject to revisitation as the Corps and Service deem necessary.

The Key is as follows:

A. Project within 0.76 km (0.47 mile)[2] of an active colony site[3] ..... "*may affect*[4]"

Project impacts Suitable Foraging Habitat (SFH)[5] at a location greater than 0.76 km (0.47 mile) from a colony site..... ....."*go to* B"

---

[1] With an outcome of "no effect" or "NLAA" as outlined in this key, and the project has less than 20.2 hectares (50 acres) of wetland impacts, the requirements of section 7 of the Act are fulfilled for the wood stork and no further action is required. For projects with greater than 20.2 hectares (50 acres) of wetland impacts, written concurrence of NLAA from the Service is necessary.

[2] Within the secondary zone (the average distance from the border of a colony to the limits of the secondary zone is 0.76 km (2,500 feet, or 0.47 mi).

[3] An active colony is defined as a colony that is currently being used for nesting by wood storks or has historically over the last 10 years been used for nesting by wood storks.

[4] Consultation may be concluded informally or formally depending on project impacts.

[5] Suitable foraging habitat (SFH) includes wetlands that typically have shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between 5 to 38 cm (2 to 15 inches) deep. Other shallow non-wetland water bodies are also SFH. SFH supports and concentrates, or is capable of supporting and concentrating small fish, frogs, and other aquatic prey. Examples of SFH include, but are not limited to freshwater marshes, small ponds, shallow, seasonally flooded roadside or agricultural ditches, seasonally flooded pastures, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs.

Project does not affect SFH……..…..*"no effect*[1]*"*.

B. Project impact to SFH is less than 0.20 hectare (one-half acre)[6]……..……*NLAA*[1]*"*

Project impact to SFH is greater in scope than 0.20 hectare (one-half acre)....……*go to* C

C. Project impacts to SFH not within the CFA (29.9 km, 18.6 miles) of a colony site ……..…….…….…..……*go to* D

Project impacts to SFH within the CFA of a colony site …….…..…...…….*go to* E

D. Project impacts to SFH have been avoided and minimized to the extent practicable; compensation (Service approved mitigation bank or as provided in accordance with Mitigation Rule 33 CFR Part 332) for unavoidable impacts is proposed in accordance with the CWA section 404(b)(1) guidelines; and habitat compensation replaces the foraging value matching the hydroperiod[7] of the wetlands affected and provides foraging value similar to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]…….. *NLAA*[1]*"*

Project not as above.……... *"may affect*[4]*"*

E. Project provides SFH compensation in accordance with the CWA section 404(b)(1) guidelines and is not contrary to the HMG; habitat compensation is within the appropriate CFA or within the service area of a Service-approved mitigation bank; and habitat compensation replaces foraging value, consisting of wetland enhancement or restoration matching the hydroperiod[7] of the wetlands affected, and provides foraging value similar

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[6] On an individual basis, SFH impacts to wetlands less than 0.20 hectare (one-half acre) generally will not have a measurable effect on wood storks, although we request that the Corps require mitigation for these losses when appropriate. Wood storks are a wide ranging species, and individually, habitat change from impacts to SFH less than one-half acre are not likely to adversely affect wood storks. However, collectively they may have an effect and therefore regular monitoring and reporting of these effects are important.

[7] Several researchers (Flemming et al. 1994; Ceilley and Bortone 2000) believe that the short hydroperiod wetlands provide a more important pre-nesting foraging food source and a greater early nestling survivor value for wood storks than the foraging base (grams of fish per square meter) than long hydroperiod wetlands provide. Although the short hydroperiod wetlands may provide less fish, these prey bases historically were more extensive and met the foraging needs of the pre-nesting storks and the early-age nestlings. Nest productivity may suffer as a result of the loss of short hydroperiod wetlands. We believe that most wetland fill and excavation impacts permitted in south Florida are in short hydroperiod wetlands. Therefore, we believe that it is especially important that impacts to these short hydroperiod wetlands within CFAs are avoided, minimized, and compensated for by enhancement/restoration of short hydroperiod wetlands.

[8] For this Key, the Service requires an analysis of foraging prey base losses and enhancements from the proposed action as shown in the examples in Enclosure 3 for projects with greater than 2.02 hectares (5 acres) of wetland impacts. For projects with less than 2.02 hectares (5 acres) of wetland impacts, an individual foraging prey base analysis is not necessary although type for type wetland compensation is still a requirement of the Key.

to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]..... *"NLAA[1]"*

Project does not satisfy these elements ..... *"may affect[4]"*

This Key does not apply to Comprehensive Everglades Restoration Plan projects, as they will require project-specific consultations with the Service.

Monitoring and Reporting Effects

For the Service to monitor cumulative effects, it is important for the Corps to monitor the number of permits and provide information to the Service regarding the number of permits issued where the effect determination was: "may affect, not likely to adversely affect." We request that the Corps send us an annual summary consisting of: project dates, Corps identification numbers, project acreages, project wetland acreages, and project locations in latitude and longitude in decimal degrees.

Thank you for your cooperation and effort in protecting federally listed species. If you have any questions, please contact Allen Webb at extension 246.

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

Enclosures

cc: w/enclosures (electronic only)
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EPA, West Palm Beach, Florida (Richard Harvey)
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Service, Jacksonville, Florida (Billy Brooks)

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HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

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HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

A number of Federal and state laws and/or regulations prohibit, cumulatively, such acts as harrassing, disturbing, harming, molesting, pursuing, etc., wood storks, or destroying their nests (see Section VII). Although advisory in nature, these guidelines represent a biological interpretation of what would constitute violations of one or more of such prohibited acts. Their purpose is to mainain and/or improve the environmental conditions that are required for the survival and well-being of wood storks in the southeastern United States, and are designed essentially for application in wood stork/human activity conflicts (principally land development and human intrusion into stork use sites). The emphasis is to avoid or minimize detrimental human-related impacts on wood storks. These guidelines were prepared in consultations with state wildlife agencies and wood stork experts in the four southeastern states where the wood stork is listed as Endangered (Alabama, Florida, Georgia, South Carolina).

General

The wood stork is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks, often in association with other species of long-legged water birds. Storks that nest in the southeastern United States appear to represent a distinct population, separate from the nearest breeding population in Mexico. Storks in the southeastern U.S. population have recently (since 1980) nested in colonies scattered throughout Florida, and at several central-southern Georgia and coastal South Carolina sites. Banded and color-marked storks from central and southern Florida colonies have dispersed during non-breeding seasons as far north as southern Georgia, and the coastal counties in South Carolina and southeastern North Carolina, and as far west as central Alabama and northeastern Mississippi. Storks from a colony in south-central Georgia have wintered between southern Georgia and southern Florida. This U.S. nesting population of wood storks was listed as endangered by the U.S. Fish and Wildlife Service on February 28, 1984 (*Federal Register* 49(4):7332-7335).

Wood storks use freshwater and estuarine wetlands as feeding, nesting, and roosting sites. Although storks are not habitat specialists, their needs are exacting enough, and available habitat is limited enough, so that nesting success and the size of regional populations are closely regulated by year-to-year differences in the quality and quantity of suitable habitat. Storks are especially sensitive to environmental conditions at feeding sites; thus, birds may fly relatively long distances either daily or between regions annually, seeking adequate food resources.

All available evidence suggests that regional declines in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat. An understanding of the qualities of good stork habitat should help to focus protection efforts on those sites

that are seasonally important to regional populations of wood storks. Characteristics of feeding, nesting, and roosting habitat, and management guidelines for each, are presented here by habitat type.

I. Feeding habitat.

A major reason for the wood stork decline has been the loss and degredation of feeding habitat. Storks are especially sensitive to any manipulation of a wetland site that results in either reduced amounts or changes in the timing of food availability.

Storks feed primarily (often almost exclusively) on small fish between 1 and 8 inches in length. Successful foraging sites are those where the water is between 2 and 15 inches deep. Good feeding conditions usually occur where water is relatively calm and uncluttered by dense thickets of aquatic vegetation. Often a dropping water level is necessary to concentrate fish at suitable densities. Conversely, a rise in water, especially when it occurs abruptly, disperses fish and reduces the value of a site as feeding habitat.

The types of wetland sites that provide good feeding conditions for storks include: drying marshes or stock ponds, shallow roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, and depressions in cypress heads or swamp sloughs. In fact, almost any shallow wetland depression where fish tend to become concentrated, either through local reproduction or the consequences of area drying, may be used by storks.

Nesting wood storks do most of their feeding in wetlands between 5 and 40 miles from the colony, and occasionally at distances as great as 75 miles. Within this colony foraging range and for the 110-150 day life of the colony, and depending on the size of the colony and the nature of the surrounding wetlands, anywhere from 50 to 200 different feeding sites may be used during the breeding season.

Non-breeding storks are free to travel much greater distances and remain in a region only for as long as sufficient food is available. Whether used by breeders or non-breeders, any single feeding site may at one time have small or large numbers of storks (1 to 100+), and be used for one to many days, depending on the quality and quantity of available food. Obviously, feeding sites used by relatively large numbers of storks, and/or frequently used areas, potentially are the more important sites necessary for the maintenance of a regional population of birds.

Differences between years in the seasonal distribution and amount of rainfall usually mean that storks will differ between years in where and when they feed. Successful nesting colonies are those that have a large number of feeding site options, including sites that may be suitable only in years of rainfall extremes. To maintain the wide range of feeding site options requires that many different wetlands, with both relatively short and long annual hydroperiods, be preserved. For example, protecting only the larger wetlands, or those with longer annual hydroperiods, will result in the eventual loss of smaller, seemingly less important wetlands. However, these small scale wetlands are crucial as the only available feeding sites during the wetter periods when the larger habitats are too deeply flooded to be used by storks.

