SR 400 (I-4) Project Development and Environment (PD&E) Study
FM No.: 432100-1-22-01

Endangered Species Biological Assessment

Segment 1: from west of CR 532 (Osceola Polk Line Road) to west of SR 528 (Beachline Expressway)

Polk County (16320), Osceola County (92130), Orange County (75280)

September 2016

Stantec
300 Primera Drive
Suite 300
Lake Mary, FL 32746

HNTB Corporation
610 Crescent Executive Court
Suite 400
Lake Mary, FL 32746

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1.0 Summary of Project

The Florida Department of Transportation (FDOT) is conducting an update/reevaluation for the Project Development and Environment (PD&E) studies for the extension of proposed express lanes for State Road 400 (SR 400)/Interstate 4 (I-4). The project limits in the original PD&E studies were:

- West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line, (29.5 miles)
- CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway (13.7 miles), and
- West of SR 528 Beachline Expressway to SR 472 (43 miles).

The corresponding environmental documents associated with these PD&E studies include: Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line [FPN 201210 (1998)] and from CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) [FPN 242526 and 242483 (1999)] and Final Environmental Impact Statement (FEIS) for I-4 from SR 528 (Beachline Expressway) to SR 472 [FPN 242486, 242592 and 242703 (2002)].

The project limits of the current SR 400 (I-4) PD&E reevaluation, herein referred to as I-4 Beyond the Ultimate (BtU) PD&E Reevaluation Study, include a total of approximately 43 miles of roadway sections east and west of the 21-mile, I-4 Ultimate project. The I-4 Ultimate project consists of reconstruction, to include new express lanes, for the section of I-4 which extends from west of SR 435 (Kirkman Road) to east of SR 434, and began construction in early 2015. The current I-4 BtU project has been divided into the following five segments:

- Segment 1: SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway - Osceola County (92130) and Orange County (75280)
- Segment 2: SR 400 (I-4) from West of SR 528 Beachline Expressway to West of SR 435 Kirkman Road - Orange County (75280)
- Segment 3: SR 400 (I-4) from 1 Mile East of SR 434 to East of SR 15-600/US 17-92 (Seminole/Volusia County Line) - Seminole County (77160)
- Segment 4: SR 400 (I-4) from East of SR 15-600/US 17-92 (Seminole/Volusia County Line) to ½ Mile East of SR 472 - Volusia County (79110)
- Segment 5: SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk/Osceola County Line) Polk County (16320)

This Endangered Species Biological Assessment was prepared for Segment 1 of the I-4 BtU PD&E study. The purpose of this report is to update the original PD&E study by documenting any changes that have occurred since the studies conducted for the for the SR 400)/I-4 from West of CR 532 (Osceola/Polk County Line) to West of SR 528 (Beachline Expressway) PD&E study. This includes changes in the current proposed concept being analyzed (the original design concept showed two high occupancy vehicle (HOV) lanes), changes to the PD&E process, and changes in the environmental regulations that have occurred in support of the PD&E reevaluation of the FONSI for SR 400 (I-4) from CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) (FPN 242526 and 242483, December 23, 1999).

This reevaluation includes environmental analysis of the original design concept, which showed six general use lanes (GUL) and four special use lanes (SUL) from CR 532 to southwest of World Drive (6+4), six GUL and two High Occupancy Vehicle (HOV) lanes from southwest of World Drive to northeast of Lake Avenue (6+2) and six GUL and 4 HOV lanes from northeast

of Lake Avenue to SR 528 (Beachline Expressway) (6+4), to the current proposed design which includes six GULs and four express lanes operating under a variable price toll plan (6+4). Other changes being reanalyzed include stormwater management, access plan and interchange configurations.

1.1 Description of Proposed Action

FDOT is proposing to reconstruct and widen I-4 as part of the I-4 BtU concept. This involves the build-out of I-4 to its ultimate condition through Central Florida, including segments in Polk, Osceola, Orange, Seminole and Volusia Counties. The concept design proposes the addition of two new express lanes in each direction, resulting in a total of ten dedicated lanes. The project limits for the segment analyzed in this report are within an approximate 14-mile segment of I-4 which extends from just west of CR 532 (Polk/Osceola County Line) to west of SR 528 (Beachline Expressway), from Milepost (MP) 31.607 to MP 32.022 in Polk County, MP 0.000 to MP 7.885 in Osceola County and from MP 0.000 to 5.650 in Orange County (herein referred to as I-4, Segment 1) and as shown in **Figure 1.1.** Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 1. The study area in this section from west of CR 532 to west of SR 528 includes the following interchanges:

Osceola County

- I-4 and CR 532 (Osceola Polk Line Road)
- I-4 and SR 429 (Daniel Webster Western Beltway)
- I-4 and World Drive
- I-4 and SR 417 (Southern Connector)
- I-4 and US 192/SR 530 (W. Irlo Bronson Memorial Highway)
- I-4 and W. Osceola Parkway

Orange County

- I-4 and SR 536 (Epcot Center/World Center Drive)
- I-4 and SR 535 (S. Apopka Vineland Road)
- I-4 and Daryl Carter Parkway*
- I-4 and Central Florida Parkway

*Formerly Fenton Street/Wildwood Avenue (previously identified as Lake Avenue in the December 1999 FONSI). Daryl Carter Parkway is currently an existing overpass; alternative evaluations include a proposed full-access interchange.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally speaking, the typical section will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with 10-foot inside and 12-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders in each direction. A barrier wall between the adjacent shoulders will separate the express lanes from the general use lanes. Twelve-foot auxiliary lanes will be provided in some areas in both the eastbound and westbound directions. The typical section includes a 44-foot rail envelope in the median within a minimum 300 foot right of way. **Figure 1.2** illustrates the proposed mainline typical section for I-4 Segment 1.

1.2 Purpose and Need

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway in order to improve traffic operations, enhance connectivity and improve mobility by providing travel choices to the motoring public. I-4 is an east-west limited access freeway which links the west and east coasts of Florida, from I-275 in Tampa to I-95 in Daytona Beach. I-4 spans across six counties in Central Florida, traversing through many cities including Lakeland, Celebration, Orlando, Altamonte Springs, Sanford and DeLand. I-4 is a critical component of Florida's Strategic Intermodal System (SIS) which links seaports, rail, airports and other intermodal facilities. This aspect of I-4's significance is evidenced through connectivity provided by major junctions with I-275, I-75, SR 429 (Daniel Webster Western Beltway), SR 417 (Southern Connector/Central Florida Greenway/Seminole Expressway), SR 528 (Martin Andersen Beachline Expressway), SR 91 (Florida's Turnpike), SR 408 (Spessard Lindsay Holland East-West Expressway) and I-95.

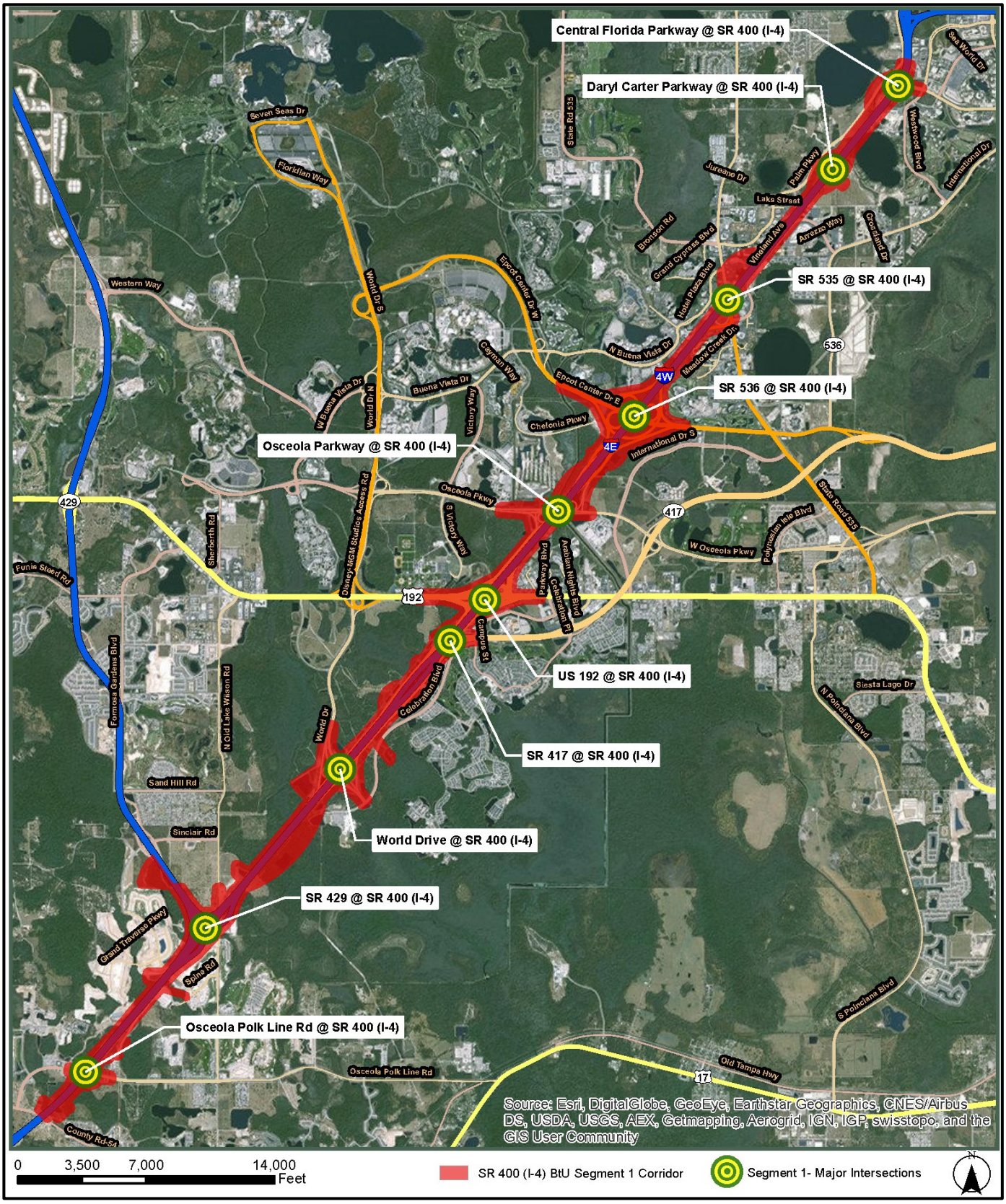
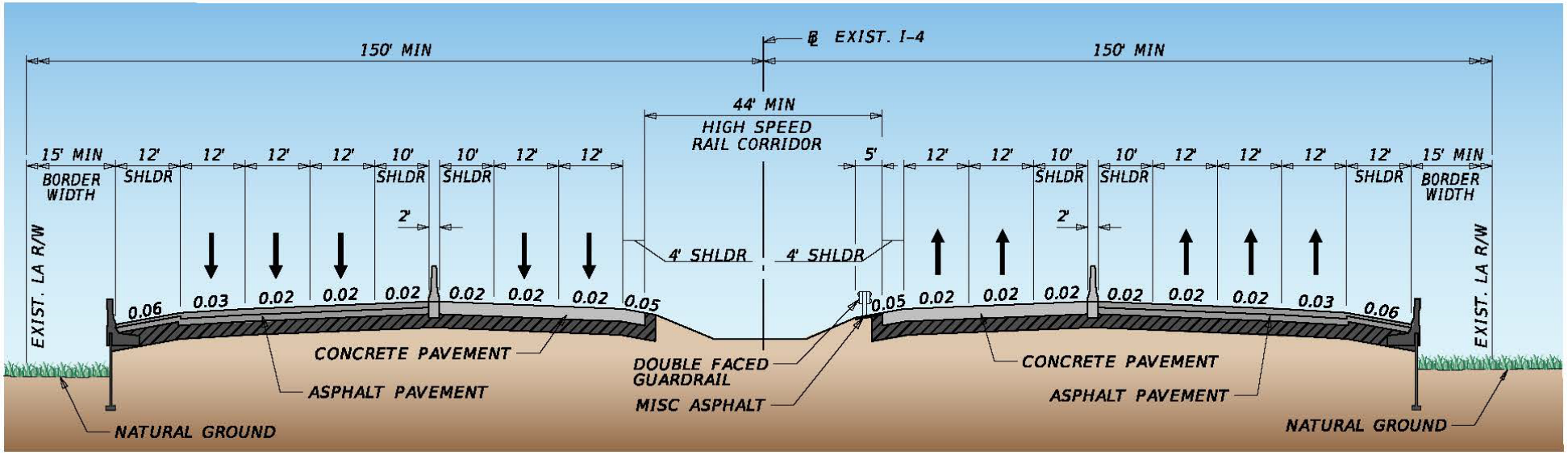


Figure 1.1 – Project Location Map



SR 400 (I-4) TYPICAL SECTION
Station 604 + 50.00 to Station 1345 + 48.48
MP 31.607 to MP 32.022 (Polk County)
MP 0.000 to MP 7.885 (Osceola County)
MP 0.000 to MP 5.650 (Orange County)

Figure 1.2 – SR 400 (I -4) Segment 1 Proposed Typical Section (6+4 with rail corridor)

I-4 serves as the primary corridor in the movement of people and freight between major population, employment and activity centers in the Central Florida region. When the entire Interstate was fully opened in the early 1960's, it was designed to serve intrastate and interstate travel by providing a critical link between the east and west coasts of Central Florida. Although this role continues to be a crucial transportation function of I-4, the highway also serves large volumes of local and commuter traffic with shorter trip distances. Today, the highway serves as the primary link between hotel/resort complexes and tourist attractions such as Walt Disney World, Universal Studios, Sea World, the International Drive Resort Area and downtown Orlando. Since I-4 is the only north-south limited access facility that is centrally located between the predominant employment centers and the major suburbs to the north, it has become the primary commuting corridor in the Central Florida metropolitan area.

Growth in Central Florida over the past decades has made it difficult for the transportation system to accommodate travel demand. Traffic congestion and crash incidents have resulted in major delays on the Interstate as well as other arterials surrounding the corridor. Increased congestion levels are experienced outside of the typical morning and afternoon rush-hour periods, affecting mobility levels for more hours of the day and impacting other non-commuter/non-weekday travel. The congestion on I-4 is further evidenced by the less than desirable levels of service on the Interstate as well as the crossroads.

Projections of future population and employment in the region indicate that travel demand will continue to increase well into the future. The ability to accommodate the new travel patterns resulting from growth must be provided to sustain the region's economy. Without the improvements, extremely congested conditions are expected to occur for extended periods of time in both the morning and evening peak periods. Due to these congested conditions, user travel times will continue to increase, the movement of goods through the urban area will be slower, and the deliveries of goods within the urban area will be forced to other times throughout the day. The need for improvements to I-4 is illustrated by the important transportation roles I-4 serves to the Central Florida region and the State of Florida. If no improvements are made to the Interstate, a loss in mobility for the area's residents, visitors, and commuters can be expected, resulting in a severe threat to the continued viability of the economy and the quality of life.

This reevaluation involves revising the original design concept showing 6 GUL + 4 SUL from CR 532 to southwest of World Drive , 6 GUL + 2 HOV lanes from southwest of World Drive to northeast of Lake Avenue and 6 GUL + 4 HOV lanes from northeast of Lake Avenue to SR 528, as recommended in the FONSI for SR 400 (I-4) from CR 532 (Polk/Osceola County Line to West of SR 528 (Beachline Expressway) (December 23, 1999), to the current proposed design of four (4) Express Lanes. The Express Lanes are tolled lanes and will extend the full length of the project. The access to/from the tolled lanes will be evaluated as part of this effort to determine if changes are needed from the previously approved concept for access to/from the SUL/HOV Lanes. The original I-4 PD&E Studies involved physical separation between the general use lanes and the SUL/HOV lanes on I -4, with demand management in the HOV lanes. The original demand management strategy was to control the use of the HOV lanes by requiring a minimum number of occupants per vehicle to maintain an acceptable level of service (Level of Service D).

This reevaluation also addresses revising the demand management tool to convert the HOV lanes to tolled express lanes. The express lanes will be separated from the general use travel lanes by two shoulders with a barrier wall between the shoulders. A variable pricing tolling plan is proposed for the express lanes. The tolls will vary by time of day and day of week to maintain acceptable levels of service in the express lanes. The tolls will be collected electronically through existing E-Pass, SunPass and other systems currently in place in the Orlando metropolitan area. The conversion to Express Lanes will maintain the same right of way limits as documented previously and will not change the impacts to the social, natural

or physical environment. An update to the Systems Access Modification Report (SAMR) prepared in January, 2013 is being completed in conjunction with this effort.

In order for this project to proceed, potential environmental impacts must be identified, including impacts to wildlife and natural habitat. This report has been prepared following guidelines presented in the Project Development and Environment (PD&E) Manual, Part 2, Chapter 27 (FDOT, 10/1/91) to identify wildlife species of known or potential occurrence and natural habitat types along the project corridor and to document potential project-related impacts. Particular attention has been given to species that have been provided regulatory protection such as federal or state listed endangered, threatened, or otherwise sensitive species, as well as suitable habitat for those species.

The purpose of this Endangered Species Biological Assessment is to present the findings of the studies conducted for this project, describe the results of the evaluation and document the justification for the recommended improvements. This document describes the potential occurrence of natural habitats and wildlife within the proposed project corridor, and the likelihood of potential impacts from the project to listed species and their habitats. The study area for the project corridor included all potential pond sites, the existing right-of-way of I-4, and a buffer of 500 feet beyond the boundary of the current right-of-way (As shown on the Land Use and Habitat Coverage map, **Figure B** in **Appendix A**).

2.0 Methodology

2.1 Literature Search

Prior to the initiation of fieldwork, a background records and literature search was conducted to identify federal and state protected plant and animal species of known or potential occurrence in Polk, Osceola, and Orange Counties, FL. The key information source for this effort was a compilation of all the observation and distribution records published by the Florida Natural Areas Inventory (FNAI), the Florida Committee on Rare and Endangered Plants and Animals (FCREPA), the Florida Fish and Wildlife Conservation Commission (FFWCC), the U.S. Fish and Wildlife Service (USFWS), and information gathered from relevant scientific literature. A database for this report can be found in the project files and was last updated in April 2015.

Appendix B provides a list of animal (See **Table 1**) and plant (See **Table 2**) species of known or potential occurrence within Polk, Osceola, and Orange County, and a summary of the habitat type(s) typically utilized by each. Fifty one (51) species of animals and 48 species of plants have been identified as potentially occurring in the study area counties, though suitable habitat may not be available for all of them along the project corridor. Of these, 11 are federally listed animals, 11 are federally listed plants, 26 are state listed animals, and 48 are state listed plants.

2.2 Agency Coordination

Information regarding the I-4 Beyond the Ultimate PD&E project was provided to John Wrublik of the USFWS South Florida Ecological Services Office and to the FFWCC Office of Conservation Planning Services. Potentially impacted species and proposed wildlife survey methods were included within the information provided, and are included in **Appendix D**.

2.3 Field Survey

The project area includes approximately 14.08 linear miles of right-of-way and 89 proposed stormwater ponds. Ground-based biological surveys were conducted in April and May of 2013, and March, April, and June 2014, and April, May, and June 2015 to identify natural habitat types, anthropogenic land use types and to investigate wildlife (including listed

species) occurrence along the project corridor. Habitat and land use types were categorized according to the Florida Land Use, Cover, and Forms Classification System (FLUCFCS) (FDOT, 1999). Results of the habitat and land use evaluation, including descriptions of types observed along the project corridor, are provided in Section 3.1.2.

Wildlife surveys were conducted during daylight hours and followed species specific survey guidelines as outlined by FFWCC and USFWS. During the field visits, all observations of listed plant and wildlife species or indicators of their presence (i.e., remnants, tracks, burrows, calls, scat) within the study corridor were noted by staff biologists. General wildlife observations were also documented during the field visits.

In order to ensure a thorough assessment of potential impacts to state and federal listed plant species, project team scientists conducted the field surveys within all suitable habitats in the proposed widening area and proposed stormwater pond sites. Prior to onset of the surveys, typical habitat and other relevant life history information were gathered for each of the listed plant species of potential occurrence along the project corridor. Aerial photographic maps and ground-truthing were used to delineate the different habitat types present along the corridor. Site surveys generally consisted of meandering transects that covered at least 25% of each site. In areas where listed plant species were discovered, the location was recorded using a sub-meter global positioning system (GPS) unit, for later depiction on aerial photographic maps. Section 3.2 provides a summary of wildlife, including listed species, of known or potential occurrence.

2.3.1 Scrub-Jay Survey

A scrub-jay (*Aphelocoma coerulescens*) survey was conducted during the original PD&E Study (Wildlife and Habitat Assessment Report completed in January 1998) within this alignment corridor. Six stations were sampled for the presence of scrub-jays based upon the availability of scrub habitat at that time. Field investigations conducted during this study indicated that much of these areas have been altered or developed since the previous study. Typically, a standard survey is conducted in accordance with the techniques outlined by the FFWCC (Florida Scrub-Jay Survey Guidelines, updated 08/24/2007). The survey consists of the playback of recorded scrub-jay vocalizations throughout all potential habitats. This includes the “classic” xeric oak scrub, along with scrubby pine flatwoods, sand pine scrub, and any other type of habitat containing scrub oaks. Due to the development since the previous surveys were conducted, no potential habitat was identified in any of these locations, or in any other area within this segment of the project. As such, no formal scrub-jay survey was conducted.

2.3.2 Gopher Tortoise Survey

A gopher tortoise (*Gopherus polyphemus*) *survey* was conducted in April, May, and June of 2013 and March, April, and June of 2014, and April, May, and June 2015 in accordance with the FFWCC technical publication titled Gopher Tortoise Permitting Guidelines, April 2008, revised February 2015. Habitats that were suspected of supporting tortoise populations because of the nature of the vegetation, hydrology and soils, were selected for the survey, as well as cleared areas within the right-of-way and along the right-of-way fence line with suitable soil conditions. The activity classification and GPS location of all burrows within the I-4 right-of-way and potential pond sites were collected for post-processing and mapping. Burrows found during the survey were classified as Potentially Occupied (PO) or Abandoned (AB). Those classified as PO were further described as either Active (POA) or Inactive (POI): Active burrows are in good repair, with the classic half-moon shaped entrance, and appear to be in use by a tortoise. They have obvious tortoise tracks or shell scraping signs on the burrow floor or the mound, often contain loose soil on the burrow floor, and may contain recently excavated soil. Inactive burrows are in good repair, but do not show recent tortoise use. They have the classic half-moon shaped entrance, but the soil on the burrow floor is usually hard packed, as is the burrow mound. There are no tortoise tracks or shell scraping signs, no recently excavated soil, and the burrow mound may have vegetation growing on it or be

partially covered with fallen leaves. The POI classification of burrows has the potential to change due to seasonal dormancy, inactivity due to weather conditions, and the affinity of the gopher tortoise to utilize more than one burrow. Activity classification can and often does change from survey to survey. Both POI and AB burrows can serve as a refuge for burrow commensals, including gopher frogs, Florida mice, and indigo snakes, and should be considered in the same manner as active burrows. The location of each burrow was depicted on an aerial to indicate its location (See Species Location Map, **Figure C, Appendix A**). Surveys methods were developed to cover 100% of the suitable habitat within the right-of-way and 50% of suitable habitat within each proposed pond site.

2.3.3 Sand Skink Survey

Because the project area occurs within the USFWS Consultation Area for sand skinks (*Neoseps reynoldsi*) and blue-tailed mole skinks (*Eumeces egregius lividus*), there is a higher likelihood of skink occupancy within suitable habitats. No previous evidence of skinks was noted in the original PD&E surveys conducted in December 1996 – December 1997, nor was a species-specific survey performed. However, guidance from USFWS on the skink now classifies areas with skink soils as potential skink habitat, whether or not natural xeric scrub habitat occurs over the soils. Areas over skink soils but 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, all present potential opportunities for skink habitat. For this project, the right-of-way and potential pond sites were surveyed for all potential listed wildlife species including skinks. This pedestrian survey was conducted to identify suitable habitat and included searching for skink trails in areas of open sand. Skink soils were also mapped for the project corridor to identify the areas of coverage overlap with proposed roadway and pond site improvements. Previous coordination with USFWS staff (see Agency Coordination in **Appendix D**) indicated that a skink cover board survey would need to be performed over all areas of soil coverage within the project footprint in order to make a suitable determination on their involvement. Areas could be excluded from survey coverage if field investigations by a state-certified soil scientist indicated that existing soils either were not present as mapped or no longer exhibited the appropriate characteristics of the skink soils. Prior to the initiation of the cover board survey, a Florida Association of Environmental Soil Scientists certified soil scientist conducted field investigations over the project right-of-way in order to determine the presence/absence of mapped skink soils. Based upon the results of this study, the mapped soils were amended, and cover board surveys were subsequently conducted over any remaining areas that were determined to still contain mapped skink soils (See Sand Skink Soil Investigation Report, **Appendix E)**. The cover board survey was conducted according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012) during March, April, and May 2014. Subsequent design changes after the completion of this survey necessitated a supplemental survey over several new areas in 2015. The results of these surveys are included in the Sand Skink Survey Report in **Appendix E**.

2.3.4 Listed Plant Survey

The original PD&E report indicated that two protected plant species (scrub lupine (*Lupinus aridorum*) and scrub pinweed (*Lechea cernua*)) were identified within the project corridor. A survey for these as well as other listed plant species was performed during May 2013, April 2014, and April 2015 to coincide with the flowering period of most Florida plants. The survey was conducted using pedestrian transects that covered 100% of the existing right-of-way and at least 25% of each pond site location. Any listed plants or obvious indicators of the possible presence of listed plants were noted. In the event that listed plants were encountered during field surveys, their position was marked using sub-meter GPS technology. Species observational data was collected in field books, describing the condition, density, and areal coverage. Any recorded data related to listed plant species was projected on an aerial map.

3.0 Results

3.1 Natural Habitat and Human Land Use Assessment

3.1.1 Soils

According to the Soil Survey of Polk County, Florida (1990), the Soil Survey of Osceola County, Florida (1979), and the Soil Survey of Orange County, Florida (1989), the proposed Project (I-4 with 500 ft. buffer) area consists of six mapped soil types in Polk County, seventeen mapped soil types in Osceola County, and sixteen mapped soil types in Orange County (See NRCS Soils Map in **Appendix A**). There is some overlap of the same identification name of several soils for the counties, but they are described differently and have different numbers by county. The soil types in Polk County are Candler sand, 0 to 5 percent slopes (3), Samsula muck (13), Tavares fine sand, 0 to 5 percent slopes (15), Smyrna and Myakka fine sands (17), Placid and Myakka fine sands, depressional (25), and Basinger mucky fine sand, depressional (36).

The soil types in Osceola County are Arents, 0 to 5 percent slopes (4), Basinger fine sand (5), Basinger fine sand, depressional (6), Candler sand, 0 to 5 percent slopes (7), Candler sand, 5 to 12 percent slopes (8), Hontoon muck (15), Immokalee fine sand (16), Myakka fine sand (22), Ona fine sand (27), Pits (31), Placid fine sand (33), Pomello fine sand, 0 to 5 percent slopes (34), Pompano fine sand, depressional (37), Riviera fine sand (38), Samsula muck (40), Smyrna fine sand (42), and Tavares fine sand, 0 to 5 percent slopes (44).

The soil types in Orange County are Archbold fine sand (2), Basinger fine sand, depressional (3), Candler fine sand, 0 to 5 percent slopes (4), Immokalee fine sand (20), Ona fine sand (26), Pits (33), Pomello fine sand, 0 to 5 percent slopes (34), St. Johns fine sand (37), St. Lucie fine sand (38), Sanibel muck (42), Seffner fine sand (43), Smyrna fine sand (44), Tavares fine sand, 0 to 5 percent slopes (46), Tavares-Millhopper fine sands, 0 to 5 percent slopes (47), Urban land (50), and Zolfo fine sand (54).

A brief description of each of the mapped soil types occurring within the project site is provided below.

Polk County:

Candler sand, 0 to 5 percent slopes (3) – Candler sand, 0 to 5 percent slopes is an excessively drained, nearly level to gently sloping soil found on the uplands or knolls in the flatwoods. Typically, the surface layer is dark brown sand about 6 inches thick. The subsurface layer is sand to a depth of about 63 inches that is brownish yellow that grades to yellow. The next layer is yellow sand that has very thin, strong brown lamellae to a depth of 80 inches or greater.

The water table in this soil is typically 80 inches or more below the surface. The natural vegetation consists of turkey oak, post oak, live oak and slash pine and other pines. The understory consists of sparse indiangrass, pineland threeawn, hairy panicum, and annual forbs.

Samsula muck (13) – Samsula muck is a very poorly drained, nearly level, organic soil found in freshwater marshes and swamps. Typically, the surface layer is black to dark reddish brown muck about 31 inches thick. The underlying material is sand to a depth of 80 inches or more. It is black in the upper part and dark grayish brown in the lower part.

The water table is at or above the surface level except during extended dry periods. The natural vegetation consists mainly of loblolly bay, cypress, red maple, blackgum, and other water-tolerant trees and pine trees. The ground cover is greenbrier, fern, and other aquatic plants, which may dominate many areas.

Tavares fine sand, 0 to 5 percent slopes (15) – Tavares fine sand, 0 to 5 percent slopes is a moderately well drained, nearly level to gently sloping soil found on broad uplands and knolls in the flatwoods. Typically, the surface layer is dark grayish brown fine sand about 8 inches thick. The underlying material to a depth of at least 80 inches is light yellowish brown fine sand that grades to very pale brown.

The water table is at a depth of between 40 and 80 inches during the seasonally high period of 6 months or more. It recedes to a depth of greater than 80 inches during extended dry periods. The natural vegetation consists mainly of slash pine, longleaf pine, turkey oak, bluejack oak, and post oak. The understory includes creeping bluestem, lopsided indiangrass, hairy panicums, low panicums, purple lovegrass, and pineland threeawn.

Smyrna and Myakka fine sands (17) – Smyrna and Myakka fine sands are poorly drained, nearly level soils found on broad areas in the flatwoods. Typically, the surface layer of the Smyrna soil is black fine sand about 4 inches thick. The subsurface layer is gray fine sand to a depth of about 12 inches. The subsoil is dark brown and brown fine sand to a depth of about 25 inches. Below that is very pale brown fine sand to a depth of about 42 inches and very dark brown fine sand to a depth of about 48 inches. The underlying material is brown and light brownish gray fine sand to a depth of at least 80 inches. Typically, the surface layer of the Myakka soil is very dark gray fine sand about 7 inches thick. The subsurface layer is gray fine sand to a depth of about 25 inches. The subsoil to a depth of about 36 inches is fine sand. It is black in the upper part and dark brown in the lower part. The underlying material is yellowish brown fine sand to a depth of at least 80 inches.

The water table is at a depth within 12 inches of the surface during the seasonally high period of between 1 and 4 months in most years. The natural vegetation on Smyrna and Myakka soils is mostly longleaf pine and slash pine. The understory includes saw palmetto, running oak, gallberry, wax myrtle, huckleberry, pineland threeawn, and scattered fetterbush lyonia. A few areas around large lakes are in oak hammocks.

Placid and Myakka fine sands, depressional (25) – Placid and Myakka fine sands, depressional are very poorly drained, nearly level soils found in depressions, primarily in the flatwoods. Typically, the surface layer of the Placid soil is black fine sand about 18 inches thick. The underlying material is dark gray fine sand to a depth of about 28 inches, light gray fine sand to a depth of about 60 inches, and grayish brown fine sand to a depth of at least 80 inches. Typically, the surface layer of the Myakka soil is very dark gray fine sand about 3 inches thick. The subsurface layer is grayish brown fine sand to a depth of about 25 inches. The subsoil is black fine sand to a depth of about 35 inches. The underlying material is dark gray fine sand to a depth of at least 80 inches.

The water table is at or above the surface of these soils for 6 months or more for both of these soils. The natural vegetation consists mostly of bay, scattered cypress, blackgum, St. John's wort, maidencane, and other water-tolerant plants.

Basinger mucky fine sand, depressional (36) – Basinger mucky fine sand, depressional is a very poorly drained, nearly level soil found in wet depressions in the flatwoods. Typically, this soil has a very dark gray mucky fine sand surface layer about 7 inches thick. The subsurface layer is light gray fine sand to a depth of about 35 inches. The subsoil is a mixture of grayish brown and very dark grayish brown fine sand to a depth of about 45 inches. The underlying material is brown fine sand to a depth of at least 80 inches.

The water table is at or above the surface of these soils for 6 months or more. The natural vegetation consists of broomsedge bluestem, chalky bluestem, maidencane, cutgrass, St. John's wort, pineland threeawn, cypress, and other water-tolerant trees.

Osceola County:

Arents, 0 to 5 percent slopes (4) – Arents soils consist of material dug from several areas that have different kinds of soil. It is fill material, which is the result of earth moving operations and is used to fill, cover, or level terrain. Typically, Arents soils have no orderly sequence of layers because they are the combination of many other subsoils. The water table of these soils is highly variable because the high water table depends on the amount and type of fill material and presence of artificial drainage. In general, the water table can be at a depth of 20 to 60 inches in wetter months but can be much deeper below the surface during extended dry periods. Arents soil is mainly used for urban development.

Basinger fine sand (5) – Basinger fine sand is a poorly drained, nearly level soil found in low, broad flats and sloughs in the flatwoods. The underlying layers are sand to a depth of 80 inches. The upper subsurface layer is light gray fine sand that contains dark brown and light gray mottles to a depth of 19 inches; the next 16 inches is dark brown fine sand that contains dark grayish brown mottles and black and dark reddish brown fragments of weakly cemented fine sand. The upper part of the substratum is light gray fine sand to a depth of 58 inches, and the lower part is brown fine sand with brown and very dark grayish brown mottles to a depth of about 80 inches.

The water table is seasonally at its highest within 10 inches of the surface for 2 to 6 months a year and between 10 to 30 inches of the surface during the dry season. In extended dry periods, the water table can drop below 40 inches from the surface. The natural vegetation consists mostly of scattered longleaf pine, saw palmetto, wax myrtle, and grasses such as maidencane, pineland threeawn, chalky bluestem, Florida threeawn, low panicum, and sand cordgrass.

Basinger fine sand, depressional (6) – Basinger fine sand, depressional is a poorly drained, nearly level sandy soil found mainly in depressions, sloughs, and poorly defined drainage ways in the flatwoods. Typically, the surface layer is black fine sand at about 7 inches thick. The underlying layers are sand to a depth of 80 inches. The upper subsurface layer is light gray fine sand that contains dark brown and light gray mottles to a depth of 19 inches; the next 16 inches is dark brown fine sand that contains dark grayish brown mottles and black and dark reddish brown fragments of weakly cemented fine sand. The upper part of the substratum is light gray fine sand to a depth of 58 inches, and the lower part is brown fine sand with brown and very dark grayish brown mottles to a depth of about 80 inches.

The water table is above the surface for 6 to 12 months a year depending on available rainfall. Vegetation in this soil type is typically dominated by water-tolerant grasses and small woody shrubs, but can also be dominated by trees in swamp systems. The natural vegetation consists of cypress, blackgum, tupelo gum, red bay, loblolly bay, red maple, sawgrass, maidencane, cutgrass, pickerelweed, St. John's wort, sand cordgrass, low panicum, stiff paspalum, and species of nut rushes.

Candler sand, 0 to 5 percent slopes (7) – Candler sand, 0 to 5 percent slopes is an excessively drained, nearly level to gently sloping soil found on the uplands. Typically, the surface layer is dark grayish brown sand about 3 inches thick. The subsurface layer is sand to a depth of about 62 inches. In sequence from the top of this layer, the upper three inches is yellowish brown, the next 11 inches is brownish yellow, the next 18 inches is light yellowish brown, and the next 27 inches is brownish yellow. The lowest layer is brownish yellow sand containing lamellae of reddish yellow loamy sand between 1/16 and 1/4 inch thick and 2 to 6 inches long to a depth of 80 inches or greater.

The water table in this soil is at its highest at 72 inches below the surface, and commonly recedes below 80 inches. The natural vegetation is dominated by turkey oak and longleaf pine. The understory consists of creeping bluestem, indiangrass, grassleaf goldaster, pineland threeawn, gopher apple, prickly pear, and a variety of legumes.

Candler sand, 5 to 12 percent slopes (8) – Candler sand, 5 to 12 percent slopes is an excessively drained, sloping to strongly sloping soil found on the uplands. Typically, the surface layer is dark grayish brown sand about 7 inches thick. It is underlain by 52 inches of sand. The upper 21 inches is pale brown, and the lower 31 inches is yellow and contains many uncoated white sand grains. Below a depth of 59 inches and extending to a depth of 80 inches or more is very pale brown sand that contains light gray with white mottles and lamellae of brownish yellow sandy loam 1/16 to 1/4 inch thick and 1 to 4 inches long.

The water table in this soil is at its highest at 72 inches below the surface, and commonly recedes below 80 inches. The natural vegetation is dominated by turkey oak and longleaf pine. The understory consists of creeping bluestem, indiangrass, grassleaf goldaster, pineland threeawn, gopher apple, prickly pear, and a variety of legumes.

Hontoon muck (15) – Hontoon muck is a very poorly drained, nearly level organic soil found in depressional areas, freshwater marshes and swamps. Typically, the surface layer is dark reddish brown muck about 5 inches thick. The next layer is black muck about 24 inches thick and underlain by dark reddish brown muck to a depth of 70 inches or more.

The natural water table is above the surface or within 10 inches of it except during extended dry periods. The natural vegetation consists mostly of sawgrass, maidencane, cattails, giant cutgrass, arrowheads, a variety of sedges. Some areas have thick stands of willow, elderberry, and buttonbush, and other areas have mixed stands of cypress, red maple, loblolly bay, black tupelo, and sweetgum with a ground cover of greenbriers and ferns.

Immokalee fine sand (16) – Immokalee fine sand is a poorly drained, nearly level sandy soil found in broad flatwoods. Typically, the surface layer of this soil is very dark gray fine sand about 7 inches thick. The fine sand subsurface layer is 30 inches thick. The upper 6 inches is light gray, and the lower 24 inches is white and has faint brown mottles. The subsoil is 10 inches thick and consists of fine sand weakly cemented by organic matter. The upper 4 inches is black and has very dark brown and grayish brown mottles, and the lower 6 inches is dark reddish brown and has reddish yellow and black mottles. The next layer is 18 inches of dark brown fine sand that has reddish yellow and dark brown mottles. Below this is dark grayish brown fine sand which extends to a depth of 80 inches or more. This layer contains black and very dark grayish brown mottles.

The water table is within 10 inches of the surface for 2 months of the year and recedes to a depth of 10 to 40 inches for 8 months in most years, and can drop below 40 inches during extended dry periods. The natural vegetation is slash pine and longleaf pine. The understory is saw palmetto, running oak, inkberry, fetterbush, creeping bluestem, lopsided indiangrass, pineland threeawn, switch grass, and several panicum species.

Myakka fine sand (22) – Myakka fine sand is a poorly drained, nearly level sandy soil found in broad areas in the flatwoods. Typically, the surface layer of this soil is very dark gray fine sand about 7 inches thick. The subsurface layer is light gray fine sand about 20 inches thick. It has very dark grayish brown and brown streaks along root channels. The subsoil is fine sand that is weakly cemented with organic matter. It is black in the upper 6 inches and dark reddish brown and very dark gray in the lower 4 inches. Next is a 6 inch layer of dark yellowish brown fine sand that has dark reddish brown stains along root channels. The next 27 inches is light yellowish brown fine sand. It is underlain by a layer of weakly cemented, dark reddish brown fine sand that extends to a depth of 80 inches or more.

The water table is at a depth of less than 10 inches for 1 to 4 months in most years and a depth of more than 40 inches during extended dry periods. The natural vegetation consists of longleaf pine and slash pine. The understory includes saw

palmetto, inkberry, fetterbush, running oak, creeping bluestem, chalky bluestem, lopsided indiangrass, pineland threeawn, switch grass, and several species of panicums.

Ona fine sand (27) – Ona fine sand is a poorly drained, nearly level soil found in broad, flat area in the flatwoods between swamps and marshes or in long, narrow bands bordering depressions and drainage ways. Typically, the surface layer is black fine sand about 6 inches thick. The subsoil is dark reddish brown, weakly cemented fine sand about 9 inches thick. Next is about 3 inches of dark brown fine sand with brown and pale brown mottles. The substratum is fine sand to a depth 80 inches or more. The upper 9 inches is pale brown and has brown, dark brown, light gray, and brownish yellow mottles; the next 15 inches is gray and has yellowish brown, brownish yellow, gray and light gray mottles; and the lower 38 inches is grayish brown and has brownish yellow and light gray mottles.

The water table is within 10 inches of the surface for 1 to 2 months a year and at a depth of between 10 and 40 inches for periods of 4 to 6 months during most years. The natural vegetation consists of longleaf pine and slash pine. The understory includes saw palmetto, inkberry, fetterbush, running oak, creeping bluestem, chalky bluestem, lopsided indiangrass, pineland threeawn, switch grass, and several species of panicum.

Pits (31) – Pits are areas that have been excavated, primarily for use in road, levee, or foundations. Pits (also called borrow-pits) can be shallow or fairly deep and may be seasonally ponded at the bottom or hold water year round.

Placid fine sand (32) – Placid fine sand is a very poorly drained, nearly level soil found in low, wet depressions and swamps in the flatwoods. Typically, the surface layer is fine sand about 24 inches thick. The upper 14 inches is black and contains pockets of light gray, and the lower 10 inches is very dark gray and also contains pockets of light gray. The underlying layer is fine sand to a depth of 80 inches or more. Between depth of 24 and 36 inches, it is light brownish gray and has mottles and stains of dark grayish brown. Between depths of 36 and 80 inches, it is light gray and has mottles of gray and brown in the upper 14 inches.

The water table is at or above the surface for 6 to 9 months or more during most years. The natural vegetation consists mainly of maidencane, cordgrass, pickerelweed, giant cutgrass, wax myrtle, sedges, and rushes. Some areas contain scattered cypress, bay, tupelo, and cabbage palm.

Pomello fine sand, 0 to 5 percent slopes (34) – Pomello fine sand, 0 to 5 percent slopes is a moderately well drained, nearly level to gently sloping soil found in transitional areas between high sand ridges and the flatwoods and on slight knolls and low ridges throughout the flatwoods. Typically, the surface layer is gray fine sand about 4 inches thick. The subsurface layer is fine sand about 43 inches thick. The upper 11 inches is gray, and the lower 32 inches is white and has gray and dark gray mottles. The subsoil is fine sand that is weakly cemented with organic matter; it extends between depths of 47 and 58 inches. The upper 5 inches is black, the lower 6 inches is dark reddish brown and has black, reddish brown, very dark gray, and dark reddish gray mottles. The next layer is brown fine sand about 7 inches thick. It is underlain by grayish brown fine sand that extends to a depth of 80 inches or more.

The water table is at a depth of between 24 and 40 inches for periods of about 1 to 4 months a year during normal wet seasons. During dry seasons, the water table is at a depth of about 40 to 60 inches below the surface. The natural vegetation consists of scattered sand pine, longleaf pine, and slash pine. In many places, sand live oaks can form dense thickets. The understory includes saw palmetto, running oak, pineland threeawn, creeping bluestem, lopsided indiangrass, and low panicum.

Pompano fine sand, depressional (37) – Pompano fine sand, depressional is a poorly drained, nearly level soil found in depressions and drainage ways. Typically, the surface layer is fine sand about 11 inches thick. It is black in the upper 5 inches and dark gray in the lower 6 inches. Below this layer to a depth of 30 inches is light gray fine sand, and to a depth of 80 inches or more is grayish brown fine sand.

The water table is at or above the surface level for 6 to 12 months during most years. Vegetation in this soil type is typically dominated by water-tolerant grasses and small woody shrubs, but can also be dominated by trees in swamp systems. The natural vegetation consists of cypress, blackgum, tupelo gum, red bay, loblolly bay, red maple, sawgrass, maidencane, cutgrass, pickerelweed, St. John's wort, sand cordgrass, low panicum, stiff paspalum, and species of nut rushes.

Riviera fine sand (38) – Riviera fine sand is a poorly drained, nearly level soil found on broad, low flats. Typically, the surface layer is about 6 inches thick consisting of black fine sand. The subsurface layer is 18 inches of white fine sand and has grayish brown and strong brown mottles. The subsoil extends between depths of 24 and 49 inches. The upper 14 inches is very dark grayish brown sandy clay loam that has dark brown and strong brown mottles and tongues of white fine sand extending into it from the layer above, and the lower 11 inches is very dark grayish brown sandy loam that has very dark gray mottles. The substratum, which extends to a depth of 80 inches or more, is dark gray loamy sand that contains pockets of sandy loam and sandy clay loam.

The water table is within 10 inches of the surface for 2 to 4 months a year and at a depth of between 10 and 30 inches the rest of the year. The natural vegetation consists mostly of a dense stand of cabbage palms. In some areas there are scattered pine trees. The understory is relatively open with sparse ground cover including saw palmetto, American beautyberry, inkberry, creeping bluestem, pineland threeawn, low panicum, and maidencane in more open areas.

Samsula muck (40) – Samsula muck is a very poorly drained, nearly level, organic soil found in freshwater marshes and swamps. Typically, the surface layer is muck about 22 inches thick. The upper 8 inches is dark reddish brown, and the lower 14 inches is black. Beneath the muck is 17 inches of black fine sand that contains light gray lenses of fine sand. Below this layer is grayish brown fine sand that is mottled with dark grayish brown and that extends to a depth of 65 inches or more.

The water table is at or above the surface level except during extended dry periods. The natural vegetation consists mainly of sawgrass, maidencane, cattails, giant cutgrass, arrowheads, and a variety of sedges. In some places there are thick stands of willow, elderberry, and buttonbush. In other places there may be mixed stands of cypress, red maple, loblolly bay, black tupelo, and sweetgum with a ground cover of greenbriers and ferns.

Smyrna fine sand (42) – Smyrna fine sand is a poorly drained, nearly level soil found in broad flat areas in the flatwoods. Typically, the surface layer is 7 inches of fine sand. The upper 4 inches is black, and the lower 3 inches is dark gray. The subsurface layer is 7 inches of light gray fine sand. The upper subsoil is about 6 inches of fine sand that is weakly cemented with organic matter. The upper 3 inches is black, and the lower 3 inches is dark reddish brown and has reddish brown and dark reddish mottles. Next is 5 inches of brown fine sand that contains black and dark reddish brown, weakly cemented fragments. Next is 18 inches of light gray fine sand and 13 inches of grayish brown fine sand. At a depth of 56 inches is a lower subsoil of fine sand which extends to a depth of 80 inches or more. The upper 13 inches is dark reddish brown, and the lower 11 inches is dark reddish brown and black.

The water table is at a depth of less than 10 inches for between 1 and 4 months and between 10 and 40 inches for more than 6 months in most years. The water table can briefly rise above the surface during very wet periods. Natural vegetation consists of longleaf pine and slash pine. The understory includes saw palmetto, inkberry, fetterbush, running

oak, creeping bluestem, chalky bluestem, lopsided indiangrass, pineland threeawn, switch grass, and several panicum species.

Tavares fine sand, 0 to 5 percent slopes (44) – Tavares fine sand, 0 to 5 percent slopes is a moderately well drained, nearly level to gently sloping soil found on low ridges in the flatwoods. Typically, the surface layer is dark grayish brown fine sand about 6 inches thick. Below is 12 inches of grayish brown fine sand that has dark gray and pale brown mottles; 11 inches of pale brown fine sand that has splotches of light gray, uncoated sand grains; 19 inches of very pale brown fine sand that has pale brown mottles; and 32 inches of white fine sand that has very pale brown, pale brown, light grayish brown, and reddish yellow mottles.

The water table is typically at a depth of between 40 and 60 inches below the surface for 6 or more months a year and recedes to a depth greater than 60 inches during dry periods. The natural vegetation is dominated by longleaf pine and turkey oak. The understory includes creeping bluestem, indiangrass, grassleaf goldaster, pineland threeawn, gopher apple, prickly pear, and a variety of legumes.

Orange County:

Archbold fine sand, 0 to 5 percent slopes (2) – Archbold fine sand soils are moderately well drained, nearly level to gently sloping soils found on low ridges and knolls on the flatwoods. Typically, the surface layer is dark gray fine sand about 2 inches thick. The underlying material is usually a white fine sand to a depth of about 80 inches.

The water table is seasonally at its highest at 42 to 60 inches for about 6 months and can reach a depth of 24 inches during wet periods. The water table recedes to a depth of between 60 to 80 inches for the rest of the year and can go deeper than 80 inches during extended dry periods. Natural vegetation is scattered slash pine, sand pine, and sand live oak. The understory includes pineland threeawn, prickly pear cactus, saw palmetto, and various weeds and grasses.

Basinger fine sand, depressional (3) – Basinger fine sand soils, depressional are poorly drained, nearly level sandy soils found mainly in depressions, sloughs, and along the edges of freshwater marches and streams. Typically, the surface layer is black fine sand at about 7 inches thick. The underlying layers are sand to a depth of 80 inches. The upper subsurface layer is gray fine sand to a depth of 32 inches, the next 15 inches is dark brown and light brownish gray fine sand, and the substratum is pale brown fine sand.

The water table is above the surface for 6 to 9 months or more each year and is within 12 inches of the surface for the rest of the year under natural conditions. The natural vegetation is mixed stands of pond cypress, sweetgum, and scattered pond pine. The understory includes chalky bluestem, blue maidencane, sedges, and other water tolerant grasses.

Candler fine sand, 0 to 5 percent slopes (4) – Candler fine sand, 0 to 5 percent slopes is an excessively drained, nearly level soil found on the uplands. Typically, the surface layer is very dark grayish brown fine sand about 5 inches thick. The upper part of the subsurface layer is yellowish brown fine sand to a depth of 30 inches, and the lower part is brownish yellow fine sand to a depth of about 74 inches. The subsoil to a depth of about 80 inches is yellow fine sand that has strong brown loamy sand lamellae about 1/16 to 1/4 of an inch thick and 2 to 4 inches long.

The seasonal high water table does not exceed 80 inches below the surface. The natural vegetation consists of scattered slash pine, sand pine, longleaf pine, bluejack oak, Chapman oak, scrub live oak, and turkey oak. The understory includes indiangrass, chalky bluestem, hairy panicum, pineland threeawn, and annual forbs.

Immokalee fine sand (20) – Immokalee fine sand soils are poorly drained, nearly level sandy soils found in broad flatwoods. Typically, the surface layer of this soil is black fine sand about 5 inches thick. The upper part of the subsurface layer is grayish brown fine sand to a depth of about 35 inches. The upper part of the subsoil is black fine sand to a depth of about 41 inches, the middle part is dark brown fine sand to a depth of about 48 inches, and the lower part is brown fine sand to a depth of about 67 inches. The substratum is light brownish gray fine sand to a depth of about 80 inches.

The water table is within 10 inches of the surface for 1 to 3 months of the year and recedes to a depth of 10 to 40 inches for more than 6 months. The natural vegetation is slash pine. The understory is saw palmetto, running oak, inkberry, fetterbush, creeping bluestem, lopsided indiangrass, pineland threeawn, chalky bluestem, and wax myrtle.

Ona fine sand (26) – Ona fine sand soils are poorly drained, nearly level sandy soils found in broad areas on the flatwoods. Typically, this soil has a surface layer of black fine sand about 6 inches thick. The subsoil is dark reddish brown fine sand to a depth of about 15 inches. The upper part of the substratum is grayish brown fine sand to a depth of about 42 inches, the middle part is light gray fine sand to a depth of about 60 inches, and the lower part is very pale brown fine sand to a depth of 80 inches or more.

The water table is seasonally at its highest for 1 to 2 months a year at within 10 inches of the surface. It recedes to a depth of between 10 and 40 inches for periods of 6 months or more. Natural vegetation is longleaf pine and slash pine. The understory includes inkberry, running oak, saw palmetto, wax myrtle, fetterbush, pineland threeawn, bluestem, panicum, and other grasses.

Pits (33) – Pits are areas that have been excavated, primarily for use in road, levee, or foundations. Pits (also called borrow-pits) can be shallow or fairly deep and may be seasonally ponded at the bottom or hold water year round.

Pomello fine sand, 0 to 5 percent slopes (34) – Pomello fine sand soils are moderately well drained, nearly level to gently sloping soils found mainly in low ridges and knolls on the flatwoods. Typically, the surface layer is gray fine sand about 3 inches thick. The subsurface layer is white fine sand to a depth of about 40 inches. The upper part of the subsoil is black fine sand to a depth of about 48 inches, and the lower part is dark reddish brown fine sand to a depth of about 55 inches. The substratum is a pale brown fine sand to a depth of about 80 inches.

The water table is at a depth of 24 to 40 inches for 1 to 4 months a year, and recedes to 40 to 60 inches deep during dry periods. The natural vegetation is longleaf pine, sand pine, and slash pine. The understory includes creeping bluestem, lopsided indiangrass, running oak, saw palmetto, and pineland threeawn.

St. Johns fine sand (37) – St. Johns fine sand soils are poorly drained, nearly level sandy soils found on broad flats on the flatwoods. Typically, the upper part of the surface layer is black fine sand to a depth of about 7 inches, and the lower part is very dark gray fine sand to a depth of about 12 inches. The subsurface layer is gray fine sand to a depth of about 24 inches. The upper part of the subsoil is fine black sand to a depth of about 30 inches, the middle part is dark reddish brown fine sand to a depth of 36 inches, and the lower part is pale brown fine sand to a depth of about 44 inches. The upper part of the substratum is light gray fine sand to a depth of 58 inches, and the lower part is pale brown sand to a depth of about 80 inches.

The water table is within 10 inches of the surface for 6 to 12 months a year and between 10 and 40 inches deep for the rest of the year. During wet periods, the water table may rise to the surface for brief amounts of time. The natural

vegetation includes longleaf pine, slash pine, and laurel oak. The understory is wax myrtle, inkberry, saw palmetto, pineland threeawn, bluestem, and various weeds and grasses.

St. Lucie fine sand, 0 to 5 percent slopes (38) – St. Lucie fine sand soils are excessively drained, deep, nearly level to gently sloping sandy soils found in the uplands. Typically, the surface layer is gray fine sand about 2 inches thick. The upper part of the underlying material is light gray fine sand to a depth of about 6 inches, and the lower part is white fine sand to a depth of 80 inches or more.

The water table is at its highest at 72 inches or deeper below the surface. The natural vegetation includes sand pine, Chapman oak, scrub live oak, and sand live oak. The understory is scattered saw palmetto, prickly pear cactus, golf leaf goldaster, deer moss, bluestem, and pineland threeawn.

Sanibel muck (42) – Sanibel muck soil is a very poorly drained, nearly level soil found in depressions, freshwater swamps and marshes, and in poorly defined drainage ways. Typically, this soil has an organic surface layer of black muck about 11 inches thick with a layer of black fine sand below it to a depth of about 15 inches. The upper part of the underlying material is gray fine sand to a depth of about 28 inches, and the lower part is light gray fine sand to a depth of 80 inches or more and has brown mottles.

The water table is ponded at the surface for 6 to 9 months a year and no deeper than 10 inches below the surface for 2 to 6 months a year in undrained areas. The organic material will rapidly lose thickness when soils are drained or during extended dry periods. The natural vegetation is mixed stands of bald cypress, red maple, sweetgum, and black tupelo. The understory includes cattail, St. John's wort, pickerel weed, sawgrass, maidencane, ferns, sedges, and other water-tolerant grasses.

Seffner fine sand (43) – Seffner fine sand is a somewhat poorly drained, nearly level soil found on the rims of depressions and broad, low ridges in the flatwoods. Typically, the surface layer is composed of 6 inches of black fine sand underlain by 19 inches of very dark grayish brown fine sand. They upper part of the underlying material is grayish brown fine sand to a depth of about 36 inches, the middle part is light gray fine sand that has common dark brown mottles to a depth of about 52 inches, and the lower part is white fine sand to a depth of 80 inches or more.

The water table is within 18 to 40 inches of the surface for 2 to 4 months a year and between 10 and 20 inches below the surface during wet periods for up to 2 weeks. The water table can recede to a depth of below 60 inches during extended dry periods. The natural vegetation consists of longleaf pine, slash pine, live oak, and laurel oak. The understory includes wax myrtle, fetterbush, creeping bluestem, broomsedge bluestem, grassleaf goldaster, lopsided indiangrass, saw palmetto, panicum, and pineland threeawn.

Smyrna fine sand (44) – Smyrna fine sand is a poorly drained, nearly level sandy soil found on broad flatwoods. Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer is gray fine sand to a depth of about 17 inches. The upper part of the substratum is pale brown fine sand to a depth of about 53 inches, and the lower part is light gray fine sand to a depth of 80 inches or more.

The water table is within 10 inches of the surface for 1 to 4 months a year and recedes to a depth of 10 to 40 inches or the rest of the year. The natural vegetation is longleaf pine and slash pine. The understory includes lopsided indiangrass, inkberry, saw palmetto, pineland threeawn, wax myrtle, bluestem, panicum, and other grasses.

Tavares fine sand, 0 to 5 percent slopes (46) – Tavares fine sand, 0 to 5 percent slopes is a moderately well drained, nearly level to gently sloping soil found on low ridges and knolls on uplands. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The upper part of the underlying material is brown fine sand to a depth of about 16 inches, the middle part is pale brown fine sand to a depth of about 41 inches, and the lower part is fine white sand to a depth of about 80 inches.

The water table is at a depth of between 40 and 80 inches during the seasonally high period of 6 months or more. It recedes to a depth of greater than 80 inches during extended dry periods. The natural vegetation is water oak, laurel oak, live oak, turkey oak, slash pine, and longleaf pine. The understory includes creeping bluestem, lopsided indiangrass, and pineland threeawn.

Tavares-Millhopper fine sands, 0 to 5 percent slopes (47) – Tavares-Millhopper fine sands, 0 to 5 percent slopes are moderately well drained, nearly level to gently sloping soils found on low ridges and knolls in the uplands and the flatwoods. In this area they occur in a regular repeating pattern. Typically, the surface layer of Tavares soil is dark grayish brown fine sand about 6 inches thick. The upper part of the underlying material is pale brown fine sand to a depth of about 21 inches, the middle part is very pale brown fine sand to a depth of about 60 inches, and the lower part is white fine sand with common very pale brown mottles to a depth of about 80 inches. Typically, the surface layer of Millhopper soil is dark grayish brown fine sand about 6 inches thick. The upper part of the subsurface layer is yellowish brown fine sand to a depth of about 40 inches and the lower part is very pale brown fine sand with a few yellowish brown mottles to a depth of about 64 inches. The upper part of the subsoil is brownish yellow sandy loam to a depth of about 76 inches and the lower part is light gray sandy clay loam that has common yellowish brown and yellowish red mottles to a depth of more than 80 inches.

The water table is at a depth of between 40 and 72 inches during the seasonally high period of 6 months or more. It recedes to a depth of greater than 80 inches during extended dry periods. The natural vegetation consists of water oak, laurel oak, turkey oak, live oak, slash pine, and longleaf pine. The understory includes creeping bluestem, lopsided indiangrass, panicum, and pineland threeawn.

Urban land (50) – Urban land is a miscellaneous area covered by urban facilities including shopping centers, parking lots, industrial buildings, houses, streets, sidewalks, and airports. The natural soil cannot be observed and the depth to seasonal high water table is dependent on the functionality of established drainage systems.

Zolfo fine sand (54) – Zolfo fine sand is a somewhat poorly drained, nearly level soil found on broad, slightly higher positions adjacent to the flatwoods. Typically, the surface layer is dark grayish brown fine sand about 5 inches thick. The upper part of the subsurface layer is grayish brown fine sand to a depth of about 23 inches, the middle part is light brownish gray fine sand that has common brownish yellow mottles to a depth of about 38 inches, and the lower part is very pale brown fine sand that has common brownish yellow mottles to a depth of about 55 inches. The upper part of the subsoil is brown fine sand to a depth of 71 inches and the lower part is dark brown fine sand to a depth of 80 inches or more.

The water table is at a depth of between 24 and 40 inches during the seasonally high period of 2 to 6 months, but can reach a depth of between 10 and 24 inches during periods of heavy rains. It recedes to a depth of about 60 inches below the surface during extended dry periods. The natural vegetation consists of water oak, laurel oak, turkey oak, live oak, slash pine, and longleaf pine. The understory includes broomsedge bluestem, chalky bluestem, lopsided indiangrass, saw palmetto, pineland threeawn, and other perennial grasses.

3.1.2 Land Use Types

Thirty-five (35) land use types were identified within the study area (See Land Use and Habitat Coverage Map**, Figure B, Appendix A**) and are described below:

Residential (1000 - 1300) – This range of land use codes consists of areas containing medium, and high density residential housing. Low density housing was only observed along Lake Willis Drive and is comprised of single family homes. Medium density housing was observed within the Celebration and Reunion developments, but not directly adjacent to the right-of-way. High density housing was observed primarily in the southern and northern portions of the project corridor. The most densely populated areas include the Tuscana development along South Goodman Road, portions of the Reunion development just south of the SR 429 interchange, portions of the Celebration development along Celebration Boulevard, and multiple apartments or condominiums near the SR 535 interchange and the Central Florida Parkway interchange. This land use has a low likelihood for wildlife occurrence.

Commercial and Services (1400) – This land use was observed throughout the majority of the project corridor along Champions Gate Boulevard/Osceola Polk Line Road, Celebration Boulevard, US 192, Buena Vista Drive, SR 535, Vineland Avenue, Central Florida Parkway, and Westwood Boulevard. It includes numerous types of businesses in malls, strip malls and as stand-alone establishments along the corridor. This land use has a low likelihood for wildlife occurrence.

Retail Sales and Services (1410) – This land use was observed in several portions of the project corridor, primarily along Buena Vista Drive, SR 535, and Vineland Avenue. It consists of shopping centers, and other service/retail oriented businesses along the adjacent roadways. This land use includes the Orlando Premium Outlets along Vineland Avenue. This land use has a low likelihood for wildlife occurrence.

Professional Services (1430) – Several medical offices, dental offices, veterinary offices, and other professional offices are located along the corridor, primarily along Celebration Boulevard and Celebration Place. This land use has a low likelihood for wildlife occurrence.

Tourist Services (1450) – Numerous hotels and resorts were identified throughout the project corridor. Some of the larger complexes include the Gaylord Palms Resort along the Osceola Parkway, the Waldorf Astoria Orlando Resort along Bonnet Creek Resort Lane, and the Orlando World Center Marriott along World Center Drive. The densest concentration of hotels was observed along Hotel Plaza Boulevard. This land use has a low likelihood for wildlife occurrence.

Industrial (1500) – The only area where this land use was observed was at the SR 429 interchange, where the Florida Gas Transmission Company has a small facility along Old Lake Wilson Road. This land use has a low likelihood for wildlife occurrence.

Institutional (1700) – This land use consists of schools and institutions such as Oak Hill Baptist Church on Osceola Polk Line Road, Celebration High School, Celebration Fire Station, Celebration Community Church, and Mary Queen of the Universe Church. This land use has a low likelihood for wildlife occurrence.

Medical and Health Care (1740) – This land use consists of medical and healthcare related institutions such as the Florida Hospital Celebration Health and the Central Florida Behavioral Hospital. This land use has a low likelihood for wildlife occurrence.

Golf Courses (1820) – This land use was observed at the Reunion Resort, Celebration Golf Club, Waldorf Astoria Resort, and the Hawks Landing Golf Club at the Orlando World Drive Marriott. This land use has a moderate likelihood for wildlife occurrence.

Parks and Zoos (1850) – This land use consists of recreational facilities that are either parks or zoos. Disney's Wide World of Sports complex, located northwest of the US 192 interchange was the only park identified for this land use along the project corridor. This land use has a low likelihood for wildlife occurrence.

Community Recreational Facilities (1860) – This land use is represented by Dr. P. Phillips Community Park along Big Sand Lake. This land use has a moderate likelihood for wildlife occurrence.

Open Land (1900) – This land use consists of undeveloped land within urban areas and inactive land with street patterns but without structures. Several large patches of this land use was observed in areas along Celebration Boulevard, to the southwest of the Osceola Parkway interchange, to the east of I-4, north of the Epcot Center Drive/World Center Parkway interchange, in the vicinity of Lake Willis, and an area to the southeast of the Central Florida Parkway interchange. This land use has a low likelihood for wildlife occurrence.

Improved Pasture (2110) – This category of land use consists of land which has been cleared, tilled, reseeded with specific grass types and periodically improved with brush control and fertilizer application. Large swaths of land along the eastern side of I-4 just north of Osceola Polk Line Road and on both sides of I-4 just north of the SR 429 interchange has been converted to improved pasture. This land use has a moderate likelihood for wildlife occurrence.

Unimproved Pasture (2120) – This category of land use consists of cleared land with major stands of trees and brush where native grasses have been allowed to grow and is typically not managed with brush control or fertilizer application. A large swath of land along Old Lake Wilson Road to the north of I-4 and an area just north of the Osceola Parkway to the east of I-4 have been converted into unimproved pasture. This land use has a moderate likelihood for wildlife occurrence.

Woodland Pastures (2130) – This category of land use consists of forest lands which are used as pastures. An area of land to the north of the SR 429 interchange was identified as woodland pasture. This land use has a moderate likelihood for wildlife occurrence.

Abandoned Groves (2240) – This category of land use consists of citrus groves which are no longer being actively used. This land use was observed to the northeast of the Champions Gate Boulevard/Osceola Polk Line Road interchange, along Old Lake Wilson Road, and along the Palm Parkway to the west of I-4. This land use has a moderate likelihood for wildlife occurrence.

Herbaceous- Dry Prairie (3100) – This land use consists of open, dry treeless areas containing grasses, forbs, sedges, rushes and other herbaceous vegetation. This habitat was observed along the northwest corner ramps of the US 192 interchange and several other small isolated patches throughout the project corridor. This land use may also be used to describe some areas surrounding reservoirs in this project corridor. This land use has a high likelihood for wildlife occurrence.

Shrub and Brushland (3200) – This land use consists of primarily shrubs and brush species. A few small patches of this land use were observed along the project corridor, primarily around the World Drive interchange and along the Palm Parkway. This land use has a high likelihood for wildlife occurrence.

Mixed Upland Non-forested (3300) – This land use is described as not being dominated by any species and may be comprised of multiple species. It was observed in small patches to the west of I-4 south of Central Florida Parkway and just west of Palm Parkway. This land use has a high likelihood for wildlife occurrence.

Upland Coniferous Forests (4100) – This land use consists of any natural forest stand whose canopy is at least 66 percent dominated by coniferous species. including natural pine flatwoods. It was observed along portions of the World Drive interchange and several small isolated patches along the project corridor. This land use has a high likelihood for wildlife occurrence.

Sand Pine (4130) – This land use consists of upland forest communities dominated by sand pine. It was observed in one small strip between Palm Parkway and I-4. This land use has a high likelihood for wildlife occurrence.

Hardwood-Conifer Mixed (4340) – Vegetation within this land use consists of oaks, pine, and other species with no clear canopy dominance between hardwoods and conifers. This land use was observed along the eastern side of I-4 north of the SR 429 interchange, southwest of the Osceola Parkway interchange, and several small isolated patches along the project corridor. This land use has a high likelihood for wildlife occurrence.

Streams and Waterways (5100) – This land use designates rivers, creeks, canals, and other linear water bodies. Reedy Creek passes under I-4 between the interchanges at SR 429 and World Drive. Bonnet Creek, which is highly channelized in this portion of its course, passes under I-4 at the Osceola Parkway interchange. This land use has a high likelihood for wildlife occurrence.

Lakes (5200) – This land use designates inland water bodies which are not classified as reservoirs. Lake Willis is a moderate sized lake that borders the right-of-way to the east of I-4 between the interchanges at SR 535 and the Central Florida Parkway. Several other named lakes, including Little Lake Bryan, Lake Ruby and Big Sand Lake are located along the project corridor. This land use has a high likelihood for wildlife occurrence.

Reservoirs (5300) – This land use designates all retention ponds and other artificial impoundments used for irrigation and flood control. Numerous reservoirs were observed along the project corridor, primarily in urban areas and within interchanges. Several reservoirs are located within the median, SR 417. This land use has a high likelihood for wildlife occurrence.

Mixed Wetland Hardwoods (6170) – This land use is reserved for those wetland hardwood communities which are composed of a large variety of hardwood species tolerant of hydric conditions yet exhibit an ill-defined mixture of species. This habitat type was primarily observed within the Reedy Creek basin between the interchanges at SR 429 and World Drive and surrounding Little Lake Bryan. Other small isolated patches of this land use were observed primarily in the southern portion of the project corridor. This land use has a high likelihood for wildlife occurrence.

Wetland Coniferous Forests (6200) – This land use is defined as wetlands which meet the crown closure requirements for coniferous forests that are a result of natural generation. Several areas along the floodplain of Bonnet Creek were identified as meeting the definition of this land use. This land use has a high likelihood for wildlife occurrence.

Cypress (6210) – Dominant vegetation consists of cypress and was observed in low areas bordering Reedy Creek and other small isolated patches near the interchange with World Drive. This land use has a high likelihood for wildlife occurrence.

Wetland Forested Mixed (6300) – This land use is defined as mixed wetlands forest communities in which neither hardwoods or conifers achieve a 66 percent dominance of the crown canopy composition. This habitat type was observed to the northeast of the Old Lake Wilson Road overpass and several small areas along Celebration Boulevard. This land use has a high likelihood for wildlife occurrence.

Freshwater Marsh (6410) – This land use is defined as vegetated non-forested wetlands which are usually found in low-lying areas or depressions in the landscape. Small isolated patches of this habitat type occur in several areas near the lakes along the project corridor. This land use has a high likelihood for wildlife occurrence.

Emergent Aquatic Vegetation (6440) – This land use is defined as being wetland areas where floating vegetation and vegetation which is found either partially or completely above the surface. Several patches of this habitat type were observed along the project corridor, usually near or adjacent to waterways. This land use has a high likelihood for wildlife occurrence.

Roads and Highways (8140) – This land use designates all major and minor roads throughout the project corridor. This land use has a low likelihood for wildlife occurrence, though the right-of-way does support habitat for gopher tortoise burrows in some locations.

Communications (8200) – This land use designates all communications structures. A Cell Phone Tower is located along International Drive near the Epcot Center Drive/World Drive Parkway interchange. This land use has a low likelihood for wildlife occurrence.

Electrical Power Facilities (8310) – This land use designates power plants and substations, including the Disney substation along the right-of-way at the World Drive interchange. This land use has a low likelihood for wildlife occurrence.

Electrical Power Transmission Lines (8320) – There are electrical power transmission lines that cross the right-of-way several times and run along I-4 from the vicinity of the SR 429 interchange to the US 192 (Irlo Bronson Memorial Highway) interchange. This land use has a low likelihood for wildlife occurrence.

3.1.3 Existing and Proposed Right-of-Way

The existing unpaved right-of-way within the project corridor consists primarily of areas of maintained grass. Some forested areas occur within the interchanges around SR 536, but these are not connected to systems outside of the right-of-way.

The project is developing alternatives for the proposed expansion, all of which will be assumed to impact the existing right-of-way in its entirety. In order to achieve the goals of the project (expansion to 6 general use lanes plus 4 managed use lanes), the designers must utilize as much of the existing right-of-way as possible, though the potential for the need to acquire minor amounts of additional right-of-way for the improvements remains. New right-of-way for pond sites will be required as the existing right-of-way does not contain sufficient areas to provide the necessary treatment and retention, along with the capacity expansions. The project right-of-way is depicted on the Land Use and Habitat Coverage Map (See **Figure B, Appendix A**).

3.1.4 Proposed Stormwater Management Areas

Eighty nine (89) potential stormwater management facilities were evaluated for this segment with all but two (FPC 103B and Pond 136A) being recommended for use. The proposed pond sites are depicted on the Land Use and Habitat Coverage Map (See **Figure B, Appendix A**) and photographs of each pond site is included in **Appendix C**. Wildlife Occurrence

rankings were made based upon habitat type, location within the overall landscape, and types of wildlife with the potential to occur within the project area.

The existing pond sites that will not require modifications are pond sites 102, 103, 104, 107, FPC 109, 111, 114A, 114B, FPC 114A, FPC 114B, 115, 116, 117, 119A, 119B, 127, 128B, and 129.