II. Nesting habitat.

Wood storks nest in colonies, and will return to the same colony site for many years so long as that site and surrounding feeding habitat continue to supply the needs of the birds. Storks require between 110 and 150 days for the annual nesting cycle, from the period of courtship until the nestlings become independent. Nesting activity may begin as early as December or as late as March in southern Florida colonies, and between late February and April in colonies located between central Florida and South Carolina. Thus, full term colonies may be active until June-July in south Florida, and as late as July-August at more northern sites. Colony sites may also be used for roosting by storks during other times of the year.

Almost all recent nesting colonies in the southeastern U.S. have been located either in woody vegetation over standing water, or on islands surrounded by broad expanses of open water. The most dominant vegetation in swamp colonies has been cypress, although storks also nest in swamp hardwoods and willows. Nests in island colonies may be in more diverse vegetation, including mangroves (coastal), exotic species such as Australian pine (*Casuarina*) and Brazilian Pepper (*Schinus*), or in low thickets of cactus (*Opuntia*). Nests are usually located 15-75 feet above ground, but may be much lower, especially on island sites when vegetation is low.

Since at least the early 1970's, many colonies in the southeastern U.S. have been located in swamps where water has been impounded due to the construction of levees or roadways. Storks have also nested in dead and dying trees in flooded phosphate surface mines, or in low, woody vegetation on mounded, dredge islands. The use of these altered wetlands or completely "artificial" sites suggests that in some regions or years storks are unable to locate natural nesting habitat that is adequately flooded during the normal breeding season. The readiness with which storks will utilize water impoundments for nesting also suggests that colony sites could be intentionally created and maintained through long-term site management plans. Almost all impoundment sites used by storks become suitable for nesting only fortuitously, and therefore, these sites often do not remain available to storks for many years.

In addition to the irreversible impacts of drainage and destruction of nesting habitat, the greatest threats to colony sites are from human disturbance and predation. Nesting storks show some variation in the levels of human activity they will tolerate near a colony. In general, nesting storks are more tolerant of low levels of human activity near a colony when nests are high in trees than when they are low, and when nests contain partially or completely feathered young than during the period between nest construction and the early nestling period (adults still brooding). When adult storks are forced to leave their nests, eggs or downy young may die quickly (<20 minutes) when exposed to direct sun or rain.

Colonies located in flooded environments must remain flooded if they are to be successful. Often water is between 3 and 5 feet deep in successful colonies during the nesting season. Storks rarely form colonies, even in traditional nesting sites, when they are dry, and may abandon nests if sites become dry during the nesting period. Flooding in colonies may be most important as a defense against mammalian predators. Studies of stork colonies in Georgia and

Florida have shown high rates of raccoon predation when sites dried during the nesting period. A reasonably high water level in an active colony is also a deterrent against both human and domestic animal intrusions.

Although nesting wood storks usually do most feeding away from the colony site (>5 miles), considerable stork activity does occur close to the colony during two periods in the nesting cycle. Adult storks collect almost all nesting material in and near the colony, usually within 2500 feet. Newly fledged storks, near the end of the nesting cycle, spend from 1-4 weeks during the fledging process flying locally in the colony area, and perched in nearby trees or marshy spots on the ground. These birds return daily to their nests to be fed. It is essential that these fledging birds have little or no disturbance as far our as one-half mile within at least one or two quadrants from the colony. Both the adults, while collecting nesting material, and the inexperienced fledglings, do much low, flapping flight within this radius of the colony. At these times, storks potentially are much more likely to strike nearby towers or utility lines.

Colony sites are not necessarily used annually. Regional populations of storks shift nesting locations between years, in response to year-to-year differences in food resources. Thus, regional populations require a range of options for nesting sites, in order to successfully respond to food availability. Protection of colony sites should continue, therefore, for sites that are not used in a given year.

III. Roosting habitat.

Although wood storks tend to roost at sites that are similar to those used for nesting, they also use a wider range of site types for roosting than for nesting. Non-breeding storks, for example, may frequently change roosting sites in response to changing feeding locations, and in the process, are inclined to accept a broad range of relatively temporary roosting sites. Included in the list of frequently used roosting locations are cypress "heads" or swamps (not necessarily flooded if trees are tall), mangrove islands, expansive willow thickets or small, isolated willow "islands" in broad marshes, and on the ground either on levees or in open marshes.

Daily activity patterns at a roost vary depending on the status of the storks using the site. Non-breeding adults or immature birds may remain in roosts during major portions of some days. When storks are feeding close to a roost, they may remain on the feeding grounds until almost dark before making the short flight. Nesting storks traveling long distances (>40 miles) to feeding sites may roost at or near the latter, and return to the colony the next morning. Storks leaving roosts, especially when going long distances, tend to wait for mid-morning thermals to develop before departing.

IV. Management zones and guidelines for feeding sites.

To the maximum extent possible, feeding sites should be protected by adherence to the following protection zones and guidelines:

A. There should be no human intrusion into feeding sites when storks are present. Depending upon the amount of screening vegetation, human activity should be no closer than between 300 feet (where solid vegetation screens exist) and 750 feet (no vegetation screen).

B. Feeding sites should not be subjected to water management practices that alter traditional water levels or the seasonally normal drying patterns and rates. Sharp rises in water levels are especially disruptive to feeding storks.

C. The introduction of contaminants, fertilizers, or herbicides into wetlands that contain stork feeding sites should be avoided, especially those compounds that could adversely alter the diversity and numbers of native fishes, or that could substantially change the characteristics of aquatic vegetation. Increase in the density and height of emergent vegetation can degrade or destroy sites as feeding habitat.

D. Construction of tall towers (especially with guy wires) within three miles, or high power lines (especially across long stretches of open country) within one mile of major feeding sites should be avoided.

V. Management zones and guidelines for nesting colonies.

A. Primary zone: This is the most critical area, and must be managed according to recommended guidelines to insure that a colony site survives.

1. Size: The primary zone must extend between 1000 and 1500 feet in all directions from the actual colony boundaries when there are no visual or broad aquatic barriers, and never less than 500 feet even when there are strong visual or aquatic barriers. The exact width of the primary zone in each direction from the colony can vary within this range, depending on the amount of visual screen (tall trees) surrounding the colony, the amount of relatively deep, open water between the colony and the nearest human activity, and the nature of the nearest human activity. In general, storks forming new colonies are more tolerant of existing human activity, than they will be of new human activity that begins after the colony has formed.

2. Recommended Restrictions:

a. Any of the following activities within the primary zone, at any time of the year, are likely to be detrimental to the colony:

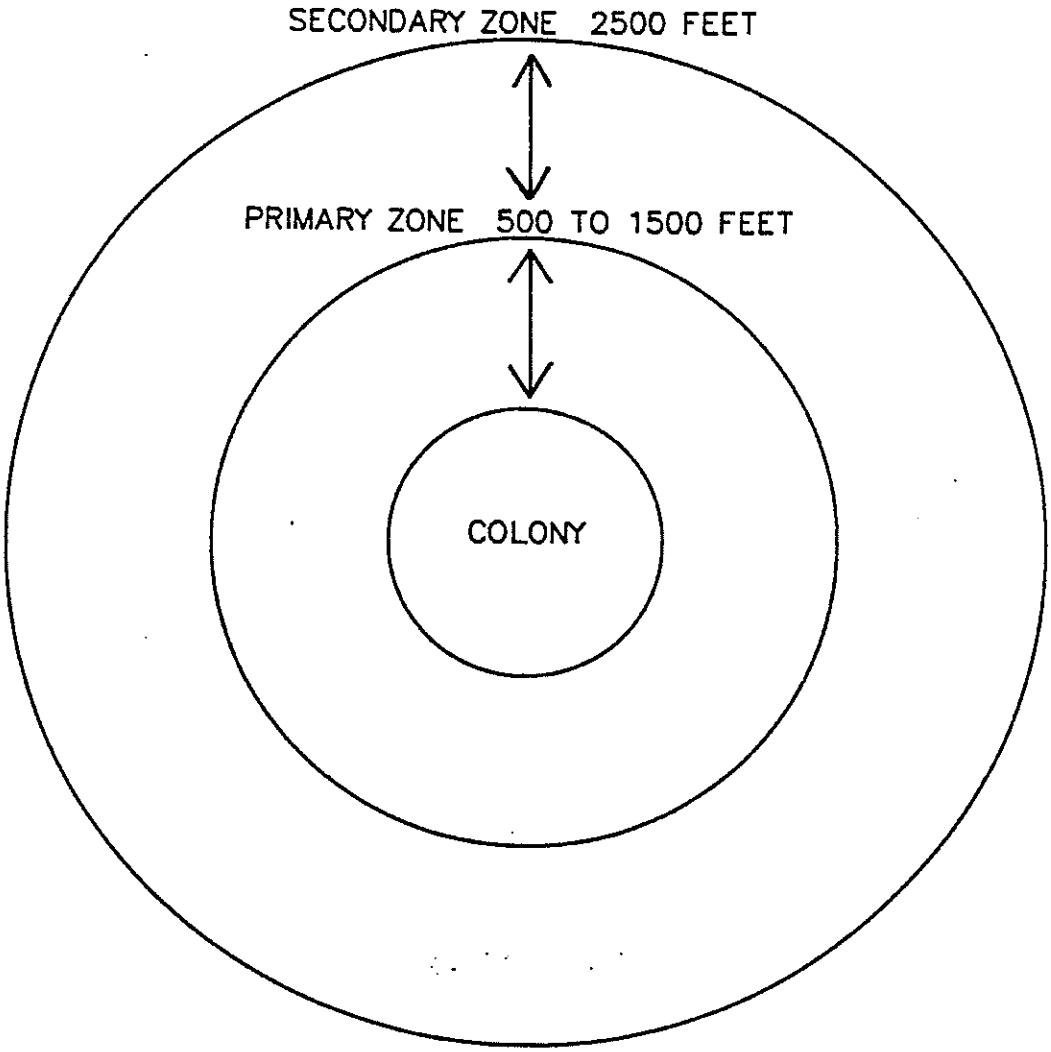
(1) Any lumbering or other removal of vegetation, and

(2) Any activity that reduces the area, depth, or length of flooding in wetlands under and surrounding the colony, except where periodic (less than annual) water control may be required to maintain the health of the aquatic, woody vegetation, and

(3) The construction of any building, roadway, tower, power line, canal, etc.

b. The following activities within the primary zone are likely to be detrimental to a colony if they occur when the colony is active:

(1) Any unauthorized human entry closer than 300 feet of the colony, and


SECONDARY ZONE 2500 FEET
PRIMARY ZONE 500 TO 1500 FEET
COLONY

(2) Any increase or irregular pattern in human activity anywhere in the primary zone, and

(3) Any increase or irregular pattern in activity by animals, including livestock or pets, in the colony, and

(4) Any aircraft operation closer than 500 feet of the colony.

B. Secondary Zone: Restrictions in this zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The secondary zone may be used by storks for collecting nesting material, for roosting, loafing, and feeding (especially important to newly fledged young), and may be important as a screen between the colony and areas of relatively intense human activities.

1. Size: The secondary zone should range outward from the primary zone 1000-2000 feet, or to a radius of 2500 feet of the outer edge of the colony.

2. Recommended Restrictions:

a. Activities in the secondary zone which may be detrimental to nesting wood storks include:

(1) Any increase in human activities above the level that existed in the year when the colony first formed, especially when visual screens are lacking, and

(2) Any alteration in the area's hydrology that might cause changes in the primary zone, and

(3) Any substantial (>20 percent) decrease in the area of wetlands and woods of potential value to storks for roosting and feeding.

b. In addition, the probability that low flying storks, or inexperienced, newly-fledged young will strike tall obstructions, requires that high-tension power lines be no closer than one mile (especially across open country or in wetlands) and tall trans-mission towers no closer than 3 miles from active colonies. Other activities, including busy highways and commercial and residential buildings may be present in limited portions of the secondary zone at the time that a new colony first forms. Although storks may tolerate existing levels of human activities, it is important that these human activities not expand substantially.

VI. Roosting site guidelines.

The general characteristics and temporary use-patterns of many stork roosting sites limit the number of specific management recommendations that are possible:

A. Avoid human activities within 500-1000 feet of roost sites during seasons of the year and times of the day when storks may be present. Nocturnal activities in active roosts may be especially disruptive.

B. Protect the vegetative and hydrological characteristics of the more important roosting sites--those used annually and/or used by flocks of 25 or more storks. Potentially, roosting sites may, some day, become nesting sites.

VII. Legal Considerations.

A. Federal Statutes

The U.S. breeding population of the wood stork is protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act). The population was listed as endangered on February 28, 1984 (49 Federal *Register* 7332); wood storks breeding in Alabama, Florida, Georgia, and South Carolina are protected by the Act.

Section 9 of the Endangered Species Act of 1973, as amended, states that it is unlawful for any person subject to the jurisdiction of the United States to take (defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.") any listed species anywhere within the United States.

The wood stork is also federally protected by its listing (50 CFR 10.13) under the Migratory Bird Treaty Act (167 U.S.C. 703-711), which prohibits the taking, killing or possession of migratory birds except as permitted.

B. State Statutes

1. State of Alabama

Section 9-11-232 of Alabama's Fish, Game, and Wildlife regulations curtails the possession, sale, and purchase of wild birds. "Any person, firm, association, or corporation who takes, catches, kills or has in possession at any time, living or dead, any protected wild bird not a game bird or who sells or offers for sale, buys, purchases or offers to buy or purchase any such bird or exchange same for anything of value or who shall sell or expose for sale or buy any part of the plumage, skin, or body of any bird protected by the laws of this state or who shall take or willfully destroy the nests of any wild bird or who shall have such nests or eggs of such birds in his possession, except as otherwise provided by law, shall be guilty of a misdemeanor...

Section 1 of the Alabama Nongame Species Regulation (Regulation 87-GF-7) includes the wood stork in the list of nongame species covered by paragraph (4). " It shall be unlawful to take, capture, kill, possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value, the following nongame wildlife species (or any parts or reproductive products of such species) without a scientific collection permit and written permission from the Commissioner, Department of Conservation and Natural Resources,..."

2. State of Florida

Rule 39-4.001 of the Florida Wildlife Code prohibits "taking, attempting to take, pursuing, hunting, molesting, capturing, or killing (collectively defined as "taking"), transporting, storing, serving, buying, selling,

possessing, or wantonly or willingly wasting any wildlife or freshwater fish or their nests, eggs, young, homes, or dens except as specifically provided for in other rules of Chapter 39, Florida Administrative Code.

Rule 39-27.011 of the Florida Wildlife Code prohibits "killing, attempting to kill, or wounding any endangered species." The "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida" dated 1 July 1988, includes the wood stork, listed as "endangered" by the Florida Game and Fresh Water Fish Commission.

3. State of Georgia

Section 27-1-28 of the Conservation and Natural Resources Code states that "Except as otherwise provided by law, rule, or regulation, it shall be unlawful to hunt, trap, fish, take, possess, or transport any nongame species of wildlife..."

Section 27-1-30 states that, "Except as otherwise provided by law or regulation, it shall be unlawful to disturb, mutilate, or destroy the dens, holes, or homes of any wildlife; "

Section 27-3-22 states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof...".

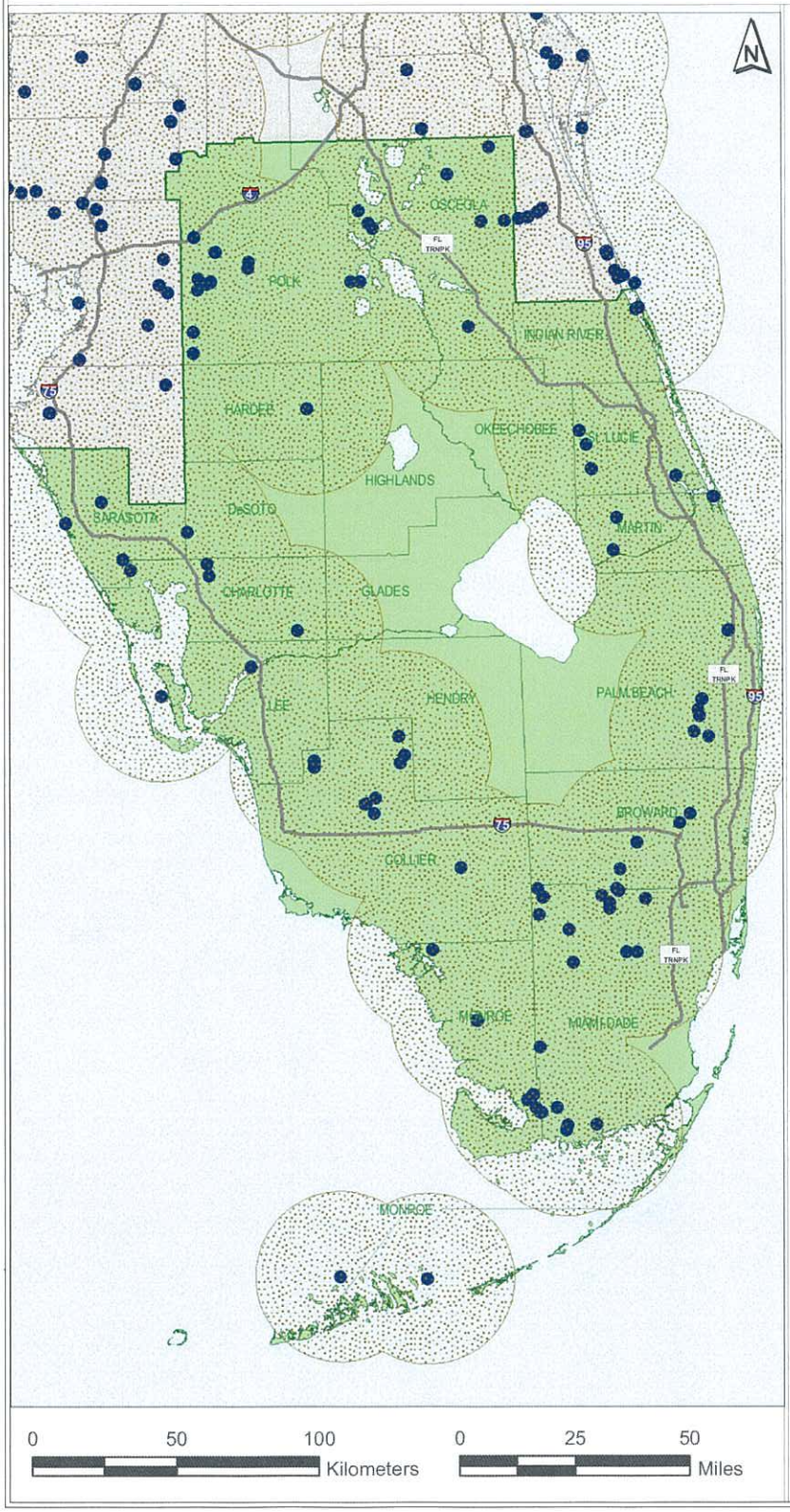
The wood stork is listed as endangered pursuant to the Endangered Wildlife Act of 1973 (Section 27-3-130 of the Code). Section 391-4-13-.06 of the Rules and Regulations of the Georgia Department of Natural Resources prohibits harassment, capture, sale, killing, or other actions which directly cause the death of animal species protected under the Endangered Wildlife Act. The destruction of habitat of protected species on public lands is also prohibited.