Pond Site 102

Pond Site 102 is located to the east of the roadway, just north of the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange. This is an existing pond and no modifications or expansions are proposed. The pond site is primarily open water with mixed submerged aquatic vegetation. A mix of cattails, Carolina willow, arrowhead, pickerel weed, and wax myrtle are present along the edges, and the banks are composed of mowed Bahia grass. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 103

Pond Site 103 is located to the west of the roadway, between Osceola Polk Line Road/Champions Gate Boulevard and SR 429. This is an existing pond and no modifications or expansions are proposed. The pond site is primarily open water with cattails and torpedo grass almost completely lining the pond out about twenty feet. Primrose, elderberry, wax myrtle, salt bush, Carolina willow, and red maple are present along the edges, and the banks are composed of mowed Bahia grass. A potentially active gopher tortoise burrow was found along the fence at the north side of the pond site (See Species Location map, **Figure C, Appendix A**). According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 104

Pond Site 104 is located along southbound SR 429, just north of the interchange with I-4. This is an existing pond and no modifications or expansions are proposed. The pond is about half open water and half covered with cattails. It is surrounded by primrose, Carolina willow, wax myrtle, red maple, and salt bush, with mowed Bahia grass and planted sweet gum on the banks. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 107

Pond Site 107 is located to the east of the SR 429 ramp to eastbound I-4. This is an existing pond and no modifications or expansions are proposed. The pond site is dominated by cattails with very little open water. The perimeter of the pond is primarily composed of cattails, Carolina willow, saltbush and dog fennel with mowed Bahia grass and planted cypress and red maple around the banks. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick turf growth and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 109

Pond Site FPC 109 is located to the east of I-4, between the SR 429 and World Drive interchanges. This is an existing borrow pit proposed to be a floodplain compensation pond. The pond is mostly open water surrounded by some cattails, torpedo grass, and sawgrass. The wooded area around the pond is primarily composed of slash pine, sweet bay, laurel oak, red maple, and saw palmetto. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 111

Pond Site 111 is located to the east of I-4, just south of the southern terminus of Celebration Boulevard. This is an existing pond with no proposed modifications or expansions. The pond site consists of open water surrounded by a mix of torpedo grass, cattails, and sedges, with some patches of Carolina willow, primrose, and wax myrtle. The banks are overgrown with a mix of salt bush, wax myrtle, red maple, cogon grass, and Caesar weed. Bahia grass dominates the upper banks surrounding the pond. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 114A

Pond Site 114A is located to the west of I-4 between the interchanges at World Drive and SR 417. This is an existing pond with no proposed modifications or expansions. The pond is dominated by white water lily with very little open water. Cattails and torpedo grass completely surround the pond with some arrowhead, slash pine, and wax myrtle are present along the edges. The banks mostly consist of mowed Bahia grass. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 114B

Pond Site 114B is located to the west of I-4 between the interchanges at World Drive and SR 417. This is an existing pond and no modifications or expansions are proposed. The pond site consists of open water with some patches of white water lily and is completely surrounded by cattails. Some torpedo grass, arrowhead, and sedge are present along the edges and the banks consist of mowed Bahia grass. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 114A

Pond Site FPC 114A is located to the west of I-4 between the interchanges at World Drive and SR 417. This is an existing pond and no modifications or expansions are proposed. The pond consists of open water with dense patches of white water lily. The edges of the pond primarily consist of torpedo grass with some patches of pickerel weed. The banks are comprised of mowed Bahia grass with some wax myrtle and slash pine. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 114B

Pond Site FPC 114B is located to the west of I-4 between the interchanges at World Drive and SR 417. This is an existing floodplain compensation pond and no modifications or expansions are proposed. The pond consists of open water with dense patches of white water lily. The edges of the pond primarily consist of torpedo grass with some patches of pickerel weed. The banks are comprised of mowed Bahia grass with some wax myrtle and slash pine. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 115

Pond Site 115 is located east of I-4, east of Celebration Boulevard. This is an existing pond and no modifications or expansions are proposed. The pond site consists of open water that is completely covered with duckweed and salvinia with large floating patches of cattail, primrose, and sedges. The banks consist of a mix of Carolina willow, red maple, sweet gum, slash pine, wax myrtle, and mixed herbaceous species. An alligator was observed in the pond at this site. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 116

Pond Site 116 is located west of I-4, between the interchanges at World Drive and SR 417. This is a fenced existing pond and no modifications or expansions are proposed. The pond consists of open water with mixed submerged aquatic vegetation and is surrounded by dense growths of cattails. The edges of the pond are overgrown and are comprised of a mix of wax myrtle, red maple, salt bush, and elderberry with heavy growth of cogon grass along the banks. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 117

Pond Site 117 is located within the interchange of I-4 and SR 417, just east of I-4. This is an existing pond and no modifications or expansions are proposed. The pond consists of open water with mixed submerged aquatic vegetation. The edges of the pond primarily consist of mowed Bahia grass, with small patches of torpedo grass, arrowhead, southern water grass, wax myrtle, and elderberry. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 119A

Pond Site 119A is located to the west of I-4 and SR 417 interchange. This is an existing pond and no modifications or expansions are proposed. The pond consists of open water with mixed submerged aquatic vegetation. The edges of the pond primarily consist of cattails, with patches of torpedo grass, southern water grass, arrowhead, and rattlebox. The banks are comprised of mowed Bahia grass with some wax myrtle. An alligator was observed in the pond at this site. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 119B

Pond Site 119B is located to the northwest of I-4 and SR 417 interchange. This is an existing pond and no modifications or expansions are proposed. The pond consists of floating mats of sedge and cattail with very little open water. The edges of the pond consist of heavy growth of cattails with some pickerel weed, arrowhead, and bacopa. The banks are primarily comprised of mowed Bahia grass with some rattlebox and rush. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 127

Pond Site 127 is located southwest of the westbound on-ramp from Osceola Parkway to I-4. This is an existing pond and no modifications or expansions are proposed. The pond consists of open water with heavy growth of hydrilla. The edges of the pond are surrounded by torpedo grass with sparse patches of cattails, arrowhead, and rattlebox, with mowed Bahia grass on the banks. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 128B

Pond Site 128B is located within the Osceola Parkway and I-4 interchange along the westbound ramp from I-4 to eastbound Osceola Parkway. This is an existing pond and no modifications or expansions are proposed. The pond consists of open water with patches of white water lily and is surrounded by torpedo grass and patches of pickerel weed. The banks primarily consist of mowed Bahia grass with some patches of planted cypress. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 129

Pond Site 129 is located northwest of the westbound ramp from I-4 to Osceola Parkway. This is an existing pond and no modifications or expansions are proposed. The pond consists of open water with dense patches of white water lily. The edges of the pond are comprised of a mix of cattails, primrose, and salt bush with some patches of wax myrtle, and mowed Bahia grass on the banks. There is a **high** likelihood for wildlife occurrence on this pond site.

The existing pond sites that will require modifications for the project include ponds 100, 101A, 101D, 105A, 105B, 106A, 106B, 108A, 109, 110, 112A, 112B, 112C, 112D, 112E, 113A, 113B, 113C, 113D, 113G, 118, 120, 121A, 121B, 122B, 123, 124, 125, 126, 128A, 130, 131A, 131B, 137A, 139A, 139B, and 140.

Pond Site 100

Pond Site 100 is located to the east of I-4, just north of the Ronald Reagan Parkway overpass. The existing pond is about half open water and half cattails and is surrounded by primrose, maidencane, torpedo grass, salt bush, and wax myrtle. The banks are primarily composed of mowed Bahia grass and some cogon grass. The area just north of the pond is forested with red maple, cabbage palm, wax myrtle, salt bush. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 101A

Pond Site 101A is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the southwest quadrant. This is an existing pond that is proposed to be reconfigured. The pond site is primarily maintained open water with a fountain in the middle and St. Augustine grass around the banks. Some cabbage palm, red maple, salt bush, wax myrtle, and elderberry are present along the east side of the proposed pond site. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick St. Augustine grass and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 101D

Pond Site 101D is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the northwest quadrant. This is an existing pond that is proposed to be reconfigured. The pond site is primarily maintained open water with a fountain and St. Augustine grass with some planted cabbage palms on the banks. The existing site is primarily a mowed Bahia grass field. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS along the eastern edge of the site, but thick St. Augustine grass and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 105A

Pond Site 105A is located within the SR 429 and I-4 interchange in the southwest quadrant. This is an existing pond that is proposed to be regraded. The pond site is almost completely covered with cattails and has Carolina willow and saltbush with planted cypress and red maple around its edges. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 105B

Pond Site 105B is located within the SR 429 and I-4 interchange in the northwest quadrant. This is an existing pond that is proposed to be reduced and regraded. The pond site is completely dominated by cattails and has very little open water.

Carolina willow, saltbush, planted cypress and red maple with cordgrass and mowed Bahia grass around its edges. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 106A

Pond Site 106A is located within the SR 429 and I-4 interchange in the southeast quadrant. This is an existing pond that is proposed to be reduced and regraded. The pond site is almost completely covered with cattails and has Carolina willow, saltbush, and planted cypress and red maple around its edges, along with Bahia grass. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick turf growth and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 106B

Pond Site 106B is located to the east of the I-4 eastbound onramp to SR 429. This is an existing pond that is proposed to be reduced and regraded. The pond site has some open water with mixed submerged aquatic vegetation. The perimeter of the pond is primarily composed of cattails, Carolina willow, and torpedo grass with mowed Bahia grass and planted cypress and red maple around the banks. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick turf growth and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 108A

Pond Site 108A is located within the SR 429 and I-4 interchange in the northeast quadrant. This is an existing pond that is proposed to be expanded and regraded. The pond site is primarily composed of cattails, with Carolina willow, wax myrtle, saltbush, planted cypress and red maple around its edges. The banks are primarily comprised of mowed Bahia grass. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick turf growth and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 109

Pond Site 109 is located to the west of the roadway, just north of the Old Lake Wilson Road overpass. This is an existing pond that is proposed to be expanded and regraded. The pond is mostly open water with mixed submerged aquatic vegetation. The pond is surrounded by cattails and torpedo grass with some salt bush, wax myrtle, primrose, cogon grass and broomsedge with mowed Bahia grass on the banks and berms. According to the Soil Survey of Osceola County (1979), the majority of this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick turf growth and the existing pond make it highly unlikely that sand skinks or blue-tailed mole skinks are present. Two potentially active gopher tortoise burrows were found along the fence at the south and west side of the pond site (See Species Location Map, **Figure C, Appendix A**). There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 110

Pond Site 110 is located to the west of I-4, southwest of the I-4 and World Drive interchange. This is an existing pond that is proposed to be expanded. The pond is mostly open water surrounded by cattails and torpedo grass with some patches of arrowhead and maidencane. The banks are overgrown with a mix of slash pine, salt bush, wax myrtle, laurel oak, and

red maple with patches of cogon grass and Carolina willow. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 112A

Pond Site 112A is located within the I-4 and World Drive interchange, in the southwest quadrant, just south of Pond Site 112B. This is an existing pond that is proposed to be regraded. The pond site consists of open water that is surrounded by torpedo grass and arrowhead with some patches of cattails, wax myrtle, primrose, and alligator flag. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 112B

Pond Site 112B is located within the I-4 and World Drive interchange, in the southwest quadrant, within the ramp from westbound I-4 to southbound World Drive. This is an existing pond that is proposed to be regraded. The pond site consists of open water that is surrounded by torpedo grass and arrowhead with some patches of salt bush, wax myrtle, and Carolina willow. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 112C

Pond Site 112C is located within the I-4 and World Drive interchange, in the World Drive median to the west of I-4. This is an existing pond that is proposed to be regraded. The pond site consists of open water that is surrounded by torpedo grass and arrowhead, with some patches of cattails and primrose. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 112D

Pond Site 112D is located within the I-4 and World Drive interchange, in the northwest quadrant. This is an existing pond that is proposed to be regraded. The pond site consists of open water with a mix of submerged aquatic vegetation. The pond is surrounded by a mix of cattails, Carolina willow, primrose and arrowhead, with some torpedo grass, cogon grass, wax myrtle, and salt bush. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 112E

Pond Site 112E is located within the I-4 and World Drive interchange, in the southwest quadrant, just west of Pond Site 112B. This is an existing pond that is proposed to be regraded. The pond site consists of open water that is mostly surrounded by torpedo grass and arrowhead with some Carolina willow, primrose, wax myrtle, and salt bush. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 113A

Pond Site 113A is located within the I-4 and World Drive interchange, in the southeast quadrant. This is an existing pond that is proposed to be regraded. The pond site consists of open water with a mix of submerged aquatic vegetation. The pond is surrounded by a mix of torpedo grass, primrose, and arrowhead. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 113B

Pond Site 113B is located within the I-4 and World Drive interchange, in the World Drive median east of I-4. This is an existing pond that is proposed to be regraded. The pond site consists of open water with a mix of submerged aquatic vegetation. The pond is surrounded by a mix of torpedo grass, cattails, and arrowhead, with some patches of Carolina willow. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 113C

Pond Site 113C is located within the I-4 and World Drive interchange, within the ramp from eastbound I-4 to northbound World Drive. This is an existing pond that is proposed to be regraded. The pond site consists of open water with heavy growth of hydrilla. The pond is surrounded by a mix of torpedo grass and arrowhead, with some patches of primrose and wax myrtle. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 113D

Pond Site 113D is located within the I-4 and World Drive interchange, in the northeast quadrant, just north of Pond Site 113C. This is an existing pond that is proposed to be regraded. The pond site consists of open water with a mix of submerged aquatic vegetation. The pond is surrounded by a mix of torpedo grass, cattails, and arrowhead, with some patches of Carolina willow and wax myrtle. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 113G

Pond Site 113G is located within the I-4 and World Drive interchange, between the eastbound on-ramps to I-4 from World Drive. This is an existing pond that is proposed to be regraded. The pond site consists of open water surrounded by torpedo grass with some arrowhead, primrose, cattails, and Carolina willow. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 118

Pond Site 118 is located within the interchange of I-4 and SR 417, just west of I-4. This is a fenced existing pond that is proposed to be reduced and regraded. The pond consists of open water with mixed submerged aquatic vegetation. The edges of the pond primarily consist of torpedo grass and arrowhead with a mix of cogon grass, Bahia grass and broomsedge along the banks. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 120

Pond Site 120 is located within the interchange of I-4 and SR 417, just east of I-4. This is a fenced existing pond that is proposed to be reconfigured. The pond is dominated by bulrush with very little open water and is surrounded by arrowhead with some patches of Carolina willow, cattails, pickerel weed, cordgrass, and bacopa. The banks of the pond primarily consist of Bahia grass and cogon grass, with some salt bush and wax myrtle. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 121A

Pond Site 121A is located within the interchange of I-4 and US 192, in the southwest quadrant to the west of Pond 121B. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails and

torpedo grass with some patches of primrose, arrowhead, and Carolina willow. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 121B

Pond Site 121B is located within the interchange of I-4 and US 192, within the westbound ramp from I-4 to eastbound US 192. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails with some torpedo grass and primrose. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 122B

Pond Site 122B is located within the interchange of I-4 and US 192, just east of I-4 and south of US 192. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails with some patches of sedge, white water lily and salt bush. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 123

Pond Site 123 is located within the interchange of I-4 and US 192, west of I-4 and just north of US 192. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails and torpedo grass with some patches of primrose, arrowhead, and cogon grass, and mowed Bahia grass on the banks. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 124

Pond Site 124 is located within the interchange of I-4 and US 192, between the westbound ramps from I-4 to US 192. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails and torpedo grass with some patches of primrose, arrowhead and cogon grass, with mowed Bahia grass on the banks. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 125

Pond Site 125 is located within the interchange of I-4 and US 192, within the eastbound ramp from I-4 to westbound US 192. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails with patches of phragmites, torpedo grass, Carolina willow, cogon grass, primrose, wax myrtle, and salt bush. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 126

Pond Site 126 is located within the interchange of I-4 and US 192, just to the north of the eastbound ramp from I-4 to westbound US 192, east of I-4. This is an existing pond that is proposed to be regraded. The pond consists of open water surrounded by cattails with patches of torpedo grass, Carolina willow, wax myrtle, and salt bush. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 128A

Pond Site 128A is located within the Osceola Parkway and I-4 interchange between Pond Sites 127 and 128B. This is an existing pond that is proposed to be regraded. The pond consists of open water with a heavy growth of hydrilla that is

surrounded by torpedo grass and alligator weed and sparse patches of cattails and spatterdock. The banks primarily consist of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 130

Pond Site 130 is located within the Osceola Parkway and I-4 interchange in the northeast quadrant. This is an existing pond that will be reduced in size and partially regraded. The pond is mostly open water with heavy growth of hydrilla and patches of white water lily. The edges of the pond are comprised of cattails, Carolina willow and primrose, with planted cabbage palm and cypress. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 131A

Pond Site 131A is located within the braided ramps of westbound I-4, to the south of the SR 536 and I-4 interchange. This is an existing pond that is proposed to be reconfigured. The pond is mostly open water with heavy growth of hydrilla and is surrounded by thick growth of torpedo grass and cattails with some pickerel weed, arrowhead, and planted cypress. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 131B

Pond Site 131B is located to the east of the right-of-way, just south of the SR 536 and I-4 interchange. This is an existing pond that is proposed to be reconfigured. The pond site is mostly open water surrounded by cattails, torpedo grass, slash pine, longleaf pine, saw palmetto, beauty berry, wax myrtle, and red maple. The portions that are proposed for expansion are primarily slash pine and longleaf pine with saw palmetto and some red bay and cypress. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 137A

Pond Site 137A is located within the SR 535 and I-4 interchange, at the off-ramp from eastbound I-4 to SR 535. This pond site is proposed to be reconfigured. The existing pond has some open water with a mix of various submerged aquatic vegetation and patches of cattails and white water lily in the middle. The edges of the pond are dominated by cattails and Carolina willow with some primrose, salt bush, and wax myrtle. The ramp from southbound SR 535 to eastbound I-4 is partially located along the southern and eastern portions of the proposed site. According to the Soil Survey of Orange County (1981), a portion of this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but the existing pond and ramp makes it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 139A

Pond Site 139A is located along the east side of I-4, just south of the Daryl Carter Parkway overpass. This pond site is proposed to be reconfigured. The pond is mostly open water with some patches of hydrilla and spatterdock. Some cattails, torpedo grass and primrose are present around the edges. The banks of the existing pond are primarily comprised of mowed Bahia grass. An active cattle pasture composed primarily of Bahia grass and prickly pear is located to the east of the existing pond, where expansion is proposed. According to the Soil Survey of Orange County (1981), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 139B

Pond Site 139B is located along the east side of I-4, just north of the Daryl Carter Parkway overpass. This pond site is proposed to be reconfigured. The pond is mostly open water with some cattails, torpedo grass, Carolina willow and primrose around the edges. The banks of the existing pond are primarily comprised of mowed Bahia grass with some areas of castor bean. An active cattle pasture composed primarily of Bahia grass and prickly pear with some scrub lupine is located to the east of the existing pond, where expansion is proposed. According to the Soil Survey of Orange County (1981), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 140

Pond Site 140 is located along the west side of I-4, just north of the Daryl Carter Parkway overpass. This pond site is proposed to be reconfigured. The existing pond is mostly open water with some cattails, torpedo grass, Carolina willow and primrose around the edges. The banks are primarily comprised of mowed Bahia grass. The area to the west of the existing pond is mostly scrub live oak with some sand pine, longleaf pine, and saw palmetto. According to the Soil Survey of Orange County (1981), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Newly proposed ponds include ponds FPC 100, FPC 101A, 101B, 101C, 101E, 101F, 101G, FPC 102, FPC 103A, FPC 103B, FPC 105A, 108B, 113E, 113F, FPC 114C, 122A, 122C, 130A, FPC 132, 132, FPC 133, 133, 134, 135, 136A, 136B, 137, 137B, 138, 138A, 138B, FPC 138, FPC 141, and 142B.

Pond Site FPC 100

Pond Site FPC 100 is located to the west of I-4, south of the Champions Gate interchange, north of Ronald Reagan Parkway. This is a proposed new floodplain compensation pond. The existing site is an active cattle pasture with fallow citrus trees, some scrub live oak and some cabbage palm, with prickly pear, beauty berry, Bahia grass, and various weedy herbaceous species. According to the Soil Survey of Polk County (1990), this floodplain compensation pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 101A

Pond Site FPC 101A is located to the east of I-4, southeast of the Osceola Polk Line Road/Champions Gate Boulevard. This is a proposed new floodplain compensation pond. The existing site is an active cattle pasture comprised primarily of a few scattered fallow citrus trees, some scrub live oak and some cabbage palm, with prickly pear, lantana, blue lupine, Bahia grass, and various weedy herbaceous species. According to the Soil Survey of Polk County (1990), this floodplain compensation pond site has soil series that are defined as suitable sand skink soils by the USFWS. Two gopher tortoise burrows were observed at this site (See Species Location Map, **Figure C, Appendix A**). There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 101B

Pond Site 101B is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the southwest quadrant. This is a proposed new pond site. The pond site is primarily mowed St. Augustine grass with a few planted cabbage palms. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick St. Augustine grass and the existing pond make it highly

unlikely that sand skinks or blue-tailed mole skinks are present. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site 101C

Pond Site 101C is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the northwest quadrant. This is a proposed new pond site. The pond site is primarily mowed St. Augustine grass with a few planted cabbage palms. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site 101E

Pond Site 101E is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the southeast quadrant. This is a proposed new pond site. The pond site is primarily mowed Bahia grass with portions of compacted milled asphalt. The existing ramp from I-4 eastbound to Osceola Polk Line Road/Champions Gate Boulevard is located within the footprint of this proposed pond site. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but compacted soils and the existing ramp make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site 101F

Pond Site 101F is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the southeast quadrant. This is a proposed new pond site. The pond site is primarily mowed Bahia grass. A portion of the existing ramp from I-4 eastbound to eastbound Osceola Polk Line Road/Champions Gate Boulevard is located within the footprint of this proposed pond site. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but the existing ramp makes it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site 101G

Pond Site 101G is located within the Osceola Polk Line Road/Champions Gate Boulevard and I-4 interchange in the northeast quadrant. This is a proposed new pond site. The pond site is primarily mowed Bahia grass with portions of compacted milled asphalt. The existing ramp from Osceola Polk Line Road/Champions Gate Boulevard to eastbound I-4 is located within the footprint of this proposed pond site. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but compacted soils make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 102

Pond Site FPC 102 is located east of I-4, along Kemp Road. This is a proposed new floodplain compensation pond. The site is entirely wooded with a mix of slash pine, red maple, sweet gum, laurel oak, and cabbage palm. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 103A

Pond Site FPC 103A is located east of I-4, just south of the Tradition Boulevard overpass in Reunion Resort. This is a proposed new floodplain compensation pond. The site is split by an unnamed dirt road running south to north. Both proposed basins are entirely open disturbed field with a mix of grasses and weedy herbaceous species. According to the Soil Survey of Osceola County (1979), the majority this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but disturbance at the site make it somewhat unlikely that sand skinks or blue-tailed mole skinks are

present. A gopher tortoise burrow was found near the southwest corner of the pond site along the fence with I-4 (See Species Location Map, **Figure C, Appendix A**). There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 103B (Alternate to FPC 103A, Not Recommended)

Pond Site FPC 103B is located east of I-4, within Reunion Resort to the southwest of the intersection of Spine Road and Whisper Way. This is a proposed new floodplain compensation pond. The pond site is primarily mowed Bahia grass with portions of compacted milled asphalt. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but compacted soils make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 105A

Pond Site FPC 105A is located south of the interchange of SR 429 with Sinclair Road. This is a proposed new floodplain compensation pond. The majority of the site has a moderately open canopy which consists of thinned planted pine with a few clusters of oaks. This part of the site has an understory and ground cover which consist primarily of lupine and prickly pear cactus with large patches of Cogon grass and some gopher apple, grape vine, passion flower, wiregrass, and Bahia grass. The southeastern portion of the site is densely wooded with scrub live oak with saw palmetto, pawpaw, lyonia, and grape vine. Areas of open sand free of canopy with minimal ground vegetation are present along an abandoned vehicular trail between the planted pine and scrub oak areas, as well as along the southern edge of the site. A thick layer of duff and/or heavy growth of roots are present in the northern portion of the site, isolated clusters of young oaks within the pines, and within the dense scrub live oak area. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS. Numerous sand skink tracks were observed at the site during site reconnaissance, and were positively identified during cover board surveys. Approximately 30 active gopher tortoise burrows were identified at the site (See Species Location Map, **Figure C, Appendix A**). There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 108B

Pond Site 108B is located to the east of the ramp from southbound SR 429 to eastbound I-4. This is a proposed new pond site. The existing site is primarily composed of live oak, slash pine, red maple, cabbage palm, and saw palmetto with some persimmon, sand pine, beauty berry, salt bush, and Carolina willow. According to the Soil Survey of Osceola County (1979), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick vegetative growth make it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 113E

Pond Site 113E is located within the I-4 and World Drive interchange, in the northeast quadrant between Pond Sites 113C and 113G. This is a proposed new pond. The current site consists entirely of mowed Bahia grass. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site 113F

Pond Site 113F is located within the I-4 and World Drive interchange, in the World Drive median to the east of I-4 and east of the eastbound on-ramp to I-4 from southbound World Drive. This is a proposed new pond. The current site consists entirely of mowed Bahia grass. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 114C

Pond Site FPC 114C is located to the west of I-4 between the interchanges at World Drive and SR 417. This is a proposed new floodplain compensation pond. The majority of the proposed site is open pasture, but also includes a small area of cypress wetland in the southwest corner. The open pasture is primarily composed of mixed grasses and weedy herbaceous species with slash pine, longleaf pine and saw palmetto, with some red maple, Dahoon holly, sweet gum, jessamine, and wild grape vine. The cypress area of the proposed expansion area is primarily comprised of bald cypress, red maple, sweet bay, and wax myrtle. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 122A

Pond Site 122A is located within the interchange of I-4 and US 192, within the eastbound ramps from I-4 to US 192. This is a proposed new pond. The pond site consists entirely of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 122C

Pond Site 122C is located within the interchange of I-4 and US 192, along the eastbound ramp from I-4 to eastbound US 192, just south of US 192. This is a proposed new pond. The current site consists of mowed Bahia grass with several swales that have a mix of arrowhead, torpedo grass, cattails, and primrose. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 130A

Pond Site 130A is located west of I-4, just north of the Osceola Parkway interchange. This is a proposed new pond site, which is currently a channelized portion of Bonnet Creek. The creek is mostly open water with some primrose and torpedo grass along the edges. The banks are primarily comprised of mowed Bahia grass. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 132

Pond Site FPC 132 is located within the braided ramps of westbound I-4, just south of the SR 536 and I-4 interchange. This is a proposed new floodplain compensation pond. The existing site is mostly wetland with a mix of slash pine, pond pine, red maple, cypress, wax myrtle, primrose, and Carolina willow. Mowed Bahia grass is located along the ramp to the southwest of the forested area. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 132

Pond Site 132 is located within the SR 536 and I-4 interchange in the southwest quadrant. This is a proposed new pond site. The existing site is forested with a mix of slash pine, long leaf pine, pond pine, red maple, and red bay with an understory dominated by saw palmetto and some elderberry, wax myrtle, and various species of vines and ferns. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 133

Pond Site FPC 133 is located within the braided ramps of eastbound I-4, just south of the SR 536 and I-4 interchange. This is a proposed new floodplain compensation pond. The existing site is mostly wetland with heavy growth of Brazilian pepper and some red maple, cabbage palm, slash pine, pond pine, saw palmetto, red bay, and salt bush with patches of wild taro, blackberry, and various species of ferns. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 133

Pond Site 133 is located within the SR 536 and I-4 interchange in the southeast quadrant. This is a proposed new pond. The existing site is forested with a mix of slash pine, long leaf pine, and red maple with an understory dominated by saw palmetto with some gallberry, St. John's wort, red root, salt bush, wax myrtle, and wild grape. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 134

Pond Site 134 is located within the SR 536 and I-4 interchange in the northwest quadrant. This is a proposed new pond site. The existing site is forested with a mix of pond pine and slash pine, with some red maple, red bay, sweet bay, and wax myrtle. The understory is dominated by saw palmetto with some Brazilian pepper, Chinese tallow, cogon grass, Carolina willow, and elderberry. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 135

Pond Site 135 is located within the SR 536 and I-4 interchange in the northeast quadrant. This is a proposed new pond site. The existing site is forested with a mix of slash pine, pond pine, red maple, and red bay with an understory dominated by saw palmetto and some gallberry, St. John's wort, red root, Brazilian pepper, salt bush, wax myrtle, and blackberry. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 136A (Alternate to 136B, Not Recommended)

Pond Site 136A is located to the east of the right-of-way, just north of the SR 536 and I-4 interchange. This is a proposed new pond site. The existing site consists of a small pond with some open and forested areas. The pond is completely covered with duckweed and is surrounded by cattails, primrose, wax myrtle, elderberry, Carolina willow, blackberry, and Brazilian pepper. The upland portion of the site is composed of a mix of cabbage palm, laurel oak, water oak, golden raintree, and longleaf pine with unmaintained Bahia grass, prickly pear cactus, cogon grass, and various other weedy herbaceous species. According to the Soil Survey of Orange County (1981), the majority of this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 136B

Pond Site 136B is located to the east of the right-of-way, to the north of the SR 536 and I-4 interchange. This is a proposed new pond site. The site is mostly forested with some openings which are dominated by cogon grass. The site is composed of a mix of cabbage palm, laurel oak, water oak, golden raintree, and longleaf pine with unmaintained weedy herbaceous species. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 137

Pond Site 137 is located within the SR 535 and I-4 interchange, east along the ramp from eastbound I-4 to SR 535. This is a proposed new pond site. The existing site is mostly planted pine with Bahia grass and mixed weedy herbaceous species. The ramp from eastbound I-4 to SR 535 is partially located along the western edge of this pond site. According to the Soil Survey of Orange County (1981), this pond site has soil series that are defined as suitable sand skink soils by the USFWS, but thick turf and the existing ramp makes it highly unlikely that sand skinks or blue-tailed mole skinks are present. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 137B

Pond Site 137B is located within the SR 535 and I-4 interchange, at the northwest corner. This is a proposed new pond site. The site is primarily comprised of a mix of wax myrtle, Carolina willow, elderberry, cabbage palm, cattail, and primrose. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 138

Pond Site 138 is located west of I-4 in the Crossroads Shopping Plaza, just north of the SR 535 and I-4 interchange. This is one of three proposed new pond sites in the Crossroads Shopping Plaza. The existing area for this pond site includes Red Lobster, Taco Bell, and Johnnie's Hideaway restaurants, as well as an existing pond for the Crossroads Shopping Plaza. The existing pond is mostly open water surrounded by mowed St. Augustine grass with an area of arrowhead, torpedo grass, and button bush. The remaining portion of the site is primarily composed of an asphalt parking lot with landscaped vegetation. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site 138A

Pond Site 138A is located west of I-4 in the Crossroads Shopping Plaza, just north of the SR 535 and I-4 interchange. This is one of three proposed new pond sites in the Crossroads Shopping Plaza. The existing area includes McDonalds, Chevys, Buffalo Wild Wings, and The Knife restaurants. The site is primarily composed of an asphalt parking lot with landscaped vegetation. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site 138B

Pond Site 138B is located west of I-4 in the Crossroads Shopping Plaza, just north of the SR 535 and I-4 interchange. This is one of three proposed new pond sites in the Crossroads Shopping Plaza. The existing area includes the Sweet Tomatoes restaurant, Pirate's Cove Mini Golf, and Gooding's Supermarket. The site is primarily composed of an asphalt parking lot with landscaped vegetation. There is a **low** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 138

Pond Site FPC 138 is located west of I-4, west of South Apopka Vineland Road, behind a row of restaurants. This is a proposed new floodplain compensation pond. The site is densely vegetated and is mostly comprised of Carolina willow, elderberry, primrose, red maple, and laurel oak. There is a **moderate** likelihood for wildlife occurrence on this pond site.

Pond Site FPC 141

Pond Site FPC 141 is located east of the right-of-way, north of the Daryl Carter Parkway overpass at the end of Lake Willis Drive. This is a proposed new floodplain compensation pond. The site is mostly forested and is primarily composed of live oak and saw palmetto which has been densely overgrown by wild grape vine. According to the Soil Survey of Orange County (1981), a portion of this pond site has soil series that are defined as suitable sand skink soils by the USFWS. There is a **high** likelihood for wildlife occurrence on this pond site.

Pond Site 142B

Pond Site 142B is located west of I-4, to the southwest of the intersection of Palm Parkway and Central Florida Parkway. This is a proposed new pond site. This pond site is comprised of a forested area to the north, a furrowed planted pine area in the middle, and an area of planted citrus to the south. The forested part of the pond site is mostly sand pine that has been densely overgrown with Brazilian pepper and weedy herbaceous species. The middle area has rows of young planted

pines in furrows with heavy growth of weedy herbaceous species. The southern area is mostly planted rows of young citrus. According to the Soil Survey of Orange County (1981), a portion of this pond site has soil series that are defined as suitable sand skink soils by the USFWS. One gopher tortoise burrow was found at this pond site (See Species Location Map, **Figure C, Appendix A**). There is a **high** likelihood for wildlife occurrence on this pond site.

3.2 Wildlife, Including Listed Species

During the field investigation, individuals or evidence of at least fifty (50) different mammals, bird, and reptile species were identified along the project corridor. Observations of species protected under state or federal regulations were documented and shown on the Species Location Map (See **Figure C, Appendix A**). The following observed species appear on protected species lists developed by the USFWS, the FFWCC, FNAI or FCREPA:

Alligator mississippiensis -- American alligator
Ardea alba – great egret
Egretta caerulea -- little blue heron
Egretta thula – snowy egret
Elanoides forficatus – American swallow-tailed kite
Eudocimus albus -- white ibis
Gopherus polyphemus -- gopher tortoise
Grus canadensis pratensis -- Florida sandhill crane
Mycteria americana -- wood stork
Neoseps reynoldsi –sand skink
Pandion haliaetus – osprey
Plegadis falcinellus – glossy ibis

Additional wildlife species observed during the field investigation included:

Agelaius phoeniceus – red-winged blackbird
Aix sponsa – wood duck
Anas fulvigula – mottled duck
Anas platyrhynchos – mallard duck
Anaxyrus quercicus – oak toad
Anaxyrus terrestris – southern toad
Anhinga anhinga – anhinga
Anolis carolinensis – green anole
Anolis sagrei – Cuban brown anole
Apalone ferox – Florida softshell turtle
Ardea herodias – great blue heron
Buteo jamaicensis – red tailed hawk
Buteo lineatus – red shouldered hawk
Butorides virescens – green heron
Canis latrans – coyote
Cardinalis cardinalis – northern cardinal
Cathartes aura – turkey vulture
Charadrius vociferous – killdeer
Cnemidophorus sexlineatus – six-lined racerunner
Coluber constrictor – southern black racer
Columba livia – rock pigeon
Coragyps atratus – black vulture
Corvus brachyrynchos – American crow
Crotalus adamanteus – eastern diamondback rattlesnake
Cyanocitta cristata – blue jay
Dasypus novemcinctus – nine-banded armadillo
Didelphis virginiana – Virginia opossum
Eumeces egregius onocrepis – peninsula mole skink
Eumeces inexpectatus – southeastern five-lined skink
Fulica americana – American coot
Gallinula galeata – common gallinule
Lampropeltis elapsoides – scarlet kingsnake
Lepomis macrochirus – bluegill sunfish
Lontra canadensis – North American river otter
Lynx rufus – bobcat
Masticophis flagellum – coachwhip snake
Meleagris gallopavo – wild turkey
Micropterus salmoides – largemouth bass
Odocoileus virginianus – white-tailed deer
Phalacrocorax auritus – double crested cormorant
Plestiodon laticeps – broad-headed skink
Podilymbus podiceps – pied-billed grebe
Procyon lotor – raccoon
Pseudemys floridana – Florida cooter
Quiscalus quiscula – common grackle
Sciurus carolinensis – eastern gray squirrel
Strix varia – barred owl
Sus scrofa – wild boar
Tantilla relicta – Florida crowned snake
Zenaida macroura – mourning dove

Numerous other wildlife and plant species, many of which are protected, have the potential to occur in Polk, Osceola, or Orange County (See Tables 1 & 2 **in Appendix B**). Although evidence of the occurrence of those species was not observed during field inspections of the existing right-of-way or proposed pond sites, suitable habitat might exist in those areas. A discussion of species that might be impacted by the proposed project is provided in Section 4.0.

4.0 Impact Analysis

4.1 Potentially Impacted Listed Species and Other Sensitive Species

During field investigations, wildlife and plant surveys were conducted in potential impact areas such as proposed pond site areas and the existing right-of-way that contain habitat for one or more listed species. Listed below are those species with the potential to occur within the study limits and be impacted by the project.

4.1.1 Federally Listed Species

Informal Consultation for federally listed species was completed with USFWS and documented in the letter dated April 4, 2016 in which the USFWS concurred with the proposed effects determinations described below. All federally listed species within the segment with the exception of the sand skink and scrub lupine were granted either "No Effect" or "May Affect, But not Likely to Adversely Affect". Formal Consultation to address a "May Affect" determination for the sand skink and scrub lupine was completed and is documented in the Biological Opinion dated August 26, 2016. The documents are included in the Agency Coordination contained in Appendix D.

Reptiles

Eastern Indigo Snake (*Drymarchon corais couperi*) – The eastern indigo snake, listed by both the FFWCC and the USFWS as Threatened, is a habitat generalist, using a variety of habitats from mangrove swamps to xeric uplands. These snakes are cold-sensitive and require gopher tortoise burrows, other animal holes, or stumps for protection during winter months. They require large tracts of natural, undisturbed habitat, and prefer to forage in and around wetlands for their preferred prey – other snakes. Numerous gopher tortoise burrows were located within the project area and the potential for indigo snakes is moderate due to the limited amount of habitat available in this developed area. The closest documented eastern indigo snake sighting was in 2008 near Blue Springs State Park, which is located approximately 43 miles north of the project area. During the construction phase of the project, FDOT will implement the USFWS *Standard Protection Measures for the Eastern Indigo Snake*, which contain specific provisions requiring the construction contractor to develop and implement an education plan concerning avoidance of eastern indigo snakes, as well as conducting post-construction reporting.

An effects determination was made by utilizing the USFWS Programmatic Key for the Eastern Indigo Snake (January 2010, updated August 2013). In accordance with this key, the project will implement the *Standard Protection Measures for the Eastern Indigo Snake* (USFWS, 2013) and will have all permits conditioned such that all active and inactive gopher tortoise burrows will be excavated prior to site manipulation in the vicinity of the burrow.

Segment 1 may impact more than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) and has more than 25 active and inactive gopher tortoise burrows. Therefore, the project would merit 'a may affect' determination under the key. Considering that the project area is primarily within an urban corridor with large areas of development offering little contiguous habitat to support the indigo snake and there are no documented sightings within the area, it should qualify for a **may affect but is not likely to adversely affect** determination.

Sand Skink (*Neoseps reynoldsi*) and Blue-tailed mole skink (*Eumeces egregius lividus*) – Both the sand skink and blue-tailed mole skink are listed as Threatened by the USFWS and FFWCC. The three most important factors in determining the presence of skinks are location, elevation, and suitable soils. Sand skinks occur on sandy ridges of interior Central Florida, including Polk, Osceola, and Orange Counties. They are found within these geographic areas typically at elevations of 82 feet above sea level and higher. They occur in excessively drained, well-drained, and moderately well-drained sandy soils, with suitable soil types including: Apopka, Arrendondo, Archbold, Astatula, Candler, Daytona, Duette, Florahome, Gainesville, Hague, Kendrick, Lake, Millhopper, Orsino, Paola, Pomello, Satellite, St. Lucie, Tavares, and Zuber. These soil types typically support scrub, sandhill, or xeric hammock natural communities, though these may be degraded by impacts to overgrown scrub, pine plantation, citrus grove, old field, or pasture. Skinks have been documented to occur in all these degraded conditions where soil types are suitable regardless of vegetative cover. This makes habitat condition of secondary importance in determining if skinks are present. If a site has suitable soils at the appropriate elevation within the counties where skinks are known to occur, there is a likelihood of presence, and potential effects to skinks should be considered. As the project occurs within the USFWS consultation area for sand skink and blue-tailed mole skink, both a pedestrian field survey and full cover board survey were conducted to assess potential habitat for the sand skink. The cover boards were placed in all areas containing mapped skink soils as verified by a certified soil scientist. A survey occurred between April 10, 2014 and May 6, 2014, and then design changes necessitated additional areas be surveyed in March and April 2015. No skinks or signs of skinks were identified during the 2014 survey. Sand skinks were observed during the survey in 2015 on one pond site (FPC 105A). After analysis of the survey results from pond site FPC 105A, it was determined that the pond site contains approximately **10.0 acres** of occupied skink habitat. Utilization of this pond site will impact occupied sand skink habitat, therefore the project **may affect** the sand skink. Consultation with USFWS to address impacts to the sand skink was initiated for the project. The Biological Opinion issued by USFWS on August 26, 2016 provides the authorization for the impacts to sand skink habitat. FDOT has committed to provide mitigation at a 2:1 ratio (20.0 credits) at a Service-approved skink conservation bank to offset the impacts.

Avian

Florida Scrub-Jay (*Aphelocoma coerulescens*) – The Florida scrub-jay, listed as Threatened by both the FFWCC and USFWS, is an endemic species found in Florida's scrub habitats. This gregarious jay is a habitat specialist and typically lives in scrub and scrubby flatwoods habitats. Potential suitable habitat was identified in several locations along the corridor. Preliminary assessment of the potential presence of the species utilized a scrub-jay playback tape during an informal survey. Scrub habitats were also assessed during the set up and process of conducting the sand skink survey. No scrub-jays have been observed within any proposed pond site areas or within the section of I-4 within this study, or during the PD&E study surveys conducted in December 1996 through December 1997, nor within the past 10 years according to the database maps kept by FNAI, the University of Florida, or the FFWCC. The proposed widening and stormwater ponds are not expected to have any impact on scrub-jays. Therefore, this project **may affect but is not likely to adversely affect** this species.

Crested caracara (*Polyborus plancus audubonii = Caracara cheriway*) – The crested caracara is listed by both the USFWS and the FFWCC as threatened. This large raptor inhabits Florida's prairies and rangelands. They forage on many kinds of insects, fish, reptiles, birds, and mammals. They will feed on live captured prey, but also on roadkill. Nests are usually constructed within cabbage palms. Sensitivity to human disturbance varies in this species with many tolerating human activities, especially when human influence is already present within their home range. If a caracara nest is found to be within the project area, management practices outlined within the *Habitat Management Guidelines for Audubon's Crested*

Caracara in Central and Southern Florida should be employed. The project occurs at the northernmost edge of the consultation area for this bird in Central Florida, though no birds or nests have been observed or were documented within the project corridor either during the current study or during the previous PD&E Study (December 1996 – December 1997). Previous communication with UFSWS (Jane Monaghan) during the early stages of this PD&E Study indicated that there was no history of caracara in the project area and that no habitat remains within the project area. Though potential foraging areas occur adjacent to I-4 within the project area (active grazing pastures for cattle), the lack of documented birds (FFWCC and Wildlife Research Institute Wildlife Occurrence Systems Database 1988 – 2014) and suitable nesting habitat make the potential for these birds extremely unlikely. The project construction limits will remain within the existing Right-of-Way with the exception of pond sites. The proposed ponds located within these pastures will be expansions of existing ponds rather than new construction. Therefore, the project **may affect but is not likely to adversely affect** this species.

Snail kite (*Rostrhamus sociabilis plumbeus*) – The snail kite is listed as Endangered by both the USFWS and the FFWCC. This non-migratory, medium-sized raptor utilizes large open freshwater marsh habitats and lakes with shallow water. Nests are usually located in a low tree or shrub at the water's edge. The main staple of their diet is the apple snail, lending to their name. The project does occur within the USFWS consultation area for the snail kite though no observations have been documented within or near the project corridor. Nesting snail kites have been documented significantly east of the project in Kissimmee at both Lake Tohopekiliga and East Lake Toho. No known adequate nesting or foraging habitat is located adjacent to the project area, either within the proposed right-of-way or pond site areas. Therefore, this project will have **no effect** this species.

Red-Cockaded Woodpecker (*Picoides borealis*) – This species is listed as Endangered by the USFWS and by the FFWCC. The colonial red-cockaded woodpecker (RCW) is a habitat specialist, requiring stands of over-mature pine that have contracted the red-heart disease. RCW's require diseased trees for cavity building, which they use for nest and roost cavities. Preferred pine stands need to have a fairly open canopy, with a sparse subcanopy to allow easy flight. RCWs must also have ample foraging habitat consisting of younger pines surrounding the cavity trees. No suitable nesting habitat was observed in the impact area within the project limits. The project occurs near (3 miles east) an area designated by USFWS as "Occurrence Area"; though the previous PD&E Study (December 1996 – December 1997) indicated no suitable habitat or any documented RCW sightings within the proposed right-of-way or pond sites. During field surveys conducted during May 2013, April 2014, and June 2015, biologists did not observe any suitable habitat within the project footprint. Therefore, this project will have **no effect** on the red-cockaded woodpecker.

Wood Stork (*Mycteria americana*) – This species, now listed as Threatened by both the USFWS and the FFWCC, is the only true species of stork nesting in the United States. This reclassification does not change any conservation or protection measures for the wood stork under the Endangered Species Act (ESA), rather it recognizes the recovery and the positive impact that conservation efforts have had on breeding populations of storks. Feeding areas for wood storks include marshes, pools, or ditches in which fish congregate. This species typically nests in mixed woodlands comprised of such overstory species as cypress, gum, and southern willow; pond apple and mangrove swamps may also be utilized for nesting.

Based upon the updated colony map prepared by the USFWS in June 2014, the project is located within the 15-mile Core Foraging Area (CFA – 15 miles from an active nesting colony in Central Florida) of two wood stork colonies (Lake Woodruff and Lake Russell). Wood storks were observed foraging within roadside ditches and stormwater facilities within several spots along the project corridor.

Utilizing the Corps of Engineers and U.S. Fish and Wildlife Service Effect Determination Key for the Wood Stork in Central and North Peninsular Florida (2008), the project is not within 2,500 feet of an active colony site, will likely impact Suitable Foraging Habitat (SFH) of greater than 0.5 acres, and is located within the CFA of 2 wood stork colonies. Additionally, FDOT commits to provide compensation within the Service Area of a Service-approved wetland mitigation bank(s) within the CFA, and the Project is not contrary to the Service's Habitat Management Guidelines for the Wood Stork in the Southeast Region, and in accordance with the Clean Water Act section 404(b)(1) guidelines. There are a number of currently permitted mitigation banks that include the project corridor within the bank service area that have credits available to offset impacts to SFH (three currently permitted banks with available federal credits that cover all or a portion of the project area). The FDOT will coordinate with the permitting agencies during the permitting phase of the project on compensatory mitigation and minimization of impacts to suitable foraging habitat. These actions should result in no net loss of foraging habitat; therefore, this project **may affect but is not likely to adversely affect** the wood stork.

Southern Bald Eagle (*Haliaeetus leucocephalus*) – The southern bald eagle was delisted from both the U.S. Endangered Species Act and FFWCC imperiled list, though it is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The USFWS issued the National Bald Eagle Management Guidelines in May 2007 while Florida adopted a Bald Eagle Management Plan (BEMP) in April 2008, written closely to follow the federal guidelines. The BEMP provides guidelines and recommendations to help people avoid violating state and federal eagle laws. The BEMP also outlines strategies to maintain the Florida population of bald eagles at or above current levels. The BEMP goal is to, "maintain a stable or increasing population of eagles in Florida in perpetuity." Bald eagles almost always nest in the tops of living or dead tall trees along or very near lakes and rivers; these water bodies provide fish, typically their preferred food. Bald eagles generally avoid areas with extensive human activity, so management guidelines must be considered before any construction can be initiated within 660 feet of an active southern bald eagle nest. Four bald eagles nests are recorded to be in the general vicinity of the project corridor (OR014, OR047, OS092 and OS151). However, none of these nests is located within 660 feet of the proposed right-of-way or any of the proposed pond sites. For that reason, the project will have **no effect** on the southern bald eagle.

FEDERALLY LISTED PLANT SPECIES

A review of agency databases and a field review of the project corridor indicate that there have been few reported occurrences of federally listed plant species within the proposed project area. Twenty (20) federally listed species have the potential to occur within Polk, Osceola, and Orange County; though not all habitat types are represented within the project area. Information from the previous PD&E Study (December 1996 – December 1997) indicated that one listed plant was observed, the scrub lupine (*Lupinus aridorum*). The observation was made west of Turkey Lake Road, to the west of the SR 528 Interchange at westbound I-4. A follow up protected plant field survey covering the area of proposed right-of-way widening and pond sites was conducted in May 2013, March and April 2014, and March and April 2015 by project biologists. The scrub lupine was observed in five areas where sand skink cover board surveys were conducted in 2014 (Area H, Area K, Area L, Area M, and Area O). No additional federally listed plant species were identified within the proposed widening impact area or pond sites during the field investigations. Based on the provided alignments of the right-of-way and proposed pond sites, the project is anticipated to have impacts on the scrub lupine. The footprint of Pond Site 139B and the edge of the proposed right-of-way northeast of the Daryl Carter Parkway overpass overlap an individual observation of scrub lupine. Based upon the proposed impacts from the project, this project **may affect** the federally listed plant species, the scrub lupine. Consultation with USFWS was initiated to address impacts to the scrub lupine, and the

resulting Biological Opinion dated August 26, 2016 provided the authorization for the project to impact this species according the following Conservation Measure:

During permitting the proposed project will be re-surveyed for occurrence of scrub lupine. In coordination with Bok Tower Gardens, the following will occur: collection of seeds, or translocation of plants out of the project footprint for replanting in lands acceptable to the Service (e.g., public conservation lands). Collected seeds would be provided to Bok Tower Gardens for reproduction and conservation of the species.

4.1.2 State Listed Species

Mammals

Florida Mouse (*Podomys floridanus*) – This mouse, listed as a Species of Special Concern by the FFWCC, is one of the two mammal species that are endemic to Florida. It typically lives within gopher tortoise burrows in fire-maintained, xeric uplands. Sub-optimal habitat exists in the xeric uplands that contain gopher tortoise burrows, such as mesic flatwoods (4110), sand pine scrub (4130), and sand pine plantations (4410). Several gopher tortoise burrows were located within the project area, but no Florida mice were observed during field surveys. If gopher tortoise burrows are proposed to be impacted, then the relocation of gopher tortoises and their burrow commensals will be conducted prior to construction. Because of this, the project **is not likely to adversely affect** the Florida mouse.

Sherman's Fox Squirrel (*Sciurus niger shermani*) – The Sherman's fox squirrel, listed by the FFWCC as a Species of Special Concern, is the largest of the three fox squirrel subspecies that occur in Florida. They have large ranges that can span over 80 acres. Optimum habitat for this subspecies is predominantly longleaf pine-turkey oak sandhills, although they are also reported to occur in mesic forested areas, as well. Some potential habitat is present within the project area, although Sherman's fox squirrels were not observed during the site investigations for this project. The amount of potential habitat for this species impacted by the project will be minimal. Therefore, the proposed project **is not likely to adversely affect** the Sherman's fox squirrel.

Florida Black Bear (*Ursus americanus floridanus*) – The Florida black bear is a very wide-ranging species formerly listed as Threatened by the FFWCC. Preferred habitat of the black bear includes dense forest, both upland and wetland, but the bear is often encountered in other areas during its seasonal movements. The bear was removed from the list in August 2012 after the approval of the Florida Black Bear Management Plan. The plan was implemented to set a strategy in place to address challenges in bear management, to manage for a sustainable bear population state-wide, and reduce human-bear conflicts. Going forward, FFWCC will continue to engage with landowners and regulating agencies to guide future land use to be compatible with the objectives of the Bear Management Plan. The plan divides the state into seven Bear Management Units (BMU's) which support the seven sub-populations of bear across the state. The unit closest to the project corridor is the Ocala/St. Johns Unit, though nearest Primary or Secondary Bear range within this unit is located in northwestern Orange County and not near the location of the project. The Secondary Bear range within the South Central Bear Unit in southeastern Polk County is equidistant from the project though may be a more likely source of bears to the project area. As it is unlikely that a black bear will travel through the project corridor, and no further fragmentation of bear habitat is proposed, the project **is not likely to adversely affect** the Florida black bear.

Reptiles

Florida Pine Snake (*Pituophis melanoleucus mugitus*) – This snake, listed as a Species of Special Concern by the FFWCC, is another tortoise burrow commensal organism, utilizing both tortoise burrows and also the tunnels of pocket gophers

(*Geomys pinetis*) for feeding and shelter. Preferred habitat of the pine snake is xeric uplands, and to a lesser extent, flatwoods and other mesic uplands. Some habitat is available within the project, especially where gopher tortoise burrows were observed (See Species Location Map, **Figure C, Appendix A**). Both the pocket gophers and the pine snakes live nearly their whole lives underground and are very hard to observe directly. With the relocation of commensal organisms from gopher tortoise burrows if impacted, the project **is not likely to adversely affect** the Florida pine snake.

Gopher Tortoise (*Gopherus polyphemus*) – The occurrence of this species, listed as Threatened by the FFWCC (and designated as a Candidate species for listing by the USFWS), is a key factor in the determination of habitat suitability for certain other listed species because of the large number of other animals that use tortoise burrows for one or more of their life requisites. While it is common to find gopher tortoise burrows in most types of upland communities, the preferred habitats include xeric uplands and disturbed, ruderal areas.

Gopher tortoise burrows and suitable habitat were observed in numerous locations along the project corridor. If impacts to these areas cannot be avoided, then relocation of the tortoises and their commensals will be necessary. During permitting, all potential gopher tortoise habitat that could be impacted by the project will be systematically surveyed according to the current guidelines published by the FFWCC. If gopher tortoise burrows are found, all practicable design measures will be employed to avoid impacts to the burrows. For burrows which cannot be avoided, a permit will be obtained from FFWCC for relocation of gopher tortoises and commensals, and relocation will be performed at a time as close as practicable to the start of construction activities at the site of the burrows (See **Figure C, Appendix A**). Therefore, the project **is not likely to adversely affect** the gopher tortoise.

Short-tailed snake (*Stilosoma extenuatum*) – The short-tailed snake, listed as Threatened by the FFWCC, belongs to a monotypic genus that is endemic to Florida. Rarely seen due to its earth-burrowing tendencies, it is restricted to xeric uplands, primarily longleaf pine-turkey oak sandhills and sand pine scrub, for its habitat requirements. Herpetologist Paul Moler (FFWCC-Retired) reports short-tailed snakes occur in a wider range of ecosystems than indicated in the scant literature on the species, and may be found where prey (small snakes) and loose soils occur in North-Central Florida. Suitable habitat (remnant scrub and sandhills, areas of loose soils) was observed in several areas along the project corridor in most areas where sand skink cover board surveys occurred. None of these snakes were observed during any field surveys. Although there is the potential impact of xeric habitat, with the commitment to relocate all potential impacted gopher tortoise burrows, it is anticipated that this project **is not likely to adversely affect** the short-tailed snake.

Amphibians

Gopher Frog (*Rana capito*) – The gopher frog, listed by the FFWCC as a Species of Special Concern, is a gopher tortoise burrow commensal organism, using tortoise burrows for shelter. Prime gopher frog habitat includes xeric uplands, especially longleaf pine-turkey oak associations with nearby (i.e. within one mile) seasonally flooded marshes or ponds. Field biological surveys have shown that gopher tortoise burrows were located at several locations within the project corridor, though no gopher frogs were observed. If gopher tortoise burrows are impacted, then this species could be impacted as well, though the excavation of any potentially occupied burrows and the relocation of any gopher tortoises and their burrow commensals should offset any impacts to this species. Therefore, the project **is not likely to adversely affect** the gopher frog.

Avian

Florida Burrowing Owl (*Speotyto cunicularia*) – The Florida burrowing owl is listed as a Species of Special Concern by the FFWCC. The breeding range of the Florida burrowing owl includes Polk, Osceola, and Orange Counties. Preferred habitats are treeless areas on well-drained soil where herbaceous ground cover is fairly short, such as dry prairies and edges of depressional marshes during the dry season. Florida burrowing owls have also been observed along canal banks, pastures, golf courses, mowed residential lawns, and airports (Rodgers, 1996). No Florida burrowing owls or their burrows were observed during the field surveys and no direct or indirect impacts are anticipated for this species. Therefore, the project **is not likely to adversely affect** the Florida burrowing owl.

Florida Sandhill Crane (*Grus canadensis pratensis*) – This non-migratory subspecies, listed as Threatened by the FFWCC, can often be seen foraging in improved pastures, open fields and along the roadside. During the winter months, it is distinguished from its migratory northern cousins by its smaller size and more delicate stature. Sandhill cranes nest in freshwater marshes and feed in adjacent fields and pastures. Some adequate nesting habitat is found within the freshwater marshes and vegetated shorelines of lakes located adjacent to the project corridor, and foraging habitat was found within the project limits. Sandhill cranes were observed flying over the project area several times during multiple surveying events, however were not observed foraging or nesting within the project area. The proposed project **is not likely to adversely affect** the sandhill crane.

Southeastern American Kestrel *(Falco sparverius paulus)* – This resident subspecies of the kestrel, listed as Threatened by the FFWCC, can be distinguished from its cousin, *F. s. sparverius*, a winter migrant, by its smaller size. The Southeastern kestrel requires three components for optimal habitat: large, open fields for foraging, snags for nesting, and snags, fence lines or telephone poles as perching sites from which to hunt. No kestrels were observed along the project corridor, nor within any pond sites or along the portion of the project to be widened. Therefore, this project **is not likely to adversely affect** this species.

Least tern (*Sterna antillarum*) – Historically, least terns nested on sandy beaches and lakeshores, but presently, they nest almost exclusively on man-made substrates such as spoil islands and gravel rooftops. This small tern, listed as Threatened by the FFWCC, is still fairly common in localized areas. However, none have been reported in the project study area. Prime nesting areas are minimal, so this species has only a low possibility of occurring along the project corridor, therefore the proposed project will have **no effect** on the least tern.

Wading Birds – Wading bird rookeries were not observed and are not known to occur within or adjacent to the study area. Potential foraging habitat for limpkin (*Aramus guarana)*, little blue heron (*Egretta caerulea),* roseate spoonbill (*Ajaia ajaja),* white ibis (*Eudocimus albus*), reddish egret (*Egretta rufescens),* tri-colored heron (*Egretta tricolor*), and snowy egret (*Egretta thula*), all classified as Species of Special Concern (SSC) by the FFWCC, occurs within the limits of the study area. Both little blue heron and white ibis were observed during field surveys. No wetlands providing critical foraging or nesting habitat for these avian species will be impacted by the proposed project and indirect impacts to wading birds are not anticipated. Therefore, the proposed project **is not likely to adversely affect** the wading bird population in the region.

STATE LISTED PLANT SPECIES

A review of available information revealed that 48 state listed plant species have the potential to occur within the habitats located within the project area in Polk, Osceola, and Orange Counties (See **Table 2, Appendix B**). No state listed plant species were observed during the field assessment of project area, though during the previous PD&E Study (May 2000),

nodding pinweed (*Lechea cernua*) was observed along Turkey Lake Road. Improvements to Turkey Lake Road since this study have eliminated the habitat areas that this plant occurred in, and no evidence of the plant was observed during the field surveys in May 2013, March, April, and June 2014, or April and May 2015. Therefore, the proposed project **is not likely to adversely affect** state listed plant species.

5.0 Conclusions, Recommendations, and Commitments

The proposed project will avoid and minimize impacts to wildlife and their habitat to the greatest practicable extent. Unavoidable impacts will be mitigated through a combination of actions designed to enhance local and regional ecological and hydrologic connectivity where possible. Those actions constitute the current recommendations developed and refined by staff and consulting environmental scientists representing various federal and state agencies and nongovernmental organizations, using the most current record and project specific scientific information available. The FDOT routinely reevaluates PD&E Study results and commitments prior to and during the project design phase, and again prior to right-of-way acquisition and construction. Therefore, the wildlife and recommendations proposed herein will be subject to reevaluation in the future. Appropriate modifications to the recommended actions may be made in the event that the latest science, design constraints or other relevant changes in circumstance so dictate.

Project Commitments

The following specific wildlife and habitat commitments will be incorporated into all appropriate project PD&E documents and will be carried over into the design phases.

1) As required by FDOT Standard Specifications, the construction of equipment staging areas for storage of oils, greases, fuel, road bed material, and equipment maintenance will be sited in previously disturbed areas not adjacent to any streams, wetlands, or surface water bodies. The staging areas will be surveyed for listed species prior to their use. Also as required by FDOT Standard Specifications, if protected species are identified unexpectedly within the construction area during construction, coordination will be initiated with the appropriate resource agencies to avoid or mitigate impacts.

2) Eastern indigo snake habitat has been identified within the project limits. Utilize the US Fish and Wildlife Service Standard Protection Measures for the Eastern Indigo Snake, at the US Fish and Wildlife Service Link: http://www.fws.gov/northflorida/IndigoSnakes/20130812_Eastern_indigo_snake_Standard_Protection_Measures.htm

3) During permitting, all potential gopher tortoise habitat that could be impacted by the project will be systematically surveyed according to the current guidelines published by the Florida Fish and Wildlife Conservation Commission. If gopher tortoise burrows are found, all practicable design measures will be employed to avoid impacts to the burrows. For burrows which cannot be avoided, a permit will be obtained from FWC for relocation of gopher tortoises and commensals, and relocation will be performed at a time as close as practicable to the start of construction activities at the site of the burrows.

4) During permitting, FDOT will ensure that mitigation proposed for wetland impacts in any wood stork suitable foraging habitat (SFH) within USFWS designated wood stork Core Foraging Area (CFA) will adhere to the requirements of the US Army Corps of Engineers and USFWS.

5) FDOT, through consultation with the USFWS for listed species impacts, assessed the impacts to sand skinks and scrub lupine. The completed Biological Opinion (dated 8/26/2016, received by FDOT 9/7/16) resulted in the following commitments for the species assessed:

   a) FHWA and FDOT propose to offset impacts by providing compensatory mitigation at a Service-approved conservation bank at a 2:1 ratio. The compensation acres are based upon surveys that determined sand skink occupancy within the Pond Site FPC 105A for the project (10.0 acres of impacts). FDOT and FHWA will provide 20.0 credits to offset project impacts to occupied sand skink habitat.

   b) During permitting, the proposed project will be re-surveyed for occurrence of scrub lupine. In coordination with Bok Tower Gardens, the following will occur: collection of seeds, or the translocation of plants out of the project footprint for replanting in lands acceptable to the Service (e.g., public conservation lands). Collected seeds would be provided to Bok Tower Gardens for reproduction and conservation of the species.

   c) The construction work for I-4 BtU Segment 1 – Pond Site FPC 105A will be clearly delineated prior to ground disturbance to ensure that take is not exceeded within the known occupied skink areas. The Service concluded that no more than 10.0 acres (4.05 ha) of occupied skink habitat will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided.

   d) FDOT will notify the Service 30 days before ground disturbance and construction begins that the compensatory mitigation has occurred.

6) Prior to the initiation of construction, FDOT will resurvey the corridor for nests of the state-listed Florida Sandhill Crane and Sherman's Fox Squirrel as recommended by FFWCC during project coordination. If any nests are found, coordination with FFWCC staff will be initiated.

The utilization of these commitments and mitigation measures for unavoidable impacts are recommended to minimize the overall impacts to wildlife from this project.