4. State of South Carolina

Section 50-15-40 of the South Carolina Nongame and Endangered Species Conservation Act states, "Except as otherwise provided in this chapter, it shall be unlawful for any person to take, possess, transport, export, process, sell, or offer of sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on any of the following lists: (1) the list of wildlife indigenous to the State, determined to be endangered within the State...(2) the United States' List of Endangered Native Fish and Wildlife... (3) the United States' List of Endangered Foreign Fish and Wildlife ..."

5/21/2010

Wood Stork



Nesting Colonies
Core Foraging Areas

1999 to 2005

- Colony Location
- Core Foraging Area
- South Florida Service Area

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

Produced by:
South Florida Ecological Services Office
http://verobeach.fws.gov
Phone: 772.562.3909

5/21/2010

Enclosure 3

Wood Stork Foraging Analysis: Excerpts of concepts and procedure as presented by the Service in this appendix may be viewed in detail in any one of our recent Biological Opinions for project related impacts to the wood stork. These documents can be found at the internet website address http://www.fws.gov/filedownloads/ftp%5verobeach.

Foraging Habitat

Researchers have shown that wood storks forage most efficiently and effectively in habitats where prey densities are high and the water shallow and canopy open enough to hunt successfully (Ogden et al. 1978, Browder 1984, Coulter 1987). Prey availability to wood storks is dependent on a composite variable consisting of density (number or biomass/m^2) and the vulnerability of the prey items to capture (Gawlik 2002). For wood storks, prey vulnerability appears to be largely controlled by physical access to the foraging site, water depth, the density of submerged vegetation, and the species-specific characteristics of the prey. For example, fish populations may be very dense, but not available (vulnerable) because the water depth is too deep (greater than 30 cm) for storks or the tree canopy at the site is too dense for storks to land. Calm water, about 5-40 cm (2-16 in) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993).

Coulter and Bryan's (1993) study suggested that wood storks preferred ponds and marshes, and visited areas with little or no canopy more frequently. Even in foraging sites in swamps, the canopy tended to be sparse. They suggested that open canopies may have contributed to detection of the sites and more importantly may have allowed the storks to negotiate landing more easily than at closed-canopy sites. In their study, the median amount of canopy cover where wood stork foraging was observed was 32 percent. Other researchers (P.C. Frederick, University of Florida, personal communication 2006; J.A. Rodgers, FWC, personal communication 2006) also confirm that wood storks will forage in woodlands, though the woodlands have to be fairly open and vegetation not very dense. Furthermore, the canopies must be open enough for wood storks to take flight quickly to avoid predators.

Melaleuca-infested Wetlands: As discussed previously, wetland suitability for wood stork foraging is partially dependent on vegetation density. Melaleuca is a dense-stand growth plant species, effectively producing a closed canopy and dense understory growth pattern that generally limits a site's accessibility to foraging by wading birds. However, O'Hare and Dalrymple (1997) suggest moderate infestations of melaleuca may have little effect on some species' productivity (*i.e.*, amphibians and reptiles) as long as critical abiotic factors such as hydrology remain. They also note as the levels of infestation increase, usage by wetland dependent species decreases. Their studies also showed that the number of fish species present in a wetland system remain stable at certain levels of melaleuca. However, the availability of the prey base for wood storks and other foraging wading birds is reduced by the restriction of access caused from dense and thick exotic vegetation. Wood storks and other wading birds can forage in these systems in open area pockets (*e.g.*, wind blow-downs), provided multiple conditions are optimal (*e.g.*, water depth, prey density). In O'Hare and Dalrmyple's study (1997), they identify five cover types (Table 1) and

provide information on the number of wetland dependent bird species and the number of individuals observed within each of these vegetation classes (Table 2).

Table 1: Vegetation classes

DMM	75-100 percent mature dense melaleuca coverage
DMS or (SDM)	75-100 percent sapling dense melaleuca coverage
P75	50-75 percent melaleuca coverage
P50	0-50 percent melaleuca coverage
MAR (Marsh)	0-10 percent melaleuca coverage

The number of wetland-dependent species and individuals observed per cover type is shown below in columns 1, 2, and 3 (Table 2). To develop an estimate of the importance a particular wetland type may have (based on density and aerial coverage by exotic species) to wetland dependent species, we developed a foraging suitability value using observational data from O'Hare and Dalrymple (1997). The Foraging Suitability Value as shown in column 5 (Table 2) is calculated by multiplying the number of species by the number of individuals and dividing this value by the maximum number of species and individuals combined (12*132=1584). The results are shown below for each of the cover types in O'Hare and Dalrymple (1997) study (Table 1). As an example, for the P50 cover type, the foraging suitability is calculated by multiplying 11 species times 92 individuals for a total of 1,012. Divide this value by 1,584, which is the maximum number of species times the maximum number of individuals (12*132 = 1,584). The resultant is 0.6389 or 64 percent 11*92=1012/1584*100=63.89).

Table 2: Habitat Foraging Suitability

Cover Type	# of Species (S)	# of Individuals (I)	S*I	Foraging Suitability
DMM	1	2	2	0.001
DMS	4	10	40	0.025
P75	10	59	590	0.372
P50	11	92	1,012	0.639
MAR	12	132	1,584	1.000

This approach was developed to provide us with a method of assessing wetland acreages and their relationship to prey densities and prey availability. We consider wetland dependent bird use to be a general index of food availability. Based on this assessment we developed an exotic foraging suitability index (Table 3):

Table 3. Foraging Suitability Percentages

Exotic Percentage	Foraging Suitability (percent)
Between 0 and 25 percent exotics	100
Between 25 and 50 percent exotics	64
Between 50 and 75 percent exotics	37
Between 75 and 90 percent exotics	3
Between 90 and 100 percent exotics	0

In our assessment however, we consider DMM to represent all exotic species densities between 90 and 100 percent and DMS to represent all exotic species densities between 75 and 90 percent. In our evaluation of a habitat's suitability, the field distinction between an exotic coverage of

90 percent and 100 percent in many situations is not definable, therefore unless otherwise noted in the field reports and in our analysis; we consider a suitability value of 3 percent to represent both densities.

Hydroperiod: The hydroperiod of a wetland can affect the prey densities in a wetland. For instance, research on Everglades fish populations using a variety of quantitative sampling techniques (pull traps, throw traps, block nets) have shown that the density of small forage fish increases with hydroperiod. Marshes inundated for less than120 days of the year average ± 4 fish/m^2; whereas, those flooded for more than 340 days of the year average ± 25 fish/m^2 (Loftus and Eklund 1994, Trexler et al. 2002).

The Service (1999) described a short hydroperiod wetland as wetlands with between 0 and 180-day inundation, and long hydroperiod wetlands as those with greater than 180-day inundation. However, Trexler et al. (2002) defined short hydroperiod wetlands as systems with less than 300 days per year inundation. In our discussion of hydroperiods, we are considering short hydroperiod wetlands to be those that have an inundation of 180 days or fewer.

The most current information on hydroperiods in south Florida was developed by the SFWMD for evaluation of various restoration projects throughout the Everglades Protection Area. In their modeling efforts, they identified the following seven hydroperiods:

Table 4. SFWMD Hydroperiod Classes – Everglades Protection Area

Hydroperiod Class	Days Inundated
Class 1	0-60
Class 2	60-120
Class 3	120-180
Class 4	180-240
Class 5	240-300
Class 6	300-330
Class 7	330-365

Fish Density per Hydroperiod: In the Service's assessment of project related impacts to wood storks, the importance of fish data specific to individual hydroperiods is the principle basis of our assessment. In order to determine the fish density per individual hydroperiod, the Service relied on the number of fish per hydroperiod developed from throw-trap data in Trexler et al.'s (2002) study and did not use the electrofishing data also presented in Trexler et al.'s study that defined fish densities in catch per unit effort, which is not hydroperiod specific. Although the throw-trap sampling generally only samples fish 8 cm or less, the Service believes the data can be used as a surrogate representation of all fish, including those larger than 8 cm, which are typically sampled by either electrofishing or block net sampling.

We base this evaluation on the following assessment. Trexler et al.'s (2002) study included electrofishing data targeting fish greater than 8 cm, the data is recorded in catch per unit effort and in general is not hydroperiod specific. However, Trexler et al. (2002) notes in their assessment of the electrofishing data that in general there is a correlation with the number of fish per unit effort per changes in water depth. In literature reviews of electrofishing data by Chick et

al. (1999 and 2004), they note that electrofishing data provides a useful index of the abundance of larger fish in shallow, vegetated habitat, but length, frequency, and species compositional data should be interpreted with caution. Chick et al. (2004) also noted that electrofishing data for large fish (> 8cm) provided a positive correlation of the number of fish per unit effort (abundance) per changes in hydropeiod. The data in general show that as the hydroperiod decreases, the abundance of larger fishes also decreases.

Studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979) also noted this abundance trend for fish species sampled. We also noted in our assessment of prey consumption by wood storks in the Ogden et al. (1976) study (Figure 4) (discussed below), that the wood stork's general preference is for fish measuring 1.5 cm to 9 cm, although we also acknowledged that wood storks consume fish larger than the limits discussed in the Ogden et al. (1976) study. A similar assessment is reference by Trexler and Goss (2009) noting a diversity of size ranges of prey available for wading birds to consume, with fish ranging from 6 to 8 cm being the preferred prey for larger species of wading birds, particularly wood storks (Kushlan et al. 1975).