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APPENDIX A
PROJECT MAPS AND FIGURES

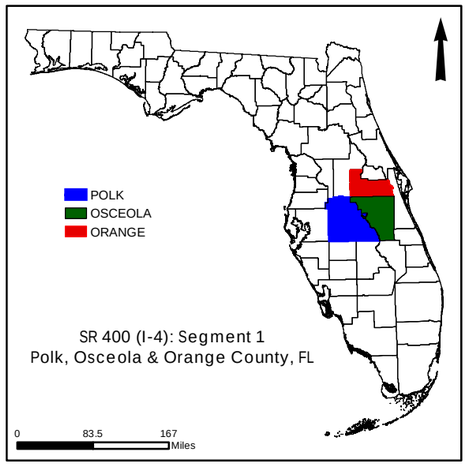
SR 400 (I-4) BEYOND THE ULTIMATE
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

SEGMENT 1

FDOT FM NO. 432100-1-22-01

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT (ESBA)

POLK, OSCEOLA & ORANGE COUNTIES
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5



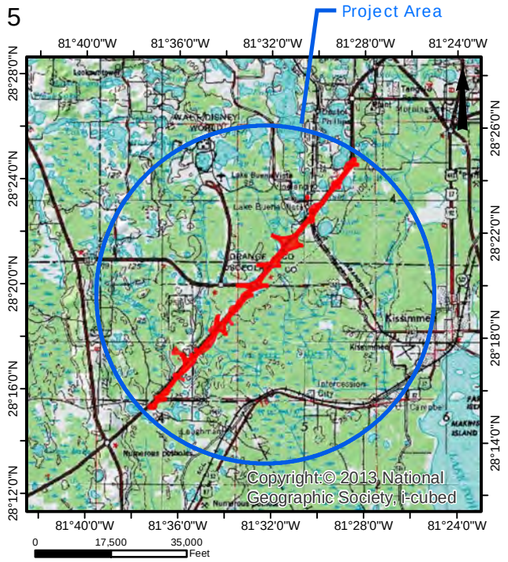


FIGURE NO.	SHEET NO.	TITLE
Figure A	Sheet 1-5	NRCS Soils Map
Figure B	Sheet 1-5	Land Use and Habitat Coverage Map
Figure C	Sheet 1-5	Species Location Map
Figure D	Single Sheet	Sand Skink Occupied Habitat Map

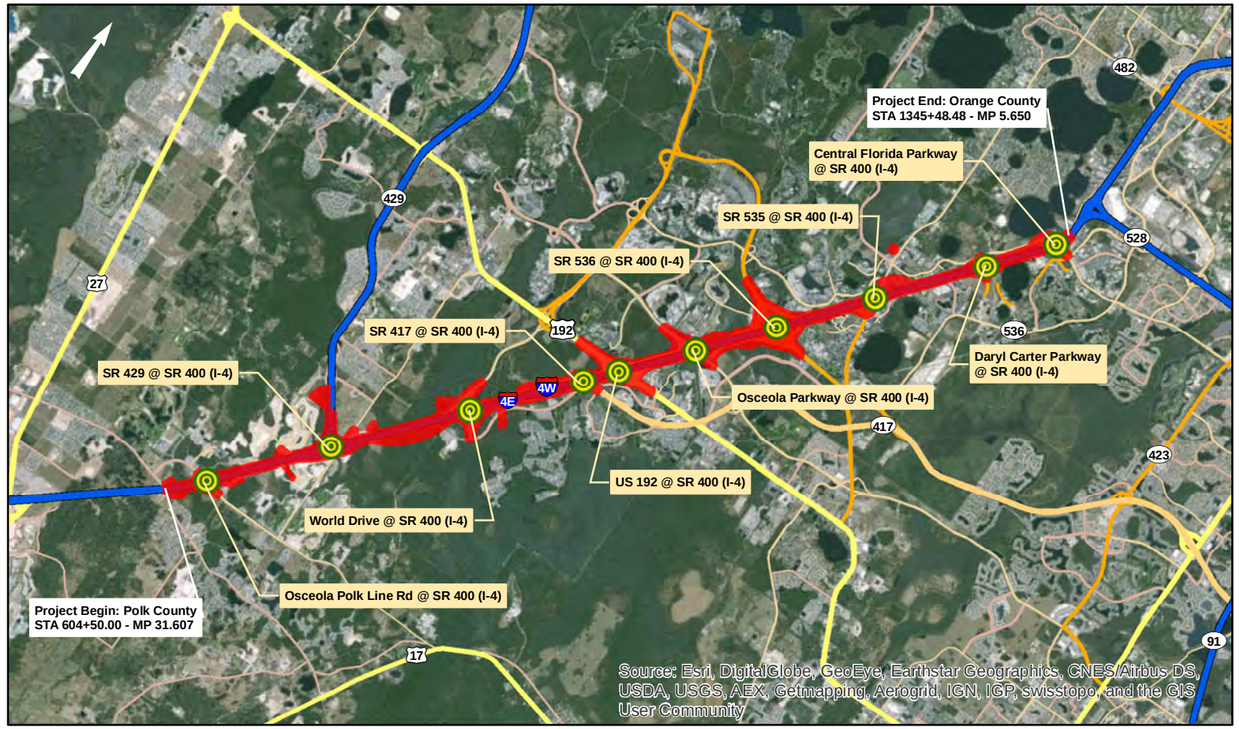
PROJECT DETAILS

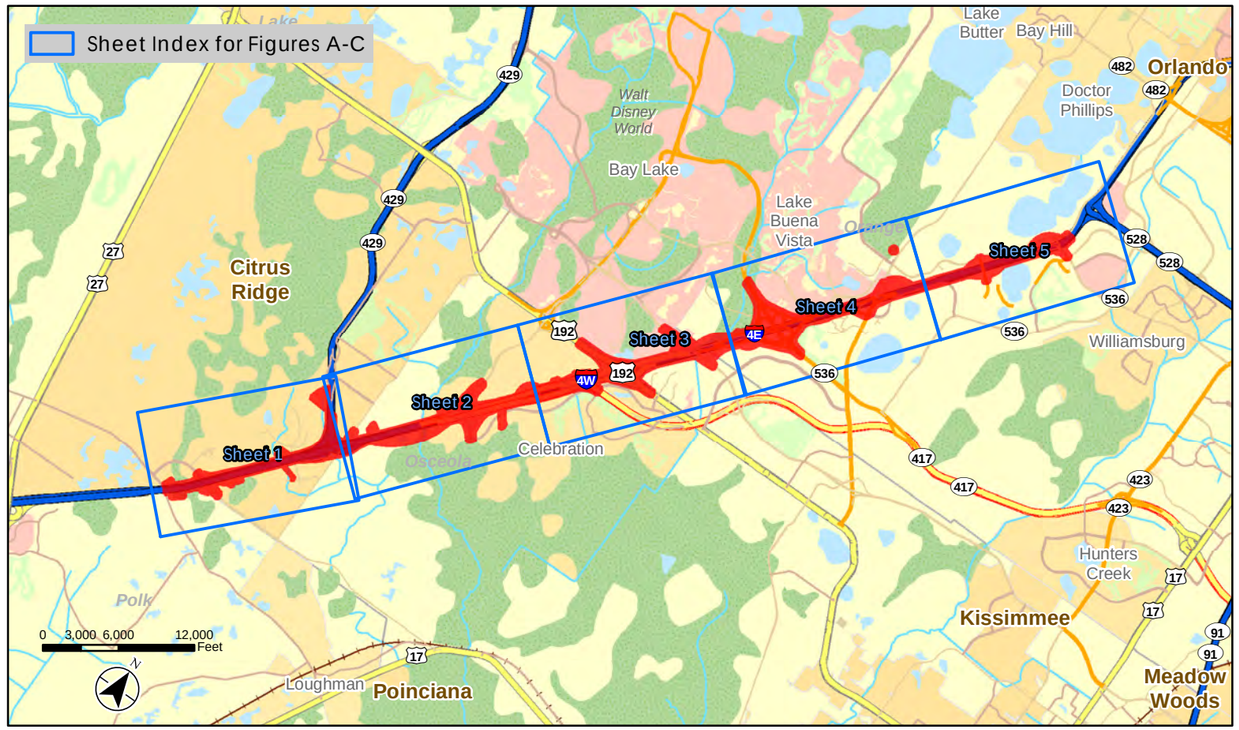
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT:
Segment 1 - Report Maps

SR 400 (I-4) from West of SR 532 (Polk/Osceola County Line)
to West of SR 528 Beachline Expressway

16320 Polk County
Begin: STA 604+50.00 - MP 31.607
End: STA 626+39.92 - MP 32.022

92130 Osceola County	75280 Orange County
Begin: STA 626+39.92 - MP 0.00	Begin: STA 1042+95 - MP 0.00
End: STA 11042+95 - MP 7.885	End: STA 1345+48.48 - MP 5.650





STN No. 2024230168

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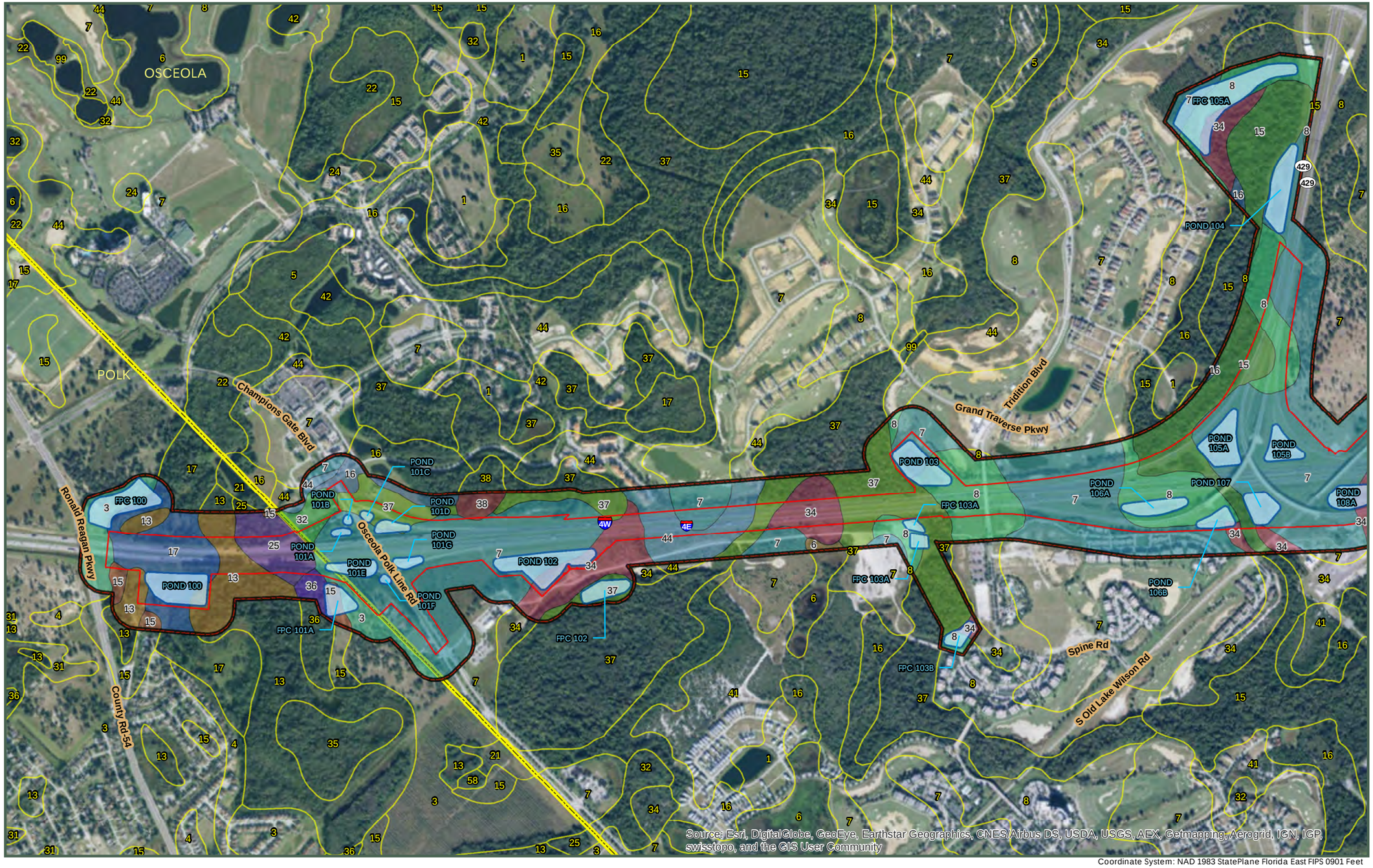


Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

NRCS Soils Units

- FL097;BASINGER FSD;6
- FL097;CANDLER SAND, 0-5% S;7
- FL097;CANDLER SAND, 5-12% S;8
- FL097;HONTOON MUCK;15
- FL097;IMMOKALEE FS;16
- FL097;PLACID FSD;32
- FL097;POMELLO FS, 0-5% S;34
- FL097;POMPANO FSD;37
- FL097;RIVIERA FS;38
- FL097;TAVARES FS, 0-5% S;44
- FL105;BASINGER MUCKY FSD;36
- FL105;CANDLER SAND, 0-5% S;3
- FL105;IMMOKALEE SAND;21
- FL105;PLACID AND MYAKKA FSD;25
- FL105;SAMSULA MUCK;13
- FL105;SMYRNA AND MYAKKA FS;17
- FL105;TAVARES FS, 0-5% S;15
- NRCS Soils Expanded Coverage

Soil Coverage Notes
FS- Fine Sand
FSD- Fine Sand Depressional
S- Slopes
FL095-Orange County
FL097- Osceola County
FL105- Polk County

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - NRCS Soils Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

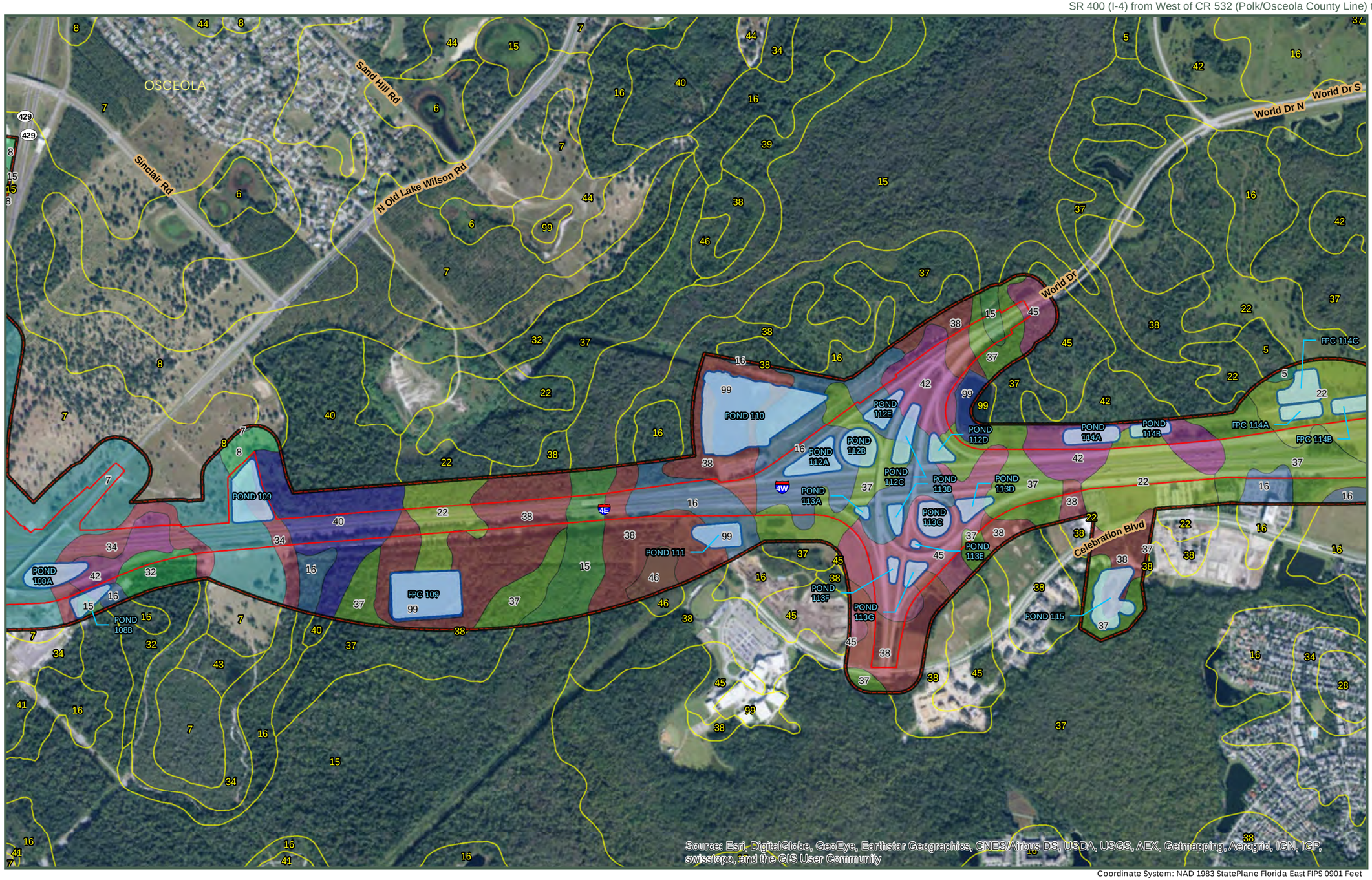
Project Location:
Polk Co.-Begin: STA 604+50.00/MP 31.607 | End: STA 626+39.92/MP 32.022
Osceola Co.-Begin: STA 626+39.92/MP 0.00 | End: STA 1042+95/MP 7.885
Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/6/2015
Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure A- NRCS Soils Map: Sheet 1 of 5



Map Key

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- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

NRCS Soils Units

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- FL097;CANDLER SAND, 0-5% S;7
- FL097;CANDLER SAND, 5-12% S;8
- FL097;HONTOON MUCK;15
- FL097;IMMOKALEE FS;16
- FL097;MYAKKA FS;22
- FL097;PLACID FSD;32
- FL097;POMELLO FS, 0-5% S;34
- FL097;POMPANO FSD;37
- FL097;RIVIERA FS;38
- FL097;SAMSULA MUCK;40
- FL097;SMYRNA FS;42
- FL097;WABASSO FS;45
- FL097;WATER;99
- FL097;WAUCHULA FS;46
- NRCS Soils Expanded Coverage

Soil Coverage Notes
FS- Fine Sand
FSD- Fine Sand Depressional
S- Slopes
FL095-Orange County
FL097- Osceola County
FL105- Polk County

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - NRCS Soils Map

Client/Project:
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Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

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Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure A- NRCS Soils Map: Sheet 2 of 5

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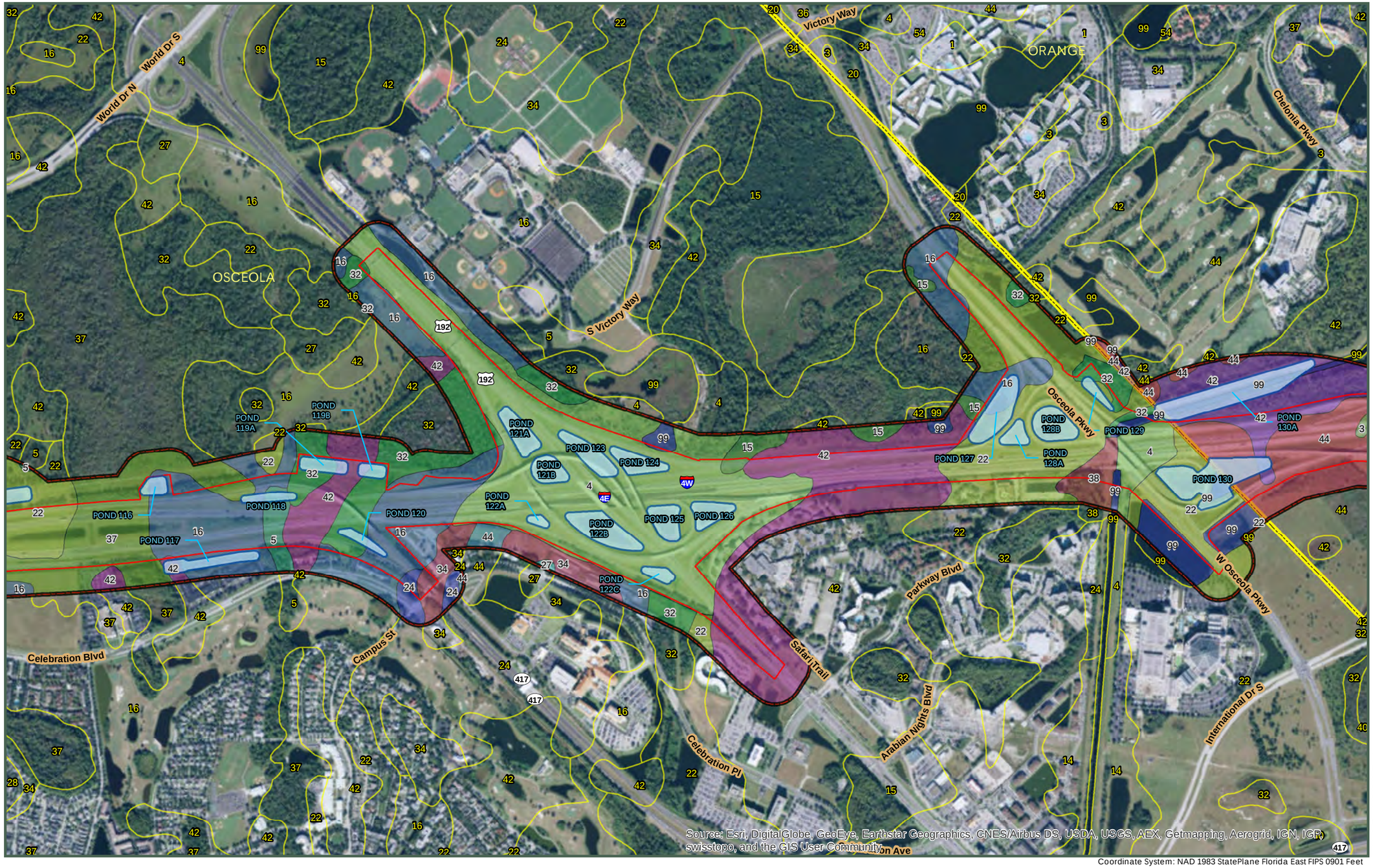

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

NRCS Soils Units

- FL095;BASINGER FSD;3
- FL095;SANIBEL MUCK;42
- FL095;SMYRNA FS;44
- FL095;WATER;99
- FL097;ARENTS, 0-5% S;4
- FL097;BASINGER FS;5
- FL097;HONTOON MUCK;15
- FL097;IMMOKALEE FS;16
- FL097;MYAKKA FS;22
- FL097;NARCOOSSEE FS;24
- FL097;ONA FS;27
- FL097;PLACID FSD;32
- FL097;POMELLO FS, 0-5% S;34
- FL097;POMPANO FSD;37
- FL097;RIVIERA FS;38
- FL097;SMYRNA FS;42
- FL097;TAVARES FS, 0-5% S;44
- FL097;WATER;99
- NRCS Soils Expanded Coverage

Soil Coverage Notes
FS- Fine Sand
FSD- Fine Sand Depressional
S- Slopes
FL095-Orange County
FL097- Osceola County
FL105- Polk County

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - NRCS Soils Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
Polk Co.-Begin: STA 604+50.00/MP 31.607 | End: STA 626+39.92/MP 32.022
Osceola Co.-Begin: STA 626+39.92/MP 0.00 | End: STA 11042+95/MP 7.885
Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/6/2015
Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Figure A- NRCS Soils Map: Sheet 3 of 5

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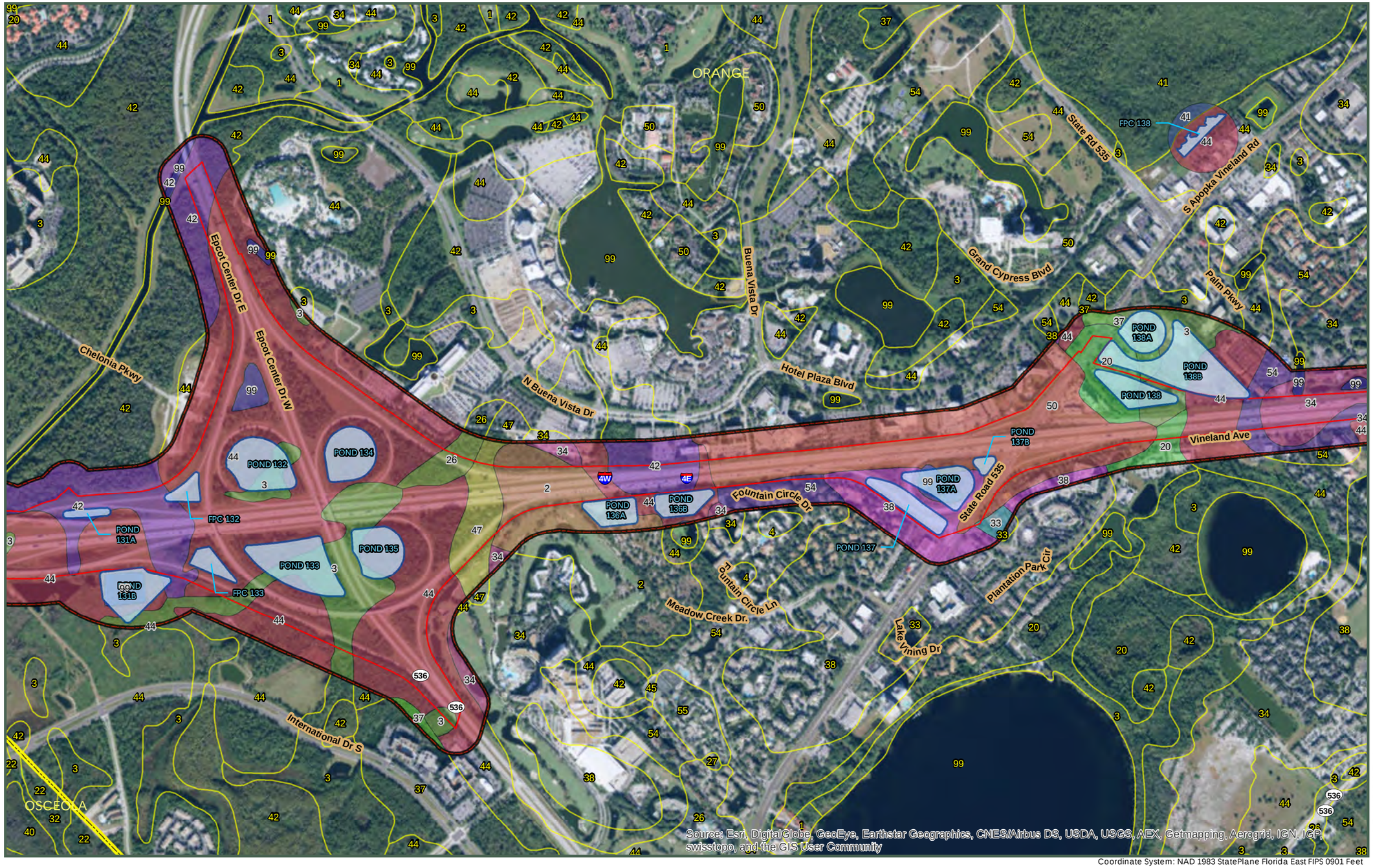

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

NRCS Soils Units

- FL095;ARCHBOLD FS, 0-5% S;2
- FL095;BASINGER FSD;3
- FL095;IMMOKALEE FS;20
- FL095;ONA FS;26
- FL095;PITS;33
- FL095;POMELLO FS, 0-5% S;34
- FL095;SAMSULA-HONTOON-BASINGE...
- FL095;SANIBEL MUCK;42
- FL095;SMYRNA FS;44
- FL095;ST. JOHNS FS;37
- FL095;ST. LUCIE FS, 0-5% S;38
- FL095;TAVARES-MILLHOPPER FS, 0;47
- FL095;URBAN LAND;50
- FL095;WATER;99
- FL095;ZOLFO FS;54
- NRCS Soils Expanded Coverage

Soil Coverage Notes
FS- Fine Sand
FSD- Fine Sand Depressional
S- Slopes
FL095-Orange County
FL097- Osceola County
FL105- Polk County

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - NRCS Soils Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
Polk Co.-Begin: STA 604+50.00/MP 31.607 | End: STA 626+39.92/MP 32.022
Osceola Co.-Begin: STA 626+39.92/MP 0.00 | End: STA 1042+95/MP 7.885
Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/6/2015
Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Figure A- NRCS Soils Map: Sheet 4 of 5

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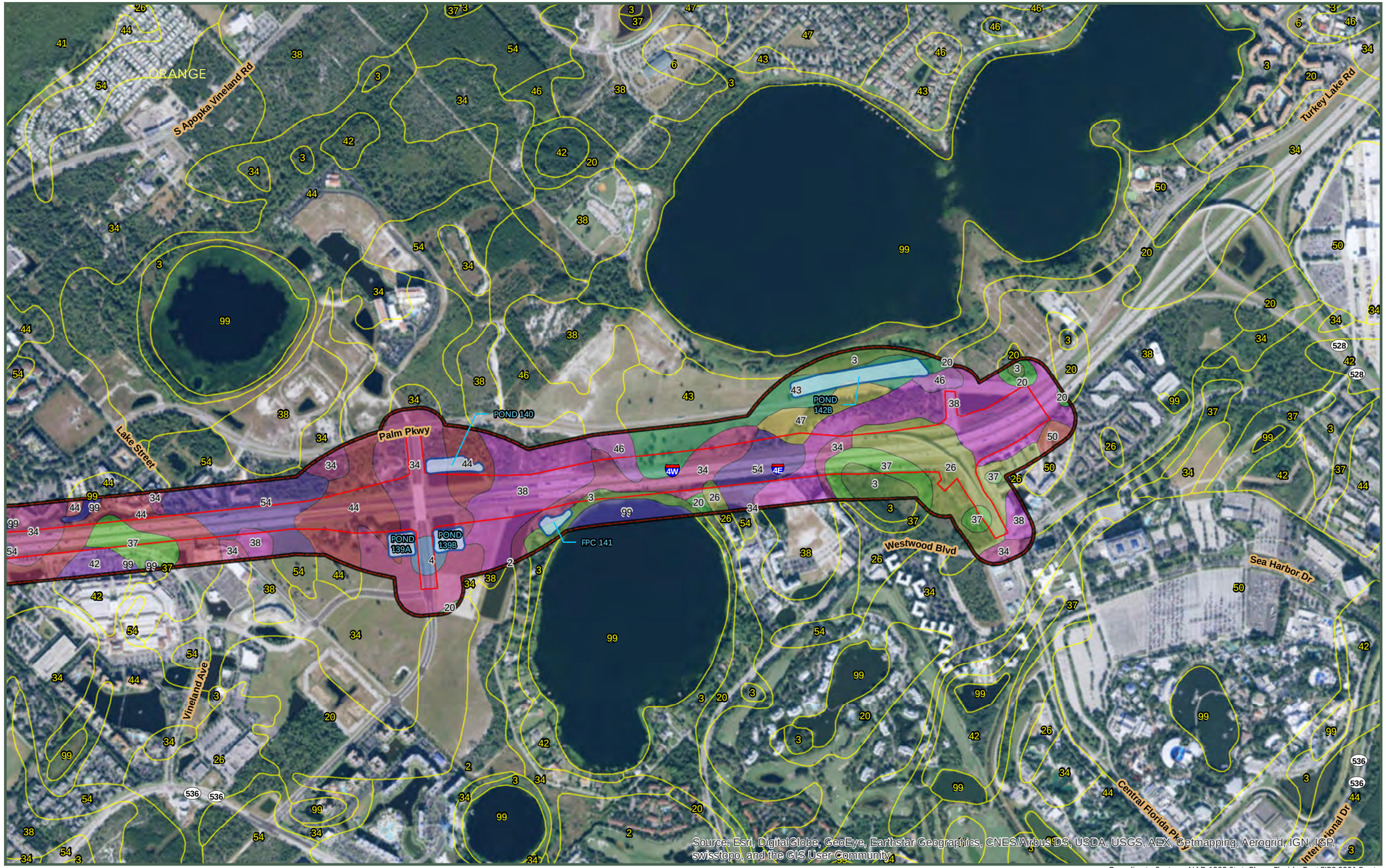

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

NRCS Soils Units

- FL095;ARCHBOLD FS, 0-5% S;2
- FL095;BASINGER FSD;3
- FL095;CANDLER FS, 0-5% S;4
- FL095;IMMOKALEE FS;20
- FL095;ONA FS;26
- FL095;POMELLO FS, 0-5% S;34
- FL095;SANIBEL MUCK;42
- FL095;SEFFNER FS;43
- FL095;SMYRNA FS;44
- FL095;ST. JOHNS FS;37
- FL095;ST. LUCIE FS, 0-5% S;38
- FL095;TAVARES FS, 0-5% S;46
- FL095;TAVARES-MILLHOPPER FS, 0;47
- FL095;URBAN LAND;50
- FL095;WATER;99
- FL095;ZOLFO FS;54
- NRCS Soils Expanded Coverage

Soil Coverage Notes
FS- Fine Sand
FSD- Fine Sand Depressional
S- Slopes
FL095-Orange County
FL097- Osceola County
FL105- Polk County

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - NRCS Soils Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
Polk Co.-Begin: STA 604+50.00/MP 31.607 | End: STA 626+39.92/MP 32.022
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Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/6/2015
Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure A- NRCS Soils Map: Sheet 5 of 5

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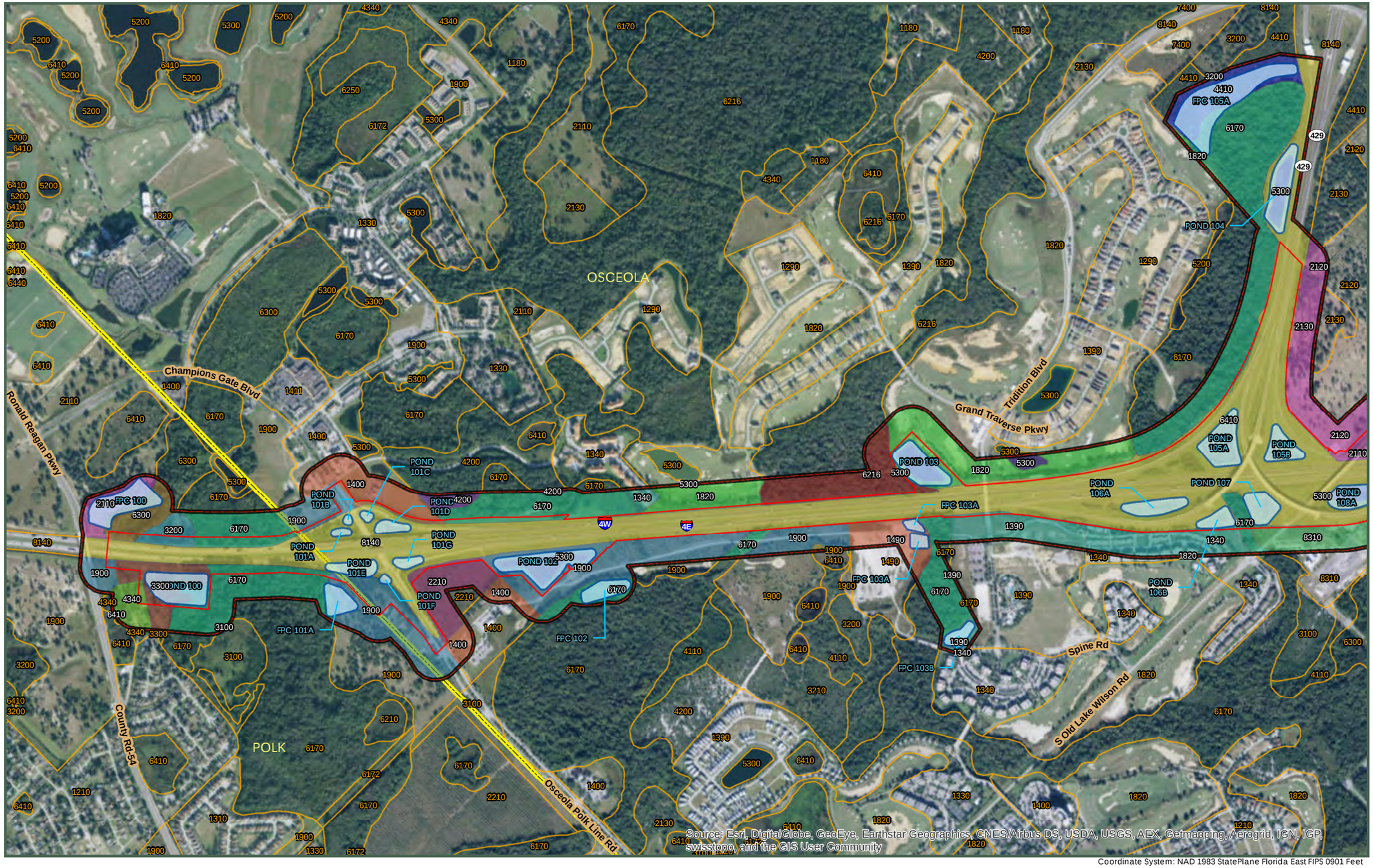

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

Land Use and Habitat Coverage

- 1100 RESIDENTIAL, LOW DENSITY
- 1300 RESIDENTIAL, HIGH DENSITY
- 1400 COMMERCIAL AND SERVICES
- 1700 INSTITUTIONAL
- 1800 RECREATIONAL
- 1900 OPEN LAND
- 2100 PASTURES
- 2200 TREE CROPS
- 3100 HERBACEOUS
- 3200 UPLAND SHRUB AND BRUSHLAND
- 3300 MIXED RANGELAND
- 4100 UPLAND CONIFEROUS FORESTS
- 4200 UPLAND HARDWOOD FORESTS
- 4300 UPLAND MIXED CONIFEROUS - HARDWOOD
- 4400 TREE PLANTATION
- 5100 STREAMS & WATERWAYS
- 5200 LAKES
- 5300 RESERVOIRS
- 6100 WETLAND HARDWOODS FORESTS
- 6200 WETLAND CONIFEROUS FORESTS
- 6300 WETLAND FORESTED MIXED
- 6400 FRESHWATER MARSHES
- 7400 DISTURBED LAND
- 8140 ROADS AND HIGHWAYS
- 8300 ELECTRICAL POWER FACILITIES
- LAND USE AND HABITAT COUNTY COVERAGE

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Land Use and Habitat Coverage Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
Polk Co.-Begin: STA 604+50.00/MP 31.607 | End: STA 626+39.92/MP 32.022
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Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/6/2015
Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure B- Land Use and Habitat Coverage Map: Sheet 1 of 5

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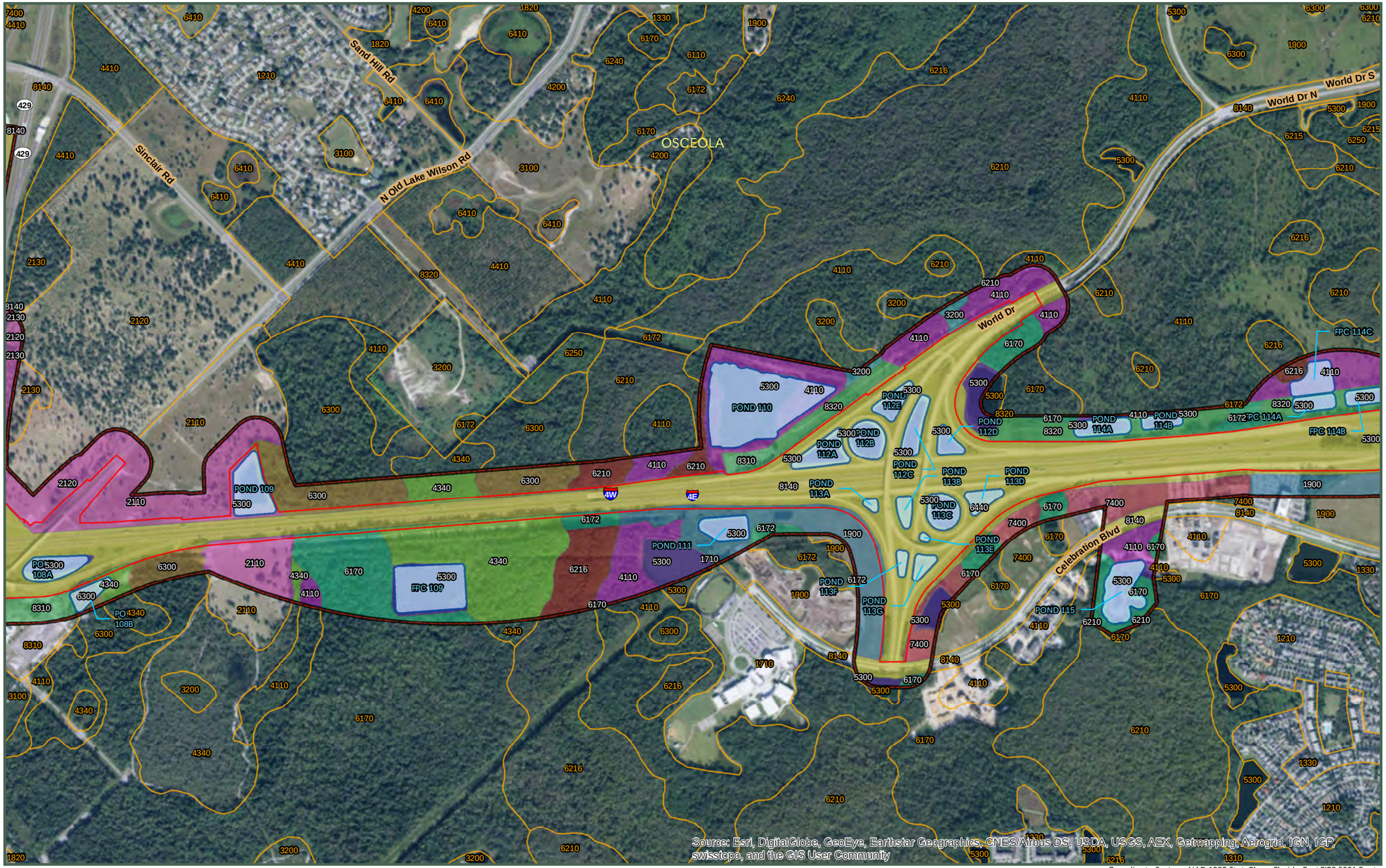

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

Land Use and Habitat Coverage

- 1100 RESIDENTIAL, LOW DENSITY
- 1300 RESIDENTIAL, HIGH DENSITY
- 1400 COMMERCIAL AND SERVICES
- 1700 INSTITUTIONAL
- 1800 RECREATIONAL
- 1900 OPEN LAND
- 2100 PASTURES
- 2200 TREE CROPS
- 3100 HERBACEOUS
- 3200 UPLAND SHRUB AND BRUSHLAND
- 3300 MIXED RANGELAND
- 4100 UPLAND CONIFEROUS FORESTS
- 4200 UPLAND HARDWOOD FORESTS
- 4300 UPLAND MIXED CONIFEROUS - HARDWOOD
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- 8300 ELECTRICAL POWER FACILITIES
- LAND USE AND HABITAT COUNTY COVERAGE

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Land Use and Habitat Coverage Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
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0 575 1,150 2,300 Feet

Figure B- Land Use and Habitat Coverage Map: Sheet 2 of 5

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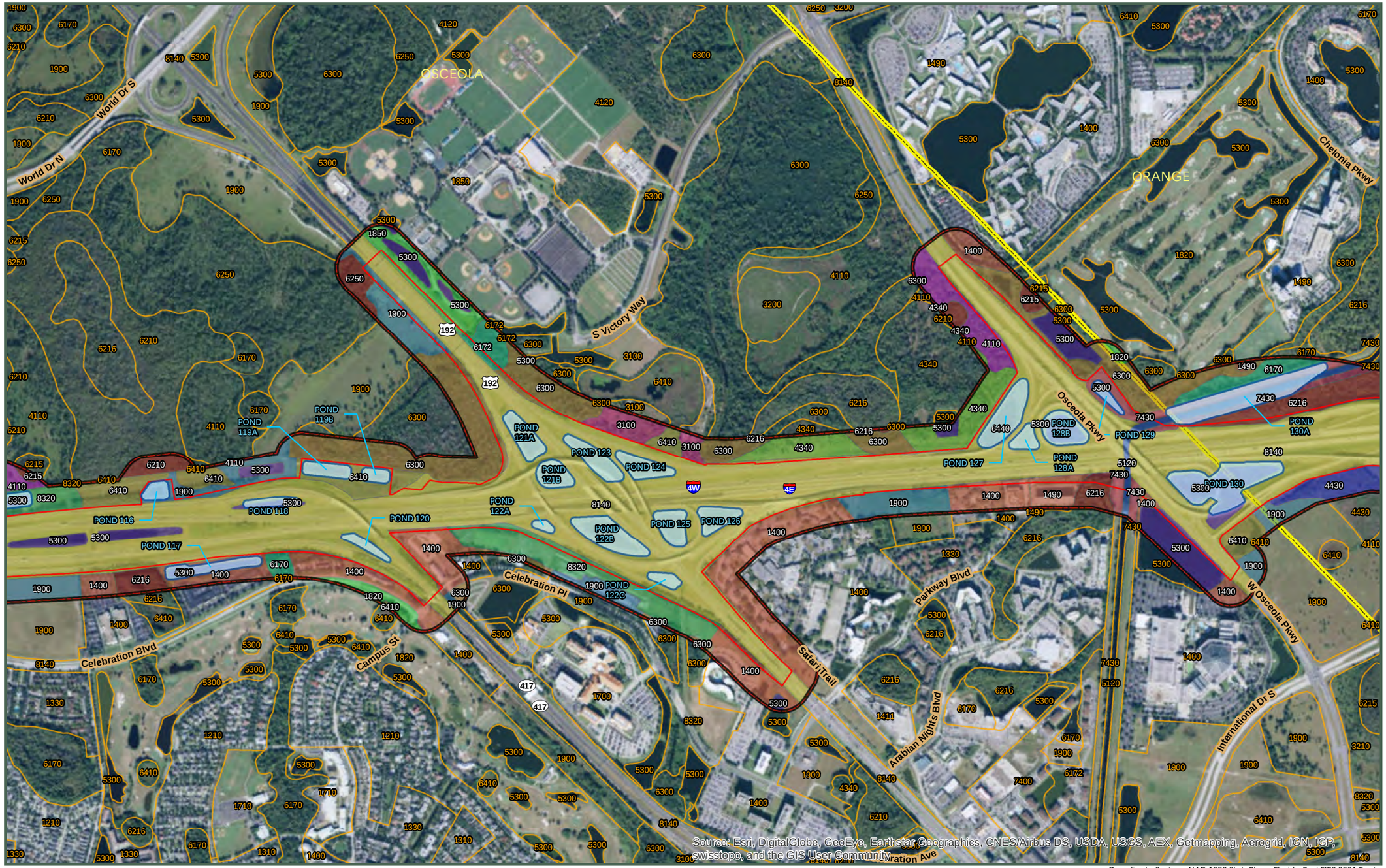

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

Land Use and Habitat Coverage

- 1100 RESIDENTIAL, LOW DENSITY
- 1300 RESIDENTIAL, HIGH DENSITY
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- 2100 PASTURES
- 2200 TREE CROPS
- 3100 HERBACEOUS
- 3200 UPLAND SHRUB AND BRUSHLAND
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- 6300 WETLAND FORESTED MIXED
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- 8140 ROADS AND HIGHWAYS
- 8300 ELECTRICAL POWER FACILITIES
- LAND USE AND HABITAT COUNTY COVERAGE

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ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Land Use and Habitat Coverage Map

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Florida Department of Transportation- D5
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Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure B- Land Use and Habitat Coverage Map: Sheet 3 of 5

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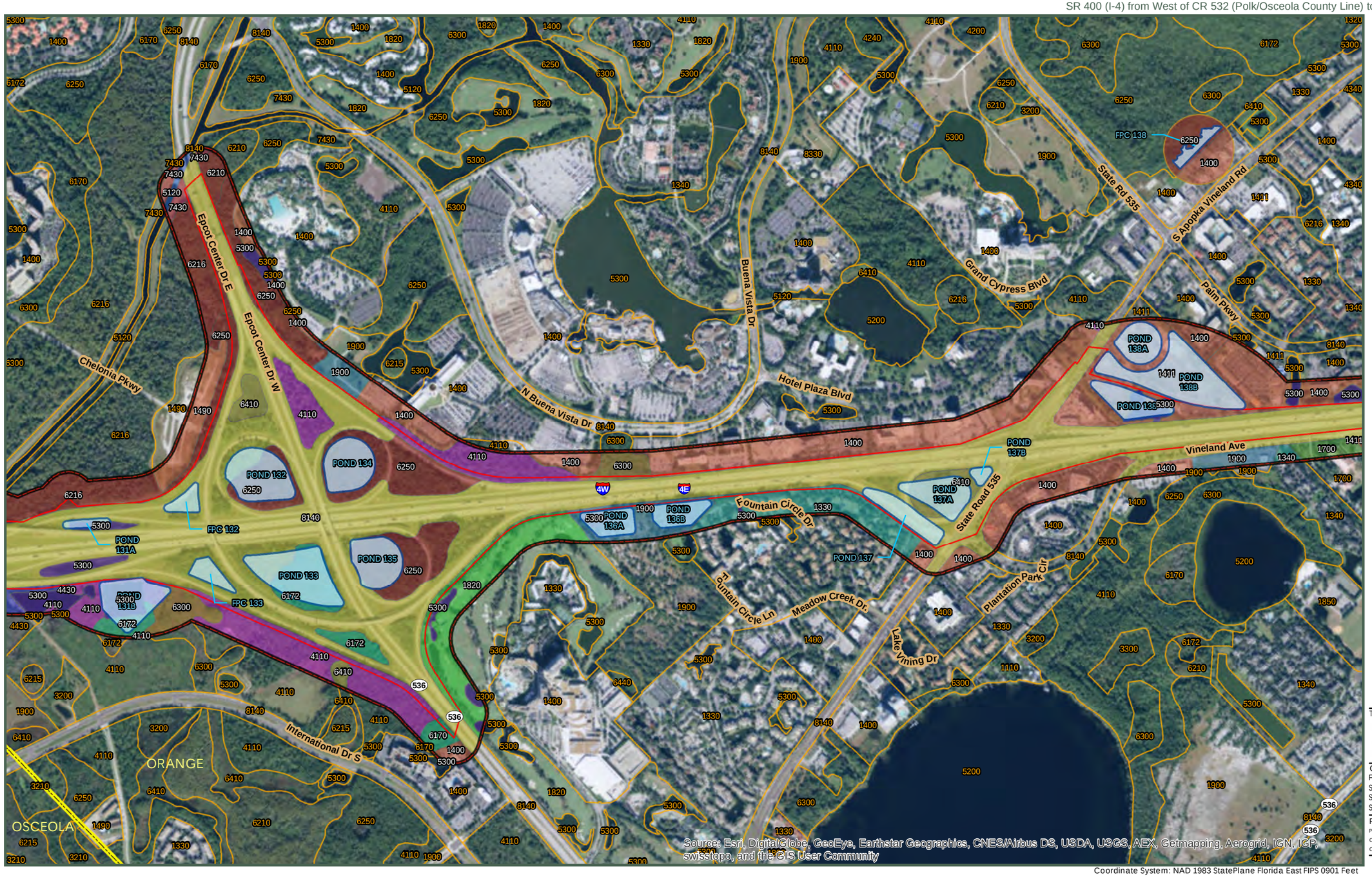

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

Land Use and Habitat Coverage

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- 1300 RESIDENTIAL, HIGH DENSITY
- 1400 COMMERCIAL AND SERVICES
- 1700 INSTITUTIONAL
- 1800 RECREATIONAL
- 1900 OPEN LAND
- 2100 PASTURES
- 2200 TREE CROPS
- 3100 HERBACEOUS
- 3200 UPLAND SHRUB AND BRUSHLAND
- 3300 MIXED RANGELAND
- 4100 UPLAND CONIFEROUS FORESTS
- 4200 UPLAND HARDWOOD FORESTS
- 4300 UPLAND MIXED CONIFEROUS - HARDWOOD
- 4400 TREE PLANTATION
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- 5200 LAKES
- 5300 RESERVOIRS
- 6100 WETLAND HARDWOODS FORESTS
- 6200 WETLAND CONIFEROUS FORESTS
- 6300 WETLAND FORESTED MIXED
- 6400 FRESHWATER MARSHES
- 7400 DISTURBED LAND
- 8140 ROADS AND HIGHWAYS
- 8300 ELECTRICAL POWER FACILITIES
- LAND USE AND HABITAT COUNTY COVERAGE

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Land Use and Habitat Coverage Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
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Osceola Co.-Begin: STA 626+39.92/MP 0.00 | End: STA 1042+95/MP 7.885
Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/6/2015
Technical Review by: mDrauer 7/6/2015
Independent Review by: jMoore 7/6/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure B- Land Use and Habitat Coverage Map: Sheet 4 of 5

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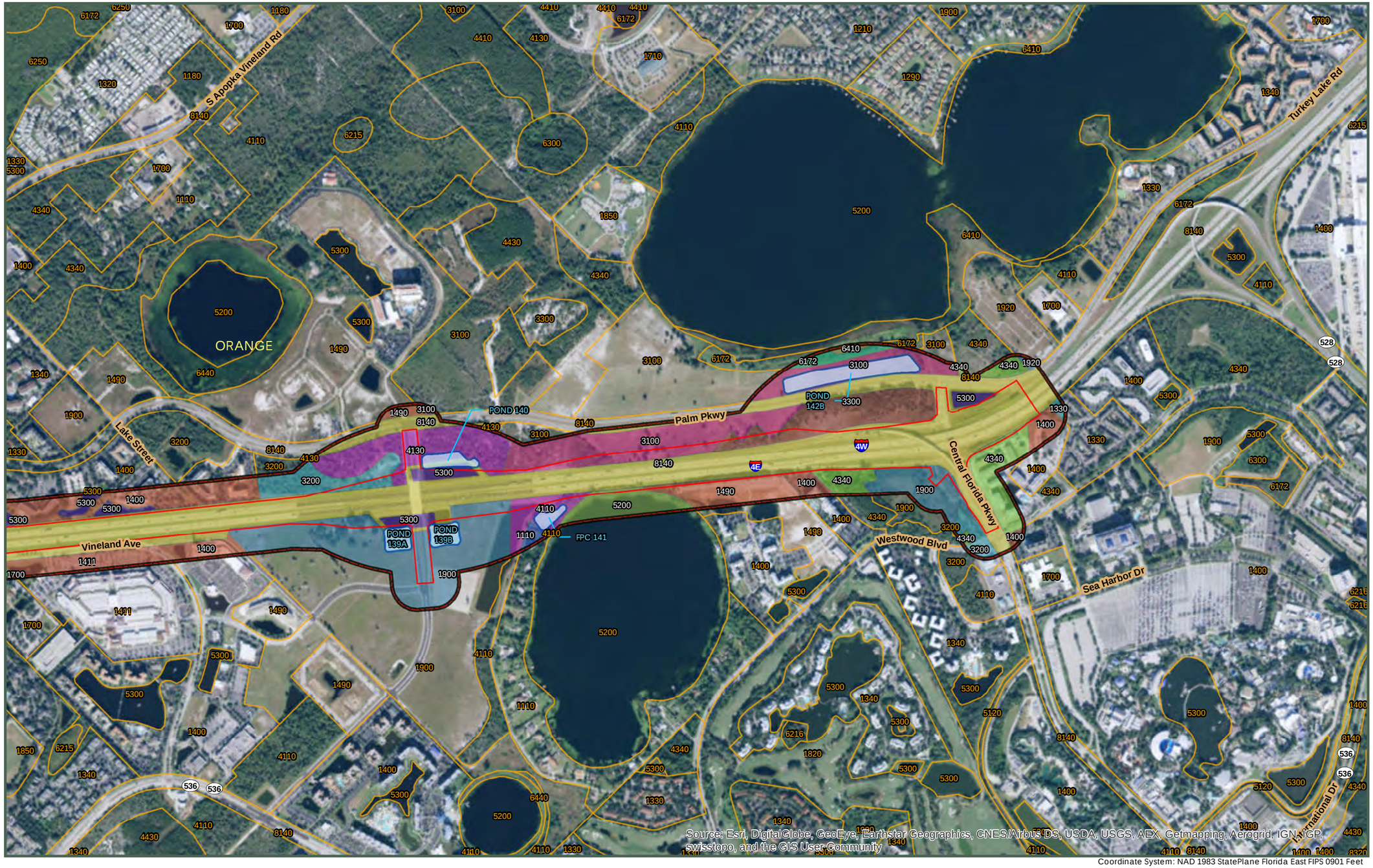

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

Land Use and Habitat Coverage

- 1100 RESIDENTIAL, LOW DENSITY
- 1300 RESIDENTIAL, HIGH DENSITY
- 1400 COMMERCIAL AND SERVICES
- 1700 INSTITUTIONAL
- 1800 RECREATIONAL
- 1900 OPEN LAND
- 2100 PASTURES
- 2200 TREE CROPS
- 3100 HERBACEOUS
- 3200 UPLAND SHRUB AND BRUSHLAND
- 3300 MIXED RANGELAND
- 4100 UPLAND CONIFEROUS FORESTS
- 4200 UPLAND HARDWOOD FORESTS
- 4300 UPLAND MIXED CONIFEROUS - HARDWOOD
- 4400 TREE PLANTATION
- 5100 STREAMS & WATERWAYS
- 5200 LAKES
- 5300 RESERVOIRS
- 6100 WETLAND HARDWOODS FORESTS
- 6200 WETLAND CONIFEROUS FORESTS
- 6300 WETLAND FORESTED MIXED
- 6400 FRESHWATER MARSHES
- 7400 DISTURBED LAND
- 8140 ROADS AND HIGHWAYS
- 8300 ELECTRICAL POWER FACILITIES
- LAND USE AND HABITAT COUNTY COVERAGE

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Land Use and Habitat Coverage Map

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Florida Department of Transportation- D5
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0 575 1,150 2,300 Feet

Figure B- Land Use and Habitat Coverage Map: Sheet 5 of 5

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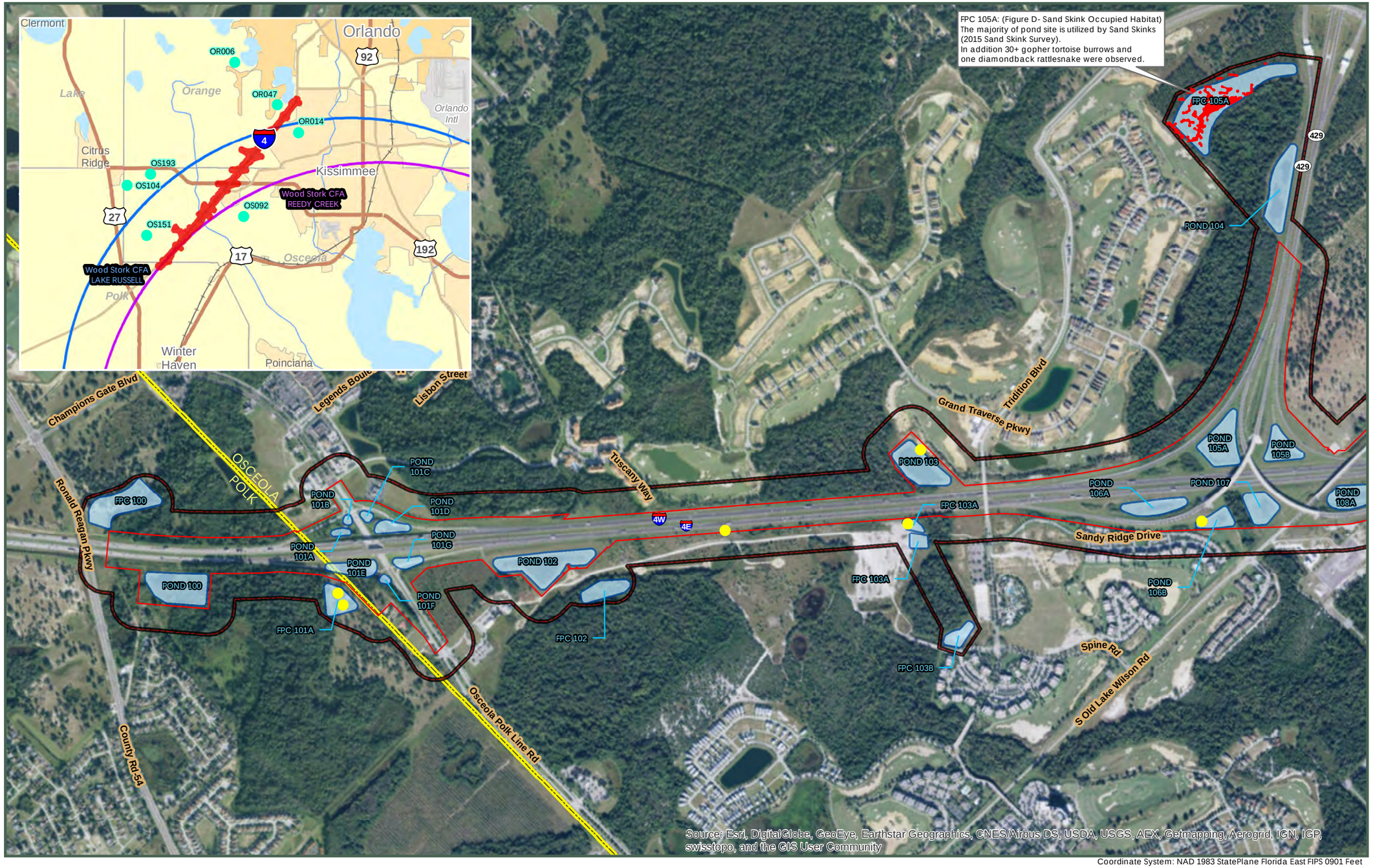

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

SPECIES DATA & OBSERVATIONS

- Gopher Tortoise Burrow
- Bald Eagle Nest (2012)
- Lupinus aridorum (2014): Scrub Lupine
- Sand Skink Occurrence

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Species Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

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Technical Review by: mDrauer 11/30/2015
Independent Review by: jMoore 11/30/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure C- Species Location Map: Sheet 1 of 5

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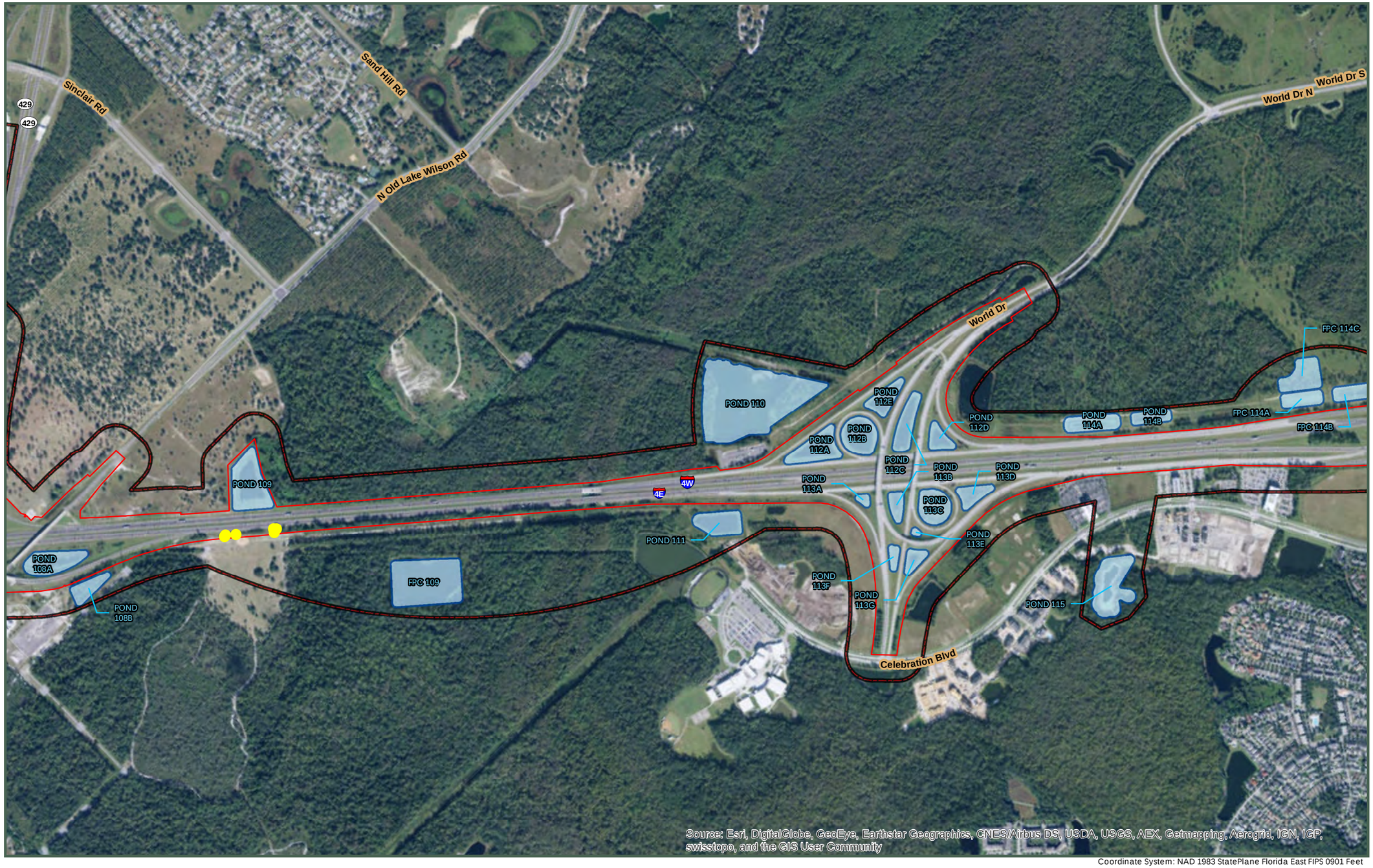

Map Key

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0 575 1,150 2,300 Feet

Figure C- Species Location Map: Sheet 2 of 5

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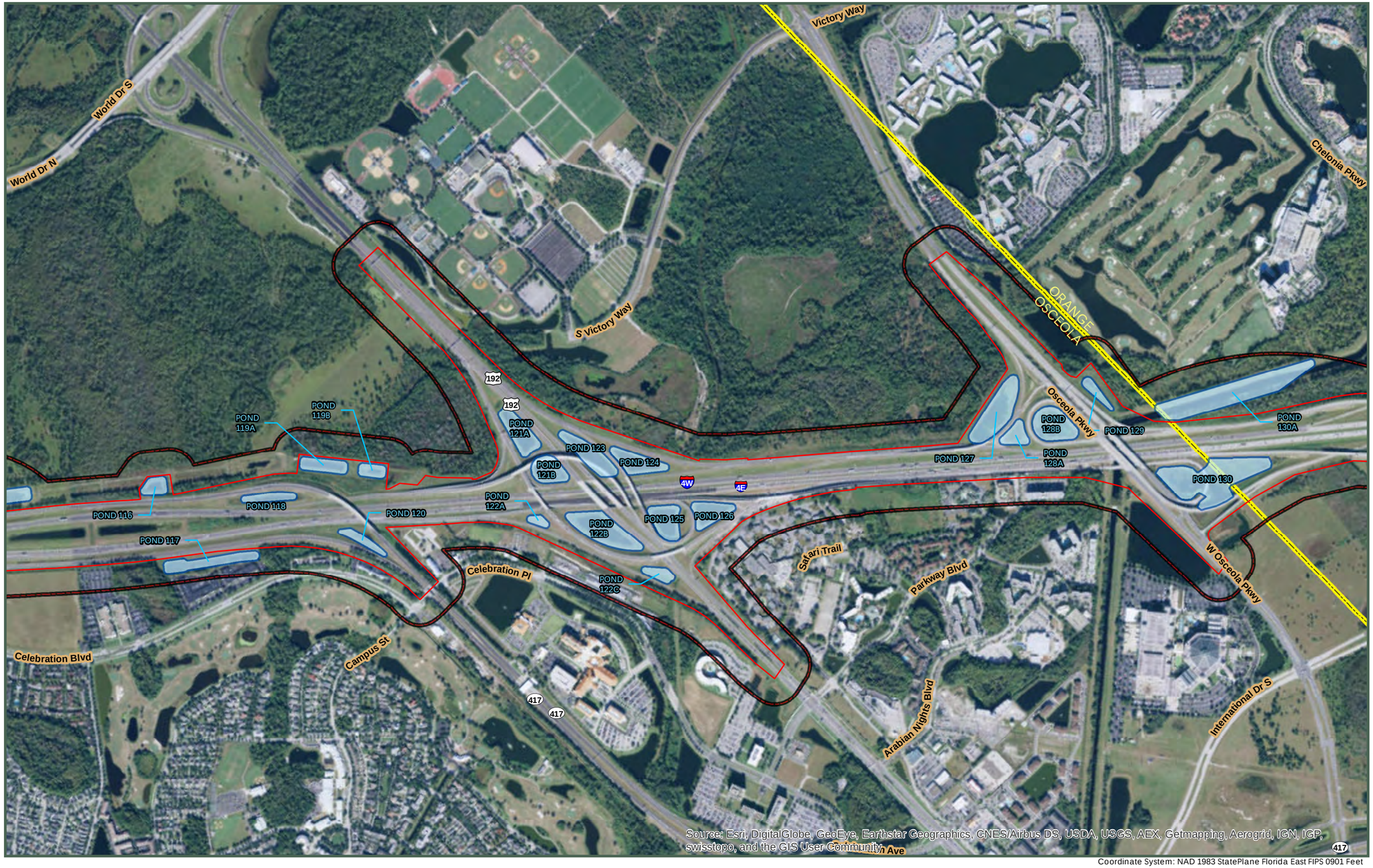

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

SPECIES DATA & OBSERVATIONS

- Gopher Tortoise Burrow
- Bald Eagle Nest (2012)
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- Sand Skink Occurrence

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Figure C- Species Location Map: Sheet 3 of 5

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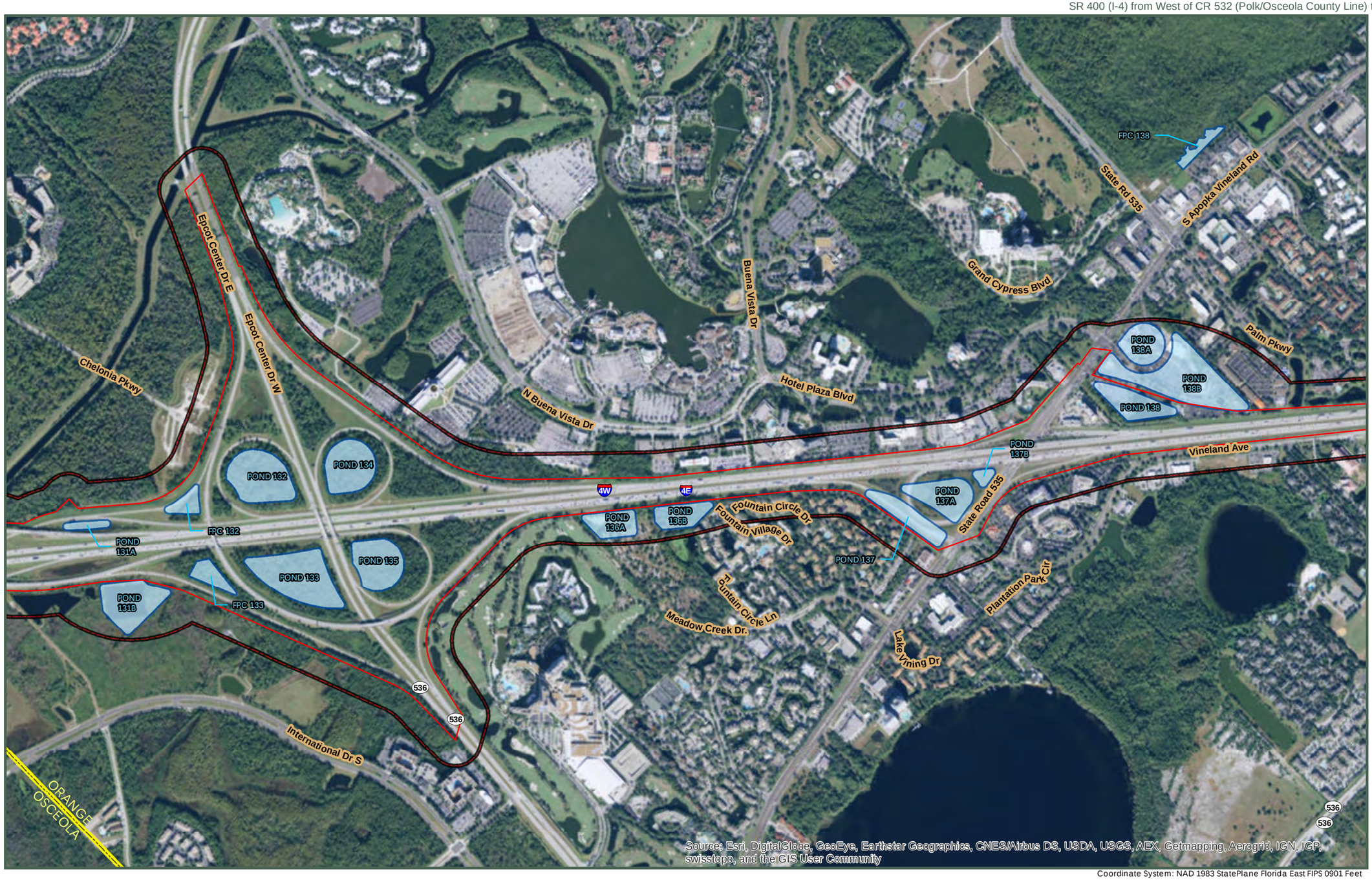

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0 575 1,150 2,300 Feet

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Figure C- Species Location Map: Sheet 4 of 5

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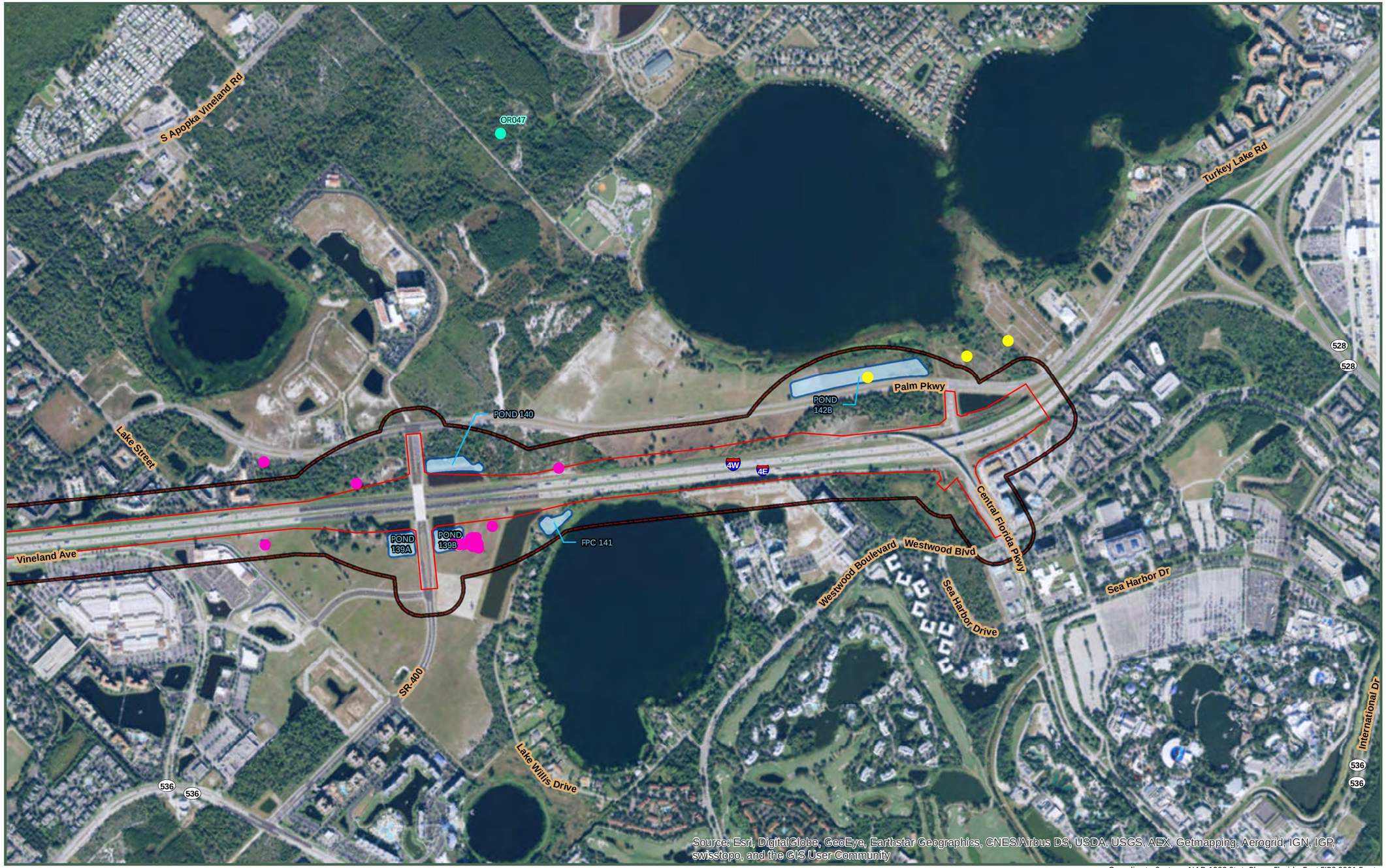

Map Key

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Figure C- Species Location Map: Sheet 5 of 5

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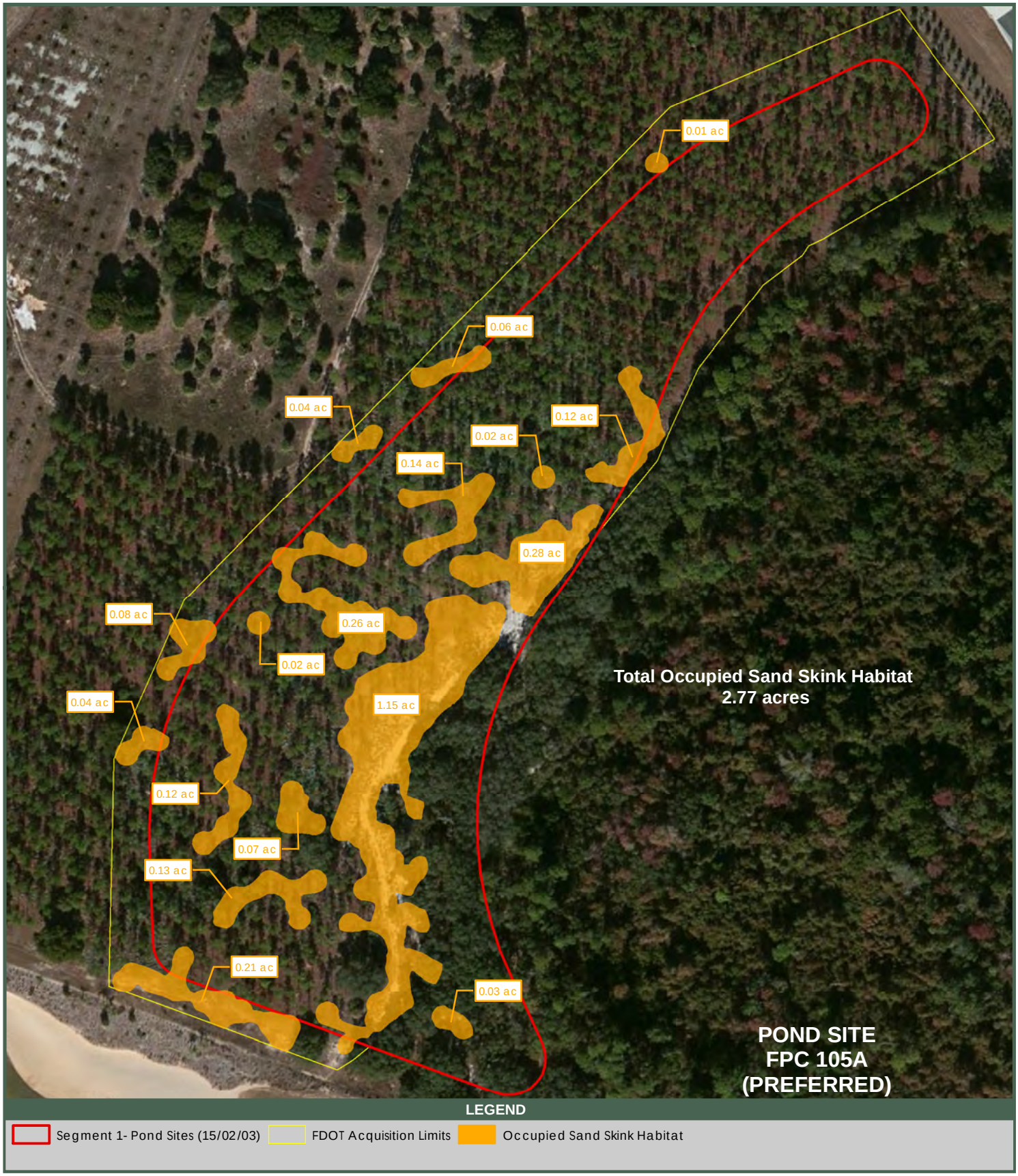

Figure D: Sand Skink Occupied Habitat Map

0 90 180 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat Map

1 " = 180 '

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APPENDIX B
LISTED SPECIES TABLES

Table 1: Protected wildlife species with the potential to occur in Polk County, Florida.