Therefore, since data were not available to quantify densities (biomass) of fish larger than 8 cm to a specific hydroperiod, and Ogden et al.'s (1976) study notes that the wood stork's general preference is for fish measuring 1.5 cm to 9 cm, and that empirical data on fish densities per unit effort correlated positively with changes in water depth, we believe that the Trexler et al. (2002) throw-trap data represents a surrogate assessment tool to predict the changes in total fish density and the corresponding biomass per hydroperiod for our wood stork assessment.

In consideration of this assessment, the Service used the data presented in Trexler et al.'s (2002) study on the number of fish per square-meter per hydroperiod for fish 8 cm or less to be applicable for estimating the total biomass per square-meter per hydroperiod for all fish. In determining the biomass of fish per square-meter per hydroperiod, the Service relied on the summary data provided by Turner et al. (1999), which provides an estimated fish biomass of 6.5 g/m^2 for a Class 7 hydroperiod for all fish and used the number of fish per square-meter per hydroperiod from Trexler et al.'s data to extrapolate biomass values per individual hydroperiods.

Trexler et al.'s (2002) studies in the Everglades provided densities, calculated as the square-root of the number of fish per square meter, for only six hydroperiods; although these cover the same range of hydroperiods developed by the SFWMD. Based on the throw-trap data and Trexler et al.'s (2002) hydroperiods, the square-root fish densities are:

Table 5. Fish Densities per Hydroperiod from Trexler et al. (2002)

Hydroperiod Class	Days Inundated	Fish Density
Class 1	0-120	2.0
Class 2	120-180	3.0
Class 3	180-240	4.0
Class 4	240-300	4.5
Class 5	300-330	4.8
Class 6	330-365	5.0

Trexler et al.'s (2002) fish densities are provided as the square root of the number of fish per square meter. For our assessment, we squared these numbers to provide fish per square meter, a simpler calculation when other prey density factors are included in our evaluation of adverse effects to listed species from the proposed action. We also extrapolated the densities over seven hydroperiods, which is the same number of hydroperiods characterized by the SFWMD. For example, Trexler et al.'s (2002) square-root density of a Class 2 wetland with three fish would equate to a SFWMD Model Class 3 wetland with nine fish. Based on the above discussion, the following mean annual fish densities were extrapolated to the seven SFWMD Model hydroperiods:

Table 6. Extrapolated Fish Densities for SFWMD Hydroperiods

Hydroperiod Class	Days Inundated	Extrapolated Fish Density
Class 1	0-60	2 fish/m^2
Class 2	60-120	4 fish/m^2
Class 3	120-180	9 fish/m^2
Class 4	180-240	16 fish/m^2
Class 5	240-300	20 fish/m^2
Class 6	300-330	23 fish/m^2
Class 7	330-365	25 fish/m^2

Fish Biomass per Hydroperiod: A more important parameter than fish per square-meter in defining fish densities is the biomass these fish provide. In the ENP and WCA-3, based on studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979), the standing stock (biomass) of large and small fishes combined in unenriched Class 5 and 6 hydroperiod wetlands averaged between 5.5 to 6.5 grams-wet-mass/m^2. In these studies, the data was provided in g/m^2 dry-weight and was converted to g/m^2 wet-weight following the procedures referenced in Kushlan et al. (1986) and also referenced in Turner et al. (1999). The fish density data provided in Turner et al. (1999) included both data from samples representing fish 8 cm or smaller and fish larger than 8 cm and included summaries of Turner and Trexler (1997) data, Carlson and Duever (1979) data, and Loftus and Eklund (1994) data. These data sets also reflected a 0.6 g/m^2 dry-weight correction estimate for fish greater than 8 cm based on Turner et al.'s (1999) block-net rotenone samples.

Relating this information to the hydroperiod classes developed by the SFWMD, we estimated the mean annual biomass densities per hydroperiod. For our assessment, we considered Class 7 hydroperiod wetlands based on Turner et al. (1999) and Trexler et al. (2002) studies to have a mean annual biomass of 6.5 grams-wet-mass/m^2 and to be composed of 25 fish/m^2. The remaining biomass weights per hydroperiod were determined as a direct proportion of the number of fish per total weight of fish for a Class 7 hydroperiod (6.5 grams divided by 25 fish equals 0.26 grams per fish).

For example, given that a Class 3 hydroperiod has a mean annual fish density of 9 fish/m^2, with an average weight of 0.26 grams per fish, the biomass of a Class 3 hydroperiod would be 2.3 grams/m^2 (9*0.26 = 2.3). Based on the above discussion, the biomass per hydroperiod class is:

Table 7. Extrapolated Mean Annual Fish Biomass for SFWMD Hydroperiods

Hydroperiod Class	Days Inundated	Extrapolated Fish Biomass
Class 1	0-60	0.5 gram/m^2
Class 2	60-120	1.0 gram/m^2
Class 3	120-180	2.3 grams/m^2
Class 4	180-240	4.2 grams/m^2
Class 5	240-300	5.2 grams/m^2
Class 6	300-330	6.0 grams/m^2
Class 7	330-365	6.5 grams/m^2

Wood stork suitable prey size: Wood storks are highly selective in their feeding habits and in studies on fish consumed by wood storks, five species of fish comprised over 85 percent of the number and 84 percent of the biomass of over 3,000 prey items collected from adult and nestling wood storks (Ogden et al. 1976). Table 8 lists the fish species consumed by wood storks in Ogden et al. (1976).

Table 8. Primary Fish Species consumed by Wood Storks from Ogden et al. (1976)

Common name	Scientific name	Percent Individuals	Percent Biomass
Sunfishes	*Centrarchidae*	14	44
Yellow bullhead	*Italurus natalis*	2	12
Marsh killifish	*Fundulus confluentus*	18	11
Flagfish	*Jordenella floridae*	32	7
Sailfin molly	*Poecilia latipinna*	20	11

These species were also observed to be consumed in much greater proportions than they occur at feeding sites, and abundant smaller species [*e.g.*, mosquitofish (*Gambusia affinis*), least killifish (*Heterandria formosa*), bluefin killifish (*Lucania goodei*)] are under-represented, which the researchers believed was probably because their small size did not elicit a bill-snapping reflex in these tactile feeders (Coulter et al. 1999). Their studies also showed that, in addition to selecting larger species of fish, wood storks consumed individuals that are significantly larger (>3.5 cm) than the mean size available (2.5 cm), and many were greater than 1-year old (Ogden et al. 1976, Coulter et al. 1999). However, Ogden et al. (1976) also found that wood storks most likely consumed fish that were between 1.5 and 9.0 cm in length (Figure 4 in Ogden et al. 1976).

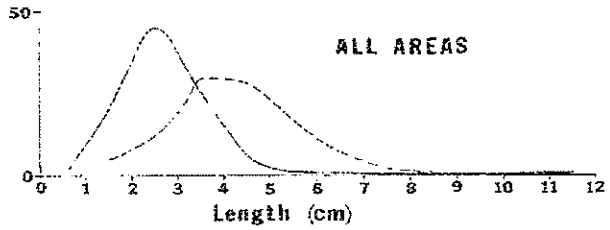


FIGURE 4. Length frequency distribution of fish available to and consumed by Wood Storks in different habitats.

In Ogden et al.'s (1976) Figure 4, the dotted line is the distribution of fish consumed and the solid line is the available fish. Straight interpretation of the area under the dotted line curve

represents the size classes of fish most likely consumed by wood storks and is the basis of our determination of the amount of biomass that is within the size range of fish most likely consumed by wood storks, which in this example is a range size of 1.5 to 9.0 cm in length.

Wood stork suitable prey base (biomass per hydroperiod): To estimate that fraction of the available fish biomass that might be consumed by wood storks, the following analysis was conducted. Trexler et al.'s (2002) 2-year throw trap data of absolute and relative fish abundance per hydroperiod distributed across 20 study sites in the ENP and the WCAs was considered to be representative of the Everglades fish assemblage available to wood storks (n = 37,718 specimens of 33 species). Although Trexler et al.'s (2002) data was based on throw-trap data and representative of fish 8 cm or smaller, the Service believes the data set can be used to predict the biomass/m^2 for total fish (those both smaller and larger than 8 cm). This approach is also supported, based on our assessment of prey consumption by wood storks in Ogden et al.'s (1976) study (Figure 4), that the wood storks general preference is for fish measuring 1.5 cm to 9 cm and is generally inclusive of Trexler et al.'s (2002) throw-trap data of fish 8 cm or smaller.

To estimate the fraction of the fish biomass that might be consumed by wood storks, the Service, using Trexler et al.'s (2002) throw-trap data set, determined the mean biomass of each fish species that fell within the wood stork prey size limits of 1.5 to 9.0 cm. The mean biomass of each fish species was estimated from the length and wet mass relationships for Everglades' icthyofauna developed by Kushlan et al. (1986). The proportion of each species that was outside of this prey length and biomass range was estimated using the species mean and variance provided in Table 1 in Kushlan et al. (1986). These biomass estimates assumed the length and mass distributions of each species was normally distributed and the fish biomass could be estimated by eliminating that portion of each species outside of this size range. These biomass estimates of available fish prey were then standardized to a sum of 6.5 g/m^2 for Class 7 hydroperiod wetlands (Service 2009).

For example, Kushlan et al. (1986) lists the warmouth (*Lepomis gulosus*) with a mean average biomass of 36.76 g. In fish samples collected by Trexler et al. (2002), this species accounted for 0.048 percent (18/37,715=0.000477) of the Everglades freshwater ichthyofauna. Based on an average biomass of 36.76 g (Kushlan et al. 1986), the 0.048 percent representation from Trexler et al. (2002) is equivalent to an average biomass of 1.75 g (36.76*0.048) or 6.57 percent (1.75/26.715) of the estimated average biomass (26.715 g) of Trexler et al.'s (2002) samples (Service 2009).