Species Name	Common Name	FFWCC	USFWS	FNAI	FCREPA	Likelihood of Occurrence	Habitat
Alligator mississippiensis	American alligator	T (S/A)	T(S/A)	S4		observed	Various aquatic habitats
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	E	S1	E	low	Palmetto prairies and ruderal habitats
Aphelocoma coerulescens	Florida scrub-jay	T	T	S3	T	low	Scrub and scrubby flatwoods
Aramus guarana	Limpkin	SSC		S3	SSC	moderate	Swamps, forested floodplains, mangrove swamps & marshes
Ardea alba	Great egret			S4	SSC	observed	Marshes, swamps, lakes, ponds, ditches and estuaries
Athene cuicularia floridana	Florida burrowing owl	SSC		S3		low	Dry prairie, sandhill, ruderal areas
Buteo brachyurus	Short-tailed hawk			S1	R	low	Open country and forested areas; avoids dense forest
Campephilus principalis	Ivory-billed woodpecker	E	E	S1		low	swamps, hammocks
Clemmys guttata	Spotted turtle			S3?	R	low	Mesic flatwoods, wooded ponds, marshes, streams & sloughs
Corynorhinus rafinesquii	Southeastern big-eared bat			S2		low	Floodplains, pine flatwoods, mixed oak/pine areas
Crotalus adamanteus	Eastern diamond back rattlesnake			S3		observed	Sandhills, pine flatwoods, dry prairie, hammocks, & coastal
Drymarchon corais couperi	Eastern indigo snake	T	T	S3	SSC	low	Wide variety of habitats
Egretta caerulea	Little blue heron	SSC		S4	SSC	observed	Marshes, ponds, lakes, meadows, streams & mangroves
Egretta thula	Snowy egret	SSC		S3	SSC	observed	Marshes, lakes, ponds and shallow, coastal habitats
Egretta tricolor	Tricolored heron	SSC		S4	SSC	low	Marshes, ponds and rivers
Elanoides forficatus	American swallow-tailed kite			S2	T	observed	Lowland forests
Elanus leucurus	White-tailed kite			S2		low	marshes
Eptesicus fuscus fuscus	Big brown bat			S3	SU	low	Caves, buildings and trees
Eudocimus albus	White ibis	SSC		S4	SSC	observed	Marshes, mangroves, lakes and estuaries
Eumops floridanus	Florida bonneted bat	T		S1		low	Roosts in palms, hollow trees, buildings
Falco columbarius	merlin			S2		low	herbaceous wetlands
Falco peregrinus tundrius	Arctic peregrine falcon			S2	E	low	Wide variety of open habitats
Falco sparverius paulus	Southeastern American kestrel	T		S3	T	moderate	Open, or partly open habitats with scattered trees
Gopherus polyphemus	Gopher tortoise	T		S3	T	observed	Sandhills, scrub, hammocks, dry prairies, flatwoods, & ruderal
Grus americna	whooping crane		E/P	S1		low	Shallow wetlands, freshwater marshes and wet prairies
Grus canadensis pratensis	Florida sandhill crane	T		S2S3	T	observed	Shallow wetlands, freshwater marshes and wet prairies
Haliaeetus leucocephalus leucocephalus	Southern bald eagle			S3	T	high	Coasts, rivers and large lakes in open areas
Hydroprogne caspia	Caspian tern			S2		low	Coastal - lakes, marshes, rivers
Ixobrychus exilis	least bittern			S4		low	marshes, brackish, mangroves
Lampropeltis extenuatum	Short-tailed snake	T		S3	T	low	Longleaf pine-turkey oak, sand pine scrub and xeric hammocks
Lampropeltis calligaster rhombomaculata	Mole snake			S2S3	R	low	Sandhills, upland pine forests, flatwoods and ruderal habitats
Lampropeltis getula	common king snake			S2S3		low	Wide variety of habitats

Mustela frenata peninsulae	Florida weasel			S3?	R	low	Scrub, sandhills, flatwoods, swamps and hammocks
Mycteria americana	Wood stork	T	T	S2	E	observed	Marshes, swamps, streams and mangroves
Neofiber alleni	Round-tailed muskrat			S3	SSC	low	Shallow freshwater and salt marshes
Nyctanassa violacea	Yellow-crowned night-heron			S3?	SSC	low	Marshes, swamps, lakes, lagoons, mudflats, & mangroves
Nycticorax nycticorax	Black-crowned night-heron			S3?	SSC	low	Marshes, swamps, ponds, lagoons, mangroves & wet prairies
Pandion haliaetus	osprey			S3S4		high	lakes, rivers. Nests on poles, structures, trees near water
Peucaea aestivalis	Bachman's sparrow			S3		low	Open pine woods, dry prairies and old fields
Picoides borealis	Red-cockaded woodpecker	T	E	S2	E	low	Open, mature pine woodlands
Picoides villosus	Hairy woodpecker			S3?	SSC	low	Deciduous and coniferous woods
Pituophis melanoleucus mugitus	Florida pine snake	SSC		S3	SU	low	Sandhills, scrubby flatwoods, xeric hammocks & ruderal habitats
Platalea ajaja	Roseate spoonbill	SSC		S2	R	low	Marshes, swamps, ponds, rivers and lagoons
Plegadis falcinellus	Glossy ibis			S2	SSC	observed	Marshes and swamps
Plestidon egregius lividus	Bluetail mole skink	T	T	S2	E	moderate	Sandy scrub, sandhills and xeric hammocks
Plestidon reynoldsi	Sand skink	T	T	S2	T	observed	Scrub, sandhills, and scrubby flatwoods
Podomys floridanus	Florida mouse	SSC		S3	T	high	Scrub, flatwoods and longleaf pine-turkey oak sandhills
Polyborus plancus audubinii	Crested caracara	T	T	S2		low	Open country, dry prairie, pasture lands
Pseudemys concinna suwaniensis	Suwannee cooter	SSC		S3	SSC	low	Rivers, spring runs, and associated backwaters
Puma concolor	puma		T (S/A)			low	Variety of forested landscapes
Puma concolor coryi	Florida panther	E	E	S1		low	Forested communities, large wetlands inaccessible to humans
Rana (=Lithobates) capito	Gopher frog	SSC		S3	T	moderate	Xeric uplands and pine flatwoods
Recurvirostra americana	American avocet			S1S2	SSC	low	Ponds, marshes, mud flats, alkaline lakes and estuaries
Rostrhamus sociabilis plumbeus	Florida snail kite	E	E	S2	E	moderate	Subtropical freshwater marshes, lakes
Rynchops niger	Black skimmer	SSC		S3	SSC	low	Coastal beaches and salt marshes
Sceloporus woodi	Florida scrub lizard			S3	T	moderate	Sandhills, scrub and sandy, forest edges
Sciurus niger shermani	Sherman's fox squirrel	SSC		S3	T	moderate	Longleaf pine-turkey oak sandhills, mesic flatwoods, & baygalls
Sterna antillarum	Least tern	T		S3	T	low	Open, flat beaches, river and lake margins
Sterna sandvicensis	Sandwich tern			S2	SSC	low	Coastal beaches, flats and islands
Ursus americanus floridanus	Florida black bear			S2	T	moderate	Variety of forested landscapes

Notes:

FFWCC = Florida Fish and Wildlife Conservation Commission

E= Endangered; T= Threatened; SSC= Species of Special Concern

USFWS = US Fish and Wildlife Service

E= Endangered; T= Threatened; (S/A)= Similarity of Appearance; (E/P)= Experimental Population; C = Candidate for Listing; *CH = Critical Habitat

FNAI = Florida Natural Areas Inventory

S1= Critically Imperiled Due to Extreme Rarity; S2= Imperiled Due to Rarity; S3= Very Rare and Local;
S4= Apparently Secure; SH= Historical Occurrence; ?= Tentative Ranking

FCREPA = Florida Committee on Rare and Endangered Plants and Animals

E= Endangered; T= Threatened; SSC= Species of Special Concern; R= Rare; SU= Status Undetermined

Likelihood of Occurrence

Low= Low likelihood; Mod= Moderate likelihood; High= High likelihood; Obs= Observed by Stantec; Obs*= Observed by Others

Source: Stantec Endangered Species Database, 2014.

Table 2: Protected plant species with the potential to occur in Polk County, Florida.

Species Name	Common Name	FDA	USFWS	FNAI	Likelihood of Occurrence	Habitat
Asclepias curtissii	Curtiss' milkweed	E		S3	low	Sandhills and scrub
Bonamia grandiflora	Florida bonamia, Scrub morning glory	E	T	S3	moderate	Sand pine scrub
Calamintha ashei	Ashe's savory	T		S3	low	Dry pinelands and sand pine scrub
Calopogon multiflorus	Many-flowered grass pink	T		S2S3	low	Pine flatwoods, esp. recently burned
Centrosema arenicola	Sand butterfly pea	E		S2	low	Sandhills and scrubby flatwoods
Chionanathus pygmaeus	Pigmy fringe tree	E	E	S3	low	Sand pine scrub
Chrysopsis highlandensis	Highlands Goldenaster			S2	low	sand pine scrub and scrubby flatwoods
Cladonia perforata	Perforate Reindeer Lichen	E	E	S1	low	Rosemary scrub
Clitoria fragrans	Scrub Pigeon-wing	E	T	S3	low	Dry sandhills and scrub
Coelorachis tuberculosa	Piedmont joint grass	T		S3	low	karst areas or margins of shallow lakes and ponds
Conradina breviflora	Short-leaved rosemary	E	E	S2	low	Sandhills and scrub
Crotalaria avonensis	Avon Park rattlebox	E	E	S1	low	Scrub
Ctenitis sloanei	Comb fern	E		S2	low	Cypress swamps and hammocks
Dicerandra frutescens	Scrub balm	E	E	S1	low	Oak scrub
Drosera intermedia	Water sundew	T		S3	low	Pinelands, woods and bogs
Encyclia tampensis	Butterfly orchid	CE			low	Mangrove, cypress and hardwood swamps; hammocks
Epidendrum conopseum	Greenfly orchid	CE			low	Moist hammocks, cypress and hardwood swamps; epiphytic
Eriogonum longifolium var. gnaphalifolium	Scrub buckwheat	E	T	S3	low	Sandhill, oak-hickory scrub, pineland & turkey-oak areas
Garberia heterophylla	Garberia	T			moderate	Sand pine and oak scrub
Gymnopogon chapmanianus	Chapman's Skeletongrass			S3	low	sanhills, scrub, sandy prairies, pine flatwoods
Harrisella filiformis	Orchid	T			low	Cypress and hardwood swamps, old citrus groves; epiphytic
Hartwrightia floridana	Florida hartwrightia	T		S2	low	Acid, seepage areas
Hypericum cumilicola	Highlands scrub St. John's-wort	E	E	S2	low	Sand pine scrub
Hypericum edisonianum	Edison's St. John's-wort	E		S2	low	Wet deppressions in pinelands
Illicium parviflorum	Yellow star anise	E		S2	low	Wet woods and swamps
Lechea cernua	Nodding pinweed	T		S3	low	Scrub
Lechea divaricata	Spreading pinweed; pine pinweed	E		S2	low	Pinelands
Liatris ohlingerae	Key blazing star	E	E	S3	low	Sand pine scrub
Lilium catesbaei	Catesby's lily	T		S3	low	Moist pine flatwoods and savannahs
Listera australis	Southern twayblade	T			low	Hammocks
Lobelia cardinalis	Cardinal flower	T			low	Streams, riverbanks and spring runs
Lupinus aridorum	Scrub lupine	E	E	S1	observed	Sand pine scrub

Lycopodiella cernua	Nodding clubmoss	CE			low	Wet pinelands
Matalea floridana	Florida Spiny-pod	E		S2	low	upland hardwood forests; esp. after a canopy opening event
Nemastylis floridana	Fall-flowering ixia; celestial lily	E		S2	low	Swamps, marshes and wet pine flatwoods
Nolina brittoniana	Britton's beargrass	E	E	S2	low	Dry pinelands and sand pine scrub
Ophioglossum palmatum	Hand adder's tongue fern	E		S2	low	Hammocks; epiphytic on Sabal palmetto
Osmunda cinnamomea	Cinnamon fern	CE			observed	Wet woods and swamps
Osmunda regalis	Royal fern	CE			high	Wet woods and swamps
Panicum abscissum	Cutthroat grass	E		S2	low	Wet pinelands and seepage areas
Paronychia chartacea	Crystal Lake nailwort	E	T	S1	low	Sand pine scrub
Pavonia spinifex	Yellow hibiscus			S2S3	low	Disturbed sites
Pecluma plumula	Polypody fern	E		S2	low	Hammocks; epiphytic
Pecluma ptilodon	Swamp plume polypody	E		S2	low	Hammocks
Peperomia humilis	Terrestrial peperomia; pepper	E		S2	low	Limestone grottos
Pinguicula caerulea	Blue butterwort	T			low	Wet, acid pinelands
Platanthera blephariglottis	Large white fringed orchid	T			low	Marshes, and wet, open, grassy areas
Platanthera cristata	Golden fringed orchid; crested fringed orchid	T			low	Marshes and wet, pine flatwoods
Platanthera flava	Southern tubercled orchid; gypsy-spikes	T			low	Cypress and hardwood swamps
Platanthera integra	Yellow fringeless orchid	E		S3	low	Wet pine flatwoods, wet prairies, bogs, marshes
Platanthera nivea	Snowy orchid; bog torch	T			low	Wet pine flatwoods
Pogonia ophioglossoides	Rose pogonia	T			low	Marshes and wet, pine flatwoods
Polygala lewtonii	Lewton's milkwort	E	E	S3	low	Dry, oak woods
Polygonella basiramia	Hairy jointweed; hairy wireweed	E	E	S3	low	Sand pine scrub
Polygonella myriophylla	Small's jointweed; woody wireweed; sandlace	E	E	S3	low	Sand pine scrub
Prunus geniculata	Scrub plum	E	E	S3	moderate	Sand pine scrub
Pteroglossaspis ecristata	Wild coco; giant orchid	T		S2	low	Sand pine scrub and sandhills
Rhapidophyllum hystrix	Needle palm	CE			low	Wet to mesic woods and hammocks
Rhynchospera megaplumosa	Large Plumed beaksedge	E		S3	low	
Salix floridana	Florida willow	E		S2	low	Wet woods and stream banks
Sarracenia minor	Hooded pitcherplant	T			low	Wet, open, acid pinelands and bogs
Scaevola plumieri	Inkberry	T			low	Coastal strands
Schizachyrium niveum	Scrub bluestem	E		S1	low	Sand pine scrub
Spiranthes brevilabris var. floridana	Florida ladies' tresses	E			low	Pine flatwoods
Spiranthes laciniata	Lace-lip ladies' tresses; lace-lip spiral orchid	T			low	Marshes and cypress swamps
Spiranthes longilabris	Long-lip ladies' tresses	T			low	Marshes and wet pine flatwoods
Spiranthes tuberosa	Little ladies' tresses; little pearl twist	T			low	Pine flatwoods

Stylisma abdita	Scrub stylisma	E		S2S3	low	Dry pinelands and scrub
Thelypteris serrata	Toothed lattice-vein fern	E		S2	low	Cypress swamps
Tillandsia utriculata	Giant wild pine	E			low	Hammocks and cypress swamps; epiphytic
Warea amplexifolia	Clasping warea	E	E	S1	low	Dry pinelands and sandhills
Warea carteri	Carter's warea; mustard	E	E	S3	low	Sandhills and sand pine scrub
Zephyranthes simpsonii	Simpson's zephyr lily	T		S2S3	low	Wet pine flatwoods and meadows
Ziziphus celata	Florida jujube; Florida zizaphus	E	E	S1	low	Scrub

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Likelihood of Occurrence

Low= Low likelihood; Mod= Moderate likelihood; High= High likelihood; Obs= Observed by Stantec;
Obs*= Observed by Others

Source: Stantec Endangered Species Database, 2014.

Table 1: Protected wildlife species with the potential to occur in Osceola County, Florida.

Species Name	Common Name	FFWCC	USFWS	FNAI	FCREPA	Likelihood of Occurrence	Habitat
Alligator mississippiensis	American alligator	T(S/A)	T(S/A)	S4		observed	Various aquatic habitats
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	E	S1	E	low	Palmetto prairies and ruderal habitats
Aphelocoma coerulescens	Florida scrub-jay	T	T	S3	T	low	Scrub and scrubby flatwoods
Aramus guarana	Limpkin	SSC		S3	SSC	high	Swamps, forested floodplains, mangrove swamps & marshes
Ardea alba	Great egret			S4	SSC	observed	Marshes, swamps, lakes, ponds, ditches and estuaries
Athene cucularia floridana	Florida burrowing owl	SSC		S3		low	Dry prairie, sandhill, ruderal areas
Buteo brachyurus	Short-tailed hawk			S1	R	low	Open country and forested areas; avoids dense forest
Campephilus principalis	Ivory-billed woodpecker	E	E	S1	E	low	Swamps, forested floodplains, mangrove swamps & marshes
Corynorhinus rafinesquii	Southeastern big-eared bat			S2		low	Floodplains, pine flatwoods, mixed oak/pine areas
Crotalus adamanteus	Eastern diamond back rattlesnake			S3		moderate	Sandhills, pine flatwoods, dry prairie, hammocks, & coastal
Drymarchon corais couperi	Eastern indigo snake	T	T	S3	SSC	observed	Wide variety of habitats
Egretta caerulea	Little blue heron	SSC		S4	SSC	observed	Marshes, ponds, lakes, meadows, streams & mangroves
Egretta thula	Snowy egret	SSC		S3	SSC	observed	Marshes, lakes, ponds and shallow, coastal habitats
Egretta tricolor	Tricolored heron	SSC		S4	SSC	low	Marshes, ponds and rivers
Elanoides forficatus	American swallow-tailed kite			S2	T	observed	Lowland forests
Elanus leucurus	White-tailed kite			S1		low	savannah, open woodland, marshes
Eptesicus fuscus fuscus	Big brown bat			S3	SU	low	Caves, buildings and trees
Eudocimus albus	White ibis	SSC		S4	SSC	observed	Marshes, mangroves, lakes and estuaries
Eumops floridanus	Florida bonneted bat	T		S1		low	roosts in palms, hollow trees, and buildings
Falco columbarius	merlin			S2		low	herbaceous wetlands
Falco peregrinus tundrius	Arctic peregrine falcon			S2	E	low	Wide variety of open habitats
Falco sparverius paulus	Southeastern American kestrel	T		S3	T	moderate	Open, or partly open habitats with scattered trees
Gopherus polyphemus	Gopher tortoise	T		S3	T	observed	Sandhills, scrub, hammocks, dry prairies, flatwoods, & ruderal
Grus americana	Whooping crane	E	E/P	S1		low	Shallow wetlands, freshwater marshes and wet prairies
Grus canadensis pratensis	Florida sandhill crane	T		S2S3	T	observed	Shallow wetlands, freshwater marshes and wet prairies
Haliaeetus leucocephalus leucocephalus	Southern bald eagle			S3	T	observed	Coasts, rivers and large lakes in open areas
Ixobrychus exilis	least bittern			S4		low	marshes, brackish, mangroves
Lampropeltis getula	common kingsnake			S2S3		low	variety of habitats
Laterallus jamaicensis	black rail			S2		low	herbaceous wetlands, salt marshes
Mustela frenata peninsulae	Florida weasel			S3?	R	low	Scrub, sandhills, flatwoods, swamps and hammocks
Mycteria americana	Wood stork	T	T	S2	E	observed	Marshes, swamps, streams and mangroves
Neofiber alleni	Round-tailed muskrat			S3	SSC	low	Shallow freshwater and salt marshes

Nyctanassa violacea	Yellow-crowned night-heron			S3?	SSC	moderate	Marshes, swamps, lakes, lagoons, mudflats, & mangroves
Nycticorax nycticorax	Black-crowned night-heron			S3?	SSC	moderate	Marshes, swamps, ponds, lagoons, mangroves & wet prairies
Pandion haliaetus	osprey			S3S4		observed	nests on poles, trees, other areas along waterbodies
Peucaea aestivalis	Bachman's sparrow			S3		low	Open pine woods, dry prairies and old fields
Picoides borealis	Red-cockaded woodpecker	T	E	S2	E	low	Open, mature pine woodlands
Picoides villosus	Hairy woodpecker			S3?	SSC	low	Deciduous and coniferous woods
Pituophis melanoleucus mugitus	Florida pine snake	SSC		S3	SU	low	Sandhills, scrubby flatwoods, xeric hammocks & ruderal habitats
Plegadis falcinellus	Glossy ibis			S2	SSC	observed	Marshes and swamps
Plestidon egregius lividus	Bluetail mole skink	T	T	S2	E	low	Sandy scrub, sandhills and xeric hammocks
Plestidon reynoldsi	Sand skink	T	T	S2	T	high	Scrub, sandhills, and scrubby flatwoods
Podomys floridanus	Florida mouse	SSC		S3	T	moderate	Scrub, flatwoods and longleaf pine-turkey oak sandhills
Polyborus plancus audubinii	Crested caracara	T	T	S2		moderate	Open country, dry prairie, pasture lands
Puma concolor	Puma		T (S/A)			low	variety of habitats
Puma concolor coryi	Florida panther	E	E	S1		moderate	Forested communities, large wetlands inaccessible to humans
Rana (=Lithobates) capito	Gopher frog	SSC		S3	T	moderate	Xeric uplands and pine flatwoods
Rostrhamus sociabilis plumbeus	Florida snail kite	E	E	S2	E	moderate	Subtropical freshwater marshes, lakes, ponds
Sceloporus woodi	Florida scrub lizard			S3	T	high	Sandhills, scrub and sandy, forest edges
Sciurus niger shermani	Sherman's fox squirrel	SSC		S3	T	moderate	Longleaf pine-turkey oak sandhills, mesic flatwoods, & baygalls
Ursus americanus floridanus	Florida black bear			S2	T	low	Variety of forested landscapes

Notes:
FFWCC = Florida Fish and Wildlife Conservation Commission
E= Endangered; T= Threatened; SSC= Species of Special Concern
USFWS = US Fish and Wildlife Service
E= Endangered; T= Threatened; (S/A)= Similarity of Appearance; (E/P)= Experimental Population; C = Candidate for Listing; *CH = Critical Habitat
FNAI = Florida Natural Areas Inventory
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S4= Apparently Secure; SH= Historical Occurrence; ?= Tentative Ranking
FCREPA = Florida Committee on Rare and Endangered Plants and Animals
E= Endangered; T= Threatened; SSC= Species of Special Concern; R= Rare; SU= Status Undetermined
Likelihood of Occurrence
Low= Low likelihood; Mod= Moderate likelihood; High= High likelihood; Obs= Observed by Stantec;
Obs*= Observed by Others

Source: Stantec Endangered Species Database, 2014.

Table 2: Protected plant species with the potential to occur in Osceola County, Florida.

Species Name	Common Name	FDA	USFWS	FNAI	Likelihood of Occurrence	Habitat
Andropogon arctatus	Pinewoods bluestem	T		S3	low	Flatwoods and sand pine scrub
Asclepias curtissii	Curtiss' milkweed	E		S3	low	Sandhills and scrub
Bonamia grandiflora	Florida bonamia, Scrub morning glory	E	T	S3	moderate	Sand pine scrub
Calopogon multiflorus	Many-flowered grass pink	T		S2S3	low	Pine flatwoods, esp. recently burned
Chionanathus pygmaeus	Pigmy fringe tree	E	E	S3	low	Sand pine scrub
Clitoria fragrans	Pigeon Wings	E	T	S3	low	Tureky Oak, blue-jack oak, scrub, high pine
Conradina grandiflora	Large-flowered rosemary	T		S3	low	Pinelands
Drosera intermedia	Water sundew	T		S3	low	Pinelands, woods and bogs
Encyclia tampensis	Butterfly orchid	CE			low	Mangrove, cypress and hardwood swamps; hammocks
Epidendrum conopseum	Greenfly orchid	CE			low	Moist hammocks, cypress and hardwood swamps; epiphytic
Eriogonum longifolium var. gnaphalifolium	Scrub buckwheat	E	T	S3	low	Sandhill, oak-hickory scrub, pineland & turkey-oak areas
Garberia heterophylla	Garberia	T			moderate	Sand pine and oak scrub
Harrisella filiformis	Orchid	T			low	Cypress and hardwood swamps, old citrus groves; epiphytic
Lechea cernua	Nodding pinweed	T		S3	low	Scrub
Lilium catesbaei	Catesby's lily	T		S3	low	Moist pine flatwoods and savannahs
Lobelia cardinalis	Cardinal flower	T			low	Streams, riverbanks and spring runs
Lupinus aridorum	Scrub lupine	E	E	S1	observed	Sand pine scrub
Lycopodiella cernua	Nodding clubmoss	CE			low	Wet pinelands
Nemastylis floridana	Fall-flowering ixia; celestial lily	E		S2	low	Swamps, marshes and wet pine flatwoods
Nolina brittoniana	Britton's beargrass	E	E	S2	low	Dry pinelands and sand pine scrub
Osmunda cinnamomea	Cinnamon fern	CE			observed	Wet woods and swamps
Osmunda regalis	Royal fern	CE			observed	Wet woods and swamps
Panicum abscissum	Cutthroat grass	E		S2	low	Wet pinelands and seepage areas
Paronychia chartacea	Papery-whitlow wort	E	T	S1	low	sandy openings around sandhill lakes and karst ponds
Pecluma ptilodon	Swamp plume polypody	E		S2	low	Hammocks
Pinguicula caerulea	Blue butterwort	T			low	Wet, acid pinelands
Platanthera blephariglottis	Large white fringed orchid	T			low	Marshes, and wet, open, grassy areas
Platanthera cristata	Golden fringed orchid; crested fringed orchid	T			low	Marshes and wet, pine flatwoods
Platanthera flava	Southern tubercled orchid; gypsy-spikes	T			low	Cypress and hardwood swamps
Platanthera integra	Orange rain orchid	E		S3S4	low	Marshes and wet, pine flatwoods
Platanthera nivea	Snowy orchid; bog torch	T			low	Wet pine flatwoods
Pogonia ophioglossoides	Rose pogonia	T			low	Marshes and wet, pine flatwoods

Polygala lewtonii	Lewton's milkwort	E	E	S3	low	Dry, oak woods
Polygonella myriophylla	Small's jointweed; woody wireweed; sandlace	E	E	S3	low	Sand pine scrub
Prunus geniculata	Scrub plum	E	E	S3	high	Sand pine scrub
Pteroglossaspis ecristata	Wild coco; giant orchid	T		S2	low	Sand pine scrub and sandhills
Rhapidophyllum hystrix	Needle palm	CE			low	Wet to mesic woods and hammocks
Sarracenia minor	Hooded pitcherplant	T			low	Wet, open, acid pinelands and bogs
Scaevola plumieri	Inkberry	T			low	Coastal strands
Schizachyrium niveum	Scrub bluestem	E		S1	low	Sand pine scrub
Spiranthes laciniata	Lace-lip ladies' tresses; lace-lip spiral orchid	T			low	Marshes and cypress swamps
Spiranthes longilabris	Long-lip ladies' tresses	T			low	Marshes and wet pine flatwoods
Spiranthes tuberosa	Little ladies' tresses; little pearl twist	T			low	Pine flatwoods
Thelypteris serrata	Toothed lattice-vein fern	E		S2	low	Cypress swamps
Tillandsia utriculata	Giant wild pine	E			low	Hammocks and cypress swamps; epiphytic
Warea amplexifolia	Clasping warea	E	E	S1	low	Dry pinelands and sandhills
Zamia pumila	Florida coontie	CE			low	Hammocks, pinelands and Indian middens
Zephyranthes simpsonii	Simpson's zephyr lily	T		S2S3	low	Wet pine flatwoods and meadows

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Likelihood of Occurrence

Low = Low Likelihood; Mod = Moderate Likelihood; High = High Likelihood; Obs = Observed by Stantec;
Obs* = Observed by Others

Source: Stantec Endangered Species Database, 2014

Table 1: Protected wildlife species with the potential to occur in Orange County, Florida.

Species Name	Common Name	FFWCC	USFWS	FNAI	FCREPA	Likelihood of Occurrence	Habitat
Alligator mississippiensis	American alligator	T (S/A)	T(S/A)	S4		moderate	Various aquatic habitats
Aphelocoma coerulescens	Florida scrub-jay	T	T	S3	T	low	Scrub and scrubby flatwoods
Aramus guarana	Limpkin	SSC		S3	SSC	low	Swamps, forested floodplains, mangrove swamps & marshes
Athene cuicularia floridana	Florida burrowing owl	SSC		S3		low	Dry prairie, sandhill, ruderal areas
Drymarchon corais couperi	Eastern indigo snake	T	T	S3	SSC	low	Wide variety of habitats
Egretta caerulea	Little blue heron	SSC		S4	SSC	observed	Marshes, ponds, lakes, meadows, streams & mangroves
Egretta thula	Snowy egret	SSC		S3	SSC	moderate	Marshes, lakes, ponds and shallow, coastal habitats
Egretta tricolor	Tricolored heron	SSC		S4	SSC	moderate	Marshes, ponds and rivers
Eudocimus albus	White ibis	SSC		S4	SSC	observed	Marshes, mangroves, lakes and estuaries
Falco sparverius paulus	Southeastern American kestrel	T		S3	T	low	Open, or partly open habitats with scattered trees
Gopherus polyphemus	Gopher tortoise	T		S3	T	observed	Sandhills, scrub, hammocks, dry prairies, flatwoods, & ruderal
Grus canadensis pratensis	Florida sandhill crane	T		S2S3	T	observed	Shallow wetlands, freshwater marshes and wet prairies
Haliaeetus leucocephalus leucocephalus	Southern bald eagle			S3	T	moderate	Coasts, rivers and large lakes in open areas
Lampropeltis extenuatum	Short-tailed snake	T		S3	T	low	Longleaf pine-turkey oak, sand pine scrub and xeric hammocks
Mycteria americana	Wood stork	T	T	S2	E	observed	Marshes, swamps, streams and mangroves
Neoseps (=Plestidon) reynoldsi	Sand skink	T	T	S2	T	moderate	Scrub, sandhills, and scrubby flatwoods
Picoides borealis	Red-cockaded woodpecker	T	E	S2	E	low	Open, mature pine woodlands
Pituophis melanoleucus mugitus	Florida pine snake	SSC		S3	SU	low	Sandhills, scrubby flatwoods, xeric hammocks & ruderal habitats
Platalea ajaja	Roseate spoonbill	SSC		S2	R	low	Marshes, swamps, ponds, rivers and lagoons
Podomys floridanus	Florida mouse	SSC		S3	T	low	Scrub, flatwoods and longleaf pine-turkey oak sandhills
Polyborus plancas audubinii	Crested caracara	T	T	S2		low	Open country, dry prairie, pasture lands
Rana (=lithobates) capito	Gopher frog	SSC		S3	T	low	Xeric uplands and pine flatwoods
Rostrhamus sociabilis plumbeus	Florida snail kite	E	E	S2	E	low	Subtropical freshwater marshes, lakes, ponds
Sciurus niger shermani	Sherman's fox squirrel	SSC		S3	T	low	Longleaf pine-turkey oak sandhills, mesic flatwoods, & baygalls
Sterna antillarum	Least tern	T		S3	T	low	Open, flat beaches, river and lake margins
Ursus americanus floridanus	Florida black bear			S2	T	low	Variety of forested landscapes

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Obs*= Observed by Others
Source: Stantec Endangered Species Database, 2014.

Table 2: Protected plant species with the potential to occur in Orange County, Florida.

Species Name	Common Name	FDA	USFWS	FNAI	Likelihood of Occurrence	Habitat
Asclepias curtissii	Curtiss' milkweed	E		S3	low	Sandhills and scrub
Bonamia grandiflora	Florida bonamia, Scrub morning glory	E	T	S3	low	Sand pine scrub
Calopogon multiflorus	Many-flowered grass pink	T		S2S3	low	Pine flatwoods, esp. recently burned
Centrosema arenicola	Sand butterfly pea	E		S2	low	Sandhills and scrubby flatwoods
Chionanthus pygmaeus	Pygmy fringe tree	E	E	S3	low	scrub, sandhill, xeric hammock, primarily on Lake Wales Ridge
Clitoria fragrans	Scrub Pigeon-wing	E	T	S3	low	Dry sandhills and scrub
Deeringothamnus pulchellus	Beautiful pawpaw	E	E	S1	low	Pinelands
Drosera intermedia	Water sundew	T		S3	low	Pinelands, woods and bogs
Encyclia tampensis	Butterfly orchid	CE			low	Mangrove, cypress and hardwood swamps; hammocks
Epidendrum conopseum	Greenfly orchid	CE			low	Moist hammocks, cypress and hardwood swamps; epiphytic
Eriogonum longifolium var. gnaphalifolium	Scrub buckwheat	E	T	S3	low	Sandhill, oak-hickory scrub, pineland & turkey-oak areas
Garberia heterophylla	Garberia	T			low	Sand pine and oak scrub
Harrisella filiformis	Orchid	T			low	Cypress and hardwood swamps, old citrus groves; epiphytic
Illicium parviflorum	Yellow star anise	E		S2	low	Wet woods and swamps
Lechea cernua	Nodding Pinweed	T		S3	moderate	deep sands with scrub oaks (historic dunes)
Lilium catesbaei	Catesby's lily	T		S3	low	Moist pine flatwoods and savannahs
Lobelia cardinalis	Cardinal flower	T			low	Streams, riverbanks and spring runs
Lupinus aridorum	Scrub lupine	E	E	S1	moderate	Sand pine scrub
Lycopodiella cernua	Nodding clubmoss	CE			low	Wet pinelands
Matelea floridana	Florida milkweed; panhandle anglepod	E		S2	low	Upland hardwood and mixed forests
Monotropa hypopithys	Pinesap	E		S1	low	Deciduous woods; parasitic on tree roots
Najas filifolia	Narrowleaf Naiad	T		S1	low	
Nemastylis floridana	Fall-flowering ixia; celestial lily	E		S2	low	Swamps, marshes and wet pine flatwoods
Nolina atopocarpa	Florida beargrass	T		S3	low	Dry pinelands and shell middens
Nolina brittoniana	Britton's beargrass	E	E	S2	low	Dry pinelands and sand pine scrub
Ophioglossum palmatum	Hand adder's tongue fern	E		S2	low	Hammocks; epiphytic on Sabal palmetto
Osmunda cinnamomea	Cinnamon fern	CE			observed	Wet woods and swamps
Osmunda regalis	Royal fern	CE			high	Wet woods and swamps
Panicum abscissum	Cutthroat grass	E		S3	low	
Paronychia chartacea	Crystal Lake nailwort	E	T	S1	low	Sand pine scrub
Pecluma (=Polypodium) plumula	Polypody fern	E		S2	moderate	Hammocks; epiphytic
Pecluma (=Polypodium) ptilodon	Swamp plume polypody	E		S2	low	Hammocks

Pinguicula caerulea	Blue butterwort	T			low	Wet, acid pinelands
Platanthera blephariglottis	Large white fringed orchid	T			low	Marshes, and wet, open, grassy areas
Platanthera cristata	Golden fringed orchid; crested fringed orchid	T			low	Marshes and wet, pine flatwoods
Platanthera flava	Southern tubercled orchid; gypsy-spikes	T			low	Cypress and hardwood swamps
Platanthera integra	Orange rain orchid	E		S3S4	low	Marshes and wet, pine flatwoods
Platanthera nivea	Snowy orchid; bog torch	T			low	Wet pine flatwoods
Pogonia ophioglossoides	Rose pogonia	T			low	Marshes and wet, pine flatwoods
Polygala lewtonii	Lewton's milkwort	E	E	S3	low	Dry, oak woods
Polygonella myriophylla	Small's jointweed; woody wireweed; sandlace	E	E	S3	low	Sand pine scrub
Prunus geniculata	Scrub plum	E	E	S3	low	Sand pine scrub
Pteroglossaspis ecristata	Wild coco; giant orchid	T		S2	low	Sand pine scrub and sandhills
Rhapidophyllum hystrix	Needle palm	CE			low	Wet to mesic woods and hammocks
Salix floridana	Florida willow	E		S2	low	Wet woods and stream banks
Sarracenia minor	Hooded pitcherplant	T			low	Wet, open, acid pinelands and bogs
Scaevola plumieri	Inkberry	T			low	Coastal strands
Spiranthes brevilabris var. floridana	Florida ladies' tresses	E			low	Pine flatwoods
Spiranthes laciniata	Lace-lip ladies' tresses; lace-lip spiral orchid	T			low	Marshes and cypress swamps
Spiranthes longilabris	Long-lip ladies' tresses	T			low	Marshes and wet pine flatwoods
Spiranthes tuberosa	Little ladies' tresses; little pearl twist	T			low	Pine flatwoods
Stylisma abdita	Scrub stylisma	E		S2S3	low	Dry pinelands and scrub
Tillandsia utriculata	Giant wild pine	E			low	Hammocks and cypress swamps; epiphytic
Triphora trianthophora	Nodding pogonia	T			low	Hammocks
Warea amplexifolia	Clasping warea	E	E	S1	low	Dry pinelands and sandhills
Zamia pumila	Florida coontie	CE			low	Hammocks, pinelands and Indian middens
Zephyranthes simpsonii	Redmargin Zephyrlilly	T		S2S3	low	

Notes:

FDA = Florida Department of Agriculture

E= Endangered; T= Threatened; CE= Commercially Exploited

USFWS = US Fish and Wildlife Service

E= Endangered; T= Threatened

FNAI = Florida Natural Areas Inventory

S1= Critically Imperiled Due to Extreme Rarity; S2= Imperiled Due to Rarity; S3= Very Rare and Local;
S4= Apparently Secure; SH= Historical Occurrence; ?= Tentative Ranking

Likelihood of Occurrence

Low= Low likelihood; Mod= Moderate likelihood; High= High likelihood; Obs= Observed by G&O;
Obs*= Observed by Others

APPENDIX C
PHOTOS

I-4 PD&E Segment 1 Pond Site Photographs

Pond Site FPC 100

Pond Site 100

Pond Site FPC 101A

Pond Site 101A

Pond Site 101B

Pond Site 101C

Pond Site 101D

Pond Site 101E

Pond Site 101F

Pond Site 101G

Pond Site 102

Pond Site FPC 102

Pond Site 103

Pond Site FPC 103A

Pond Site FPC 103B

Pond Site 104

Pond Site FPC 105A

Pond Site 105A

Pond Site 105B

Pond Site 106A

Pond Site 106B

Pond Site 107

Pond Site 108A

Pond Site 108B

Pond Site 109

Pond Site FPC 109

Pond Site 110

Pond Site 111

Pond Site 112A

Pond Site 112B

Pond Site 112C

Pond Site 112D

Pond Site 112E

Pond Site 113A

Pond Site 113B

Pond Site 113C

Pond Site 113D

Pond Site 113E

Pond Site 113F

Pond Site 113G

Pond Site 114A

Pond Site 114B

Pond Site FPC 114A

Pond Site FPC 114B

Pond Site FPC 114C: Cypress area

Pond Site FPC 114C: Pasture area

Pond Site 115

Pond Site 116

Pond Site 117

Pond Site 118

Pond Site 119A

Pond Site 119B

Pond Site 120

Pond Site 121A

Pond Site 121B

Pond Site 122A

Pond Site 122B

Pond Site 122C

Pond Site 123

Pond Site 124

Pond Site 125

Pond Site 126

Pond Site 127

Pond Site 128A

Pond Site 128B

Pond Site 129

Pond Site 130

Pond Site 130A

Pond Site 131A

Pond Site 131B

Pond Site FPC 132

Pond Site 132

Pond Site FPC 133

Pond Site 133

Pond Site 134

Pond Site 135

Pond Site 136A: Existing pond

Pond Site 136A: Open sandy area

Pond Site 136B

Pond Site 137

Pond Site 137A

Pond Site 137B

Pond Site 138

Pond Site 138A

Pond Site 138B

Pond Site FPC 138

Pond Site 139A

Pond Site 139B

Pond Site 140

Pond Site FPC 141

Pond Site 142B

APPENDIX D
AGENCY COORDINATION

United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log. No. 04EF1000-2016-F-0430

August 26, 2016

Cathy Kendall, AICP
Senior Environmental Specialist
FHWA - FL, PR and VI
3500 Financial Plaza, Suite 400
Tallahassee, FL 32312

Dear Ms. Kendall:

This document is the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed SR 400 (I-4) Beyond the Ultimate-Segment 1 widening and improvement project in Orange and Osceola Counties, Florida, and its effects on the threatened sand skink (*Neoseps reynoldsi*) [*Plestiodon reynoldsi*] and scrub lupine (*Lupinus aridorum)* per section 7 of the Endangered Species Act (Act) of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The Service received your written request to initiate formal consultation on April 6, 2016, for improvements to I-4 Beyond the Ultimate (BtU)-Segment 1. The proposed project will be addressed in this biological opinion as requested by the applicants.

This biological opinion is based on information provided by the Florida Department of Transportation (FDOT) and Federal Highway Administration (FHWA), prior technical assistance and informal consultations with FDOT, field investigations, and other sources of information. A complete administrative record of this consultation is on file at the Service's North Florida Ecological Services Office, Jacksonville, Florida.

BIOLOGICAL OPINION

A Biological Opinion is a document that includes the Service's analysis of whether the proposed action, the SR 400 (I4) Beyond Ultimate Segment 1, is likely to jeopardize the continued existence of sand skinks (*Plestiodon reynoldsi)* and scrub lupine (*Lupinus aridorum*). "To jeopardize the continued existence of a listed species" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species (50 CFR §402.02). Because critical habitat has not been designated for the sand skink or scrub lupine, this Biological Opinion will not discuss critical habitat or analyze adverse modification.

CONSULTATION HISTORY

The summary presented below highlights our early coordination and discussions about sand skinks, which is the focus of the action agency's request for Formal Consultation. The Service provided technical guidance on specific roadway sections and survey methods. A separate informal consultation was completed for this project.

The following list is presented in reverse chronological order, starting with the most recent coordination with the Service.

2016 August 26, The Service provided a draft Biological Opinion to the FHWA and FDOT to review and provide comments.

2016 June 1, Representatives of FDOT, Service staff from both North Florida and South Florida field offices, and project consultants attended a field meeting to determine the areas of skink occupied habitat based upon the site characteristics and the cover board survey results.

2016 May 11, FHWA, FDOT, the Service and project consultants met at the Service's office to discuss the new designation for skink occupied habitat and resultant increased project impacts.

2016 April 6, FHWA requested formal consultation with the Service for I-4 BtU - Segment 1.

2016 March 8, FDOT requested informal consultation for I-4 BtU Segment 1. Informal consultation for this segment was concluded on April 11, 2016. The informal consultation covered Florida scrub jays, wood storks, snail kites, crested caracara, and eastern indigo snakes.

2015 December 17, FDOT, FHWA, project consultant (Stantec) and the Service met to discuss needs for consultation for I-4 extension of proposed express lanes. The decision was made to send the Service a request for informal consultation and another request for formal consultation.

2014 October 22, Service staff in the North Florida Office (Jane Monaghan) communicated to FDOT and project consultant that survey results were reviewed and that concurrence for a MANLAA for sand skinks was possible.

2014 May 12, Project consultant sent South Florida staff (John M. Wrublik) message indicating negative results of cover boards for Osceola County, FL.

DESCRIPTION OF PROPOSED ACTION

As part of the I-4 Beyond the Ultimate concept FDOT is proposing to reconstruct and widen SR 400 (I-4). The project consists of the build-out of I-4 to its ultimate condition through Central Florida. The design proposes the addition of two new express lanes in each direction, resulting in a total of ten dedicated lanes. The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. The typical section will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with 10-foot inside and 12-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders in each direction. A barrier wall

between the adjacent shoulders will separate the express lanes from the general use lanes. Twelve-foot auxiliary lanes will be provided in some areas in both the eastbound and westbound directions. The typical section includes a 44-foot rail envelope in the median within a minimum 300 foot right of way.

The focus of this consultation is Segment 1: SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway in Osceola and Orange Counties, Florida. Construction work will include the use of heavy machinery to clear vegetation, compact soils, and construct the proposed project. All fill, dirt hauling, asphalt paving, and staging areas for the proposed construction will occur in the construction right-of-way.

Based on survey results, the FHWA and FDOT determined the proposed project "may affect and is likely to adversely affect" the sand skink and scrub lupine. The Service concurs with this determination. For the scrub lupine we found that while adverse effects will result, the species will not be jeopardized. Because it is a plant, take is not prohibited.

Action area

The action area is defined as all areas to be directly or indirectly affected by the Federal action and not merely the immediate area involved in the action. The action may result in a variety of indirect and cumulative effects in the project area. Also, it may potentially encouraging new development resulting in the loss of additional sand skink habitat and sand skinks. Consequently, existing sand skink habitat in the project area is threatened by future development and increased fragmentation of the landscape. However, the extent of the project's effects on the surrounding lands is difficult to discern. The action area identified for this project is SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway in Osceola and Orange Counties, Florida (Figure 1). FDOT and FHWA have identified 14.5 acres of potential suitable habitat for sand skinks in a proposed pond site for this Segment of I-4. The Service has established a skink action area for this project that includes all lands within the proposed Pond Site 105A and a buffer of 188 feet that includes all undeveloped lands with suitable soils (excessively drained to moderately well drained) adjacent to the project footprint (Figure 2). The action area as described above is sufficient to capture the direct, indirect, and cumulative effects resulting from the proposed roadway improvements.

The scrub lupine was observed west of Turkey Lake Road, to the west of the SR 528 Interchange at westbound I-4 in five areas surveyed for sand skinks in 2014 (Area H, Area K, Area L, Area M, and Area O). The footprint of Pond Site 139B and the edge of the proposed right-of-way northeast of the Daryl Carter Parkway overpass overlap an individual observation of scrub lupine. For the scrub lupine the action area was identified as the total project area (Figure 3) surrounding the areas where the species was identified, as mentioned above.

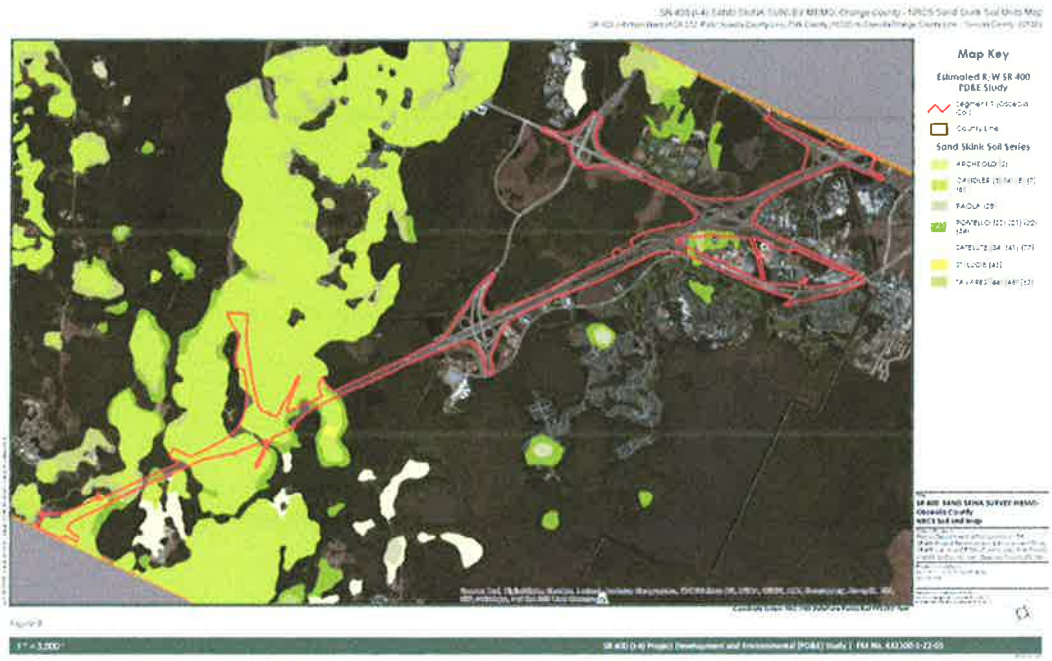

Figure 1. Project area (red) showing sand skink soils

Figure 2. Pond Site FPC 105, sand skink habitat.

Figure 3. Identified scrub lupine habitat and occurrences at proposed project.

Conservation Measures

Conservation measures are actions to benefit or promote the recovery of a listed species that are included by the Federal agency as an integral part of the proposed action. These actions are taken by the Federal agency or applicant and serve to avoid, minimize, or compensate for project effects on the listed species.

Conservation Measure 1: Compensation for Sand Skink Habitat Loss

FHWA and FDOT propose to offset impacts by providing compensatory mitigation at a Service-approved conservation bank at 2:1 ratio. The compensation acres are based on surveys that determined sand skink occupancy within the Pond Site FPC 105 for the project (10.0 acres of impacts). FDOT and FHWA will provide 20.0 credits to offset project impacts to occupied sand skink habitat.

Conservation Measure 2: Scrub lupine conservation
During permitting the proposed project will be re-surveyed for occurrence of scrub lupine. In coordination with Bok Tower Gardens, the following will occur: collection of seeds, or translocation of plants out of the project footprint for replanting in lands acceptable to the Service (e.g., public conservation lands). Collected seeds would be provided to Bok Tower Gardens for reproduction and conservation of the species.

STATUS OF SPECIES/CRITICAL HABITAT

The most recent review of the sand skink can be found in the 5-year review (Service 2007) and in the 5-year review for the scrub lupine (USFWS 1996). This review builds on the detailed information in the Multi-Species Recovery Plan (MSRP) (Service 1999) The MSRP is incorporated by reference and can be used to obtain more detailed information about these species. Additional species information was obtained from the Peninsular Florida Species Conservation and Consultation Guide (Service 2012).

Scrub Lupine

Species/critical habitat description

Appearance/Morphology

Lupinus aridorum is a woody, perennial herb, with sprawling stems up to 1 m long. The leaves are obovateelliptic, 4 to 7 cm long and 2 to 4 cm wide. The base and end of the leaf are rounded with a sharp point at the leaf's end. The petioles are 2.0 to 4.5 cm long and the stipules are very small or absent. A silvery pubescence covers the leaves and stems. The flowers are a pale flesh-colored pink and are 4 to 5 cm long. The upper petal (standard) has a black center surrounded by a maroon area. They are arranged in racemes with stalks 4 to 13 cm long. Each raceme has 5 to 14 flowers, but up to 25 on occasion (Stout in press). *Lupinus aridorum* fruits are long, woody, and elliptical with a pointed end. It is differentiated from *L. villosus*, the only other pink flowering lupine, in that *L. aridorum* is not prostrate, has hairs on the leaves and stem, and is the only upright pink-flowering lupine in Florida.

Taxonomy

Until being named *L. aridorum* in 1982, this taxon was identified as *L. diffusus* and *L. westianus* (52 FR 11172). Isley (1986, 1990) evaluated the systematics of *L. aridorum* in his floristic treatment of the pea family (Fabaceae) in the Southeast and concluded that *L. aridorum* belongs to the same species as *L. westianus* of the Gulf Coast of northwest Florida, which differs mainly in flower color (blue). Isley's taxonomic status for the central Florida plant is *L. westianus* var. *aridorum* (McFarlin ex Beckner) Isley. However, the former classification *L. aridorum* was used to list the species (52 FR 11172), and will be used here to maintain consistency.

Life History

The scrub lupine was first collected in 1900 in Orange County, Florida. It was not collected again until it was found in Polk County in 1928 and 1937. Renewed survey efforts in the early 1970s and the early 1980s greatly expanded the knowledge of the species distribution in both Orange and Polk counties (Figure 1). Scrub lupine is now known from two distinct areas. In western Orange County (Orlando area) it is found on the southern Mount Dora Ridge from the Apopka-Plymouth area south, past Lake Buena Vista. In South Florida it is found in north-central Polk County on the Winter Haven Ridge near Auburndale and Winter Haven.

The scrub lupine has been found in bloom between March and May. The seed pods mature by June, and the seeds fall off the plant and take root nearby or remain in a long-lived seedbank (T. Race, Bok Tower Gardens, personal communication 1996, J. Stout, University of Central Florida, personal communication 1996). Recent information indicates the plant may bloom from one to three times throughout its life, though few seeds are produced the first year (J. Stout, University of Central Florida, personal communication 1996). Pollinators of this species are unknown.

Habitat

The scrub lupine grows primarily on well-drained sandy soils of the Lakewood or St. Lucie series (Wunderlin 1984). These soils are very dry and have very little organic accumulation (Lowe *et al.* 1990). The sands are white or occasionally yellow and generally support sand pine scrub (Wunderlin 1984). They are also quite acidic with a pH from 4.0 to 4.5 (J. Stout, University of Central Florida, personal communication 1996).

The natural habitat for *L. aridorum* is believed to be sand pine and rosemary scrub (J. Stout, University of Central Florida, personal communication 1996). Scrub lupine probably existed in sunny gaps until succession of the scrub resulted in excessive shading and closure of open, sunny patches. After long periods without disturbance, gap specialists usually become less common in scrub communities. Regrowth of *L. aridorum* after fire or other disturbances occurs from seedbanks stored in the sand.

Most of the sites where *L. aridorum* is now found are moderately to severely disturbed by soil scraping, road construction, land clearing, or offroad vehicles (Stout *in press*). With these disturbances and associated vegetative responses, it is difficult to determine what the "natural" vegetative cover may have been. However, Wunderlin (1984) found the predominant overstory for this species to be sand pine (*Pinus clausa*), longleaf pine (*Pinus palustris*), and occasionally turkey oak (*Quercus laevis*). The shrub layer tends to be sparse at *L. aridorum* sites; however this may be a result of manmade disturbances to the soil. Shrub species most frequently found in association with *L. aridorum* include rosemary (*Ceratiola ericoides*), scrub live oak (*Quercus geminata*), rusty lyonia (*Lyonia ferruginea*), *Palafoxia feayi*, tallowwood (*Ximenia americana*), and an occasional cabbage palm (*Sabal palmetto*). The herbaceous layer is mostly wiregrass (*Aristida beyrichiana*).

Status and distribution

Distribution

Like many other Florida scrub endemics, *L. aridorum* has suffered from habitat loss due to urban and agricultural expansion. Currently, most of the estimated 1,000 individuals of this species occur in habitats that have already been highly modified or are threatened by future land clearing for residential housing; road construction and maintenance; pedestrian, horse, and off-road vehicles; and conversion to pasture land. It is endemic to 2 counties in central FL: Orange County on the southern Mount Dora Ridge and Polk County on the Winter Haven Ridge. Throughout much of its range, the scrub lupine is afforded little protection; it occurs on fewer than 2 ha of public land (excluding road rights-of-ways) (Stout *in press*). The limited distribution

of *L. aridorum* makes it especially vulnerable to loss of habitat. As a result of these threats, this species was federally listed as an endangered species on April 7, 1987 (52 FR 11172).

In South Florida, only six sites are inhabited by *L. aridorum.* They are in Polk County, near Winter Haven and Auburndale. The sites near Auburndale are threatened by land clearing to support a rapidly growing human population. Presently only small tracts of scrub remain among expanses of residential development. Polk County sites total only about 380 ha (Christman 1988). The status of the 10 sites inhabited by *L. aridorum* in Orange County is important to evaluate the pressures on this species. All 10 sites are between the City of Orlando and Walt Disney World. Orlando has been, and continues to be, one of the most rapidly growing cities in Florida. The portion of the species' range in western Orange County is largely urbanized, with many of the remaining sites composed of small remnants of the original scrub, including vacant residential lots and the right-of-ways of the Florida Turnpike. These are also rapidly expanding communities whose human population growth threatens the continued existence of *L. aridorum.*

Status

Although the species is not abundant or well-distributed, the seeds of *L. aridorum* may be numerous in many locations in which it historically grew. This species may persist only in the form of a seed bank in many heavily vegetated scrubs (J. Stout, University of Central Florida, personal communication 1996). In most known localities, *L. aridorum* grows aggressively following soil disturbance, because of the open patches of bare sand resulting from these disturbances. Since fire and other sources of disturbance have been excluded from many scrub sites, succession and the subsequent growth of other scrub vegetation probably have out-competed *L. aridorum* in many historic localities. Even though seed sources may be available in many of these locations, vegetative surveys rarely locate seeds, and these potential sources of plants are overlooked and rarely considered when reviewing areas for acquisition or protection needs.

Analysis of the species/critical habitat likely to be affected

It is difficult to adequately assess the status and population dynamics of the scrub lupine. The status of the 10 sites inhabited by *L. aridorum* in Orange County is important to evaluate the pressures on this species. All 10 sites are between the City of Orlando and Walt Disney World. Orlando has been, and continues to be, one of the most rapidly growing cities in Florida. The portion of the species' range in western Orange County is largely urbanized, with many of the remaining sites composed of small remnants of the original scrub, including vacant residential lots and the right-of-ways of the Florida Turnpike. These are also rapidly expanding communities whose human population growth threatens the continued existence of *L. aridorum.*

In 2010 there was a population planted at Mackay Gardens and Lakeside Preserve. This is one of 5 introduced populations in conservation lands introduced by the Rare Plant Conservation Program at Bok Tower Gardens and its many partners. Another population, one of the largest, is found in Orange County near Vineland Road, Apopka.

SAND SKINK

Species/critical habitat description

Appearance/Morphology

The sand skink is a small, fossorial lizard that reaches a maximum length of about 5 inches (in) (12.7 centimeters [cm]). The tail makes up about half the total body length. The body is shiny and usually gray to grayish-white in color, although the body color may occasionally be light tan. Hatchlings have a wide black band located along each side from the tip of the tail to the snout. This band is reduced in adults and may only occur from the eye to snout on some individuals (Telford 1959). Sand skinks contain a variety of morphological adaptations for a fossorial lifestyle. The legs are vestigial and practically nonfunctional, the eyes are greatly reduced, the external ear openings are reduced or absent (Greer 2002), the snout is wedge-shaped, and the lower jaw is countersunk.

Taxonomy

The taxonomic classification of the sand skink has been reevaluated since it was listed as *Neoseps reynoldsi* in 1987 (52 FR 42658), and the commonly accepted scientific name for the sand skink is now *Plestiodon reynoldsi* (Brandley et al. 2005; Smith 2005). A detailed description of the recent taxonomic review can be found in Service (2007). We continue to use the scientific name as published in the final listing rule (52 FR 42658).

The sand skink is believed to have evolved on the central Lake Wales Ridge (LWR) and radiated from there (Branch et al. 2003). Analysis of mitochondrial DNA indicates populations of the sand skink are highly structured with most of the genetic variation partitioned among four lineages: three subpopulations on the LWR characterized by high haplotype diversity and a single, unique haplotype detected only on the Mount Dora Ridge (MDR) (Branch et al. 2003). Under the conventional molecular clock, the 4.5 percent divergence in sand skinks between these two ridges would represent about a 2-million-year separation; the absence of haplotype diversity on the MDR would suggest this population was founded by only a few individuals or severely reduced by genetic drift of a small population (Branch et al. 2003).

Life History

The sand skink is usually found below the soil surface burrowing through loose sand in search of food, shelter, and mates. Sand skinks feed on a variety of hard and soft-bodied arthropods that occur below the ground surface. The diet consists largely of beetle larvae and termites (*Prorhinotermes* spp.). Spiders, larval ant lions, lepidopteran larvae, roaches, and adult beetles are also eaten (Myers and Telford 1965; Smith 1982).

Sand skinks are most active during the morning and evening in spring and at mid-day in winter, the times when body temperatures can easily be maintained at a preferred level between 82 ° Fahrenheit (F) and 88° F (27.8 ° Celsius [C] - 31.1 ° C) in open sand (Andrews 1994). During the hottest parts of the day, sand skinks move under shrubs to maintain their preferred body temperatures in order to remain active near the surface. With respect to season, Telford (1959) reported skinks most active from early March through early May, whereas Sutton (1996) found

skinks most active from mid-February to late April. Based on monthly sampling of pitfall traps, Ashton and Telford (2006) found captures peaked in March at Archbold Biological Station (ABS), but in May at the Ocala National Forest (ONF). All of these authors suggested the spring activity peak was associated with mating. At ABS, Ashton and Telford (2006) noted a secondary peak in August that corresponded with the emergence of hatchling sand skinks.

Telford (1959) assumed sand skinks become sexually mature during the first year following hatching, at a size of 1.78 in (4.52 cm) snout-vent length. He suspected most of the breeders in his study were in their second year and measured between 1.78 in and 2.24 in (4.52 cm - 5.69 cm) snout-vent length. However, Ashton (2005) determined sand skinks become sexually mature between 19 and 23 months of age and have a single mating period each year from February through May. Sand skinks first reproduce at 2 years of age and females produce a single clutch in a season, although some individuals reproduce biennially or less frequently (Ashton 2005). Sand skinks lay between two and four eggs, typically under logs or debris, in May or early June (Ashton 2005; Mushinsky in Service 2007), approximately 55 days after mating (Telford 1959). The eggs hatch from June through July. Sand skinks can live at least to 10 years of age (Meneken et al. 2005). Gianopulos (2001) found the sex ratio of sand skinks did not differ significantly from 1:1, which is consistent with the findings of Sutton (1996).

Evidence suggested smaller sand skinks might move greater distances than larger individuals. The longest sand skink movement documented is 26,250 ft (8 km) and an average movement of 5,250 ft (1.6 km) in naturally fragmented scrubby flatwoods at the ABS (Mushinsky et al. 2011). However, most sand skinks move less than 130 ft (39.6 m) between captures, but some have been found to move over 460 ft (140.2 m) in 2 weeks (Mushinsky et al. 2001). Limited dispersal has been suggested to explain the relatively high degree of genetic structure within and among sand skink populations (Branch et al. 2003; Reid et al. 2004).

Habitat

The sand skink is widespread in native xeric uplands with excessively drained, well-drained, and moderately well-drained soils on the sandy ridges of interior central Florida at elevations greater than 80 ft (24.4 m) above mean sea level (Service 2012). Commonly occupied native habitats include Florida scrub variously described as sand pine scrub, xeric oak scrub, rosemary scrub and scrubby flatwoods, as well as high pine communities that include sandhill, longleaf pine/turkey oak, turkey oak barrens and xeric hammock (see habitat descriptions in Myers 1990 and Service 1999). Sand skinks also use disturbed habitats such as citrus groves, pine plantations, and old fields, especially when adjacent to existing occupied scrub (Pike et al. 2007; 2008).

Various authors have attempted to characterize optimal sand skink habitat (Telford 1959; 1962; Christman 1978; 1992a; Campbell and Christman 1982). Literature descriptions of scrub characteristics have not proven very useful to predict sand skink abundance, but expert opinion was more successful (McCoy et al. 1999). McCoy et al. (1999) used trap-out enclosures to measure sand skink densities at seven scrub sites and attempted to rank each area individually based on eight visual characteristics to identify good habitat: root-free, grass-free, patchy bare areas, bare areas with lichens, bare areas with litter, scattered scrubs, open canopy, and sunny exposure. None of the individual literature descriptions of optimal habitat (or any combination thereof) accurately predicted the rank order of actual sand skink abundance at these sites, which ranged in density from 52 to 270 individuals per acre (Sutton 1996). However, knowledgeable

researchers, especially as a group, appear to be able to visually sort out the environmental variables important to sand skinks, but had difficulty translating their perceptions into a set of rules that others could use to identify optimal sand skink habitat (McCoy et al. 1999).

Multiple studies (Collazos 1998; Hill 1999; Mushinsky and McCoy 1999; Gianopulos 2001; Mushinsky et al. 2001) have quantified the relationship between sand skink density and a suite of environmental variables. These studies have found that sand skink relative density was positively correlated with low canopy cover, percent bare ground, amount of loose sand and large sand particle size, but negatively correlated with understory vegetation height, litter cover, small sand particle size, soil moisture, soil temperature, and soil composition. In an unburned sandhill site at ABS, Meshaka and Lane (2002) captured significantly more sand skinks in pitfall traps set in openings without shrubs than at sites with moderate to heavy shrub density. Telford (1959) suggested scattered debris and litter provided moisture that was important to support an abundant food supply and nesting sites for sand skinks. Cooper (1953) noted the species was most commonly collected under rotting logs, and Christman (1992) suggested they nest in these locations. Christman (2005) found the species continues to occupy scrub with a closed canopy and thick humus layer, although at lower densities. Recent surveys have also shown sand skinks may occupy both actively managed lands such as citrus groves and pine plantations and old-field communities (Pike et al. 2007), particularly if these sites are adjacent to patches of native habitat that can serve as a source population for recolonization.

Habitat size may be a factor in maintaining viable skink populations. Pike et al. (2006) monitored sand skinks and quantified vegetation change in six areas from 5 ac to 69 ac (2 - 27.9 ha) that were restored to a more natural state using fire and canopy thinning, and set aside for conservation in residential areas. Pike et al. (2006) documented a severe decline in occupancy and relative density of sand skinks, and hypothesized indirect impacts from surrounding development, such as changes in soil hydrology, may have caused the decline. Hydrologic changes in the soil may have occurred as a result of construction of retention ponds or run-off from neighborhoods that caused a rise in the groundwater level (Pike et al. 2006). The population decline of skinks noted may also have been caused by prescribed burning used to restore these sites (Mushinsky in Service 2007).

Population Dynamics

The current status of the sand skink throughout its geographic range is unclear because recent comprehensive, range-wide surveys have not been conducted. At the time of listing in 1987, Florida Natural Areas Inventory (FNAI) had recorded 31 known sites for the sand skink. By September 2006, 132 localities were known by FNAI (Griffin 2007). This increase is largely the result of more intensive sampling of scrub habitats in recent years and does not imply this species is more widespread than originally supposed. Nonetheless, except for a few locations where intensive research has been conducted, limited information about the presence or abundance of sand skinks exists. Additional studies have provided presence/absence information that has been used to determine the extant range of the species (Mushinsky and McCoy 1991; Stout and Corey 1995). However, few long-term monitoring efforts have been undertaken to evaluate the population size, or population trends, of sand skinks at these sites, on remaining scrub habitat on private lands, or range-wide.

The population dynamics of sand skinks within their extant ranges are not well known because the skinks' small size and secretive habits make their study difficult. Sand skinks are known to exhibit life-history traits that are also found in a number of other fossorial lizard species, such as: delayed maturity, a small clutch size of relatively large eggs, low frequency of reproduction, and a long lifespan (Ashton 2005). Such character traits may have resulted from, and be indicative of, high intraspecific competition or predation.

Status and distribution

The modification and destruction of xeric upland communities in central Florida were a primary consideration in listing the sand skink as threatened under the Act in 1987 (52 FR 42658), and is listed as federally-designated threatened by the state. Critical habitat has not been designated for the sand skink.

Distribution

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 LWR and Winter Haven Ridge (WHR) in Highlands, Lake, and Polk counties (Christman 1992a; Mushinsky and McCoy 1995). The sand skink is uncommon on the MDR, including sites within the ONF (Christman 1970; 1992a). Herptile surveys in a variety of scrub habitats in the ONF did not detect sand skinks (Greenberg et al. 1994). Telford (1998) cited the ephemeral nature of early successional scrub habitats due to dynamic changes as an important confounding factor in the evaluation of the sand skink's present status in the ONF. At least two persistent populations are known from the ONF (Telford 1998), where sand skinks have been collected for genetic analysis (Branch et al. 2003) and population studies (Ashton and Telford 2006). Despite intensive sampling efforts in scrub habitat with similar herpetofauna, the sand skink has not been recorded at Avon Park Air Force Range on the Bombing Range Ridge (Branch and Hokit 2000). Although we do not have estimates of acreage for all of the ridges, we do know that the largest of these, the LWR, encompasses approximately 517,303 ac (209,353 ha) (Weekley et al. 2008).

According to the FNAI database updated as of September 2006, there were 132 locality records for the sand skink, including 115 localities on the LWR, 7 on the MDR, and 4 on the WHR (Griffin 2007). FNAI also reports four localities for this species west of the MDR in Lake County and two localities between the LWR and the Lake Hendry Ridge.

Range-wide trends

Approximately 85 percent of xeric upland communities historically used by sand skinks on the LWR are estimated to have been lost due to development (Turner et al. 2006b). It is likely continued residential and agricultural development of xeric upland habitat in central Florida has destroyed or degraded habitat containing sand skinks. Protection of the sand skink from further habitat loss and degradation provides the most important means of ensuring its continued existence. Of the 73 locations examined by Turner et al. (2006a) on which sand skinks were reported, 39 are protected and, as of 2004, 27 were managed. Current efforts to expand the system of protected xeric upland communities on the LWR, coupled with implementation of effective land management practices, represent the most likely opportunity for assuring the sand skink's survival.

Over the last 20 years, a concerted effort by public and private institutions to protect the remaining undeveloped areas of the LWR has resulted in the acquisition of 21,498 ac (8,700 ha) of scrub and sandhill habitat (Turner et al. 2006). A variety of state and federal agencies and private organizations are responsible for management of these areas. The Service has also acquired portions of several tracts totaling 1,800 ac (728.4 ha) as a component of the LWR National Wildlife Refuge (Service 1993). Private organizations, such as TNC and ABS, have acquired and currently manage xeric uplands within the LWR. All of these efforts have greatly contributed to the protection of imperiled species including sand skinks on the LWR (Turner et al. 2006).

The Service currently has certified six conservation banks totaling nearly 1,500 ac (607 ha) for sand and blue-tailed mole skinks, two in Highlands County and four in Polk County. Additional conservation banks are in the approval process in Polk County which will significantly increase the amount of habitat in conservation for this species once approved. Conservation banking provides an avenue for collaboration of private/public partnerships to maintain and preserve habitat, providing for the conservation of endangered species. These banks conserve and manage land in perpetuity through a conservation easement to offset impacts occurring elsewhere to the same resource values on non-bank lands. The certification of these banks should help reduce the piece-meal approach to sand skink conservation that can result from separate evaluation of individual projects by establishing larger reserves and improving connectivity of habitat.

Analysis of the species/critical habitat likely to be affected

Little information is available to adequately assess the status and population dynamics of the sand skink. However, the sand skink may be relatively widespread in remaining xeric uplands. Furthermore, the implementation of favorable management practices can create and maintain suitable habitat conditions for the sand skink, as well as other xeric upland-dependent species. A number of actions over the last 20 years have resulted in conservation benefits to xeric uplands within the extant range of the species. The state of Florida has acquired xeric upland habitat through various acquisition programs for conservation of native landscapes. The Service has also acquired portions of several tracts as a component of the LWR National Wildlife Refuge. In 2012, the Service began acquisition and conservation easements to create the Everglades Headwaters National Wildlife Refuge and Conservation Area that includes xeric uplands on LWR. Finally, private organizations, such as TNC and ABS have acquired and currently manage xeric uplands within the LWR.

ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem within the action area. The environmental baseline does not include the effects of the action under review in this Biological Opinion.

STATUS OF THE SPECIES WITHIN THE ACTION AREA

Project biologists conducted visual pedestrian surveys according to the USFWS Sand Skink and Blue-tailed Mole Skink Survey Protocol (2012) within the proposed right-of-way and pond sites of the SR 400 (I-4) Segment 1, in locations where land elevation exceeded 82 feet mean sea level and well-drained soils were suitable. There wasn't previous evidence of skinks noted in the original PD&E surveys conducted in December 1996 – December 1997, nor was there a species-specific survey performed. However, guidance from USFWS on the skink now classifies areas with skink soils as potential skink habitat, whether or not natural xeric scrub habitat occurs over the soils. Cover board surveys were conducted according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Bluetailed Mole Skink (USFWS 2012) during March, April, and May 2014. Subsequent design changes after the completion of the 2014 survey necessitated a supplemental survey over several new areas in 2015.

Sand skink tracks were not observed on the 2014 surveys. In 2015 an extensive survey was conducted and sand skinks were found in Pond Site FPC 105A. Originally, total acres proposed as occupied were 14.5 acres. Areas where heavy oak cover occurred and soil conditions were changed to include a heavy duff layer, high soil moisture, organic presence, and high root mass density are considered non-suitable sand skink habitat. A 188-foot buffer from a positive occurrence was used to determine the extent of occupied habitat. In areas where positive tracks were found with unsuitable habitat in a direction a 30-foot buffer in that same direction was used. In the areas where the pine plantation included heavy coverage of Bahia grass and a slightly altered soil profile (high root mass density, higher soil moisture), the extent of the occupied habitat was again determined using a 30-foot buffer from the end of the line of positive occurrences. In addition, it was agreed that the several areas that were vegetated with a heavy cover of Cogon grass likely represented unsuitable habitat for sand skinks and would be excluded from the calculation of occupied habitat. Based on survey results, the FHWA and FDOT determined the proposed Pond Site 105A of the SR 400 BtU project "may affect and is likely to adversely affect" the sand skink.

Scrub lupine was found during the sand skink surveys in 2014. This plant species was observed west of Turkey Lake Road, to the west of the SR 528 Interchange at westbound I-4 in five areas surveyed for sand skinks in 2014 (Area H, Area K, Area L, Area M, and Area O). The footprint of Pond Site 139B and the edge of the proposed right-of-way northeast of the Daryl Carter Parkway overpass overlap with an individual observation of scrub lupine. Based on the survey results, the FHWA and FDOT determined the proposed project, SR 400 BtU Segment 1, "may affect and is likely to adversely affect" the scrub lupine.

The Service concurs with these determinations and finds that the project will result in adverse effects to the federally listed sand skink and its habitat, and the federally listed scrub lupine and its habitat. The project's effects on the sand skink and the scrub lupine will be discussed in the Effects of the Action.

FACTORS AFFECTING SPECIES' ENVIRONMENT WITHIN THE ACTION AREA

The habitats surrounding the action area are threatened by degradation resulting from fire exclusion, lack of management, and residential development. As mentioned in the previous section, some suitable habitat is interspersed within the residential and compacted pastureland. Xeric habitats favored by skinks require periodic fire to maintain optimal habitat values such as patches of bare sand and low shrub architecture. The need to protect agricultural, residential, and commercial development has resulted in the suppression of wildfires.

Xeric habitats lacking periodic fire or management become overgrown and less suitable to skinks and scrub lupine. Over time, skinks and scrub lupine will diminish in abundance and eventually may be extirpated as other vegetation takes over the available habitat and open sandy areas are covered. The FHWA and FDOT have no mechanism to perpetuate land management practices beyond their right-of-way, so the maintenance of habitat for skink and scrub lupine suitability surrounding the action area will be the responsibility of individual property owners.

CLIMATE CHANGE

Climate change is evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level, according to the Intergovernmental Panel on Climate Change Report (IPCC 2007a,b). The IPCC Report describes changes in natural ecosystems with potential wide-spread effects on many organisms, including marine mammals and migratory birds. The potential for rapid climate change poses a significant challenge for fish and wildlife conservation. Species' abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the Department of the Interior (DOI) requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007).

Temperatures are predicted to rise from 3.6 °F to 9.0 °F (2 ° - 5 °C) for North America by the end of this century (IPCC 2007a,b). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing and distribution), storms (frequency and intensity), and sea level rise.

Climatic changes in Florida could amplify current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management. Global warming will be a particular challenge for endangered, threatened, and other "at risk" species. It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. The Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for adjusting our management strategies in response to climate change (Service 2006). As the level of information increases concerning the effects of global climate change on sand skinks and scrub lupine, the Service will have a better basis to address the nature and magnitude of this potential threat and will more effectively evaluate these effects to the range-wide status of these species.

EFFECTS OF THE ACTION

This section analyzes the direct, indirect, and beneficial effects of the proposed action and interrelated and independent actions on federally listed skinks and their habitat and scrub lupine.

FACTORS TO BE CONSIDERED

The project site contains skink and scrub lupine habitat and is located within the geographic range of the sand skink and scrub lupine. The timing of construction for this project, relative to sensitive periods of the species, is unknown. The project will be constructed in a single, disruptive event and alter native vegetation within the action area. The time required to complete construction of the project is not known, but it is likely the majority of the land clearing will be completed within a few months. The disturbance associated with the project will be permanent and will result in a direct loss of habitat currently occupied and available to these species.

Direct effects

Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, and are reasonably certain to occur. Direct effects include: the permanent and temporary loss of habitat for the sand skink and a reduction in the geographic distribution of sand skink habitat. Direct impacts to scrub lupine are the permanent loss of habitat and mortality of the plants located in the project area.

The construction of I-4 BtU Segment 1 will result in the permanent loss of 10 acres of occupied sand skink habitat. Based on the outcome of sand skink coverboard surveys conducted in the spring of 2015 construction activities will directly destroy 10.0 acres of occupied skink habitat at Pond Site 105A. Incidental mortality of skinks due to land clearing and construction activities may also occur. Mechanical preparation of the proposed project site can crush or injure individual skinks and skink eggs, and destroy or degrade occupied and potential habitat and foraging areas. In addition, any clearing activities may adversely affect skinks by causing them to leave the area and possibly miss foraging and mating opportunities. Individual skinks fleeing the area may be more vulnerable to predation.

Sand skinks may respond to the commencement of construction activities by attempting to flee the project site to avoid the disturbance. However, because skinks are not highly agile, they may not be able to successfully flee the project site before they are affected by construction activities. As such, skinks may be crushed by construction vehicles or entombed during earth moving, contouring and trenching activities associated with the construction of the proposed pond site 105A of I-4 BtU Segment-1 analyzed in this Biological Opinion.

Mechanical preparation of the proposed project site will also crush any scrub lupine plant located at the proposed project site. It will also destroy or degrade occupied and potential habitat for this species.

Interrelated and interdependent actions

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

Indirect effects

Indirect effects are those effects that result from the proposed action, are later in time, and are reasonably certain to occur. Unintentional yet often unavoidable indirect effects of a new roadway are increased incidences of vehicle wildlife collision resulting in road kill. In addition, the project will add to the continued fragmentation of skink and scrub lupine habitat in the Mount Dora region and skink home ranges that extend into Pond Site 105A may be truncated.

Beneficial effects

Beneficial effects are those effects of the proposed action that are completely positive, without any adverse effects to the listed species or its critical habitat. The proposed action includes a habitat restoration or conservation component (Conservation Measure 1 and 2) that will result in management or protection of suitable, potentially occupied habitat within the northern portion of the species range.

Analyses for effects of the action

To minimize potential impacts to sand skinks and scrub habitat, the applicants will provide compensatory mitigation at a Service Approved conservation bank to preserve skink habitat as a part of the proposed action. Targeted habitat credit acquisition will have beneficial effects for the species and protect or restore up to two times as much habitat that is proposed to be directly impacted.

Although we know that the site is occupied, it is difficult to quantify abundance due to the cryptic nature of the species and survey methodology. Therefore, the actual number of skinks that currently occupy the site are unknown. The Service has determined that the acres of occupied scrub habitat are a quantifiable proxy for the jeopardy analysis and allows the Service to quantify and monitor take of the species. Results of the surveys suggest that federally listed sand skinks occur within 10 acres of the project footprint. Based on estimated acres of protected lands that manage for sand skinks and scrub species, the proposed loss of occupied habitat is insignificant amount, less than .04% (assuming 29,511 acres, Mushinsky et al 2011). The Service acknowledges that this may be a conservative estimate because of limited rangewide data regarding sand skink population size at all protected sites in the remaining scrub habitat. Based on the best available information, the Service has determined that the loss would not jeopardize the recovery or continued existence of the sand skink.

To minimize impacts to the scrub lupine, the applicants will do surveys during the permitting phase to determine where the specimens are located. After determining if the plants are still located within the area identified in the 2014 surveys, the applicants will work with Bok Tower Gardens to collect seed and/or transplant the specimens found in the project area. The Service

has determined that the plants identified in the six surveyed areas that identified scrub lupine occurrence in Orange County are located in isolated areas with roads north and south of the plants where management (prescribed fire) will most likely never occur. These plants are in already fragmented habitat and are few in numbers. Based on the best available information, the Service has determined that the loss of these plants would not jeopardize the recovery or continued existence of the scrub lupine.

CUMULATIVE EFFECTS

The Service defines "cumulative effects" considered in this Biological Opinion as the effects of future State, Tribal, local, or private actions (*i.e.*, non-Federal actions) reasonably certain to occur in the action area. Our definition of cumulative effects does not include future Federal actions unrelated to the proposed action because these actions require separate consultation pursuant to section 7 of the Act. Cumulative effects are considered in regard to the risk of the proposed action having an effect that would jeopardize the recovery and continued existence of the species.

Anticipated future county actions in the action area that will adversely affect sand skink habitat include the issuance of county building permits. Construction projects requiring only county building permits will not have a Federal nexus requiring consultation with the Service under the Act. However, applicants obtaining county building permits are not absolved from the prohibition of take of listed species under the Act. Section 10 of the Act provides a means for permitting the incidental take of listed species associated with non-Federal actions such as county building permits. In order to obtain an incidental take permit, the applicant must prepare a Habitat Conservation Plan (HCP), acceptable to the Service, describing how impacts to both species will be minimized and mitigated to the maximum extent practicable. To be acceptable to the Service, an HCP for a non-Federal action affecting Federally-listed species would generally include the enhancement, restoration, or preservation of sand skink habitat. Take provisions are only given in federal lands but the Service would recommend that plants be relocated or seed collected for conservation during the HCP process.

The Service has considered cumulative effects within the action area for the sand skink and scrub lupine and based on the above discussion, we have not identified any additional cumulative effects beyond those already discussed in the Environmental Baseline.

CONCLUSION

After reviewing the current status of sand skink and the scrub lupine, the environmental baseline for the action area, the effects of the proposed roadway construction and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the sand skink or the scrub lupine. No critical habitat has been designated for either of these species; therefore, none will be affected. Construction of the proposed project will result in the permanent loss of 10 ac (4.05 ha) of occupied sand skink habitat. However, the loss of this habitat is not expected to appreciably affect the overall survival and recovery of the sand skink.

Additionally, the proposed project will also impact 10 or more scrub lupine plants, however, the loss of these plants will not affect the overall survival and recovery of the species. The scrub lupine is a plant and take is not prohibited for plants. An incidental take statement will only be provided for sand skinks.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." "Harass" is defined by the Service as intentional or negligent 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. "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 essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking, that is incidental to and not intended as part of the agency action, is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

The Service has reviewed the biological information for this species, the information presented by the applicant, and other available information relevant to this action. The Service anticipates incidental take of sand skinks in the form of harm (*i.e.,* mortality and habitat loss). Construction activities associated with the project may wound or kill skinks, and result in the loss 10 acres of occupied skink habitat. The Service finds the actual number of sand skinks incidentally taken by the action will be difficult to quantify for the following reasons: 1) individuals have a small body size and spend the majority of their time underground, making the detection of a dead or impaired specimen unlikely; and 2) a commercially practicable and suitable survey method has not been developed to accurately estimate skink density, thus the number of skinks currently occurring in the project footprint is not well known. The Service finds that all sand skinks occurring within the 10 acres (4.05 ha) of occupied skink habitat on the Pond Site 105A will be taken incidental to the action.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to the sand skink. Critical habitat has not been designated for the sand skink and therefore, will not be affected. If during the course of this action, this level of take is exceeded; such take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide modification of the reasonable and prudent measures.

REASONABLE AND PRUDENT MEASURES

When providing an incidental take statement, the Service is required to give reasonable and prudent measures it considers necessary or appropriate to minimize the take along with terms and conditions that must be complied with, to implement the reasonable and prudent measures. The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize the take of sand skinks.

1) FHWA and FDOT shall ensure the level of incidental take anticipated in this Biological Opinion is commensurate with the analysis contained herein.

The conservation measures described as a part of the project description are considered binding measures and shall be implemented for the exemption in section 7(o)(2) to apply. In the event that a sick, injured, or dead species is found, the Service has provided the following procedures to be used to handle or dispose of any individuals taken.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FDOT and FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. These terms and conditions are non-discretionary.

- The construction work area for I-4 BtU Segment 1 – Pond Site 105A will be clearly delineated prior to ground disturbance to ensure that take is not exceeded within the known occupied skink areas. The Service concluded that no more than 10 ac (4.05 ha) of occupied sand skink habitat will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided.

- FDOT will be required to notify the Service 30 days before ground disturbance and construction begins that the compensatory mitigation has occurred.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommends incorporating the following minimization measures to the ongoing maintenance of the highway right-of-way:

- Setting mower height at greater than 4 inches to avoid or minimize adverse effects to ground-dwelling wildlife.

- Limit the use of pesticides in the right-of-ways and pond sites that have suitable soils at elevations that could support sand skinks.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation in the effort to protect fish and wildlife resources. If you have any questions regarding this project, please contact Lourdes Mena at 904-731-3134.

Sincerely,

for Jay B. Herrington
Field Supervisor

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From:	Owen, Catherine
To:	Stys-Palasz, Beata; Walsh, William
Cc:	Drauer, Mike; Lyon, Casey; Chasez, Heather
Subject:	FW: 432100-1 I-4 BTU Segment 1
Date:	Wednesday, April 06, 2016 1:37:12 PM
Attachments:	image001.png

For your records….. we sent this to FHWA on March 10th

Catherine B. Owen, M.S.
Environmental Specialist IV
District Cultural Resources Coordinator
FDOT District Five
719 S. Woodland Blvd.
DeLand FL 32720
phone (386) 943-5383

From: Cathy.Kendall@dot.gov [mailto:Cathy.Kendall@dot.gov]
Sent: Wednesday, April 06, 2016 1:24 PM
To: lourdes_mena@fws.gov
Cc: Owen, Catherine; DeTizio, Nahir; Lina.Maldonado@dot.gov
Subject: 432100-1 I-4 BTU Segment 1

The Federal Highway Administration has reviewed the February 2016 Endangered Species Biological Assessment (BA) for the subject project. Based on the information in the report and in discussions with staff from the Florida Department of Transportation (FDOT), we have determined that the proposed action **may affect and is likely to adversely affect** the following listed species: Sand Skink (*Neoseps reynodsi*) and Blue-tailed Mole Skink (*Eumeces egregious lividus*), and the Scrub Lupine (*Lupinus aridorum*). FHWA therefore requests formal consultation with your agency for the potential impact of this project on these protected species.

It is my understanding that FDOT has already transmitted the BA to you. Please let me know if there is anything you need for our formal consultation for this project, or if there is anything you would like to discuss as you review the report.

Cathy Kendall, AICP
Senior Environmental Specialist
FHWA - FL, PR and VI
3500 Financial Plaza, Suite 400
Tallahassee, FL 32312
(850) 553-2225
cathy.kendall@dot.gov

FDOT

Florida Department of Transportation

RICK SCOTT
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

JIM BOXOLD
SECRETARY

March 10, 2016

Mr. James Christian, Division Administrator
Federal Highway Administration
Florida Division Office
3500 Financial Plaza, Suite 400
Tallahassee, Florida 32312

Attention: Ms. Cathy Kendall, Senior Environmental Specialist

RE: **Request for Section 7 Formal Consultation**
SR 400 (I-4) Beyond the Ultimate Project Development and Environment Study – **Segment 1** (Orange and Osceola Counties)
Financial Management No. 432100-1-22-01

Dear Mr. Christian,

The FDOT is conducting an update of the Project Development and Environment (PD&E) Studies for the extension of proposed express lanes for SR 400 (I-4). The project limits in the original I-4 PD&E Studies, along with the corresponding environmental documents associated with these PD&E Studies, were:

- West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line, (29.5 miles) – *Environmental Assessment/Finding of No Significant Impact (EA/FONSI) [FPN 201210, (1998)]*
- **CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) (13.7 miles) – *EA/FONSI [FPN 242526 and 242483, (1999)]***
- West of SR 528 (Beachline Expressway) to SR 472 (43 miles) - *Final Environmental Impact Statement (FEIS) [FPN 242486, 242592 and 242703, (2002)].*

The I-4 Ultimate project consists of reconstruction to include new express lanes for the 21-mile section of I-4 that extends from west of SR 435 (Kirkman Road) to east of SR 434. It was approved under FPNs 242486, 242592 and 242703 (FEIS 09/03/2002, ROD 12/08/2005), and is currently under construction.

The current I-4 Beyond the Ultimate (BtU) PD&E Study update includes a total of approximately 41 miles of roadway sections, located both east and west of the 21-mile, I-4 Ultimate project. It has been divided into the following five segments (**see attached figure**):

- **Segment 1: SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) - Osceola County and Orange County**

- Segment 2: SR 400 (I-4) from West of SR 528 (Beachline Expressway) to West of SR 435 (Kirkman Road) - Orange County
- Segment 3: SR 400 (I-4) from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92) (Seminole/Volusia County Line) - Seminole County
- Segment 4: SR 400 (I-4) from East of SR 15/600 (US 17/92) (Seminole/Volusia County Line) to ½ Mile East of SR 472 - Volusia County
- Segment 5: SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk/Osceola County Line) - Polk County

As part of the PD&E Study update, Endangered Species Biological Assessments (ESBA) were prepared for each of the individual BtU segments. (Note that ESBAs for Segments 2, 3, and 4 were combined under one submittal; and Segment 5 will be submitted under separate cover to the South Florida Ecological Services Office.) Based upon the results of the individual species effects determinations, both informal and formal consultation with the USFWS for potential impacts will be required. A separate request for informal consultation dated March 7, 2016 was submitted by FDOT to USFWS for all species having the potential to be affected by BtU **Segment 1** that were proposed to have either a **No Effect** or **May Affect, Not Likely to Adversely Affect** determination.

As requested by FHWA, it was determined that a separate submittal for formal consultation from FHWA to USFWS should occur for the sand skink and scrub lupine. The sand skink survey results and potential project impacts are documented in the Sand Skink Survey Technical Memorandum (an appendix to the Segment 1 ESBA). The following is the proposed Section 7 effects determinations for the sand skink as well as the scrub lupine:

Sand Skink (*Neoseps reynoldsi*) and Blue-tailed Mole Skink (*Eumeces egregius lividus*) – Both the sand skink and blue-tailed mole skink are listed as Threatened by the USFWS and FFWCC. The three most important factors in determining the presence of skinks are location, elevation, and suitable soils. Sand skinks occur on sandy ridges of interior Central Florida, including Polk, Osceola, and Orange Counties, typically at elevations of 82 feet above sea level and higher. They occur in excessively drained, well-drained, and moderately well-drained sandy soils, with suitable soil types. These soil types typically support scrub, sandhill, or xeric hammock natural communities, though these may be degraded by impacts to overgrown scrub, pine plantation, citrus grove, old field, or pasture. Skinks have been documented to occur in all these degraded conditions where soil types are suitable, regardless of vegetative cover. This makes habitat condition of secondary importance in determining if skinks are present. If a site has suitable soils at the appropriate elevation within the counties where skinks are known to occur, there is a likelihood of presence, and potential effects to skinks should be considered.

As the Segment 1 project occurs within the USFWS Consultation Area for sand skink and blue-tailed mole skink, both a pedestrian field survey and full cover board survey were conducted to assess potential habitat for the sand skink. The cover boards were placed in all areas containing mapped skink soils as verified by a certified soil scientist. A survey occurred between April 10, 2014 and May 6, 2014; and then design changes necessitated additional areas be surveyed in March and April 2015. No skinks or signs of skinks were identified during the 2014 survey, but

sand skinks were observed during the survey in 2015 on one pond site (FPC 105A). This pond site contains approximately **2.77 acres** of occupied skink habitat. FDOT commits to provide compensatory mitigation at a Service-approved sand skink conservation bank at a ratio of 2:1 for occupied habitat to offset the potential impacts from the project. As this pond site will impact occupied sand skink habitat, this project **May Affect** the sand skink.

Scrub lupine *(Lupinus aridorum)*

A review of agency databases and field reviews of the project corridor indicate that there have been few reported occurrences of federally listed plant species within the proposed project area. Twenty (20) federally-listed species have been demonstrated to have the potential to occur within Polk, Osceola, and Orange Counties; though not all habitat types are represented within the project area. Information from the previous PD&E Study (1996-1997) indicated that one listed plant was observed, the scrub lupine. The observation was made west of Turkey Lake Road, to the west of the SR 528 Interchange at westbound I-4. Follow-up protected plant field surveys covering the proposed project alignment and pond sites were conducted in May 2013, March and April 2014, and March and April 2015 by project biologists. The scrub lupine was observed in five areas where sand skink cover board surveys were conducted in 2014 (Areas H, K, L, M, and O on Figure C in Appendix A of ESBA; and Sand Skink Survey Report, Appendix E of ESBA). No additional federally listed plant species were identified within the proposed widening impact area or pond sites during the field investigations. Based on the provided alignments of the right-of-way and proposed pond sites, the project is anticipated to have impacts to the scrub lupine. The footprint of Pond Site 139B and the edge of the proposed right-of-way northeast of the Daryl Carter Parkway overpass overlap individual observations of scrub lupine. Specific measures to address these plants will be undertaken, in consultation with USFWS, and mitigation for sand skinks at a Service-approved scrub conservation bank will be provided. This mitigation should also offset impacts to the scrub lupine. Therefore, this project **May Affect** the federally listed plant species, the scrub lupine.

We ask that USFWS provide concurrence with the determinations for these species based upon the results documented in the Segment 1 ESBA. We appreciate the coordination effort and input already provided and look forward to continued consultation on this project. If you have any questions, feel free to contact either Catherine Owen at (386) 943-5383, catherine.owen@dot.state.fl.us or me at (386) 943-5411, william.walsh@dot.state.fl.us at your convenience. Thank you for your assistance with this project.

Sincerely,

William G. Walsh
Environmental Manager
FDOT, District Five

Cc: Casey Lyon, Beata Stys-Palasz, PE, FDOT
Mike Drauer, Stantec

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:

FWS Log No. 04EF1000-2016-I-0223

April 4, 2016

William G. Walsh
Environmental Manager
Florida Department of Transportation, District 5
719 S. Woodland Blvd.
Deland, FL 32720

RE: SR 400 (I-4) Beyond the Ultimate Project Development and Environment Study - Segment 1
Orange and Osceola Counties, Florida
Financial Management No. 432100-1-22-01

Dear Mr. Walsh:

The U.S. Fish and Wildlife Service (Service) has completed its review of the update for the Project Development and Environment (PD&E) Studies for the extension of proposed express lanes for SR 400 (I-4). The current I-4 Beyond the Ultimate (BtU) PD&E Study update includes a total of 41 miles of roadway sections, both east and west of the 21 -mile, I-4 Ultimate project that extends from west of SR 435 to east of SR 434. Segment 1, which this letter is addressing, extends from West of CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) in Osceola and Orange County, Florida. The updated Endangered Species Biological Assessments (ESBA) was prepared for each of the individual BtU segments and based on the results of the determinations both informal consultation and formal consultation will be needed. In this correspondence, the Service provides the following comments, in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*), for the informal portion of the consultation for Segment 1. A separate request for formal consultation for the sand skink and blue-tailed mole skink has been received for this segment and will be addressed separately.

Eastern indigo snake (*Drymarchon couperi*)

Gopher tortoise burrows were found within the proposed project area. Eastern indigo snakes were not observed but habitat for the species exists along the corridor. FDOT believes that the potential for eastern indigo snakes in the project area is moderate and is committed to implementing the Standard Protection Measures for the Eastern Indigo Snake and will have all permits conditioned so that all burrows are excavated prior to site manipulation in the vicinity of

the burrow. The closest documented sighting is approximately eight to ten miles to the southwest of the project area. The Service has reviewed the available information and **concurs with a 'may affect, but not likely to adversely affect' determination for this species.** The Service requests that in the event that an eastern indigo snake is observed in the project area that work is halted immediately, the snake is removed away from the construction area away from danger and that the Service is contacted.

Florida Scrub-Jay (*Aphelocoma coerulescens*)

Florida scrub-jays were not observed during the previous PD&E Study (December 1996-19997) and potential habitat was not identified during the current PD&E study. Field investigations conducted during this PD&E study (2013-2015) indicated that many of the areas previously identified as scrub-jay habitat have been altered or developed since the previous study in 1996-1997. The Service has reviewed the available information and **concurs with a 'may affect, but not likely to adversely affect' determination for this species.**

Wood Stork (*Mycteria americana*)

Segment 1 is located within the Core Foraging Areas (CFA) of two wood stork colonies (Lake Woodruff and Lake Russell). The project is not within 2,500 feet of an active colony site, will likely impact Suitable Foraging Habitat (SFH) of greater than 0.5 acres, and is located within the CFA of the two wood stork colonies mentioned above. FOOT commits to provide SFH compensation within the Service Area of a Service-approved wetland mitigation bank(s) within the CFA and will coordinate with the permitting agencies during the permitting phase of the project on compensatory mitigation and minimization of impacts to suitable foraging habitat. The Service has reviewed the available information and FDOT's commitments for minimizing and mitigating impacts to the wood stork and **concurs with a 'may affect, but not likely to adversely affect' determination for this species.**

Crested Caracara (*Caracara cheriway*)

The project area for Segment 1 is within the northernmost consultation area for the crested caracara. Surveys and field visits have not identified the caracara within the project corridor and the Service's data identifies the closest nest and observation at approximately 8 miles south of the project in Osceola County. The Service agrees that the ponds proposed for the project corridor, which are expansions of existing ponds rather than new construction, will not have significant impacts on foraging habitat for these birds and that the project will not impact nesting habitat. The Service has reviewed the available information submitted by FDOT and found in our records for this species and **concurs with a 'may affect, but not likely to adversely affect' determination for the crested caracara.**

Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*) and Red-cockaded woodpecker (*Picoides borealis*)

The snail kite and the red-cockaded woodpecker (RCW) use specific habitats that are not found within the proposed project corridor. The snail kite uses large open freshwater areas where it can

hunt for apple snails, their primary prey item. The closest observations and nest locations are at more than ten miles southeast at Lake Tohopekaliga. The RCW is a habitat specialist which requires stands of mature, live pines to build cavities where they nest. RCWs prefer to forage in large, older trees found in open pine ecosystems. Suitable nesting and/or foraging habitat will not be impacted by the proposed project. The Service has reviewed the available information submitted by FDOT and the data found in our records for both of these species and we agree that there is no habitat present within the proposed project area and consequently these species will not be impacted.

Federally listed plant species

The federally listed scrub lupine (*Lupinus aridorum*) was observed in five areas where sand skink surveys were conducted in 2014. FDOT concludes that based on the right-of-way alignment and pond sites the project will have impacts to the scrub lupine plant. Measures to address impacts to this species will be taken during the formal consultation for the sand skinks

Thank you for considering the effects of your proposed project on fish and wildlife, and the ecosystems upon which they depend. Although this does not represent a biological opinion as described in Section 7 of the Act, it does fulfill the requirements of the Act. Should changes to the proposed project occur or new information regarding fish and wildlife resources become available, further consultation with the Service should be initiated to assess any or further potential impacts. If you have any questions, please contact Lourdes Mena at (904)731-3119.

Sincerely,

for Jay B. Herrington
Field Supervisor

cc: Cathy Kendall, FHWA
Casey Lyon, FDOT District 5

Florida Department of Transportation

RICK SCOTT
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

JIM BOXOLD
SECRETARY

March 7, 2016

Dr. Heath Rauschenberger, Deputy Field Supervisor
U.S. Fish and Wildlife Service
North Florida Ecological Services Office
7915 Baymeadows Way, Suite 200
Jacksonville, FL 32256-7517

Attention: Ms. Lourdes Mena, Fish and Wildlife Biologist

RE: **Request for Section 7 Informal Consultation**
SR 400 (I-4) Beyond the Ultimate Project Development and Environment Study - **Segment 1** (Orange and Osceola Counties)
Financial Management No. 432100-1-22-01

Dear Dr. Rauschenberger,

The FDOT is conducting an update of the Project Development and Environment (PD&E) Studies for the extension of proposed express lanes for SR 400 (I-4). The project limits in the original I-4 PD&E Studies, along with the corresponding environmental documents associated with these PD&E Studies, were:

- West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line, (29.5 miles) – *Environmental Assessment/Finding of No Significant Impact (EA/FONSI) [FPN 201210, (1998)]*
- **CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) (13.7 miles) – *EA/FONSI [FPN 242526 and 242483, (1999)]***
- West of SR 528 (Beachline Expressway) to SR 472 (43 miles) - *Final Environmental Impact Statement (FEIS) [FPN 242486, 242592 and 242703, (2002)].*

The I-4 Ultimate project consists of reconstruction to include new express lanes for the 21-mile section of I-4 that extends from west of SR 435 (Kirkman Road) to east of SR 434. It was approved under FPNs 242486, 242592 and 242703 (FEIS 09/03/2002, ROD 12/08/2005), and is currently under construction.

The current I-4 Beyond the Ultimate (BtU) PD&E Study update includes a total of approximately 41 miles of roadway sections, located both east and west of the 21-mile, I-4 Ultimate project. It has been divided into the following five segments (**see attached figure**):

- **Segment 1: SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) - Osceola County and Orange County**
- Segment 2: SR 400 (I-4) from West of SR 528 (Beachline Expressway) to West of SR 435 (Kirkman Road) - Orange County
- Segment 3: SR 400 (I-4) from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92) (Seminole/Volusia County Line) - Seminole County
- Segment 4: SR 400 (I-4) from East of SR 15/600 (US 17/92) (Seminole/Volusia County Line) to ½ Mile East of SR 472 - Volusia County
- Segment 5: SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk/Osceola County Line) - Polk County

As part of the PD&E Study update, updated Endangered Species Biological Assessments (ESBA) were prepared for each of the individual BtU segments. (Note that ESBAs for Segments 2, 3, and 4 were combined under one previous submittal, and Segment 5 will be submitted under separate cover to the Service's South Florida Ecological Services Office.) Based upon the results of the individual species effects determinations described below, both formal and informal consultation with the USFWS for potential impacts will be required. The following is a description of the species that have the potential to be affected by BtU **Segment 1**:

Reptiles

Eastern Indigo Snake (*Drymarchon corais couperi*) – The eastern indigo snake, listed by both the FFWCC and the USFWS as Threatened, is a habitat generalist, using a variety of habitats from mangrove swamps to xeric uplands. These snakes are cold-sensitive and require gopher tortoise burrows, other animal holes, or stumps for protection during winter months. They require large tracts of natural, undisturbed habitat, and prefer to forage in and around wetlands for their preferred prey – other snakes.

Numerous gopher tortoise burrows were located within the project area, and the potential for indigo snakes is moderate due to the limited amount of habitat available in this developed area, though no indigo snakes were observed during field studies. During the construction phase of the project, FDOT will implement the USFWS *Standard Protection Measures for the Eastern Indigo Snake*, which contain specific provisions requiring the construction contractor to develop and implement an education plan concerning avoidance of eastern indigo snakes, as well as conducting post-construction reporting.

An effects determination was made by utilizing the USFWS Programmatic Key for the Eastern Indigo Snake (January 2010, updated August 2013). In accordance with this key, the project will implement the *Standard Protection Measures for the Eastern Indigo Snake* (USFWS, 2013) and

will have all permits conditioned such that all active and inactive gopher tortoise burrows will be excavated prior to site manipulation in the vicinity of the burrow.

Segment 1 may impact more than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) and has more than 25 active and inactive gopher tortoise burrows. Although this segment would merit a "may affect" determination under the key, there were no indigo snakes observed during any of the field reviews, the closest documented sighting (2008) is approximately 43 miles to the north (near Blue Springs State Park), and all active and inactive gopher tortoise burrows will be excavated prior to construction. In addition, as stipulated in the USFWS informal consultation concurrence letter (February 28, 2016) for the adjacent I-4 BtU segments to the north, in the event an indigo snake is observed in the project area during construction, work will be halted immediately and the USFWS contacted. For these reasons, and because the project area is primarily within an urban corridor with large areas of development offering little contiguous habitat to support the indigo snake, Segment 1 should qualify for a **may affect, but is not likely to adversely affect** determination.

Sand Skink (*Neoseps reynoldsi*) and Blue-tailed Mole Skink (*Neoseps egregius lividus*) – Both the sand skink and blue-tailed mole skink are listed as Threatened by the USFWS and FFWCC. The three most important factors in determining the presence of skinks are location, elevation, and suitable soils. Sand skinks occur on sandy ridges of interior Central Florida, including Polk, Osceola, and Orange Counties, typically at elevations of 82 feet above sea level and higher. They occur in excessively drained, well-drained, and moderately well-drained sandy soils, with suitable soil types. These soil types typically support scrub, sandhill, or xeric hammock natural communities, though these may be degraded by impacts to overgrown scrub, pine plantation, citrus grove, old field, or pasture. Skinks have been documented to occur in all these degraded conditions where soil types are suitable, regardless of vegetative cover. This makes habitat condition of secondary importance in determining if skinks are present. If a site has suitable soils at the appropriate elevation within the counties where skinks are known to occur, there is a likelihood of presence, and potential effects to skinks should be considered.

As the Segment 1 project occurs within the USFWS consultation area for sand skink and blue-tailed mole skink, both a pedestrian field survey and full cover board survey were conducted to assess potential habitat for the sand skink. The cover boards were placed in all areas containing mapped skink soils as verified by a certified soil scientist. A survey occurred between April 10, 2014 and May 6, 2014; and then design changes necessitated additional areas be surveyed in March and April 2015. No skinks or signs of skinks were identified during the 2014 survey, but sand skinks were observed during the 2015 survey on one pond site (FPC 105A). This pond site contains approximately 2.77 acres of occupied skink habitat. FDOT commits to provide compensatory mitigation at a Service-approved sand skink conservation bank at a ratio of 2:1 for

occupied habitat to offset the potential impacts from the project. As this pond site will impact occupied sand skink habitat, this project **may affect** the sand skink.

Avians

Florida Scrub-Jay (*Aphelocoma coerulescens*) – The Florida scrub-jay, listed as Threatened by both the FFWCC and USFWS, is an endemic species found in Florida's scrub habitats. This gregarious jay is a habitat specialist and typically lives in scrub and scrubby flatwoods habitats. Potential suitable habitat was identified in several locations along the corridor. Preliminary assessment of the potential presence of the species utilized a scrub-jay playback tape during an informal survey. Scrub habitats were also assessed during the set up and process of conducting the sand skink surveys. No scrub-jays have been observed within the Segment 1 project area or any proposed pond site areas during the current study; nor were any observed during the PD&E Study surveys (conducted in December 1996 through December 1997), or within the past 10 years according to the database maps kept by FNAI, the University of Florida, and the FFWCC. The proposed widening and stormwater ponds are not expected to have any impact on scrub-jays. Therefore, this project **may affect, but is not likely to adversely affect**, this species.

Crested Caracara (*Polyborus plancus audubonii = Caracara cheriway*) – The crested caracara is listed with both the USFWS and the FFWCC as threatened. This large raptor inhabits Florida's prairies and rangelands. They forage on many kinds of insects, fish, reptiles, birds, and mammals. They will feed on live captured prey, but also on roadkill. Nests are usually constructed within cabbage palms. Sensitivity to human disturbance varies in this species with many tolerating human activities, especially when human influence is already present within their home range. If a caracara nest is found to be within the project area, management practices outlined within the *Habitat Management Guidelines for Audubon's Crested Caracara in Central and Southern Florida* should be employed.

The project occurs at the northernmost edge of the USFWS Consultation Area for this bird in Central Florida, though no birds or nests have been observed or were documented within the project corridor either during the current study or during the previous PD&E Study (December 1996 – December 1997). Previous communication with UFSWS (Jane Monaghan) during the early stages of this PD&E Study indicated that there was no history of caracara in the project area and that no habitat remains within the project area. Though potential foraging areas occur adjacent to I-4 within the Segment 1 project area (active grazing pastures for cattle), the lack of documented birds (FFWCC, Fish and Wildlife Research Institute Wildlife Occurrence System Database 1988-2014) and suitable nesting habitat make the potential for these birds extremely unlikely. The project construction limits will remain within the existing right-of-way with the exception of pond sites. The proposed ponds located within these pastures will be expansions of

existing ponds rather than new construction. Therefore, this project **may affect, but is not likely to adversely affect** this species.

Snail Kite (*Rostrhamus sociabilis plumbeus*) – The snail kite is listed as Endangered by both the USFWS and the FFWCC. This non-migratory, medium-sized raptor utilizes large open freshwater marsh habitats and lakes with shallow water. Nests are usually located in a low tree or shrub at the water's edge, and the main staple of their diet is the apple snail. The project does occur within the USFWS Consultation Area for the snail kite, though no observations have been documented within or near the project corridor. Nesting snail kites have been documented significantly east (greater than 10 miles) of the project in Kissimmee at both Lake Tohopekiliga and East Lake Toho. No known adequate nesting or foraging habitat is located within or adjacent to the Segment 1 project area or proposed pond sites. Therefore, this project will have **no effect** on this species.

Red-Cockaded Woodpecker (*Picoides borealis*) – This species is listed as Endangered by the USFWS and by the FFWCC. The colonial red-cockaded woodpecker (RCW) is a habitat specialist, requiring stands of over-mature pine that have contracted the red-heart disease. RCWs require diseased trees for cavity building, which they use for nest and roost cavities. Preferred pine stands need to have a fairly open canopy, with a sparse subcanopy to allow easy flight. RCWs must also have ample foraging habitat consisting of younger pines surrounding the cavity trees. No suitable nesting habitat was observed in the impact area within the project limits. The project occurs near to (3 miles east of) an area designated by USFWS as "Occurrence Area"; though the previous PD&E Study (December 1996 – December 1997) indicated no suitable habitat or any documented RCW sightings within the proposed right-of-way or pond sites. During field surveys conducted in May 2013, April 2014, and June 2015, biologists did not observe any suitable habitat within the project or proposed ponds footprint. Therefore, this project will have **no effect** on this species.

Wood Stork (*Mycteria americana*) – This species, now listed as Threatened by both the USFWS and the FFWCC, is the only true species of stork nesting in the United States. This reclassification does not change any conservation or protection measures for the wood stork under the Endangered Species Act (ESA), rather it recognizes the recovery and the positive impact that conservation efforts have had on breeding populations of storks. Feeding areas for wood storks include marshes, pools, or ditches in which fish congregate. This species typically nests in mixed woodlands comprised of such overstory species as cypress, gum, and southern willow; pond apple and mangrove swamps may also be utilized for nesting.

Based upon the updated colony map prepared by the USFWS in June 2014, the Segment 1 project is located within the Core Foraging Area (CFA) (CFA-15 miles from an active nesting colony in Central Florida) of two wood stork colonies (Lake Woodruff and Lake Russell). Wood

storks were observed foraging within roadside ditches and stormwater facilities at several locations along the project corridor.

Utilizing the *Corps of Engineers and U.S. Fish and Wildlife Service Effect Determination Key for the Wood Stork in Central and North Peninsular Florida* (2008), the project is not within 2,500 feet of an active colony site, will likely impact Suitable Foraging Habitat (SFH) of greater than 0.5 acres, and is located within the CFA of two wood stork colonies. Additionally, FDOT commits to provide SFH compensation within the Service Area of a Service-approved wetland mitigation bank(s) within the CFA, and the Project is not contrary to the Service's *Habitat Management Guidelines for the Wood Stork in the Southeast Region*, and in accordance with the Clean Water Act section 404(b)(1) guidelines. There are a number of currently permitted mitigation banks that include the project corridor within the bank service area that have credits available to offset impacts to SFH (three currently permitted banks with available federal credits that cover all or a portion of the project area – see **Attachment**). The FDOT will coordinate with the permitting agencies during the permitting phase of the project on compensatory mitigation and minimization of impacts to suitable foraging habitat. These actions should result in no net loss of foraging habitat; therefore, this project **may affect, but is not likely to adversely affect** the wood stork.

Southern Bald Eagle (*Haliaeetus leucocephalus*) – The southern bald eagle was delisted from both the U.S. Endangered Species Act and FFWCC imperiled list, though it is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The USFWS issued the National Bald Eagle Management Guidelines in May 2007 while Florida adopted a Bald Eagle Management Plan (BEMP) in April 2008, written closely to follow the federal guidelines. The BEMP provides guidelines and recommendations to help people avoid violating state and federal eagle laws, and also outlines strategies to maintain the Florida population of bald eagles at or above current levels. Bald eagles almost always nest in the tops of living or dead tall trees along or very near lakes and rivers; these water bodies provide fish, typically their preferred food. Bald eagles generally avoid areas with extensive human activity, so management guidelines must be considered before any construction can be initiated within 660 feet of an active southern bald eagle nest. Four bald eagles nests are recorded to be in the general vicinity of the project corridor (OR014, OR047, OS092 and OS151). However, none of these nests is located within 660 feet of the project right-of-way or any of the proposed pond sites. For that reason, the project will have **no effect** on the southern bald eagle.

Federally Listed Plant Species

A review of agency databases and a field review of the project corridor indicate that there have been few reported occurrences of federally listed plant species within the proposed project area. Twenty (20) federally listed species have been demonstrated to have the potential to occur within

Polk, Osceola, and Orange Counties; though not all habitat types are represented within the project area. Information from the previous PD&E Study (December 1996-December 1997) indicated that one listed plant was observed, the scrub lupine (*Lupinus aridorum*). The observation was made west of Turkey Lake Road, to the west of the SR 528 Interchange at westbound I-4. Follow-up protected plant field surveys covering the proposed project alignment and pond sites were conducted in May 2013, March and April 2014, and March and April 2015 by project biologists. The scrub lupine was observed in five areas where sand skink cover board surveys were conducted in 2014 (Areas H, K, L, M, and O on Figure C in Appendix A of ESBA; and Sand Skink Survey Report, Appendix E of ESBA). No additional federally listed plant species were identified within the proposed widening impact area or pond sites during the field investigations. Based on the provided alignments of the right-of-way and proposed pond sites, the project is anticipated to have impacts to the scrub lupine. The footprint of Pond Site 139B and the edge of the proposed right-of-way northeast of the Daryl Carter Parkway overpass overlap individual observation of scrub lupine. Specific measures to address these plants will be undertaken in consultation with USFWS, and mitigation for sand skinks at a Service-approved scrub conservation bank will be provided. This mitigation should also offset impacts to the scrub lupine. Therefore, this project **may affect** the federally listed plant species, the scrub lupine.

We ask that USFWS review the ESBA for Segment 1 and provide concurrence with FDOT's determinations for these species. *Note that for the sand skink and scrub lupine, a separate FHWA submittal for initiation of formal consultation will be provided.* We appreciate the coordination effort and input already provided and look forward to continued consultation on this project. If you have any questions, feel free to contact either Catherine Owen at (386) 943-5383, catherine.owen@dot.state.fl.us or me at (386) 943-5411, william.walsh@dot.state.fl.us at your convenience. Thank you for your assistance with this project.

Sincerely,

William G. Walsh
Environmental Manager
FDOT, District Five

wgw/cbo

Cc: Cathy Kendall, FHWA
Casey Lyon, FDOT
Beata Stys-Palasz, PE, FDOT
Mike Drauer, Stantec

Attachment (2 pages): Wetland Impact Breakdown and Available Wetland Mitigation

Wetland Impact Breakdown

Summary of Proposed Jurisdictional Wetlands/Other Surface Water Impacts (Type and Hydrologic Basin)					
Hydrological Basin	Forested Wetlands (acres)	Freshwater Wetlands (acres)	Lakes (acres)	Canals (acres)	Other Surface Waters (acres)
Reedy Creek	113.47	4.52	--	0.57	36.31
Shingle Creek	0.2	1.27	2.31	0.00	6.19
Totals	113.67	5.79	2.31	4.56	42.50

Available Wetland Mitigation

AVAILABLE MITIGATION SERVICES AREAS & CREDITS WITHIN THE HORSE CREEK, REEDY CREEK AND SHINGLE CREEK BASINS		
Mitigation Bank (MB)	Mitigation Service areas	Credit Availability*
REEDY CREEK MB	REEDY CREEK AND SHINGLE CREEK BASINS	65 FORESTED ONLY CREDITS AVAILABLE $145,000.00/DUAL CREDIT $145,000.00/STATE ONLY $29,250.00/FEDERAL ONLY CREDIT STATE: UMAM, FEDERAL: M-WRAP
HATCHINHEA RANCH MB	REEDY CREEK AND SHINGLE CREEK BASINS	55 FORESTED ONLY CREDITS AVAILABLE $145,000.00/CREDIT STATE: UMAM FEDERAL: PENDING PERMIT

AVAILABLE MITIGATION SERVICES AREAS & CREDITS WITHIN THE HORSE CREEK, REEDY CREEK AND SHINGLE CREEK BASINS		
		(CAN USE FEDERAL CREDITS FROM FLORIDA MITIGATION BANK: 200 M-WRAP CREDITS AVAILABLE)
SOUTHPORT MB	REEDY CREEK AND SHINGLE CREEK BASINS	150 FORESTED ONLY CREDITS AVAILABLE 5 HERBACEOUS CREDITS (AVAILABLE JANUARY 2015) $145,000.00/DUAL CREDIT $145,000.00/STATE ONLY $29,250.00/FEDERAL ONLY STATE: UMAM, FEDERAL: UMAM

From: Monaghan, Jane
To: Lyon, Casey; Drauer, Mike
Subject: I-4 Ultimate_Orange county
Date: Wednesday, October 22, 2014 1:52:38 PM

Hi Casey
I just reviewed the results of the sand skink survey perfomed by Mike Drauer along this corridor.
We appreciate the survey effort and the quality of the report. When DOT submits a letter for our concurrence on their determination of effect...we would concur with a MANLAA for sand skinks.
However, we have to respond to a DOT request and we would like to see all the federal species listed and the determination of effect made by DOT and why.
Thanks very much!

Jane Monaghan
Fish and Wildlife Biologist
USFWS
7915 Baymeadows Way, Suite 200
Jacksonville, FL 32256-7517
904-731-3119
904-731-3116 (main office)

From: Monaghan, Jane
To: Drauer, Mike
Subject: Re: FW: I-4 PD&E Study
Date: Friday, January 24, 2014 9:50:49 AM
Attachments: image014.jpg
image010.jpg
image011.jpg
image013.jpg
image001.gif
image007.gif
image006.gif
image002.gif
image003.gif
image004.gif
image012.jpg
image009.jpg
image008.png
image005.gif

Sounds good.

On Fri, Jan 24, 2014 at 9:11 AM, Drauer, Mike <mike.drauer@stantec.com> wrote:

> Jane – thanks for the call yesterday and offering the guidance for us on the sand skink survey. We are going to revisit all of the areas in the field in order to inspect for the "swimmable soils" and revise our maps for the survey accordingly. We will get those worked up next week and get them up to you.
>
> Thanks again,
>
> Mike
>
> **Mike Drauer**
>
> Senior Project Manager
> Stantec
> Phone: (407) 585-0157
> mike.drauer@stantec.com
>
> 
>
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>
> Please consider the environment before printing this email.

From: Monaghan, Jane [mailto:jane_monaghan@fws.gov]
Sent: Thursday, January 23, 2014 7:53 AM
To: Drauer, Mike
Subject: Re: FW: I-4 PD&E Study

sorry Mike

I had a medical emergency and I asked Annie to give you a call and let you know...I am back today and will give you a call.

On Wed, Jan 22, 2014 at 11:34 AM, Drauer, Mike <mike.drauer@stantec.com> wrote:

Are we still planning on talking today?

From: Monaghan, Jane [mailto:jane_monaghan@fws.gov]
Sent: Tuesday, January 21, 2014 01:58 PM
To: Drauer, Mike
Subject: Re: FW: I-4 PD&E Study

Thanks Mike. I will give you a call in the morning around 10am.

On Tue, Jan 21, 2014 at 1:54 PM, Drauer, Mike <mike.drauer@stantec.com> wrote:

Sure – pretty much anytime. I will be on the road heading up to Pensacola for some field work but can talk at any time. I will have the maps and photos with me.

You can get me on my cell at 407-765-1661.

Mike Drauer

Senior Project Manager
Stantec
Phone: (407) 585-0157
mike.drauer@stantec.com

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From: Monaghan, Jane [mailto:jane_monaghan@fws.gov]
Sent: Tuesday, January 21, 2014 1:48 PM
To: Drauer, Mike; Stephen Tonjes
Subject: Re: FW: I-4 PD&E Study

Thanks for the additional information Mike. Is there a good time to call you tomorrow to discuss?

I think there are still quite a few areas that do not need to be surveyed.

On Tue, Jan 21, 2014 at 12:53 PM, Drauer, Mike <mike.drauer@stantec.com> wrote:

I did – so here is a new link with the new photos. Let me know if you have any questions.

Automatic Login

FTP site link: ftp://s0204103909:8586026@ftptmp.stantec.com
By clicking on the link above (or pasting the link into Windows Explorer) you will be automatically logged into your FTP site.

Manual Login

FTP link: ftp://ftptmp.stantec.com
Login name: s0204103909
Password: 8586026
Disk Quota: 2GB
Expiry Date: 2/4/2014

Mike Drauer

Senior Project Manager

Stantec
615 Crescent Executive Court, Suite 248

Lake Mary, FL 32746
Phone: (407) 585-0157

Cell: (407) 765-1661

mike.drauer@stantec.com

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From: Monaghan, Jane [mailto:jane_monaghan@fws.gov]
Sent: Tuesday, January 21, 2014 12:34 PM
To: Drauer, Mike
Subject: Re: FW: I-4 PD&E Study

Hey Mike, sorry I am just getting back to this one again...did you put those additional photos etc in the document on the ftp site?

because that link has expired...

thanks for your help

On Fri, Jan 10, 2014 at 3:54 PM, Drauer, Mike <mike.drauer@stantec.com> wrote:

Steve / Jane – I have added additional photographs from areas that we have as "included" in the survey to the FTP site. There is also a map set that indicates the areas that the photos were taken.

Please let me know if you need further clarification or would like to discuss the approach in general.

Thanks,

Mike Drauer

Senior Project Manager

Stantec
615 Crescent Executive Court, Suite 248

Lake Mary, FL 32746
Phone: (407) 585-0157

Cell: (407) 765-1661

mike.drauer@stantec.com

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From: Tonjes, Stephen [mailto:Stephen.Tonjes@dot.state.fl.us]
Sent: Friday, January 10, 2014 8:51 AM
To: Drauer, Mike
Cc: Moore, John (Orlando); Jane Monaghan
Subject: FW: FW: I-4 PD&E Study

Please call Jane to discuss.

Stephen Tonjes

Senior Environmental Scientist

Florida Department of Transportation District Five

719 S. Woodland Blvd.

DeLand, FL 32720

stephen.tonjes@dot.state.fl.us

Office telephone: 386-943-5394

Office hours 8:30 - 5:30 M - F

From: Monaghan, Jane [mailto:jane_monaghan@fws.gov]
Sent: Friday, January 10, 2014 8:42 AM
To: Tonjes, Stephen
Subject: Re: FW: I-4 PD&E Study

Hey Steve, I have all the docs downloaded and I am reviewing right now.

Have you had a chance to review this? Can you look at photo point #10?

Why would this area be kept in the survey?

I am okay with the areas they have excluded from the survey based on the photos. I am questioning why they are surveying in some of the medians and sodded areas such as photo 10 and photo 11.

I would like to see more representative photo points for areas that are included in the survey, if they have them. Otherwise I will just try to view on google earth. I tired to turn the colors off for the survey layers but could not manipulate the map in that way. My first impression is that we can eliminate more of these survey areas.

What do you think?

On Thu, Jan 9, 2014 at 2:46 PM, Tonjes, Stephen <Stephen.Tonjes@dot.state.fl.us> wrote:

> Squeaking the wheel … this project goes ahead of the scrub jays at I-95/Ellis Road.
>
> I think you've received paper copies of the exhibits by now, but all the documents are on John's FTP site:

Holdsworth, Mike

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Monday, February 10, 2014 3:07 PM
To: Drauer, Mike
Subject: Re: I-4 PD&E Project Coordination and species consultations - sand skinks 2

a state certified FAESS soil scientist is acceptable.

John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
(772) 469-4282

On Mon, Feb 10, 2014 at 3:03 PM, Drauer, Mike <mike.drauer@stantec.com> wrote:

John – we are making preparations for conducting the coverboard survey on I-4 this spring. I have coordinated with Jane on the segments in Orange County already, but I had a question for you regarding getting a soils scientist on board. We spoke with Mark Easley a couple months ago when we coordinated with District 1 on the segment in Polk County, and he gave us the names of 3 USDA guys in the state. When we contacted Juan Vega (one of the three), he directed us to get in touch with the FAESS who could assist us. Do we need to have one of the three USDA NRCS guys, or can we use a guy from FAESS who is state-certified?

Mike Drauer

Senior Project Manager
Stantec
Phone: (407) 585-0157
mike.drauer@stantec.com

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From: Wrublik, John [mailto:john_wrublik@fws.gov]
Sent: Thursday, November 07, 2013 11:26 AM
To: Drauer, Mike

Cc: jane_monaghan@fws.gov
Subject: Re: I-4 PD&E Project Coordination and species consultations - sand skinks

The way this office looks at coverboard surveys is that if the site is at or above the 82 foot elevation and contains the soils listed in the skink conservation guidelines, then the vegetation cover doesn't matter, and you should do the survey. Since the soil survey maps are not always accurate, we do allow the FDOT the option of having a certified soil scientist conduct a soil survey of a site in question. If the results of the survey indicate that the soil is not one of soil types listed in the conservation guidelines as preferred by the skink, then a coverboard survey would not have to be conducted at that particular site.

John

John M. Wrublik

U.S. Fish and Wildlife Service

1339 20th Street

Vero Beach, Florida 32960

(772) 469-4282

On Thu, Nov 7, 2013 at 10:37 AM, Drauer, Mike <mike.drauer@stantec.com> wrote:

Jane and John: The I-4 PD&E project in parts of Polk, Osceola, Orange, Seminole, and Volusia Counties is progressing and we have alerted the FDOT folks to the sand skink potential that they are facing. This has led them to move forward with planning for skink surveys to be conducted during the window in March 2014. We are conducting the soils mapping exercise to indicate those areas with skink soils above elevation 82 for each of the ESBA's we are preparing, but would like to be able to get your help with identifying where cover board surveys should be conducted. I have attached the soils maps for Segment 2 (which is the first segment that we have completed the mapping for) which shows all of the areas of skink soils above elevation. I have gone through the survey protocol and had discussions with another senior biologist (who has done some skink surveys recently with you guys) about trying to pin down where we should be planning on the surveys. I haven't done one since 2005, so I want to make sure we planning properly. Do you recommend cover boards at every location regardless of current cover type, including within the maintained right-of-way? Jane's initial email relating to concurrence and effects determinations indicated that we should plan to survey but that not all areas might be necessary. I would anticipate that we should plan on surveying the pond sites and any natural areas that remain undisturbed within the right-of-way, but that is just a guess.

Both FDOT District 5 and FDOT District 1 EMO staff have concurred that they want surveys done on Segments 5, 1, and 2 in 2014, so we need to be able to get them sufficient info to plan for the survey effort (purchasing boards and doing the site prep to prepare for board placement as well as the actual survey). These segments cover large areas and the data we have for Segment 2 has approximately 95 acres of skink soils, and this is the smallest segment. It looks like it could be twice that much in Segments 1 and 5 based on the preliminary data. If we can eliminate any areas from the need to do cover boards, that would be beneficial, but if not, it is what it is. We are scheduled to meet with Steve Tonjes sometime next week to get into specifics, so I appreciate any guidance you can provide.

The Segments of the Project (as determined by FDOT and FHWA) are:

- Segment 5 – from west of US 27 to CR 532 (Polk County)
- Segment 1 – from CR 532 to west of SR 528 (Osceola, Orange County)
- Segment 2 – from west of SR 528 to SR 435 (Orange County)
- Segment 3 – from east of SR 434 to US 17/92 (Seminole County)
- Segment 4 – from US 17/92 to SR 472 (Volusia County)

Thanks for your assistance,

Mike Drauer

Senior Project Manager

Stantec
615 Crescent Executive Court, Suite 248

Lake Mary, FL 32746
Phone: (407) 585-0157

Cell: (407) 765-1661

mike.drauer@stantec.com

Error! Filename not specified.

Holdsworth, Mike

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Tuesday, April 01, 2014 3:20 PM
To: Drauer, Mike
Cc: ldiaz@hntb.com; Tonjes, Stephen (Stephen.Tonjes@dot.state.fl.us); Lyon, Casey (Casey.Lyon@dot.state.fl.us); Stys-Palasz, Beata (Beata.Stys-Palasz@dot.state.fl.us)
Subject: Re: I-4 PD&E Project Coordination and species consultations - sand skinks

looks good, conduct coverboard surveys in the areas that the soil scientist concluded are skink soils as listed in our skink conservation guidelines, and you will be fine.

John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
(772) 469-4282

On Tue, Apr 1, 2014 at 12:30 PM, Drauer, Mike <mike.drauer@stantec.com> wrote:

John – We are actively working on the cover board survey for sand skinks on the I-4 Beyond Ultimate PD&E project. Relating to the potential survey areas within the segment occurring in Osceola County, FDOT enlisted the help of Terry Zable, a state certified FAESS soil scientist working for Atkins to review the soils within the project corridor to better define the coverage of soils which could be potentially used by sand skinks. Attached is the result of his field work and review. If you could review the findings and provide us with your comments or guidance, we would much appreciate it. We will be placing cover boards per the survey guidelines within the areas determined to be suitable soils over the next week to be able to successfully conduct the survey during the current window. You can contact me, or Steve Tonjes and Casey Lyon with FDOT if you have any questions or would like additional information on the project.

Thanks for your help,

Mike Drauer

Senior Project Manager
Stantec
Phone: (407) 585-0157
mike.drauer@stantec.com

Holdsworth, Mike

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Tuesday, May 13, 2014 7:52 AM
To: Drauer, Mike
Subject: Re: I-4 PD&E Sand Skink survey

No, I don't need to make a site visit. Just send me the report when finished.

John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
(772) 469-4282

On Mon, May 12, 2014 at 11:18 AM, Drauer, Mike <mike.drauer@stantec.com> wrote:

John – we have completed the cover board survey for the I-4 Beyond the Ultimate PD&E in Osceola County with boards on all of the areas of skink soils per the results of the soil scientist report. The cover boards were negative for skink tracks/signs during the set-up and 4 week survey. We are planning on cleaning up the boards beginning next Monday, so they are all still in place for the remainder of this week if you feel the need to take a look at anything. We are working on the report documenting the survey this week.

Please let me know if there is anything else we need to do at this time.

Thanks, for your assistance.

Mike Drauer

Senior Project Manager
Stantec
Phone: (407) 585-0157
mike.drauer@stantec.com

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Florida Fish and Wildlife Conservation Commission

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Managing fish and wildlife resources for their long-term well-being and the benefit of people.

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Voice: (850) 488-4676

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(800) 955-8770 (V)

MyFWC.com

October 13, 2015

Mr. Mike Drauer
Senior Project Manager
Stantec Consulting Services, Inc.
615 Crescent Executive Court, Suite 248
Lake Mary, FL 32746-2129
Mike.Drauer@Stantec.com

Re: Potential List of Protected Species for SR 400 (I-4) Project Development and Environment (PD&E) Study, Segment 1 from west of CR 532 to west of SR 528 in Polk, Osceola, and Orange Counties; and Segment 5 from west of US 27 to west of CR 532 in Polk County

Dear Mr. Drauer:

The Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the proposed list of protected species potentially affected by the above-referenced projects, prepared as part of the Project Development and Environment Study, and we believe that it is complete except for the American alligator (federally listed as threatened due to similarity with the American crocodile). Although most Endangered Species Biological Assessments within PD&E Studies include the alligator in the discussion of potentially affected species, project impacts to alligators are not why this species was listed under the Endangered Species Act. We also support your proposed effect determinations and project commitments for each species, although we recommend the addition of pre-construction surveys for nests of Florida sandhill cranes and Sherman's fox squirrels, and coordination with FWC as appropriate.

We look forward to the opportunity to review the Endangered Species Biological Assessment, or its equivalent, in the future. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or at FWCConservationPlanningServices@MyFWC.com. If you have specific technical questions regarding the content of this letter, please contact Brian Barnett at (772) 579-9746 or by email at Brian.Barnett@MyFWC.com.

Sincerely,

Jennifer D. Goff
Land Use Planning Program Administrator
Office of Conservation Planning Services

jdg/bb
ENV 1-13-2
I-4 PDE Study Segments 1 and 5_21931_101315

September 17, 2015
File: 2024.230168

Attention: Jane Chabre
Florida Fish and Wildlife Conservation Commission
Office of Conservation Planning Services
620 South Meridian Street, Mail Station 5B5
Tallahassee, FL 32399-1600

Via Email: FWCConservationPlanningServices@myfwc.com

Reference: **SR 400 (I-4) Project Development and Environment (PD&E) Study**
Segment 1: from west of CR 532 (Osceola Polk Line Road) to west of SR 528 (Beachline Expressway)

Polk, Osceola, and Orange County, FL

Dear Ms. Chabre;

The Florida Department of Transportation (FDOT) District 5 is conducting a PD&E Study on SR 400 (I-4) as part of the overall corridor project for the I-4 Beyond the Ultimate design. The project limits for the segment analyzed in this report are within an approximate 14-mile segment of I-4 which extends from just west of CR 532 (Polk/Osceola County Line) to west of SR 528 (Beachline Expressway), from Milepost (MP) 31.607 to MP 32.022 in Polk County, MP 0.000 to MP 7.885 in Osceola County and from MP 0.000 to 5.650 in Orange County (herein referred to as I-4, Segment 1). Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 1. The study area in this section from west of CR 532 to west of SR 528 includes the following interchanges:

Osceola County

- I-4 and CR 532 (Osceola Polk Line Road)
- I-4 and SR 429 (Daniel Webster Western Beltway)
- I-4 and World Drive
- I-4 and SR 417 (Southern Connector)
- I-4 and US 192/SR 530 (W. Irlo Bronson Memorial Highway)
- I-4 and W. Osceola Parkway

Orange County

- I-4 and SR 536 (Epcot Center/World Center Drive)
- I-4 and SR 535 (S. Apopka Vineland Road)
- I-4 and Daryl Carter Parkway*
- I-4 and Central Florida Parkway

*Formerly Fenton Street/Wildwood Avenue (previously identified as Lake Avenue in the December 1999 FONSI). Daryl Carter Parkway is currently an existing overpass; alternative evaluations include a proposed full-access interchange.

The required stormwater treatment will be provided with 89 pond sites along the corridor. A previous study was conducted in 1998, though a Record of Decision was not reached with the Federal Highway Administration. This segment along with four additional segments are included in the larger PD&E study to enable FDOT to have completed Records of Decision or Findings of No Significant Impact on all potential segments of the I-4 Ultimate design. This reevaluation includes environmental analysis of the original design

concept, which showed six general use lanes (GUL) and four special use lanes (SUL) from CR 532 to southwest of World Drive (6+4), six GUL and two High Occupancy Vehicle (HOV) lanes from southwest of World Drive to northeast of Lake Avenue (6+2) and six GUL and 4 HOV lanes from northeast of Lake Avenue to SR 528 (Beachline Expressway) (6+4), to the current proposed design which includes six GULs and four express lanes operating under a variable price toll plan (6+4). Other changes being reanalyzed include stormwater management, access plan and interchange configurations.

At this time, we are seeking your concurrence with a species list for potential species and habitat along the project corridor that should be included in the ongoing investigation for this project. Stantec Consulting Services Inc. conducted a background literature search to determine the legally protected species that have the potential to occur in Polk, Osceola, and Orange County as listed by the Florida Fish and Wildlife Conservation Commission (FFWCC) and the United States Fish and Wildlife Service (USFWS). Protected Species lists were compiled using Stantec's computer database containing species occurrence by county and habitat type. These species lists were then customized to include only the species that have the potential to occur within the habitats that occur on this Project site. The database was developed by reviewing current scientific literature and consulting the most current observation and distribution records maintained by the Florida Natural Areas Inventory (FNAI). Listed species descriptions and potential occurrences are described below.

Federally Listed Species

Reptiles

Eastern Indigo Snake (*Drymarchon corais couperi*) – The eastern indigo snake, listed by both the FFWCC and the USFWS as Threatened, is a habitat generalist, using a variety of habitats from mangrove swamps to xeric uplands. These snakes are cold-sensitive and require gopher tortoise burrows, other animal holes, or stumps for protection during winter months. These snakes require large tracts of natural, undisturbed habitat, and prefer to forage in and around wetlands for their preferred prey – other snakes. Several burrows were located within the project area but the potential for indigo snakes is low due to the limited amount of habitat available in this developed area. One possible sighting of an indigo snake was made during field studies by the project biologists conducting wetland studies along the eastbound side of I-4 north of CR 532. In accordance with the USFWS Programmatic Key for the Eastern Indigo Snake (January 2010, updated August 2013), the project will implement the Standard Protection Measures for the Eastern Indigo Snake (USFWS, 2013) which specify education of the construction contractor concerning avoidance of indigo snakes and post-construction reporting, but may impact more than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) and has more than 25 active and inactive gopher tortoise burrows. Therefore, the project would merit a **may affect** determination under the key. The Department will make the commitment to have permits conditioned such that all active and inactive gopher tortoise burrows will be evacuated prior to site manipulation in the vicinity of the burrow, and may then qualify for a **may affect but is not likely to adversely affect** determination.

Sand Skink (*Neoseps reynoldsi*) and Blue-tailed mole skink (*Neoseps egregious lividus*) – Both the sand skink and blue-tailed mole skink are listed as Threatened by the USFWS and FFWCC. The three most important factors in determining the presence of skinks are location, elevation, and suitable soils. Sand skinks occur on sandy ridges of interior Central Florida, including Polk, Osceola, and Orange Counties. They are found within these geographic areas typically at elevations of 82 feet above sea level and higher. They occur in excessively drained, well-drained, and moderately well-drained sandy soils, with suitable soil types including: Apopka, Arrendondo, Archbold, Astatula, Candler, Daytona, Duette, Florahome, Gainesville, Hague, Kendrick, Lake, Millhopper, Orsino, Paola, Pomello, Satellite, St. Lucie, Tavares, and Zuber. These soil types typically support scrub, sandhill, or xeric hammock natural communities, though these may be degraded by impacts to overgrown scrub, pine plantation, citrus grove, old field, or pasture. Skinks have

been documented to occur in all these degraded conditions where soil types are suitable regardless of vegetative cover. This makes habitat condition of secondary importance in determining if skinks are present. If a site has suitable soils at the appropriate elevation within the counties where skinks are known to occur, there is a likelihood of presence, and potential effects to skinks should be considered. As the project occurs within the USFWS consultation area for sand skink and blue-tailed mole skink, both a pedestrian field survey and full cover board survey were conducted to assess potential habitat for the sand skink. The cover boards were placed in all areas containing mapped skink soils as verified by a certified soil scientist. A survey occurred between April 10, 2014 and May 6, 2014, and then design changes necessitated additional areas be surveyed in March and April 2015. No skinks or signs of skinks were identified during the 2014 survey. Sand skinks were observed during the survey in 2015 on one pond site (FPC 105A). As this pond site will impact occupied sand skink habitat, the project **may affect** the sand skink.

Avian

Florida Scrub-Jay (*Aphelocoma coerulescens coerulescens*) – The Florida scrub-jay, listed as Threatened by both the FFWCC and USFWS, is an endemic species found in Florida scrub habitats. This gregarious jay is a habitat specialist and typically lives in scrub and scrubby flatwoods habitats. Potential suitable habitat was identified in several locations along the corridor, and the use of a scrub-jay playback tape was used. Scrub habitats were also assessed during the set up and process of conducting the sand skink survey. No scrub-jays have been observed within any proposed pond site areas or within the section of I-4 within this study, or during the PD&E study conducted in 1998. The proposed widening and stormwater ponds are not expected to have any impact on scrub-jays. Therefore, this project **may affect but is not likely to adversely affect** this species.

Crested caracara (*Polyborus plancas audobinii = Caracara cheriway*) – The crested caracara is listed with both the USFWS and the FFWCC as threatened. This large raptor inhabits Florida's prairies and rangelands. They forage on many kinds of insects, fish, reptiles, birds, and mammals. They will feed on live captured prey, but also on roadkill. Nests are usually constructed within cabbage palms. Sensitivity to human disturbance varies in this species with many tolerating human activities, especially when human influence is already present within their home range. If a caracara nest is found to be within the project area, management practices outlined within the *Habitat Management Guidelines for Audubon's Crested Caracara in Central and Southern Florida* should be employed. The project occurs at the northernmost edge of the consultation area for this bird in Central Florida. No birds or nests have been observed or were documented within the project corridor either during the current study or during the previous PD&E Study (May 2000), therefore, the project **may affect but is not likely to adversely affect** this species.

Snail kite (*Rostrhamus sociabilis plumbeus*) – The snail kite is listed as Endangered by both the USFWS and the FFWCC. This non-migratory, medium-sized raptor utilizes large open freshwater marsh habitats and lakes with shallow water. Nests are usually located in a low tree or shrub at the water's edge. The main staple of their diet is the apple snail, lending to their name. The project does occur within the USFWS consultation area for the snail kite though no observations have been documented within or near the project corridor. Nesting snail kites have been documented significantly east of the project in Kissimmee at both Lake Tohopekiliga and East Lake Toho. No known adequate nesting or foraging habitat is located adjacent to the project area, either within the proposed right-of-way or pond site areas. Therefore, this project **may affect but is not likely to adversely affect** this species.

Red-Cockaded Woodpecker (*Picoides borealis*) – This species is listed as Endangered by the USFWS and by the FFWCC. The colonial red-cockaded woodpecker (RCW) is a habitat specialist, requiring stands of over-mature pine that have contracted the red-heart disease. RCW's require diseased trees for cavity building, which they use for nest and roost cavities. Preferred pine stands need to have a fairly open canopy, with a sparse subcanopy to allow easy flight. RCWs must also have ample foraging habitat consisting of

younger pines surrounding the cavity trees. No suitable nesting habitat was observed in the impact area within the project limits. The project occurs near to an area designated by USFWS as "Occurrence Area"; though the previous PD&E Study (May 2000) indicated no suitable habitat or any documented RCW sightings within the proposed right-of-way or pond sites. Field surveys conducted during May 2013, April 2014, and June 2015 did not observe any suitable habitat within the project footprint. Therefore, this project will have **no effect** on the red-cockaded woodpecker.

Wood Stork (*Mycteria americana*) – This species, now listed as Threatened by both the USFWS and the FFWCC, is the only true species of stork nesting in the United States. This reclassification does not change any conservation or protection measures for the wood stork under the Endangered Species Act (ESA), rather it recognizes the recovery and the positive impact that conservation efforts have had on breeding populations of storks. Feeding areas for wood storks include marshes, pools, or ditches in which fish congregate. This species typically nests in mixed woodlands comprised of such overstory species as cypress, gum, and southern willow; pond apple and mangrove swamps may also be utilized for nesting.

Based upon the updated colony map prepared by the USFWS in June 2014, the project is located within the 15-mile Core Foraging Area (CFA) of two wood stork colonies (Lake Woodruff and Lake Russell CFA'S). Wood storks were observed foraging within roadside ditches and stormwater facilities along the project corridor. Compensation for wetland impacts that are unavoidable, including impacts to potential wood stork foraging habitat, will be mitigated for during permitting where wetland functional assessment results will compare the impacts with the proposed mitigation to ensure a balance is maintained in the drainage basin; therefore, there should be no net loss of wood stork foraging habitat. Utilizing the Army Corps of Engineers Wood Stork Key for Central and North Peninsular Florida (September, 2008), the project will likely have impacts to Suitable Foraging Habitat within two CFA's. FDOT will commit to provide compensation for foraging area impacts via mitigation through a USFWS-approved site; therefore, this project **may affect but is not likely to adversely affect** the wood stork.

Southern Bald Eagle (*Haliaeetus leucocephalus*) – The southern bald eagle was delisted from both the U.S. Endangered Species Act and FFWCC imperiled list, though it is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The USFWS issued the National Bald Eagle Management Guidelines in May 2007 while Florida adopted a Bald Eagle Management Plan (BEMP) in April 2008, written closely to follow the federal guidelines. The BEMP provides guidelines and recommendations to help people avoid violating state and federal eagle laws. The BEMP also outlines strategies to maintain the Florida population of bald eagles at or above current levels. The BEMP goal is to, "maintain a stable or increasing population of eagles in Florida in perpetuity." Bald eagles almost always nest in the tops of living or dead tall trees along or very near lakes and rivers; these water bodies provide fish, typically their preferred food. Bald eagles generally avoid areas with extensive human activity, so management guidelines must be considered before any construction can be initiated within 660 feet of an active southern bald eagle nest. Four bald eagles nests are recorded to be in the general vicinity of the project corridor (OR014, OR047, OS092 and OS151). However, none of these nests is located within 660 feet of the proposed right-of-way or any of the proposed pond sites. For that reason, the project will have **no effect** on the southern bald eagle.

FEDERALLY LISTED PLANT SPECIES

A review of agency databases and a field review of the project corridor indicate that there have been few reported occurrences of federally listed plant species within the proposed project area. Twenty (20) federally listed species have been demonstrated to have the potential to occur within Polk, Osceola, and Orange County; though not all habitat types are represented within the project area. Information from the previous PD&E Study (May 2000) indicated that one listed plant was observed, the scrub lupine (*Lupinus aridorum*). The observation was made west of Turkey Lake Road, to the west of the SR 528 Interchange at westbound I-4. A follow up protected plant field survey covering the area of proposed right-of-way widening and pond

sites was conducted in May 2013, March and April 2014, and March and April 2015 by project biologists. The scrub lupine was observed in five areas where sand skink cover board surveys were conducted in 2014 (Area H, Area K, Area L, Area M, and Area O). No additional federally listed plant species were identified within the proposed widening impact area or pond sites during the field investigations. Based on the provided alignments of the right-of-way and proposed pond sites, the project is anticipated to have impacts on the scrub lupine. The footprint of Pond Site 139B and the edge of the proposed right-of-way northeast of the Daryl Carter Parkway overpass overlap individual observation of scrub lupine. Specific measures to address these plants will be undertaken. Therefore, this project **may affect** federally listed plant species.

State Listed Species

Mammals

Florida Mouse (*Podomys floridanus*) – This mouse, listed as a Species of Special Concern by the FFWCC, is one of the two mammal species that are endemic to Florida. It typically lives within gopher tortoise burrows in fire-maintained, xeric uplands. Sub-optimal habitat exists in the xeric uplands that contain gopher tortoise burrows, such as mesic flatwoods (4110), sand pine scrub (4130), and sand pine plantations (4410). Several gopher tortoise burrows were located within the project area, but no Florida mice were observed during field surveys. If gopher tortoise burrows are proposed to be impacted, then the relocation of gopher tortoises and their burrow commensals will be conducted prior to construction. Because of this, the project **is not likely to adversely affect** the Florida mouse.

Sherman's Fox Squirrel (*Sciurus niger shermani*) – The Sherman's fox squirrel, listed by the FFWCC as a Species of Special Concern, is the largest of the three fox squirrel subspecies that occur in Florida. They have large ranges that can span over 80 acres. Optimum habitat for this subspecies is predominantly longleaf pine-turkey oak sandhills, although they are also reported to occur in mesic forested areas, as well. Some potential habitat is present within the project area, although Sherman's fox squirrels were not observed during the site investigations for this project. The amount of potential habitat for this species impacted by the project will be minimal. Therefore, the proposed project **is not likely to adversely affect** the Sherman's fox squirrel.

Florida Black Bear (*Ursus americanus floridanus*) – The Florida black bear is a very wide-ranging species formerly listed as Threatened by the FFWCC. Preferred habitat of the black bear includes dense forest, both upland and wetland, but the bear is often encountered in other areas during its seasonal movements. The bear was removed from the list in August 2012 after the approval of the Florida Black Bear Management Plan. The plan was implemented to set a strategy in place to address challenges in bear management, to manage for a sustainable bear population state-wide, and reduce human-bear conflicts. Going forward, FFWCC will continue to engage with landowners and regulating agencies to guide future land use to be compatible with the objectives of the Bear Management Plan. The plan divides the state into seven Bear Management Units (BMU's) which support the seven sub-populations of bear across the state. The unit closest to the project corridor is the Ocala/St. Johns Unit, though nearest Primary or Secondary Bear range within this unit is located in northwestern Orange County and not near the location of the project. The Secondary Bear range within the South Central Bear Unit in southeastern Polk County is equidistant from the project though may be a more likely source of bears to the project area. As it is unlikely that a black bear will travel through the project corridor, and no further fragmentation of bear habitat is proposed, the project **is not likely to adversely affect** the Florida black bear.