Standardizing these data to a sample size of 6.5 g/m^2, the warmouth biomass for long hydroperiod wetlands would be about 0.427 g (Service 2009). However, the size frequency distribution (assumed normal) for warmouth (Kushlan et al. 1986) indicate 48 percent are too large for wood storks and 0.6 percent are too small (outside the 1.5 cm to 9 cm size range most likely consumed), so the warmouth biomass within the wood stork's most likely consumed size range is only 0.208 g (0.427*(0.48+0.006)=0.2075) in a 6.5 g/m^2 sample. Using this approach summed over all species in long hydroperiod wetlands, only 3.685 g/m^2 of the 6.5 g/m^2 sample consists of fish within the size range likely consumed by wood storks or about 57 percent (3.685/6.5*100=56.7) of the total biomass available.

An alternative approach to estimate the available biomass is based on Ogden et al. (1976). In their study (Table 8), the sunfishes and four other species that accounted for 84 percent of the biomass eaten by wood storks totaled 2.522 g of the 6.5 g/m^2 sample (Service 2009). Adding the remaining 16 percent from other species in the sample, the total biomass would suggest that 2.97 g of a 6.5 g/m^2 sample are most likely to be consumed by wood storks or about 45.7 percent (2.97/6.5=0.4569)

The mean of these two estimates is 3.33g/m^2 for long hydroperiod wetlands (3.685 + 2.97 = 6.655/ 2 = 3.33). This proportion of available fish prey of a suitable size (3.33 g/m^2 / 6.5 g/m^2 = 0.51 or 51 percent) was then multiplied by the total fish biomass in each hydroperiod class to provide an estimate of the total biomass of a hydroperiod that is the appropriate size and species composition most likely consumed by wood storks.

As an example, a Class 3 SFWMD model hydroperiod wetland with a biomass of 2.3 grams/m^2, adjusted by 51 percent for appropriate size and species composition, provides an available biomass of 1.196 grams/m^2. Following this approach, the biomass per hydroperiod potentially available to predation by wood storks based on size and species composition is:

Table 9. Wood Stork Suitable Prey Base (fish biomass per hydroperiod)

Hydroperiod Class	Days Inundated	Fish Biomass
Class 1	0-60	0.26 gram/m^2
Class 2	60-120	0.52 gram/m^2
Class 3	120-180	1.196 grams/m^2
Class 4	180-240	2.184 grams/m^2
Class 5	240-300	2.704 grams/m^2
Class 6	300-330	3.12 grams/m^2
Class 7	330-365	3.38 grams/m^2

Wood Stork-Wading Bird Prey Consumption Competition: In 2006, (Service 2006), the Service developed an assessment approach that provided a foraging efficiency estimate that 55 percent of the available biomass was actually consumed by wood storks. Since the implementation of this assessment approach, the Service has received comments from various sources concerning the Service's understanding of Fleming et al.'s (1994) assessment of prey base consumed by wood storks versus prey base assumed available to wood stork and the factors included in the 90 percent prey reduction value.

In our original assessment, we noted that, "*Fleming et al. (1994) provided an estimate of 10 percent of the total biomass in their studies of wood stork foraging as the amount that is actually consumed by the storks. However, the Fleming et al. (1994) estimate also includes a second factor, the suitability of the foraging site for wood storks, a factor that we have calculated separately. In their assessment, these two factors accounted for a 90 percent reduction in the biomass actually consumed by the storks. We consider these two factors as equally important and are treated as equal components in the 90 percent reduction; therefore, we consider each factor to represent 45 percent of the reduction. In consideration of this approach, Fleming et al.'s (1994) estimate that 10 percent of the biomass would actually be consumed by the storks would be added to the 45 percent value for an estimate that 55 percent (10 percent plus the remaining 45 percent) of the available biomass would actually be consumed by the storks and is the factor we believe represents the amount of the prey base that is actually consumed by the stork.*"

In a follow-up review of Fleming et al.'s (1994) report, we noted that the 10 percent reference is to prey available to wood storks, not prey consumed by wood storks. We also noted the 90 percent reduction also includes an assessment of prey size, an assessment of prey available by water level (hydroperiod), an assessment of suitability of habitat for foraging (openness), and an assessment for competition with other species, not just the two factors considered originally by the Service (suitability and competition). Therefore, in re-evaluating of our approach, we identified four factors in the 90 percent biomass reduction and not two as we previously considered. We believe these four factors are represented as equal proportions of the 90 percent reduction, which corresponds to an equal split of 22.5 percent for each factor. Since we have accounted previously for three of these factors in our approach (prey size, habitat suitability, and hydroperiod) and they are treated separately in our assessment, we consider a more appropriate foraging efficiency to represent the original 10 percent and the remaining 22.5 percent from the 90 percent reduction discussed above. Following this revised assessment, our competition factor would be 32.5 percent, not the initial estimate of 55 percent.

Other comments reference the methodology's lack of sensitivity to limiting factors, i.e., is there sufficient habitat available across all hydroperiods during critical life stages of wood stork nesting and does this approach over emphasize the foraging biomass of long hydroperiod wetlands with a corresponding under valuation of short hydroperid wetlands. The Service is aware of these questions and is examining alternative ways to assess these concerns. However, until futher research is generated to refine our approach, we continue to support the assessment tool as outlined.

Following this approach, Table 10 has been adjusted to reflect the competition factor and represents the amount of biomass consumed by wood storks and is the basis of our effects assessments (Class 1 hydroperiod with a biomass 0.26 g, multiplied by 0.325, results in a value of 0.08 g [0.25*.325=0.08]) (Table 10).

Table 10 Actual Biomass Consumed by Wood Storks

Hydroperiod Class	Days Inundated	Fish Biomass
Class 1	0-60	0.08 gram/m^2
Class 2	60-120	0.17 gram/m^2
Class 3	120-180	0.39 grams/m^2
Class 4	180-240	0.71 grams/m^2
Class 5	240-300	0.88 grams/m^2
Class 6	300-330	1.01 grams/m^2
Class 7	330-365	1.10 grams/m^2

Sample Project of Biomass Calculations and Corresponding Concurrence Determination

Example 1:

An applicant is proposing to construct a residential development with unavoidable impacts to 5 acres of wetlands and is proposing to restore and preserve 3 acres of wetlands onsite. Data on the onsite wetlands classified these systems as exotic impacted wetlands with greater than 50

percent but less than 75 percent exotics (Table 3) with an average hydroperiod of 120-180 days of inundation.

The equation to calculate the biomass lost is: The number of acres, converted to square-meters, times the amount of actual biomass consumed by the wood stork (Table 10), times the exotic foraging suitability index (Table 3), equals the amount of grams lost, which is converted to kg.

Biomass lost (5*4,047*0.39 (Table 10)*0.37 (Table 3)=2,919.9 grams or 2.92 kg)

In the example provided, the 5 acres of wetlands, converted to square-meters (1 acre= 4,047 m^2) would provide 2.9 kg of biomass (5*4,047*0.39 (Table 10)*0.37 (Table 3)= 2,919.9 grams or 2.9 kg), which would be lost from development.

The equation to calculate the biomass from the preserve is the same, except two calculations are needed, one for the existing biomass available and one for the biomass available after restoration.

Biomass Pre: (3*4,047*0.39(Table 10)*0.37 (Table 3)=1,751.95grams or 1.75 kg)

Biomass Post: (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg)

Net increase: 4.74 kg-1.75 kg = 2.98 kg Compensation Site

Project Site Balance 2.98 kg- 2.92 kg = 0.07kg

The compensation proposed is 3 acres, which is within the same hydroperiod and has the same level of exotics. Following the calculations for the 5 acres, the 3 acres in its current habitat state, provides 1.75 kg (3*4,047*0.39 (Table 10)*0.37 (Table 3)=1,751.95grams or 1.75 kg) and following restoration provides 4.74 kg (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg), a net increase in biomass of 2.98 kg (4.74-1.75=2.98).

Example 1: 5 acre wetland loss, 3 acre wetland enhanced – same hydroperiod - NLAA

Hydroperiod	Existing Footprint		On-site Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days								
Class 3 - 120 to 180 Days	5	2.92	3	1.75	3	4.74	(5)	0.07
Class 4 - 180 to 240 Days								
Class 5 - 240 to 300 Days								
Class 6 - 300 to 330 Days								
Class 7 - 330 to 365 days								
TOTAL	**5**	**2.92**	**3**	**1.75**	**3**	**4.74**	**(5)**	**0.07**

*Since the net increase in biomass from the restoration provides 2.98 kg and the loss is 2.92 kg, there is a positive outcome (4.74-1.75-2.92=0.07) in the same hydroperiod and Service concurrence with a NLAA is appropriate.

Example 2:

In the above example, if the onsite preserve wetlands were a class 4 hydroperiod, which has a value of 0.71. grams/m^2 instead of a class 3 hydroperiod with a 0.39 grams/m^2 [Table 10]), there would be a loss of 2.92 kg of short hydroperiod wetlands (as above) and a net gain of 8.62 kg of long-hydroperiod wetlands.

Biomass lost: (5*4,047*0.39 (Table 10)*0.37 (Table 3)=2,919.9 grams or 2.92 kg)

The current habitat state of the preserve provides 3.19 kg (3*4,047*0.71 (Table 10)*0.37 (Table 3)=3,189.44 grams or 3.19 kg) and following restoration the preserve provides 8.62 kg (3*4,047*0.71 (Table 10)*1(Table 3)= 8,620.11 grams or 8.62 kg, thus providing a net increase in class 4 hydroperiod biomass of 5.43 kg (8.62-3.19=5.43).