Reptiles

Florida Pine Snake (*Pituophis melanoleucus mugitus*) – This snake, listed as a Species of Special Concern by the FFWCC, is another tortoise burrow commensal organism, utilizing both tortoise burrows and also the tunnels of pocket gophers (*Geomys pinetis*) for feeding and shelter. Preferred habitat of the pine snake is xeric uplands, and to a lesser extent, flatwoods and other mesic uplands. Some habitat is available

within the project, especially where gopher tortoise burrows were observed. Both the pocket gophers and the pine snakes live nearly their whole lives underground and are very hard to observe directly. With the relocation of commensal organisms from gopher tortoise burrows if impacted, the project **is not likely to adversely affect** the Florida pine snake.

Gopher Tortoise (*Gopherus polyphemus*) – The occurrence of this species, listed as Threatened by the FFWCC (and designated as a Candidate species for listing by the USFWS), is a key factor in the determination of habitat suitability for certain other listed species because of the large number of other animals that use tortoise burrows for one or more of their life requisites. While it is common to find gopher tortoise burrows in most types of upland communities, the preferred habitats include xeric uplands and disturbed, ruderal areas.

Gopher tortoise burrows and suitable habitat were observed in numerous locations along the project corridor. If impacts to these areas cannot be avoided, then relocation of the tortoises and their commensals will be necessary. During permitting, all potential gopher tortoise habitat that could be impacted by the project will be systematically surveyed according to the current guidelines published by the FFWCC. If gopher tortoise burrows are found, all practicable design measures will be employed to avoid impacts to the burrows. For burrows which cannot be avoided, a permit will be obtained from FFWCC for relocation of gopher tortoises and commensals, and relocation will be performed at a time as close as practicable to the start of construction activities at the site of the burrows. Therefore, the project **is not likely to adversely affect** the gopher tortoise.

Short-tailed snake (*Stilosoma extenuatum*) – The short-tailed snake, listed as Threatened by the FFWCC, belongs to a monotypic genus that is endemic to Florida. Rarely seen due to its earth-burrowing tendencies, it is restricted to xeric uplands, primarily longleaf pine-turkey oak sandhills and sand pine scrub, for its habitat requirements. Herpetologist Paul Moler (FFWCC-Retired) reports short-tailed snakes occur in a wider range of ecosystems than indicated in the scant literature on the species, and may be found where prey (small snakes) and loose soils occur in North-Central Florida. Suitable habitat (remnant scrub and sandhills, areas of loose soils) was observed in several areas along the project corridor in most areas where sand skink cover board surveys occurred. None of these snakes were observed during any field surveys. Although there is the potential impact of xeric habitat, with the commitment to relocate all potential impacted gopher tortoise burrows, it is anticipated that this project **is not likely to adversely affect** the short-tailed snake.

Amphibians

Gopher Frog (*Rana capito*) – The gopher frog, listed by the FFWCC as a Species of Special Concern, is a gopher tortoise burrow commensal organism, using tortoise burrows for shelter. Prime gopher frog habitat includes xeric uplands, especially longleaf pine-turkey oak associations with nearby (i.e. within one mile) seasonally flooded marshes or ponds. Field biological surveys have shown that gopher tortoise burrows were located at several locations within the project corridor, though no gopher frogs were observed. If gopher tortoise burrows are impacted, then this species could be impacted as well, though the excavation of any potentially occupied burrows and the relocation of any gopher tortoises and their burrow commensals should offset any impacts to this species. Therefore, the project **is not likely to adversely affect** the gopher frog.

Avian

Florida Burrowing Owl (*Speotyto cunicularia*) – The Florida burrowing owl is listed as a Species of Special Concern by the FFWCC. The breeding range of the Florida burrowing owl includes Polk, Osceola, and Orange Counties. Preferred habitats are treeless areas on well-drained soil where herbaceous ground cover is fairly short, such as dry prairies and edges of depressional marshes during the dry season. Florida burrowing owls have also been observed along canal banks, pastures, golf courses, mowed residential lawns,

and airports (Rodgers, 1996). No Florida burrowing owls or their burrows were observed during the field surveys and no direct or indirect impacts are anticipated for this species. Therefore, the project **is not likely to adversely affect** the Florida burrowing owl.

Florida Sandhill Crane (*Grus canadensis pratensis*) – This non-migratory subspecies, listed as Threatened by the FFWCC, can often be seen foraging in improved pastures, open fields and along the roadside. During the winter months, it is distinguished from its migratory northern cousins by its smaller size and more delicate stature. Sandhill cranes nest in freshwater marshes and feed in adjacent fields and pastures. Some adequate nesting habitat is found within the freshwater marshes and vegetated shorelines of lakes located adjacent to the project corridor, and foraging habitat was found within the project limits. Sandhill cranes were observed flying over the project area several times during multiple surveying events, however were not observed foraging or nesting within the project area. The proposed project **is not likely to adversely affect** the sandhill crane.

Southeastern American Kestrel *(Falco sparverius paulus)* – This resident subspecies of the kestrel, listed as Threatened by the FFWCC, can be distinguished from its cousin, *F. s. sparverius*, a winter migrant, by its smaller size. The Southeastern kestrel requires three components for optimal habitat: large, open fields for foraging, snags for nesting, and snags, fence lines or telephone poles as perching sites from which to hunt. No kestrels were observed along the project corridor, nor within any pond sites or along the portion of the project to be widened. Therefore, this project **is not likely to adversely affect** this species.

Least tern (*Sterna antillarum*) – Historically, least terns nested on sandy beaches and lakeshores, but presently, they nest almost exclusively on man-made substrates such as spoil islands and gravel rooftops. This small tern, listed as Threatened by the FFWCC, is still fairly common in localized areas. However, none have been reported in the project study area. Prime nesting areas are minimal, so this species has only a low possibility of occurring along the project corridor, therefore the proposed project will have **no effect** on the least tern.

Wading Birds – Wading bird rookeries were not observed and are not known to occur within or adjacent to the study area. Potential foraging habitat for limpkin (*Aramus guarana)*, little blue heron (*Egretta caerulea),* roseate spoonbill (*Ajaia ajaja),* white ibis (*Eudocimus albus*), reddish egret (*Egretta rufescens),* tri-colored heron (*Egretta tricolor*), and snowy egret (*Egretta thula*), all classified as Species of Special Concern (SSC) by the FFWCC, occurs within the limits of the study area. Both little blue heron and white ibis were observed during field surveys. No wetlands providing critical foraging or nesting habitat for these avian species will be impacted by the proposed project and indirect impacts to wading birds are not anticipated. Therefore, the proposed project **is not likely to adversely affect** the wading bird population in the region.

STATE LISTED PLANT SPECIES

A review of available information revealed that 48 state listed plant species have the potential to occur within the habitats located within the project area in Polk, Osceola, and Orange Counties (See **Table 2, Appendix B**). No state listed plant species were observed during the field assessment of project area, though during the previous PD&E Study (May 2000), nodding pinweed (*Lechea cernua*) was observed along Turkey Lake Road. Improvements to Turkey Lake Road since this study have eliminated the habitat areas that this plant occurred in, and no evidence of the plant was observed during the field surveys in May 2013, March, April, and June 2014, or April and May 2015. Therefore, the proposed project **is not likely to adversely affect** state listed plant species.

This project is also being coordinated with the US Fish and Wildlife Service. If you have any questions, please contact Mike Drauer at (407) 765-1661.

Thank you for taking the time to provide assistance with this project.

Regards,

Mike Drauer
Senior Project Manager
Tel:407-585-0157
Fax: 407-585-0158
Mike.Drauer@stantec.com

Attachment: Figures

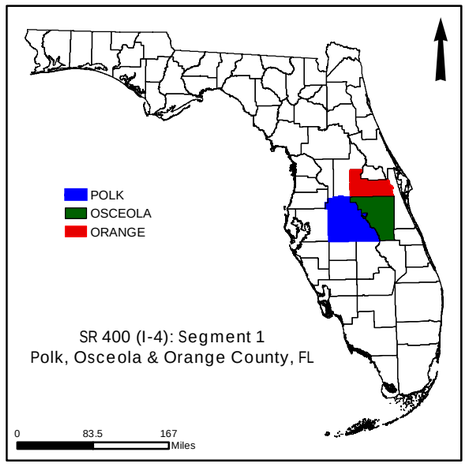
SR 400 (I-4) BEYOND THE ULTIMATE
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

SEGMENT 1

FDOT FM NO. 432100-1-22-01

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT (ESBA)

POLK, OSCEOLA & ORANGE COUNTIES
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5



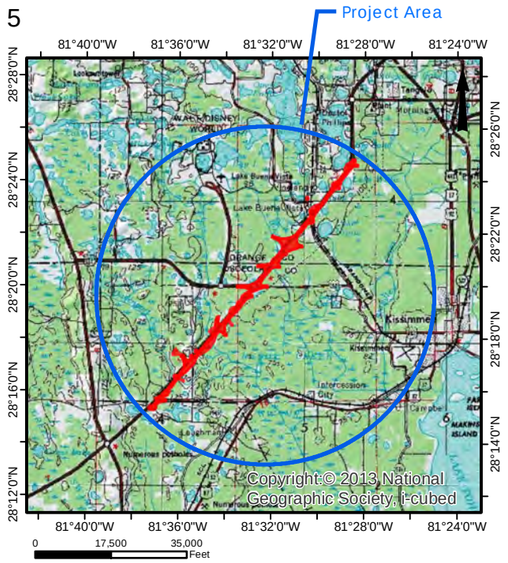


FIGURE NO.	SHEET NO.	TITLE
Figure A	Sheet 1-5	NRCS Soils Map
Figure B	Sheet 1-5	Land Use and Habitat Coverage Map
Figure C	Sheet 1-5	Species Location Map

PROJECT DETAILS

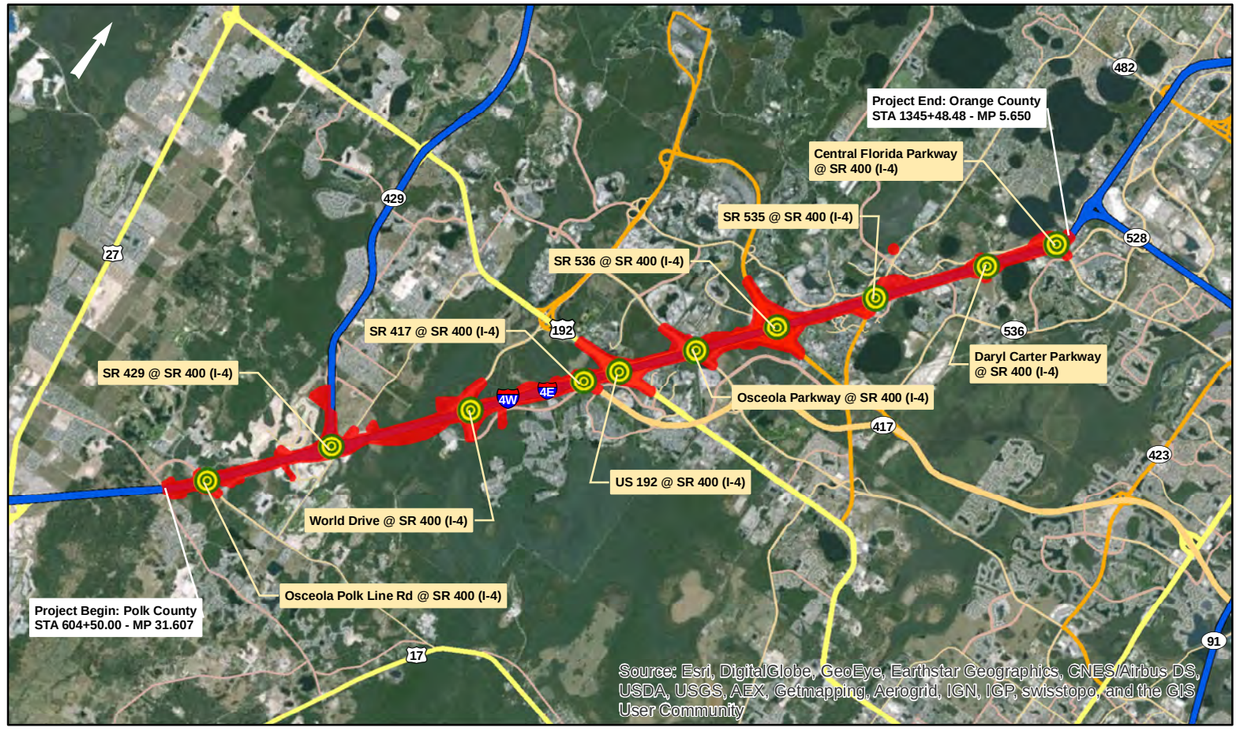
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT:
Segment 1 - Report Maps

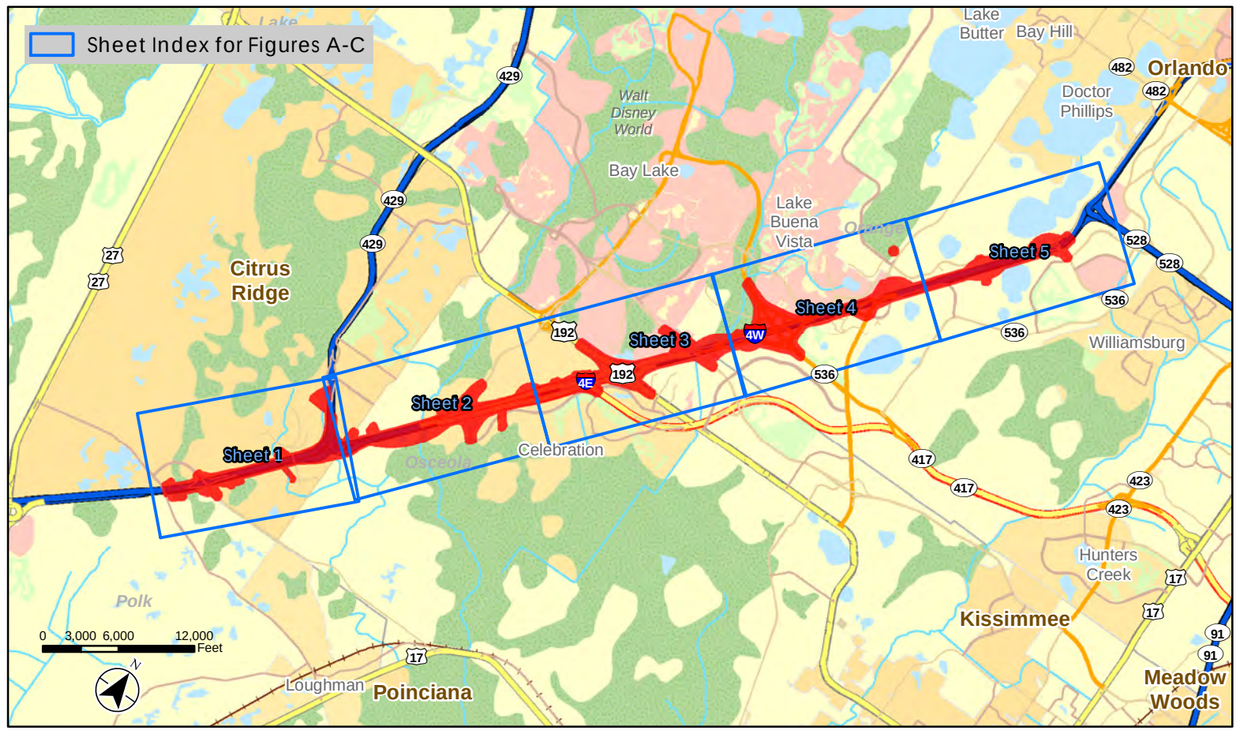
SR 400 (I-4) from West of SR 532 (Polk/Osceola County Line)
to West of SR 528 Beachline Expressway

16320 Polk County
Begin: STA 604+50.00 - MP 31.607
End: STA 626+39.92 - MP 32.022

92130 Osceola County
Begin: STA 626+39.92 - MP 0.00
End: STA 11042+95 - MP 7.885

75280 Orange County
Begin: STA 1042+95 - MP 0.00
End: STA 1345+48.48 - MP 5.650





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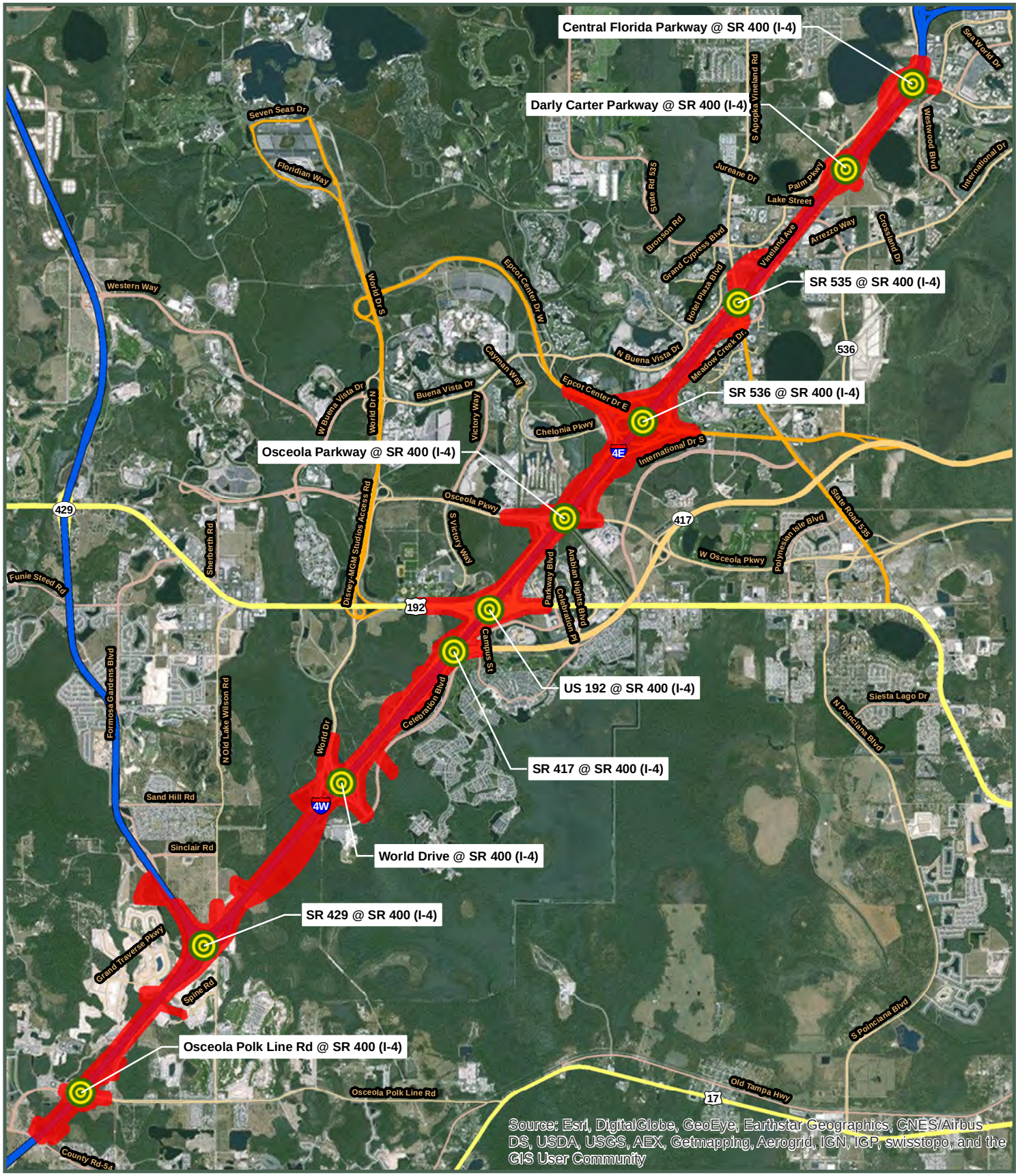

0 3,500 7,000 14,000 Feet

1 " = 7,000 '

FPC 105A:
The majority of pond site is utilized by Sand Skinks (2015 Sand Skink Survey).
In addition 30+ gopher tortoise burrows and one diamondback rattlesnake were observed.

FPC 105A
POND 104
429
Champions Gate Blvd
Tridition Blvd
Grand Traverse Pkwy
POND 103
POND 105A
POND 105B
POND 106A
POND 107
POND 108A
POND 101C
POND 101B
POND 101D
POND 101G
POND 101A
POND 101E
POND 101F
FPC 100
POND 100
POND 102
FPC 101A
FPC 102
FPC 103A
FPC 103B
POND 106B
Spine Rd
S Old Lake Wilson Rd
Ronald Reagan Pkwy
County Rd 54
OSCEOLA
POLK
Osceola Polk Line Rd
4W
4E

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Key

- SR 400 (I-4) Beyond the Ultimate R/W (05/12/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Potential Pond Sites (06/05/15)

SPECIES DATA & OBSERVATIONS

- Gopher Tortoise Burrow
- Bald Eagle Nest (2012)
- Lupinus aridorum (2014): Scrub Lupine
- Sand Skink Occurrence

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 1 - Species Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
Polk Co.-Begin: STA 604+50.00/MP 31.607 | End: STA 626+39.92/MP 32.022
Osceola Co.-Begin: STA 626+39.92/MP 0.00 | End: STA 11042+95/MP 7.885
Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/7/2015
Technical Review by: mDrauer 7/7/2015
Independent Review by: jMoore 7/7/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure C- Species Location Map: Sheet 1 of 5

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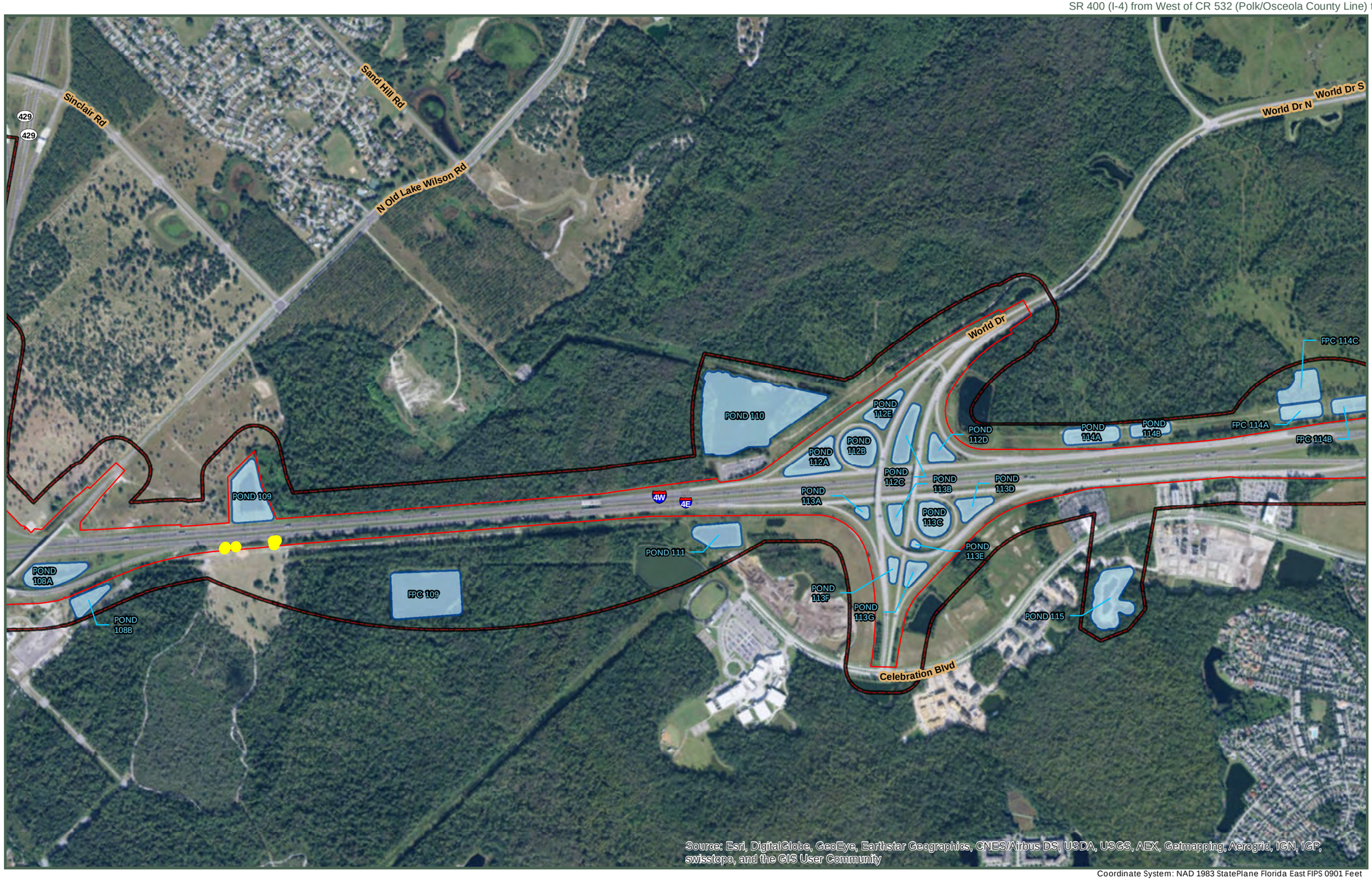

Map Key

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- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
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Orange Co.-Begin: STA 1042+95/MP 0.00 | End: STA 1345+48.48/MP 5.650

Prepared by: mLeonard 7/7/2015
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Independent Review by: jMoore 7/7/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 575 1,150 2,300 Feet

Figure C- Species Location Map: Sheet 2 of 5

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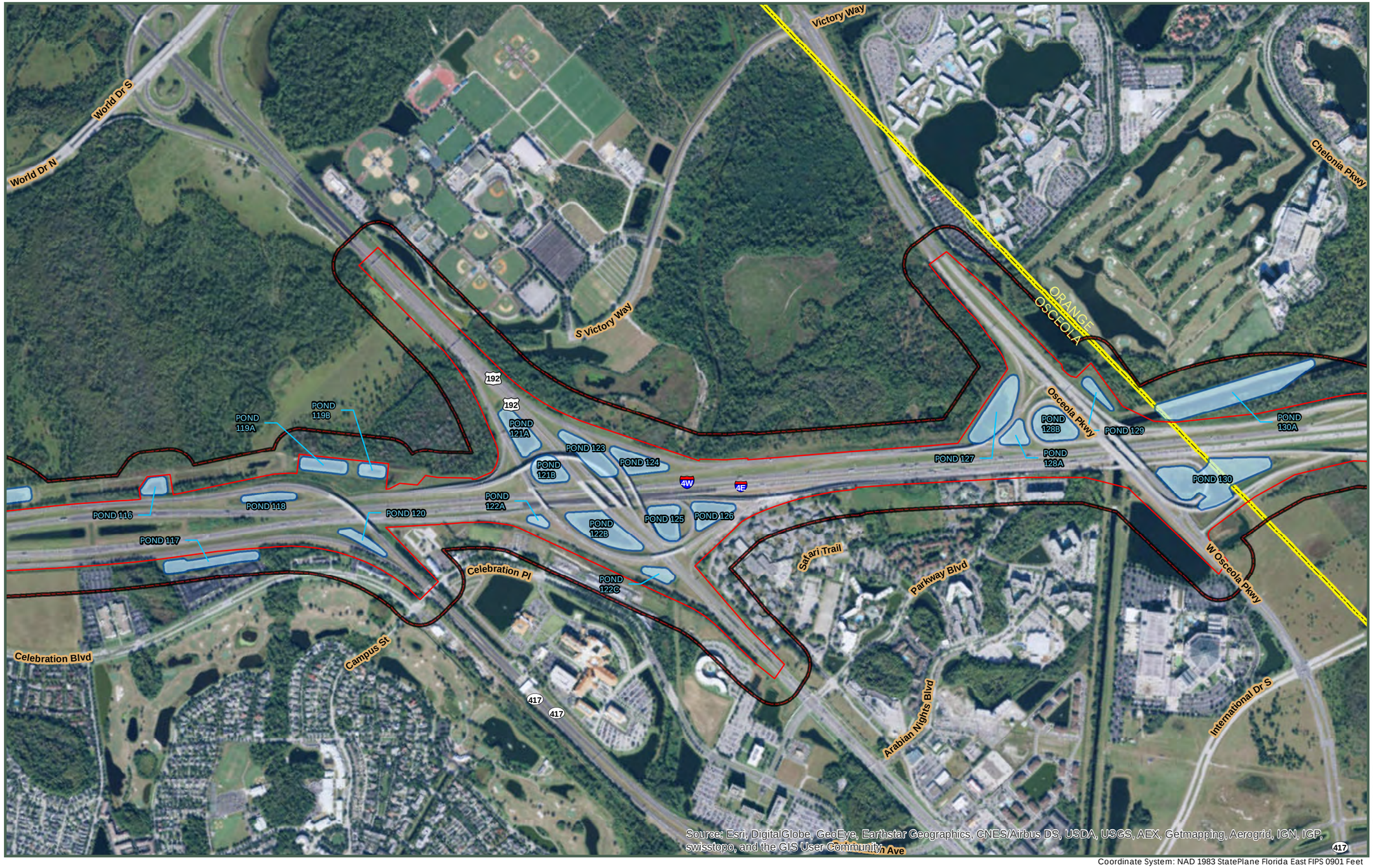

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0 575 1,150 2,300 Feet

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Florida Department of Transportation- D5
SR 400 (I-4) Beyond the Ultimate PD&E Study
Segment 1: SR 400 (I-4) from W. of CR 532 to W. of SR 528 Beachline Expressway

Project Location:
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Prepared by: mLeonard 7/7/2015
Technical Review by: mDrauer 7/7/2015
Independent Review by: jMoore 7/7/2015

Figure C- Species Location Map: Sheet 3 of 5

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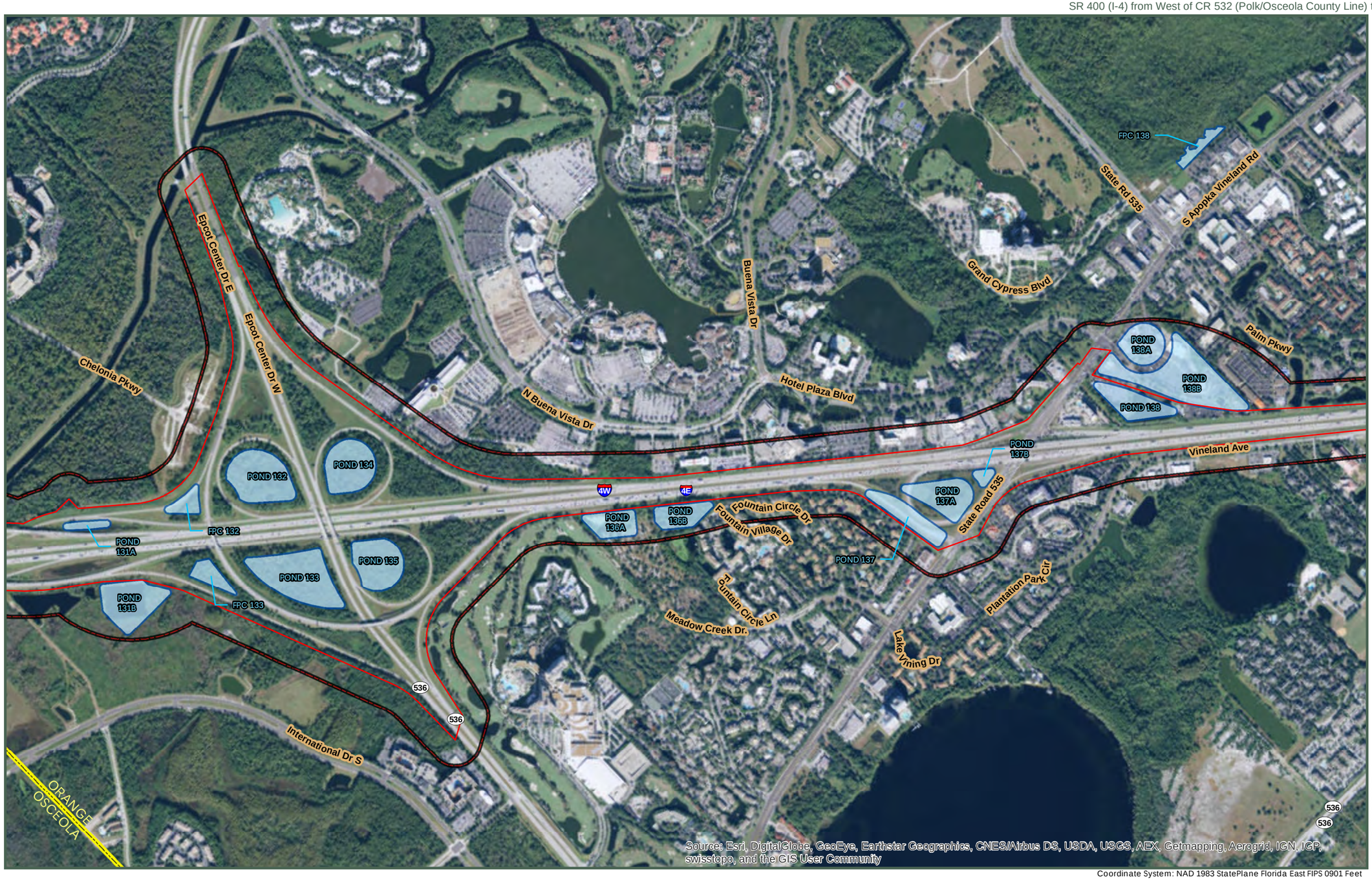

Map Key

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Prepared by: mLeonard 7/7/2015
Technical Review by: mDrauer 7/7/2015
Independent Review by: jMoore 7/7/2015

Figure C- Species Location Map: Sheet 4 of 5

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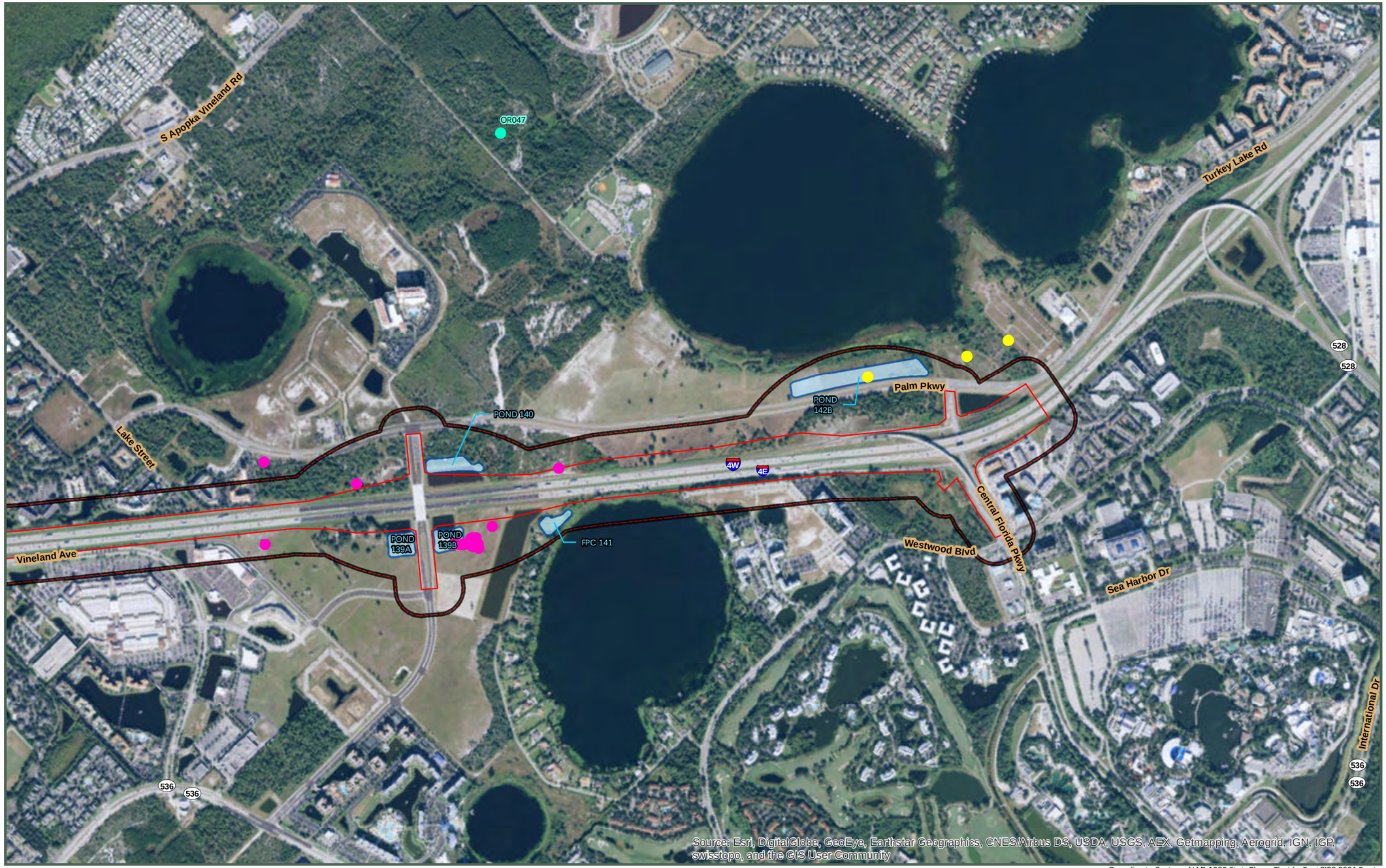

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0 575 1,150 2,300 Feet

Figure C- Species Location Map: Sheet 5 of 5

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APPENDIX E
SAND SKINK SURVEY
MEMO REPORTS

I-4 Beyond the Ultimate PD&E Segment 1 Sand Skink Survey Memo Reports Contents

Osceola County Sand Skink Memo Report – 2014

Project Description

The Florida Department of Transportation (FDOT) is conducting an update of the PD&E studies for the extension of express lanes for SR 400 (I-4). The project limits in the original PD&E studies were:

- West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line, (29.5 miles)
- CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway (13.7 miles), and
- West of SR 528 Beachline Expressway to SR 472 (43 miles).

The corresponding environmental documents include: Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line (FPN 201210, 1998) and from CR 532 (Polk/Osceola County Line to West of SR 528 Beachline Expressway (FPN 242526 and 242483, 1999) and Final Environmental Impact Statement (FEIS) for I-4 from SR 528 Beachline Expressway to SR 472 (FPN 242486, 242592 and 242703, 2002).

The re-evaluation study is being conducted to document changes to SR 400 (I-4) from CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway, including environmental and engineering analysis of the original design concept which showed two high occupancy vehicle (HOV) lanes, to the current proposed design, which includes four managed lanes operating under a variable price toll plan.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally speaking, the typical section will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with 12-foot inside and 10-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders, in each direction. A barrier wall in between the shoulders will separate the express lanes from the general use lanes. Three 12-foot auxiliary lanes will be provided in some areas in the eastbound direction and up to two auxiliary lanes will be provided in some locations in the westbound direction. Stormwater ponds will be included to provide treatment throughout the corridor.

The project area for this survey included the portions of Segment 1 occurring within Osceola County, from I-4 at CR 532 (Osceola-Polk Line Road) to the Orange/Osceola county line, and the potential right-of-way areas for pond sites and other improvements adjacent to the I-4 corridor. Survey areas are depicted on the attached maps.

Survey Scope

Because the project area occurs within the USFWS Consultation Area for sand skinks (*Neoseps reynoldsi*) and blue-tailed mole skinks (*Eumeces egregious lividus*), there is a higher likelihood of skink occupancy within suitable habitats. No previous evidence of skinks was noted in the original PD&E report from May 2000, nor was a species-specific survey performed. However, guidance from USFWS on the skink now classifies areas with skink soils as potential skink habitat (at or above elevation 82), whether or not

natural xeric scrub habitat occurs over the soils. Skink soils are found in excessively drained, well drained, and moderately well drained soils. Suitable soil types typically support scrub, sandhill, or xeric hammock natural communities. Areas over skink soils but altered for human uses include but are not limited to pine plantations, active or inactive citrus groves, pastures, residential developments, and neglected vegetative cover like old fields and overgrown scrub, all present potential opportunities for skink habitat. For this project, the right-of-way and potential pond sites were surveyed for all potential listed wildlife species including skinks. A pedestrian survey was conducted to identify suitable habitat and included searching for skink trails in areas of open sand. Skink soils were also mapped for the project corridor to identify the areas of coverage that overlap with proposed roadway and pond site improvements. Coordination with USFWS staff indicated that a skink cover board survey would need to be performed over all areas of soil coverage within the project footprint in order to make a suitable determination on their involvement. Areas could be excluded from survey coverage if field investigations by a state-certified soil scientist indicated that existing soils either were not present as mapped or no longer exhibited the appropriate characteristics of the skink soils. A Florida Association of Environmental Soil Scientists certified soil scientist (Terry Zable of Atkins) conducted field investigations over the project right-of-way to determine the presence/absence of mapped skink soils prior to the initiation of the cover board survey. Based upon the results of this study, the mapped soils were amended, and cover board surveys were subsequently conducted over any remaining areas that were determined to still contain suitable mapped skink soils. The cover board survey was conducted according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012).

Survey Methodology

Per the USFWS Survey Protocol, the coverboard survey was conducted during the survey window of March 1st through May 15th. Plywood coverboards measuring 2' x 2' and 0.5" thick were placed in areas of bare sand or sparse vegetation to meet a minimum coverage of 40 boards per acre (**See Table 1**) within the areas of suitable soils previously mapped out. A grid system was set up to pre-determine the board placement within each area, and the boards were placed in the field in the most suitable areas within the grids. Final positions of the boards were recorded with a Trimble GPS Unit, and each board was marked with a unique designation. Raking, grading, and manipulation of the soils and vegetation were conducted to ensure full contact of the coverboard with the soil surface. Areas with heavy coverage of grasses within the survey areas necessitated removal of vegetation to place the coverboards. Coverboards were placed beginning on March 24, 2014 and completed by April 8, 2014 and all boards were allowed to acclimate for a minimum of 7 days prior to the first sampling event. The first sampling event began on April 10, 2014 and was completed on April 16, 2014. Subsequent events occurred April 21-23, April 28-29, and May 5-6. The boards were collected from the field on May 21-22 and were checked informally for any sign of sand skinks.

Survey Area Descriptions

Each survey area was given a unique designation and is described as follows.

Unit U – Pomello fine sand 0 – 5%, Candler sand 0 – 5%

Unit U is located within the right-of-way of I-4 eastbound at the end of the on-ramp from SR 429 and consists of open sand, low scrubby plants such as prickly pear cactus, and some bahia grass. Maintenance (mowing) of this area occurs throughout the year.

Unit V – Pomello fine sand 0 – 5%

Unit V is located along the right-of-way of I-4 westbound to the east of the Old Lake Wilson Road overpass and consists of open sand and Bahia grass. Maintenance (mowing) of this area occurs throughout the year.

Unit W – Pomello fine sand 0 – 5%, Candler sand 0 – 5%

Unit W is located within the right-of-way of I-4 westbound east of Old Lake Wilson Road and consists of Bahia grass with sparse areas of open sand. An FDOT maintenance truck got stuck in this area during the survey between events 1 and 2 and used some of the cover boards to get the truck out. Maintenance (mowing) of this area occurs throughout the year.

Unit X – Candler sand 0 – 5%

Unit X is located within a portion of the median between I-4 westbound and the on-ramp to SR 429 northbound. The area consists of maintained Bahia grass.

Unit Y – Candler sand 0 – 5%, Candler sand 5 – 12%

Unit Y is located within the right-of-way of the SR 429 on-ramp from I-4 westbound, and consists of maintained Bahia grass within much of the area, but is primarily open sand as it progresses further west. The area within the right-of-way is maintained, but the area outside on the other side of the fence contains open sand, scrub, and sandhill vegetation.

Unit Z - Candler sand 0 – 5%, Candler sand 5 – 12%

Unit Z is located within the right-of-way of SR 429 just prior to the off-ramp to I-4 westbound and consists of Bahia grass and recently sodded grass areas.

Unit AA – Candler sand 0 – 5%

Unit AA is located adjacent to the off-ramp from SR 429 to I-4 westbound and consists of maintained Bahia grass.

Unit BB – Candler sand 5 – 12%

Unit BB is located within the right-of-way of I-4 eastbound just north of the Tradition Boulevard overpass and consists of open sand and maintained Bahia grass.

Unit CC – Candler sand 5 -12%

Unit CC is located within the right-of-way of I-4 eastbound just south of the Tradition Boulevard overpass and consists of maintained Bahia grass and some open sandy soil.

Unit DD – Pompano fine sand, Candler sand 5 – 12%

Unit DD is located within the right-of-way of I-4 eastbound, south of the Tradition Boulevard overpass and consists of maintained Bahia grass and some open sandy soil.

Unit EE – Pompano fine sand, Pomello fine sand 0 – 5%, Candler sand 0 – 5%

Unit EE is located within the right-of-way of I-4 eastbound between the interchange with CR-532 and the Tradition Boulevard overpass. The site consists of maintained Bahia grass and some open sandy soil.

Unit FF – Pomello fine sand 0 – 5%

Unit FF is located within the right-of-way of I-4 westbound between the interchange with CR-532 and the Tradition Boulevard overpass. The site consists of Bahia grass and some open sandy soil.

Unit GG – Pomello fine sand 0 – 5%, Tavares fine sand 0 – 5%

Unit GG is located within the right-of-way of I-4 eastbound between the interchange with CR-532 and the Tradition Boulevard overpass. The site consists of maintained Bahia grass and some open sandy soil.

Unit HH – Candler sand 0 – 5%, Tavares fine sand 0 -5%

Unit HH is located within the right-of-way of I-4 westbound between the interchange with CR-532 and the Tradition Boulevard overpass. The site consists of maintained Bahia grass and some open sandy soil.

Unit II – Pomello fine sand 0 – 5%, Candler sand 0 -5%

Unit II is located within the right-of-way of I-4 eastbound, east of the interchange with CR-532. The site consists of maintained Bahia grass and some open sandy soil.

Unit JJ – Candler sand 0 -5%

Unit JJ is located within the right-of-way of I-4 westbound, east of the interchange with CR-532. The site consists of maintained Bahia grass and some open sandy soil.

Unit KK – Candler sand 0 -5%

Unit KK is located within the right-of-way of I-4 eastbound, east of the interchange with CR-532. The site consists of maintained Bahia grass, maintained St. Augustine grass, and some open sandy soil.

Table 1 - Sand Skink Cover Board Survey Summary			
Unit	Acreage	Number of Boards	Boards per Acre
U	**0.84**	**38**	**45**
V	**0.07**	**5**	**71**
W	**0.64**	**28**	**44**
X	**0.39**	**16**	**41**
Y	**2.52**	**113**	**45**
Z	**0.35**	**16**	**46**
AA	**0.65**	**30**	**46**
BB	**0.20**	**11**	**55**
CC	**0.25**	**12**	**48**
DD	**0.16**	**11**	**68**
EE	**0.77**	**31**	**40**
FF	**0.23**	**10**	**43**
GG	**0.69**	**40**	**58**
HH	**0.91**	**40**	**44**
II	**1.69**	**85**	**50**
JJ	**0.56**	**26**	**46**
KK	**0.76**	**41**	**54**

Survey Results

Cover boards were inspected for signs of sand skinks by lifting each board and visually inspecting the area beneath. After each inspection, the area under the board was smoothed out, and the boards were placed back down in the original position. During the first survey event, any boards with vegetation or debris still under them were raked, re-graded, and smoothed out. Any boards that were moved, damaged, or removed were noted on the data sheets.

Event 1 – April 10, 11, 14 and 16, 2014

Numerous 6-lined race runners were observed and several different types of curves and lines were observed under boards, but no sand skink tracks or other signs of sand skinks were observed. Southern toads, 5-lined skinks, eastern narrow-mouthed toads, and brown anoles were also observed.

Event 2 – April 21, 22, and 23, 2014

Tracks from an unknown species were observed under several boards, but no signs or tracks of sand skinks were observed. Eastern narrow-mouthed toads and 6-lined race runners were observed under numerous boards throughout the survey corridor.

Event 3 – April 28 and 29, 2914

No signs of sand skinks were observed under any of the cover boards. Many 6-lined race runners and eastern narrow-mouthed toads were observed, as were several pine bark scorpions.

Event 4 – May 5 and 6, 2014

No signs of sand skinks were observed under any of the cover boards. 6-lined race runners and eastern narrow-mouthed toads were common under the boards throughout the survey area.

Survey Summary

No sand skinks or evidence of sand skinks was observed during the survey. Many different types of species were encountered, but no continuous sinusoidal tracks were found either under the cover boards or at any other place within the survey area.

References:

FWS. 2012. Peninsular Florida Species Conservation and Consultation Guide, Sand Skink and Blue-tailed (Blue-tail) Mole Skink.

DATA SHEET
SAMPLE AND DATA
SHEET TABLE

Stantec Sand Skink Survey Data Sheet

Date:
Start Time:
End Time:
Temp:
Wind Speed/Direction:
Visibility:
Precipitation:
Biologists/Technicians:

Coverboard Point	Tracks Present	Tracks Absent	Notes
W 13			
W 14			
W 17			
W 18			
W 22			
W 25			
W 26			
W 30			
W 33			
W 34			
W 35			
W 37			
W 38			
W 39			
W 41			
W 42			
W 43			
W 45			
W 46			
W 49			
W 50			
W 52			
W 53			
W 54			
W 56			
W 58			
W 59			
W 60			

SAMPLE

Date:	4/10/2014	Survey Event:	1	Start Time:	9:20 AM	End Time:	3:30 PM
Start Temp:	64 F	End Temp:	76 F	Wind Speed/Direction:		0-10 NW	
Visibility:	Clear	Precipitation:	None				
Sites Sampled (in order):	C, D, B, K, J						
Biologists/Technicians:	Mike Dinardo, Mike Drauer, Mike Holdsworth, Matt Leonard, Kevin Muldrew						
Observations:	A skink with a blue tail was observed under board D69, but a positive ID could not be made. An 8 inch "S" shaped curve was observed under coverboard B60, which was determined to not be from a sand skink. No other signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners were observed under coverboards.						

Date:	4/11/2014	Survey Event:	1	Start Time:	8:45 AM	End Time:	3:35 PM
Start Temp:	65 F	End Temp:	80 F	Wind Speed/Direction:		0-10 N/NE	
Visibility:	Partly Cloudy	Precipitation:	None				
Sites Sampled (in order):	A, F, G, H						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners were observed under coverboads. Site A included observations of southern toads, five-lined skinks, eastern narrow-mouthed toads, and some brown anoles under coverboards.						

Date:	4/14/2014	Survey Event:	1	Start Time:	8:55 AM	End Time:	4:46 PM
Start Temp:	70 F	End Temp:	89 F	Wind Speed/Direction:		5-10 SE	
Visibility:	Partly Cloudy	Precipitation:	None				
Sites Sampled (in order):	I, L, M, N, O, O (24), Q, R, T, S, P, KK, II, GG, EE, DD, CC, BB, U, V, W, FF, HH, JJ						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Matt Leonard, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Several tracks of an unknown species, not a sand skink, were found under coverboards I15 and I25. A southern toad, a five-lined skink, a eastern narrow-mouthed toad, and numerous six-lined racerunners were observed under coverboards.						

Date:	4/16/2014	Survey Event:	1	Start Time:	8:50 AM	End Time:	10:43 AM
Start Temp:	55 F	End Temp:	60 F	Wind Speed/Direction:		5-10 NW	
Visibility:	Clear	Precipitation:	None				
Sites Sampled (in order):	X, Y, Z, AA						
Biologists/Technicians:	Mike Drauer, Matt Leonard, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners were observed under coverboards.						

Date:	4/21/2014	Survey Event:	2	Start Time:	9:35 AM	End Time:	2:45 PM
Start Temp:	65 F	End Temp:	75 F	Wind Speed/Direction:		0-5 NE	
Visibility:	Mostly Cloudy	Precipitation:	None				
Sites Sampled (in order):	C, D, B, J						
Biologists/Technicians:	Mike Holdsworth, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners and several eastern narrow-mouthed toads were found under coverboards.						

Date:	4/22/2014	Survey Event:	2	Start Time:	8:45 AM	End Time:	4:05 PM
Start Temp:	65 F	End Temp:	86 F	Wind Speed/Direction:		5-10 S/SW	
Visibility:	Partly Cloudy	Precipitation:	None				
Sites Sampled (in order):	K, I, H, G, F, L, M, N, O, O(24), Q, R, S, T, KK, II, GG, EE, DD, CC, U, BB, P						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Matt Leonard						
Observations:	Tracks of an unknown species, not a sand skink, were found under coverboards K50 and G63. No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners were found under coverboards.						

Date:	4/23/2014	Survey Event:	2	Start Time:	8:40 AM	End Time:	11:02 AM
Start Temp:	65 F	End Temp:	70 F	Wind Speed/Direction:	0-5 W/NW		
Visibility:	Clear	Precipitation:	None				
Sites Sampled (in order):	V, W, X, Y, Z, AA, FF, HH, JJ						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. A green anole, several eastern narrow-mouthed toads, and numerous six-lined racerunners were found under coverboards.						

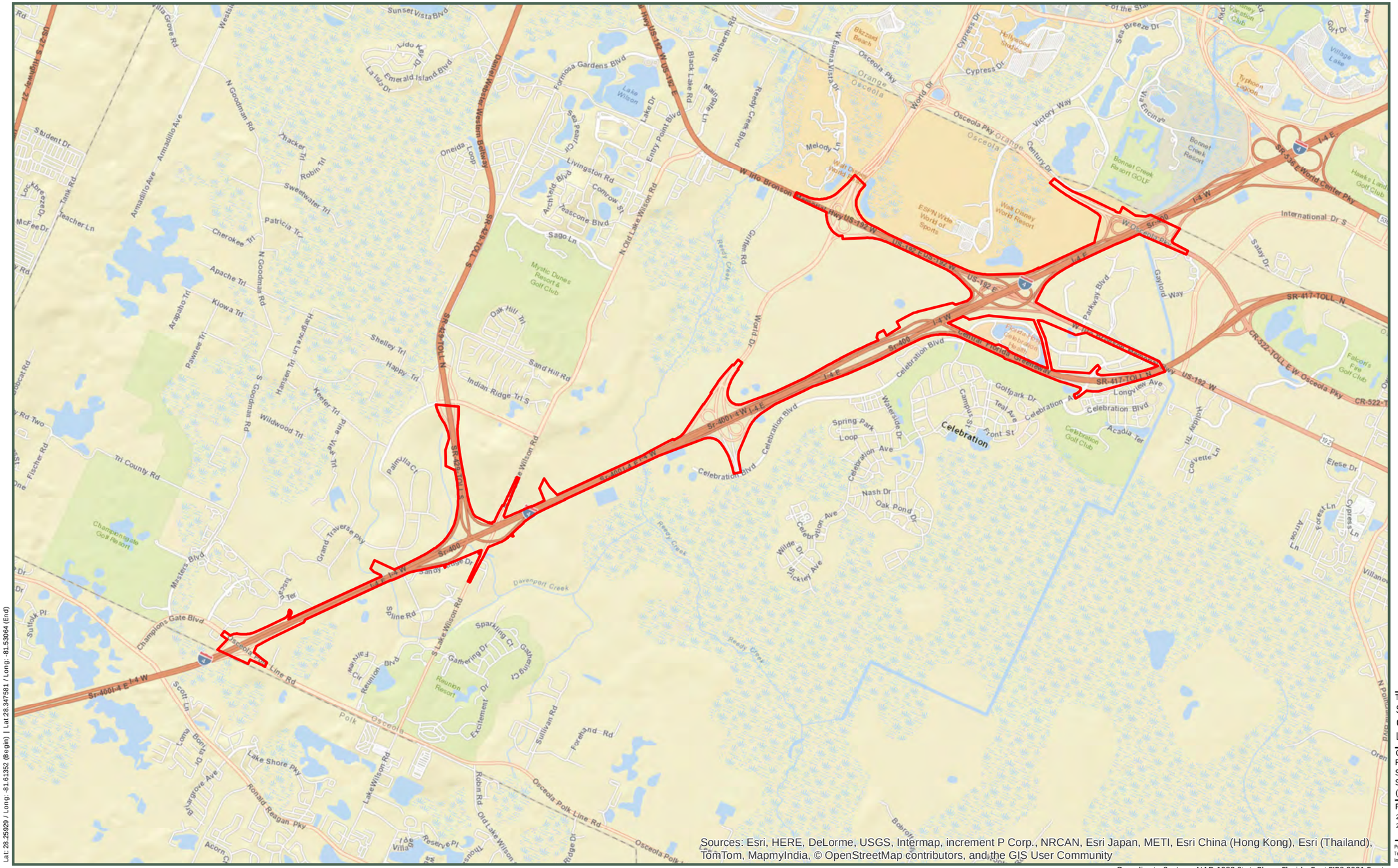
Date:	4/28/2014	Survey Event:	3	Start Time:	9:30 AM	End Time:	3:26 PM
Start Temp:	80 F	End Temp:	92 F	Wind Speed/Direction:	0-10 SE		
Visibility:	Clear	Precipitation:	None				
Sites Sampled (in order):	C, D, B, J, K						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Several six-lined racerunners were found under coverboards.						

Date:	4/29/2014	Survey Event:	3	Start Time:	9:15 AM	End Time:	3:00 PM
Start Temp:	78 F	End Temp:	90 F	Wind Speed/Direction:	0-5 S		
Visibility:	Mostly Cloudy	Precipitation:	None				
Sites Sampled (in order):	F, V,W, X, Y, G, H, I, Z, AA, FF, HH, JJ, L, M, N, O, O(24), BB, P, Q, R, S, T, KK, II, GG, EE, DD, CC, U						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Matt Leonard, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners, several eastern narrow-mouthed toads, and a brown anole were found under coverboards.						

Date:	5/5/2014	Survey Event:	4	Start Time:	9:00 AM	End Time:	2:27 PM
Start Temp:	65 F	End Temp:	85 F	Wind Speed/Direction:	0-5 W		
Visibility:	Clear	Precipitation:	None				
Sites Sampled (in order):	C, D, B, I, H, G, F, K, J, L, M, N, R, Q, S, T, U, P, O, O(24)						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Matt Leonard, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners and several eastern narrow-mouthed toads were found under coverboards.						

Date:	5/6/2014	Survey Event:	4	Start Time:	8:38 AM	End Time:	10:55 AM
Start Temp:	70 F	End Temp:	80 F	Wind Speed/Direction:	0-5 W		
Visibility:	Clear	Precipitation:	None				
Sites Sampled (in order):	V, W, X, Y, Z, FF, HH, JJ, KK, AA, BB, II, GG, EE, DD, CC						
Biologists/Technicians:	Mike Drauer, Mike Holdsworth, Matt Leonard, Kevin Muldrew						
Observations:	No signs of sand skinks were found under coverboards or in open sand. Numerous six-lined racerunners and one eastern narrow-mouthed toad were found under coverboards.						

FIGURES



Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Map Key

Estimated R/W SR 400 PD&E Study

Segment 1 (Osceola Co.)

Segment 1 (Osceola County):
Begin Station 626+39.92
End Station 1042+95
Begin MP 0.00 / End MP 7.885
Total Length 7.885 miles

Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure A

1 " = 4,000 '

SR 400 (I-4) Project Development and Environmental (PD&E) Study | FM No. 432100-1-22-01

2024230168

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eoseps\mxd\rpt_nere_osceola_series140819.mxd

Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Sand Skink Soil Series

- ARCHBOLD (2)
- CANDLER (3) (4) (5) (7) (8)
- PAOLA (28)
- POMELLO (20) (21) (22) (34)
- SATELLITE (34) (41) (77)
- ST. LUCIE (43)
- TAVARES (44) (46) (63)

Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
NRCS Soil Unit Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure B

1 " = 3,000 '

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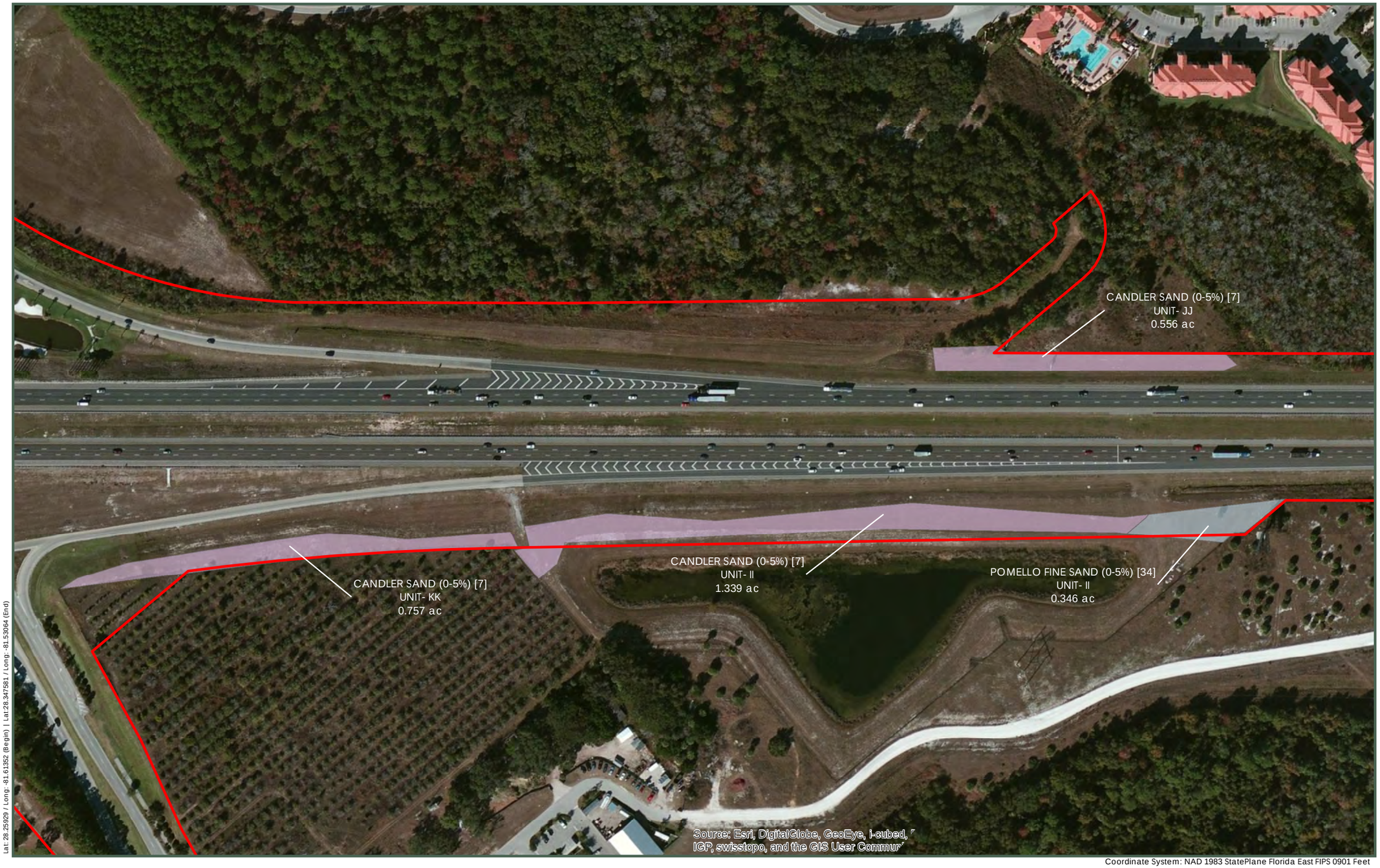


Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

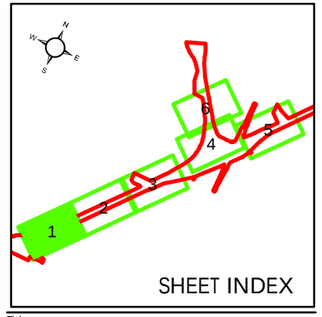
Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Soil Units of Survey

- CANDLER SAND (0-5%)
- CANDLER SAND (5-12%)
- POMELLO (FINE SAND 0-5%)
- POMELLO FINE SAND (0-5%)
- POMPANO FINE SAND (DEP)
- ST. LUCIE (FINE SAND 0-5%)
- TAVARES FINE SAND (0-5%)
- TAVARES-MILLHOPPER (FINE SAND 0-5%)



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Sand Skink Survey Units Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure C - Sheet 1 of 6

1 " = 200 '

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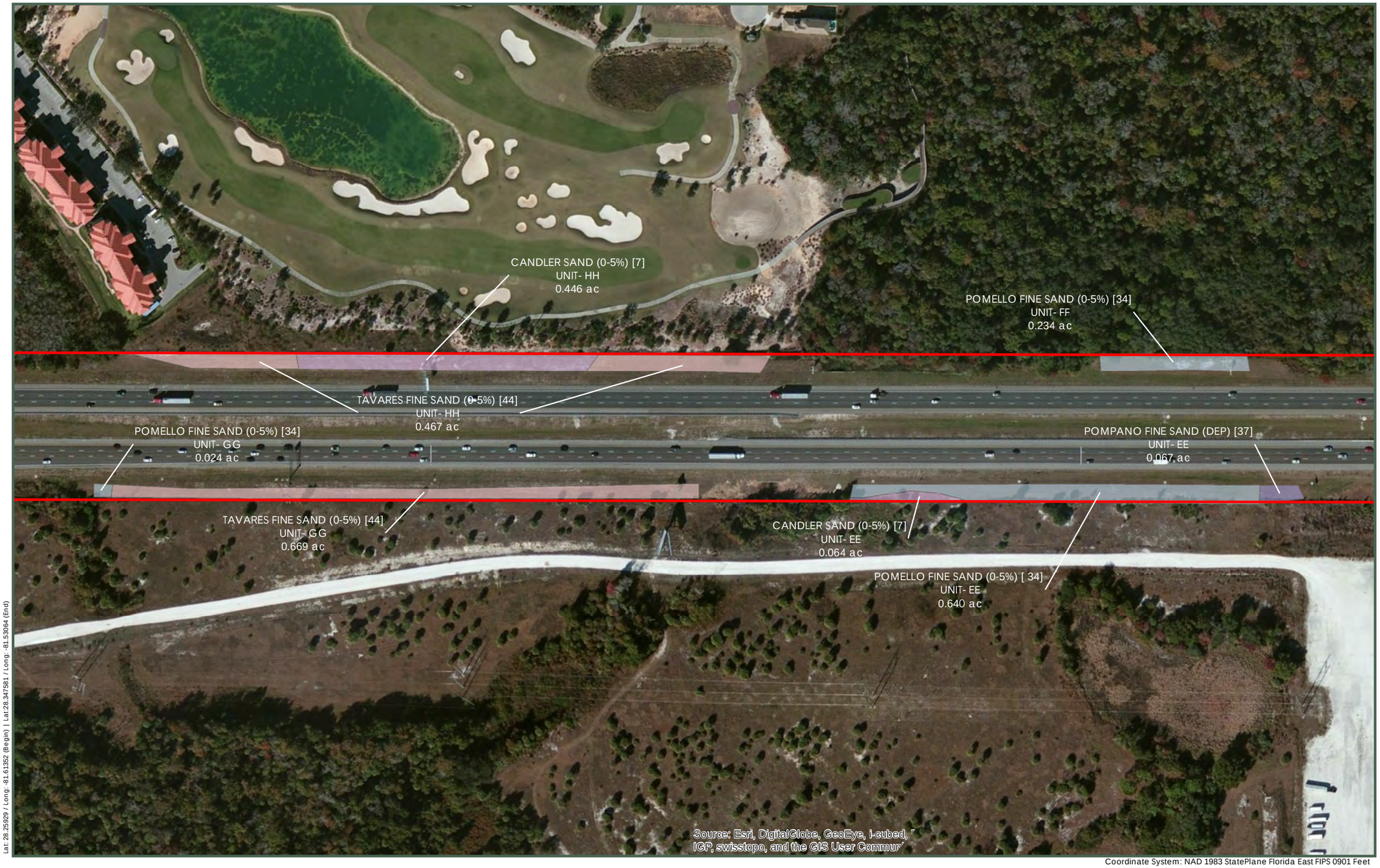


Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

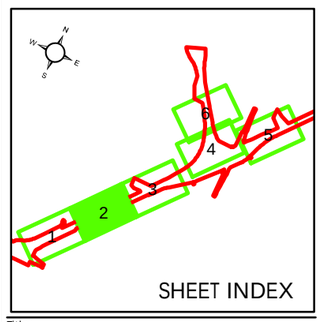
Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Soil Units of Survey

- CANDLER SAND (0-5%)
- CANDLER SAND (5-12%)
- POMELLO (FINE SAND 0-5%)
- POMELLO FINE SAND (0-5%)
- POMPANO FINE SAND (DEP)
- ST. LUCIE (FINE SAND 0-5%)
- TAVARES FINE SAND (0-5%)
- TAVARES-MILLHOPPER (FINE SAND 0-5%)



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Sand Skink Survey Units Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure C - Sheet 2 of 6

1 " = 200 '

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Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

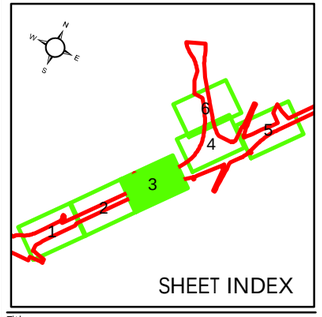
Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Soil Units of Survey

- CANDLER SAND (0-5%)
- CANDLER SAND (5-12%)
- POMELLO (FINE SAND 0-5%)
- POMELLO FINE SAND (0-5%)
- POMPANO FINE SAND (DEP)
- ST. LUCIE (FINE SAND 0-5%)
- TAVARES FINE SAND (0-5%)
- TAVARES-MILLHOPPER (FINE SAND 0-5%)



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Sand Skink Survey Units Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure C - Sheet 3 of 6

1 " = 200 '

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Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

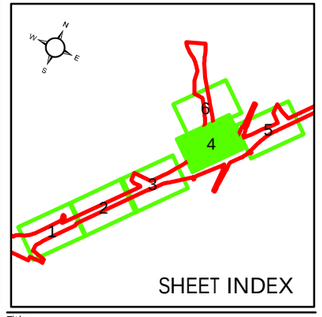
Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Soil Units of Survey

- CANDLER SAND (0-5%)
- CANDLER SAND (5-12%)
- POMELLO (FINE SAND 0-5%)
- POMELLO FINE SAND (0-5%)
- POMPANO FINE SAND (DEP)
- ST. LUCIE (FINE SAND 0-5%)
- TAVARES FINE SAND (0-5%)
- TAVARES-MILLHOPPER (FINE SAND 0-5%)



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Sand Skink Survey Units Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure C - Sheet 4 of 6

1 " = 200 '

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eoseps\mxd\rpt_nere_osceola_series140819.mxd

Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

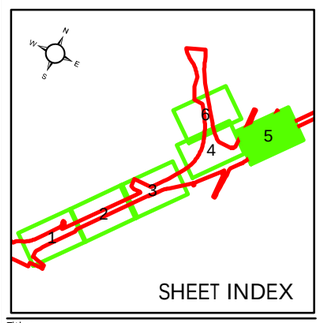
Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Soil Units of Survey

- CANDLER SAND (0-5%)
- CANDLER SAND (5-12%)
- POMELLO (FINE SAND 0-5%)
- POMELLO FINE SAND (0-5%)
- POMPANO FINE SAND (DEP)
- ST. LUCIE (FINE SAND 0-5%)
- TAVARES FINE SAND (0-5%)
- TAVARES-MILLHOPPER (FINE SAND 0-5%)



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Sand Skink Survey Units Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure C - Sheet 5 of 6

1 " = 200 '

SR 400 (I-4) Project Development and Environmental (PD&E) Study | FM No. 432100-1-22-01