Biomass Pre: (3*4,047*0.71(Table 10)*0.37 (Table 3) = 3,189.44 grams or 3.19 kg)

Biomass Post: (3*4,047*0.71 (Table 10)*1(Table 3)=8,620.11 grams or 8.62 kg)

Net increase: 8.62 kg-3.19 kg = 5.43 kg

Project Site Balance 5.43 kg- 2.92 kg = 2.51 kg

Example 2: 5 acre wetland loss, 3 acre wetland enhanced – different hydroperiod – May Affect

Hydroperiod	Existing Footprint		On-site Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days								
Class 3 - 120 to 180 Days	5	2.92					(5)	-2.92
Class 4 - 180 to 240 Days			3	3.19	3	8.62	0	5.43
Class 5 - 240 to 300 Days								
Class 6 - 300 to 330 Days								
Class 7 - 330 to 365 days								
TOTAL	**5**	**2.92**	**3**	**3.19**	**3**	**8.62**	**(5)**	**2.51**

In this second example, even though there is an overall increase in biomass, the biomass loss is a different hydroperiod than the biomass gain from restoration, therefore, the Service could not concur with a NLAA and further coordination with the Service is appropriate.

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APPENDIX O

UMAM Summary Sheets

Uniform Mitigation Assessment Method Summary

Site/Project Name:	Application Number:	Date:
SR 544 PD&E Study		October 27, 2023

Impact Summary

	Assessment Area	Impact Type	Location and Landscape Support		Water Environment		Community Structure		Impact Delta	Acres	Functional Loss
			Current	w/Impact	Current	w/Impact	Current	w/Impact			
1	WL 1, WL 17, WL 18	Direct Impact	4	0	5	0	4	0	0.43	1.03	0.446
2	WL 1, WL 17, WL 18	Secondary Impact	4	3	5	5	4	3	0.07	1.52	0.101
3	WL 2, WL 3, WL 4, WL 8	Direct Impact	4	0	4	0	4	0	0.40	1.75	0.700
4	WL 2, WL 3, WL 4, WL 8	Secondary Impact	4	3	4	4	4	3	0.07	0.84	0.056
5	WL 4, WL 7, WL 9, WL 10, WL 16	Direct Impact	4	0	4	0	4	0	0.40	6.57	2.628
6	WL 4, WL 7, WL 9, WL 10, WL 16	Secondary Impact	4	3	4	4	4	3	0.07	4.37	0.291
7	WL 5, WL 6, WL 13, WL 14, WL 21	Direct Impact	5	0	6	0	6	0	0.57	4.05	2.295
8	WL 5, WL 6, WL 13, WL 14, WL 21	Secondary Impact	5	4	6	6	6	5	0.07	3.30	0.220
9	WL 6	Direct Impact	5	0	6	0	6	0	0.57	0.28	0.159
10	WL 12	Direct Impact	4	0	3	0	3	0	0.33	0.43	0.143
11	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	0	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-
								TOTAL		24.14	7.039

Mitigation Summary

	Assessment Area	Mitigation Type	Location and Landscape Support		Water Environment		Community Structure		Mitigation Delta	Time Lag	Risk	PAF	RFG	Acres	Functional Gain
			w/o Mit	w/Mit	w/o Mit	w/Mit	w/o Mit	w/Mit							
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
													TOTAL	0.00	0.000

TOTALS					
Impacts	Acres	Mitigation - Upland	Acres	Mitigation - Wetland	Acres
				Creation	0.00
		Restoration	0.00	Restoration	0.00
Direct Impacts	14.11	Enhancement	0.00	Enhancement	0.00
Secondary Impacts	10.03	Preservation	0.00	Preservation	0.00
Total Impacts	**24.14**	**Total Upland Mitigation**	**0.00**	**Total Wetland Mitigation**	**0.00**

Total Functional Loss	**7.039**
Total Functional Gain	**0.000**
Mitigation Deficit	**-7.039**

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 1, WL 17, WL 18**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
618, 644	**Herbaceous**	**Direct Impact**	**1.03** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are hydrologically connected to lake systems present adjacent to the project. WL 1 is adjacent to and hydrologically connected to Lake Smart. WL 17 and WL 18 are adjacent to and hydrologically connected to Lake Conine.

Assessment area description

WL 1, WL 17, and WL 18 are located in the western portion of the project. WL 1 is on the south side of SR 544 while WL 17 and WL 18 are on the north side of SR 544. Vegetation within the assessment area includes spatterdock, smartweed, duckweed, pickerelweed, Peruvian primrose willow, and cattails.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Conine, Lake Smart	**N/A**

Functions	Mitigation for previous permit/other historic use
Provide refuge, cover, and foraging habitat for wildlife; natural water storage	**N/A**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Salamanders, frogs, snakes, birds, small mammals	**Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 1, WL 17, WL 18**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**0**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
5	**0**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
4	**0**

Additional Notes:

Raw Score = Sum of above scores/30 (if uplands, divide by 20)

Current	**With Impact**
0.4333333	0

Impact Delta (ID)	
Current - w/Impact	0.433333333

Impact Acres =	1.03

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.446

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 1, WL 17, WL 18**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
618, 644	**Herbaceous**	**Secondary Impact**	**1.52** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are hydrologically connected to lake systems present adjacent to the project. WL 1 is adjacent to and hydrologically connected to Lake Smart. WL 17 and WL 18 are adjacent to and hydrologically connected to Lake Conine.

Assessment area description

WL 1, WL 17, and WL 18 are located in the western portion of the project. WL 1 is on the south side of SR 544 while WL 17 and WL 18 are on the north side of SR 544. Vegetation within the assessment area includes spatterdock, smartweed, duckweed, pickerelweed, Peruvian primrose willow, and cattails.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Conine, Lake Smart	**N/A**

Functions	Mitigation for previous permit/other historic use
Provide refuge, cover, and foraging habitat for wildlife; natural water storage	**N/A**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Salamanders, frogs, snakes, birds, small mammals	**Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 1, WL 17, WL 18**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**3**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
5	**5**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
4	**3**

Additional Notes:

Raw Score = Sum of above scores/30
(if uplands, divide by 20)

Current	**With Impact**
0.4333333	0.366666667

Impact Delta (ID)	
Current - w/Impact	0.066666667

Impact Acres =	1.52

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.101

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 2, WL 3, WL 4, WL 8**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
615, 630	**Forested**	**Direct Impact**	**1.75** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are associated with the lake systems present adjacent to the project. WL 4 is adjacent to and hydrologically connected to Lake Fannie. WL 8 is adjacent to and hydrologically connected to Lake Butler.

Assessment area description

WL 2, WL 3, WL 4 and WL 8 are located in the central and eastern portion of the project. WL 2, WL 3, and WL 4 are on the south side of SR 544 while WL 8 is on the north side of SR 544. Vegetation within the assessment area includes red maple, sweet bay, black gum, bald cypress, slash pine, laurel oak, Brazilian pepper, Peruvian primrose willow, Carolina willow, elderberry, saltbush, wax myrtle, torpedograss, cinnamon fern, beggar ticks, and swamp fern.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Lake Butler	**N/A**

Functions	Mitigation for previous permit/other historic use
Provide refuge, cover, and foraging habitat for wildlife; natural water storage	**N/A**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Salamanders, frogs, snakes, birds, small mammals	**Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 2, WL 3, WL 4, WL 8**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**0**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
4	**0**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
4	**0**

Additional Notes:

Raw Score = Sum of above scores/30 (if uplands, divide by 20)

Current	**With Impact**
0.4	0

Impact Acres =	1.75

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.700

Impact Delta (ID)	
Current - w/Impact	0.4

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 2, WL 3, WL 4, WL 8**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
615, 630	**Forested**	**Secondary Impact**	**0.84** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are associated with the lake systems present adjacent to the project. WL 4 is adjacent to and hydrologically connected to Lake Fannie. WL 8 is adjacent to and hydrologically connected to Lake Butler.

Assessment area description

WL 2, WL 3, WL 4 and WL 8 are located in the central and eastern portion of the project. WL 2, WL 3, and WL 4 are on the south side of SR 544 while WL 8 is on the north side of SR 544. Vegetation within the assessment area includes red maple, sweet bay, black gum, bald cypress, slash pine, laurel oak, Brazilian pepper, Peruvian primrose willow, Carolina willow, elderberry, saltbush, wax myrtle, torpedograss, cinnamon fern, beggar ticks, and swamp fern.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Lake Butler	**N/A**

Functions	Mitigation for previous permit/other historic use
Provide refuge, cover, and foraging habitat for wildlife; natural water storage	**N/A**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Salamanders, frogs, snakes, birds, small mammals	**Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 2, WL 3, WL 4, WL 8**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**3**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
4	**4**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
4	**3**

Additional Notes:

Raw Score = Sum of above scores/30
(if uplands, divide by 20)

Current	**With Impact**
0.4	0.333333333

Impact Delta (ID)	
Current - w/Impact	0.066666667

Impact Acres =	0.84

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.056

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 4, WL 7, WL 9, WL 10, WL 16**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
641, 643	**Herbaceous**	**Direct Impact**	**6.57** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are associated with the lake systems present adjacent to the project. WL 4 is adjacent to and hydrologically connected to Lake Fannie. WL 7 is hydrologically connected to Middle Lake Hamilton and historicallly connected to WL 10, but the two are now bisected by SR 544.