2024230168

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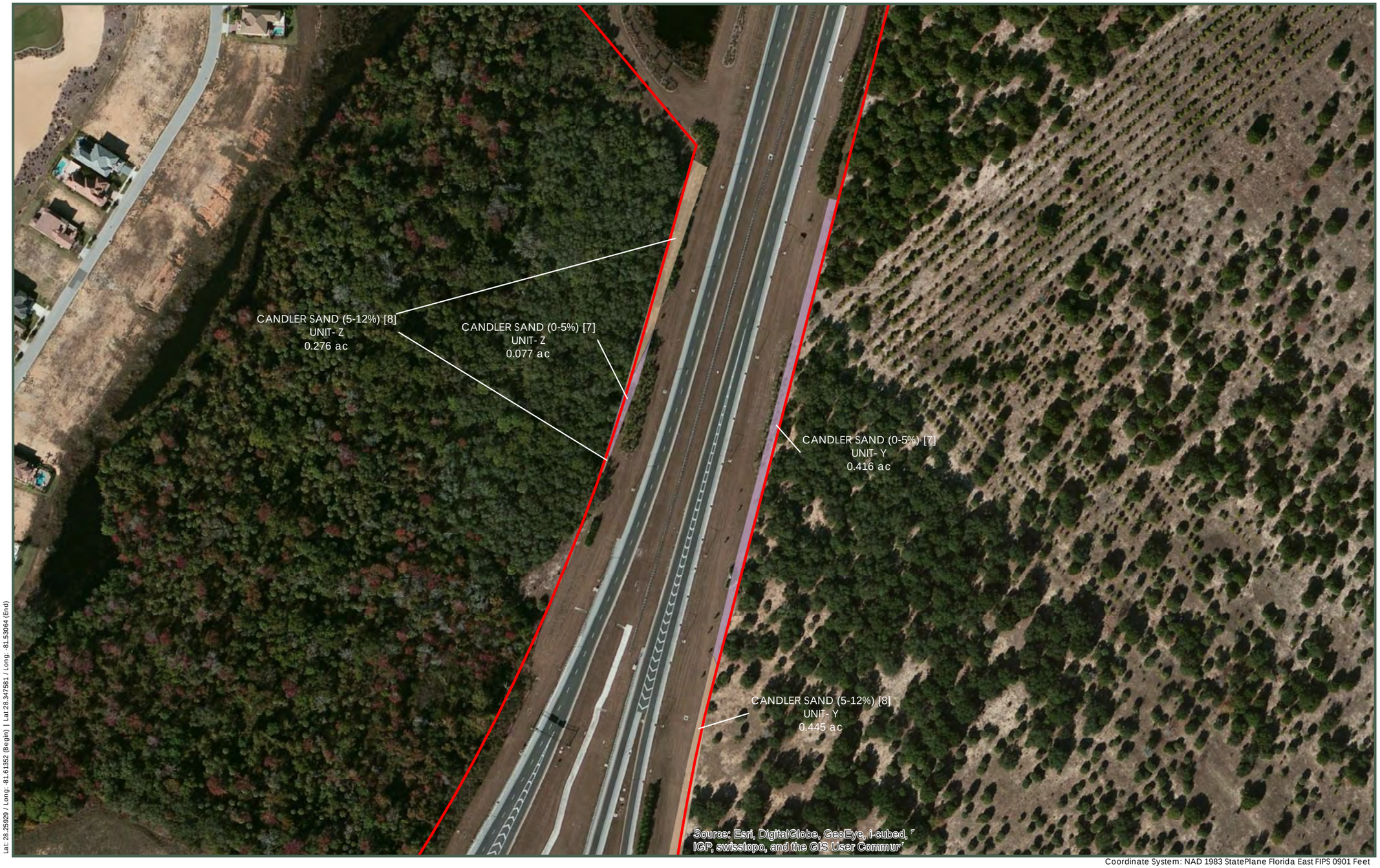


Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

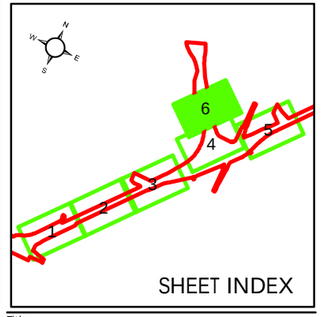
Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line

Soil Units of Survey

- CANDLER SAND (0-5%)
- CANDLER SAND (5-12%)
- POMELLO (FINE SAND 0-5%)
- POMELLO FINE SAND (0-5%)
- POMPANO FINE SAND (DEP)
- ST. LUCIE (FINE SAND 0-5%)
- TAVARES FINE SAND (0-5%)
- TAVARES-MILLHOPPER (FINE SAND 0-5%)



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Sand Skink Survey Units Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure C - Sheet 6 of 6

1 " = 200 '

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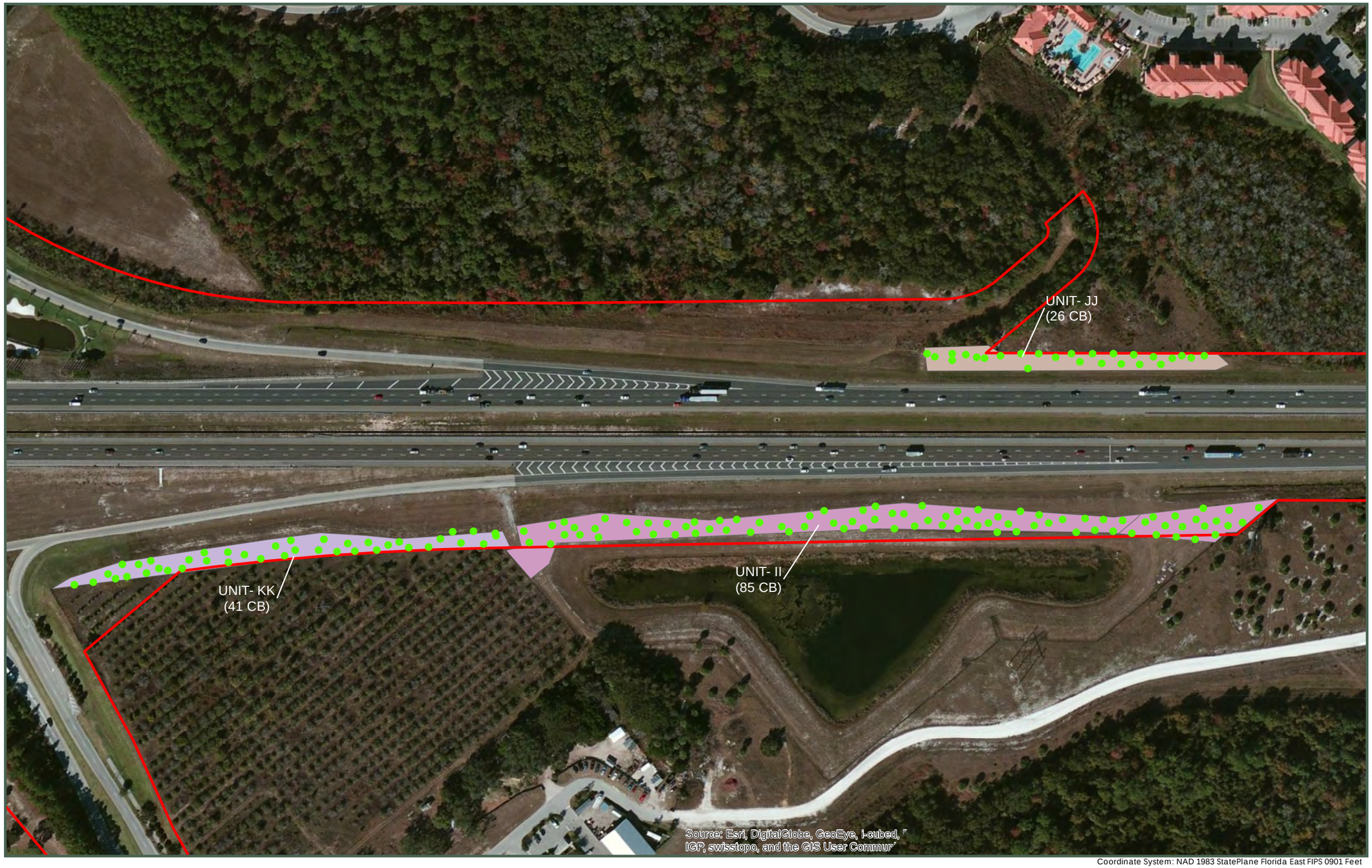


Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Map Key

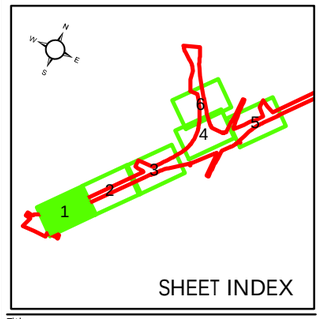
Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line
- Coverboard Locations

Survey Units

UNIT- AA	UNIT- JJ
UNIT- BB	UNIT- KK
UNIT- CC	UNIT- U
UNIT- DD	UNIT- V
UNIT- EE	UNIT- W
UNIT- FF	UNIT- X
UNIT- GG	UNIT- Y
UNIT- HH	UNIT- Z
UNIT- II	

Notes: CB = Coverboards



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Coverboard Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Figure D - Sheet 1 of 6

1 " = 200 '

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eoseps\mxd\rpt_nere_osceola_series140819.mxd

Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Map Key

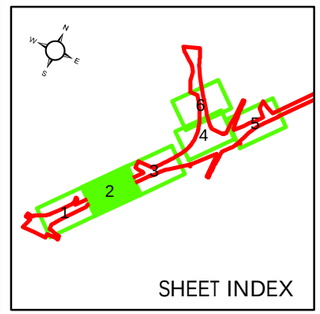
Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line
- Coverboard Locations

Survey Units

- UNIT- AA
- UNIT- BB
- UNIT- CC
- UNIT- DD
- UNIT- EE
- UNIT- FF
- UNIT- GG
- UNIT- HH
- UNIT- II
- UNIT- JJ
- UNIT- KK
- UNIT- U
- UNIT- V
- UNIT- W
- UNIT- X
- UNIT- Y
- UNIT- Z

Notes: CB = Coverboards



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Coverboard Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure D - Sheet 2 of 6

1 " = 200 '

SR 400 (I-4) Project Development and Environmental (PD&E) Study | FM No. 432100-1-22-01

2024230168

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eoseps\mxd\rpt_nere_osceola_series140819.mxd

Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Map Key

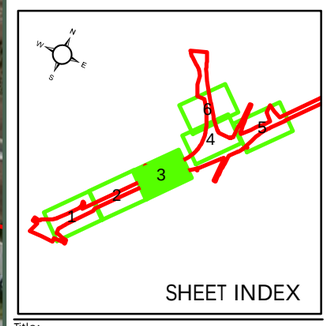
Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line
- Coverboard Locations

Survey Units

- UNIT- AA
- UNIT- BB
- UNIT- CC
- UNIT- DD
- UNIT- EE
- UNIT- FF
- UNIT- GG
- UNIT- HH
- UNIT- II
- UNIT- JJ
- UNIT- KK
- UNIT- U
- UNIT- V
- UNIT- W
- UNIT- X
- UNIT- Y
- UNIT- Z

Notes: CB = Coverboards



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Coverboard Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure D - Sheet 3 of 6

1 " = 200 '

SR 400 (I-4) Project Development and Environmental (PD&E) Study | FM No. 432100-1-22-01

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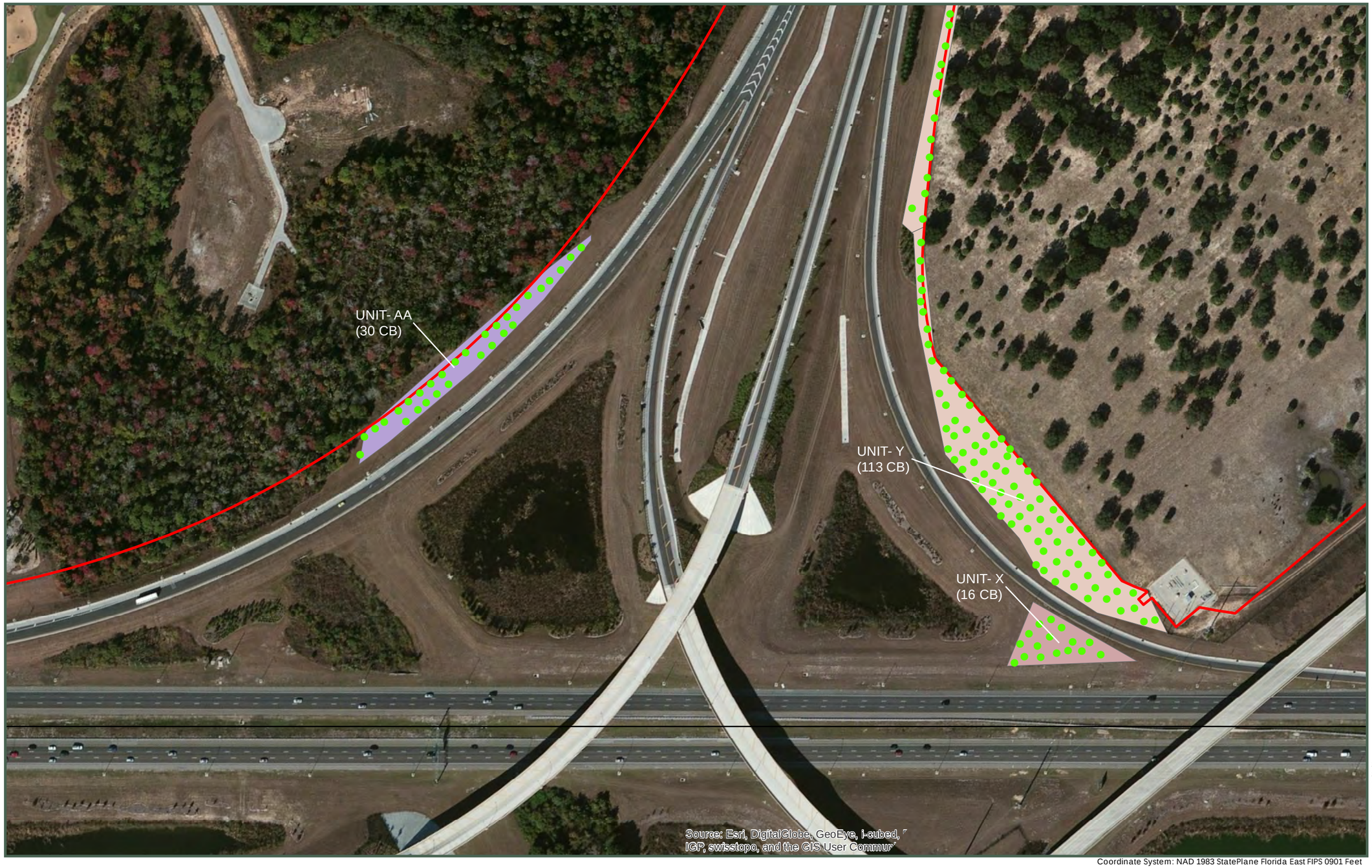


Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Map Key

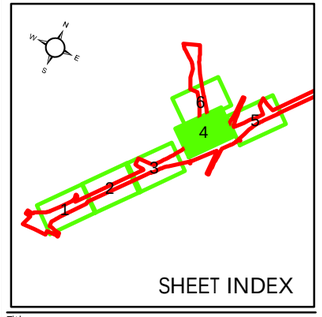
Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line
- Coverboard Locations

Survey Units

- UNIT- AA
- UNIT- BB
- UNIT- CC
- UNIT- DD
- UNIT- EE
- UNIT- FF
- UNIT- GG
- UNIT- HH
- UNIT- II
- UNIT- JJ
- UNIT- KK
- UNIT- U
- UNIT- V
- UNIT- W
- UNIT- X
- UNIT- Y
- UNIT- Z

Notes: CB = Coverboards



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Coverboard Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Figure D - Sheet 4 of 6

1 " = 200 '

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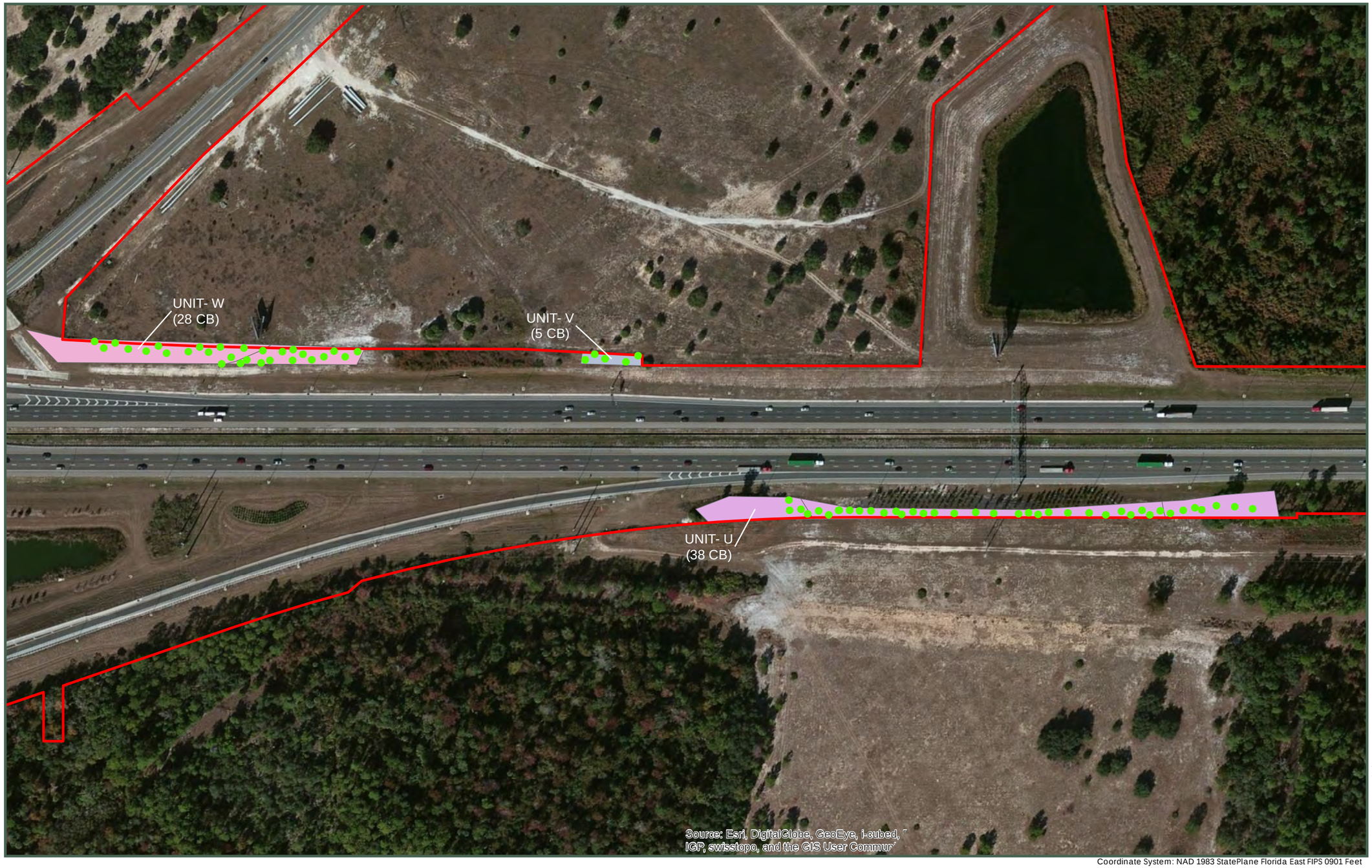

Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Map Key

Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line
- Coverboard Locations

Survey Units

- UNIT- AA
- UNIT- BB
- UNIT- CC
- UNIT- DD
- UNIT- EE
- UNIT- FF
- UNIT- GG
- UNIT- HH
- UNIT- II
- UNIT- JJ
- UNIT- KK
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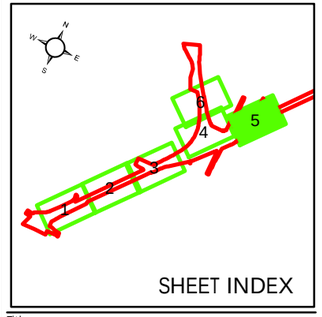
- UNIT- V
- UNIT- W
- UNIT- X
- UNIT- Y
- UNIT- Z

Notes: CB = Coverboards



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Coverboard Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Figure D - Sheet 5 of 6

1 " = 200 '

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Lat: 28.25929 / Long: -81.61352 (Begin) | Lat:28.347581 / Long: -81.53064 (End)

Map Key

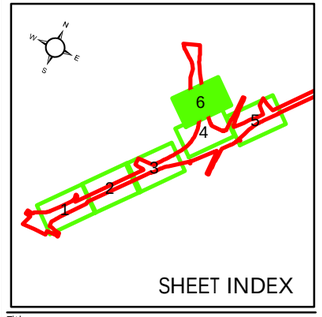
Estimated R/W SR 400 PD&E Study

- Segment 1 (Osceola Co.)
- County Line
- Coverboard Locations

Survey Units

UNIT- AA	UNIT- JJ
UNIT- BB	UNIT- KK
UNIT- CC	UNIT- U
UNIT- DD	UNIT- V
UNIT- EE	UNIT- W
UNIT- FF	UNIT- X
UNIT- GG	UNIT- Y
UNIT- HH	UNIT- Z
UNIT- II	

Notes: CB = Coverboards



Title:
SR 400 SAND SKINK SURVEY MEMO-
Osceola County
Coverboard Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
SR 400 (I-4) W of CR 532 (County Line)-Polk County (16320) to County Line - Osecola County (92130)

Project Location:
25S/27E/1, 12-13, 22-23, 27, 33-34
25S/28E/5-8

Prepared by: mLeonard 2014/08/12
Technical Review by: mDrauer 2014/08/12
Independent Review by: jMoore 2014/08/12

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Figure D - Sheet 6 of 6

1 " = 200 '

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ATKINS SOIL INVESTIGATION REPORT

Florida Department of Transportation, District 5
State Road 400 (I-4) and State Road 429, FDOT Project ID 432100-1
Osceola County, Florida

Florida Sand Skink (*Neoseps reynoldsi*) Soil Investigation Report

March 18, 2014

Prepared by:
Atkins
482 South Keller Road
Orlando, Florida 32810

Field Investigation Dates: March 7 through March 11, 2014.

Project / Location: Florida Department of Transportation (FDOT), Florida Sand Skink (*Neoseps reynoldsi*) Soil Investigation, State Road 400 (Interstate Highway 4) between SR 532 and SR 429, Osceola County Florida **(Exhibit 1).**

Project Number: 100039095

Client: Florida Department of Transportation, District 5.

Inspection Staff: Sarah Oxford (Senior Scientist I), Craig Stout (Senior Scientist II), Terry Zable (Senior Program Manager/Project Director). Report prepared and submitted by Terry Zable.

Project Footprint: State Road 400 (I-4) right-of-way (ROW) and interchange areas beginning just west of State Road 532 (SR 532) to one-quarter mile east of the State Road 429 (SR429) interchange, including access ramps to and from SR 429 onto I-4, in Osceola County, Florida (**Exhibit 1**).

Introduction: At the client's request, the project site as described above was investigated to identify potential areas that may have been subject to past soil alterations (filling, excavation, and excavation/filling) which may have sufficiently altered the soils such that they no longer exhibit surface or shallow surface characteristics for suitable Florida Sand Skink (*Neoseps reynoldsi*) soils as identified by U.S. Fish and Wildlife Service (USFWS) within the Osceola County Consultation Area. The entire project area was field reviewed and soil borings were undertaken where there was not a reasonable probability that the soils in the area had been previously excavated (slope cuts, swales, ditches, ponds), filled (ramps, treatment pond berms, road beds), or excavation/filling due to roadway alterations, stormwater treatment areas or utility, lighting and/or signage features. Soil borings were also performed to verify areas where natural, unaltered suitable soils were mapped, and road construction activities appeared to have not impacted the soil surface. The soil series identified by USFWS as suitable sand skink habitat soils which have been mapped as occurring within the project area consists of: Candler, Pomello, and Tavares soil series.

In order to accurately describe the existing soil conditions within the project footprint, the entire project was separated into 35 study areas (**Exhibit 2**), which are independently described below. Soil borings performed in the study area were hand augured utilizing a bucket auger and directly filled after each excavation. A push probe was also utilized to verify the limits of fill, when filled areas were identified, no soil borings were performed where filling or excavation was obvious. The location of each soil boring, or probe location was memorialized utilizing a Trimble Pro Global Positioning System (GPS) unit. Soil Boring locations are shown on the attached soil boring location map **(Exhibit 4)**, and details regarding the individual soil borings are listed in the Soil Boring Description **(Exhibit 6).** In addition to the recorded locations, one or more representative photographs were taken within each of the 35 study areas (**Exhibit 5**).

Study Areas:

Study Area 1 Located between the I-4 east bound exit ramp to SR 523 and the I-4 interchange overpass. With the exception of overpass ramps and roadways, this area is relatively flat and is vegetated with a mixture of grass and sedges. A total of 13 soil borings were performed within the area (**Exhibit 4A**), and all bore locations reflected either sandy surface soils with limestone material or, finer textured loamy soils with or without limerock. Based on the field review, this area appears to be entirely composed of fill material.

Study Area 2 Small study area bordered by SR 532 and the eastbound I-4 exit lane to SR 522. The soils identified in this area are either finer textured loamy sand, or fine sand with limestone. The soils observed

are not similar to the Candler series mapped in this area. Based upon the soils observed it is assumed that this area was filled, and/or altered during road construction.

Study Area 3 Located adjacent to the eastbound I-4 exit ramp onto SR 532, which is bordered by the exit ramp and ROW fence. The portion of the study area located immediately adjacent to the access ramp is fill material composed of sandy and loamy sand soils with mixed lime rock occurring at a depth of 8 -12 inches. Closer to the ROW fence, it appears that the natural slope has been graded to create a level roadway. The slope grading that occurred removed several feet of the soil surface which exposes finer textured subsoil. Therefore, the soils observed in this study area do not exhibit profiles similar to the mapped Candler series and are either fill material or a truncated soil profile with exposed subsoil. At this time, no significant areas of Candler soil can be found within this study area.

Study Area 4 Located along the south side of the SR 532 access ramp to I-4. A majority of this area contains the side slope of a sand ridge that was cut and graded to provide a more level roadway contour. Depending upon the location, it appears that up to 20 feet of vertical height may have been removed from the ridge for roadway construction. Several soil borings were conducted along the relatively undisturbed ridge top that revealed soil profiles consistent with the mapped Candler series. The side slopes are composed with truncated soil profiles, and much of the area supports maintained turf and ornamental landscape plantings. The portion of the study area containing Candler soils was delineated, and a GPS boundary has been created (**Exhibit 3A**).

Study Area 5 This is a small study area located between the eastbound I-4 access ramp from SR 532 and the I-4 overpass of SR 532. Soil borings performed within this area all revealed soils with a sandy surface and limestone material occurring between depths of 2 to 6 inches of the surface, indicating that the entire study area appears to be composed of fill containing limestone material.

Study Area 6 This study area is located along the east bound travel lanes of I-4, beginning just east of the terminus of SR 532 access ramp onto I-4 and continuing east until intersecting with an un-named wetland system. Field investigation reveal that portions of this study area located adjacent to the travel lanes are composed of sandy fill with limestone material. Other sections of this study area bordering the ROW fence do not appear to have been impacted by roadway excavation and filling activities and soil borings indicate profiles consistent with the original mapped Candler soil series. The portions of the study area with suitable sand skink soils were delineated and are shown in **Exhibit 3A**.

Study Area 7 This study area is located along the east bound travel lanes of I-4, beginning just east of the un-named wetland system bordering Study Area 6, and continuing east until intersecting with an un-named wetland system located west of the Tradition Boulevard overpass. Portions of this study area which are located adjacent to travel lanes are composed of sandy fill with limestone material. The remaining portions of this area bordering the ROW fence do not appear to have been impacted by roadway excavation and filling activities and soil borings indicate profiles consistent with either Pomello or Tavares soil series, both mapped for this area. All identified suitable sand skink soils were delineated and are shown in **Exhibits 3A and 3B**.

Study Area 8 This study area is located along the east side of eastbound I-4 travel lanes, beginning at the east edge wetland area that borders Study Area 7, and terminating at a drainage area located within the interchange. All portions of this study area are located within landscapes that were either excavated and graded to lower slopes, or were filled for ramps, bridge piers, travel lanes, or ornamental planting areas. Although this area was historically mapped as Candler series, there are no natural grades remaining within the FDOT ROW that have not been significantly altered by road building activities, and therefore the soils within this study area cannot be identified as the Candler series.

Study Area 9 This study area is located between the east sides of the eastbound I-4 travel lanes and the west side of the I-4 to SR 429 access ramp. This study area is entirely composed of soils that were excavated to reduce elevations and modify grades, or were excavated to create stormwater swales and a treatment pond. Although this area was historically mapped as Candler series, there are no natural

grades remaining within the FDOT ROW that have not been significantly altered by road building activities. Therefore, the soils within this study area cannot be identified as the Candler series.

Study Area 10 This study area is located between the eastbound I-4 travel lanes and SR 545. All portions of this study area are located within landscapes that were either excavated and graded to lower the slopes to create ponds, or were filled for ramps, bridge piers, or travel lanes. Although this area was historically mapped as Candler series, there are no natural grades remaining within the FDOT ROW that have not been significantly altered by road building activities. Therefore, the existing soils located within this study area cannot be identified as the Candler series.

Study Area 11 This study area is the eastern most segment of the I-4/SR429 interchange, and is bordered by SR545, westbound I-4 and the SR 429 access ramp to I-4, located between the eastbound I-4 travel lanes and SR 545. All portions of this study area are located within landscapes that were either excavated and graded to lower the existing slopes to create ponds, or were filled for ramps, bridge piers, or travel lanes. Although this area was historically mapped as Candler series, there are no natural grades remaining within the FDOT ROW that have not been significantly altered by road building activities. Therefore the existing soils within this study area cannot be identified as the Candler series.

Study Area 12 This study area is located along the east bound travel lanes of I-4, beginning at the SR 429 access ramp to west bound I-4, and continuing east approximately one-quarter mile and terminating at the eastern project limits. The portions of this study area are located adjacent to travel lanes that are composed of fill, with an excavated swale. Additional portions of the study area located east of the swale to the ROW fence do not appear to have been impacted by roadway filling and excavation activities and soil borings indicate profiles consistent with the Candler soil series. The portions of the study area with suitable sand skink soils were delineated and are shown in **Exhibit 3D**.

Study Area 13 This study area consists of the project I-4 median section from the intersection of SR 532 and I-4, to approximately one-quarter mile east of the intersection of I-4 and SR 429. The roadway median for this section of I-4 consists of a relatively continuous swale feature that intercepts and directs stormwater runoff from roadway surfaces. The median swale is an excavated system that is set at a lower elevation than the existing travel lanes. Although the median area was historically mapped as a Candler series, I-4 roadway construction activities have altered the soils so that these areas no longer can be classified as Candler series.

Study Area 14 This study area contains the stormwater treatment pond located one-quarter mile east of the I-4 and SR 429 interchange, and northwest of the westbound I-4 travel lanes. The existing stormwater treatment pond consists of constructed berms produced from fill material and stabilized with grass side slopes. The pond area is entirely constructed of excavated or fill material, and does not contain areas with natural soil profiles. Therefore, this study area does not contain soils suitable for sand skink habitat.

Study Area 15 This study area is located along the west bound travel lanes of I-4, beginning one-quarter mile east of the I-4 and SR 429 interchange, and continuing west to a small wetland depressional feature located east of SR 545. Portions of this study area located adjacent to travel lanes are composed of roadway fill material, with excavated swale and sideslope features. The portions of the study area northwest of the swale and cut sideslope features to the I-4 ROW fence have not been impacted by roadway construction activities and soil borings indicate profiles consistent with the Candler soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibit 3D**.

Study Area 16 This area is located along the west bound travel lanes of I-4, between SR 545 and a small wetland depressional feature just east of SR 545. Portions of this study area located adjacent to travel lanes are composed of roadway fill material, with excavated swale and side-slope features. The portions of the study area located northwest of the swale and cut side-slope features to the I-4 ROW fence have not been impacted by roadway construction activities and soil borings indicate profiles consistent with the Candler soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibit 3D**.

Study Area 17 This area is located along the eastern side-slope of the north side of SR 545 overpass at I-4. This entire study area is composed of either overpass side-slope, or compacted limerock roadway. Although this area was historically mapped as Candler series, all portions of this study area have been filled and there are no areas that were observed to contain suitable sand skink soils.

Study Area 18 This area is located along the west side-slope of the north side of SR 545 overpass at I-4.This entire study area is composed of a filled overpass side-slope. Although this area was historically mapped as Candler series, all portions of this study area were observed to have been filled and no areas were observed to contain suitable sand skink soils.

Study Area 19 This area is located along the east side of the northbound travel lanes of SR 429, beginning at the merge of the northbound SR 429 access ramp from west bound I-4 and continuing north approximately one-quarter mile, terminating at the northern project limits. The portions of this study area located adjacent to travel lanes are composed of fill, with an excavated swale. Portions of the study area east of the swale feature to the ROW fence do not appear to have been impacted by roadway filling and excavation activities and soil borings indicate profiles consistent with the Candler soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibits 3C and 3D.**

Study Area 20 This area is located in the north-eastern quadrant of the I-4/SR429 interchange and is bordered on the west by the westbound I-4 access ramp to SR 429 and on the east by the eastbound access ramp to SR 429. Most portions of this study area are located within landscapes that were either excavated and graded to lower slopes to create ponds, or were filled for ramps, bridge piers, or travel lanes. Although this area was historically mapped as Candler series, at this time there is only one area located at the eastern boundary of this study area that was identified to have not been significantly altered by road building activities and supports soils consistent with the Candler series (**Exhibit 3C**). The remaining portions of this study area cannot be identified as the Candler series.

Study Area 21 This study area is located in the north-western quadrant of the I-4/SR429 interchange and is bordered on the west by the westbound I-4 access ramp from SR 429, and on the east by the SR429 access ramp to eastbound I-4. All portions of this study area are located within landscapes that were either excavated and graded to lower slopes in order to create ponds, or were filled for ramps, bridge piers, or travel lanes. Although this area was historically mapped as Candler series, there are no field identified natural grades remaining within the study area that have not been significantly altered by road construction activities and therefore the soils within this area cannot be identified as the Candler series.

Study Area 22 This study area is located between the eastbound I-4 access ramp to SR 429 and the SR429 access ramp to westbound I-4. This entire study area is composed of filled overpass side-slope. Although this area was historically mapped as Candler series, all portions of this study area have been filled and field investigations indicate that there are no remaining areas with suitable sand skink soils.

Study Area 23 This study area is located along the southbound travel lanes of SR 429, north of the SR 429 and I-4 interchange. Portions of this study area located adjacent to travel lanes are composed of roadway fill material, with an excavated swale. However, the remaining portions of the study area located west of the swale to the SR 429 ROW fence have not been impacted by roadway construction activities and soil borings indicate profiles consistent with the Candler soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibit 3C**.

Study Area 24 This study area is the SR 429 median section, from the northern SR 429 project limits to the mapped limits of the Candler soil series. The roadway median for this section of SR 429 consists of a roadway swale that intercepts and directs stormwater runoff from roadway surfaces. The median swale appears to have been excavated and is set at a lower elevation than the SR 429 travel lanes. Although the median area was historically mapped as Candler series, SR 429 roadway construction activities have altered the soils so that these areas no longer can be classified as Candler series.

Study Area 25 This area is located along the west side of the SR 429 access ramp to westbound I-4. The portions of this study area located adjacent to travel lanes are composed of roadway fill material, with an excavated swale. In addition, there are excavated side-slopes, however the remaining portions of the study area between the cut side-slopes and SR 429 ROW fence have not been impacted by roadway construction activities and soil borings indicate profiles consistent with the Candler soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibit 3C**.

Study Area 26 This area is located in the western most quadrant of the I-4/SR429 interchange, and is bordered on the west by the SR 429 access ramp to westbound I-4, and on the east by the westbound travel lanes of I-4. All portions of this study area are located within landscapes that were either excavated and graded to lower slopes to create ponds, or were filled for ramps, or travel lanes. Although this area was historically mapped as Candler series, there are no natural grades that can be identified within the study area that have not been significantly altered by road building activities. Therefore, the soils within this area cannot be identified as the Candler series.

Study Area 27 This area is located along the west side of the SR 429 access ramp to westbound I-4. All portions of this study area were observed to contain fill material. In addition, this study area also contained an excavated swale and excavated side-slopes.

Study Area 28 This study area consists of a stormwater treatment pond located west of the I-4 travel lanes and bordered by a wetland system to southwest and a residential subdivision to the north. The stormwater treatment pond consists of a constructed bermed pond of fill material, containing grass sideslopes that adjoins a landscaped subdivision berm on the northeast. In addition to the stormwater pond, there is an excavated access area connecting to I-4. All portions of the study area have been filled or excavated and therefore does not support soil profiles consistent with the Candler series mapped for this area.

Study Area 29 This is a small study area located along westbound I-4 travel lanes bordered on the east and west by wetland features, and west of Study Area 28. Portions of this study area located adjacent to travel lanes are composed of fill, with an excavated swale. However, the remaining portion of the study area west of the swale to the ROW fence does not appear to have been impacted by roadway filling and excavation activities. This area contains suitable sand skink soils that were delineated and are shown in **Exhibit 3B.**

Study Area 30 This study area is located along the westbound travel lanes of I-4 just east of the of the SR 532 and I-4 interchange. Portions of this study area located adjacent to travel lanes are composed of roadway fill material, with an excavated swale. However, the remaining portions of the study area located west of the swale to the I-4 ROW fence have not been impacted by roadway construction activities and soil borings indicate profiles consistent with the Tavares soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibits 3A and 3B.**

Study Area 31 This study area is located along the westbound travel lanes of I-4, east of the SR 532 and I-4 interchange. Portions of the study area located adjacent to travel lanes are composed of roadway fill material, with an excavated swale. However, the remaining portions of the study area located west of the swale to the I-4 ROW fence have not been impacted by roadway construction activities and soil borings indicate profiles consistent with the Pomello soil series. The portions of the study area with suitable sand skink soils have been delineated and are shown in **Exhibit 3A**.

Study Area 32 Study area 32 is located adjacent to the westbound exit ramp to SR 532. This area is a relatively flat area that contains a herbaceous vegetative (mixed grasses and sedges) structure. A total of six (6) soil borings were performed within this study area, of which all bore locations reflected sandy surface soils with limestone material. It appears that all portions of this study area have been filled.

Study Area 33 This study area is located between the I-4 overpass of SR 532 and the westbound I-4 exit ramp to SR 523. The study area contains either overpass side-slope fill, or landscaped pond features with

simulated golf green and sand traps. All portions of this area have been filled and landscaped. There are no suitable sand skink soils within the study area.

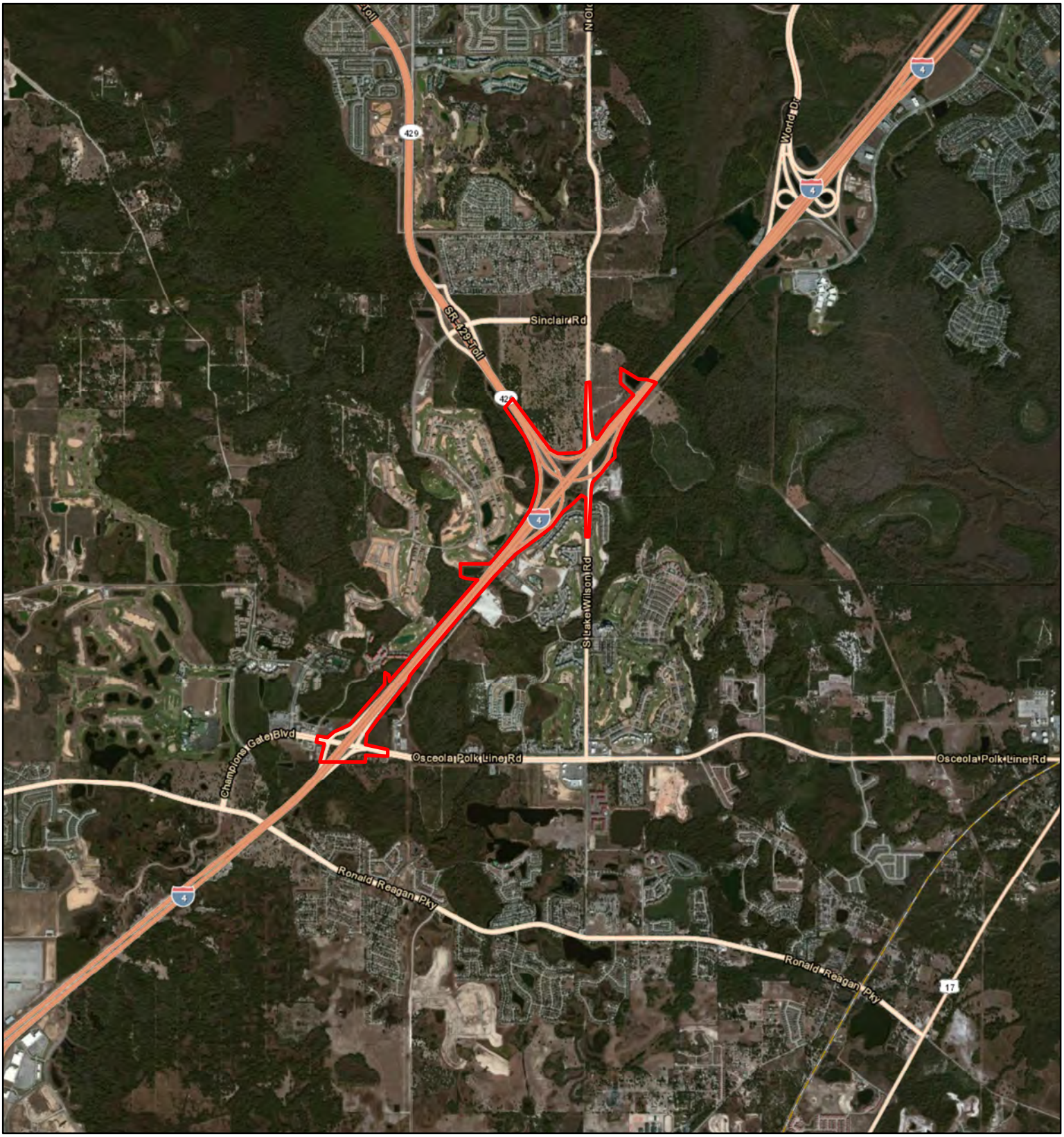
Study Area 34 This study area consists of a landscaped access ramp from SR 532 to westbound I-4. The area contains an excavated pond with irrigated landscaped buffers. There are no natural soils located within this area.

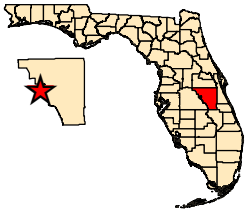
Study Area 35 This study area is located between the I-4 overpass of SR 532 and the SR 523 access ramp to westbound I-4. All portions of this area are either identified as overpass side-slope fill, or landscaped pond and ornamental planting areas. All portions of this area have been filled, and landscaped. There are no suitable sand skink soils within the study area.

Summary:

At the clients request, the project site as described above was investigated to identify potential areas that may have been subject to past soil alterations (filling, excavation, and excavation/filling) which may have sufficiently altered the soils such that they no longer exhibit surface or shallow surface characteristics for suitable Florida Sand Skink soils as identified by U.S. Fish and Wildlife Service (USFWS) within the Osceola County Consultation Area. In order to accurately describe the existing soil conditions within the project footprint, the entire project was separated into 35 study areas. These study areas were field reviewed and soil borings were undertaken where there was a reasonable probability that the soils in the area had been previously excavated (slope cuts, swales, ditches, ponds), filled (ramps, treatment pond berms, road beds), or excavation/filling due to roadway alterations, stormwater treatment areas or utility, lighting and/or signage features. Soil borings were also performed to verify areas where natural, unaltered suitable soils were mapped, and road construction activities appeared to have not impacted the soil surface. The soil series identified by USFWS as suitable sand skink habitat soils which have been mapped as occurring within the project area consists of: Candler, Pomello, and Tavares soil series.

Generally all areas immediately adjacent to paved road surfaces, constructed treatment ponds, ramps or bridge structures or created landscape buffers have all been subject to filling. In addition, areas that were subject to excavation for the creation of ponds, swales, ditches or sideslope contouring all exhibit truncated soil profiles. In some cases these area were also filled after excavation to achieve final grade of install limerock or road bedding material. Areas supporting soil profiles similar to the mapped soil units generally were located along or in close proximity to ROW limits or were located at the top of ridges where sideslope contouring had not taken place. The areas supporting the natural soil profiles were field delineated, and are shown in the report **Exhibit 3**.





Soil Site Investigation
Project Footprint Map

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

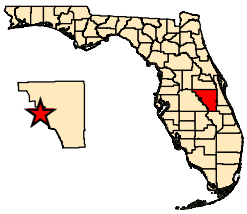
Project Footprint

Exhibit 1

1 inch = 4,000 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Survey Areas Overall

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

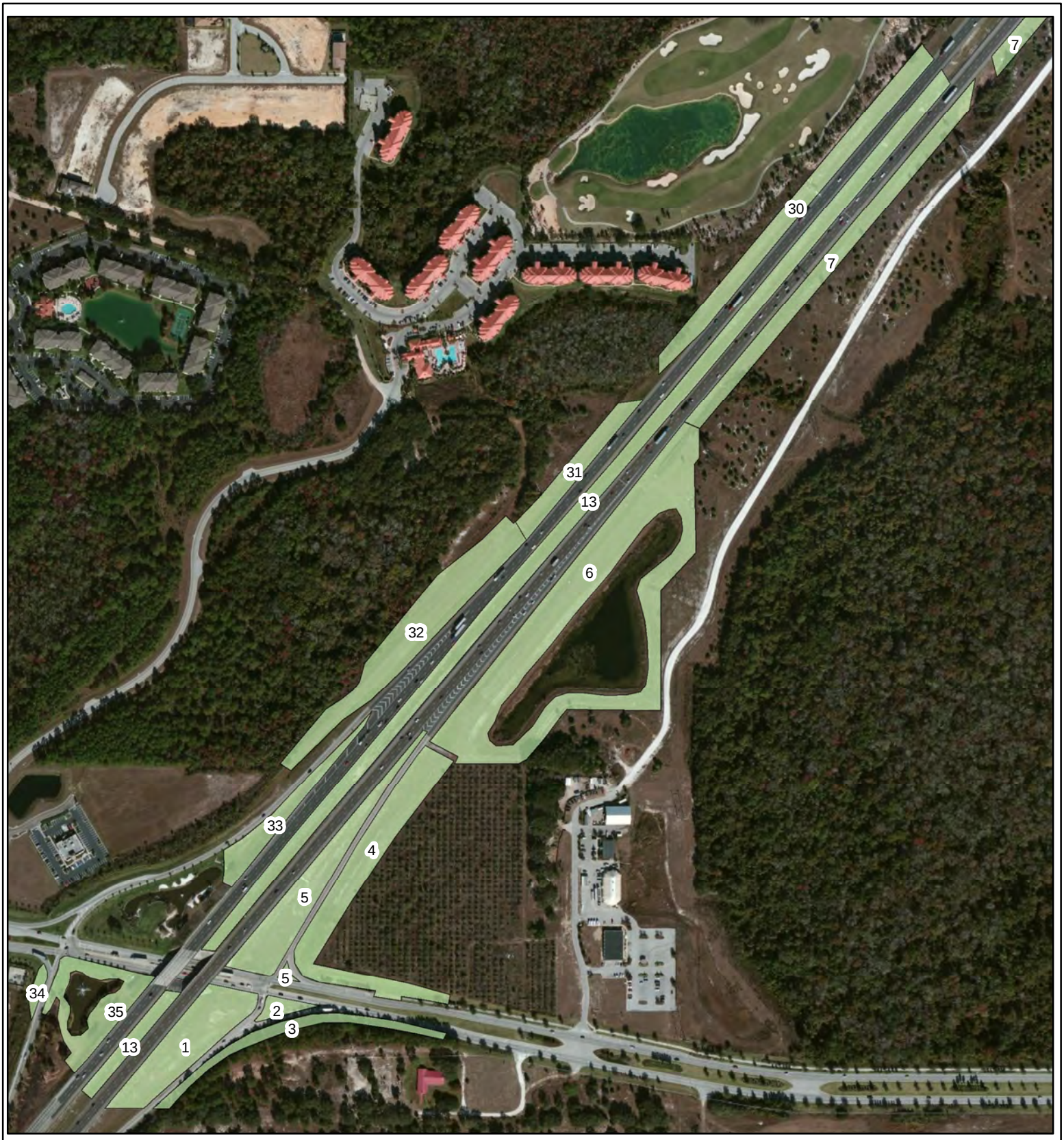
Soil Survey Areas

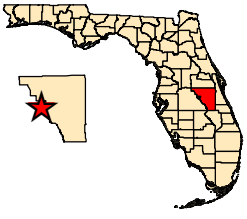
Exhibit 2

1 inch = 1,500 feet

Exhibit Date:
03.17.14

N





Soil Site Investigation
Soil Survey Areas

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

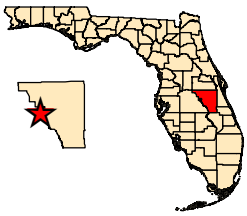
Soil Survey Areas

Exhibit 2A

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Survey Areas

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

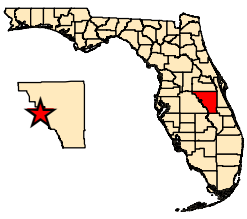
Soil Survey Areas

Exhibit 2B

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Survey Areas

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

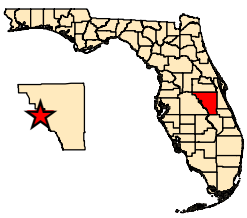
Soil Survey Areas

Exhibit 2C

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Survey Areas

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

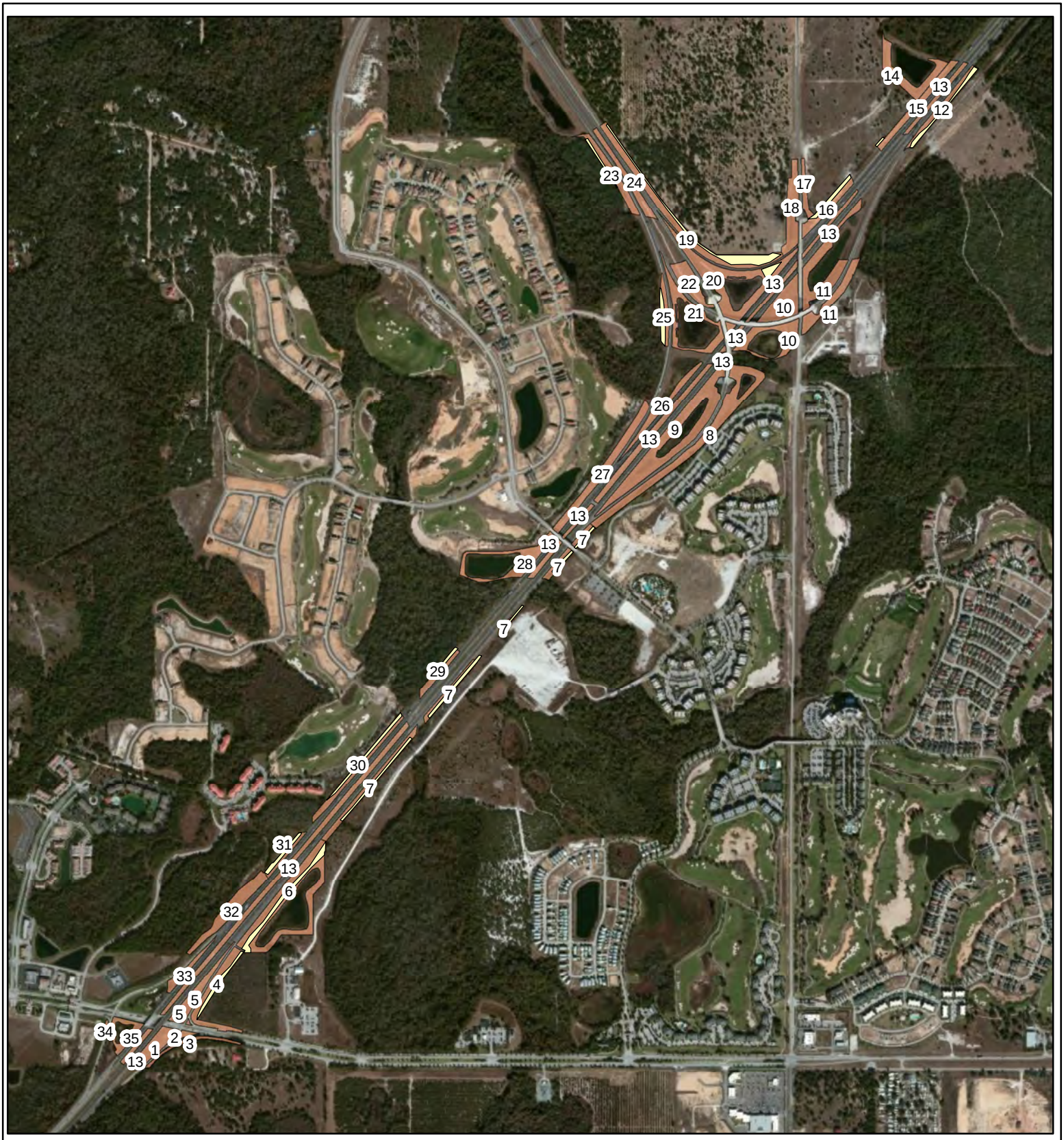
Soil Survey Areas

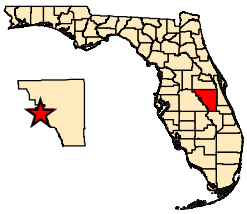
Exhibit 2D

1 inch = 500 feet

Exhibit Date:
03.17.14

N





Soil Site Investigation
Potential Sand Skink Habitat
Overall Map

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Potential Sand Skink Habitat

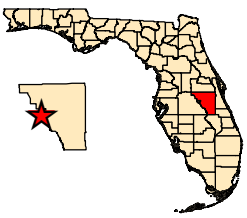
Unsuitable Sand Skink Habitat

Exhibit 3

1 inch = 1,500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Potential Sand Skink Habitat

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Potential Sand Skink Habitat

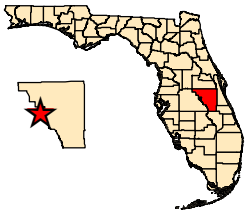
Unsuitable Sand Skink Habitat

Exhibit 3A

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Potential Sand Skink Habitat

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Potential Sand Skink Habitat

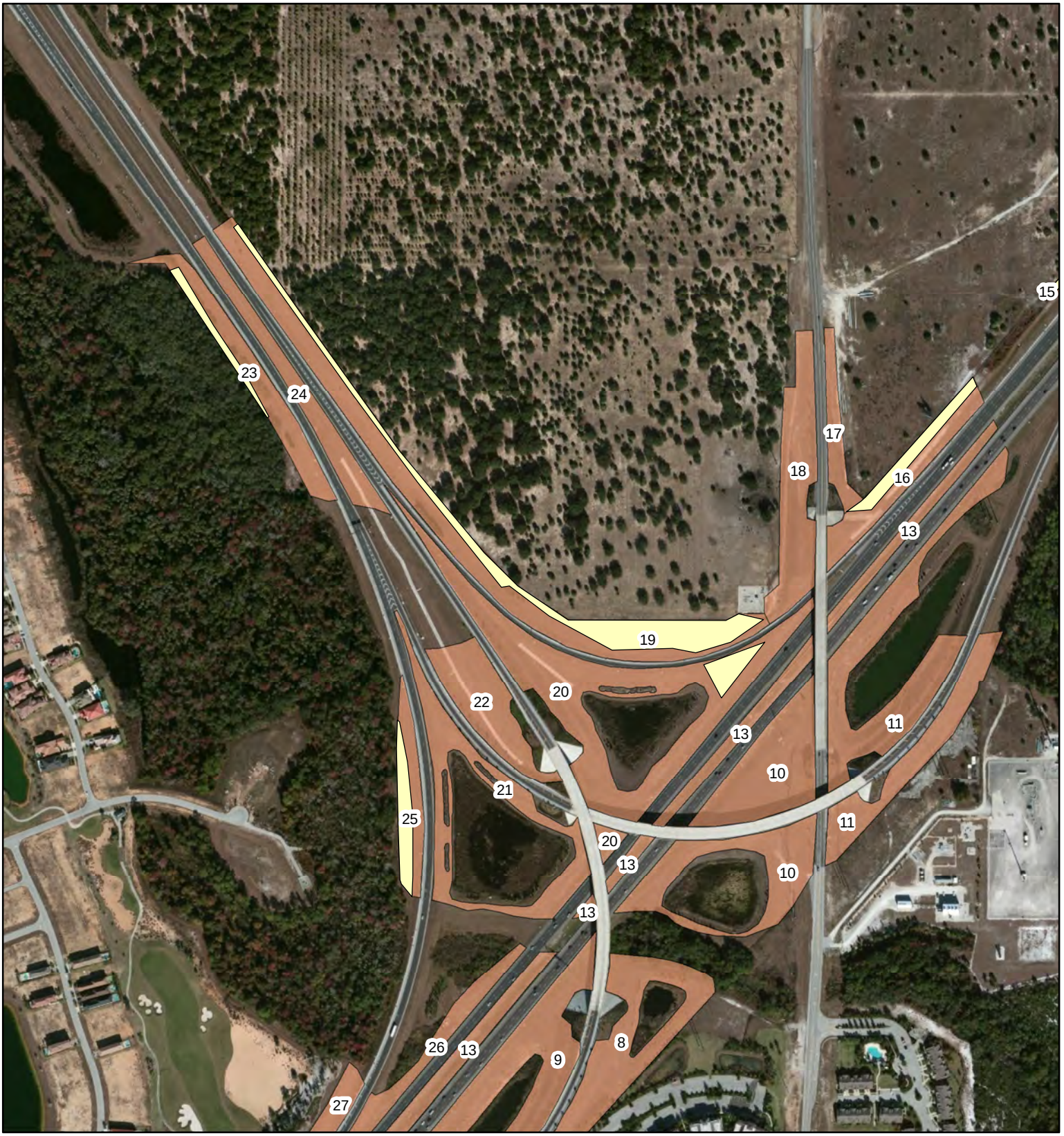
Unsuitable Sand Skink Habitat

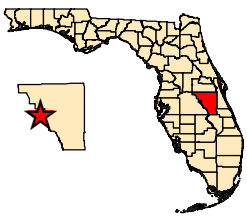
Exhibit 3B

1 inch = 500 feet

Exhibit Date:
03.17.14

N





Soil Site Investigation
Potential Sand Skink Habitat

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

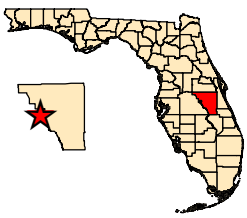
Potential Sand Skink Habitat
Unsuitable Sand Skink Habitat

Exhibit 3C

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Potential Sand Skink Habitat

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

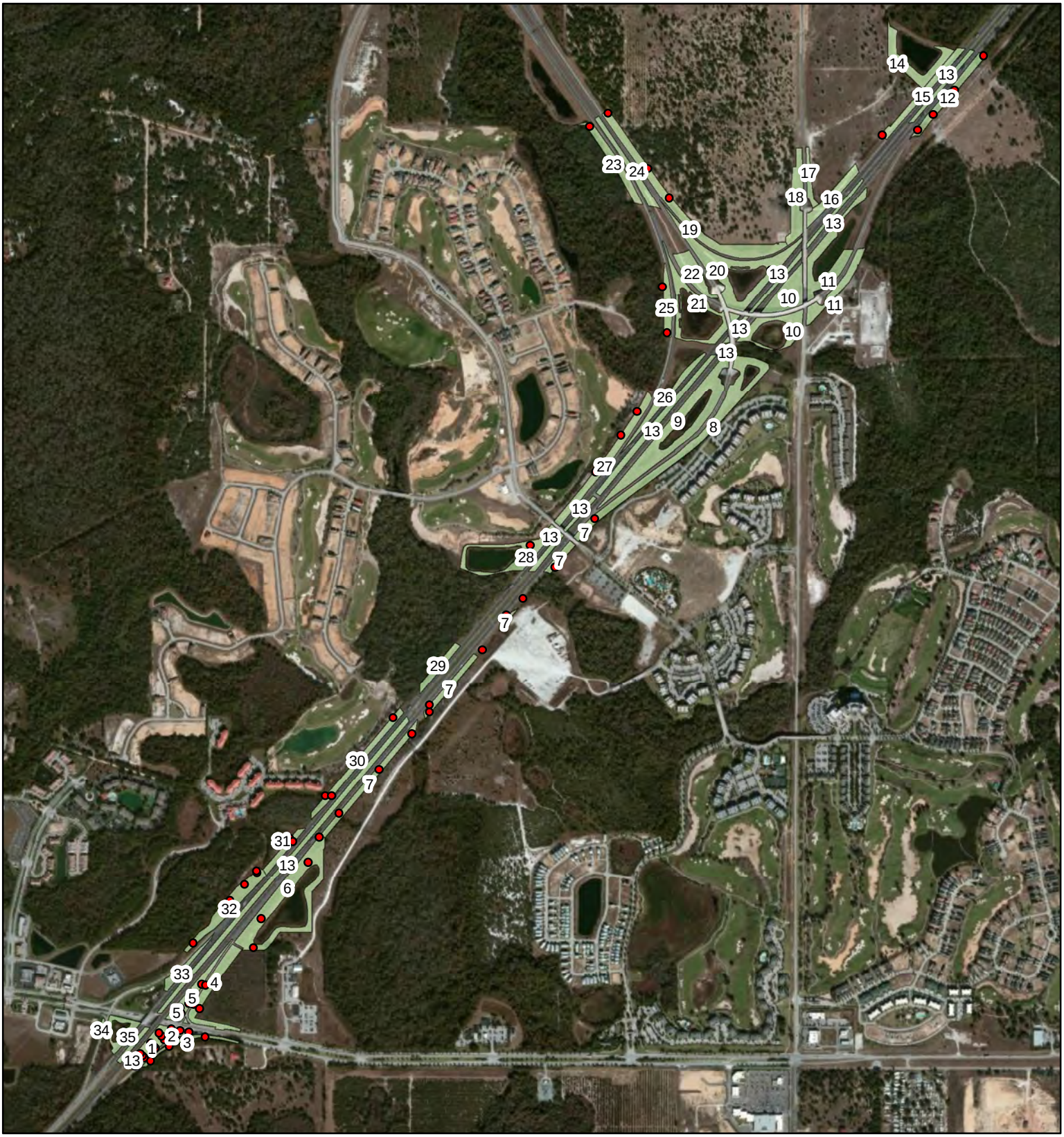
Potential Sand Skink Habitat
Unsuitable Sand Skink Habitat

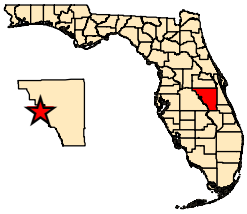
Exhibit 3D

1 inch = 500 feet

Exhibit Date:
03.17.14

N





Soil Site Investigation
Soil Borings
Overall Map

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Soil Borings

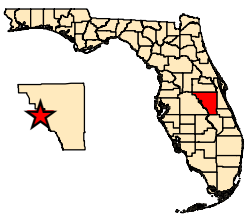
Soil Survey Areas

Exhibit 4

1 inch = 1,500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Borings

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Soil Borings

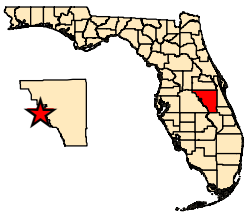
Soil Survey Areas

Exhibit 4A

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Borings

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Soil Borings

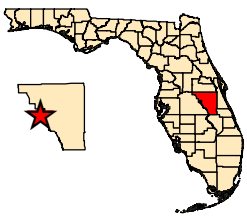
Soil Survey Areas

Exhibit 4B

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Borings

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Soil Borings

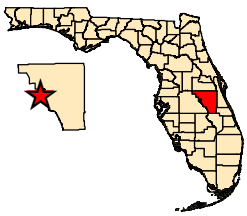
Soil Survey Areas

Exhibit 4C

1 inch = 500 feet

Exhibit Date:
03.17.14

N



Soil Site Investigation
Soil Borings

Florida Department of Transportation
District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Soil Borings

Soil Survey Areas

Exhibit 4D

1 inch = 500 feet

Exhibit Date:
03.17.14

N

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 1 facing SW

Area 2 facing NE

Area 3 facing NE

Area 4 facing N

Exhibit 5-1

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 5 facing S

Area 5 facing N

Area 6 facing E

Area 6 facing NE

Exhibit 5-2

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 7 facing NE

Area 7 facing NE

Area 7 facing NE

Area 7 facing NE

Exhibit 5-3

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 8 facing E

Area 8 facing NE

Area 9 facing SW

Area 9 facing NE

Exhibit 5-4

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 9 facing NE

Area 10 facing ESE

Area 10 facing NNE

Area 11 facing E

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 11 facing NE

Area 12 facing NE

Area 14 facing NW

Area 15 facing SW

Exhibit 5-6

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 16 facing SW

Area 17 facing N

Area 18 facing N

Area 19 facing W

Exhibit 5-7

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 20 facing SW

Area 21 facing NE

Area 22 facing W

Area 23 facing E

Exhibit 5-8

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 25 facing NE

Area 26 facing SW

Area 27 facing NW

Area 28 facing W

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 30 facing SW

Area 31 facing S

Area 32 facing NE

Area 33 facing SE

Florida Department of Transportation District 5
State Road 400 (I-4) and State Road 429
Osceola County, Florida

Area 34 facing S

Area 35 facing E

Area 35 facing S

Exhibit 6
SR 400 and SR 429, SOIL BORING DESCRIPTIONS

Soil Boring 1A - At this location it was determined that approximately 10 inches of fill has been placed for road building. The material consisted of sand and organic material.

Soil Boring 1B - At this location it was determined approximately 13 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 1C - At this location it was determined approximately 13 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 1D - At this location it was determined approximately 14 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 1E - At this location it was determined approximately 10 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 1F - At this location it was determined approximately 12 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 1G - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 1H - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 1I - At this location it was determined approximately 12 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 1J - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 1L - At this location it was determined approximately 10 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 1M - At this location it was determined approximately 11 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 2A - At this location it was determined approximately 8 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 2B - At this location it was determined approximately 13 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 2C - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 3A - At this location it was determined approximately 12 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 3B - At this location it was determined approximately 12 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 3C - At this location it was determined approximately 10 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 4A - At this location it was determined that the soil profile was consistent with the mapped soil unit Candler series.

Soil Boring 4B - At this location it appears the natural slope has been altered by excavation or grading resulting in a truncated soil profile with subsoil consistent with the Candler series observed at the surface.

Soil Boring 4C- At this location it was determined approximately 8 inches of fill has been placed for road building. The material consisted of sand and limestone materials (on loam, and clay).

Soil Boring 5A - At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with limestone material.

Soil Boring 5B - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 5C - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 5D - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 5E - At this location it was determined that fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 6A - At this location it was determined approximately 6 inches of fill has been placed for road building. The material consisted of sand and limestone materials.

Soil Boring 6B - At this location it was determined that the soil profile was consistent with the mapped soil unit Tavares series.

Soil Boring 6C - At this location it was determined that the soil profile was consistent with the soil map unit Candler series.

Soil Boring 7A - At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with limestone material with compacted limestone material below.

Soil Boring 7B- At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with limestone material with compacted limestone material below.

Soil Boring 7C- At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with limestone material with compacted limestone material below.

Soil Boring 7D - At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with limestone material with compacted limestone material below.

Area 8 - All excavated slope or swales for filled roadways or ramps.

Area 9 - All excavated slope or swale, or filled roadways and shoulders, ramps, ramp and bridge structures, stormwater treatment ponds, landscape planting areas.

Area 10 - All excavated pond or swales, or for filled roadway or road shoulders.

Area 11 - All excavated slope or swales for filled roadways or ramps.

Soil Boring 12A - At this location it was determined that the soil profile was consistent with the mapped soil unit Candler series.

Area 13 - Roadway median between east and west bound lanes, this area composed of roadway fill and excavated swale.

Area 14 - Treatment pond with filled berm, also excavated slope.

Area 15 - Roadside shoulder area fill, excavated sideslopes. Area along ROW fence exhibited soil profile consistent with Candler soil map unit.

Area 16 - Roadside shoulder area fill, excavated swale. Area along ROW fence exhibited soil profile consistent with Candler soil map unit.

Area 17 - Fill and pavement.

Area 18 - Fill mound adjacent to overpass ramp.

Area 19 - Area between road fill and ROW fence exhibited soil profile consistent with Candler soil map unit.

Area 20 - This area is dominated by a treatment pond and roadway fill, however the eastern portions contain soils consistent with the Candler series.

Area 21 - Ramp and roadway fill, excavated pond.

Area 22 - This area is filled ramp sideslope.

Area 23 - Area between road fill and ROW fence exhibited soil profile consistent with Candler soil map unit.

Area 24 - Roadway median, filled roadway shoulders and excavated swale.

Area 25 - Area between road fill and ROW fence exhibited soil profile consistent with Tavares soil map unit.

Area 26 - This area is located between filled I-4 travel lanes and filled SR 429 access ramp.

Soil boring 27A - At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 27B - At this location it was determined that approximately 3 inches of fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 27B - At this location it was determined that approximately 2- 3 inches of fill has been placed for road building. The material consisted of sand, with compacted limestone material.

Soil Boring 28A - At this location it was determined that approximately 6 inches of fill has been placed for road building. The material consisted of sand, with compacted limestone material. Also excavated pond and sideslopes.

Soil Boring 29 - Area between road fill and ROW fence exhibited soil profile consistent with Candler soil map unit.

Soil Boring 30A - Area between road fill and ROW fence exhibited soil profile consistent with Candler soil map unit.

Soil Boring 30B - At this location it was determined approximately 4-6 inches of fill has been placed for road building. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 31A - Area between road fill and ROW fence exhibited soil profile consistent with Candler soil map unit.

Soil Boring 31B - At this location (road shoulders) it was determined approximately 5-6 inches of fill has been placed for road building. The material consisted of sand and limestone material.

Soil Boring 32A - At this location it appears that 10 inches of fill has been placed. The material consisted of sand and organic materials.

Soil Boring 32B - At this location it appears that 5 inches of fill has been placed. The material consisted of sand and organic materials.

Soil Boring 32C - At this location it appears that 4 inches of fill have been placed. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 32D - At this location it appears that 4 inches of fill has been placed. The material consisted of sand and organic materials (on loam, and clay).

Soil Boring 32E - At this location it appears that 5 inches of fill has been placed. The material consisted of sand and organic materials (on loam, and clay).

Area 33 - This area is composed of filled I-4 overpass ramp and treatment pond, simulated golf green and landscaped buffers.

Area 34 - This area is a landscaped filled access ramp to I-4.

Area 35 - This area is composed of filled I-4 overpass ram, and treatment pond, maintained turf, and landscaped buffers.

2015 OSCEOLA COUNTY
SAND SKINK SURVEY MEMO

I-4 PD&E Segment 1 / Osceola County 2015 Supplemental Sand Skink Survey Memo Report

The Florida Department of Transportation (FDOT) is conducting an update/Re-evaluation of the PD&E studies for the extension of proposed express lanes for SR 400 (I-4). The project limits in the original PD&E studies were:

- West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line, (29.5 miles)
- CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway (13.7 miles), and
- West of SR 528 Beachline Expressway to SR 472 (43 miles).

The corresponding environmental documents associated with these PD&E studies include: Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line (FPN 201210, December 1998) and from CR 532 (Polk/Osceola County Line to West of SR 528 Beachline Expressway (FPN 242526 and 242483, December 1999) and Final Environmental Impact Statement (FEIS) for I-4 from SR 528 Beachline Expressway to SR 472 (FPN 242486, 242592 and 242703, August 2002, Record of Decision Pending). The project limits of the current SR 400 (I-4) PD&E study update/reevaluation include a total of approximately 43 miles of roadway sections east and west of the 21-mile, I-4 Ultimate project. The I-4 Ultimate project, which began construction in early 2015, is reconstruction to include new express lanes, of the section of I-4 that extends from west of SR 435 (Kirkman Road) to east of SR 434.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally speaking, the typical section will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with 12-foot inside and 10-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders, in each direction. A barrier wall in between the shoulders will separate the express lanes from the general use lanes. Three 12-foot auxiliary lanes will be provided in some areas in the eastbound direction and up to two auxiliary lanes will be provided in some locations in the westbound direction. Stormwater ponds will be included to provide treatment throughout the corridor.

The project area for this survey included potential right-of-way areas for pond sites and other improvements adjacent to the I-4 corridor for Segment 1 occurring within Osceola County, from I-4 west of CR 532 (Polk/Osceola County Line) to Osceola Parkway (the Orange/Osceola County Line). The survey area is depicted on the attached maps.

Survey Scope

Because the project area occurs within the USFWS Consultation Area for sand skinks (*Neoseps reynoldsi*) and blue-tailed mole skinks (*Eumeces egregious lividus*), both listed as federally threatened, there is a higher likelihood of skink occupancy within suitable habitats. No previous evidence of these listed skinks was noted in the original PD&E report from May 2000, nor was a species-specific survey performed. However, guidance from USFWS on the skink now classifies areas with skink soils as potential skink habitat (at or above elevation 82), whether or not natural xeric scrub habitat occurs over the soils. Skink

soils are found in excessively drained, well drained, and moderately well drained soils. Suitable soil types typically support scrub, sandhill, or xeric hammock natural communities. Areas over skink soils but altered for human uses present potential opportunities for skink habitat and include but are not limited to: pine plantations, active or inactive citrus groves, pastures, residential developments, and neglected vegetative cover like old fields and overgrown scrub. This sand skink survey, conducted by Stantec Consulting Services, Inc. (Stantec) is part of the same sand skink survey conducted by Stantec for this project in spring 2014, which surveyed current right-of-way and potential pond sites where potential skink habitat was present. Due to changes or modifications in plans for potential pond site acquisitions, additional sites required a sand skink survey in spring 2015. Two ponds sites (FPC 105A and FPC 103B) were added to the project area. Skink soils were mapped for the additional potential acquisitions to identify the areas of coverage that overlap with proposed pond site improvements (see **Figure A**). A pedestrian survey was conducted to identify suitable habitat at the new pond sites where skink soils are present and included searching for skink trails in areas of open sand. During this survey, it was determined that FPC 103B was nearly completed covered with asphalt and gravel, and contained no natural sandy soils. This area was subsequently eliminated from the survey. FPC 105A contained sandy soils with good habitat necessitating that a skink cover board survey would need to be performed over the entire footprint of the pond site in order to make a suitable determination on their involvement. The cover board survey was conducted according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012).

Spring 2014 Sand Skink Survey Summary

A coverboard survey was conducted per the USFWS Survey Protocol during the survey window of March 1st through May 15th, 2014 in all existing right-of-way or proposed acquisitions which were classified as potential sand skink habitat based on the presence of skink soils. A total of 17 areas comprising 11.68 acres were surveyed using a total of 553 coverboards for Segment 1 in Osceola County, Florida. No sand skinks or evidence of their presence were detected as a result of this survey. Many organisms and their tracks were encountered underneath coverboards, but no continuous sinusoidal tracks were found either under the coverboards or at any other place within the survey area.

Spring 2015 Survey Methodology

Per the USFWS Survey Protocol, the coverboard survey was conducted during the survey window of March 1st through May 15th. Oriented Strand Board (OSB) coverboards measuring 2’ x 2’ and 0.5 inches thick were placed in areas of bare sand or sparse vegetation to meet a minimum coverage of 40 boards per acre within the areas of suitable soils previously mapped out. A grid system was set up to pre-determine the board placement within each area (see **Figure B**), and the boards were placed in the field in the most suitable areas within the grids and each board was marked with a unique designation. Raking, grading, and manipulation of the soils and vegetation were conducted to ensure full contact of the coverboard with the soil surface. Areas with heavy coverage of grasses within the survey areas necessitated removal of vegetation to place the coverboards. Areas within mapped skink soils which were covered with excessively dense vegetation or compacted material other than sand were considered unsuitable for skink movement or detection and were eliminated from the survey.

Coverboards were placed beginning on March 10, 2015 and completed by March 11, 2015 and all boards were allowed to acclimate for a minimum of 12 days prior to the first sampling event. The first sampling event was conducted on March 23, 2015. Subsequent events occurred March 31 to April 1, April 8, and April 15. The coverboards were collected from the field on June 1 and 2. Data sheets were used to record field data during each survey event. These data sheets were used to generate consolidated information for each survey event.

Survey Area Description

One recently proposed pond site which was not surveyed in 2014 was determined to have suitable skink soils at elevations above 82 feet and have areas which were free of barriers to movement:

Floodplain Compensation Pond 105A – Pomello fine sand 0 – 5%, Candler sand 5 – 12%

Floodplain Compensation Pond 105A is located south of the interchange of SR 429 with Sinclair Road. Skink soils were determined to be present over the entire pond site (14.5 acres). The majority of the site has a moderately open canopy which consists of thinned planted pine with a few clusters of oaks. This part of the site has an understory and ground cover which consist primarily of lupine and prickly pear cactus with large patches of Cogon grass and some gopher apple, grape vine, passion flower, wiregrass, and Bahia grass. The southeastern portion of the site is densely wooded with scrub live oak with saw palmetto, pawpaw, lyonia, and grape vine. Areas of open sand free of canopy with minimal ground vegetation are present along an old vehicular trail between the planted pine and scrub oak areas, as well as along the southern edge of the site. A thick layer of duff and/or heavy growth of roots are present in the northern portion of the site and within the dense scrub live oak area.

Pond Site FPC 105A

Survey Results

Prior to the installation of coverboards at the site, pedestrian surveys resulted in the identification of several sand skink tracks along the open sandy vehicular trail, and were observed during each subsequent monitoring event. A total of 580 coverboards were installed at the 14.5 acre site, based on the pre-determined grid, for a density of 40 boards per acre. Once installed, coverboards were inspected for signs of sand skinks by lifting each board and visually inspecting the area beneath. After each inspection, the area under the board was smoothed out, and the boards were placed back down in the original position. During the first survey event, any boards with vegetation or debris still under them were raked, re-graded, and smoothed out.

Pond Site FPC 105A – sand skink tracks prior to coverboard installation

Event 1 – March 23, 2015

Early morning rain eliminated most tracks from the open sandy vehicular trail, but some remnant sand skink tracks were still present. Numerous false positive tracks were attributed to beetles, ant lions, millipedes, ants, scorpions, cockroaches, and other organisms which were observed occupying the space under coverboards. Sand skink tracks were positively identified under four (4) coverboards during this monitoring event. Several 5-lined skinks and 6-lined race runners were observed under other coverboards.

Pond Site FPC 105A – Monitoring Event 1, coverboard M18

Event 2 – March 31 and April 1, 2015

One sand skink was observed at the surface of the sand under coverboard J8, though no tracks were observed under coverboard. The animal quickly moved below the surface upon detection. Sand skink tracks were observed under an additional 28 coverboards. Numerous 6-lined racerunners, 5-lined skinks, and invertebrates were also observed under coverboards throughout the site.

Pond Site FPC 105A – Monitoring Event 2, coverboard L15

Event 3 – April 8, 2015

A total of 56 coverboards were determined to have sand skink tracks underneath them and another 4 coverboards had sand skink tracks nearby but not underneath. Sand skink individuals were briefly observed under boards L15, M17, and N1. Several 6-lined racerunners, 5-lined skinks, and numerous invertebrates were also observed under coverboards throughout the site.

Pond Site FPC 105A – Monitoring Event 3, coverboard J10

Event 4 – April 15 2015

A total of 110 coverboards were determined to have sand skink tracks underneath them and another 2 coverboards had sand skink tracks nearby but not underneath. Sand skink individuals were briefly observed under boards F26, and O22. Several 6-lined racerunners, 5-lined skinks, and numerous invertebrates were also observed under coverboards throughout the site.

Pond Site FPC 105A – Monitoring Event 4, coverboard J6

Survey Summary

Sand skink tracks were detected under 198 boards during the survey, with tracks also being observed adjacent or between 6 other boards. The total number of unique boards with positive hits was 145. A total of 6 individual sand skinks were observed under the coverboards. The estimated area of utilization by sand skink on the site is 2.77 acres, as shown on **Figure E**. The area of utilization was calculated by taking each positive identification of skink tracks at a board and extrapolating that over the entire grid (33' X 33') it was contained in, and linking up connecting grids with positive hits. Some areas without positive identifications were included as utilized habitat as they contain similar habitat as adjacent grids with positive hits and were located between areas with positive identifications and still contained suitable habitat. Areas without positive signs of skinks that did not contain suitable swimmable soils (they contained dense root masses from grasses and other vegetation) were excluded from the utilized habitat calculation.

Pond Site FPC 105A – sand skink diving into sand under coverboard O22

References:

FWS. 2012. Peninsular Florida Species Conservation and Consultation Guide, Sand Skink and Blue-tailed (Blue-tail) Mole Skink.

DATA SHEETS AND
DATA SHEET TABLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services Inc. Field Data Sheet

FPC 105A (SR 429)

Date:

Start Time:

End Time:

Temp:

Wind Speed/Direction:

Visibility:

Precipitation:

Biologists/Technicians:

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
A1		B14		D3		E2		E24	
A2		C1		D4		E3		E25	
A3		C2		D5		E4		F1	
A4		C3		D6		E5		F2	
A5		C4		D7		E6		F3	
A6		C5		D8		E7		F4	
A7		C6		D9		E8		F5	
A8		C7		D10		E9		F6	
A9		C8		D11		E10		F7	
B1		C9		D12		E11		F8	
B2		C10		D13		E12		F9	
B3		C11		D14		E13		F10	
B4		C12		D15		E14		F11	
B5		C13		D16		E15		F12	
B6		C14		D17		E16		F13	
B7		C15		D18		E17		F14	
B8		C16		D19		E18		F15	
B9		C17		D20		E19		F16	
B10		C18		D21		E20		F17	
B11		C19		D22		E21		F18	
B12		D1		D23		E22		F19	
B13		D2		E1		E23		F20	

NOTES:

EXAMPLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services Inc. Field Data Sheet

FPC 105A (SR 429)

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
F21		G23		H23		I21		J17	
F22		G24		H24		I22		J18	
F23		G25		H25		I23		J19	
F24		G26		H26		I24		J20	
F25		G27		H27		I25		J21	
F26		G28		H28		I26		J22	
F27		G29		H29		I27		J23	
F28		G30		H30		I28		J24	
G1		H1		H31		I29		J25	
G2		H2		H32		I30		J26	
G3		H3		I1		I31		J27	
G4		H4		I2		I32		J28	
G5		H5		I3		I33		J29	
G6		H6		I4		I34		J30	
G7		H7		I5		J1		J31	
G8		H8		I6		J2		J32	
G9		H9		I7		J3		J33	
G10		H10		I8		J4		J34	
G11		H11		I9		J5		J35	
G12		H12		I10		J6		J36	
G13		H13		I11		J7		K1	
G14		H14		I12		J8		K2	
G15		H15		I13		J9		K3	
G16		H16		I14		J10		K4	
G17		H17		I15		J11		K5	
G18		H18		I16		J12		K6	
G19		H19		I17		J13		K7	
G20		H20		I18		J14		K8	
G21		H21		I19		J15		K9	
G22		H22		I20		J16		K10	

NOTES:

EXAMPLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services Inc. Field Data Sheet

FPC 105A (SR 429)

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
K11		L2		L32		M21		N8	
K12		L3		L33		M22		N9	
K13		L4		L34		M23		N10	
K14		L5		L35		M24		N11	
K15		L6		L36		M25		N12	
K16		L7		L37		M26		N13	
K17		L8		L38		M27		N14	
K18		L9		L39		M28		N15	
K19		L10		L40		M29		N16	
K20		L11		L41		M30		N17	
K21		L12		M1		M31		N18	
K22		L13		M2		M32		N19	
K23		L14		M3		M33		N20	
K24		L15		M4		M34		N21	
K25		L16		M5		M35		N22	
K26		L17		M6		M36		N23	
K27		L18		M7		M37		N24	
K28		L19		M8		M38		N25	
K29		L20		M9		M39		N26	
K30		L21		M10		M40		N27	
K31		L22		M11		M41		N28	
K32		L23		M12		M42		N29	
K33		L24		M13		M43		N30	
K34		L25		M14		N1		N31	
K35		L26		M15		N2		N32	
K36		L27		M16		N3		N33	
K37		L28		M17		N4		N34	
K38		L29		M18		N5		N35	
K39		L30		M19		N6		N36	
L1		L31		M20		N7		N37	

NOTES:

EXAMPLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services Inc. Field Data Sheet

FPC 105A (SR 429)

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
N38		O25		P20		Q21		S8	
N39		O26		P21		Q22		S9	
N40		O27		P22		Q23		S10	
N41		O28		P23		Q24		S11	
N42		O29		P24		Q25		S12	
N43		O30		P25		Q26		S13	
O1		O31		P26		R1		S14	
O2		O32		P27		R2		S15	
O3		O33		P28		R3		T1	
O4		O34		P29		R4		T2	
O5		O35		Q1		R5		T3	
O6		P1		Q2		R6		T4	
O7		P2		Q3		R7		T5	
O8		P3		Q4		R8		T6	
O9		P4		Q5		R9		T7	
O10		P5		Q6		R10		T8	
O11		P6		Q7		R11		T9	
O12		P7		Q8		R12		T10	
O13		P8		Q9		R13		T11	
O14		P9		Q10		R14		T12	
O15		P10		Q11		R15		T13	
O16		P11		Q12		R16		U1	
O17		P12		Q13		R17		U2	
O18		P13		Q14		S1		U3	
O19		P14		Q15		S2		U4	
O20		P15		Q16		S3		U5	
O21		P16		Q17		S4		U6	
O22		P17		Q18		S5		U7	
O23		P18		Q19		S6		U8	
O24		P19		Q20		S7		U9	

NOTES:

EXAMPLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services Inc. Field Data Sheet

FPC 105A (SR 429)

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
U10									
U11									
V1									
V2									
V3									
V4									
V5									
V6									
V7									
V8									
W1									
W2									
W3									
W4									
W5									
X1									
X2									
X3									
Y1									
Y2									

EXAMPLE

NOTES:

Date:	3/23/2015	Survey Event:	1	Start Time:	10:24 AM	End Time:	12:32 PM
Start Temp:	78 F	End Temp:	85 F	Wind Speed/Direction:	0-5 E		
Visibility:	Partly Cloudy	Precipitation:	Intermittent light rain in AM, none in afternoon				
Sites Sampled (in order):	FPC 105A						
Biologists/Technicians:	Mike Holdsworth, Matt Leonard, Kevin Muldrew						
Observations:	Skink tracks were positively identified under coverboards B11, D2, M18, and M19 at FPC 105A. An eastern diamondback rattlesnake was observed near coverboard I26. Several 5-lined skinks, and numerous invertebrates were observed under coverboards at FPC 105A. Many of the invertebrates under coverboards, such as ant lions, cockroaches, beetles, and termites, appeared to leave tracks which could be mistaken for sand skink tracks.						

Date:	3/31/2015	Survey Event:	2	Start Time:	12:00 PM	End Time:	4:15 PM
Start Temp:	76 F	End Temp:	76 F	Wind Speed/Direction:	0-10 E		
Visibility:	Partly Cloudy	Precipitation:	None				
Sites Sampled (in order):	FPC 105A						
Biologists/Technicians:	Raymond Dennis, Kevin Muldrew						
Observations:	A sand skink was observed under coverboard J8, but no tracks were observed. Possible tracks were observed under coverboards L8 and L15, photos of each were taken for later identification. Numerous 6-lined racerunners, centipedes, a bark scorpion, and a skink with a blue tail was observed under other coverboards.						

Date:	4/1/2015	Survey Event:	2	Start Time:	8:30 AM	End Time:	12:15 PM
Start Temp:	72 F	End Temp:	82 F	Wind Speed/Direction:	5-10 W/NW		
Visibility:	Partly Cloudy	Precipitation:	None				
Sites Sampled:	FPC 105A						
Biologists/Technicians:	Raymond Dennis, Kevin Muldrew						
Observations:	Sand skink tracks were observed under coverboards M9, M10, M12, M17, M18, M20, M23, M24, M27, M41, N5, N6, N8, N9, N19, N20, N21, O2, O3, O12, O13, O15, O16, O22, P4, P14, and S10 at FPC 105A. Numerous 6-lined racerunners, centipedes, several bark scorpions, a broadhead skink, and a skink with a blue tail were observed under other coverboards. Numerous 6-lined racerunners and several broadhead skinks were observed under coverboards at						

Date:	4/8/2015	Survey Event:	3	Start Time:	8:45 AM	End Time:	3:35 PM

Start Temp:	73 F	End Temp:		Wind Speed/Direction:	5-10 NW
Visibility:	Clear	Precipitation:	None		
Sites Sampled:	FPC 105A				
Biologists/Technicians:	Mike Holdsworth, Kevin Muldrew				
Observations:	Sand skink tracks were positively identified under coverboards B6, D17, H7, I2, I15, J2, J6, J10, J11, J14, J16, J19, J25, K2, K17, K18, K19, K20, K22, K26, L3, L10, L11, L13, L14, L15, L16, L17, L18, L19, M7, M9, M10, M12, M17, M18, M20,				

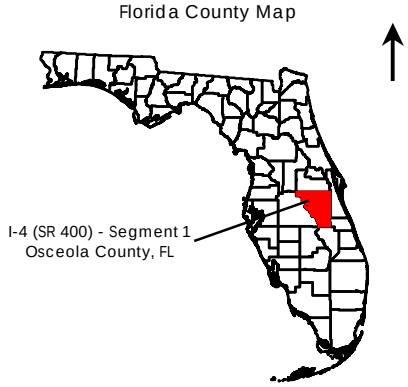
Date:	4/15/2015	Survey Event:	4	Start Time:	8:45 AM	End Time:	3:00 PM
Start Temp:	70 F	End Temp:		Wind Speed/Direction:	0-5 E		
Visibility:	Mostly Sunny	Precipitation:	None				
Sites Sampled:	FPC 105A						
Biologists/Technicians:	Mike Holdsworth, Kevin Muldrew, Raymond Dennis, Julia Millet						
Observations:	Sand skink tracks were positively identified under coverboards A2, A3, A6, A8, B6, B10, D13, D20, E2, E8, E11, E12, E19, E21, E25, F3, F9, F10, F19, F26, G2, G5, G6, G18, G19, G21, G29, H1, H7, H10, H11, H17, H18, H19, H24, I7, I10, I14, I15, I16, I18, I19, I22, I31, J6, J8, J10, J11, J12, J14, J15, J16, J17, J19, J25, K1, K10, K11, K12, K13, K14, K15, K16, K17, K18,						

FIGURES

I-4 (SR 400) PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY
BEYOND THE ULTIMATE

FDOT FM NO. 432100-1-22-01

Florida County Map



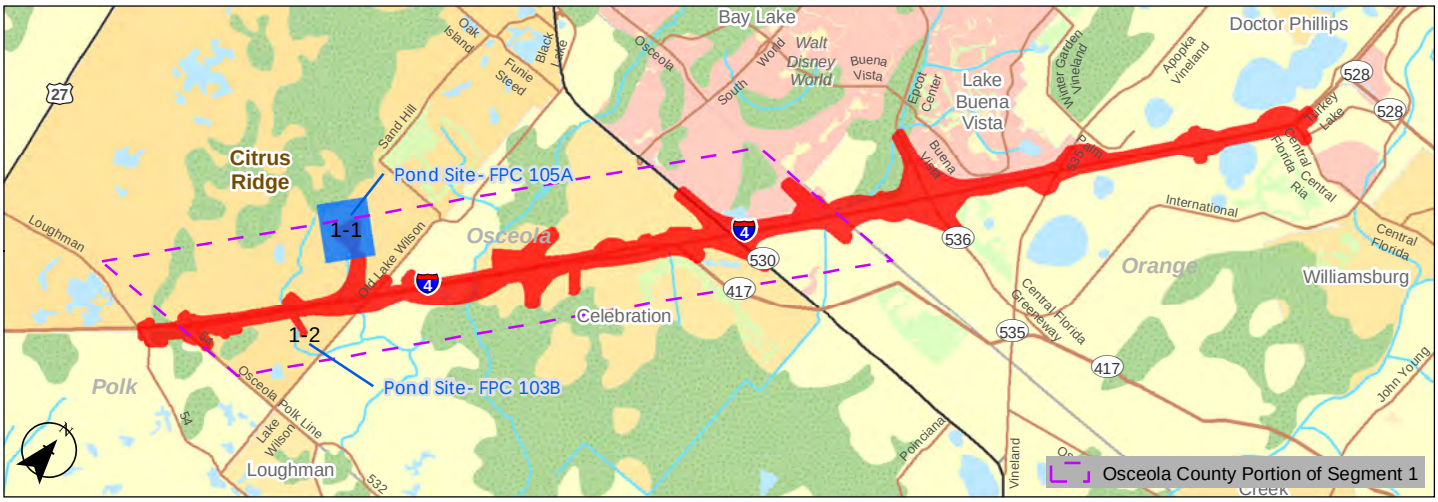
SAND SKINK (*NEOSEPS REYNOLDSI*)
2015 SUPPLEMENTAL SURVEY

SEGMENT 1: OSCEOLA COUNTY PORTION
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT:
Specific Species Survey Supplement
SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to
West of SR 528 Beachline Expressway

16320 Polk County	**92130 Osceola County**	75280 Orange County
Begin: STA 604+50.00 - MP 31.607	**Begin: STA 626.392 - MP 0.00**	Begin: STA 1042+95 - MP 0.00
End: STA 626+39.92 - MP 32.022	**End: STA 11042+95 - MP 7.885**	End: STA 1345.48.48 - MP 5.650

FIGURE NO.	SHEET NO.	MAP TITLE
Figure A	Single Sheet	NRCS Soils Map
Figure B	Single Sheet	Coverboard Grid Map
Figure C	Single Sheet	Coverboard Location Map
Figure D	Single Sheet	Sand Skink Occurrence Map
Figure E	Single Sheet	Sand Skink Utilization Map



1 " = 12,000 '

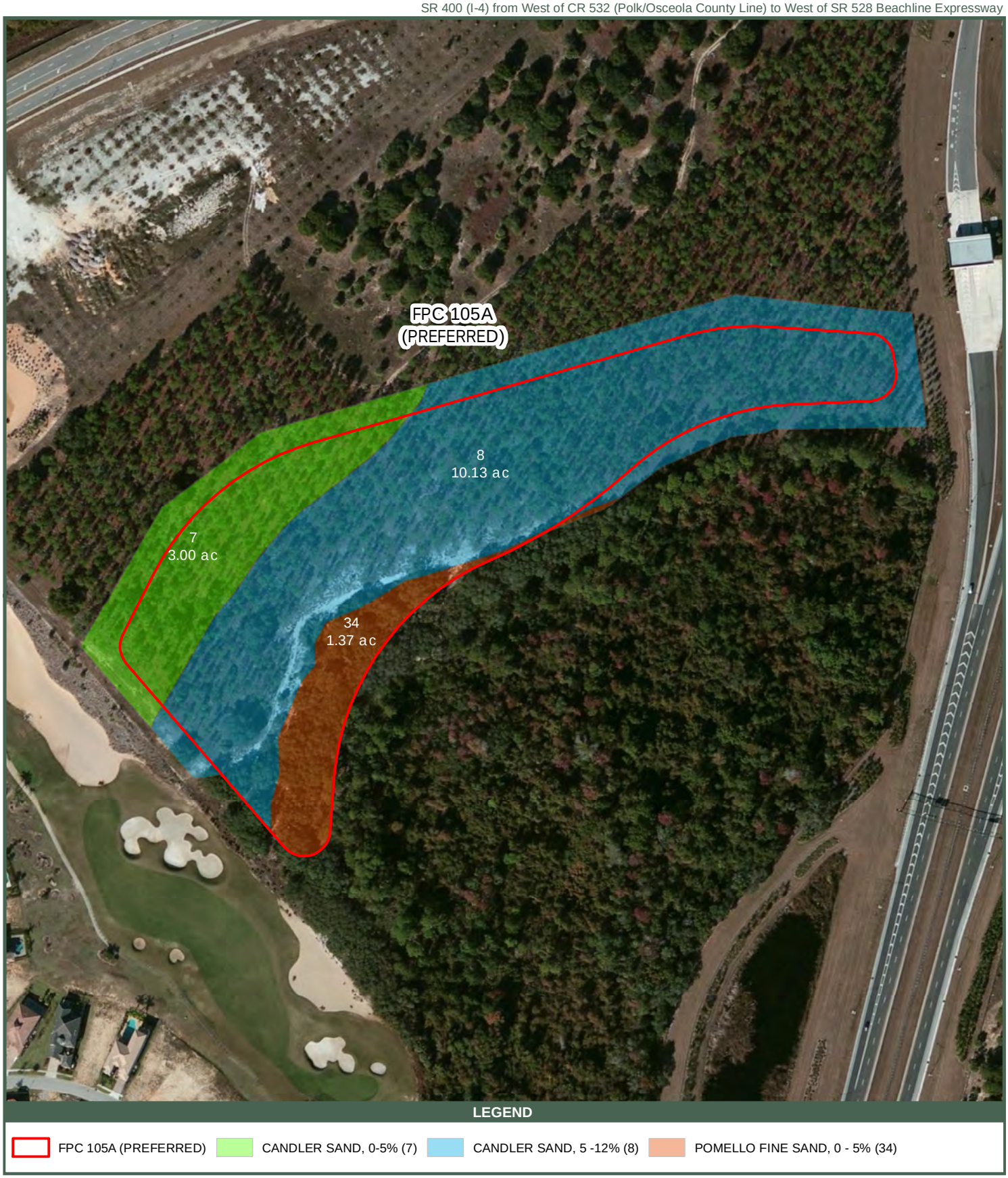


Figure A- NRCS Soils Map

2015 Sand Skink Survey
NRCS Soils Map

0 150 300 Feet

1 " = 250 '

Figure B- Coverboard Grid Map

0 90 180 Feet

2015 Sand Skink Survey
Coverboard Grid Map

1 " = 180 '

Figure C: Coverboard Location Map

0 90 180 Feet

2015 Sand Skink Survey
Coverboard Location Map

1 " = 180 '

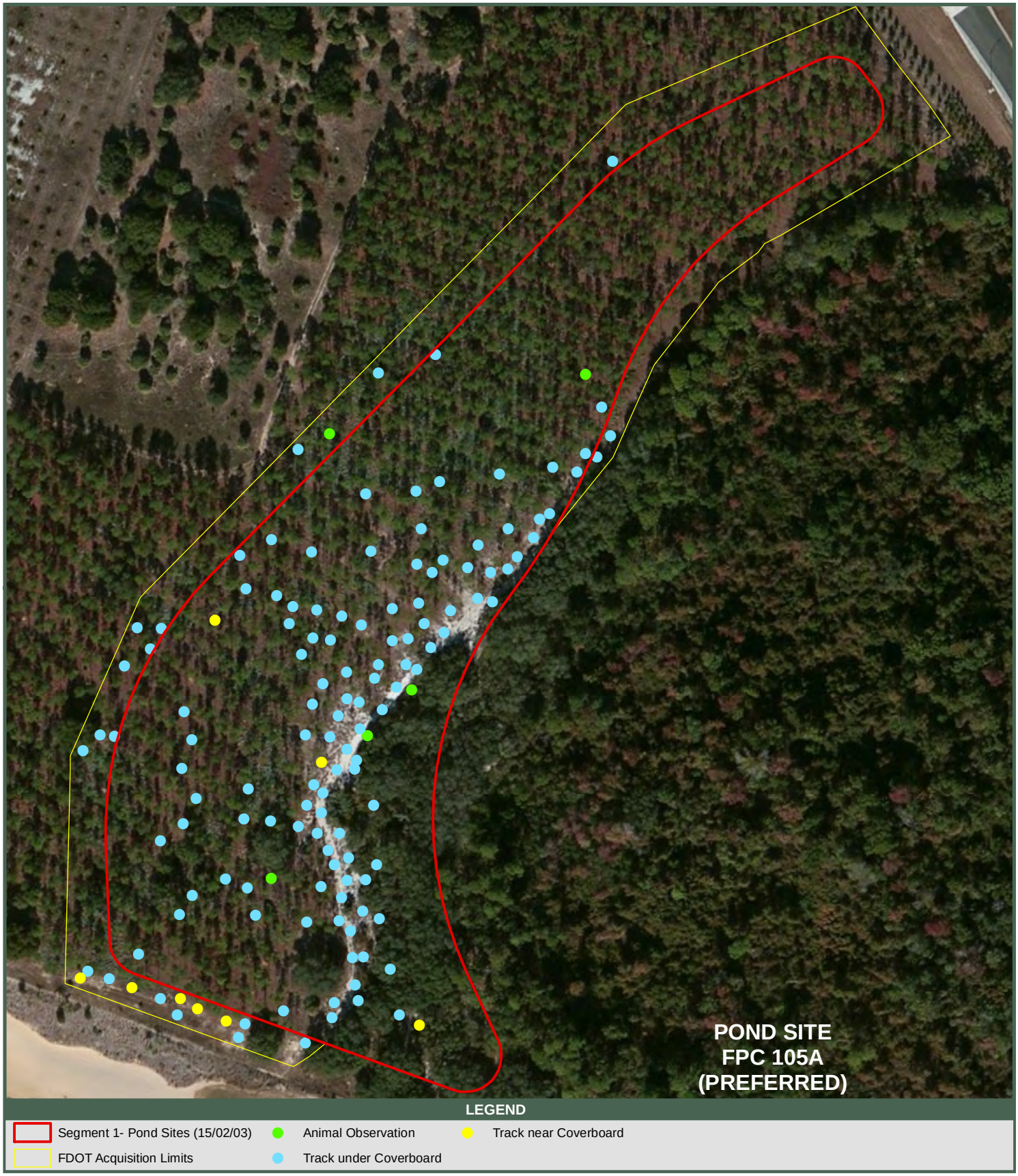


Figure D: Sand Skink Occurrence Map

0 90 180 Feet

2015 Sand Skink Survey
Sand Skink Occurrence Map

1 " = 180 '

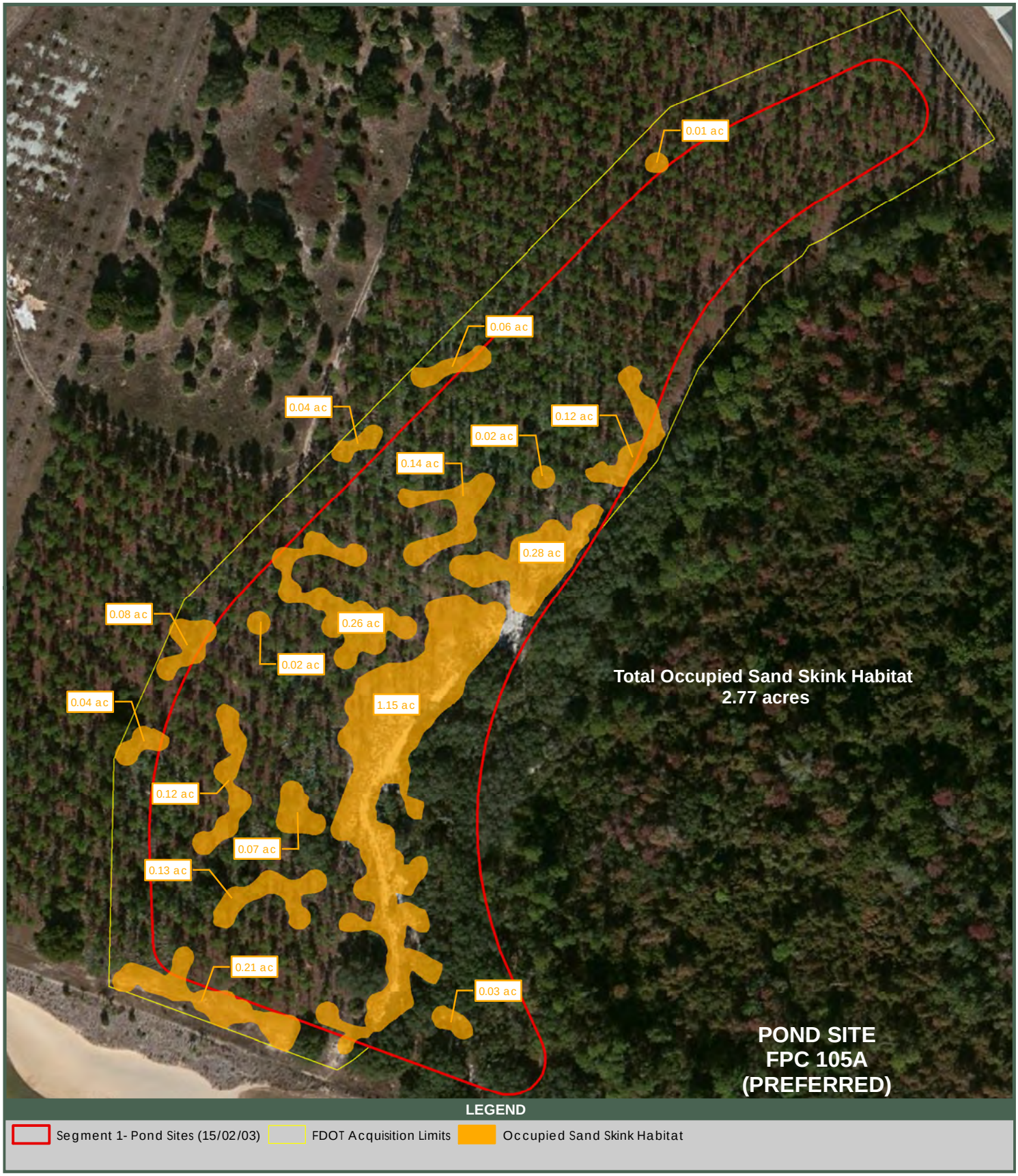


Figure E: Sand Skink Occupied Habitat Map

0 90 180 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat Map

1 " = 180 '

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2014 ORANGE COUNTY SAND SKINK MEMO REPORT

I-4 BtU PD&E Segment 1 2014 Orange County Sand Skink Survey Memo Report

Project Description and Background

The Florida Department of Transportation (FDOT) is conducting an update of the PD&E studies for the extension of express lanes for SR 400 (I-4). The project limits in the original PD&E studies were:

- CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway (13.7 miles), and
- West of SR 528 Beachline Expressway to SR 472 (43 miles).

The corresponding environmental documents include: Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line (FPN 201210, 1998) and from CR 532 (Polk/Osceola County Line to West of SR 528 Beachline Expressway (FPN 242526 and 242483, 1999) and Final Environmental Impact Statement (FEIS) for I-4 from SR 528 Beachline Expressway to SR 472 (FPN 242486, 242592 and 242703, 2002).

The re-evaluation study is being conducted to document changes to SR 400 (I-4) from CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway, including environmental and engineering analysis of the original design concept which showed two high occupancy vehicle (HOV) lanes, to the current proposed design, which includes four managed lanes operating under a variable price toll plan.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally speaking, the typical section will be consistent throughout Segments 1 and 2 and will have three 12-foot general use travel lanes with 12-foot inside and 10-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders, in each direction. A barrier wall in between the shoulders will separate the express lanes from the general use lanes. Three 12-foot auxiliary lanes will be provided in some areas in the eastbound direction and up to two auxiliary lanes will be provided in some locations in the westbound direction. Stormwater ponds will be included to provide treatment throughout the corridor.

The project area for this survey included the portions of Segment 1 and Segment 2 occurring within Orange County, from I-4 at Osceola Parkway to the SR 528 interchange, and the potential right-of-way areas for pond sites and other improvements adjacent to the I-4 corridor. Survey areas are depicted on the attached maps.

Survey Scope

Because the project area occurs within the US Fish and Wildlife Service (USFWS) Consultation Area for sand skinks (*Neoseps reynoldsi*), there is a higher likelihood of skink occupancy within suitable habitats. No previous evidence of skinks was noted in the original PD&E report from May 2000, nor was a species-

specific survey performed. However, the revised 2012 guidance from USFWS on the skink now classifies areas with skink soils above 82 feet elevation as potential skink habitat, whether or not natural xeric scrub habitat occurs over the soils. Skink soils are found in excessively drained, well drained, and moderately well drained soils. Suitable soil types typically support scrub, sandhill, or xeric hammock natural communities. Areas over skink soils but altered for human uses include but are not limited to pine plantations, active or inactive citrus groves, pastures, residential developments, and neglected vegetative cover like old fields and overgrown scrub, all present potential opportunities for skink habitat. For this project, the right-of-way and potential pond sites were surveyed for all potential listed wildlife species including skinks. A pedestrian survey was conducted to identify suitable habitat and included searching for skink trails in areas of open sand. Skink soils were also mapped for the project corridor to identify the areas of coverage that overlap with proposed roadway and pond site improvements. Coordination with USFWS staff indicated that a skink cover board survey would need to be performed over any areas of soil coverage within the project footprint that contained suitable soils ("swimmable soils"). Areas that contained thick vegetation and/or a dense root mass and did not contain loose open soils could be eliminated from the survey. Based upon the results of this study, the mapped soils were amended, and cover board surveys were subsequently conducted over any remaining areas that were determined to still contain suitable mapped skink soils. The cover board survey was conducted according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012).

Survey Methodology

Per the USFWS Survey Protocol, the coverboard survey was conducted during the survey window of March 1st through May 15th. Plywood coverboards measuring 2' x 2' and 0.5" thick were placed in areas of bare sand or sparse vegetation to meet a minimum coverage of 40 boards per acre (**See Table 1**) within the areas of suitable soils previously mapped out. A grid system was set up to pre-determine the board placement within each area, and the boards were placed in the field in the most suitable areas within the grids. Final positions of the boards were recorded with a Trimble GPS Unit, and each board was marked with a unique designation. Raking, grading, and manipulation of the soils and vegetation were conducted to ensure full contact of the coverboard with the soil surface. Areas with heavy coverage of grasses within the survey areas necessitated removal of vegetation to place the coverboards. Coverboards were placed beginning on March 24, 2014 and completed by April 8, 2014 and all boards were allowed to acclimate for a minimum of 7 days prior to the first sampling event. The first sampling event began on April 10, 2014 and was completed on April 16, 2014. Subsequent events occurred April 21-23, April 28-29, and May 5-6. The boards were collected from the field on May 21-22 and were checked informally for any signs of sand skinks.

Survey Area Descriptions

Each survey area was given a unique designation and is described as follows.

Unit A – St. Lucie fine sand 0 – 5%

Unit A consists of sand pines with some open sandy areas spread throughout. The coverage of sand pines is heaviest in the central portion of the site with more open sand along the eastern side and in the northwest corner.

Unit B – St. Lucie fine sand 0 – 5%

Unit B is a sand pine / scrubby area that has evidence of vegetative clearing within the last year. Most of the trees have been removed, and saw palmetto growth and ground cover are emerging. Open sandy areas are evident in patches throughout the site.

Unit C – St. Lucie fine sand 0 – 5%

Unit C is adjacent to Unit B, though it contains more sand pines, and does not appear to have been altered like Unit B. The northern portion of the site contains a heavy layer of duff and other vegetative material from past activities on the site. Open sandy areas are sparse; though do occur sporadically on the site. A portion of Unit C is on the adjacent property and occurs over sandy areas with pasture grasses and low herbaceous vegetation.

Unit D – St. Lucie fine sand 0 – 5%

Unit D is the site of a partially completed development that was abandoned. Asphalt paved roadways and a buried sewer system is in place, and the remaining areas are open sandy soils with pasture grasses and low herbaceous vegetation. Gopher tortoise burrows were observed in several places, and several larger pines are present. Planted sabal palms occur on the northern side of the site, and a small area of pines, oaks, and palmetto is in the center of the site.

Unit F – Tavares-Millhopper fine sand 0 – 5 %

Unit F occurs adjacent to the southeast corner of Unit A, outside of the right-of-way from the on-ramp to I-4 westbound at Central Florida Parkway. The area is primarily open sand with low herbaceous vegetation and scattered saw palmetto.

Unit G- St. Lucie fine sand 0 – 5%

Unit G occurs outside of the right-of-way to the south of Unit F north of the Fenton Street overpass. The area is open sandy soils with pasture grasses and scattered scrubby vegetation. Numerous scraps of old bill boards were on the ground at the base of the current bill board.

Unit H – St. Lucie fine sand 0 – 5%

Unit H is adjacent to Area G and extends outside of the right-of-way towards Palm Parkway. It contains primarily open sandy soils and scrubby vegetation. Areas of pasture grasses were found nearer to the right-of-way fence line. Several scrub lupines were observed on this site.

Unit I – Pomello fine sand 0 – 5%

Unit I is adjacent to the Fenton Street overpass on the north side outside of the right-of-way and consists of a dense canopy of sand pines, with several areas of open white sand. Scattered saw palmetto was present but little additional ground cover was observed.

Unit J – Pomello fine sand 0 – 5%

Unit J is outside of the right-of-way adjacent to the Fenton Street overpass on the south side and consists of scattered sand pines with areas of open sand and some low scrubby vegetation. A dense area of mixed pine and oak occurs at the eastern side of the site near the right-of-way fence line.

Unit K – Pomello fine sand 0 – 5%

Unit K is located outside of the right-of-way adjacent to the hotel complex on Palm Parkway south of Fenton Street and consists of a mix of sand pine scrub and open sandy areas. One scrub lupine was observed near the hotel.

Unit L – St. Lucie fine sand 0 – 5%

Unit L is located north of the Fenton Street overpass east of I-4 outside of the right-of-way that is currently used as a pasture for cattle grazing. The site is primarily grasses with open patches of sand and some low scrubby vegetation. Several scrub lupines were observed on this site.

Unit M – Pomello fine sand 0 -5%

Unit M is located to the southeast of Unit L and is part of the same pasture and contains patches of open sand and some low scrubby vegetation. Several gopher tortoise burrows were observed, as was a patch of scrub lupine.

Unit N – Pomello fine sand 0 – 5%

Unit N is to the south of Fenton Street outside of the right-of-way in another pasture used for cattle grazing. Several large live oaks were present, along with small patches of open sand and pasture grasses. The grasses had been compacted and contained a dense root mass throughout.

Unit O – St. Lucie fine sand 0 -5%

Unit O is a pasture to the south of Unit N outside of the right-of-way, containing pasture grasses and small areas of open sand. Much of the area was compacted soils. Several scrub lupines were observed in the pasture.

Unit P – Tavares-Millhopper fine sand 0 -5%

Unit P is located within the right-of-way and median of I-4 eastbound at the on-ramp from SR 536. It consists primarily of sand pine with a fairly dense canopy, and some open sandy areas mixed in with saw palmetto, wire grass, and low scrubby herbaceous vegetation. The maintained right-of-way is Bahia grass.

Unit Q – St. Lucie fine sand 0 -5%

Unit Q is located along the right-of-way of I-4 eastbound just north of Central Florida Parkway and consists of some low scrubby areas with mixed sand pine and saw palmetto with maintained Bahia grass near the roadway. Vegetation was dense with little open ground.

Unit R – St. Lucie fine sand 0 – 5%

Unit R is located along the right-of-way of the SR 528 off-ramp from I-4 eastbound to SR 528 eastbound. It consists of open sandy areas, Bahia grass, and some scrubby vegetation with sand pines.

Unit S- St. Lucie fine sand 0 -5%

Unit S is located along the right-of-way of I-4 westbound at the on-ramp from SR 528 westbound. It consists primarily of open sand and Bahia grass, with some sand pine and low scrubby vegetation.

Unit T – St. Lucie fine sand 0 – 5%

Unit T is located along the right-of-way of I-4 westbound south of the on-ramp from SR 528 westbound and consists primarily of open sand and Bahia grass.

Unit O-24 – Tavares-Millhopper fine sand 0 - 5%

Unit O-24 is located in the median between the off-ramp from I-4 westbound to SR 536 westbound, and the off-ramp from I-4 westbound to SR 536 eastbound and consists of Bahia grass adjacent to a heavily canopied pine forest.

Table 1 - Sand Skink Cover Board Survey				
Project Segment	Unit	Acreage	Number of Boards	Boards per Acre
1	A	**6.26***	**275**	**44**
2	B	**2.05**	**105**	**51**
2	C	**2.78**	**140**	**50**
2	D	**2.2**	**92**	**42**
1	F	**1.0***	**13 (27 damaged)**	**40**
1	G	**1.1**	**63**	**57**
1	H	**0.74**	**40**	**54**
1	I	**1.09**	**58**	**53**
1	J	**1.41**	**58**	**41**
1	K	**1.32**	**68**	**51**
1	L	**0.5**	**20**	**40**
1	M	**0.37**	**15**	**40**
1	N	**0.11**	**6**	**54**
1	O	**0.55**	**22**	**40**
1	P	**0.37**	**15**	**40**
2	Q	**0.21**	**11**	**52**
2	R	**0.42**	**25**	**59**
2	S	**0.24**	**10**	**41**
2	T	**0.19**	**10**	**52**
1	0-24	**0.02**	**1**	**50**

*Survey note: While conducting the survey, it was observed that development had begun within all of Unit A and a portion of Unit F. This development was a residential project (apartments) with approved permits from Orange County. After the boards were checked during week 1, clearing and grubbing activities began to take place and the site was prepared with silt fencing. By the time of the week 3 survey, these areas were completely cleared of all vegetation and were no longer accessible.

Survey Results

Cover boards were inspected for signs of sand skinks by lifting each board and visually inspecting the area beneath. After each inspection, the area under the board was smoothed out, and the boards were placed back down in the original position. During the first survey event, any boards with vegetation or debris still under them were raked, re-graded, and smoothed out. Any boards that were moved, damaged, or removed were noted on the data sheets

Survey Event 1 – April 10, 11, 14 and 16, 2014

Numerous 6-lined race runners were observed and several different types of curves and lines were observed under boards, but no sand skink tracks or other signs of sand skinks were identified. Southern toads, 5-lined skinks, eastern narrow-mouthed toads, and brown anoles were also observed. The tracks found under boards and in the surrounding sand were later identified as belonging to ant lions, crickets, race runners, and beetles, and were ruled out as being sand skink as they did not represent continuous sinusoidal movement.

Survey Event 2 – April 21, 22, and 23, 2014

Tracks from species identified above were observed under several boards, but no signs or tracks of sand skinks were observed. Eastern narrow-mouthed toads and 6-lined race runners were observed under numerous boards throughout the survey corridor.

Survey Event 3 – April 28 and 29, 2914

No signs of sand skinks were observed under any of the cover boards. Many 6-lined race runners and eastern narrow-mouthed toads were observed, as were several pine bark scorpions.

Survey Event 4 – May 5 and 6, 2014

No signs of sand skinks were observed under any of the cover boards. 6-lined race runners and eastern narrow-mouthed toads were common under the boards throughout the survey area.

Survey Summary

No sand skinks or evidence of sand skinks was observed during the survey. Many different types of species were encountered, but no continuous sinusoidal tracks were found either under the cover boards or at any other place within the survey area.

References:

US Fish and Wildlife Service, Peninsular Florida Species Conservation and Consultation Guide, Sand Skink and Blue-Tailed Mole Skink, 2012

2015 ORANGE COUNTY
SAND SKINK MEMO REPORT

I-4 PD&E Segment 1/Orange County 2015 Supplemental Sand Skink Survey Memo Report

Project Description

The Florida Department of Transportation (FDOT) is conducting an update/reevaluation for the Project Development and Environment (PD&E) studies for the extension of proposed express lanes for State Road 400 (SR 400)/Interstate 4 (I-4). The project limits in the original PD&E studies were:

- West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line, (29.5 miles)
- CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway (13.7 miles), and
- West of SR 528 Beachline Expressway to SR 472 (43 miles).

The corresponding environmental documents associated with these PD&E studies include: Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line [FPN 201210 (1998)] and from CR 532 (Polk/Osceola County Line) to West of SR 528 (Beachline Expressway) [FPN 242526 and 242483 (1999)] and Final Environmental Impact Statement (FEIS) for I-4 from SR 528 (Beachline Expressway) to SR 472 [FPN 242486, 242592 and 242703 (2002)].

The project limits of the current SR 400 (I-4) PD&E reevaluation, herein referred to as I-4 Beyond the Ultimate (BtU) PD&E Reevaluation Study, include a total of approximately 43 miles of roadway sections east and west of the 21-mile, I-4 Ultimate project. The I-4 Ultimate project consists of reconstruction, to include new express lanes, for the section of I-4 which extends from west of SR 435 (Kirkman Road) to east of SR 434, and began construction in early 2015.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally speaking, the typical section will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with 12-foot inside and 10-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders, in each direction. A barrier wall in between the shoulders will separate the express lanes from the general use lanes. Three 12-foot auxiliary lanes will be provided in some areas in the eastbound direction and up to two auxiliary lanes will be provided in some locations in the westbound direction. Stormwater ponds will be included to provide treatment throughout the corridor.

The project area for this survey included potential right-of-way areas for pond sites and other improvements adjacent to the I-4 corridor for Segment 1 occurring within Orange County, from I-4 at the Orange/Osceola county line to west of SR 528 (Beachline Expressway). Survey areas are depicted on the attached maps.

Survey Scope

Because the project area occurs within the USFWS Consultation Area for sand skinks (*Neoseps reynoldsi*) which are listed as federally threatened, there is a higher likelihood of skink occupancy within suitable habitats. No previous evidence of listed skinks was noted in the original PD&E report from May 2000,

nor was a species-specific survey performed. However, guidance from USFWS on the skinks now classifies areas with skink soils as potential skink habitat (at or above elevation 82), whether or not natural xeric scrub habitat occurs over the soils. Skink soils are found in excessively drained, well drained, and moderately well drained soils. Suitable soil types typically support scrub, sandhill, or xeric hammock natural communities. Areas over skink soils but altered for human uses present potential opportunities for skink habitat and include but are not limited to: pine plantations, active or inactive citrus groves, pastures, residential developments, and neglected vegetative cover like old fields and overgrown scrub. This sand skink survey is a continuation of the same sand skink survey conducted for this project in spring 2014, which surveyed the current right-of-way and potential pond sites where potential skink habitat was present. Due to changes or modifications in plans for potential pond site acquisitions, additional sites required a sand skink survey in spring 2015. Two sites (Pond Site 136A and Pond Site 142B) were added to the previous project area and were included in this survey. Skink soils were mapped for the additional potential acquisitions to identify the areas of coverage that overlap with proposed pond site improvements (see **Figure A**). A pedestrian survey was conducted to identify suitable habitat at the new pond sites where skink soils are present and included searching for skink trails in areas of open sand. Coordination with USFWS staff indicated that a skink coverboard survey would need to be performed over all areas of soil coverage within the footprint of two new potential pond sites in order to make a suitable determination on their involvement. The coverboard survey was conducted according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012).

Spring 2014 Sand Skink Survey Summary

A coverboard survey was conducted per the USFWS Survey Protocol during the survey window of March 1st through May 15th, 2014 in all existing right-of-way or proposed acquisitions which were classified as potential sand skink habitat based on the presence of skink soils. A total of 13 areas comprising 14.84 acres were surveyed using a total of 668 coverboards for Segment 1 in Orange County, Florida. No sand skinks or evidence of their presence were detected as a result of this survey. Many organisms and their tracks were encountered underneath coverboards, but no continuous sinusoidal tracks were found either under the coverboards or at any other place within the survey area.

Spring 2015 Survey Methodology

Per the USFWS Survey Protocol, the coverboard survey was conducted during the survey window of March 1st through May 15th. Oriented strand board (OSB) coverboards measuring 2’ x 2’ and 0.5 inches thick were placed in areas of bare sand or sparse vegetation to meet a minimum coverage of forty (40) boards per acre within the areas of suitable soils previously mapped out. A grid system, which was set up to evenly distribute forty (40) coverboards per acre, was used to pre-determine the board placement within each area. The coverboards were placed in the field in the most suitable areas within the grids and each board was marked with a unique designation which corresponded with the pre-determined grid position. Raking, grading, and manipulation of the soils and vegetation were conducted to ensure full contact of the coverboard with the soil surface. Areas with heavy coverage of grasses within the survey areas necessitated removal of vegetation to place the coverboards. Areas within mapped skink

soils which were covered with excessively dense vegetation or compacted material other than sand were considered unsuitable for skink movement or detection and were eliminated from the survey. Coverboards were placed on March 12, 2015 and all boards were allowed to acclimate prior to the first survey event. The first survey event was conducted on March 23, 2015. Subsequent events occurred April 1, April 9, and April 16. The coverboards were collected from the field upon completion of the survey. Data sheets were used to record field data during each survey event. These data sheets were used to generate consolidated information for each survey event.

Survey Area Descriptions

Two recently proposed pond sites which were not surveyed in 2014 were determined to have suitable skink soils at elevations above 82 feet and have areas which were free of barriers to movement. Each site is described below and a map of each site is provided.

<u>Pond 136A – Archbold fine sand 0 – 5%</u>

Pond 136A is located to the east of the right-of-way between the interchanges at SR 536 and SR 535. Skink soils were determined to be present over the majority of the eastern half of the site (2.59 acres). The site is part of an unfinished development which still has compacted clay roads and evidence of human manipulation. The majority of the site is a mix of open sandy patches with widespread Cogon grass and patches of Bahia grass and prickly pear cactus. Small clusters of vegetation consisting primarily of a mix of oaks, pines, cabbage palms, and vines are located throughout the site. Several patches of extremely dense oak and cabbage palm, along with areas where the compacted clay roads were present were excluded from the survey at this site, which reduced the surveyed acreage to 2.0 acres. Eighty (80) coverboards were placed on the site, for a density of forty (40) coverboards per acre. Four supplemental coverboards were installed in a patch of open sand to the southeast of the site, where habitat conditions appeared more favorable for detecting sand skink presence.

Pond Site 136A

Pond 142B – Tavares-Millhopper fine sands 0 – 5%, Tavares fine sand 0 – 5%

Pond 142B is located to the west of the right-of-way, along Palm Parkway, just south of Central Florida Parkway. Skink soils were determined to be present over a small portion of the eastern edge of the pond site, near the central and northern parts of the site. The eastern portion of the site where skink soils are present is part of a furrowed field where young pines have been planted, but is dominated by weedy herbaceous species and Bahia grass. The northern portion of the site where skink soils are present is primarily comprised of sand pine and Brazilian pepper, with some Bahia grass and weedy herbaceous vegetation. Part of the northern portion of the site where mapped skink soils were present was covered with construction debris and dense vegetation, which reduced the total surveyed acreage at the site to 0.62 acres. Twenty-five (25) coverboards were placed on the site, for a density of forty (40) coverboards per acre.

Pond Site 142B

Survey Results

Prior to the installation of coverboards at the sites, pedestrian surveys of open sandy areas did not result in the identification of any sand skink tracks. A total of eighty four (84) coverboards were installed at Pond Site 136A, and a total of twenty five (25) coverboards were installed at Pond Site 142B. Once installed, coverboards were inspected for signs of sand skinks by lifting each coverboard and visually inspecting the area beneath. After each inspection, the area under the coverboard was smoothed out, if needed, and the coverboards were placed back down in the original position. During the first survey event, any coverboards with vegetation or debris still under them were raked, re-graded, and smoothed out.

Event 1 – March 23, 2015

Early morning rain eliminated most tracks visible on open sandy areas within the survey area. Several false positive tracks were attributed to ant lions, cockroaches, and other organisms which were observed occupying the space under coverboards. No sand skink tracks were observed under any of the coverboards. Several six-lined race runners (*Aspidoscelis sexlineata*) were observed under other coverboards.

Pond Site 142B - Six Lined Race Runner

Event 2 – April 1, 2015

Numerous 6-lined racerunners and two broadhead skinks (*Plestiodon laticeps*) were observed under coverboards. No sand skink tracks were observed under any of the coverboards or in patches of open sand at either pond site.

Event 3 – April 9, 2015

Two southeastern five-lined skinks (*Plestiodon inexpectatus*) and a six-lined racerunner were observed under coverboards. A track from an organism which resembles the sinusoidal movement of sand skinks was observed under coverboard J9 at Pond Site 136A. This track was determined to be a false positive for the detection of sand skinks due to the inconsistencies in the sinusoidal track that included a turn on the left side of the track, the linear portion of the track to the right lower side of the track, and a 90 degree arc within the sinusoidal movement near the middle right of the track (see photo below). No tracks in the sand were visible in the open areas surrounding coverboard J9. This track was likely left by an organism which may briefly move in sinusoidal movements, but does not strictly move this way such as a snake or ant lion. No sand skink tracks were observed under any of the coverboards or in patches of open sand at either pond site.

Pond Site 136A – coverboard J9 false positive

Event 4 – April 16, 2015

A Florida crowned snake (*Tantilla relicta*) was observed under coverboard K9 at pond site 136A which left tracks similar to sand skinks. The only lizard observed at either site was a six-lined racerunner at Pond Site 142B. No sand skink tracks were observed under any of the coverboards or in patches of open sand at either pond site.

Pond Site 136A – Florida crowned snake under coverboard K6

Survey Summary

No sand skinks or evidence of sand skinks were observed during the survey. Tracks from numerous organisms were encountered, but no continuous sinusoidal tracks were found either under the coverboards or any other open sandy areas within the survey area. Compacted clay roads at Pond Site 136A, construction debris at Pond Site 142B, and areas of excessively dense vegetation at both pond sites were determined to be barriers to movement for sand skinks, and these areas were subtracted from the overall suitable skink habitat based on the mapped soil type. During the 3rd monitoring event, a

track which resembles that of a sand skink was observed under coverboard J9 at Pond Site 136A. This track was determined to be a false positive based on erratic, non-continuous sinusoidal movement and the lack of any other signs of sand skinks in the immediate vicinity. A burrowing snake, the Florida crowned snake, was observed under a nearby coverboard. This snake, ant lions, and numerous other ground dwelling organisms were attributed to leaving tracks which can resemble sinusoidal patterns, but usually will not make a continuous pattern of sinusoidal movement like the sand skink. Based on the results of this survey and the 2014 Orange County Sand Skink Survey Memo (see **Appendix C**), sand skinks are not likely to be present at these pond sites or within the right-of-way of the project corridor.

References:

US Fish and Wildlife Service, Peninsular Florida Species Conservation and Consultation Guide, Sand Skink and Blue-Tailed Mole Skink, 2012

DATA SHEETS AND
DATA SHEET TABLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services Inc. Field Data Sheet

FPC 136A (Marriott)

Date:

Start Time:

End Time:

Temp:

Wind Speed/Direction:

Visibility:

Precipitation:

Biologists/Technicians:

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
E1		H7		J7		L8		O3	
E2		H8		J8		L9		O4	
F1		H9		J9		L10		O5	
F2		H10		J10		M1		O6	
F3		H11		J11		M2		O7	
F4		I1		K1		M3		P1	
G1		I2		K2		M4		P2	
G2		I3		K3		M5		P3	
G3		I4		K4		M6		P4	
G4		I5		K5		M7		P5	
G5		I6		K6		M8		Q1	
G6		I7		K7		M9		Q2	
G7		I8		K8		N1		Q3	
G8		I9		K9		N2		Q4	
G9		I10		K10		N3		R1	
G10		I11		L1		N4			
H1		J1		L2		N5			
H2		J2		L3		N6		D	
H3		J3		L4		N7		A	
H4		J4		L5		N8		AA	
H5		J5		L6		O1		C	
H6		J6		L7		O2			

*Shaded = Unsuitable Area, Coverboard Omitted

NOTES:

EXAMPLE

I-4 SAND SKINK SURVEY

Stantec Consulting Services, Inc. Field Data Sheet

Pond 142B (Turkey Lake)

Date:

Start Time:

End Time:

Temp:

Wind Speed/Direction:

Visibility:

Precipitation:

Biologists/Technicians:

Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?	Coverboard #	Tracks?
A1		B5							
A2		B6							
A3		B7							
A4		B8							
A5		B9							
A6									
A7									
A8									
A9									
A10									
A11									
A12									
A13									
A14									
A15									
A16									
A17									
A18									
B1									
B2									
B3									
B4									

*Shaded = Unsuitable Area, Coverboard Omitted

NOTES:

EXAMPLE

Date:	3/23/2015	Survey Event:	1	Start Time: 4:30 PM	End Time: 5:43 PM
Start Temp:	85 F	End Temp:	85 F	Wind Speed/Direction	0-10 NE
Visibility:	Partly Cloudy	Precipitation:	None		
Sites Sampled (in order):	Pond 136A, Pond 142B				
Biologists/Technicians:	Mike Holdsworth, Kevin Muldrew				
Observations:	No sank skink tracks were found at Pond Sites 136A or 142B. Many of the invertebrates under coverboards, such as ant lions, cockroaches, beetles, and termites, appeared to leave tracks which could be mistaken for sand skink tracks.				

Date:	4/1/2015	Survey Event:	2	Start Time: 2:45 PM	End Time: 4:30 PM
Start Temp:	81 F	End Temp:	82 F	Wind Speed/Direction	5-10 W/NW
Visibility:	Partly Cloudy	Precipitation:	None		
Sites Sampled (in order):	Pond 136A, Pond 142B				
Biologists/Technicians:	Raymond Dennis, Kevin Muldrew				
Observations:	Numerous 6-lined racerunners and several broadhead skinks were observed under coverboards at Pond Sites 136A, and Pond 142B, but no sand skink tracks were observed at these locations.				

Date:	4/9/2015	Survey Event:	3	Start Time: 9:35 AM	End Time: 10:52 AM
Start Temp:	75 F	End Temp:	80 F	Wind Speed/Direction	0-10 S/SE
Visibility:	Clear	Precipitation:	None		
Sites Sampled (in order):	Pond 136A, Pond 142B				
Biologists/Technicians:	Mike Holdsworth				
Observations:	A track with portions of semisoidal movement was observed at coverboard J9 at Pond Site 136A. This tracks appears to be a false positive because it was erratic at the ends, has a broad curve at one end, and a straight				

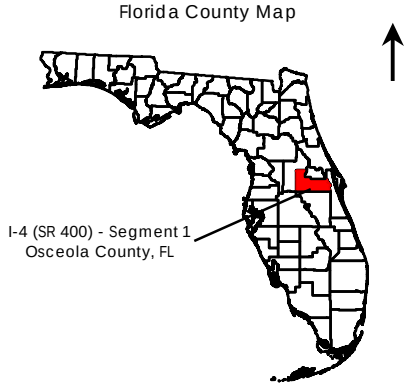
Date:	4/16/2015	Survey Event:	4	Start Time: 8:45 AM	End Time: 10:05 AM
Start Temp:	74 F	End Temp:	75 F	Wind Speed/Direction	0-5 NE
Visibility:	Overcast	Precipitation:	None		
Sites Sampled (in order):	Pond 136A, Pond 142B				
Biologists/Technicians:	Mike Holdsworth, Kevin Muldrew				
Observations:	One Florida crowned snake was found under coverboard K6 at Pond 136A which left tracks similar to sand skink semisoidal pattern. A 6-lined racerunner was observed under coverboard A7 at Pond 142B. No sand skinks or tracks were observed at either pond site.				

FIGURES

I-4 (SR 400) PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY
BEYOND THE ULTIMATE

FDOT FM NO. 432100-1-22-01

Florida County Map



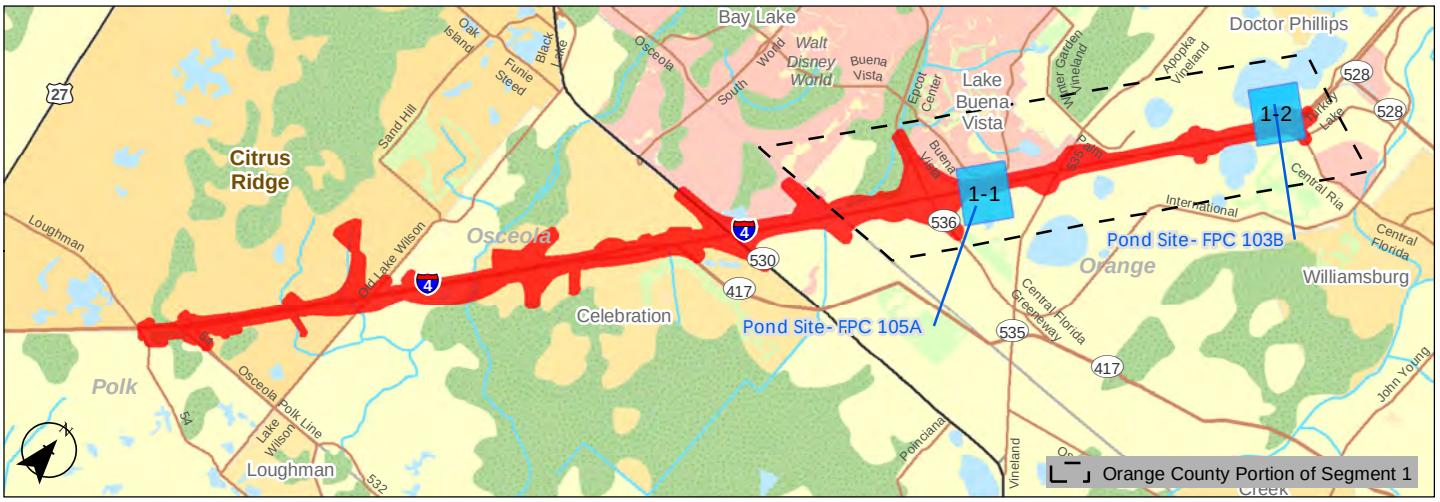
SAND SKINK (*NEOSEPS REYNOLDSI*)
2015 SUPPLEMENTAL SURVEY

SEGMENT 1: ORANGE COUNTY PORTION
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT:
Specific Species Survey Supplement
SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to
West of SR 528 Beachline Expressway

16320 Polk County	92130 Osceola County	75280 Orange County
Begin: STA 604+50.00 - MP 31.607	Begin: STA 626.392 - MP 0.00	Begin: STA 1042+95 - MP 0.00
End: STA 626+39.92 - MP 32.022	End: STA 11042+95 - MP 7.885	End: STA 1345.48.48 - MP 5.650

FIGURE NO.	SHEET NO.	MAP TITLE
Figure A	Single Sheet	NRCS Soils Map
Figure B	Single Sheet	Coverboard Grid Map
Figure C	Single Sheet	Coverboard Location Map



1 " = 12,000 '

Figure A- Sheet 1 of 2: NRCS Soils Map

2015 Sand Skink Survey
NRCS Soils Map

0 150 300 Feet

1 " = 250 '

Figure A- Sheet 2 of 2: NRCS Soils Map

2015 Sand Skink Survey
NRCS Soils Map

0 250 500 Feet

Figure B- Sheet 1 of 2: Coverboard Grid Map

0 50 100 Feet

2015 Sand Skink Survey
Coverboard Grid Map

1 " = 100 '

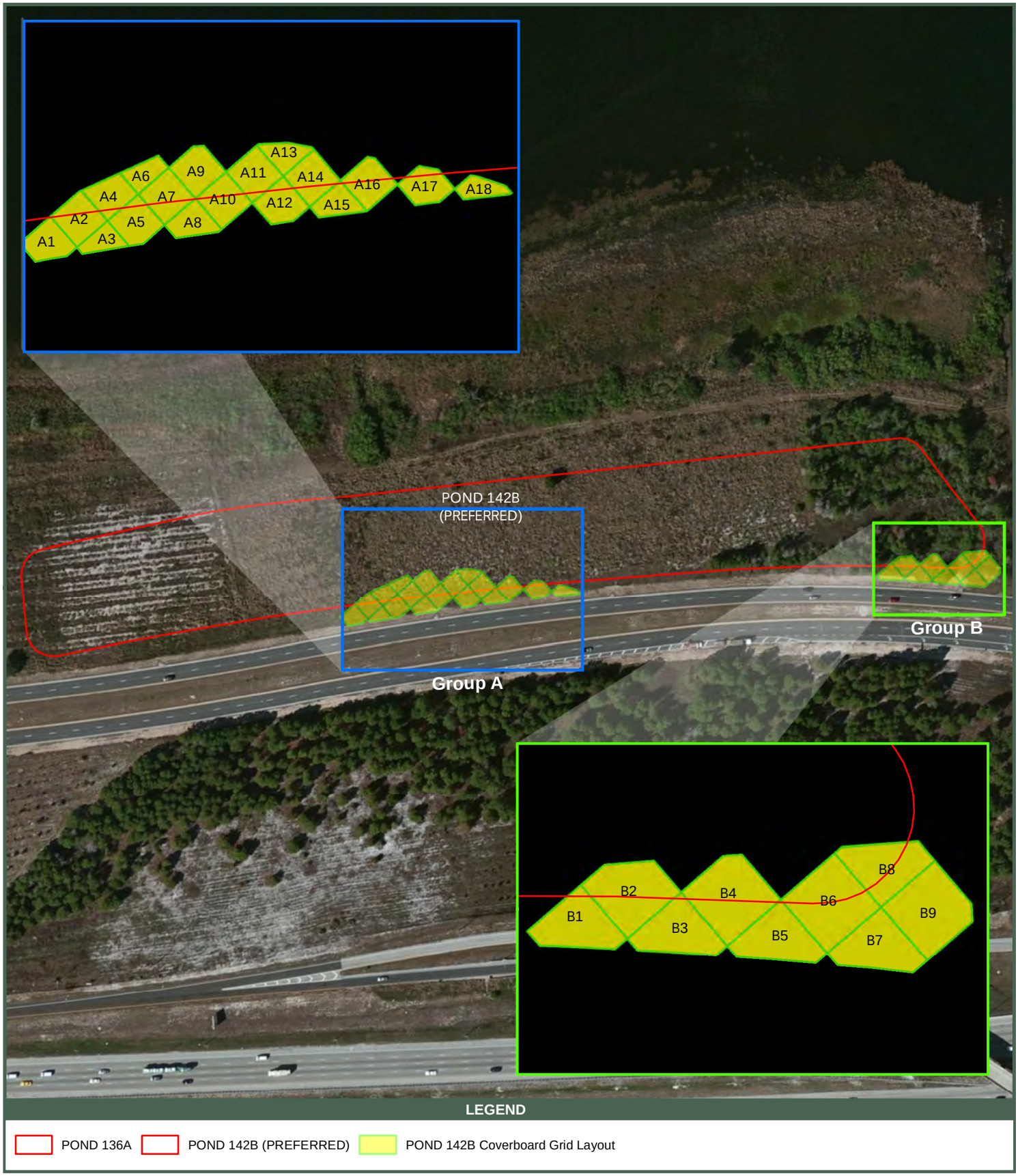


Figure B- Sheet 2 of 2: Coverboard Grid Map

0 100 200 Feet

2015 Sand Skink Survey
Coverboard Grid Map

1 " = 220 '

Figure C- Sheet 1 of 2: Coverboard Location Map

0 50 100 Feet

2015 Sand Skink Survey
Coverboard Location Map

1 " = 100 '

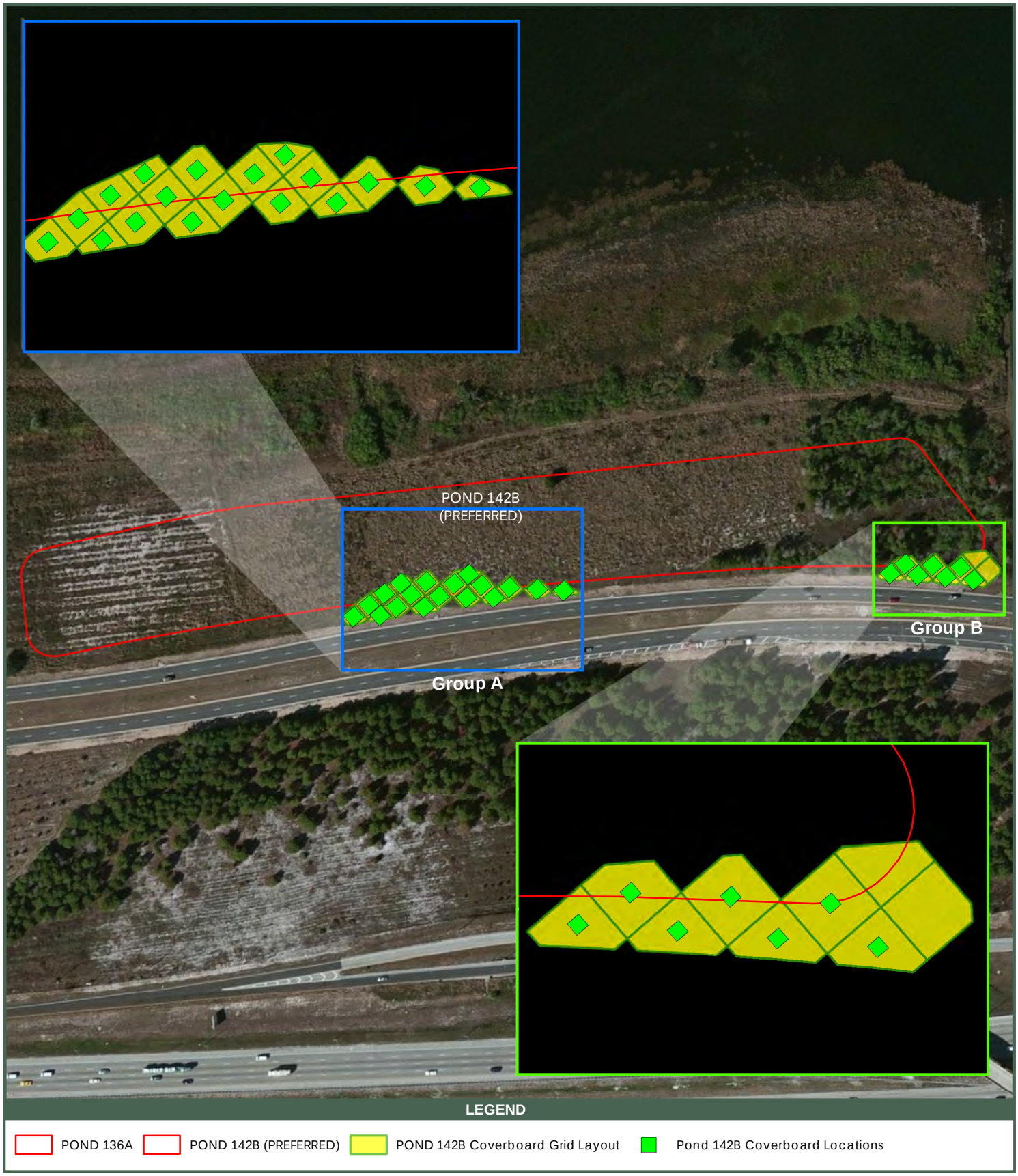


Figure C- Sheet 2 of 2: Coverboard Location Map

0 100 200 Feet

2015 Sand Skink Survey
Coverboard Location Map

1 " = 220 '