Assessment area description

WL 4, WL 7, WL 9, WL 10 and WL 16 are located in the central and eastern portion of the project. WL 4 and WL 7 are on the south side of SR 544 while WL 9, WL 10, and WL 16 are on the north side of SR 544. Vegetation within the assessment area includes Peruvian primrose willow, saltbush, Carolina willow, red maple saplings, cinnamon fern, torpedograss, soft rush, arrowhead, lizards' tail, and cattails.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Middle Lake Hamilton	**N/A**
Functions **Provide refuge, cover, and foraging habitat for wildlife; natural water storage**	Mitigation for previous permit/other historic use **N/A**
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) **Salamanders, frogs, snakes, birds, small mammals**	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) **Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 4, WL 7, WL 9, WL 10, WL 16**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**0**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
4	**0**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
4	**0**

Additional Notes:

Raw Score = Sum of above scores/30 (if uplands, divide by 20)

Current	**With Impact**
0.4	0

Impact Delta (ID)	
Current - w/Impact	0.4

Impact Acres =	6.57

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	2.628

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 4, WL 7, WL 9, WL 10, WL 16**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
641, 643	**Herbaceous**	**Secondary Impact**	**4.37** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are associated with the lake systems present adjacent to the project. WL 4 is adjacent to and hydrologically connected to Lake Fannie. WL 7 is hydrologically connected to Middle Lake Hamilton and historicallly connected to WL 10, but the two are now bisected by SR 544.

Assessment area description

WL 4, WL 7, WL 9, WL 10 and WL 16 are located in the central and eastern portion of the project. WL 4 and WL 7 are on the south side of SR 544 while WL 9, WL 10, and WL 16 are on the north side of SR 544. Vegetation within the assessment area includes Peruvian primrose willow, saltbush, Carolina willow, red maple saplings, cinnamon fern, torpedograss, soft rush, arrowhead, lizards' tail, and cattails.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Middle Lake Hamilton	**N/A**
Functions **Provide refuge, cover, and foraging habitat for wildlife; natural water storage**	Mitigation for previous permit/other historic use **N/A**
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) **Salamanders, frogs, snakes, birds, small mammals**	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) **Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 4, WL 7, WL 9, WL 10, WL 16**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**3**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
4	**4**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
4	**3**

Additional Notes:

Raw Score = Sum of above scores/30 (if uplands, divide by 20)

Current	**With Impact**
0.4	0.333333333

Impact Delta (ID)	
Current - w/Impact	0.066666667

Impact Acres =	4.37

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.291

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 5, WL 6, WL 13, WL 14, WL 21**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
615, 630	**Forested**	**Direct Impact**	**4.05** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are associated with the lake systems present adjacent to the project. WL 5 is adjacent to and hydrologically connected to Lake Fannie. WL 21 is adjacent to and hydrologically connected to Lake Henry.

Assessment area description

WL 5, WL 6, WL 13, WL 14 and WL 21 are located in the central and eastern portion of the project. WL 5 and WL 6 are on the south side of SR 544 while WL 13, WL 14, and WL 21 are on the north side of SR 544. Vegetation within the assessment area includes red maple, sweet bay, black gum, bald cypress, slash pine, laurel oak, Brazilian pepper, Peruvian primrose willow, Carolina willow, elderberry, saltbush, wax myrtle, torpedograss, cinnamon fern, beggar ticks, and swamp fern.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Lage Henry	**N/A**
Functions **Provide refuge, cover, and foraging habitat for wildlife; natural water storage**	Mitigation for previous permit/other historic use **N/A**
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) **Salamanders, frogs, snakes, birds, small mammals**	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) **Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 5, WL 6, WL 13, WL 14, WL 21**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
5	**0**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
6	**0**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
6	**0**

Additional Notes:

Raw Score = Sum of above scores/30
(if uplands, divide by 20)

Current	**With Impact**
0.5666667	0

Impact Delta (ID)	
Current - w/Impact	0.566666667

Impact Acres =	4.05

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	2.295

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 5, WL 6, WL 13, WL 14, WL 21**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
615, 630	**Forested**	**Secondary Impact**	**3.30** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The wetlands within the assessment area are associated with the lake systems present adjacent to the project. WL 5 is adjacent to and hydrologically connected to Lake Fannie. WL 21 is adjacent to and hydrologically connected to Lake Henry.

Assessment area description

WL 5, WL 6, WL 13, WL 14 and WL 21 are located in the central and eastern portion of the project. WL 5 and WL 6 are on the south side of SR 544 while WL 13, WL 14, and WL 21 are on the north side of SR 544. Vegetation within the assessment area includes red maple, sweet bay, black gum, bald cypress, slash pine, laurel oak, Brazilian pepper, Peruvian primrose willow, Carolina willow, elderberry, saltbush, wax myrtle, torpedograss, cinnamon fern, beggar ticks, and swamp fern.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Lage Henry	**N/A**
Functions **Provide refuge, cover, and foraging habitat for wildlife; natural water storage**	Mitigation for previous permit/other historic use **N/A**
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found) **Salamanders, frogs, snakes, birds, small mammals**	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) **Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 5, WL 6, WL 13, WL 14, WL 21**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
5	**4**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
6	**6**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
6	**5**

Additional Notes:

Raw Score = Sum of above scores/30 (if uplands, divide by 20)

Current	**With Impact**
0.5666667	0.5

Impact Delta (ID)	
Current - w/Impact	0.066666667

Impact Acres =	3.30

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.220

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 6**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
641	**Herbaceous**	**Direct Impact**	**0.28** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

WL 6 is associated with a canal system and chain of lakes that surrounds the project. WL 6 was historically contiguous with WL 14, however they are now bisected by SR 544. A linear surface water (SW 7) runs through WL 6.

Assessment area description

WL 6 is located in the central portion of the project on the south side of SR 544. Vegetation within the assessment area includes Peruvian primrose willow, saltbush, Carolina willow, sapling red maple, cinnamon fern, torpedograss, soft rush, arrowhead, lizards' tail, and cattails.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Fannie, Lage Henry	**N/A**

Functions	Mitigation for previous permit/other historic use
Provide refuge, cover, and foraging habitat for wildlife; natural water storage	**N/A**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Salamanders, frogs, snakes, birds, small mammals	**Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 6**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
c. **Wildlife access** to and from AA (proximity and barriers).	
d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
5	**0**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
6	**0**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
6	**0**

Additional Notes:

Raw Score = Sum of above scores/30
(if uplands, divide by 20)

Current	**With Impact**
0.5666667	0

Impact Delta (ID)	
Current - w/Impact	0.566666667

Impact Acres =	0.28

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.159

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes:

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR 544 PD&E Study		**WL 12**

FLUCCs code	Further classification (optional)	Impact Type	Assessment Area Size
653	**Herbaceous**	**Direct Impact**	**0.43** Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Peace River Basin	**Class III**	

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

WL 12 is isolated from other wetland systems. It was historically part of a larger wetland system associated with the chain of lakes that surrounds the project, but is now surrounded by development.

Assessment area description

WL 12 is located in the central portion of the project on the north side of SR 544. Vegetation within the assessment area includes soft rush, Peruvian primrose willow, torpedograss, and maidencane.

Significant Nearby Features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Lake Henry	**N/A**

Functions	Mitigation for previous permit/other historic use
Provide refuge, cover, and foraging habitat for wildlife; natural water storage	**N/A**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Salamanders, frogs, snakes, birds, small mammals	**Little blue heron (T), tricolored heron (T), wood stork (T), roseate spoonbill (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

N/A

Additional relevant factors:

Assessment conducted by:	Assessment date(s):

UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART II - IMPACT
Form 62-345.900(2), F.A.C. (See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name:	Application Number:	Assessment Area Name or Number:
SR 544 PD&E Study	**-**	**WL 12**
Impact or Mitigation:	Assessment Conducted by:	Assessment Date:
Impact	**-**	**-**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Enter Notes below (do NOT score each subcategory individually)

.500(6)(a) Location and Landscape Support

a. Quality and quantity **of habitat support** outside of AA.	
b. **Invasive plant species** in proximity to AA**.**	
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d. **Downstream benefits** provided to fish and wildlife.	
e. Adverse impacts to wildlife in AA from **land uses** outside of AA.	
f. **Hydrologic impediments and flow restrictions.**	
g. **Dependency** of downstream habitats on quantity or quality of discharges.	
h. Protection of wetland functions provided by uplands (**upland** AAs only).	

Current	**With Impact**
4	**0**

Additional Notes:

.500(6)(b) Water Environment (n/a for uplands)

a. Appropriateness of **water levels and flows**.	
b. Reliability of **water level indicators**.	
c. Appropriateness of **soil moisture**.	
d. **Soil erosion** or **depositional patterns, flow rates/points of discharge.**	
e. **Fire history** (frequency/severity).	
f. **Appropriate vegetative and/or benthic zonation**.	
g. **Hydrologic stress** on vegetation.	
h. **Use by animal**s with hydrologic requirements.	
i. **Plant community composition** associated with water quality (i.e., plants tolerant of poor WQ).	
j. **Water quality of standing water by observation** (I.e., discoloration, turbidity).	
k. **Water quality data** for the type of community.	
l. Water depth, wave energy, currents, and light penetration.	

Current	**With Impact**
3	**0**

Additional Notes:

.500(6)(c) Community Structure

X Vegetation

_____ Benthic

_____ Both

I. Appropriate/desirable species	
II. Invasive/exotic plant species	
III. Regeneration/recruitment	
IV. Age, size distribution.	
V. Snags, dens, cavity, etc.	
VI. Plants' condition.	
VII. Land management practices.	
VIII. Topographic features (refugia, channels, hummocks).	
IX. Submerged vegetation (only score if present).	
X. Upland assessment area	

Current	**With Impact**
3	**0**

Additional Notes:

Raw Score = Sum of above scores/30
(if uplands, divide by 20)

Current	**With Impact**
0.3333333	0

Impact Delta (ID)	
Current - w/Impact	0.333333333

Impact Acres =	0.43

Functional Loss (FL) [For Impact Assessment Areas]:	
FL = ID x Impact Acres =	0.143

NOTE: If impact is proposed to be mitigated at a mitigation bank that was assessed using UMAM, then the credits required for mitigation is equal to Functional Loss (FL). If impact mitigation is proposed at a mitigation bank that was not assessed using UMAM, then UMAM cannot be used to assess impacts; use the assessment method of the mitigaiton bank.

Additional Notes: