SR 400 (I-4) Project Development and Environment (PD&E) Study
FM No.: 201210-2-22-01

Endangered Species Biological Assessment

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)

April 2017

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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 [Financial Project Number (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 (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 is prepared for Segment 5 of the SR 400 (I-4) BtU PD&E Reevaluation of the FONSI for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line (FPN 201210, December 1998). The purpose of this report is to update the original PD&E study by documenting any changes that have occurred since the PD&E study. This reevaluation includes environmental and engineering analysis of the original design concept, that showed six general use lanes (GUL) and four special use lanes (SUL) for high occupancy vehicles (HOV)/single occupant through vehicles (SOV), to the current proposed design that includes six GULs and four express lanes (EL) operating under a variable pricing toll plan. 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 4.5-mile segment of I-4 which extends from west of SR 25/US 27 to west of CR 532 (Polk/Osceola County Line), from Milepost (MP) 27.145 to MP 31.607 in Polk County (herein referred to as I-4 Segment 5) 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 5. The study area in this section from west of SR 25/US 27 to west of CR 532 includes only one interchange at US 27.

Figure 1.2 illustrates the previously recommended typical section from the originally-approved EA/FONSI for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line [Financial Project Number (FPN) 201210 (December 1998). The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally, the typical section will be consistent throughout Segment 5 and will have three 12-foot general use travel lanes with 12-foot inside and outside shoulders (10-foot paved outside) and two 12-foot express lanes with 10-foot inside and 12-foot outside shoulders in each direction. A 2-foot barrier wall between the adjacent shoulders will separate the express lanes from the general use lanes. The typical section includes a 44-foot transit envelope in the median within a minimum 300 foot right of way (ROW) as shown in **Figure 1.3**.

1.2 Proposed Stormwater Management Areas

The existing unpaved right-of-way within the project corridor consists primarily of areas of maintained grass. The right-of-way is lined with intermittent patches of landscaped vegetation, as well as other smaller areas of natural vegetation. Some depressions with emergent aquatic vegetation are present to the northeast of the US 27 interchange.

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 express lanes), the designers must utilize as much of the existing right-of-way as possible, though the potential for the need to acquire minimal 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 and proposed pond sites are depicted on the Stormwater Management Areas Location Map (see **Figure D**, in **Appendix A**).

Nineteen (19) potential stormwater management facilities were evaluated for this segment (sixteen potential pond sites and three potential floodplain compensation ponds). Eleven (11) are existing facilities which were previously permitted and are being modified or enlarged to meet the requirements of the project. Eight (8) new pond sites are proposed. Photographs of the proposed and existing pond sites are included in **Appendix C**. Species observations are depicted on the Stormwater Management Areas Location Map (see **Figure D**, in **Appendix A**).

<u>Pond Site FPC 506 (Recommended)</u>

Pond Site FPC 506 is located west of the US 27 interchange, along the westbound roadway. This is a proposed new floodplain compensation pond. The pond site is currently a mix of ditches and swales with associated berms, maintained right-of-way dominated by Bahia grass, and wetlands west of the right-of-way primarily comprised of pines with areas of cypress and standing water. Vegetation in the ditches and swales is comprised primarily of cattails, Carolina willow, primrose, and

broomsedge. There is a high likelihood for wildlife occurrence such as wading birds or wood stork on this proposed pond site.

Pond Site 506 (Recommended)

Pond Site 506 is located west of the US 27 interchange, west of the right-of-way. This is a proposed new pond site. The pond site is primarily used for pasture and is comprised pines with some saw palmetto in the understory. An open area comprised of Bahia grass is present at the southern portion of the site. A wetland is present along the southwestern edge of the pond site. There is a moderate likelihood for wildlife occurrence on this proposed pond site.

Pond Site 500 (Recommended)

Pond Site 500 is located southwest of the US 27 interchange, along the westbound roadway. This is an existing pond site, proposed to be regraded. The pond site is primarily dominated by cattails at the north end and has a mix of duck potato, torpedo grass, primrose, and Carolina willow in the shallower south end. The banks are dominated by cogon grass and weedy herbaceous species. An active gopher tortoise burrow was observed along the fence at the northwest corner of this pond site. There is a high likelihood for wildlife occurrence on this proposed pond site.

Pond Site 501A (Recommended)

Pond Site 501A is located within the US 27 and I-4 interchange in the west quadrant. This is an existing pond site, proposed to be reduced in size and regraded. The pond site is primarily maintained Bahia grass with some patches of cogon grass with some planted trees for landscaping. There is a low likelihood for wildlife occurrence on this proposed pond site.

Pond Site 501B (Recommended)

Pond Site 501B is located within the US 27 and I-4 interchange in the west quadrant. This is an existing pond site, proposed to be enlarged and regraded. The pond site is primarily maintained Bahia grass with some patches of cogon grass with some planted trees for landscaping. There is a low likelihood for wildlife occurrence on this proposed pond site.

Pond Site 501C (Recommended)

Pond Site 501C is located within the US 27 and I-4 interchange in the west quadrant. This is an existing pond site, proposed to be regraded. The pond site is primarily maintained Bahia grass with some patches of cogon grass with some planted trees for landscaping. An active gopher tortoise burrow was observed to the east of the pond site within the right-of-way. There is a moderate likelihood for wildlife occurrence on this proposed pond site.

Pond Site 502 (Recommended)

Pond Site 502 is located southwest of the intersection of Frontage Road and Southwest Access Road. This is an existing pond site, no modifications are proposed. The pond site is primarily maintained Bahia grass. There is a low likelihood for wildlife occurrence on this proposed pond site.

Pond Site 504 (Recommended)

Pond Site 504 is located west of US 27, along the south side of Heller Brothers Boulevard. This is an existing pond site, no modifications are proposed. The pond site is primarily maintained Bahia grass. Two active gopher tortoise burrows and one inactive burrow were observed within this pond site. Two additional active gopher tortoise burrows were observed along the southwestern fence line of the pond site. There is a high likelihood for wildlife occurrence on this proposed pond site.

Pond Site 503A (Recommended)

Pond Site 503A is located within the US 27 and I-4 interchange in the northeast quadrant. This is an existing pond site, proposed to be reduced in size and regraded. The pond site is primarily maintained Bahia grass and planted trees for landscaping. There is a low likelihood for wildlife occurrence on this proposed pond site.

Pond Site 503B (Recommended)

Pond Site 503B is located within the US 27 and I-4 interchange in the northeast quadrant. This is an existing pond site which is proposed to be enlarged and regraded. The pond site is primarily maintained Bahia grass with some patches of cogon grass and planted trees for landscaping. There is a low likelihood for wildlife occurrence on this proposed pond site.

Pond Site 503C (Recommended)

Pond Site 503C is located within the US 27 and I-4 interchange in the northeast quadrant. This is the western half of an existing pond site which is proposed to be modified and regraded. The pond site is primarily maintained Bahia grass with some patches of cogon grass and torpedo grass with some planted trees for landscaping. There is a low likelihood for wildlife occurrence on this proposed pond site.

Pond Site 503D (Recommended)

Pond Site 503D is located within the US 27 and I-4 interchange in the northeast quadrant. This is the eastern half of an existing pond site which is proposed to be modified and regraded. The pond site is primarily maintained Bahia grass with some patches of cogon grass and torpedo grass with some planted trees for landscaping. There is a low likelihood for wildlife occurrence on this proposed pond site.

Regional Pond 1 (Recommended)

Regional Pond 1 is located northwest of the US 27 interchange, to the west of the right-of-way. This is a proposed new pond site. The existing site is entirely planted pines with some small fallow citrus, persimmon, cherry, scrub live oak, and weedy herbaceous species in the understory. There is a moderate likelihood for wildlife occurrence on this proposed pond site.

Regional Pond 2 (Recommended)

Regional Pond 2 is located northwest of the US 27 interchange, to the west of the right-of-way. This is a proposed new pond. The existing site is entirely planted pines with some small fallow citrus, persimmon, cherry, scrub live oak, and weedy herbaceous species in the understory. There is a moderate likelihood for wildlife occurrence on this proposed pond.

Pond Site 505 A3

Pond Site 505 A3 is located east of the US 27 interchange, to the west of the right-of-way. This is a proposed new pond. The existing site is entirely planted pines with some small fallow citrus, persimmon, cherry, scrub live oak, and weedy herbaceous species in the understory. There is a moderate likelihood for wildlife occurrence due to the land use of this proposed pond.

Pond Site FPC 500D (Recommended)

Pond Site FPC 500D is located east of the US 27 interchange, to the west of the right-of-way. This is a proposed new floodplain compensation pond. The existing site is entirely planted pines with some small fallow citrus, persimmon, cherry, scrub live oak, and weedy herbaceous species in the understory. There is a moderate likelihood for wildlife occurrence due to the land use of this proposed floodplain compensation pond.

Pond Site FPC 500C

Pond Site FPC 500C is located northeast of the US 27 interchange, to the east of the right-of-way. This is a proposed new floodplain compensation pond. The existing site is naturally vegetated and comprised primarily of scrub live with saw palmetto in the understory with some open patches of sand with mixed bushy and herbaceous vegetation. Several scrub plum (*Prunus geniculata*) were observed growing in the northern portion of the site. Posted signs read that a portion of the site is a conservation area, but no formal preserve or ownership by a conservation management entity could be determined. This pond site was not included in the 2015 sand skink survey, although appropriate skink soils and habitat is present at this site. There is a high likelihood for wildlife occurrence on this proposed floodplain compensation pond.

Pond Site 505 B2

Pond Site 505 B2 is located northeast of the US 27 interchange, east of the right-of-way. This is a proposed new pond site. The pond site is primarily used for pasture and is comprised of an open upland and forested wetland. The open upland is mostly open Bahia grass with some patches of saw palmetto, persimmon, live oak, Cogon grass, goldenrod, and Florida lupine. The wetland is dominated by pines. Two active and two inactive gopher burrows were observed at this proposed pond site and other active burrows were observed in the pasture to the northwest of this proposed pond site. A scrub plum was observed near the center of the proposed pond site. Although a formal sand skink survey was not performed on this proposed pond site due to a lack of access during the survey window, observations of sand skink tracks under coverboards were recorded on April 16, 2015 along the existing I-4 right-of-way adjacent to this pond site. Similar habitat and suitable soils for sand skinks exist on this proposed pond site. There is a high likelihood for wildlife occurrence on this proposed pond site.

Pond Site 100 (Segment 1) (Recommended)

Pond Site 100 is located to the east of I-4, just northeast of the Ronald Reagan Parkway overpass. It is part of I-4 Segment 1, but is included in this report as well. This pond is proposed to be expanded. 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, and salt bush. There is a high likelihood for wildlife occurrence on this proposed pond site.

2.0 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 many cities including Lakeland, 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 and I-75 in the Tampa Bay area, SR 429 (Daniel Webster Western Beltway), SR 417 (Southern Connector/Central Florida Greeneway/Seminole Expressway), SR 528 (Martin Andersen Beachline Expressway), SR 91 (Florida's Turnpike), SR 408 (Spessard Lindsay Holland East-West Expressway) in Central Florida, and I-95 on the east coast.

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 (**Figure 1.2**) showing 6 GUL + 4 SUL from west of SR 25/US 27 to west of CR 532 (Polk/Osceola County Line, as recommended in the FONSI for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line (FPN 201210, December 1998), to the current proposed design of six general use and four express lanes (**Figure 1.3**). 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

Figure 1.1 - Project Location Map

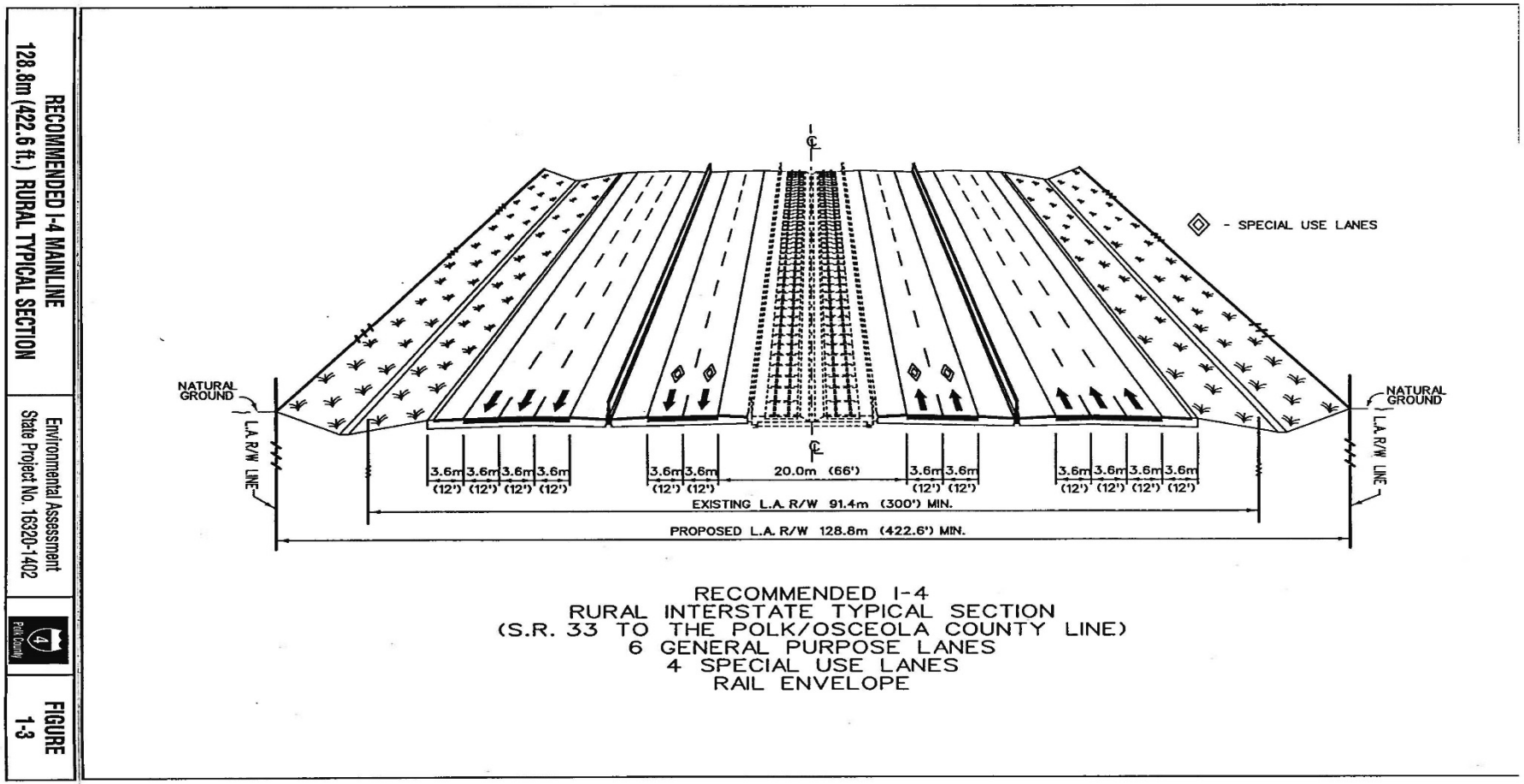

Figure 1.2 – SR 400 (I-4) Typical Section from 1998 EA / FONSI

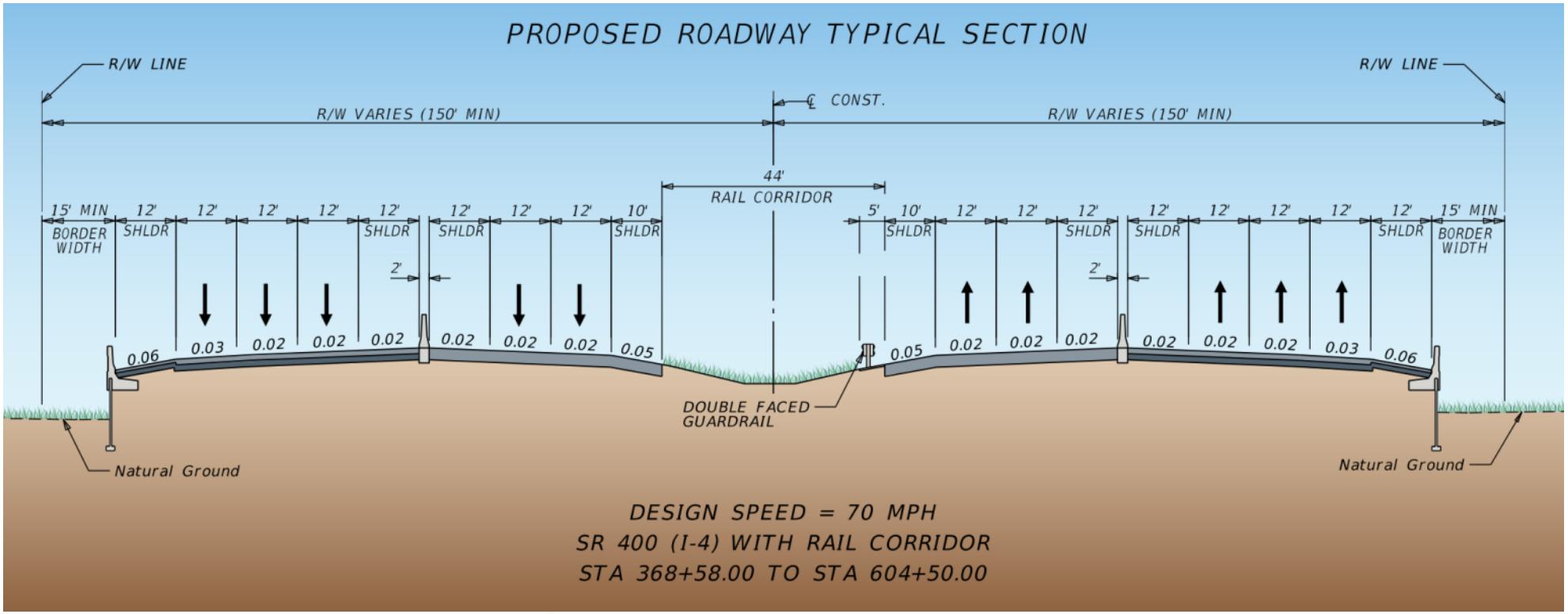

Figure 1.3 – SR 400 (I -4) Segment 5 Proposed Typical Section (6+4 with rail corridor)

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. All species designations are provided utilizing the most recent classifications under the Endangered Species Act (as amended) from 1973 (ESA; 16 U.S.C. § 1531 et seq.), and under the Florida State Endangered and Threatened Species Act, Chapter 379.2291 Florida Statutes.

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.

3.0 Methodology

3.1 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 County, FL (Polk County). 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 Fish and Wildlife Conservation Commission (FFWCC), the U.S. Fish and Wildlife Service (USFWS), and information gathered from relevant scientific literature. The database used for this report was last updated in June 2015.

Appendix B provides a list of animal (see **Table 1**) and plant (see **Table 2**) species of known or potential occurrence within Polk County, and a summary of the habitat type(s) typically utilized by each. Sixty (60) species of animals and 74 species of plants have been identified as potentially occurring in Polk County, though suitable habitat may not be available for all of them along the project corridor. Of these, 12 are federally listed animals, 20 are federally listed plants, 30 are state listed animals, and 71 are state listed plants.

3.2 Agency Coordination

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

3.3 Field Survey

The project area includes approximately 2.8 linear miles of right-of-way and nineteen (19) proposed stormwater ponds. Ground-based biological surveys were conducted in July, August, and September 2014, April, May and September 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, Classification System (FLUCCS) (FDOT, 1999). Results of the habitat and land use evaluation, including descriptions of types observed along the project corridor, are provided in **Section 4.1.2**.

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, and scat) within the study corridor were noted by staff biologists (See Species Location Map, **Figure C in Appendix A**). 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 habitat in the proposed widening area and proposed stormwater pond sites. Prior to the commencement 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. Photographic aerial interpretation 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 6.1** provides a summary of wildlife, including listed species, of known or potential occurrence.

3.3.1 Florida Scrub-Jay Survey

Surveys were conducted during the original PD&E Study [EA/FONSI for SR 400 (I-4) from West of Memorial Boulevard (SR 546) to the Polk/Osceola County Line [Financial Project Number (FPN) 201210 (December 1998] in 1994 and 1995 for Florida scrub-jays. The results of this survey determined that the only known occurrence of Florida scrub-jays on or near I-4 in Polk County occurred near CR 54 (Loughman Road), now called Ronald Reagan Parkway. The survey originally detected 8 scrub-jays in 1994, and then 6 in 1995, and proposed compensatory mitigation from the FDOT Highlands County Mitigation Bank to offset the impacts. During the field studies conducted for this project, the areas where these birds were likely observed (westbound I-4, south and west of Loughman Road) is currently undergoing development for the extension of Champions Gate Blvd., and the Festiva Resort Development. No observations were made within 5-miles of the project corridor, though some potential habitat was identified, primarily east of the I-4 corridor near CR 532 (Osceola Polk Line Road). Some stations along the I-4 eastbound right-of-way were informally surveyed in October 2013 using a call-back tape at locations with potential habitat. Some potential foraging habitat was observed adjacent to the project, but no suitable nesting habitat was identified. A formal survey was not proposed to be conducted due to the lack of a response to the call-back tape, the lack of suitable nesting habitat, and the lack of any recorded observations (according to FNAI, University of Florida, and FFWCC mapping data) over the past 10 years.

3.3.2 Gopher Tortoise Survey

A gopher tortoise survey was conducted in September and October 2014, and September 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 located 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 (**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.

3.3.3 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 report from 1998, nor was a species-specific survey performed during that study. However, guidance from USFWS on skinks 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. Skink soils were mapped for the project corridor to identify the areas of coverage overlap with proposed roadway and pond site improvements. Coordination with USFWS staff (See Coordination Materials in **Appendix D**) indicated that a skink cover board survey would need to be performed over 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. For this project, the right-of-way and potential pond sites were surveyed and a formal coverboard survey was conducted by Scheda Ecological Associates, Inc. in the spring of 2015 (**Appendix E**) in accordance to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012). Several areas over mapped skink soils were added to the project footprint after the survey window had closed for 2015. These areas are assumed as occupied for the purposes of this study, and are accounted for in the results section (**Section 6.1.1**) of the report.

3.3.4 Listed Plant Survey

The original PD&E study indicated that only one plant, Britton's bear grass (*Nolina brittoniana*) was observed within the corridor. Current data from USFWS (Information for Planning and Conservation (IPaC) at http://ecos.fws.gov/ipac) indicates that 18 additional listed species have the potential to occur within the project corridor. A survey was performed during September and October 2014, and September 2015. 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.

4.0 Existing Conditions

4.1 Natural Habitat and Human Land Use Assessment

4.1.1 Soils

According to the Soil Survey of Polk County, Florida (1990), the proposed project (I-4 with 500 ft. buffer) area consists of fifteen mapped soil types including Candler sand, 0 to 5 percent slopes (3), Candler sand, 5 to 8 percent slopes (4), Eaton mucky fine sand, depressional (6), Pomona fine sand (7), Samsula muck (13), Tavares fine sand, 0 to 5 percent slopes (15), Urban land (16), Smyrna and Myakka fine sands (17), Immokalee sand (21), Pomello fine sand (22), Placid and Myakka fine sands, depressional (25), Adamsville fine sand (31), Basinger mucky fine sand, depressional (36), Felda fine sand (42), and Udorthents, excavated (58).

A brief description of each of the mapped soil types occurring within the project site is provided below, and shown on the NRCS Soils Map, **Figure A in Appendix A**.

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.

Candler sand, 5 to 8 percent slopes (4) – Candler sand, 5 to 8 percent slopes is an excessively drained, sloping soil found on side slopes in the uplands. Typically, the surface layer is dark brown sand about 7 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 includes indiangrass, pineland threeawn, hairy panicum, and annual forbs.

Eaton mucky fine sand, depressional (6) – Eaton mucky fine sand, depressional is a very poorly drained soil in wet depressions on flatwoods. Typically, the surface layer is a black mucky fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of about 29 inches. The subsoil is typically gray sandy clay loam to a depth of about 33 inches and sandy clay to a depth of at least 80 inches.

The water table is at or above the surface of this soil for 6 months or more each year. The natural vegetation consists of pond cypress and other water-tolerant trees. The understory includes waxmyrtle, gallberry, and other water tolerant grasses and forbs.

Pomona fine sand (7) – Pomona fine sand is a poorly drained soil in broad areas of flatwoods. Typically, the surface layer is a very dark gray fine sand about 6 inches thick. The subsurface layer is a light brownish gray in the upper part and light gray in the lower part to a depth of about 21 inches. The subsoil to a depth of 26 inches is dark reddish brown loamy fine sand, followed by very pale brown and light gray fine sand to a depth of about 48 inches, light gray fine sandy loam to a depth of about 60 inches, and light gray sandy clay loam to a depth of about 73 inches. The underlying material is light gray loamy 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 is mostly longleaf pine and slash pine. The understory includes saw palmetto, pineland threeawn, chalky bluestem, fetterbush lyonia, gallberry, and low panicums.

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.

Urban land (16) – 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.

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 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.

Immokalee sand (21) – Immokalee sand is a poorly drained soil in broad areas of flatwoods. Typically, the surface layer is very dark gray sand about 7 inches thick. The subsurface layer is light gray sand that grades to white to a depth of about 39 inches. The subsoil to a depth of about 58 inches is black sand. The underlying material is gray sand to a depth of about 66 inches, very dark gray sand to a depth of about 75 inches, and black 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 is mostly longleaf pine, slash pine, and oaks. The understory includes saw palmetto, gallberry, wax myrtle, fetterbush lyonia, and pineland threeawn.

Pomello fine sand (22) – Pomello fine sand is a moderately well drained soil on low, broad ridges and low knolls of flatwoods. Typically, the surface layer is dark gray fine about 7 inches thick. The subsurface layer is white fine sand to a depth of about 48 inches. The subsoil to a depth of about 53 inches is dark reddish brown fine sand that is coated with organic matter. In a few areas the subsoil is weakly cemented by organic matter. The underlying material is dark brown fine sand to a depth of at least 80 inches.

The water table is seasonally at its highest within 24 to 40 inches of the surface for 1 to 4 months in most year. The natural vegetation consists mainly of scrub oaks, longleaf pine, and sand pine. The understory includes saw palmetto, fetterbush lyonia, tar flower, and pineland threeawn.

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.

Adamsville fine sand (31) – Adamsville fine sand is a somewhat poorly drained, nearly level soil found on low ridges on in the flatwoods and in low areas on the uplands. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The underlying material to a depth of 80 inches or more is light yellowish brown fine sand that grades to very pale brown.

The water table is seasonally at its highest within 20 to 40 inches of the surface for 2 to 6 months a year. The natural vegetation consists mainly of slash pine, longleaf pine, laurel oak, and water oak. The understory includes saw palmetto, pineland threeawn, indiangrass, bluestem, and panicums.

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.

Felda fine sand (42) – Felda fine sand is a poorly drained soil in sloughs or low hammocks in flatwoods. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is light brownish gray fine sand to a depth of about 22 inches. The subsoil is gray sandy clay loam to a depth of about 45 inches and light gray sandy loam to a depth of about 50 inches. The underlying material is sandy loam 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 2 and 4 months in most years. The natural vegetation is mostly longleaf pine, slash pine, and cabbage palm. The understory includes saw palmetto, wax myrtle, pineland threeawn, and many grasses.

Udorthents, excavated (58) – Udorthents, excavated (also called borrow pits) are areas of unconsolidated or heterogeneous soil and geologic materials which have been removed mainly for road construction or fill material. Most areas of Udorthents, excavated are between 5 and 40 feet deep and may be seasonally ponded at the bottom or hold water.

4.1.2 Land Use Types

Land Use types found within the project corridor are described below (see **Land Use and Habitat Coverage Map, Figure B, Appendix A**) as listed in the FDOT Florida Land Use, Cover, and Forms Classification System Handbook (1999).

Residential (1200-1300) – These land use codes consist of areas containing medium and high density residential housing. Low density housing was not observed in the project corridor. These areas are found along adjacent roads at the US 27 and I-4 interchange, as well as along Ronald Reagan Parkway. This land use has a low likelihood for wildlife occurrence.

Commercial and Services (1400) – This land use includes numerous types of businesses in malls, strip malls and as stand-alone establishments along the corridor. It was primarily observed at the US 27 and I-4 interchange along the adjacent roadways. This land use has a low likelihood for wildlife occurrence.

Retail Sales and Services (1410) – This land use consists of office complexes, shopping centers, and other service/retail oriented businesses, which was observed at the US 27 and I-4 interchange along the adjacent roadways. 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 US 27 in the project corridor. This land use has a low likelihood for wildlife occurrence.

Tourist Services (1450) – There are several hotels and resorts located in the vicinity of the US 27 and I-4 interchange. This land use has a low likelihood for wildlife occurrence.

Institutional (1700) – This land use consists of schools and institutions. The only example of this land use was the Oak Hill Baptist Church on Osceola Polk Line Road at the eastern end of the project corridor. This land use has a low 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 patches of this land use were observed in the vicinity of the US 27 and I-4 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. Several small patches of this land use were observed along the project corridor. This land use has a moderate likelihood for wildlife occurrence.

Unimproved Pasture (2120) – This category of land use consists of land which has been cleared, with major stands of trees and brush where native grasses have been allowed to develop. Several small patches of this land use were observed along the project corridor. This land use has a moderate likelihood for wildlife occurrence.

Citrus Groves (2210) – Some citrus groves are located along Home Run Boulevard and US 27. This land use has a moderate likelihood for wildlife occurrence.

Other Open Lands <Rural> (2600) – This category of land use consists of agricultural lands whose intended usage cannot be determined. Several patches of this land use were observed along the project corridor. This land use has a moderate 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. This land use has a high likelihood for wildlife occurrence.

Pine Flatwoods (4110) – This land use consists of natural pine flatwoods, a small patch is located at the southern end of the project corridor. This land use has a high likelihood for wildlife occurrence.

Coniferous Plantations (4410) – Some small areas of planted pine were observed along the right-of-way. This land use has a moderate likelihood for wildlife occurrence.

Reservoirs (5300) – This land use designates all retention ponds and other artificial impoundments used for irrigation and flood control along the project corridor and within residential developments. 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 observed in a small patch within the median at the western end of the project area. This land use has a high likelihood for wildlife occurrence.

Cypress (6210) – Dominant vegetation consisted of cypress is present at the southern end of the project corridor. 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 adjacent to the eastbound lanes east of US 27. This land use has a high likelihood for wildlife occurrence.

Freshwater Marsh (6410) – This land use designates vegetated non-forested wetlands usually defined as low-lying areas or depressions in the landscape. Several of these marshes can be found adjacent to the roadway, as well as in isolated patches within 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. Small patches of this land use were observed in the western portion of the project corridor. 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.

Sewage Treatment Facilities (8340) – There is a sewage treatment facility south of I-4 at Westview Road. This land use has a low likelihood for wildlife occurrence.

5.0 Wildlife, Including Listed Species

During the field investigation, individuals or evidence of at least eighteen (18) different mammal, bird, and reptile species were identified along the project corridor. Of those species, the following four (4) species appear on protected species lists developed by the USFWS, the FFWCC, or FNAI and are shown on the Listed Species Location Map**, Figure C, Appendix A**):

Egretta caerulea – little blue heron
Gopherus polyphemus – gopher tortoise
Sciurus niger shermani – Sherman's fox squirrel
Neoseps reynoldsi – sand skink

Additional wildlife species observed during the field investigations included:

Ardea alba – great egret
Bubulcus ibis – cattle egret
Buteo lineatus – red shouldered hawk
Butorides virescens – green heron
Cnemidophorus sexlineatus – six-lined racerunner
Coragyps atratus – black vulture
Dumetella carolinensis – catbird
Lanius ludovicianus – loggerhead shrike
Meleagris gallopavo – wild turkey
Mimus polyglottos - mockingbird
Pantherophis guttatus – corn snake
Sceloporus woodi – Florida scrub lizard

Toxostoma rufum - thrasher
Zenaida macroura – mourning dove

Numerous other wildlife and plant species, many of which are protected, have the potential to occur in Polk 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 exists in those areas. A discussion of species that might be impacted by the proposed project is provided below in **Section 6.0**.

6.0 Impact Analysis

6.1 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 potentially be impacted by the project.

6.1.1 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. A number of gopher tortoise burrows were located within the project area (approximately 80) though the potential for indigo snakes is only moderate due to this being a primarily developed area, with the nearest known recorded sighting being 6.7 miles north of the project, according to data from USFWS Vero Beach. 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 5 will impact less than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) but more than 25 active and inactive gopher tortoise burrows. Therefore, the project would merit 'a may affect' determination under the key. The adjacent segments to the north, as well as the I-4 Ultimate project have been considered and afforded a determination of may affect, not likely to adversely affect. Considering this and that the project area is primarily within an urban corridor with large areas of development offering little contiguous habitat to support the indigo snake, 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 County. 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, a coverboard survey was conducted by Scheda Ecological Associates, Inc. in March and April of 2015 (the full survey report is in **Appendix E**). The results of the survey were positive for the presence of sand skinks within the proposed right-of-way at a total of six locations (Polygons D, E, G, H, N, and R). Subsequent to the survey, USFWS introduced a new designation for determining what areas will be considered occupied habitat after a survey. It states that "A radius of 188 feet (57.2 meters) will be drawn around any positive survey hit/track, and that area will be considered occupied. This distance is based on the distance that 2/3 (67 percent) of the skinks moved in Penney's study." Using this designation, the positive results from the survey were re-mapped and a total area of occupied habitat was calculated at 6.28 acres.

There is additional occupied habitat that was not surveyed in 2015 but with a positive survey result from a 2013 survey (Polygon B South, 0.23 acres). Also, Polygon F, which consists of 5.74 acres that was not surveyed due to access issues but is adjacent to areas within the ROW with positive results (Polygon E) is also considered occupied. There are two additional pond sites that were added to the project after the completion of the sand skink survey. These ponds (FPC 500C, Regional Pond 1) occur either completely or partially over mapped skink soils. Since neither area was subjected to a coverboard survey, it is presumed that the areas that occur over skink soils are occupied (7.57 acres). Additionally, areas included within the revised design footprints for pond site FPC 500D, Pond 505A3, and Regional Pond 2 were outside of the areas surveyed during the coverboard survey totaling 1.22 acres. Total occupied habitat within the project corridor is 21.04 acres. Due to the location of the existing roadway and the proposed design concept, direct impacts to both threatened skink species are possible. Mitigation in the form of bank credits from a Service-approved conservation bank that has credits available and services the impacted project area will be provided at a ratio of 2:1 to offset the proposed impacts (42.08 credits). Therefore, the project **may affect** the sand skink and blue-tailed mole skink. The Biological Opinion issued by USFWS on February 21, 2017 provides the authorization for the impact to 21.04 acres of occupied sand skink habitat provided that 42.08 credits are provided at a Service Approved Conservation bank.

Birds

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 scrub habitats. This gregarious jay is a habitat specialist and typically lives in scrub and scrubby flatwoods habitats. Field surveys during the original PD&E Study in 1994 and 1995 identified scrub-jays near to I-4 at CR 54 at the eastern end of the project. An exact location of the observation was not given in the report. Research on any other scrub-jay observations and known habitat was conducted for the project area. No observations were made within 5-miles of the project corridor (FFWCC and Wildlife Research Institute Wildlife Occurrence System Database 1988 – 2014),

though some potential habitat was identified, primarily east of the I-4 corridor near CR 54 and CR 532 (Osceola Polk Line Road). Much of the habitat previously identified in the original PD&E Study has been developed adjacent to CR 54. Some stations along the I-4 eastbound right-of-way were surveyed in October 2013 using a call-back tape at locations with potential habitat. No scrub-jays responded to the playback tape calls. Field surveys for listed species in 2015 indicated additional areas of previous potential habitat are under current development. No scrub-jays have been observed within any proposed pond site areas or within the section of I-4 within this study; therefore, this project **may affect but is not likely adversely affect** this species.

Audubon's Crested caracara (*Polyborus plancus audubonii = Caracara cheriway*) – Audubon's 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 and no nesting or foraging habitat has been documented within the project corridor. 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 and no observations have been recorded by FFWCC (FFWCC and Wildlife Research Institute Wildlife Occurrence System Database 1988 – 2014). Therefore, the project **may affect but is not likely to adversely affect** this species.

Everglades 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 well to the 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** on this species.

Red-Cockaded Woodpecker (*Picoides borealis*) – This species is listed as Endangered by the USFWS and Threatened 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 an area previously designated by USFWS as an "Occurrence Area" located north and west of the corridor near Walt Disney World, though the previous PD&E Study indicated that no suitable habitat or any documented RCW sightings occurred within the proposed right-of-way or pond sites. During field surveys conducted during July, August, and September 2014, and September 2015, no suitable habitat was observed 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.

Utilizing the *Corps of Engineers and U. S. Fish and Wildlife Service Effect Determination Key for the Wood Stork in South Florida* (2010), the project is not within 0.47 miles 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 (*Lake Russell*, *Gatorland*). 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. Proposed wetland impacts include approximately 13 acres of forested wetlands, 4.85 acres of herbaceous wetlands, and 2 acres of other surface waters. There are multiple (five) currently permitted mitigation banks that include the project corridor within the bank service area that have federal credits available to offset impacts to SFH. 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, the project **may affect but is not likely to adversely affect** the wood stork.

Florida Grasshopper Sparrow (Ammodramus savannarum floridanus) – This diminutive species of sparrow is listed as Endangered by both the USFWS and FFWCC. This bird prefers frequently burned and poorly drained prairie habitat with low vegetation typically less than 2 feet in height. Dominant vegetation is saw palmetto, with a sparse distribution of dwarf live oak, gopher apple, pawpaw, and St. John's wort. Grasses such as wiregrass, bluestems, and flat-topped goldenrod are common. It is believed that only seven localized populations exist in Florida; they occur in southern Osceola County, and portions of Polk, Highlands, Okeechobee, and Glades counties. Although the project does occur within the consultation zone for this bird, no observations have been made or confirmed in the vicinity of the project site according to a Florida Natural Areas Inventory Biodiversity Matrix inquiry. A field survey of the project site revealed that suitable habitat is not present within the vicinity of the project. Therefore, the project will have **no effect** on this bird.

Southern Bald Eagle (*Haliaeetus leucocephalus*) – The southern bald eagle was delisted from both the US 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. No bald eagle nests have been identified within 1 mile of the corridor. The closest nests are OSC151, located west of Goodman Road to the northwest of the corridor and PO048, located south of I-4 and west of US 27. For that reason, the project will have **no effect** on the southern bald eagle.

Osprey (Pandion haliaetus) – The osprey, also known as the fish hawk, are expert anglers that typically share the same habitat as bald eagles but are smaller in size. Ospreys build large stick nests located in the tops of large living or dead trees and on manmade structures such as utility poles, channel markers and nest platforms. They are listed as a Species of Special Concern by FFWCC only in Monroe County, but are also still protected under the Migratory Bird Treaty Act. Permits are required throughout the state to remove a nest for these raptors, and a replacement structure must be erected to mitigate the removal of the nest. Should any nests found along the corridor be subject to impacts, a nest removal permit will be applied for from FFWCC. No osprey nests currently exist in proximity to the project corridor. Therefore, this project **may affect but not likely adversely affect** the osprey.

FEDERALLY LISTED PLANT SPECIES

Twenty federally listed species have been demonstrated to have the potential to occur within Polk County, though not all habitat types are represented within the project area (see **Table 2, Appendix B**). Information from the previous PD&E Study indicated that one listed plant was observed, Britton's Beargrass (*Nolina brittoniana*), but no location for this observation was provided. A follow up protected plant field survey covering the area of proposed right-of-way widening and pond sites was conducted in September and October 2014 by project biologists. No Britton's Beargrass was observed within the survey areas, so the project **may affect but not likely adversely affect** Britton's Beargrass. However, the scrub plum (*Prunus geniculata*) was observed within proposed Pond Sites 500C and 505B2 on the eastbound side of I-4 (see Listed Species Map, **Figure C in Appendix A**). No additional federally listed plant species were identified within the proposed widening impact area or pond sites during the field investigations. Additionally, during the sand skink cover board survey in March and April 2015, no listed plant species observations were noted. Listed plant species, specifically the scrub plum, is anticipated to be impacted by this project. Specific measures to address these plants will be undertaken during consultation with USFWS. The project will coordinate with Conservation Staff at Bok Tower Gardens prior to construction to collect and relocate the individual scrub plum plants and seeds (if possible) as part of the Rare Plant Conservation Program which helps prevent the loss of unique germplasm. Therefore, the project **may affect** federally listed plant species. The Biological Opinion issued on February 21, 2017 provides the authorization for impacts to the scrub plum provided the project adheres to the commitment to work with Bok Tower Gardens Conservation Staff to remove and relocate viable scrub plum plants prior to the commencement of construction.

6.1.2 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). 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, and one Sherman's fox squirrel was observed south of US 27 west of the I-4 ROW 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 project occurs within the South Central BMU, which includes Charlotte, De Soto, Glades, Hardee, Highlands, Hillsborough, Indian River, Manatee, Martin, Okeechobee, Osceola, Pinellas, Polk, Sarasota, and St Lucie counties and contains the Highlands subpopulation. Black bears are not common in this part of Polk County, though as a migratory species could enter the project corridor. As 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 **Figure C, Appendix A**). Both the pocket gophers and the pine snakes live nearly their whole lives underground and are very difficult to observe directly. Earth work in suitable habitat may impact subterranean pine snakes. With the relocation of commensal organisms from gopher tortoise burrows, the project **is not likely to adversely affect** this species.

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. Approximately 80 gopher tortoise burrows were identified within the project study area. 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 (such as remaining outside of a 25 foot radius from each burrow). 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. Short-tailed snakes may 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. None of these snakes were observed during any field surveys. There is little proposed impact to xeric habitat, though with the commitment to relocate all potential impacted gopher tortoise burrows, it is anticipated that this project **is not likely adversely affect** the short-tailed snake.

Amphibians

Gopher Frog (*Rana (AKA Lithobates) 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 within the 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.

Birds

Florida Burrowing Owl (*Speotyto (AKA Athene) 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 County. 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. 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. 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. Therefore, this project **is not likely to adversely affect** this species.

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 great egret were observed during field surveys. No wetlands providing foraging or nesting habitat for these avian species will be impacted by the proposed project and indirect impacts to wading birds are not anticipated. Unavoidable impacts to wetlands will be mitigated for during project permitting with the appropriate regulatory agencies. 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 71 state listed plant species have the potential to occur within the habitats located within the project area in Polk County (see **Table 2, Appendix B**). Vegetation surveys conducted during the previous PD&E Study (EA/FONSI completed December 1998) identified Garberia (*Garberia heterophylla*) and Leafless beak orchid (*Stenorrhynchos lanceolatus*) as two state listed species observed, but did not provide a detailed location in the report. Surveys for state-listed plants were conducted during September and October 2014, and during September 2015. Additionally, during the sand skink cover board survey in March and April 2015, no listed plant species observations were noted. It is unknown if the project will impact state listed species at this time, but all efforts will be made to avoid any impacts. Therefore, the proposed project **is not likely to adversely affect** state listed plant species.

7.0 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 will be made in the event that the latest science, design constraints or other relevant changes in circumstance so dictate.

The project effects determinations indicate that the project may affect the federally listed eastern indigo snake, sand skink and blue-tailed mole skink, and scrub plum. Consultation with the USFWS under Section 7 of the Endangered Species Act will take place to address the impacts, and the results will be included in the final environmental document for this project.

The 1998 EA/FONSI for this project evaluated the project impacts at that time (although this segment was only a portion of the entire project study area). Commitments made in that document included:

- The construction of low-level bridges for wildlife corridor enhancements at 3 locations in Polk County
- Mitigation for the loss of habitat for the Florida scrub-jay at the Highlands County Upland Mitigation Bank at a ratio of 2:1 for impacts at the time of construction
- FDOT committed to follow through on recommendations that

- Temporal considerations would be made during construction to avoid disturbances to bald eagles
- Temporal considerations be made and appropriate sandhill crane nesting habitat be surveyed immediately prior to construction if this should coincide with the nesting season
- Temporal considerations be made during construction to avoid disturbance of nesting wading birds and identified rookeries and that appropriate habitat be surveyed according to FGFWFC recommended guidelines immediately prior to construction if initiated during the nesting season
- Since the right-of-way and construction phases of this project are not included in the current FDOT 5-year work program and because of the anticipated resulting delay in right-of-way acquisition and construction of the proposed I-4 improvements, a resurvey of the project corridor for the presence of listed species will be made prior to the construction phase of this project.
- The eastern indigo snake could be present in the project area. To satisfy agency concerns regarding this species, FDOT will notify the U.S. Army Corps of Engineers (ACOE) of the potential for involvement with this Threatened Species so that a formal Section 7 consultation through the ACOE dredge and fill permitting process may be conducted, and a Biological Opinion issued. In addition, the standard protection measures will be implemented, as previously approved.

The locations for the wildlife corridor enhancement bridges were all further west of the Segment 5 project area and are not relevant to this segment. No scrub-jays were identified within the project corridor and therefore mitigation for impacts to occupied habitat is not relevant. Recommendations for temporal considerations prior to and during construction will still be considered. A re-survey of the project area during permitting will be a project commitment carried forward. A 'May Affect but not Likely to Adversely Affect' effect determination has been recommended in this report for the eastern indigo snake, and will be part of the consultation process initiated for this project to address impacts to listed species.

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. FDOT has completed consultation with the USFWS to address impacts to listed species as proposed by the project. The Biological Opinion dated February 21, 2017 documents the results of the analysis and provides a statement for the Incidental Taking of listed species with the commensurate mitigation measures. Based upon this decision, FDOT commits to:

   a) Acquire 42.08 credits providing 42.08 acres of skink habitat from a USFWS-approved Conservation Bank to compensate for the loss of skinks and 21.04 acres of skink habitat. Prior to construction, provide the USFWS a receipt or letter from the USFWS-approved conservation bank verifying that the 42.08 credits have been acquired. Following land clearing activities with the I-4 BtU Segment 5 project, FDOT must provide a letter or email to the USFWS providing the actual acreage of occupied skink habitat cleared by the project. Should anyone on the project locate a dead, injured, or sick threatened or endangered species, initial notification must be made to the nearest USFWS Law Enforcement Office; Fish and Wildlife Service; 20501 Independence Blvd.; Groveland, Florida 34736-8573; (352) 429-1064. Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission; South Region; 3900 Drane Field Road; Lakeland, Florida; 33811-1299; 1 (800) 282-

8002. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In instances where the amount or extent of incidental take is to be exceeded, any operation must cease and consultation should be reinitiated.

b) FDOT will coordinate with Bok Tower Gardens Conservation Staff from the Rare Plant Conservation Program to collect the seeds from scrub plum plants and translocate suitable specimens to public conservation lands or other lands acceptable to the USFWS prior to construction. Collected seeds should be under the protection of the Bok Tower Gardens and either stored or used for propagation. Collected plant specimens may be temporarily housed, depending on available space, at the National Collection Beds that exist on-site at the Bok Tower Gardens.

2. FDOT will ensure that mitigation proposed for wetland impacts in any wood stork suitable foraging habitat (SFH) will adhere to the requirements of the Corps of Engineers and U. S. Fish and Wildlife Service Effect Determination Key for the Wood Stork in South Florida (2010). The mitigation should include at a minimum wetland credits comprised of 12.18 acres of short hydroperiod (< 180 days inundated annually) wetlands and 8.65 acres of long hydroperiod (> 180 days inundated annually) wetlands.

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 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.

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

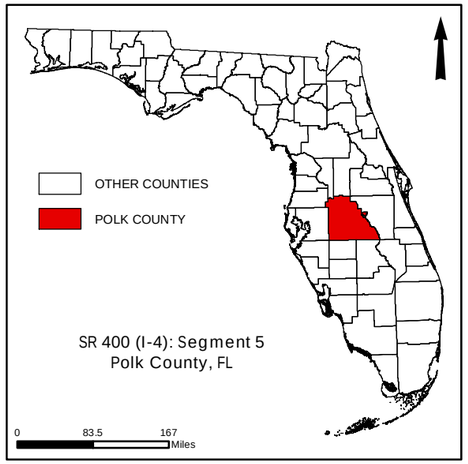
SR 400 (I-4) BEYOND THE ULTIMATE
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

SEGMENT 5

FDOT FM NO. 201210-2-22-01

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT (ESBA)

POLK COUNTY
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 1



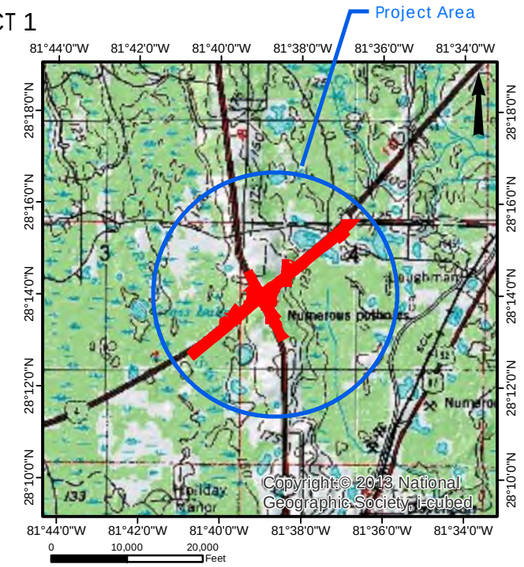


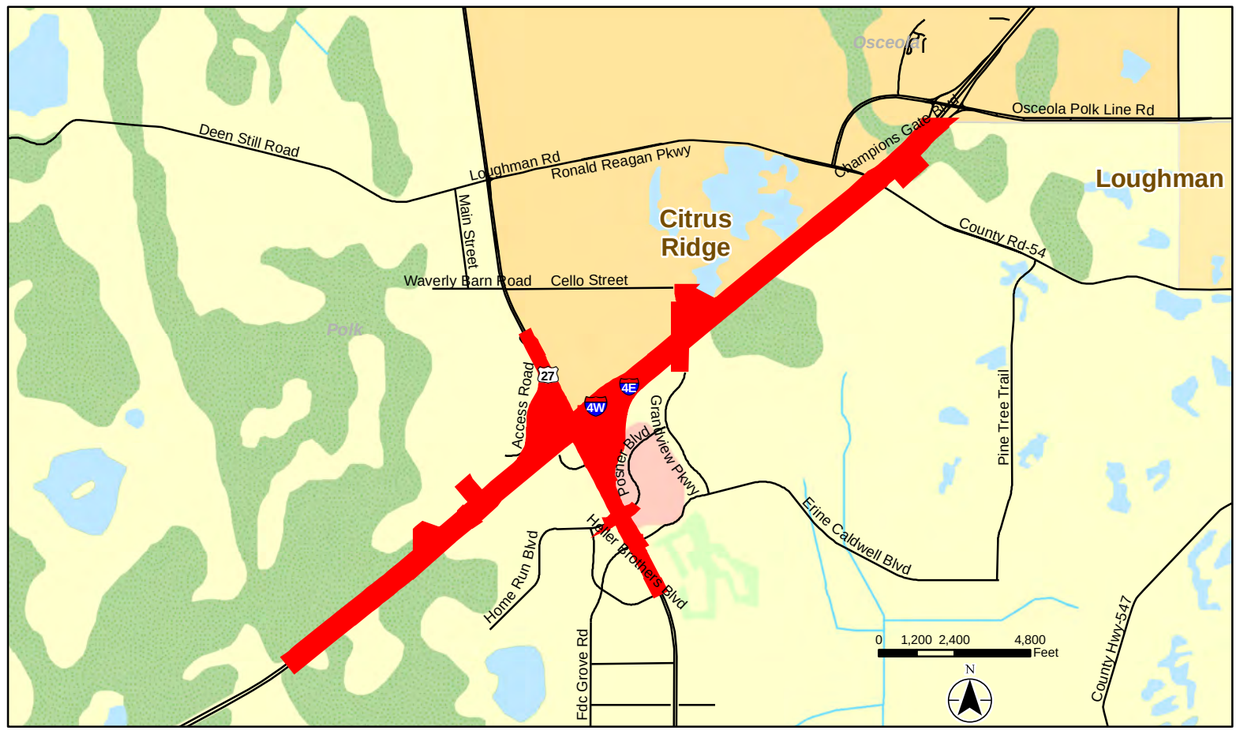
FIGURE NO.	SHEET NO.	TITLE
Figure A	Single Sheet	NRCS Soils Map
Figure B	Single Sheet	Land Use and Habitat Coverage Map
Figure C	Single Sheet	Listed Species Location Map
Figure D	Single Sheet	Stormwater Management Areas Location Map
Figure E	**Sheets 1-7**	**Sand Skink Occupied Habitat**

PROJECT DETAILS

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT:
Segment 5 - Report Maps

SR 400 (I-4) from West of SR 25/US 27 to West of CR 532
(Polk/Osceola County Line Polk County (16320)

16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)



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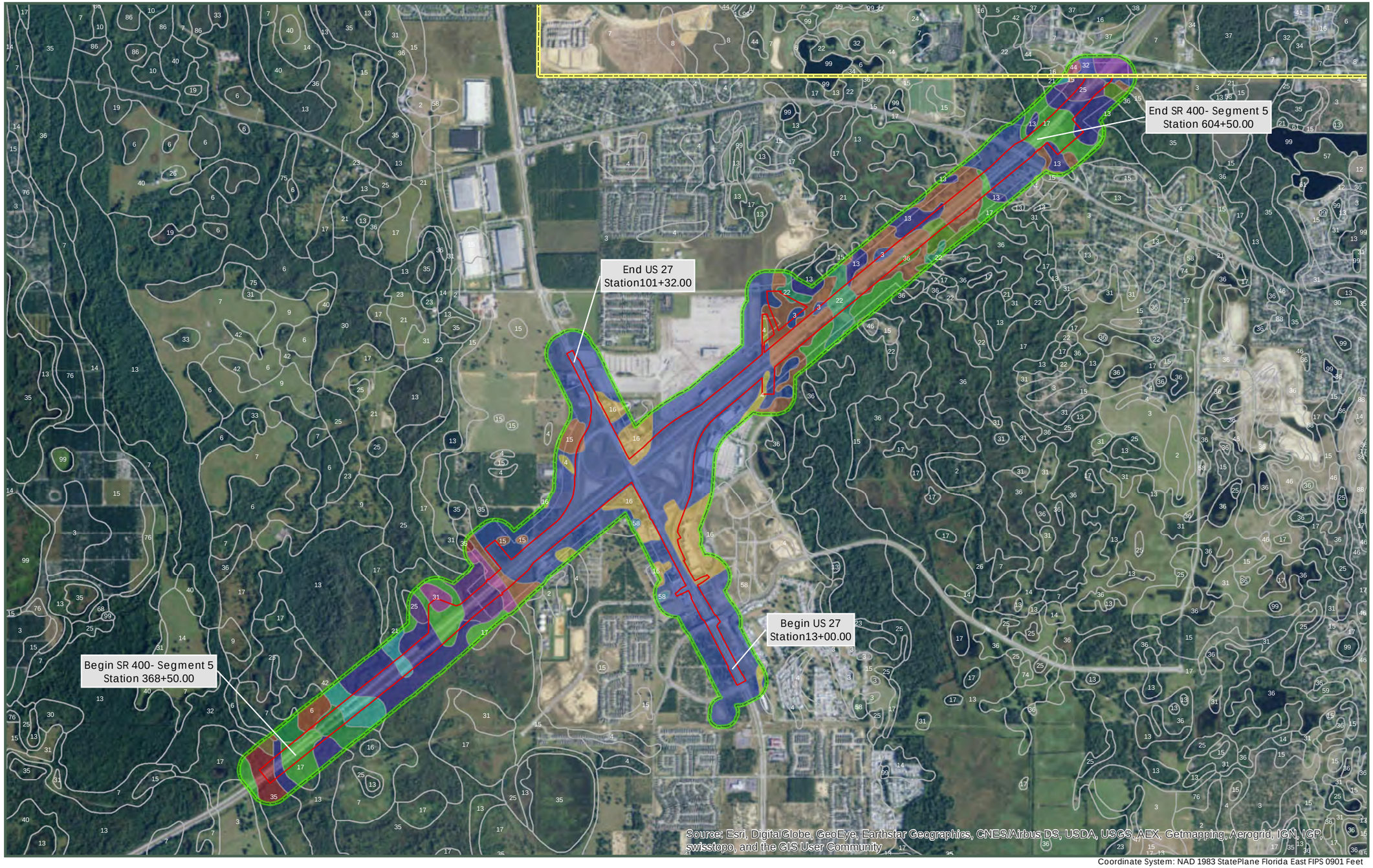


Map Key

- County Boundary
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Soil Type

- 13:SAMSULA MUCK
- 15:TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES
- 16:IMMOKALEE FINE SAND
- 16:URBAN LAND
- 17:SMYRNA AND MYAKKA FINE SANDS
- 21:IMMOKALEE SAND
- 22:POMELLO FINE SAND
- 25:PLACID AND MYAKKA FINE SANDS, DEPRESSIONAL
- 2:APOPKA FINE SAND, 0 TO 5 PERCENT SLOPES
- 31:ADAMSVILLE FINE SAND
- 32:KALIGA MUCK
- 32:PLACID FINE SAND, DEPRESSIONAL
- 35:HONTOON MUCK
- 36:BASINGER MUCKY FINE SAND, DEPRESSIONAL
- 3:CANDLER SAND, 0 TO 5 PERCENT SLOPES
- 42:FELDA FINE SAND
- 44:TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES
- 4:CANDLER SAND, 5 TO 8 PERCENT SLOPES
- 58:UDORTHENTS, EXCAVATED
- 6:EATON MUCKY FINE SAND, DEPRESSIONAL
- 7:CANDLER SAND, 0 TO 5 PERCENT SLOPES
- 7:POMONA FINE SAND

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 5 - NRCS Soils Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
Segment 5: SR 400 (I-4) from W of SR 25/US 27 to W of CR 532

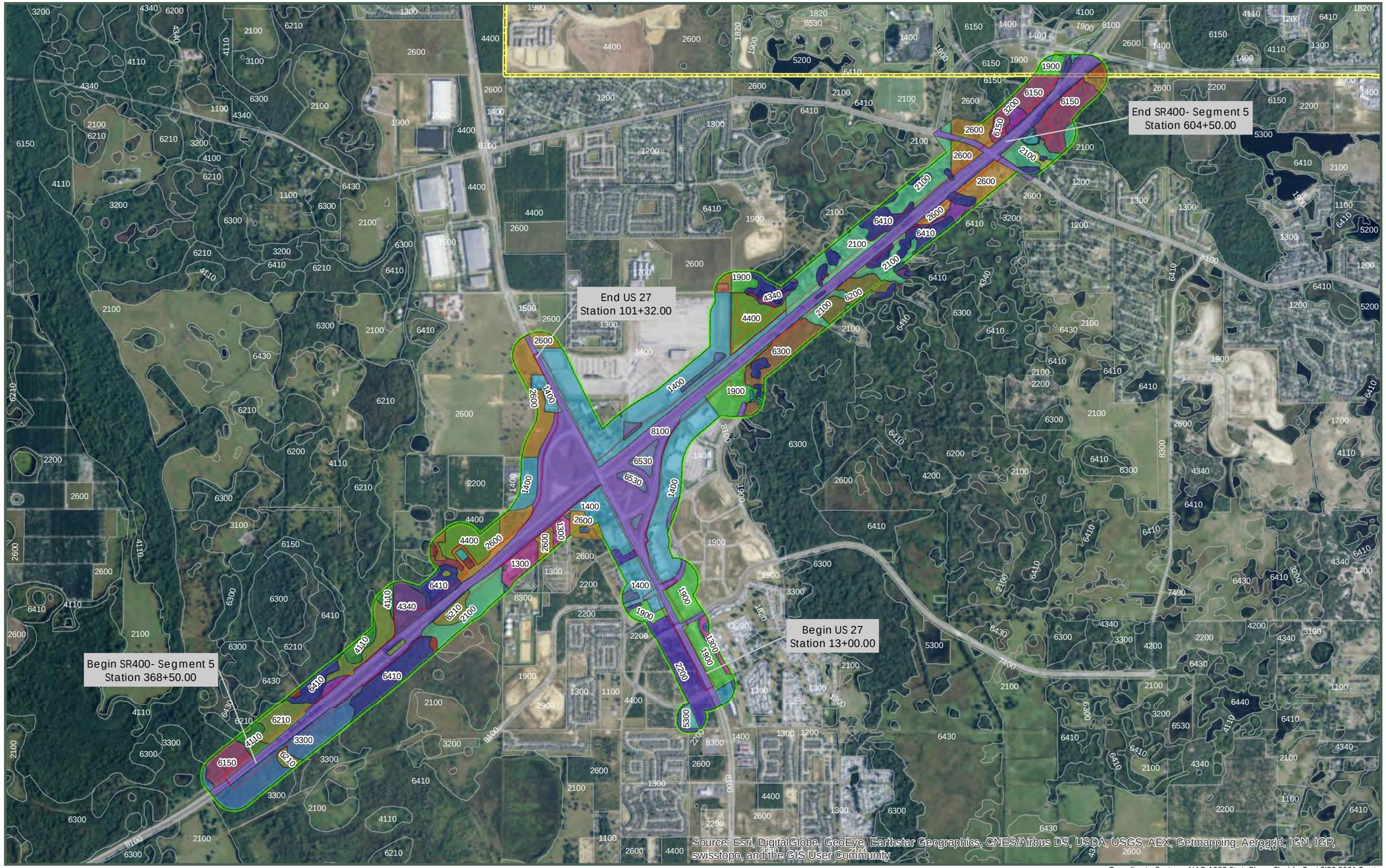
Project Location:
16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)

Prepared by: mLeonard 2/18/2016
Technical Review by: mDrauer 2/18/2016
Independent Review by: jMoore 2/18/2016

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 1,200 2,400 4,800 Feet

Figure A - NRCS Soils Map



Map Key

- County Boundaries
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Polk and Osceola County Landuse

Land Use and Habitat Coverage

- 1200, RESIDENTIAL MED DENSITY
- 1300, RESIDENTIAL HIGH DENSITY
- 1400, COMMERCIAL/SERVICES
- 1700, INSTITUTIONAL
- 1820, GOLF COURSES
- 1900, OPEN LAND
- 2100, CROPLAND AND PASTURELAND
- 2200, TREE CROPS
- 2600, OTHER OPEN LANDS <RURAL>
- 3100, HERBACEOUS
- 3200, SHRUB AND BRUSHLAND
- 3300, MIXED RANGELAND
- 4110, PINE FLATWOODS
- 4340, HARDWOOD CONIFER MIXED
- 4400, TREE PLANTATIONS
- 5300, RESERVOIRS
- 6150, STREAM AND LAKE SWAMPS (BOTTOMLAND)
- 6200, WETLAND CONIFEROUS FORESTS
- 6210, CYPRESS
- 6300, WETLAND FORESTED MIXED
- 6410, FRESHWATER MARSHES
- 6430, WET PRAIRIES
- 6440, EMERGENT AQUATIC VEGETATION
- 6530, INTERMITTENT PONDS
- 8100, TRANSPORTATION
- 8300, UTILITIES

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 5 - Land Use and Habitat Coverage Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
Segment 5: SR 400 (I-4) from W of SR 25/US 27 to W of CR 532

Project Location:
16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)

Prepared by: mLeonard 9/21/2015
Technical Review by: mDrauer 9/21/2015
Independent Review by: jMoore 9/21/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 1,200 2,400 4,800 Feet

Figure B - Land Use and Habitat Coverage Map

1 " = 2,400 '

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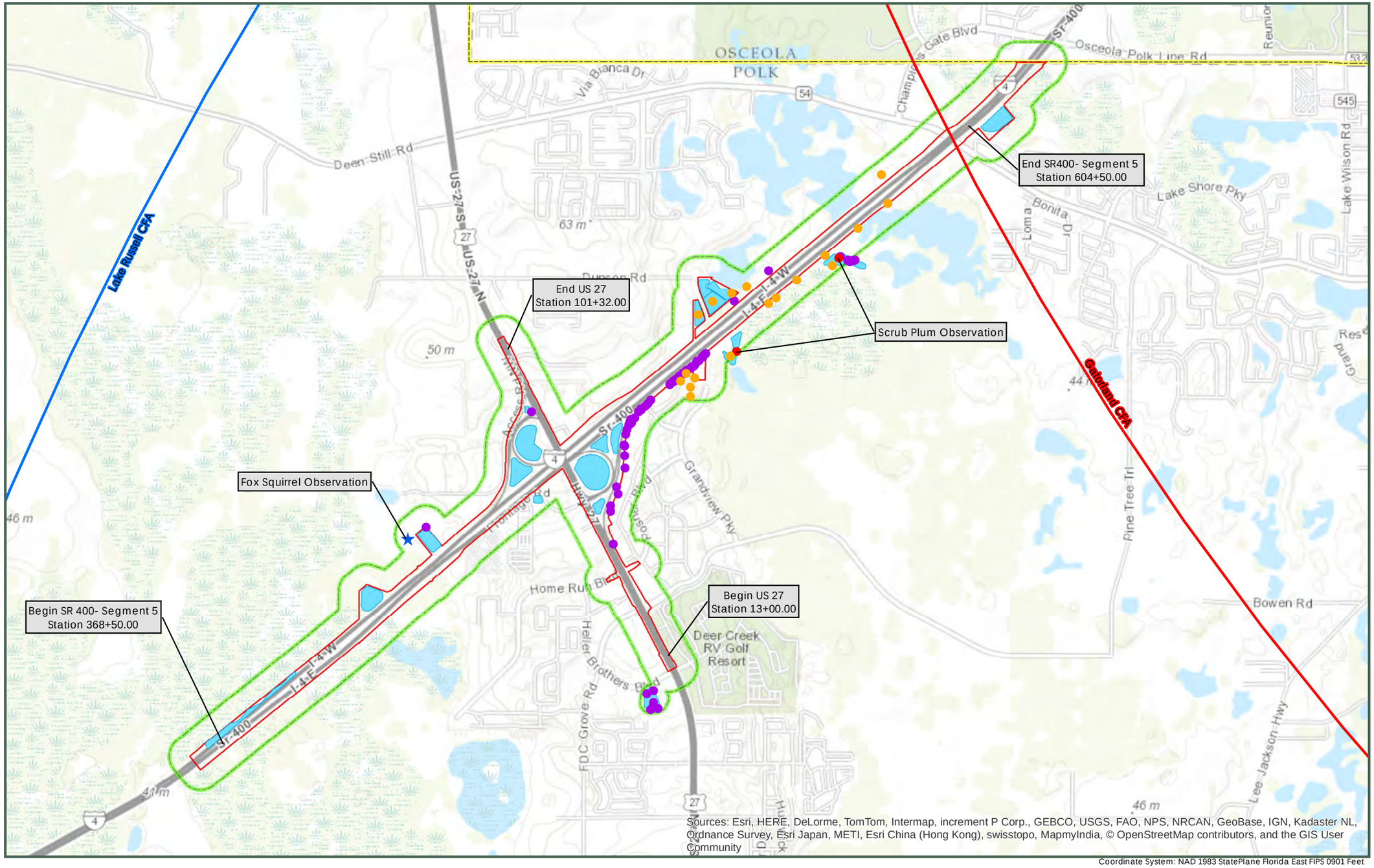

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 1,200 2,400 4,800 Feet

Map Key

- County Boundaries
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Proposed Pond Sites (12/2/15)
- Wood Stork Colony-Gatorland
- Wood Stork Colony-Lake Russell

Observed Species

- Fox Squirrel
- Scrub Plum
- Gopher Tortoise Burrows
- Sand Skink Locations

Segment 5 Species Notes:

Wood Stork Colonies-Gatorland (15 mile CFA Buffer). Segment 5 is partially within CFA.

Woodstork Colonies-Lake Russell (18.6 mile CFA Buffer). Segment 5 is fully within CFA.

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 5 - Listed Species Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
Segment 5: SR 400 (I-4) from W of SR 25/US 27 to W of CR 532

Project Location:
16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)

Prepared by: mLeonard 2/18/2016
Technical Review by: mDrauer 2/18/2016
Independent Review by: jMoore 2/18/2016

Figure C - Listed Species Location Map

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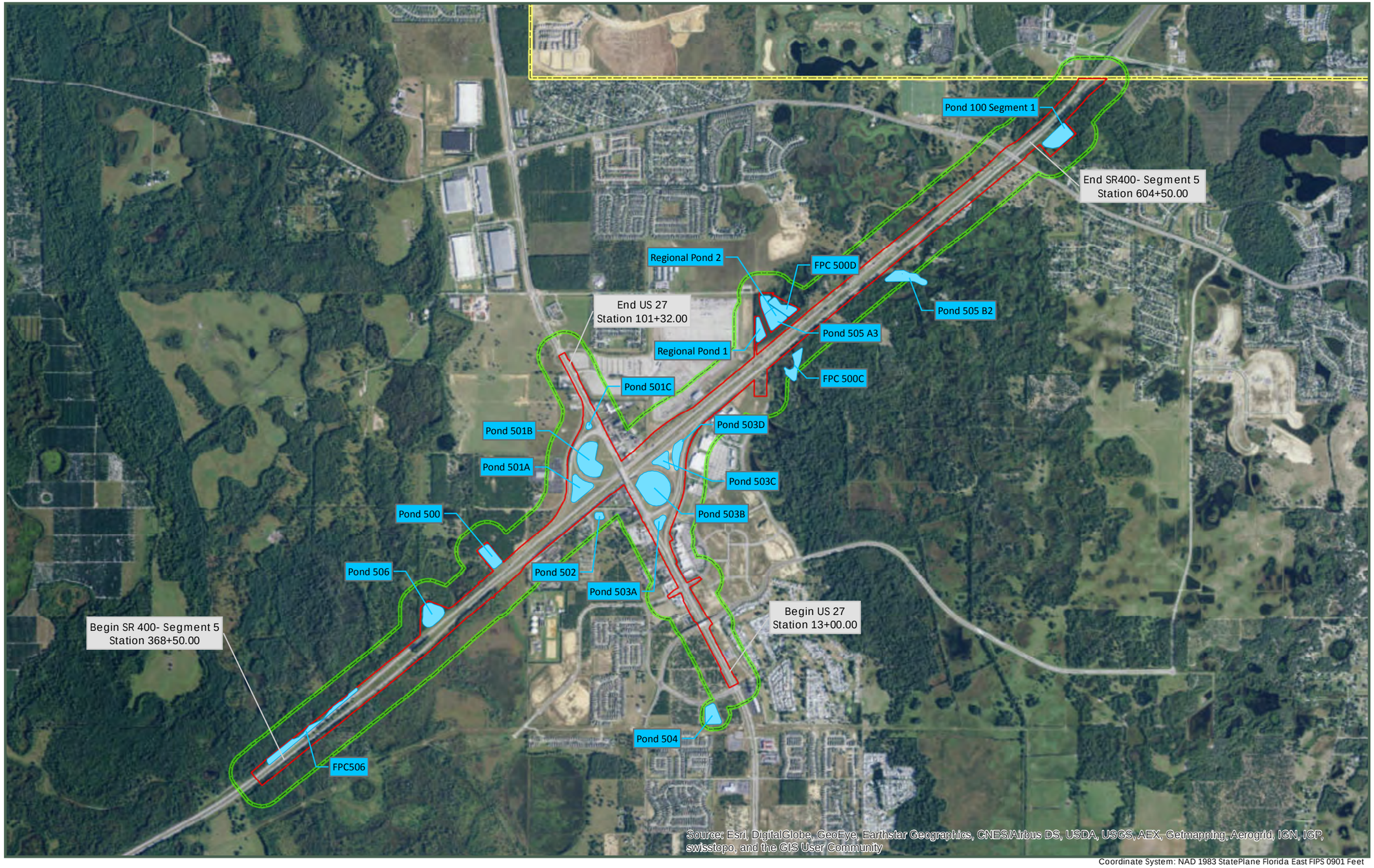

Map Key

- County Boundaries
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Proposed Pond Sites (12/2/15)

Title: ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 5 - Stormwater Management Areas Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
Segment 5: SR 400 (I-4) from W of SR 25/US 27 to W of CR 532

Project Location:
16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)

Prepared by: mLeonard 12/2/2015
Technical Review by: mDrauer 12/2/2015
Independent Review by: jMoore 12/2/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 1,200 2,400 4,800 Feet

Figure D - Stormwater Management Areas Location Map

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L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Occupied Habitat
- Area Not Surveyed (Presence Assumed)
- Surveyed Areas (Field Observations-2015)

Notes:
RGP = Regional Pond
P = Pond
FPC = Floodplain Compensation

Figure E-Sheet 1 of 7: Sand Skink Occupied Habitat Map

0 100 200 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat
Based on FWS 188 ft Radial Buffer

1 " = 210 '

L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Occupied Habitat
- Area Not Surveyed (Presence Assumed)
- Surveyed Areas (Field Observations-2015)

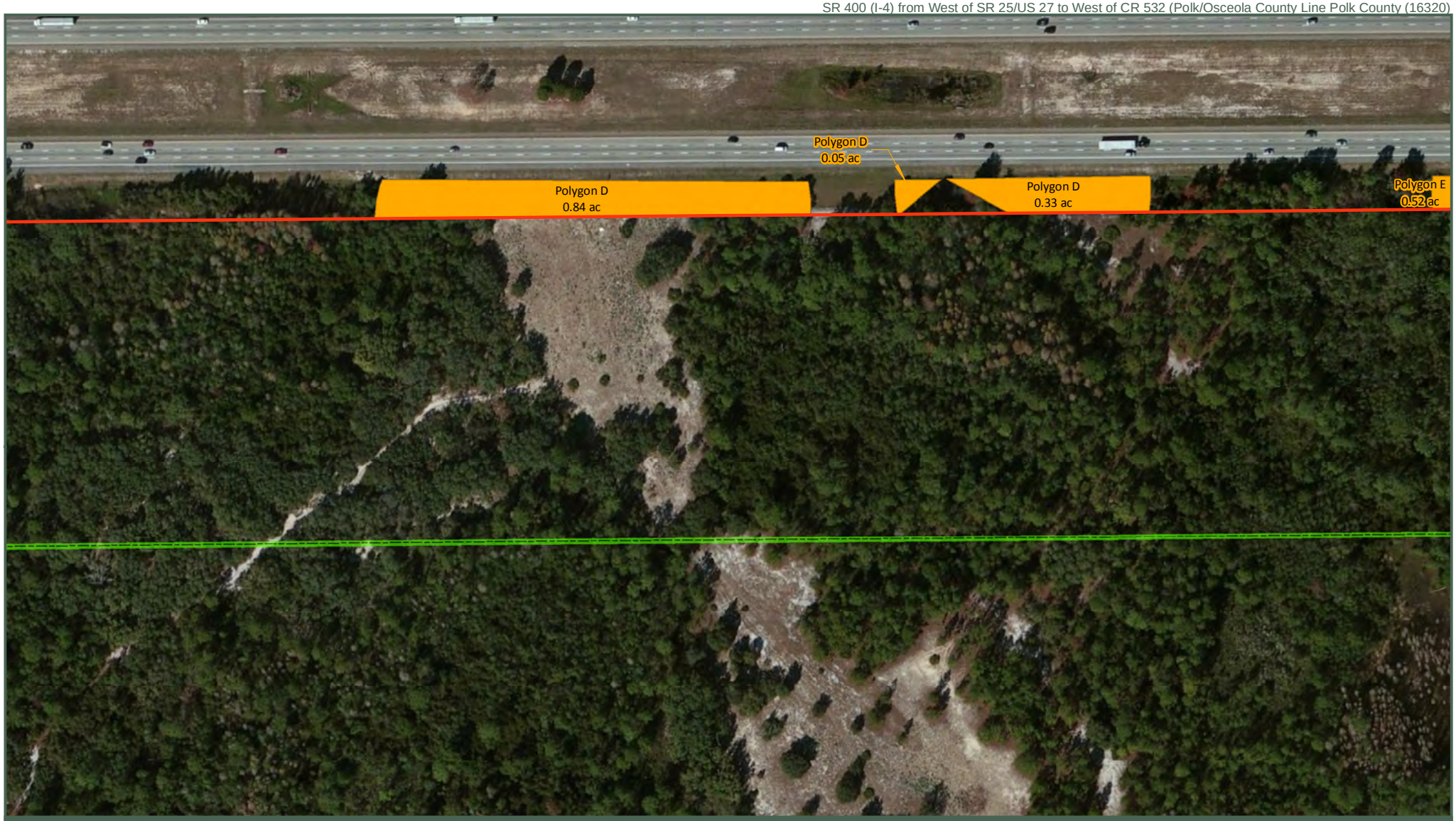
Notes:
RGP = Regional Pond
P = Pond
FPC = Floodplain Compensation

Figure E-Sheet 2 of 7: Sand Skink Occupied Habitat Map

0 100 200 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat
Based on FWS 188 ft Radial Buffer

1 " = 210 '



L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Occupied Habitat
- Area Not Surveyed (Presence Assumed)
- Surveyed Areas (Field Observations-2015)

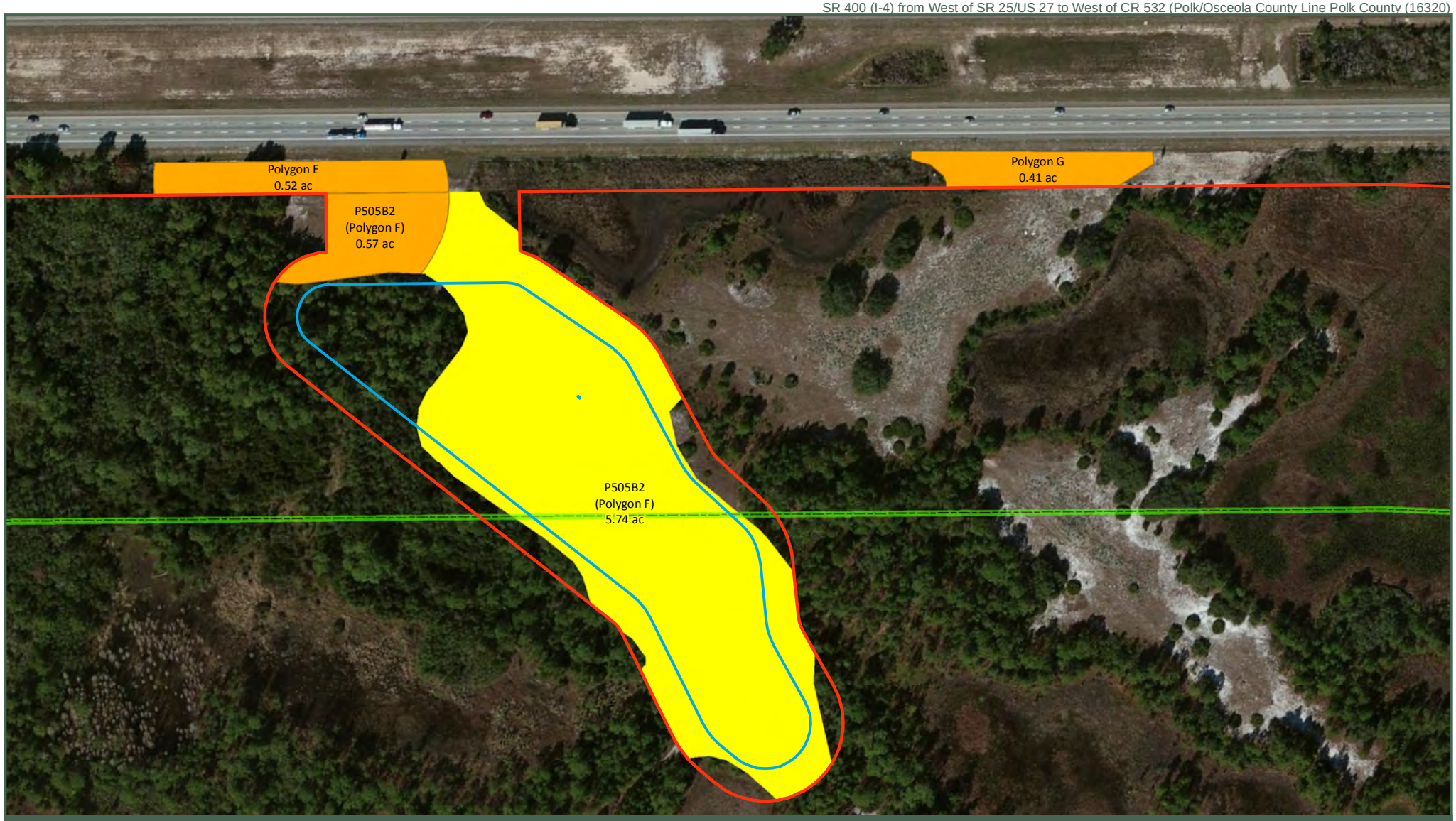
Notes:
RGP = Regional Pond
P = Pond
FPC = Floodplain Compensation

Figure E-Sheet 3 of 7: Sand Skink Occupied Habitat Map

0 100 200 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat
Based on FWS 188 ft Radial Buffer

1 " = 210 '



L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Occupied Habitat
- Area Not Surveyed (Presence Assumed)
- Surveyed Areas (Field Observations-2015)

Notes:
RGP = Regional Pond
P = Pond
FPC = Floodplain Compensation

Figure E-Sheet 4 of 7: Sand Skink Occupied Habitat Map

0 100 200 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat
Based on FWS 188 ft Radial Buffer

1 " = 210 '

L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Occupied Habitat
- Area Not Surveyed (Presence Assumed)
- Surveyed Areas (Field Observations-2015)

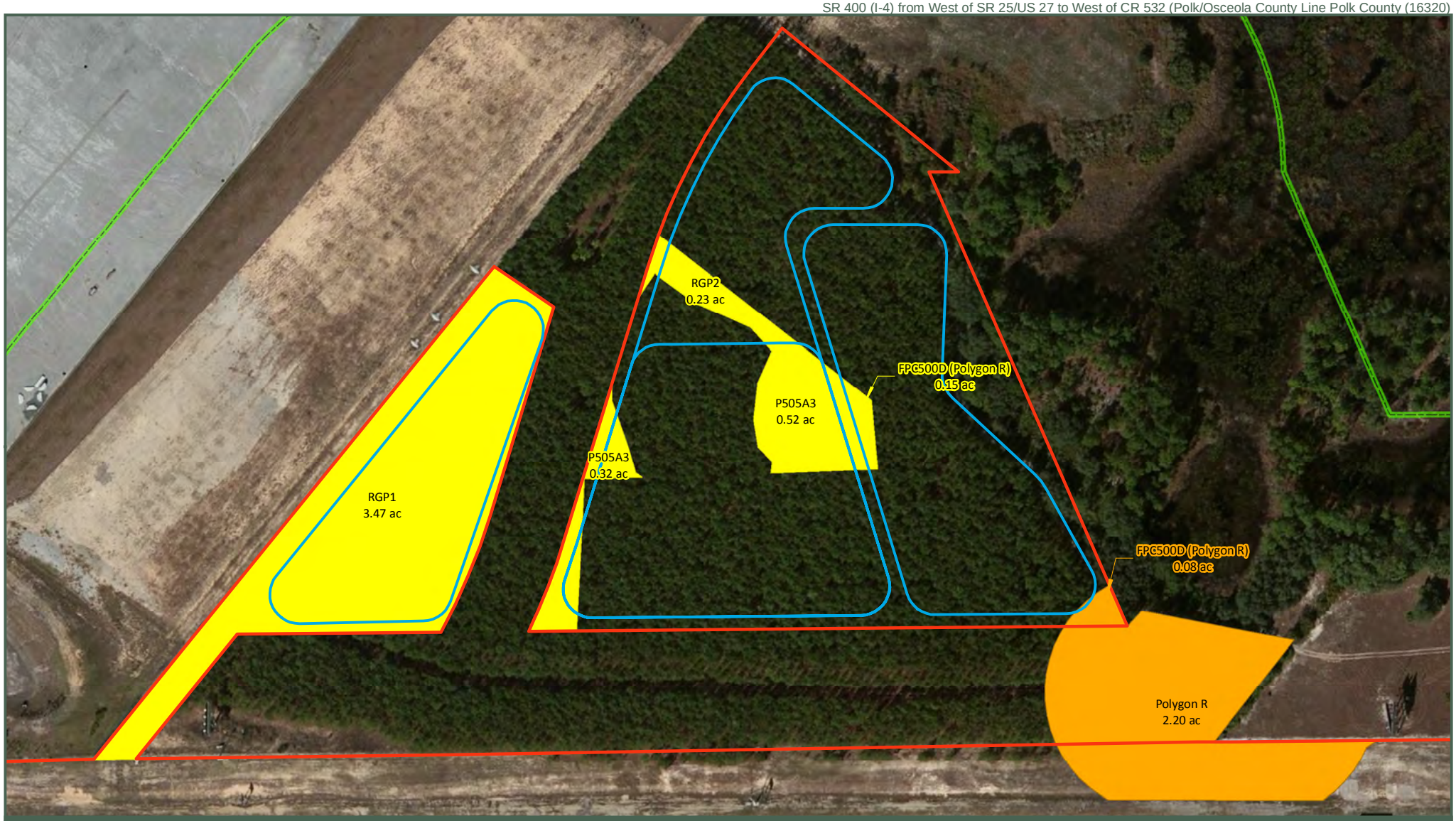
Notes:
RGP = Regional Pond
P = Pond
FPC = Floodplain Compensation

Figure E-Sheet 5 of 7: Sand Skink Occupied Habitat Map

0 100 200 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat
Based on FWS 188 ft Radial Buffer

1 " = 210 '



L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Occupied Habitat
- Area Not Surveyed (Presence Assumed)
- Surveyed Areas (Field Observations-2015)

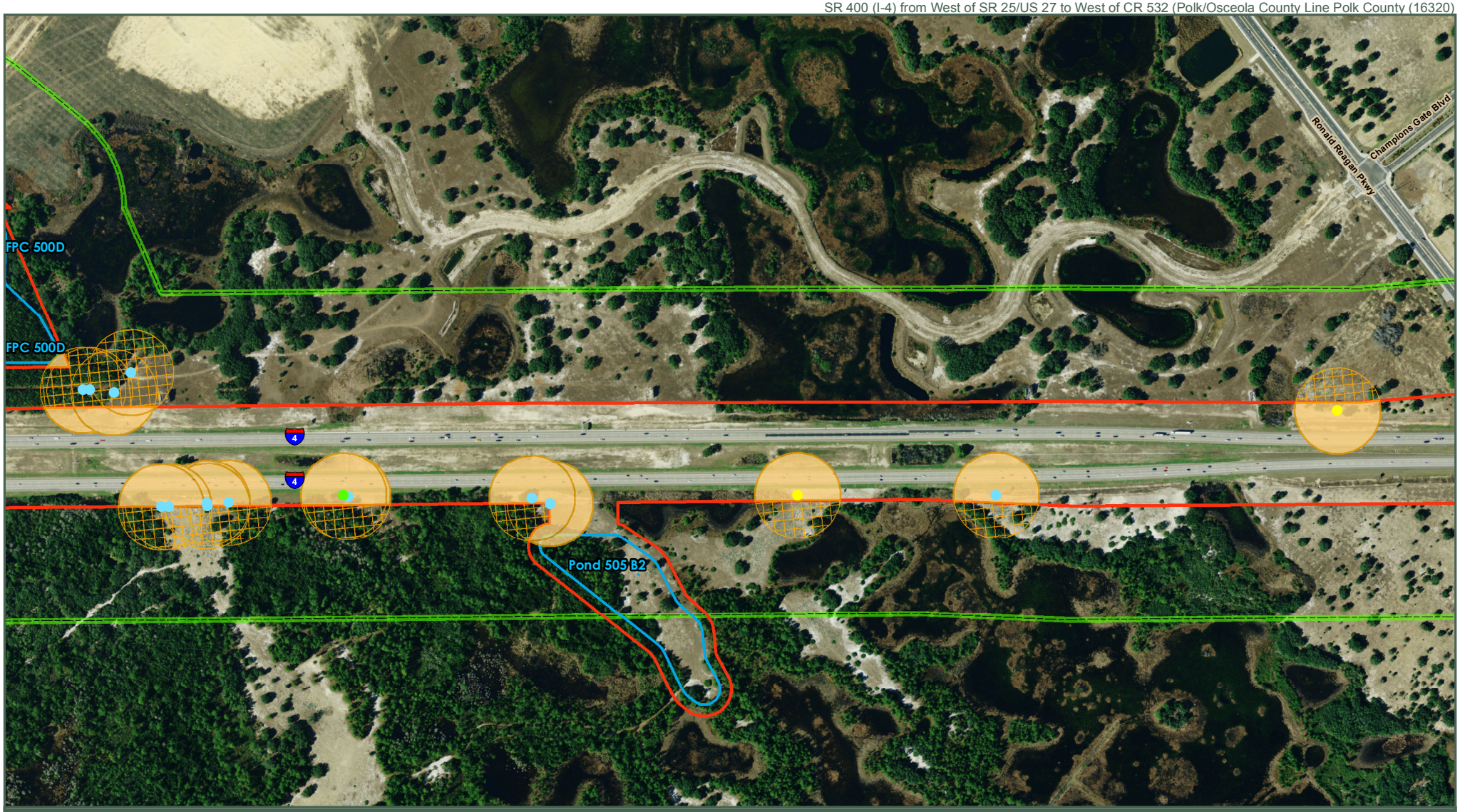
Notes:
RGP = Regional Pond
P = Pond
FPC = Floodplain Compensation

Figure E -Sheet 6 of 7: Sand Skink Occupied Habitat Map

0 100 200 Feet

2015 Sand Skink Survey
Sand Skink Occupied Habitat
Based on FWS 188 ft Radial Buffer

1 " = 210 '



L E G E N D

SR 400 (I-4) Segment 5 Boundaries
- Proposed Pond Sites (12/02/15)
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits

Sand Skink Data
- Tracks under Coverboard
- Animal Observation
- Tracks near Coverboard

FWS 188' Radial Buffer "Occupied Habitat"
- Area Beyond Project Boundary
- Area within Project Boundary

Figure E: Sheet 7 of 7 - FWS 188' "Occupied" Buffer Area

2015 Sand Skink Survey
Sand Skink Occupied Habitat
FWS 188 ft Radial Buffer

0 600 1,200 Feet

1 " = 600 '

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**	**Likelihood of Occurrence**	**Habitat**
Alligator mississippiensis	American alligator	T (S/A)	T(S/A)	S4	high	Various aquatic habitats
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	E	S1	low	Palmetto prairies and ruderal habitats
Aphelocoma coerulescens	Florida scrub-jay	T	T	S3	low	Scrub and scrubby flatwoods
Aramus guarana	Limpkin	SSC		S3	moderate	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	low	Wide variety of habitats
Egretta caerulea	Little blue heron	SSC		S4	observed	Marshes, ponds, lakes, meadows, streams & mangroves
Egretta thula	Snowy egret	SSC		S3	high	Marshes, lakes, ponds and shallow, coastal habitats
Egretta tricolor	Tricolored heron	SSC		S4	low	Marshes, ponds and rivers
Eudocimus albus	White ibis	SSC		S4	high	Marshes, mangroves, lakes and estuaries
Eumops floridanus	Florida bonneted bat	T		S1	low	Roosts in palms, hollow trees, buildings
Falco sparverius paulus	Southeastern American kestrel	T		S3	moderate	Open, or partly open habitats with scattered trees
Gopherus polyphemus	Gopher tortoise	T	C	S3	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	high	Shallow wetlands, freshwater marshes and wet prairies
Haliaeetus leucocephalus leucocephalus	Southern bald eagle			S3	high	Coasts, rivers and large lakes in open areas
Lampropeltis extenuatum	Short-tailed snake	T		S3	low	Longleaf pine-turkey oak, sand pine scrub and xeric hammocks
Mycteria americana	Wood stork	T	T	S2	high	Marshes, swamps, streams and mangroves
Picoides borealis	Red-cockaded woodpecker	T	E	S2	low	Open, mature pine woodlands
Pituophis melanoleucus mugitus	Florida pine snake	SSC		S3	low	Sandhills, scrubby flatwoods, xeric hammocks & ruderal habitats
Platalea ajaja	Roseate spoonbill	SSC		S2	low	Marshes, swamps, ponds, rivers and lagoons
Eumeces egregius lividus	Bluetail mole skink	T	T	S2	moderate	Sandy scrub, sandhills and xeric hammocks
Neoseps reynoldsi	Sand skink	T	T	S2	observed	Scrub, sandhills, and scrubby flatwoods
Podomys floridanus	Florida mouse	SSC		S3	high	Scrub, flatwoods and longleaf pine-turkey oak sandhills
Polyborus plancus audubonii	Crested caracara	T	T	S2	low	Open country, dry prairie, pasture lands
Pseudemys concinna suwaniensis	Suwannee cooter	SSC		S3	low	Rivers, spring runs, and associated backwaters
Puma concolor coryi	Florida panther	E	E	S1	low	Forested communities, large wetlands inaccessible to humans
Rana (=Lithobates) capito	Gopher frog	SSC		S3	moderate	Xeric uplands and pine flatwoods
Rostrhamus sociabilis plumbeus	Everglades snail kite	E	E	S2	moderate	Subtropical freshwater marshes, lakes
Rynchops niger	Black skimmer	SSC		S3	low	Coastal beaches and salt marshes
Sciurus niger shermani	Sherman's fox squirrel	SSC		S3	observed	Longleaf pine-turkey oak sandhills, mesic flatwoods, & baygalls
Sterna antillarum	Least tern	T		S3	low	Open, flat beaches, river and lake margins
Ursus americanus floridanus	Florida black bear			S2	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.						

	A	B	C	D	E	F	G
1	**Table 2: Protected plant species with the potential to occur in Polk County, Florida.**						
2	**Species Name**	**Common Name**	**FDA**	**USFWS**	**FNAI**	**Likelihood of**	**Habitat**
3						**Occurrence**	
4	*Asclepias curtissii*	Curtiss' milkweed	E		S3	low	Sandhills and scrub
5	*Bonamia grandiflora*	Florida bonamia, Scrub morning glory	E	T	S3	moderate	Sand pine scrub
6	*Calamintha ashei*	Ashe's savory	T		S3	low	Dry pinelands and sand pine scrub
7	*Calopogon multiflorus*	Many-flowered grass pink	T		S2S3	low	Pine flatwoods, esp. recently burned
8	*Centrosema arenicola*	Sand butterfly pea	E		S2	low	Sandhills and scrubby flatwoods
9	*Chionanathus pygmaeus*	Pigmy fringe tree	E	E	S3	low	Sand pine scrub
10	*Cladonia perforata*	Perforate Reindeer Lichen	E	E	S1	low	Rosemary scrub
11	*Clitoria fragrans*	Scrub Pigeon-wing	E	T	S3	low	Dry sandhills and scrub
12	*Coelorachis tuberculosa*	Piedmont joint grass	T		S3	low	karst areas or margins of shallow lakes and ponds
13	*Conradina breviflora*	Short-leaved rosemary	E	E	S2	low	Sandhills and scrub
14	*Crotalaria avonensis*	Avon Park rattlebox	E	E	S1	low	Scrub
15	*Ctenitis sloanei*	Comb fern	E		S2	low	Cypress swamps and hammocks
16	*Dicerandra frutescens*	Scrub balm	E	E	S1	low	Oak scrub
17	*Drosera intermedia*	Water sundew	T		S3	low	Pinelands, woods and bogs
18	*Encyclia tampensis*	Butterfly orchid	CE			low	Mangrove, cypress and hardwood swamps; hammocks
19	*Epidendrum conopseum*	Greenfly orchid	CE			low	Moist hammocks, cypress and hardwood swamps; epiphytic
20	*Eriogonum longifolium var. gnaphalifolium*	Scrub buckwheat	E	T	S3	low	Sandhill, oak-hickory scrub, pineland & turkey-oak areas
21	*Garberia heterophylla*	Garberia	T			moderate	Sand pine and oak scrub
22	*Harrisella filiformis*	Orchid	T			low	Cypress and hardwood swamps, old citrus groves; epiphytic
23	*Hartwrightia floridana*	Florida hartwrightia	T		S2	low	Acid, seepage areas
24	*Hypericum cumilicola*	Highlands scrub St. John's-wort	E	E	S2	low	Sand pine scrub
25	*Hypericum edisonianum*	Edison's St. John's-wort	E		S2	low	Wet deppressions in pinelands
26	*Illicium parviflorum*	Yellow star anise	E		S2	low	Wet woods and swamps
27	*Lechea cernua*	Nodding pinweed	T		S3	low	Scrub
28	*Lechea divaricata*	Spreading pinweed; pine pinweed	E		S2	low	Pinelands
29	*Liatris ohlingerae*	Key blazing star	E	E	S3	low	Sand pine scrub
30	*Lilium catesbaei*	Catesby's lily	T		S3	low	Moist pine flatwoods and savannahs
31	*Listera australis*	Southern twayblade	T			low	Hammocks
32	*Lobelia cardinalis*	Cardinal flower	T			low	Streams, riverbanks and spring runs
33	*Lupinus aridorum*	Scrub lupine	E	E	S1	moderate	Sand pine scrub
34	*Lycopodiella cernua*	Nodding clubmoss	CE			low	Wet pinelands
35	*Matalea floridana*	Florida Spiny-pod	E		S2	low	upland hardwood forests; esp. after a canopy opening event
36	*Nemastylis floridana*	Fall-flowering ixia; celestial lily	E		S2	low	Swamps, marshes and wet pine flatwoods
37	*Nolina brittoniana*	Britton's beargrass	E	E	S2	low	Dry pinelands and sand pine scrub

	A	B	C	D	E	F	G
38	*Ophioglossum palmatum*	Hand adder's tongue fern	E		S2	low	Hammocks; epiphytic on Sabal palmetto
39	*Osmunda cinnamomea*	Cinnamon fern	CE			observed	Wet woods and swamps
40	*Osmunda regalis*	Royal fern	CE			high	Wet woods and swamps
41	*Panicum abscissum*	Cutthroat grass	E		S2	low	Wet pinelands and seepage areas
42	*Paronychia chartacea*	Crystal Lake nailwort	E	T	S1	low	Sand pine scrub
43	*Pecluma plumula*	Polypody fern	E		S2	low	Hammocks; epiphytic
44	*Pecluma ptilodon*	Swamp plume polypody	E		S2	low	Hammocks
45	*Peperomia humilis*	Terrestrial peperomia; pepper	E		S2	low	Limestone grottos
46	*Pinguicula caerulea*	Blue butterwort	T			low	Wet, acid pinelands
47	*Platanthera blephariglottis*	Large white fringed orchid	T			low	Marshes, and wet, open, grassy areas
48	*Platanthera cristata*	Golden fringed orchid; crested fringed orchid	T			low	Marshes and wet, pine flatwoods
49	*Platanthera flava*	Southern tubercled orchid; gypsy-spikes	T			low	Cypress and hardwood swamps
50	*Platanthera integra*	Yellow fringeless orchid	E		S3	low	Wet pine flatwoods, wet prairies, bogs, marshes
51	*Platanthera nivea*	Snowy orchid; bog torch	T			low	Wet pine flatwoods
52	*Pogonia ophioglossoides*	Rose pogonia	T			low	Marshes and wet, pine flatwoods
53	*Polygala lewtonii*	Lewton's milkwort	E	E	S3	low	Dry, oak woods
54	*Polygonella basiramia*	Hairy jointweed; hairy wireweed	E	E	S3	low	Sand pine scrub
55	*Polygonella myriophylla*	Small's jointweed; woody wireweed; sandlace	E	E	S3	low	Sand pine scrub
56	*Prunus geniculata*	Scrub plum	E	E	S3	observed	Sand pine scrub
57	*Pteroglossaspis ecristata*	Wild coco; giant orchid	T		S2	low	Sand pine scrub and sandhills
58	*Rhapidophyllum hystrix*	Needle palm	CE			low	Wet to mesic woods and hammocks
59	*Rhynchospera megaplumosa*	Large Plumed beaksedge	E		S3	low	
60	*Salix floridana*	Florida willow	E		S2	low	Wet woods and stream banks
61	*Sarracenia minor*	Hooded pitcherplant	T			low	Wet, open, acid pinelands and bogs
62	*Scaevola plumieri*	Inkberry	T			low	Coastal strands
63	*Schizachyrium niveum*	Scrub bluestem	E		S1	low	Sand pine scrub
64	*Spiranthes brevilabris var. floridana*	Florida ladies' tresses	E			low	Pine flatwoods
65	*Spiranthes laciniata*	Lace-lip ladies' tresses; lace-lip spiral orchid	T			low	Marshes and cypress swamps
66	*Spiranthes longilabris*	Long-lip ladies' tresses	T			low	Marshes and wet pine flatwoods
67	*Spiranthes tuberosa*	Little ladies' tresses; little pearl twist	T			low	Pine flatwoods
68	*Stylisma abdita*	Scrub stylisma	E		S2S3	low	Dry pinelands and scrub
69	*Thelypteris serrata*	Toothed lattice-vein fern	E		S2	low	Cypress swamps
70	*Tillandsia utriculata*	Giant wild pine	E			low	Hammocks and cypress swamps; epiphytic
71	*Warea amplexifolia*	Clasping warea	E	E	S1	low	Dry pinelands and sandhills
72	*Warea carteri*	Carter's warea; mustard	E	E	S3	low	Sandhills and sand pine scrub
73	*Zephyranthes simpsonii*	Simpson's zephyr lily	T		S2S3	low	Wet pine flatwoods and meadows
74	*Ziziphus celata*	Florida jujube; Florida zizaphus	E	E	S1	low	Scrub

	A	B	C	D	E	F	G
75							
76	Notes:						
77	FDA = Florida Department of Agriculture						
78		E= Endangered; T= Threatened; CE= Commercially Exploited					
79	USFWS = US Fish and Wildlife Service						
80		E= Endangered; T= Threatened					
81	FNAI = Florida Natural Areas Inventory						
82		S1= Critically Imperiled Due to Extreme Rarity; S2= Imperiled Due to Rarity; S3= Very Rare and Local;					
83		S4= Apparently Secure; SH= Historical Occurrence; ?= Tentative Ranking					
84	Likelihood of Occurrence						
85		Low= Low likelihood; Mod= Moderate likelihood; High= High likelihood; Obs= Observed by Stantec;					
86		Obs*= Observed by Others					
87							
88	*Source: Stantec Endangered Species Database, 2014.*						

APPENDIX C
PHOTOS

I-4 PD&E Segment 5 Pond Site Photographs

Pond Site 500

Pond Site FPC 500B

Pond Site FPC 500C

Pond Site 501A

Pond Site 501B

Pond Site 501C

Pond Site 502

Pond Site 503A

Pond Site 503B

Pond Site 503C and 503D

Pond Site 504

Pond Site 505 A3/ Regional Pond 2

Pond Site 505 B2

Pond Site 506

Pond Site FPC 506

Regional Pond 1

Pond Site 100 (Segment 1)

APPENDIX D
AGENCY COORDINATION

United States Department of the Interior

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

February 21, 2017

Cathy Kendall
Federal Highway Administration
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Service Consultation Code:	04EF2000-2016-F-0379
Date Received:	June 7, 2016
Consultation Initiation Date:	October 14, 2016
Applicant:	Florida Department of Transportation
Project:	Interstate 4 from U.S. Highway 27 to County Road 532
County:	Polk

Dear Ms. Kendall:

The U.S. Fish and Wildlife Service (Service) has received the Federal Highway Administration's (FHWA) email dated June 24, 2016, requesting initiation of formal consultation for their authorization of the widening of Interstate 4 (I-4) from about 2 miles{mi [3.2 kilometers (km)]} west of U.S. Highway 27 to just west of County Road 532 (I-4 Project). The I-4 Project is being proposed by the Florida Department of Transportation (FDOT). This document transmits the Service's biological opinion regarding the likelihood of the I-4 Project to jeopardize the continued existence of the threatened sand skink (*Neoseps reynoldsi*), threatened blue-tailed mole skink (*Eumeces egregius lividus*), and the endangered scrub plum (*Prunus geniculata*). It also provides the Service's concurrences for the FHWA's determinations for the threatened eastern indigo snake (*Drymarchon corais couperi*), Florida scrub-jay (*Aphelocoma coerulescens*), Audubon's crested caracara (*Polyborus plancus audubonii*), wood stork (*Mycteria americana*), and endangered Britton's beargrass (*Nolina brittoniana*). This document is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended in 1998 (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

The Service's biological opinion is based on the biological assessment provided to the FHWA by the FDOT, correspondence, telephone conversations, emails, and other sources of information. A complete record of this consultation is on file at the South Florida Ecological Services Office in Vero Beach, Florida.

Consultation History

In letter to the Service dated June 8, 2016, the FDOT, on behalf of the FHWA, provided a biological assessment for the I-4 Project.

In an email to the Service dated June 24, 2016, the FHWA determined that the I-4 Project may affect and is likely to adversely affect the sand skink, the blue-tailed mole skink, and the scrub plum. The FHWA requested that the Service initiate formal consultation pursuant to section 7 of the Act. The FHWA also determined that the I-4 Project may affect, but is not likely to adversely affect the eastern indigo snake, Florida scrub-jay, Audubon's crested caracara, wood stork, and Britton's beargrass, and requested concurrence for these determinations pursuant to section 7 of the Act.

In an email to the FDOT dated June 13, 2016, the Service requested that the FDOT, on behalf of the FHWA, provide additional information on the I-4 project.

In an email to the Service dated October 14, 2016, the FDOT, on behalf of the FHWA, provided additional information on the I-4 Project.

As of October 14, 2016, the Service has received all the information necessary for initiation of formal consultation on the sand skink, blue-tailed mole skink, and scrub plum for this project as required in the regulations governing interagency consultations (50 CFR § 402.14).

BIOLOGICAL OPINION

This Biological Opinion provides the Service's opinion as to whether the proposed I-4 Project is likely to jeopardize the continued existence of the sand skink, the blue-tailed mole skink, and the scrub plum. Critical habitat has not been designated for the sand skink, the blue-tailed mole skink, or the scrub plum. Therefore, this Biological Opinion will not address destruction or adverse modification of critical habitat.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" 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 that species (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, defined as a description of the range wide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental

Baseline, defined as an analysis of the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, defined as the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) the Cumulative Effects, defined as an evaluation of the effects of future, non-federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the species, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

DESCRIPTION OF PROPOSED ACTION

The FHWA proposes to authorize the FDOT to construct improvements to I-4 from about 2 mi (3.2 km) west of U.S. Highway 27 to just west of County Road 532. The existing 4.5-mi (7.2 km) segment of six-lane roadway will be enlarged to 10 paved travel lanes. The 10 travel lanes will each be 12 feet {ft [3.7-meter (m)]} wide and configured as 5 westbound lanes and 5 eastbound lanes. Each 5-lane configuration will consist of 3 general use travel lanes bounded on both sides by 10-ft (3-m) wide paved shoulders, and 2 express travel lanes bounded to the inside by a 12-ft (3.7-m) wide paved shoulder and to the outside by a 10-ft (3-m) wide paved shoulder. The general use lanes and the express lanes will be separated by a 2-ft (0.6-m) tall barrier wall. The eastbound and westbound lanes will be bounded to the outside by a 15-ft (4.6-m) wide grass swale and separated by a 44-foot (13.4-m) wide grass center median. The I-4 Project will also include the construction of 8 new stormwater treatment ponds, and the modification of 11 existing stormwater treatment ponds. The purpose of the I-4 Project is to provide additional lane capacity to reduce traffic congestion associated with expected future population growth, and enhance the movement of freight and goods. The I-4 Project is located in Sections 4, 5, 7 and 8, Township 26 South, Range 27 East; and Sections 1, 23 and 24, Township 26 South, Range 24 East in Polk County, Florida (Figure 1).

The I-4 Project will fill 20.83ac (8.4 ha) of wetlands. To compensate for the loss of wetlands, the FDOT has proposed to acquire credits from an approved wetland mitigation bank.

As described below in the section entitled "Environmental Baseline", the construction of the I-4 Project will incidentally result in take of the sand skink, blue-tailed mole skink and the scrub plum through construction activities associated with the I-4 Project. Construction activities are expected to incidentally injure and kill skinks, result in the permanent loss 21.04 acres (ac [8.5 hectare (ha)]) of skink habitat, and result in the loss of several specimens of the scrub plum.

The FDOT has proposed the following conservation measures to benefit the listed species affected by this action. To compensate for the loss of skinks and 21.04 ac (8.5 ha) of skink habitat, the FDOT will acquire 42.08 credits providing 42.08 ac (17 ha) of skink habitat at a

Service-approved Conservation Bank. Before construction of the I-4 Project can commence: 1) the FDOT will provide the Service a receipt or letter from the Service-approved conservation bank verifying that the 42.08 credits have been acquired, and 2) the Service will provide an email or letter to the FHWA and FDOT indicating that we have received the receipt or letter from the Service-approved conservation bank. To benefit the conservation and recovery of the scrub plum, the FDOT has proposed to work with Bok Tower Gardens (BTG), a participating institution of the National Center for Plant Conservation (NCPC), to collect seeds from scrub plum plants and translocate suitable specimens of the scrub plum to public conservation lands or other lands acceptable to the Service. Collected seeds would be under the protection of the BTG and either stored or used for propagation. Collected plant specimens may be temporarily housed, depending on available space, at the National Collection Beds that exist on-site at the BTG. It may also be possible to use nurseries associated with the Florida Native Plant Society, to temporarily care for collected plant specimens until permanent placement within nearby conservation lands can be coordinated.

Action area

The action area is defined as all areas to be affected directly or indirectly by the Federal action. The I-4 Project will result in the widening of an existing highway, and not provide new access to undeveloped lands. Therefore, the Service finds it unlikely the I-4 Project will induce new development in the project area. Consequently, the Service considers the action area for this I-4 Project as all lands within the project footprint

LISTED SPECIES NOT LIKELY TO BE ADVERSELY AFFECTED BY THE PROPOSED ACTION

Eastern indigo snake

The I-4 Project occurs within the geographic range of the eastern indigo snake. Eastern indigo snakes were not observed within the project site during pedestrian surveys conducted by the FDOT's environmental consultant. To minimize adverse effects to this species during construction, the FDOT has agreed to follow the Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013) during construction of the project. The FHWA has determined the I-4 Project may affect, but is not likely to adversely affect the eastern indigo snake. Based on the protective measures provided, the Service concurs with the FHWA's determination for the eastern indigo snake.

Florida scrub-jay

The I-4 Project occurs within the geographic range of the Florida scrub-jay. Much of the habitat for the scrub-jay near and within the project corridor has been lost due to development. Florida scrub-jays were not observed within the small area of remaining suitable habitat within the project footprint during call surveys conducted in 2013, and during recent pedestrian surveys the habitat. The FHWA has determined that the I-4 Project may affect but is not likely to adversely

affect the Florida scrub-jay. Based on the information provided, the Service concurs with this determination.

Audubon's crested caracara

The I-4 Project occurs within the geographic range of Audubon's crested caracara (caracara). Suitable nesting habitat for the caracara does not occur in or near the project footprint. Caracaras and caracara nests were not observed in or near the project footprint during pedestrian surveys of the project foot print and immediately adjacent lands conducted by the FDOT's consultant. The FHWA has determined that the I-4 Project may affect but is not likely to adversely affect Audubon's crested caracara. Based on the information provided, the Service concurs with this determination.

Wood stork

The I-4 Project occurs within the geographic range of the wood stork and within the Core Foraging Area [i.e., all lands within 18.6 mi (29.9km)] of two active wood stork nesting colonies. The project will fill 20.83 ac (8.4 ha) of wetlands consisting of 12.18 ac (4.9 ha) of short hydroperiod (≤ 180 days inundated annually) wetlands and 8.65 ac (3.5 ha) of long hydroperiod (>180 days inundated annually) wetlands . Through use of the Service's Wood Stork Foraging Habitat Assessment Methodology (Service 2012a), the FDOT's consultant has determined that the 12.18 ac (4.9 ha) of short hydroperiod wetlands provide 19.47 kilograms{kg [pounds (42.92 lb)]} of wood stork forage, and the 8.65 ac (3.5 ha) of long hydroperiod wetlands provide 26.62 kg (58.69 lb) of wood stork forage. To compensate for the loss of wood stork foraging habitat resulting from the I-4 Project, the FDOT has proposed to acquire credits from an approved wetland mitigation bank that provide at least 19.47 kg (42.92 lb) of wood stork forage from short hydroperiod wetlands and 26.62 kg (58.69 lb) of wood stork forage from long hydroperiod wetlands. The FHWA has determined the I-4 Project may affect, but is not likely to adversely affect the wood stork. Based on the minor impacts to wood stork foraging habitat (i.e., the loss of 20.83 ac [8.4 ha of wetlands]), the Service concurs with the FHWA's determination for the wood stork.

Britton's beargrass

The I-4 Project occurs within the geographic range of Britton's beargrass. Britton's beargrass was observed on and near the I-4 Project site during surveys conducted in the 1990s However, this species was not observed within the I-4 Project footprint during recent surveys of the for Federally listed plants conducted by FDOT's consultant in 2014. The FHWA has determined that the I-4 Project may affect but is not likely to adversely affect Britton's beargrass. Based on the information provided, the Service concurs with this determination.

STATUS OF THE SPECIES RANGE WIDE – SAND SKINK

Please see Enclosure 1 for a detailed Status of the Species for the sand skink. A short summary of the Status of the Species is presented below.

The sand skink is a small, maximum total length of about 5 inches {in [12.7 centimeters (cm)]}, fossorial lizard that occurs in sparsely vegetated, xeric-upland habitats with loosely aggregated, sandy soils. This species spends nearly all its time within the soil and has a variety of morphological adaptations for a fossorial lifestyle. The legs of the sand skink are vestigial and practically nonfunctional, and sand skinks move or swim through the soil by serpentine locomotion. Sand skinks feed on a variety of hard and soft-bodied arthropods that occur below the ground surface, such as: beetles, termites, spiders, ant lions, caterpillars, and roaches, (Myers and Telford 1965; Smith 1982). The range of the sand skink is located on the sandy ridges of interior central Florida from Marion County south to Highlands County, and includes Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam Counties (Christman 1988; Telford 1998). The current population size of the sand skink is not well known because recent comprehensive, range wide surveys have not been conducted. As of September 2006, 132 records of the sand skink have been documented by the Florida Natural Areas Inventory (Griffin 2007). Threats to the sand skink include the destruction and degradation of its habitat due to commercial and residential development and conversion of habitat due to agricultural activities. Approximately 85 percent of the xeric upland communities historically used by the sand skink have been lost (Turner *et al.* 2006)

STATUS OF THE SPECIES RANGE WIDE – BLUE-TAILED MOLE SKINK

Please see Enclosure 2 for a detailed Status of the Species for the blue-tailed mole skink. A short summary of the Status of the Species is presented below.

The blue-tailed mole skink is a small, maximum total length of 5 in (12.7 cm), fossorial lizard known to occur in sparsely vegetated xeric-upland habitats with loosely aggregated, sandy soils. The legs of the blue-tailed mole skink are somewhat reduced in size and used only for surface locomotion and not for "swimming" through the sand (Christman 1992). Blue-tailed mole skinks eat arthropods, and roaches, crickets, and spiders make up the bulk of the diet (Mount 1963). This species has a small geographic range and has been documented only in the central ridges of Polk County, Osceola County, and Highlands County in Florida. The population size of the blue-tailed mole skink is not known due to the lack of recent range wide surveys, and blue-tailed mole skinks are thought to be less common than the sand skink. Threats to the blue-tailed mole skink are similar to those of the sand skink and include the destruction and degradation of its habitat due to commercial and residential development, and conversion of habitat due to agricultural activities. Much of xeric upland communities historically used as habitat by the blue-tailed mole skink have been lost due to anthropogenic activities.

STATUS OF THE SPECIES RANGE WIDE – SCRUB PLUM

Please see Enclosure 3 for a detailed Status of the Species for the scrub plum. A short summary of the Status of the Species is presented below.

The scrub plum is a highly branched shrub that can reach 6 ft (2 m) in height. This species is andromonoecious (i.e., having male and bisexual flowers are present on the same plant)

(Weekley and Menges 2001), and prefers dry and sunny locations that contain nutrient-poor and acidic sandy soils (entisols). Scrub plums are usually found in oak-dominated scrub and high pine, sandhill and scrub communities. The scrub plum occurs in three general areas on Florida's central ridges: 1) Lake County, west and southwest of Lake Apopka; 2) the southwest and northwest corners of Orange and Osceola Counties, respectively; and 3) Polk and Highlands Counties, from the City of Lake Wales south to the Highlands County/Glades County border (FNAI 1996) on the Lake Wales Ridge. Although the historic range was rather extensive compared to other narrowly endemic plants of Florida's central ridges, this species has declined with destruction and fragmentation of its scrub habitat. Treats to the species include habitat loss due to commercial and residential development and agricultural conversion, removal by plant collectors, and fire suppression.

ENVIRONMENTAL BASELINE

As defined in Service's regulations, "the environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process."

In addition, under the Act's regulatory approach, future Federal actions are not included in either the environmental baseline or the cumulative effects analysis of a biological opinion, because they will be subjected to consultation when they occur [51 Fed. Reg. 19926, 19933 (June 3, 1986 - preamble to FWS consultation regulations)].

Status of the species within the action area

Sand skink and blue-tailed mole skink: The FDOT's consultants surveyed the I-4 Project footprint to determine the status of sand skinks. Pedestrian and coverboard surveys, based on the Service's guidance (Service 2012b), were conducted in March and April of 2015 in areas of suitable soils (i.e., excessively drained, well drained and moderately drained, sandy soils) known to be preferred as habitat by sand skinks throughout their range (Service 2012b). Because sand skinks leave a distinctive sinusoidal (s-shaped) track at the soil surface when they move through the soil, tracks of the sand skink can be used to establish the presence of the sand skink at a site. The pedestrian surveys consisted of visual surveys for sand skink tracks throughout areas that contained suitable skink soils in the I-4 Project site. Coverboard surveys consisted of placing 2-ft x 2 ft x 0.5 in (0.61m by 0.61m x 1.2 cm) squares of plywood, masonite, or a similarly rigid material at a density of 40 per ac (110 per ha), randomly or at regular intervals throughout areas of suitable skink soils on the I-4 Project Site. The coverboards were allowed to sit for one week, and then were visually inspected once per week for the next four consecutive weeks. The inspection protocol consisted of picking up the board, scanning the area underneath the board for sand skink tracks, and replacing the coverboard in its original location until the final inspection of the survey. The use of coverboards for survey purposes enhances the detectability of sand skink tracks because sand skinks shelter under the boards for thermoregulatory purposes. The

survey methods employed can be used to demonstrate presence, and estimate the relative abundance of sand skinks on the I-4 Project site and the extent of the I-4 Project site used by skinks, but do not provide an estimate of the number of sand skink that occur on the site.

Tracks of the sand skink were observed during the surveys conducted within suitable soils conducted on the I-4 Project site. Based on the spatial extent of the tracks observed during the survey, research on sand skink movements conducted by Penney (2001) indicating that about $2/3^{rds}$ of sand skinks in her study were observed to exhibit dispersal movements of at least 188 ft (57.2 m), and the acreage of suitable skink soils found on the I-4 Project site, the Service finds that 21.04 ac (8.51 ha) of the I-4 Project site is occupied by the sand skink. The actual number of skinks that currently occur on the site is not known. Mark-recapture surveys would need to be undertaken for at least a year to obtain this information.

Blue-tailed mole skinks were not observed on the I-4 Project site. However, a reliable survey method has not been developed for this species, and this species is generally difficult to detect. The entire known geographic range of the blue-tailed mole skink occurs within a portion of the known geographic range of the sand skink (i.e., the central ridges of Polk County, Osceola County, and Highlands County in Florida). Blue-tail mole skinks also have soil and habitat preferences that are basically identical to the sand skink. The Service notes that blue-tailed mole skinks are likely to occur wherever sand skinks occur in the range of the blue-tailed mole skink. Therefore, for the purposes of this Biological Opinion, the Service finds that blue-tailed mole skink also reasonably certain to occur within the 21.04 ac (8.51 ha) of the I-4 Project site defined as occupied sand skink habitat discussed above

To compensate for the loss of sand skinks, blue-tailed mole skinks and their habitat, the FDOT has proposed to restore, enhance, and preserve at least 42.08 ac (17.02 ha) of sand skink and blue-tailed mole skink habitat. This habitat will be provided through the purchase of 42.08 skink credits at a Service-approved conservation bank or banks.

Scrub plum: The FDOT's consultant surveyed the I-4 Project footprint to determine the status of Federally listed plants. Three specimens of scrub plum were observed during the survey. As a conservation measure to benefit the scrub plum, the FDOT has proposed to work with BTG, a participating institution of the NCPC, to collect seeds from scrub plum plants and translocate suitable specimens of the scrub plum to public conservation lands or other lands acceptable to the Service. Collected seeds would be under the protection of the BTG and either stored or used for propagation. Collected plant specimens may be temporarily housed, depending on available space, at the National Collection Beds that exist on-site at the BTG. It may also be possible to use nurseries associated with the Florida Native Plant Society to temporarily care for collected plant specimens until permanent placement within nearby conservation lands can be coordinated.

Factors affecting species environment within the action area

Past land clearing related to the construction of the existing I-4 roadway, fire suppression and the presence of invasive and exotic invasive plant species [i.e., cogongrass (*Imperata cylindrical)*]

have all resulted in the degradation and loss of skink habitat and scrub plum habitat in the action area. The I-4 Project will result in the permanent conversion of habitat for the sand skink, the blue-tailed mole skink, and the scrub plum within the I-4 Project footprint into a paved highway, maintained road right-of-way, and stormwater treatment ponds. Suitable habitat for sand skink, blue-tailed mole skink, and the scrub plum is not expected to persist in the action area following completion of the I-4 Project.

Climate change

Our analyses under the Act include consideration of observed or likely environmental effects to the sand skink, blue-tailed mole skink and scrub plum related to ongoing and projected changes in climate. As defined by the Intergovernmental Panel on Climate Change (IPCC), "climate" refers to average weather, typically measured in terms of the mean and variability of temperature, precipitation, or other relevant properties over time. Thus "climate change" refers to a change in such a measure that persists for an extended period, typically decades or longer, due to natural conditions (e.g., solar cycles) or human-caused changes in the composition of the atmosphere or in land use (IPCC 2013, p. 1450). Detailed explanations of global climate change and examples of various observed and projected changes and associated effects and risks at the global level are provided in reports issued by the IPCC (2014 and citations therein). Information for the United States at national and regional levels is summarized in the National Climate Assessment (Melillo *et al.* 2014 entire and citations therein; see Melillo *et al.* 2014, pp.28-45 for an overview). Because observed and projected changes in climate vary regionally and locally from global average conditions, the Service uses "downscaled" climate projections (developed through appropriate scientific procedures), when available, to assess the range wide effects of climate change on a given species (See Melillo *et al.* 2014, Appendix 3, pp. 760-763 for a discussion of climate modeling, including downscaling) . Projections of this type provide higher resolution climatic information and are likely more relevant to our assessment. In our analysis, we use our expert judgment to weigh the best scientific and commercial data available in our consideration of relevant aspects of climate change and related effects on a species through its range.

Climate change may result in sea level rise and altered weather patterns in south Florida. Although inundation of habitat from sea level rise is not anticipated to occur within the action area, altered weather patterns could affect the sand skink, blue tailed mole skink and scrub plum. For example, an increase in precipitation could increase vegetation growth, including root growth, in sand skink and blue-tailed mole skink habitat. This could inhibit the movement of skinks through the soil or potentially make the habitat unsuitable for these species. The effect of an increase or decrease in precipitation on the scrub plum is largely unknown but could benefit other plant species that may compete with the scrub plum.

EFFECTS OF THE ACTION

This section analyzes the direct and indirect effects of the proposed action, and interrelated and independent actions on the sand skink, blue-tailed mole skink, and scrub plum.

Factors to be considered

The sand skink, blue-tailed mole skink, and scrub plum are known to occur, or are likely to occur, within the I-4 Project site. The timing of construction for the I-4 Project, relative to sensitive periods of the life cycles of these species, is unknown. The I-4 project will be constructed in a single, disruptive event and alter soils and the native vegetation within the project site. The time required to complete construction of the I-4 Project is not known, but it is likely the majority of the land clearing will be completed within a few months. The I-4 Project will result in incidental injury or mortality of sand skinks and blue-tailed mole skinks and the permanent loss of habitat for these species. The I-4 Project will also result in the loss of scrub plums from the I-4 Project site. Conversely, the acquisition of 42.08 credits at an approved skink conservation bank will benefit skinks by providing for the perpetual protection and management of 42.08 ac (17 ha) of skink habitat. The removal and relocation of the scrub plums from the I-4 Project site to another location is likely to prevent the mortality of these specimens and may help to establish a new population of this species.

Analyses for effects of the action

Direct effects: Direct effects are those effects that are caused by the proposed action, at the time of construction, and are reasonably certain to occur. The direct effects that the I-4 Project will have on the sand skink, blue-tailed mole skink and scrub plum are discussed below.

The construction of the I-4 Project will convert all potential habitat in the project footprint for the sand skink, blue-tailed mole skink, and scrub plum into paved roadway for motor vehicles, sodded and maintained road right-of-way, and stormwater treatment ponds. Construction activities within the I-4 Project site can crush skinks, skink eggs and scrub plum plants, and incidental mortality of sand skinks and blue-tailed mole skinks is expected to occur from the land clearing associated with the I-4 Project. The scrub plum plants on the I-4 Project site will be removed and relocated to another site prior to the commencement of construction activities. However, stress associated with removal and translocation process has the potential to kill at least some of the plant specimens. As described above, the I-4 project will result in the loss of 21.04 ac (8.5 ha) of habitat currently occupied by the sand skinks and the blue-tailed mole skink and approximately three specimens of the scrub plum. Suitable habitat for these species is not expected to occur in the project footprint following completion of the I-4 Project. Therefore, the project is expected to directly affect the persistence of sand skinks, blue-tailed mole skinks, and scrub plum in the action area. The I-4 Project will also add to the continued fragmentation of sand skink, blue-tailed mole skink, and scrub plum habitat in the region and result in a small reduction of the geographic distribution of each of these species. The Service notes that the impact of habitat loss on the fitness of the sand skink, blue-tailed mole skink, and scrub plum in the action area, and ultimately their range wide populations, can be difficult to discern. However we do not expect the amount of habitat loss due to the project, by itself, to significantly affect the important biological functions of these species (e.g., feeding and breeding, growth and development etc.), or ultimately affect the population size of these species within in the action area or range wide. Nevertheless, we acknowledge that, collectively, habitat loss and degradation

due to development projects, in the action area and range wide, could threaten the survival of the sand skink, blue-tailed mole skink, and scrub plum and their recovery. Therefore, we will continue to monitor the collective effects of habitat loss related to development and other causes on these species as it continues to occur.

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. Interrelated or interdependent actions are not expected to result from the project.

Indirect effects: Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. The sand skink, blue-tailed mole skink, and scrub plum, and habitat for these species, are not is not expected to exist in the action area following completion of the I-4 Project. Therefore, the I-4 Project is not expected to result in indirect effects to the sand skink, blue-tailed mole skink, and scrub plum.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, County, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future Federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service has considered cumulative effects within the action area for the sand skink, blue-tailed mole skink, and scrub plum, 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 the sand skink, blue-tailed mole skink, and scrub plum, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the I-4 Project, as proposed, is not likely to jeopardize the continued existence of the sand skink, blue-tailed mole skink, or scrub plum. We have reached this conclusion because: only a small amount of habitat [21.04 ac (8.5 ha)] currently used by the sand skink, blue-tailed mole skink, and scrub plum will be permanently lost; this amount only represents a small reduction in the geographic range of the species; and the

habitat lost will not significantly affect the important biological functions of these species or significantly reduce their range-wide populations.

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. 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. 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. 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 such taking is in compliance with the terms and conditions of the incidental take statement. The terms and conditions described below are nondiscretionary and must be undertaken by the FHWA so they become binding conditions of any grant or permit issued to the FDOT, as appropriate, for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require the FDOT to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protection coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA or the FDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

Sections 7(b)(4) and 7 (o)(2) of the Act generally do not apply to listed plant species (i.e., the scrub plum). However, limited protection of listed plants is provided to the extent that the Act prohibits the removal and reduction to possession of Federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law. Therefore, the scrub plum will not be mentioned further in this incidental take statement.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The Service anticipates incidental take of sand skinks and blue-tailed mole skinks in the form of harm (i.e., injury, mortality and habitat loss). Construction activities associated with the I-4 Project will result in the loss of 21.04 ac (8.5 ha) of occupied skink habitat. The Service finds that the number of sand skinks and blue-tailed mole skinks 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) extensive mark/recapture surveys would be needed to estimate skink numbers at the I-4 Project site, thus the number of skinks currently occurring in the I-4 Project footprint is not well known. As discussed in the *Status of the species in the action area*, although blue-tailed mole skinks have not been documented within the I-4 Project site, they have similar biological and habitat requirements as sand skinks and are reasonably certain to occur on the I-4 Project site.

Because habitat loss is known to result in take of the sand skinks and blue-tailed mole skinks, and is easily measured and monitored, the Service has decided to express the amount of take resulting from the I-Project in terms of the acreage of habitat lost. The amount of take resulting from the I-4 Project is 21.04 ac (8.5 ha). The Service finds that habitat loss provides a suitable surrogate, as defined in 50 CFR 402.14(i)(1)(i), to express the amount of anticipated take of sand skinks and blue-tailed mole skinks resulting from the I-4 Project, and sets a clear standard for determining when the amount of anticipated take is exceeded. In addition, the Service finds that the amount of incidental take is moderated by the acquisition of 42.08 credits at a Service-approved conservation bank. This habitat will be enhanced, managed, and preserved in perpetuity to benefit the sand skink and blue-tailed mole skink.

REASONABLE AND PRUDENT MEASURES

When providing an incidental take statement, the Service is required to provide: 1) reasonable and prudent measures it considers necessary or appropriate to minimize the take; 2) terms and conditions that must be complied with to implement the reasonable and prudent measures; and 3) procedures to be used to handle or dispose of any individuals taken. The Service finds the FDOT has already designed the I-4 Project to minimize take resulting from the action as described in the "Description of the Proposed Action" section of this Biological Opinion. Therefore, additional reasonable and prudent measure and their implementing terms and conditions are not necessary to reduce take of the sand skink and blue-tailed mole skink resulting from the action, and will not be provided.

MONITORING AND REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the FHWA and the FDOT must provide adequate monitoring and reporting to determine if the amount or extent of take is approached or exceeded. Following land clearing associated with the I-4 Project, the FDOT must provide a letter or email to the Service providing the actual acreage of occupied skink habitat cleared by the I-4 Project.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Upon locating a dead, injured, or sick threatened or endangered species, initial notification must be made to the nearest Service Law Enforcement Office; Fish and Wildlife Service; 20501 Independence Boulevard; Groveland, Florida 34736-8573; 352-429-1064. Secondary notification should be made to the FWC; South Region; 3900 Drane Field Road; Lakeland, Florida; 33811-1299; 1-800-282-8002. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured sand skinks and blue-tailed mole skinks, or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not unnecessarily disturbed.

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 is not proposing any conservation recommendations at this time.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the I-4 Project. 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 (see below); (2) 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; (3) 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; or (4) a new species is listed or critical habitat designated that may be affected by the action. The amount of incidental take authorized by this consultation may be exceeded should impacts from the proposed I-4 Project increase beyond 21.04 ac (8.5 ha) of occupied skink habitat as reported in this Biological Opinion. 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 John Wrublik at 772-469-4282.

Sincerely yours,

for Roxanna Hinzman
Field Supervisor
South Florida Ecological Services Office

Enclosures

cc: electronic only
FDOT, DeLand, Florida (Catherine Owen)
FHWA, Orlando, Florida (Luis Lopez)
FWC, Tallahassee, Florida (FWC-CPS)
NOAA Fisheries, St. Petersberg, Florida (David Rydene)
Service, Vero Beach, Florida (Marilyn Knight, David Bender)

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Figure 1. Location map of the I-4 Project site in Polk County, Florida.

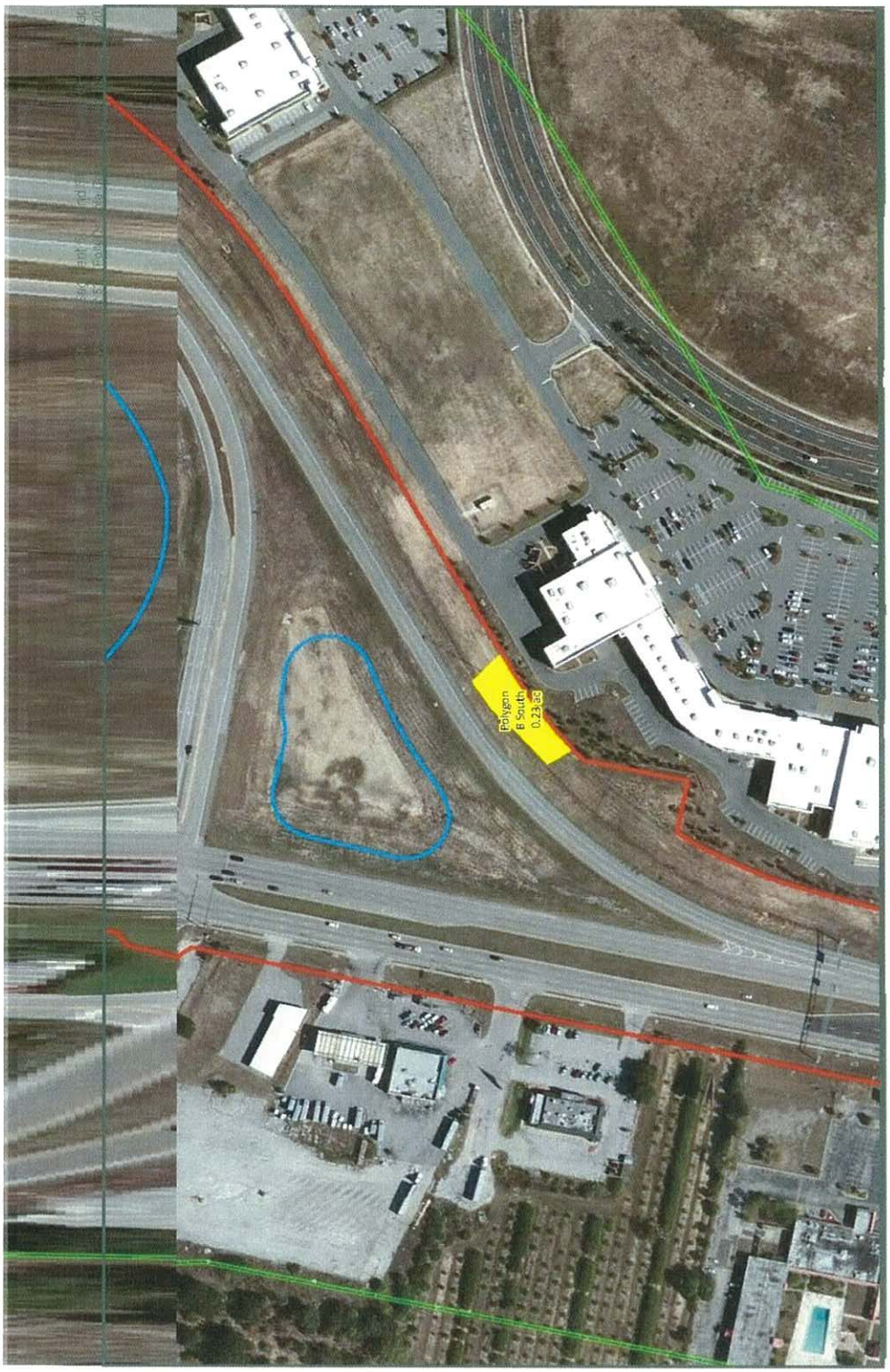

Figure 2. Aerial maps of lands within the I-4 Project site determined to be occupied by the sand skink and the blue-tailed moles skink (as indicated by shading).

Figure 2, Continued

Figure 2, Continued

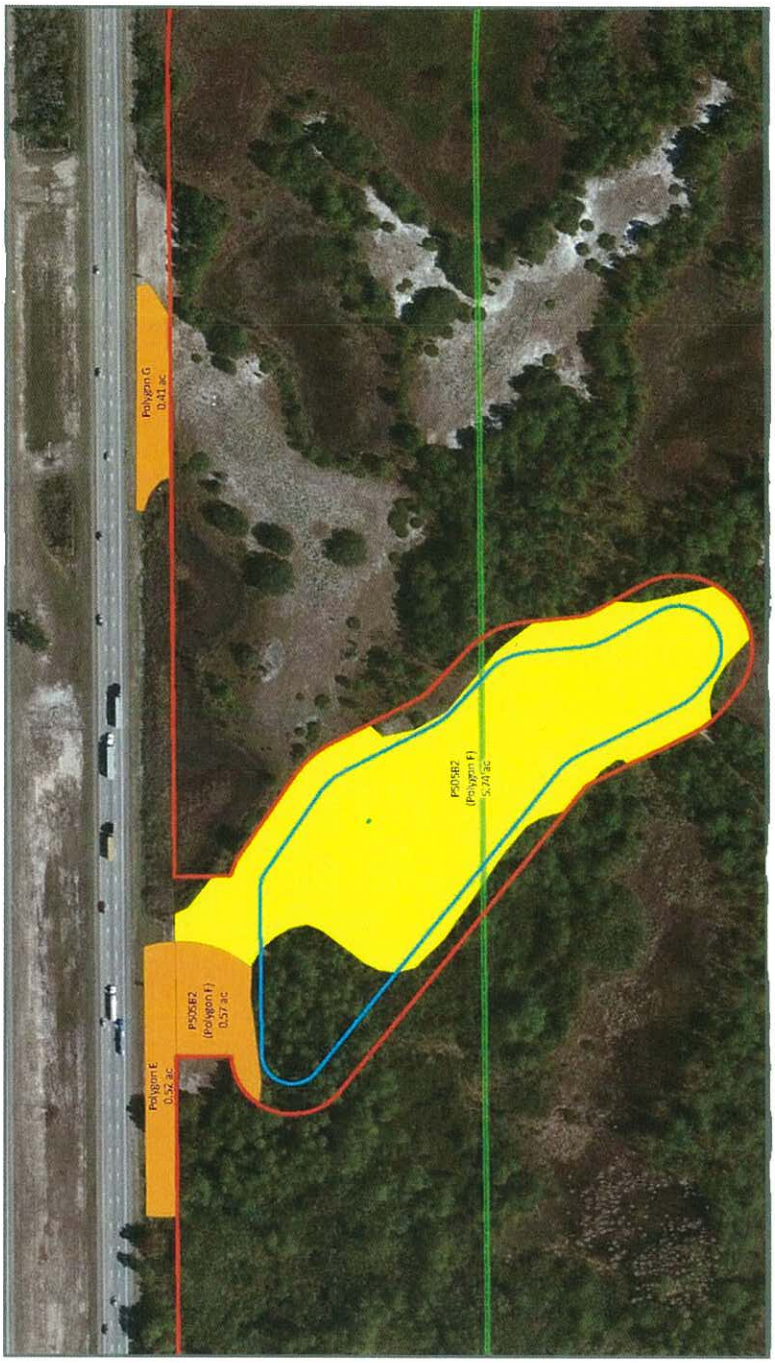

Figure 2, Continued

Figure 2, Continued

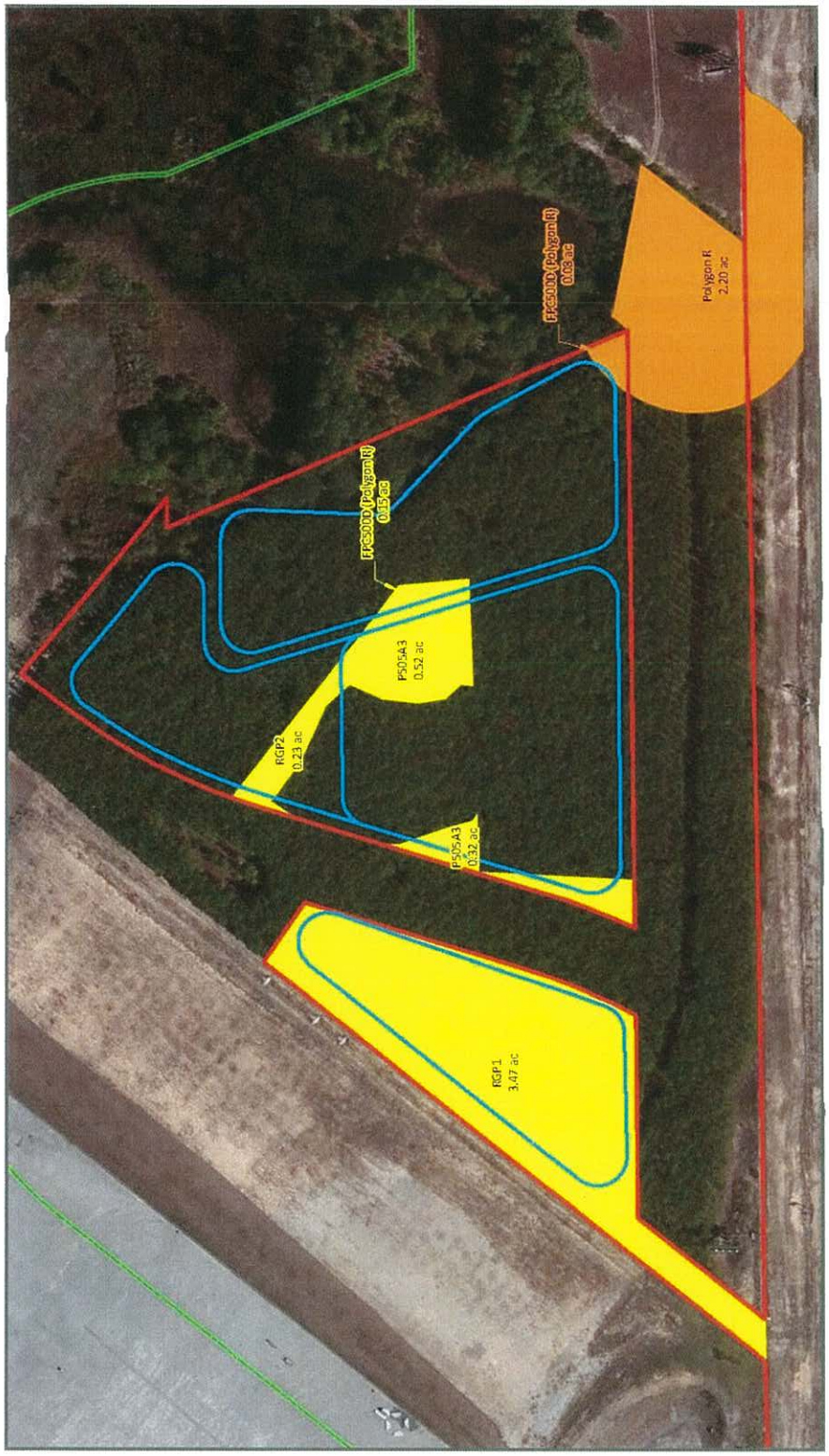

Figure 2, Continued

STATUS OF THE SPECIES – sand skink (*Neoseps reynoldsi*)

Legal Status

The sand skink was listed as threatened under the Endangered Species 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.

Species 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 from 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 and 88 degrees Fahrenheit 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 and 2.24 in (4.52 and 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).

Most sand skinks move less than 130 feet (ft) (39.6 meters [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 ability 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). Analysis of blood and fecal samples obtained from 20 sand skinks in ONF demonstrated that no blood parasites were present and only normal protistan and helminth symbiotes were observed, with no evidence of effect on survival of individuals or the population (Telford 1998). Similarly, a species of nematode (*Parapharyngodon ocalaensis*) was collected from the intestinal tracts of 22 sand skinks (Bursey

and Telford 2002). It is not known to be a threat to the species. In a subsequent paper, Telford and Bursey (2003) found 3 species of endoparasites in 45 sand skinks from ONF.

Habitat

The sand skink is widespread in native xeric uplands with excessively well-drained soils (Service 2012), principally on the ridges listed above at elevations greater than 80 ft (24.4 m) above mean sea level. 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). Coverboard transects extended from scrub or high pine (sandhill) through scrubby flatwoods to pine flatwoods revealed that sand skinks left more tracks in scrub than the other three habitats and did not penetrate further than 130 ft (39.6 m) into scrubby flatwoods or 65 ft (19.8 m) into pine flatwoods (Sutton et al. 1999). Sand skinks also use disturbed habitats such as citrus groves, pine plantations, and old fields, especially when adjacent to existing scrub (Pike et al. 2007; 2008).

Various authors have attempted to characterize optimal sand skink habitat (Telford 1959; 1962; Christman 1978; 1992; 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: (1) root-free, (2) grass-free, (3) patchy bare areas, (4) bare areas with lichens, (5) bare areas with litter, (6) scattered scrubs, (7) open canopy, and (8) 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 (ac) (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 determined the relationship between sand skink density and a suite of environmental variables. These studies have found 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 skinks continue 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.

Experimental studies have been conducted to investigate the effects of management techniques, such as mechanical treatment and prescribed burning, on sand skink abundance. Several studies found a decrease in relative abundance of skinks immediately following both mechanical and burning treatments (Mushinsky and McCoy 1999; Gianopulos 2001; Gianopulos et al. 2001; Mushinsky et al. 2001; Sutton et al. 1999). Gianopulos (2001) and Gianopulos et al. (2001) reported a significant increase in skink captures in mechanical treatment plots over the 5-year period following the treatment. However, a clear increase in skink numbers following a burn was not observed (Navratil 1999; Gianopulos et al. 2001; Mushinsky et al. 2001). Christman (2005) conducted trap surveys at sites with a known burn history on the LWR in Polk and Highlands Counties and did not observe a strong correlation between skink density and number of years since the site was burned. Mushinsky et al. (2001) noted significantly larger skinks were captured in burned plots, indicating more insect prey may have been available from decaying logs or older skinks inhabited these sites.

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 to 69 ac (2 to 27.9 hectare [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).

Distribution

The sand skink occurs on the sandy ridges of interior central Florida from Marion County south to Highlands County. 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 Ridges (WHR) in Highlands, Lake, and Polk Counties (Christman 1992; Mushinsky and McCoy 1991). The sand skink is uncommon on the MDR, including sites within the ONF (Christman 1970; 1992). 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 the largest of these, the LWR, encompasses approximately 517,303 ac (209,300 ha) (Weekley et al. 2008). According to the Florida Natural Areas Inventory (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.

Population Dynamics

Abundance (historical and current), population estimates, stability/viability

The current status of the sand skink throughout its geographic range is unclear because recent comprehensive, rangewide surveys have not been conducted. At the time of Federal listing in 1987, 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. Reptile 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). 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 rangewide.

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.

Threats

Present or Threatened Destruction, Modification or Curtailment of its Habitat or Range

The modification and destruction of xeric upland communities in central Florida were a primary consideration in listing the sand skink as threatened. By some estimates, as much as 90 percent of the scrub ecosystem has already been lost to residential development and conversion to agriculture, primarily citrus groves (Kautz 1993; Turner et al. 2006a). Xeric uplands remaining on private lands are especially vulnerable to destruction because of increasing residential and agricultural pressures.

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.

The 5-year review found no justification for change in the threatened status (Service 2007).

Ongoing Conservation Efforts

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 The Nature Conservancy 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 skinks on the LWR (Turner et al. 2006).

The Service has also certified six conservation banks totaling nearly 1,500 ac for sand and blue-tailed mole skinks, two in Highlands County and four in Polk County. 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 skink conservation that can result from separate evaluation of individual projects by establishing larger reserves and improving connectivity of habitat.

Recovery of the skink may also require rehabilitation of suitable but unoccupied habitat or restoration of potentially suitable habitat. Translocation efforts may also be needed. Comparisons of persistence, recruitment, and survival were used to determine translocation success of sand skinks on two restored scrub sites for 6 years following relocation (Mushinsky et al. 2001; Penney 2001; Penney et al. 2001). One site established a self-sustaining population, while the other did not. It was determined that site location, habitat suitability, and initial propagule size were the factors affecting success; researchers concluded the chances of long-term survival may improve when habitat is restored and skinks are introduced to sites close to intact scrub, rather than to isolated sites (Mushinsky et al. 2001; Penney 2001). In another study, Osman (2010) found that survival of sand skinks was significantly greater on translocation sites with low soil moisture and no shade-providing object, and evidence of reproduction was observed more readily on sites with lower soil compaction and light intensities over the two-year study. He concluded that sand skinks can do well in multiple microhabitat conditions and microhabitat heterogeneity in and around these sites is important. Emerick (2015) monitored and analyzed long-term translocation success of sand skinks over a total of 7 years. He confirmed survival success of the offspring of founding individuals born on the site and determined those individuals were also successfully reproducing.

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STATUS OF THE SPECIES – blue-tailed mole skink (*Eumeces egregius lividus*)

Legal Status – Federal: *threatened*, 1987; State: *threatened*

The blue-tailed mole skink was listed as threatened under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq*.) on December 7, 1987 (52 FR 42658- 52 FR 42662), and is listed as threatened by the State of Florida. The historic and anticipated future modification and destruction of xeric upland communities in central Florida were primary considerations in listing. Almost 90 percent of the xeric upland communities on the Lake Wales Ridge (LWR) have already been lost because of habitat destruction and degradation due to residential development and conversion to agriculture, primarily citrus groves (Turner et al. 2006). Remaining xeric habitat on private lands is especially vulnerable because projections of future human population growth suggest additional demands for residential development within the range of the blue-tailed mole skink. Critical habitat has not been designated for the blue-tailed mole skink.

Species Description

Appearance/Morphology

The blue-tailed mole skink (*Eumeces egregius lividus*) is a small, fossorial lizard that occupies xeric upland habitats of the southern LWR in central Florida (Mount 1965; Christman 1992). It reaches a maximum length of about 5 inches (in) (12.7 centimeters [cm]), and the tail makes up about half the body length (Christman 1978; 1992). The body is shiny, and brownish to pink in color, with lighter paired dorsolateral stripes diverging posteriorly (Christman 1978; 1992). Males develop a colorful orange pattern on the sides of the body during breeding season (Christman 1992). Juveniles usually have a blue tail (Christman 1978; 1992). Regenerated tails and the tails of older individuals are typically pinkish. The legs are somewhat reduced in size and used only for surface locomotion and not for "swimming" through the sand (Christman 1978; 1992).

Taxonomy

Mount (1965) described the blue-tailed mole skink largely on the basis of a bright blue tail in juveniles and restricted this subspecies to the southern LWR in Polk and Highlands Counties. Christman (1978) also limited the range of blue-tailed mole skink to these two counties, but later added Osceola County to the range, based on the collection of a single blue-tailed mole skink juvenile just north of the Polk County line on the LWR (Christman 1992). Analysis of mitochondrial DNA (Branch et al. 2003) supports Mount's (1965) hypotheses that blue-tailed mole skink from the lower LWR represents the ancestral stock, which radiated from there. Genetic analysis also indicates substantial population variability with limited dispersal in mole skinks among sandy habitats (Branch et al. 2003). Based on conventional estimates of molecular evolutionary clocks, these authors suggest a separation of approximately 4 million years between mole skinks occurring on the two oldest ridges (LWR and MDR), which overlaps the proposed Pliocene origin of scrub habitats (Webb 1990).

Five subspecies of mole skinks have been described, all of which occupy xeric upland habitats of Florida, Alabama, and Georgia (Mount 1965), but only the blue-tailed mole skink (*Eumeces egregius lividus*) is federally listed as threatened (52 FR 42658). The taxonomic classification of the mole skink has been reevaluated, and there is evidence to suggest that it should be revised (Griffith et al. 2000; Brandley et al. 2005; Smith 2005). Brandley et al. (2005) and Smith (2005) formally proposed that the name *Plestiodon* be used to describe the Genus of the North American skinks. However, until such time as it can be officially designated through the Federal Register process, the Service continues to use the scientific name as published in the final listing rule (52 FR 42658). A detailed description of the recent taxonomic review can be found in Service (2007a).

Life History

Blue-tailed mole skinks are typically found in a variety of xeric upland communities, including rosemary and oak-dominated scrub, turkey oak barrens, high pine, and xeric hammocks (Christman 1992). They are primarily found within the top 2 in (5 cm) of the soil surface (Mount 1963). Roaches, crickets, and spiders make up the bulk of the diet (Mount 1963; Smith 1982; McCoy et al. 2010). Smith (1982) suggested that their diet is more generalized than that of the fossorial sand skink (*Neoseps reynoldsi*), which probably reflects their tendency to feed at the surface. However, McCoy et al. (2010) suggest that the dietary diversity of mole skinks is very similar to sand skinks or perhaps even more specialized. Also, like sand skinks, mole skinks show an activity peak in spring (Mount 1963; Smith 1982).

The reproductive biology of the blue-tailed mole skink is poorly known. Reproduction is presumably very much like that of the peninsula mole skink (*Eumeces egregius onocrepis*) where courtship and mating occur in the fall and winter (Mount 1963; Christman 1978). In the peninsula mole skink, individuals probably become reproductively active at 1 to 2 years of age (Mount 1963; Christman 1978). Two to nine eggs are laid in a shallow nest cavity less than 12 in (30.5 cm) below the surface (Mount 1963; Christman 1978). The eggs incubate for 31 to 51 days, during which time the female tends the nest (Mount 1963; Christman 1978). Females have a large clutch size (maximum nine) of relatively small eggs (Mount 1963).

Habitat

A variety of xeric upland communities provide habitat for the blue-tailed mole skink, including rosemary and oak-dominated scrub, turkey oak barrens, high pine, and xeric hammocks (Christman 1992). Areas with few plant roots, open canopies, scattered shrub vegetation, and patches of bare, loose sand provide optimal habitats (Christman 1988; 1992). Within these habitat types, blue-tailed mole skinks are typically found under leaves, logs, palmetto fronds, and other ground debris (Christman 1992). Shaded areas presumably provide suitable microhabitat conditions for thermoregulation, egg incubation, and foraging (Mount 1963).

Specific physical structures of habitat that sustain sand skink populations, and likely blue-tailed mole skink populations as well, include a well-defined leaf litter layer on the ground surface and

shade from either a tree canopy or a shrub layer, but not both (McCoy 2011, University of South Florida, pers. comm.). Leaf litter likely provides important skink foraging opportunities. Shade provided by a tree canopy or a shrub layer likely helps skinks regulate body temperature to prevent overheating. However, having both a tree canopy and a shrub layer appears to be detrimental to skinks (McCoy 2011, University of South Florida, pers. comm.).

Turner et al. (2006) reported that development and agriculture have resulted in the loss of approximately 85% of the scrub and sandhill habitats on the LWR, and what remains contains high concentrations of imperiled species. Over the last 20 years, more than 87 square kilometers (km^2) (48.9%) of the remaining 187 km^2 of these habitat types on the Lake Wales Ridge have been acquired and protected (Turner et al. 2006). Therefore, only 6.3% of pre-settlement scrub and sandhill habitats are currently protected (Turner et al. 2006).

In addition to the need for these remaining scrub and sandhill habitats to be protected, these habitats along with those on sites that have already been acquired for conservation depend upon active management, most often prescribed fire, to persist long-term (Turner et al. 2006). Much of the remaining habitat occurs in small, isolated fragments surrounded by residential areas or citrus groves, making them difficult to protect and manage. Many of these fragments are overgrown and in need of restoration. It is unknown whether or not small, fragmented properties are able to maintain viable populations.

Either natural fire started by lightning or prescribed fire is necessary to maintain habitat in natural scrub ecosystems. However, if fire occurs too frequently, leaf litter might not build up sufficiently to support skink populations. At Archbold Biological Station (ABS), fossorial sand skinks appear to be most abundant after 10 years of leaf litter development. The ideal fire frequency to maintain optimal leaf litter development for skinks likely varies by site and other environmental conditions (Mushinsky 2011, University of South Florida, pers. comm.). Although this information is specific to sand skinks, the same may be true for blue-tailed mole skinks.

Distribution

The blue-tailed mole skink historically occurred on the LWR in Highlands, Polk, and Osceola Counties (Service 1999). Despite intensive sampling efforts in scrub habitat with similar herpetofauna, neither the sand skink nor blue-tailed mole skink have been recorded at Avon Park Air Force Range on the Bombing Range Ridge (Branch and Hokit 2000). It appears that skinks are still distributed throughout their historic range, although we believe their numbers have likely declined substantially because of habitat loss and degradation.

Turner et al. (2006) reported that blue-tailed mole skinks are known to occur in 23 locations, 22 of which are on the LWR. The authors did not indicate where the single site occurs from which blue-tailed mole skink is reported off of the LWR, but we believe that this record may be in error. The subspecies has not been documented elsewhere off of the LWR and is believed to be restricted to this ridge alone (Moler 2007; Mushinsky 2007).

Blue-tailed mole skinks often seem absent or rare on the same LWR study sites where sand skinks are common, and when present, are patchily distributed (Christman 1988, 1992; Mushinsky and McCoy 1995). Mount (1963) noted peninsula mole skinks also are patchily distributed and mostly occurred on xeric sites greater than 100 acres (ac) (40 hectares [ha]) in size. The distribution of the blue-tailed mole skink appears to be closely linked to the distribution of surface litter and, in turn, suitable microhabitat sites. Campbell and Christman (1982) characterized blue-tailed mole skinks as colonizers of a patchy, early successional, or disturbed habitat, which may occur as a result of natural or anthropogenic factors. Susceptibility of mature sand pine to windthrow may be an important factor in maintaining bare, sandy microhabitats required by blue-tailed mole skinks and other scrub endemics (Myers 1990).

Population Dynamics

The population dynamics of the blue-tailed mole skink are not well known because the skinks' diminutive size and secretive habits make their study difficult. The best current method available to detect blue-tailed mole skinks involves the raking of sand and organic liter and intensive searching, or the use of pit-fall traps and drift fences. Because these methods are laborious and time-consuming, they are not well suited for use over large areas. Unfortunately, cover board surveys used to detect sand skinks are not useful for specifically detecting the presence of blue-tailed mole skinks. As such, assessing the abundance and population trends of the blue-tailed mole skink over large areas is problematic.

Early maturity and a large clutch size of relatively small eggs (Mount 1963) suggest the population dynamics of mole skinks are different from sand skinks. Blue-tailed mole skinks appear to be far less common than sand skinks A survey of seven protected sites conducted in 2004-2005 by Christman (2005) reported a density of 1.3 individuals per acre (0.53 per ha), compared to 56 sand skinks per acre (22.7 per ha), or a ratio of 1 blue-tailed mole skink for every 43 sand skinks collected. Previous studies indicated lower blue-tailed mole skink to sand skink ratios of 1:1.89 based on 54 total skinks captured in six trap arrays (Christman 1988), 1:4.3 based on 332 total skinks in 58 trap arrays (Mushinsky and McCoy 1991) and 1:2.7 based on 49 total skinks in 31,640 pitfall trap-days (Meshaka and Lane 2002). Christman (1992) suggested only 1 blue-tailed mole skink is encountered for every 20 sand skinks.

Peninsula mole skinks tend to be clumped in distribution with variable densities that may approach 25 adults per acre (10.12 per ha) (Mount 1963); however, it appears that blue-tailed mole skinks are much rarer (Christman 1992). Telford (2007) suggests that this disparity in relative abundance of the two species may be explained by seasonal variation in activity and movements and year-round surveys should be conducted over an adequate number of years to minimize the effect of variation in rainfall in order to obtain better estimates.

Unfortunately, determining population stability and viability is unattainable with current information. Because of the ongoing habitat loss and degradation on the LWR, it is likely that overall populations are declining (Moler 2007).

Critical habitat

Critical habitat is not designated for this species.

Threats

Present or Threatened Destruction, Modification or Curtailment of its Habitat or Range

It is likely that ongoing residential and agricultural development of xeric upland habitat in central Florida has destroyed or degraded extensive tracts of habitat containing the blue-tailed mole skink. Continued habitat loss, fragmentation, and changes in land use threaten the existence of the subspecies. Unlike sand skinks, their tracks cannot be easily detected in the sand, and most of the extant scrub, including protected sites, on the LWR has not been adequately surveyed for blue-tailed mole skinks. Populations on private sites are threatened with destruction or habitat modification due to improper or lack of management.

The LWR encompasses approximately 517,303 ac (209, 345 ha) (Weekley et al. 2008*)*. Roughly 69,683 ac of this area is protected in refuges, parks, State forests, wildlife and environmental areas, and on private lands, and, therefore, protected from general destruction (Turner et al. 2006). However, Turner et al. (2006) indicated that blue-tailed mole skinks seem to be underrepresented in the reserve network of protected public lands, but the authors could not determine if their absence reflects actual exclusion or a lack of survey effort. If the former is true, then additional lands must be protected and managed in perpetuity to ensure the survival of this subspecies (Turner et al. 2006).

Another concern is whether relatively small, isolated properties are able to maintain viable populations. There is evidence of an edge effect on sand skink distribution on isolated scrub fragments bordered by non-scrub habitat (Gianopulos 2001, Mushinsky et al. 2001). Gianopulos (2001) found that on scrub fragments bordered by non-scrub habitat, sand skinks were found more frequently within the middle of the sites than along the edges bordered by non-scrub habitat, and this difference was detected as far as 50 m (164 ft) into the sites. This could be a concern for blue-tailed mole skinks, as well.

Between 2005 and 2060 Florida's population is projected to double from approximately 18 to 36 million people (Zwick and Carr 2006). Assuming a similar pattern of development at current gross urban densities for each county, this translates into the need to convert an additional 7 million ac of undeveloped land into urban land uses (Zwick and Carr 2006). Over most of the range of the sand and blue-tailed mole skinks in the central region of Florida from Marion County southward to northern Polk and Osceola Counties, human population growth and the conversion of previously undeveloped lands to urban use is expected to be explosive (Zwick and Carr 2006). It is predicted that Osceola County is among the counties that will experience the greatest transformation from rural to urban land over the next 50 years (Zwick and Carr 2006). This is expected to be the result of population spillover from the build-out in Orange County (Zwick and Carr 2006).

The protection and recovery of blue-tailed mole skinks will require that habitat loss be limited to disturbed areas, and that suitable unoccupied habitat be restored. Current efforts to expand the system of protected xeric upland habitats on the LWR, in concert with implementation of aggressive land management practices, represent the most likely opportunity for securing the future of this species.

Inadequacy of Existing Regulatory Mechanisms

In addition to protections associated with the Act and existing regulations on refuges and other protected lands where skinks occur, the blue-tailed mole skink is listed by the Florida Fish and Wildlife Conservation Commission as federally-designated threatened (Chapter 39-27, Florida Administrative Code). This legislation prohibits take, except under permit, but does not provide any direct habitat protection. Wildlife habitat is protected on Florida Fish and Wildlife Conservation Commission wildlife management areas and wildlife environmental areas according to Florida Administrative Code 68A-15.004. Therefore, the Act provides additional protection for these species and their habitat through section 7 (interagency cooperation), as well as through the prohibitions of section 9(a)(l) and the provisions of section 4(d) and recovery planning. Although section 7 and 9(a)(l) provide some regulatory protection, these provisions do not adequately protect against habitat loss. In addition, existing regulations are not specific enough to guard against loss of genetic integrity of the species. Research has shown that it is important to preserve certain areas of the historic range to maintain genetic diversity.

Other Natural or Manmade Factors Affecting its Continued Existence

Improper habitat management and invasion by nonnative and invasive species threaten the existence of blue-tailed mole skinks. Active management is necessary to maintain suitable habitat for skinks. Management of scrub habitat is problematic because much of the remaining habitat occurs in small fragmented areas surrounded by residential areas where prescribed burning may not be feasible. These residential areas are also often a source of nonnative plants that invade native habitat. Many of the fragments are overgrown and in need of restoration.

Habitat degradation on protected and private sites continues to be a threat because vegetation restoration and management programs are costly and depend upon availability of funding. Where prescribed fire is not feasible as a management technique because of smoke management and other concerns, mechanical treatment is sometimes used. However, heavy machinery disturbs the soil more than prescribed burning, and it removes often limited nutrients from the soil (Mushinsky et al. 2001). This changes the nutrient levels in the topsoil, affecting the vegetative composition of the site, whereas fire releases nutrients (Mushinsky et al. 2001). Also, if logs are removed from a site after mechanical treatment, prey abundance (termites) may be lower than it would be after a fire (Mushinsky et al. 2001).

Another threat to skinks is the loss of genetic diversity. Branch et al.'s (1999; 2003) work on sand skinks identified genetic distinctions among populations from the Mt. Dora Ridge, the northern LWR, the central LWR, and the southern LWR. Because each site where more than five individuals were sampled contained unique haplotypes, populations on isolated ridges

should be protected to avoid the loss of genetic diversity. This likely applies to blue-tailed mole skinks, as well.

Climate Change and Sea Level Rise

According to the Intergovernmental Panel on Climate Change Report (IPCC) (2007), warming of the earth's climate is "unequivocal," as is now evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level. The 2007 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 requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007b).

Climate change at the global level drives changes in weather at the regional level, although weather is also strongly affected by season and local effects (*e.g.*, elevation, topography, latitude, proximity to the ocean, etcetera). Temperatures are predicted to rise from 2º C to 5º C for North America by the end of this century (IPCC 2007). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing and distribution), storms (frequency and intensity), and sea level rise. However, the exact magnitude, direction, and distribution of these changes at the regional level are not well understood or easy to predict. Seasonal change and local geography make prediction of the effects of climate change at any location variable. Current models offer a wide range of predicted changes.

Climatic changes in south Florida could amplify current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management (Pearlstine 2008). 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).

For the blue-tailed mole skink, sea level rise is likely to increase man-made effects, as the human population moves from the coast to central parts of the State. This human migration will increase the demand for development and could lead to increased loss of upland xeric habitat. In addition, the increased human population would likely increase the threats associated with human interactions, such as fire suppression, habitat degradation, and nonnative species described above.

Ongoing Conservation Efforts

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 The Nature Conservancy 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 skinks on the LWR (Turner et al. 2006).

The Service has also certified six conservation banks totaling nearly 1,500 ac for sand and blue-tailed mole skinks, two in Highlands County and four in Polk County. 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 skink conservation that can result from separate evaluation of individual projects by establishing larger reserves and improving connectivity of habitat.

Recovery of the skink may also require rehabilitation of suitable but unoccupied habitat or restoration of potentially suitable habitat. Translocation efforts may also be needed. Although blue-tailed mole skinks have not been translocated, we may be able to infer likelihood of success based upon success of similar species. Comparisons of persistence, recruitment, and survival were used to determine translocation success of skinks on two restored scrub sites for 6 years following relocation (Mushinsky et al. 2001; Penney 2001; Penney et al. 2001). One site established a self-sustaining population, while the other did not. It was determined that site location, habitat suitability, and initial propagule size were the factors affecting success; researchers concluded the chances of long-term survival may improve when habitat is restored and skinks are introduced to sites close to intact scrub, rather than to isolated sites (Mushinsky et al. 2001; Penney 2001). In another study, Osman (2010) found that survival of sand skinks was significantly greater on translocation sites with low soil moisture and no shade-providing object, and evidence of reproduction was observed more readily on sites with lower soil compaction and light intensities over the two-year study. He concluded that sand skinks can do well in multiple microhabitat conditions and microhabitat heterogeneity in and around these sites is important. Emerick (2015) monitored and analyzed long-term translocation success of sand skinks over a total of 7 years. He confirmed survival success of the offspring of founding individuals born on the site and determined those individuals were also successfully reproducing.

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STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE – SCRUB PLUM

The following discussion is summarized from the South Florida Multi-Species Recovery Plan (MSRP) (Service 1999), as well as from recent research publications and monitoring reports. A complete scrub plum life history discussion may be found in the MSRP. Critical habitat has not been designated for scrub plum.

Description

Scrub plum is a highly branched shrub that can reach 2 meters (6 feet) in height, although 0.5 meters (1.5 feet) is more typical at sites with frequent fires. It forms gnarled, half-buried trunks and contains twigs that are strongly geniculate (zigzag shaped). The lateral branches are either short, stubby, spur shoots bearing leaves and flowers, or are strongly tapering and spine-like. The bark of old stems is thin, gray, usually lichen-encrusted, and forms small rectangular or square plates. The bark of new shoots is lustrous reddish-brown or purplish and smooth.

The scrub plum's leaves are crowded on the spur shoots (an arrangement typical of the Rosaceae family) and are widely spaced on the normal shoots. The flowers of scrub plum are distinctive in being sessile, without flower stalks. They are fragrant, five-petaled, and 11 to 13 mm (0.43 to 0.51 in) across when open. The flowers have "numerous stamens with conspicuous yellow anthers that are exerted well above the floral cup. Some flowers have a well-developed pistil equal in height to the stamens, while in other flower the pistil is vestigial and nonfunctional." (Archbold Biological Station 2003). The fruit of the scrub plum is an ovoid or ellipsoidal drupe, 12 to 25 mm (0.47 to 0.98 inch) long, and dull reddish or "vaguely peachy" (Archbold Biological Station 2003) in color. It has a thin, bitter flesh and a slightly flattened seed.

Although it is distinctive as the only plum with crooked twigs, scrub plum can be casually mistaken for other scrub and sandhill plants. Several have a similar geniculate, thorny habit of growth, including tough bumelia (*Sideroxylon tenax*), hog plum (*Ximenia americana*), Florida ziziphus (*Ziziphus celata*), and a local hawthorn, a variant of *Crataegus lepida* (Judd and Hall 1984). Hog plum has yellow fruit, straight twigs, and thorns only in the angles of leaf and stem. Florida ziziphus has entire leaf margins and yellow fruit (and is exceedingly rare). Buckthorns have thorns and clustered leaves, but the leaves or twigs are very hairy (Florida Natural Areas Inventory 2000).

Life History

Scrub plum has a very unusual breeding system called andromonoecy, in which male and bisexual flowers are present on the same individual (Weekley and Menges 2001). Flowering occurs in January to February, leafing occurs from late February to March, fruit begins to develop in late February and may continue to early May, seed dispersal is in early May, but germination dates are unknown (Harper 1911, Ward 1979, C. Weekley, Lake Wales Ridge SF, personal communication 1998). Archbold Biological Station's plant ecology lab reports that flowering occurs in February-March when the plants are largely leafless. Individuals drop most of their leaves in the winter dry season.

Scrub plum is believed to be self-incompatible and pollinators are essential for fruit set (Weekley 1997). The fragrant white flowers attract insect visitors and insects may disseminate the pollen of the scrub plum. Flowering occurs in January to February, leafing occurs from late February to March, fruit begins to develop in late February and can continue to early May. Fruit maturation is low in comparison to flowering due to high levels of premature abscission and predation. Seed dispersal is in early May, but little is known about germination dates (Archbold Biological Station 2003). Birds and possibly mammals disperse the seeds.

Plants add new stems every year, especially after fire (Archbold Biological Station 2003). Fire stimulates growth and flowering; flowering and fruit production gradually declines until the next fire (Menges et al. 2005). Seedlings have not yet been observed in the wild.

Population Dynamics

Scrub plum plants nearly always resprout after fire (Menges and Kohfeldt 1995, Menges et al. 2005, Weekley and Menges 2001, 2003a, 2003b). Three years after a fire, more than 98 percent of burned plants had survived, though they had lesser height and crown diameter than unburned control plants). In three years of collecting demographic data, four plants died from fire effects, six from other causes. Twelve plants near the study area boundaries were inadvertently damaged during site maintenance in 2004, but are expected to recover (Menges et al. 2005).

Status and Distribution

Scrub plum occurs in three general areas on Florida's central ridges: Lake County, west and southwest of Lake Apopka; the southwest and northwest corners of Orange and Osceola Counties, respectively; and Polk and Highlands Counties, from the City of Lake Wales south to the Highlands County/Glades County border (FNAI 1996) on the LWR. It is absent from the Bombing Range Ridge of Avon Park Air Force Range.

Scrub plum prefers dry, sunny, nutrient-poor sites of acidic, entisols (deep, nearly featureless, sand soils). It is most typically associated with oak-dominated scrub and high pine communities. Scrub plum has a very unusual breeding system called andromonoecy, in which male and bisexual flowers are present on the same individual. Scrub plum is native to sandhills (high pineland) and Florida scrub. Sandhill vegetation is usually though of as having a grassy understory, although the abundance of scrub palmetto (*Sabal etonia*) and shrubs like scrub plum and pygmy fringe tree (*Chionanthus pygmaeus*) at areas like the Lake Wales Ridge National Wildlife Refuge tract at Carter Creek indicate that high pinelands on the Ridge may not historically have had the lawn-like appearance of many high pinelands farther north. High pineland is subject to low-intensity, frequent fires (every one to five years). Scrub has shrubby vegetation and is subject to high-intensity, infrequent fires. Fires maintain both habitats. In the absence of frequent fires, high pine vegetation is typically invaded by sand pines and evergreen oaks, eventually becoming upland hardwood forest (Myers 1985). Similarly, scrub may become upland hardwood forest if fire is absent (Myers 1985).

Sandhills plants that can be found in the vicinity of scrub plum include Chickasaw plum (*Prunus angustifolia*), tallowwood (*Ximenia americana*), wiregrasses (*Aristida stricta* var. *beyrichiana* and others), broomsedges (*Andropogon* spp.), slenderleaf clammyweed (*Polanisia tenuifolia*), and largeflower wireweed (*Polygonella robusta*). The trees are turkey oak (*Quercus laevis*), the dominant tree, and longleaf pine (*Pinus palustris*). Listed species that co-occur with scrub plum in sandhills include pygmy fringe tree, pigeon wings (*Clitoria fragrans*), scrub buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*), Britton's beargrass (*Nolina brittoniana*), wide-leaf warea (*Warea amplexifolia*), Carter's mustard (*Warea carteri*), and Florida ziziphus (*Ziziphus celata*).

Scrub plum is present on nearly all conservation lands within its that have scrub or high pineland vegetation (FNAI 1985, Stout 1982). In Polk County, protected sites containing scrub plum exist at the Arbuckle and the Lake Walk-in-the-Water tracts of Lake Wales Ridge State Forest, at the Pine Ridge Nature Preserve of Historic Bok Sanctuary, at the Allen David Broussard Catfish Creek State Preserve, and at The Nature Conservancy's Tiger Creek Preserve and probably at the Saddle Blanket Lakes Preserve. In Highlands County, the scrub plum is protected on the Carter Creek tract and Apthorpe, Holmes Avenue, Lake Placid, and Gould Road areas of the Lake Wales Ridge Wildlife and Environmental Area; the Carter Creek and Flamingo Villas tracts of Lake Wales Ridge National Wildlife Refuge; Archbold Biological Station; and Lake June in Winter Scrub State Park.

Although the historic range was rather extensive compared to other narrowly endemic plants of Florida's central ridges, this species has declined with destruction and fragmentation of its scrub habitat. Habitat loss due to conversion to agriculture and residential development continue to threaten this species. Removal by plant collectors has been an additional threat that land acquisitions and conservation areas are alleviating. Fire suppression has degraded the habitat required by this species. This federally endangered species apparently requires periodic fire or other disturbances to maintain suitable habitat.

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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

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

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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

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Please consider the environment before printing this email.

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

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(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

September 18, 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 5: SR 400 (I-4) from west of SR 25/US 27 to west of CR 532 (Polk/Osceola County Line)

Polk 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 4.5-mile segment of I-4 which extends from west of SR 25/US 27 to west of CR 532 (Polk/Osceola County Line), from Milepost (MP) 27.145 to MP 31.607 in Polk County (herein referred to as I-4 Segment 5). Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 5. The study area in this section from west of SR 25/US 27 to west of CR 532 includes only one interchange at US 27.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally, the typical section will be consistent throughout Segment 5 and will have three 12-foot general use travel lanes with 12-foot inside and outside shoulders (10-foot paved outside) and two 12-foot express lanes with 10-foot inside and 12-foot outside shoulders in each direction. A 2-foot barrier wall between the adjacent shoulders will separate the express lanes from the general use lanes. The typical section includes a 44-foot transit envelope in the median within a minimum 300 foot right of way (ROW).

The purpose of this report is to update the original PD&E study by documenting any changes that have occurred since the PD&E study. This reevaluation includes environmental and engineering analysis of the original design concept, that showed six general use lanes (GUL) and four special use lanes (SUL) for high occupancy vehicles (HOV)/single occupant through vehicles (SOV), to the current proposed design that includes six GULs and four express lanes (EL) operating under a variable price toll plan. 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. A number of burrows were located within the project area though the potential for indigo snakes is limited due to this being a primarily developed area. According to the USFWS Programmatic Key for the Eastern Indigo Snake (January 2010, updated August 2013), as 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, will impact less than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) but more than 25 active and inactive gopher tortoise burrows, and will 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; therefore, the project **may affect** the eastern indigo snake.

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 County. 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, a coverboard survey was conducted by Scheda Ecological Associates, Inc. in March and April of 2015. The results of the survey were positive for the presence of sand skinks within the proposed right-of-way at a total of six locations (Polygons D, E, G, H, N, and R), totaling 2.95 acres of occupied sand skink habitat. Additional occupied habitat that was not surveyed in 2015 but with positive results from a 2013 survey totals 0.23 acres, and Polygon F, which consists of 4.93 acres that was not surveyed due to access issues but is adjacent to areas within the ROW with positive results (Polygon E) is considered occupied. Total occupied habitat within the project corridor is 8.11 acres. Due to the location of the existing roadway and the proposed design concept, direct impacts to both threatened skink species are possible. Therefore, the project **may affect** the sand skink and blue-tailed mole skink.

Avians

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 previous PD&E study. The proposed widening and stormwater ponds are not expected to have any impact on scrub-jays though some potential habitat exists and scrub-jays were observed during surveys in 1994; therefore, this project **may affect but will not likely 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 and no observations have been recorded by FFWCC. Some potential habitat for both foraging and nesting was observed; therefore, the project **may affect but not 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 well to the 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** on this species.

Red-Cockaded Woodpecker (*Picoides borealis*) – This species is listed as Endangered by the USFWS and Threatened 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 indicated that no suitable habitat or any documented RCW sightings occurred within the proposed right-of-way or pond sites. Field surveys conducted during September and October 2014 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.

The study area is located within 2 wood stork Core Foraging Areas (Lake Russell and Gatorland CFA'S). Wetland Mitigation will adhere to the requirements of the *Corps of Engineers and U. S. Fish and Wildlife Service Effect Determination Key for the Wood Stork in South Florida* (2010); therefore, there should be no net loss of foraging habitat; because of this, the 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 US 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. No bald eagle nests have been identified within 1 mile of the corridor. The closest nests are OSC151, located west of Goodman Road to the northwest of the corridor and PO048, located south of I-4 and west of US 27. For that reason, the project will have **no effect** on the southern bald eagle.

Osprey (Pandion haliaetus) – The osprey, also known as the fish hawk, are expert anglers that typically share the same habitat as bald eagles but are smaller in size. Ospreys build large stick nests located in the tops of large living or dead trees and on manmade structures such as utility poles, channel markers and nest platforms. They are listed as a Species of Special Concern by FFWCC only in Monroe County, but are also still protected under the Migratory Bird Treaty Act. Permits are required throughout the state to remove a nest for these raptors, and a replacement structure must be erected to mitigate the removal of the nest. Should any nests found along the corridor be subject to impacts, a nest removal permit will be applied for from FFWCC. Therefore, this project **may affect but not likely adversely affect** the osprey.

FEDERALLY LISTED PLANT SPECIES

Nineteen federally listed species have been demonstrated to have the potential to occur within Polk County, though not all habitat types are represented within the project area. Information from the previous PD&E Study indicated that one listed plant was observed, Britton's Beargrass (*Nolina brittoniana*). A follow up protected plant field survey covering the area of proposed right-of-way widening and pond sites was conducted in October 2014 by project biologists. The scrub plum (*Prunus geniculata*) was observed within proposed Pond Sites 500C and 505 B2 on the eastbound side of I-4 (see Listed Species Map). No additional federally listed plant species were identified within the proposed widening impact area or pond sites during the field investigations. Listed plant species, specifically the scrub plum, will be impacted by this project. Therefore, the project **may affect, and is likely to adversely 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). 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, and one Sherman's fox squirrel was observed south of US 27 west of the I-4 ROW 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 project occurs within the South Central BMU, which includes Charlotte, De Soto, Glades, Hardee, Highlands, Hillsborough, Indian River, Manatee, Martin, Okeechobee, Osceola, Pinellas, Polk, Sarasota, and St Lucie counties and contains the Highlands subpopulation. Black bears are not common in this part of Polk County, though as a migratory species could enter the project corridor. As 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 difficult to observe directly. Earth work in suitable habitat may impact subterranean pine snakes. With the relocation of commensal organisms from gopher tortoise burrows, the project **is not likely to adversely affect** this species.

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. None of these snakes were observed during any field surveys. There is little proposed impact to xeric habitat, though with the commitment to relocate all potential impacted gopher tortoise burrows, it is anticipated that this project **is not likely 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 within the 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.

Avians

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 County. 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. 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. Therefore, this project **is not likely to adversely affect** this species.

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 great egret 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 74 state listed plant species have the potential to occur within the habitats located within the project area in Polk County. Vegetation surveys conducted during the previous PD&E Study identified Garberia (*Garberia heterophylla*) and Leafless beak orchid (*Stenorrhynchos lanceolatus*) as two state listed species observed. It is unknown if the project will impact state listed species at this time, but all efforts will be made to avoid any impacts. 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

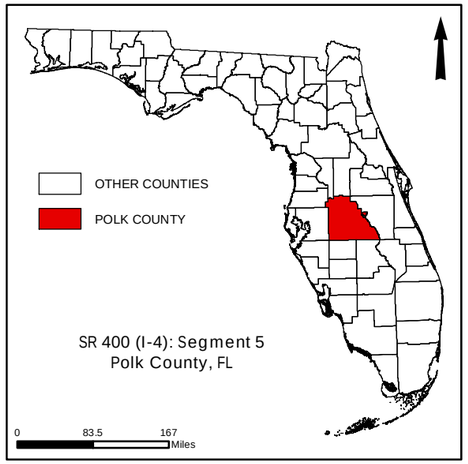
SR 400 (I-4) BEYOND THE ULTIMATE
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

SEGMENT 5

FDOT FM NO. 201210-2-22-01

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT (ESBA)

POLK COUNTY
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 1



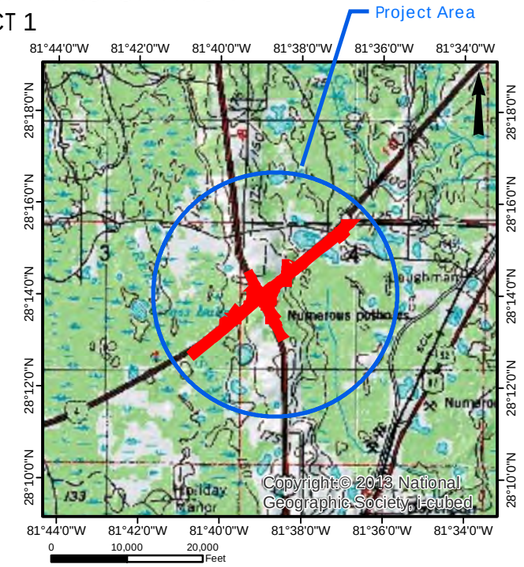


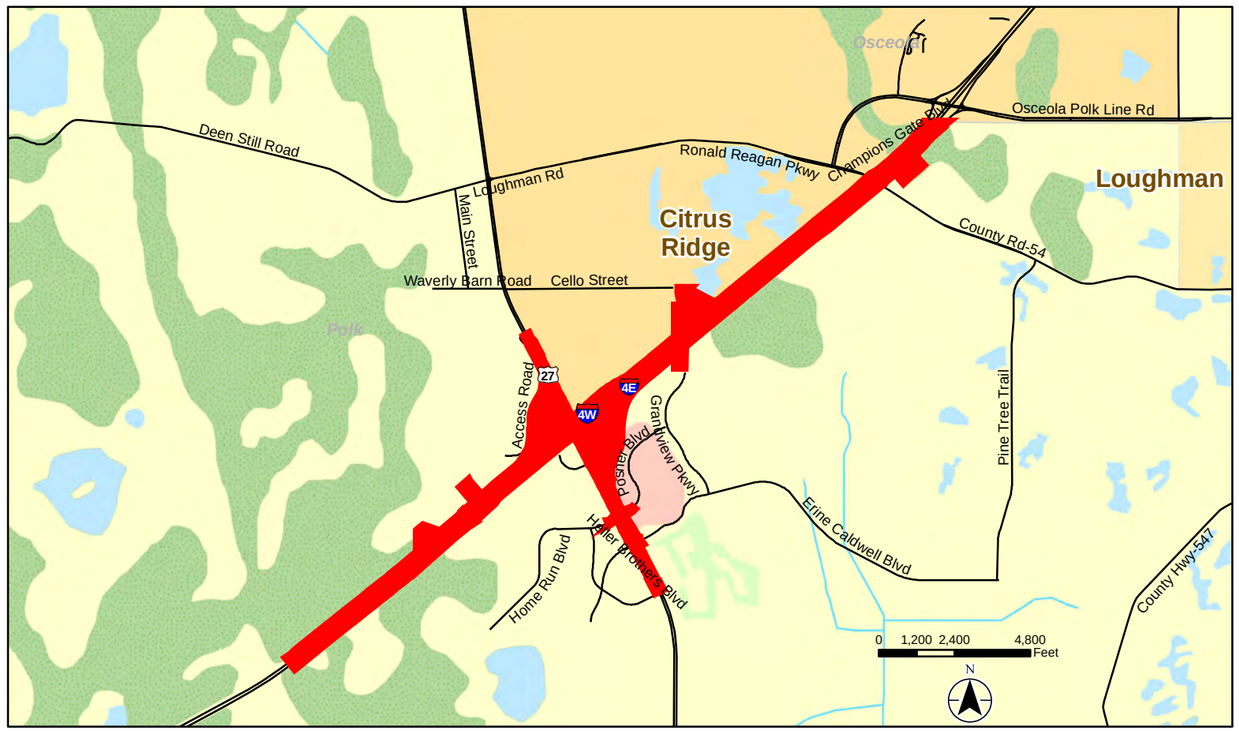
FIGURE NO.	SHEET NO.	TITLE
Figure A	Single Sheet	NRCS Soils Map
Figure B	Single Sheet	Land Use and Habitat Coverage Map
Figure C	Single Sheet	Species Location Map

PROJECT DETAILS

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT:
Segment 5 - Report Maps

SR 400 (I-4) from West of SR 25/US 27 to West of CR 532
(Polk/Osceola County Line Polk County (16320)

16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)



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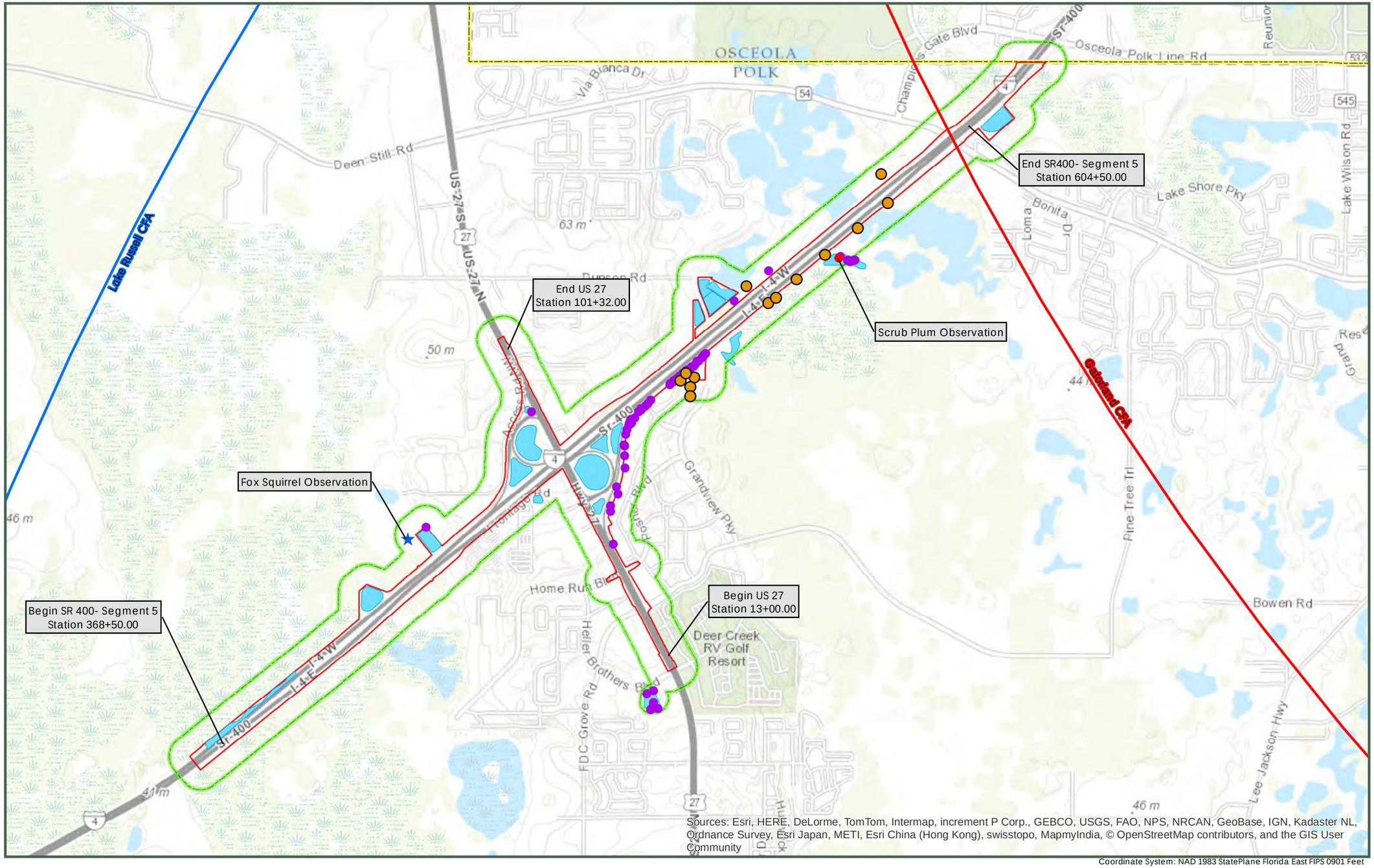

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Map Key

- County Boundaries
- SR 400 (I-4) Beyond the Ultimate R/W (8/31/15)
- SR 400 (I-4) Beyond the Ultimate PD&E Study Limits
- Proposed Pond Sites (08/31/15)
- Wood Stork Colony-Gatorland
- Wood Stork Colony-Lake Russell

Observed Species

- Fox Squirrel
- Scrub Plum
- Gopher Tortoise Burrows
- Sand Skink Locations

Segment 5 Species Notes:

Wood Stork Colonies-Gatorland (15 mile CFA Buffer). Segment 5 is partially within CFA.

Woodstork Colonies-Lake Russell (18.6 mile CFA Buffer). Segment 5 is fully within CFA.

Title:
ENDANGERED SPECIES BIOLOGICAL ASSESSMENT REPORT: Segment 5 - Species Location Map

Client/Project:
Florida Department of Transportation- D5
SR 400 Project Development & Environment Study
Segment 5: SR 400 (I-4) from W of SR 25/US 27 to W of CR 532

Project Location:
16320 Polk County
STA 368+50.00 (Begin)
STA 604+50.00 (End)

Prepared by: mLeonard 9/18/2015
Technical Review by: mDrauer 9/18/2015
Independent Review by: jMoore 9/18/2015

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

0 1,200 2,400 4,800 Feet

Figure C - Species Location Map

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APPENDIX E
SAND SKINK SURVEY REPORT

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)
Polk County, Florida



Sand Skink Survey Report

September 2015 Financial Project ID. 201210-2-22-01

Prepared by

Scheda Ecological Associates, Inc.

Prepared For

Florida Department of Transportation District 1

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APPENDICES

1.0 INTRODUCTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study for SR 400 (I-4) Beyond the Ultimate roadway widening project. Segment 5 of this project (**Figure 1**) is approximately 3 miles from west of SR 25 (US 27) to west of CR 532 within Polk County, Florida. Segment 5 falls within the U.S. Fish and Wildlife Service (USFWS) consultation area (CA) for the sand skink (*Neoseps reynoldsi*) and blue-tailed (bluetail) mole skink (*Eumeces egregius lividus*). The USFWS has stated that research and incidental observations indicate bluetail mole skinks typically occur with sand skinks and that sand skink occurrence is used as an indicator of bluetail mole skink occurrence where the two species overlap in distribution (USFWS 2012a). As reported in the Draft October 2014 Endangered Species Biological Assessment (ESBA) (FDOT 2014a) for the project, pedestrian surveys were conducted in 2014 and no direct or indirect observations of sand skinks were reported. However, coordination with USFWS staff indicated that a skink coverboard survey would need to be performed over areas of appropriate 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 professional 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 and during initiation of the coverboard survey, professional soil scientists conducted field investigations over the project right-of-way (ROW) to determine the presence/absence of mapped skink soils. Based upon the results of the studies, the mapped soils were amended, and coverboard surveys were subsequently conducted over the remaining areas that were determined to still contain mapped skink soils. The coverboard survey was conducted during March and April of 2015 according to the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012a).

Evidence of sand skinks was observed in seven locations within the project as part of this survey. As a result of the study results, we have determined that the project "may affect" the sand skink and bluetail mole skink. The FDOT commits to the purchase of credits from a species conservation bank with a service area that covers the project limits (details are provided in Sections 7.0 and 8.0) as appropriate mitigation for species impacts. This report was prepared to initiate formal consultation with the USFWS.

2.0 STUDY AREA CHARACTERISTICS AND HABITAT

As per the USFWS Consultation Guide for the sand skink and bluetail mole skink (USFWS 2012a), proposed actions are subject to a review of potential project effects on these species if the proposed action is within a county known to contain sand skinks/bluetail mole skinks or is within the sand skink/bluetail mole skink CA. If the proposed action is within the consultation area or otherwise might affect skinks, the USFWS requires an assessment of potentially affected habitat. Potential skink habitat includes all areas with "skink soils" at or above 82 feet in elevation in Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam counties. The USFWS-defined skink soils include the following soil map units as mapped by the Natural Resources Conservation Service (NRCS): Apopka, Arredondo, Archbold, Astatula, Candler, Daytona, Duette, Florahome, Gainesville, Hague, Kendrick, Lake, Millhopper, Orsino, Paola, Pomello, Satellite, St. Lucie, Tavares, and Zuber.

As previously described in the Draft October 2014 ESBA (FDOT 2014a), all of Segment 5 occurs in Polk County and is within the USFWS CA for the sand skink/bluetail mole skink. Elevations throughout the project area range from approximately 115 feet to 200 feet North American Vertical Datum (NAVD). **Figure 2** shows USFWS-defined skink soils based on mapping from the NRCS (NRCS 2012). The NRCS created the soils data by digitizing maps or by revising digitized maps using remotely sensed data and other sources of information. The NRCS soils data is for planning purposes only and on-site sampling and testing may be required to accurately determine soil map unit boundaries (NRCS 2012).

Based on the NRCS mapping, a total of 329.26 acres of skink soils occur within the existing ROW and five potential off-site stormwater management facilities (SMF). This acreage is the sum of the suitable soil area as mapped by the NRCS and does not reflect areas that may in fact be unsuitable skink habitat due to presence of existing paved roadway, disturbance, inappropriate soil conditions, or other factors that may render a soil as unsuitable.

To determine the suitability of areas suspected of alteration, soil borings were collected and results were compiled into two soils investigation reports which are provided in **Appendix A** (FDOT 2014b, 2015). The results of these investigations indicated that areas immediately adjacent to paved road surfaces, constructed treatment ponds, ramps or bridge structures or created landscape buffers have been subject to filling activities or other soil disturbance. It is generally accepted that a zone of 15-feet adjacent to the roadway pavement is unsuitable for sand skinks. On state-constructed roadways, this area is subject to routine FDOT roadway maintenance and construction activities such as scraping/grading, placement of asphalt millings, and contouring and sod laying associated with minor roadway improvements. Additionally, noise

and vibrations from vehicles on the roadway may deter sand skinks from entering this zone. Therefore, this 15-foot zone was excluded from survey polygons along the FDOT roadway. Where adjacent to a county roadway within the project limits, coverboards occasionally were placed within 15 feet of the edge of pavement as these roadways were deemed to have less intensive traffic, construction, and maintenance activities.

Biologists completed a reconnaissance trip to field-verify the suitability of the USFWS-skink soils as shown by NRCS from a biological perspective. This effort and consideration of the factors above resulted in the exclusion of some NRCS-identified areas based on presence of wetlands and wet soils, and the inclusion of some areas which were not identified by NRCS based on presence of dry soils. **Figure 3** shows the final field-verified survey area which totals 89.33 acres.

The majority of land adjacent to the ROW is undeveloped and generally rural consisting of wetlands, scrubby habitats, cattle pastures, and pine plantations. Developed areas abutting the mainline include commercial centers near the I-4/US 27 interchange, and an area currently under development (Festival residential community) north of I-4 near the Osceola County line.

The surveyed areas within the existing ROW are mostly maintained grassy areas with sloped grading in some instances. Some of the survey polygons were characterized as having open sandy patches while others contained a dense cover of planted bahiagrass (*Paspalum notatum*). These survey polygons consisted of: A, B, D, E, G, H, I, J, L, N, O, P, Q, S, T, U, V, and Z. With two exceptions, all of these are adjacent to an I-4 mainline travel lane. Survey Polygon V is the one median area deemed to have potential skink soils and is therefore flanked on both sides by roadway. The other exception is Polygon Z which is an existing pond berm/maintenance area. Representative photos of all survey polygons are provided in **Appendix B**.

Originally, the FDOT was considering five locations for the construction of off-site SMFs. However, one potential site owned by the FDOT is no longer being considered due to several factors, one being the high presence of sand skinks as documented with this survey. The remaining four privately-owned sites are outside the existing ROW. Private property owners were contacted to coordinate permission to conduct the survey and accessibility logistics. One landowner was unresponsive after multiple communication efforts so coverboard surveys were not conducted on that site (Polygon F). The landowner's representative did contact FDOT on April 29, 2015 and stated that they would allow for site access and coverboard surveys. However, since this date was beyond the designated last day to begin surveys as per the USFWS survey protocol (April 17), the survey was not initiated. For this reason, the 2015 sand skink

survey was limited to the existing mainline ROW and the remaining four off-site SMFs. Descriptions of the off-site SMF areas are provided below.

Polygon C is owned by FDOT and the ground cover consists of open sand, sparse ruderal grasses, and small herbaceous plants. Shrubby oaks are present at low to medium densities throughout the site. Gopher tortoise (*Gopherus polyphemus*) burrows are apparent throughout the area. Initial visual inspection revealed this site contains the habitat requirements for sand skinks.

Polygon F is owned by a private corporation and consists mostly of open grassy pasture dominated by bahiagrass with some bare open sand patches. Sparse oaks and pines exist in the open grassy area and are dense along the forested southern boundary. A forested wetland, not deemed to be potential sand skink habitat, abuts and is located partially within the southeastern portion of the site. Cattle were observed on this site; however, grazing appeared to be limited and impacts from the cattle did not appear to be extensive. As previously discussed, due to the inability to obtain permission to access this private property prior to April 17, 2015, this polygon was not surveyed in 2015. Visual inspection revealed that the upland portion of this site appears to contain the habitat requirements for sand skinks.

Polygon K is also owned by a private corporation. Open sand patches are distributed throughout areas of bahiagrass, hay, and livestock manure. Clumps of shrubby oaks and a few cabbage palms (*Sabal palmetto*) occur throughout the site. Cattle, horses, and donkeys actively graze this area, the effects of which are evident. Open sand throughout the area is trampled by hooves and hay and manure are highly concentrated in the northeast corner where a feeding station is located. A forested wetland abuts, and is partially located within, the southeastern portion of the site. Initial visual inspection revealed that the upland portions of this site could contain the habitat requirements for sand skinks; however, intensive grazing practices made presence doubtful.

Polygon M is owned by the Tohopekaliga Water Authority and contains bahiagrass throughout the site. In some areas it is rather dense and in other areas it is sparser with open sand. The northwestern portion has large spreading live oaks (*Quercus virginiana*) with a sandy understory topped with leaf litter. Cattle occasionally graze this land as evident by manure; however, their effects are not extensive. Visual inspection revealed this site appears to contain the habitat requirements for sand skinks. Due to issues associated with a lease-hold on this property, FDOT consultant biologists deployed and recorded the locations of 163 coverboards but subsequent surveys were conducted by a developer's ecological consultant. Their findings are presented within this report and are noted as such.

Polygon R is an active pine plantation owned and managed by a private corporation. A light harvest was conducted during the week prior to the start of the 2015 sand skink survey. Mature pines grow in rows throughout the survey area excluding only an access road, powerline easement, and various brush piles throughout. A layer of thick pine needle duff covers sandy soils on the majority of the plantation; however, this layer is not as thick on the eastern side. A few citrus trees grow amongst the pines on the eastern portion. A wetland bordered by mesic oaks abuts the northern boundary while a row of saw palmetto (*Serenoa repens*) in a sandy area is located just within the eastern edge of the polygon.

3.0 PREVIOUS OBSERVATIONS

No project-specific formal coverboard surveys were conducted prior to this survey. In 2014, a pedestrian field survey for tracks was conducted and no direct or indirect observations were made (FDOT 2014a). On two previous occasions, private consulting firms documented three observations of sand skink tracks within the project limits. One observation was documented in the USFWS 2012 Biological Opinion for Lakeland-Taft Transmission Line Upgrade (USFWS 2012b). This sand skink observation was located adjacent to the ROW line of I-4 eastbound and was approximately 2,200 feet west of Ronald Reagan Parkway. Two observations were documented by AECOM (formerly as URS) in February of 2013. Both of these observations occurred on the US 27 westbound on-ramp to I-4 and were adjacent to the FDOT ROW boundary (AECOM 2013).

4.0 METHODOLOGY

4.1 SURVEY DESIGN

All survey activities were completed in accordance with the current USFWS survey protocol, which is included as Appendix A of the USFWS Peninsular Florida Species Consultation and Conservation Guide (USFWS 2012a). The design for the 2015 sand skink survey included the placement of coverboards in areas of the ROW, and potential off-site SMFs, that met the three factors indicating potential sand skink habitat: location (County), elevation, and suitable soils (USFWS 2012a). Project-specific soil surveys, a 15-foot exclusion zone adjacent to the FDOT roadway, and the other factors described previously contributed to determining the survey area boundaries. In addition, because we did not receive the AECOM 2013 sand skink observation data in time for our coverboard survey, and because the extreme southernmost section of the westbound on-ramp to I-4 is not mapped as one of the suitable sand skink soils, we did not include this area in our 2015 coverboard survey.

All survey areas were separated into polygons. Project scientists created the polygons based on soil boundaries and naturally occurring or man-made features visible on the aerial such as wetland locations. Each polygon was assigned a unique label (i.e., letter) based on the location of the polygon within the segment. The first polygon in the east-bound direction was labeled "A" with subsequent letters continuing sequentially in a counter-clockwise direction around the I-4 alignment. **Figure 4** shows the labeled survey polygons.

The area (acreage) of each polygon was determined in GIS and the resulting information was used to calculate the number of coverboards required for each polygon to meet the minimum requirement of 40 boards per acre based on the USFWS Consultation Guide. Based on this information, a total of 23 polygons covering 89.33 acres were established. The coverboard density of this survey (3,381 coverboards / 83.63 acres = 40.43 coverboards / acre) slightly exceeded the required 40 coverboards / acre density per USFWS requirements. **Table 1** shows the acreage of and number of coverboards installed in each polygon.

4.2 COVERBOARD PREPARATION AND DEPLOYMENT

Coverboard preparation and installation occurred from March 9 through March 20, 2015. Biologists selecting the coverboard locations were cognizant of listed plant species that occur within Polk County and avoided any areas suspected of containing protected flora. Review of the Draft October 2014 ESBA (FDOT 2014a) indicated that pedestrian surveys for protected flora were conducted in May 2013 and April 2013; scrub lupine (*Lupinus aridorum*) was identified in several locations throughout the project limits.

While the initial field reconnaissance trip noted obvious areas to be included or excluded in the survey, a secondary effort was taken on the days of deployment to further scrutinize microhabitats for inclusion or exclusion. As much as terrain permitted, the coverboard locations were generally evenly distributed throughout the polygon. Where swales or other inappropriate skink habitat areas were present, an adequate number of coverboards were placed elsewhere within the polygon in order to maintain the appropriate board density for that survey polygon. Other inappropriate microhabitat areas included one active construction zone (Polygon S), and one area of large brush and tree debris (Polygon R). Coverboards were not placed in the western end of survey Polygon N because sand skink tracks were observed here during the initial placement of coverboards; therefore this area was considered occupied sand skink habitat. Coverboards were placed in the remainder of survey Polygon N at the 40 boards/acre density. **Figure 4** shows the location of each monitored coverboard and includes notes on microhabitats where coverboards were not installed. Photographs of areas within the polygons where coverboards were deemed not to be needed are provided in **Appendix C**. In all cases, the USFWS minimum coverboard density of 40 boards per acre was maintained based on the

acreage of the entire pre-determined polygon including the areas of what was ultimately deemed unsuitable microhabitat.

Each coverboard location (slightly larger than 2-foot by 2-foot) was cleared of vegetation and roots using rakes, hoes, and diamond scuffle hoes. The coverboards used were 2-foot by 2-foot ½-inch engineered plytanium plywood and were deployed immediately following ground clearing. During deployment, the polygon letter and a unique identification number were written on each coverboard. GPS coordinates were collected for each coverboard using a hand-held Trimble GeoXT 3000 series submeter unit. During the labeling and recording of the GPS location of each board, additional clearing and smoothing of the coverboard locations was conducted to ensure that each coverboard had maximum contact with exposed soil. A total of 3,381 coverboards were installed in the survey area. One or more signs reading "FDOT wildlife survey in progress - do not mow or disturb" were placed within each polygon to deter disturbance of the study area. Prior to coverboard deployment, FDOT maintenance staff was notified to suspend maintenance activity for the duration of the survey.

Sand skink tracks were observed in two polygons during the installation effort. In one instance, at Polygon N, the majority of the coverboards had already been installed when sand skink tracks were identified. The western end of the site appeared to be suitable habitat with loose sandy soils and sparse vegetation, while the middle and eastern sections of the polygon was composed of extremely dense grass which was difficult to clear soil for coverboards. Presence of the sand skink in the western limit of the polygon was assumed and that portion was claimed as "occupied". No additional coverboards were installed in the area where presence was assumed. The coverboards that had already been installed in the remainder of the polygon were left in place and monitoring was conducted per USFWS protocol. While installing coverboards in Polygon C, three potential tracks were located. In order to positively confirm sand skink presence, all coverboards were installed throughout this polygon and were checked for the remainder of the survey period.

Coverboards were left in place for one week prior to monitoring in order to acclimate to the natural environment. All surveyed polygons except for Polygon V and Polygon Z were monitored four times, once during each of the following weeks: March 23rd, March 30th, April 6th, and April 13th, 2015. Polygon V and Polygon Z were monitored four times, once during each of the following weeks: March 30th, April 6th, April 13th, and April 20th. Coverboards were installed in these two polygons at the end of the two week installation period after the March 2015 *Florida Sand Skink Soils Investigation Report* (Florida Department of Transportation 2015) was completed. Results from that soil survey unexpectedly indicated suitable skink soils in these

two polygons. Therefore, in order to ensure the boards received the appropriate acclimation period, their monitoring was staggered one week behind the other survey polygons.

During the monitoring events, each coverboard was carefully lifted with a hoe facing away from the observing biologist (for protection in the event of venomous insects or reptiles) and the underlying soil was observed for the presence of sinusoidal skink tracks. As needed, the soil beneath the coverboard was smoothed in preparation for subsequent monitoring. Within each polygon, areas containing open loose sands were visually inspected for the presence of skink tracks during each monitoring event. Information was recorded on datasheets including the survey start and stop time, names of biologists conducting the survey, and observations of any vertebrates encountered under coverboards. If sand skink tracks or live individuals were found, the coverboard number, number of tracks, number of individuals, and weather conditions (temperature, wind speed and direction, cloud cover, and precipitation) were recorded. Scanned field datasheets are provided in **Appendix D**.

When live sand skinks or sand skink tracks were observed, monitoring within the occupied area continued in an effort to gather potentially valuable information such as skink activity changes and likelihood of detecting skink tracks solely by pedestrian surveys. At the completion of the fourth monitoring event all coverboards and signs were collected from the project site and removed.

5.0 RESULTS

Coverboard surveys were conducted during the spring, which is typically a dry, warm season in central Florida. Rainfall and temperatures in spring 2015 were fairly typical to past years, although daytime temperatures were warmer than average, as many days were in the high 80's and even reached 90 degrees on several days.

Five sand skink tracks were observed during coverboard installation. Three tracks were documented in Polygon C and two tracks were documented in Polygon N. During the four monitoring events, five live sand skinks were found under coverboards and sand skink tracks were observed on 84 occasions. In 83 of these occasions, tracks were observed under or immediately adjacent to a coverboard. During one occasion, tracks were observed in open sand. Sand skink tracks were observed under 55 unique boards; as coverboards were left in place after tracks were identified, some coverboards had sand skink tracks during more than one monitoring event. Some boards had multiple overlapping sand skink tracks. The highest recorded number of tracks observed under a coverboard was 15 tracks during a single monitoring event. Sand skink tracks were observed in six polygons (C, D, E, G, H, and R) during monitoring and in Polygon N during installation only. Live sand skinks were observed in Polygon C and Polygon D.

Photographs of representative tracks and individuals are provided for each survey polygon in **Appendix E**. Most track observations occurred on the south side of the I-4 roadway with the vast majority of those observations in Polygon C. **Figure 5** shows the locations of sand skink tracks (both under coverboards and in bare sand between coverboards) and live sand skinks observed during the survey, as well as previous observations by other private consulting firms. **Table 2** summarizes the results of the coverboard monitoring. **Appendix F** contains a list of all incidental species observed under coverboards.

Although the coverboard survey was not executed on the privately-owned Polygon F, it appears that the upland area may support sand skinks. Furthermore, sand skink tracks were found within Polygon E where the habitat is continuous with Polygon F. Since the 2015 survey was unable to confirm or deny the presence of sand skinks within Polygon F, the FDOT will assume presence within the upland (non-wetland) portions of Polygon F for the purpose of the formal consultation. Should FDOT decide at a later time to survey the parcel with coverboards, and find that the site does not support the species, the FDOT may choose to request a revision to the Biological Opinion.

6.0 SKINK-OCCUPIED HABITAT

Field reconnaissance of abrupt changes in habitat, vegetation, soil characteristics and possible barriers to sand skink movements (e.g., deep ditches, paved roadways, abrupt changes in top layer of soils, presence of dense vegetation with root mats) was used in combination with a desktop aerial review to delineate approximate boundaries to the movement of sand skinks within and between survey areas. For the purpose of determining mitigation, continuous areas of suitable habitat were considered occupied. As per the current guidance in the USFWS Survey Protocol for Peninsular Florida for the Sand Skink and Blue-tailed Mole Skink (USFWS 2012a), there is no standard, required buffer distance to utilize when determining occupied habitat from a species observation. Therefore, biologists used reasonable scientific judgment to determine the amount of occupied sand skink habitat within the project area.

Figure 6 illustrates the areas determined to be occupied by skinks, and **Table 3** summarizes the sand skink-occupied habitat. Results indicate that 8.24 acres of the project area are occupied by sand skinks. This excludes Polygon C, since the FDOT is no longer proposing to utilize this area for a stormwater management facility. A total of seven survey polygons (C, D, E, G, H, N, and R) had evidence of sand skinks. Polygon C (3.64 acres) was considered to be fully occupied based on the high number and scattered location of the skink observations. The remaining six survey polygons were determined to have both occupied and unoccupied habitat components.

Table 3 and **Figure 6** include an area located on the US 27 northbound on-ramp to I-4 eastbound, south of and adjacent to Polygon B, that was not surveyed with coverboards in 2015 due to lack of mapped, suitable soils. However, since a sand skink was observed previously in this area (AECOM 2013), a portion of this area was included as occupied sand skink habitat (0.23 acres) in our documentation.

As previously mentioned, since Polygon F was not surveyed and sand skink presence was neither confirmed nor denied, the upland (non-wetland) portion of this polygon is considered to be potential habitat (4.93 acres). Based on field surveys, the Southwest Florida Water Management District (SWFWMD) Florida Land Use, Cover and Forms Classification System (FLUCFCS) data is a better representation of the upland-wetland break than the NRCS soils data. Therefore, the FLUCFCS data was utilized to determine the acreage of potential skink habitat. Using the NRCS soils GIS layer to determine Polygon F habitat impacts instead of FLUCFCS, the 4.93 acre determination would increase to 5.70 acres. Note that Figure 6 depicts Polygon F potentially occupied habitat using the FLUCFCS boundary; prior figures utilize the soil boundary. Polygons D, E, G, H, N, and R were determined to contain both occupied and unoccupied portions based on the following:

Polygon D

There were nine observations of sand skink tracks within Polygon D under seven unique boards. Boards D-26 and D-29 both had skink tracks during two monitoring events. As discussed previously, particular attention was given to microhabitat considerations during coverboard deployment. In this polygon, coverboards were not placed in one sub-area containing wet soils and there was standing water in this same low-elevation area at the time boards were collected. At the time of the initial field reconnaissance trip, this area was mesic; had it been wetter at that time, we would have excluded this sub-area from survey. Therefore, it was concluded that this sub-area, totaling 0.20 acres, is not potential sand skink habitat. Of the remaining 1.20 acres, a portion (0.77 acres) was deemed occupied habitat, using a 100-foot buffer around the observation points. This buffer distance is the approximate distance of 40 coverboards in a grid of 40 boards/acre. Photos of unoccupied and occupied areas of Polygon D are provided in **Appendix G**.

Polygon E

There were two observation of sand skink tracks recorded within Polygon E under two unique boards. Prior survey data as part of the Lakeland-Taft Transmission Line Upgrade Biological Opinion (USFWS 2012b) recorded one track observation near this current observation point. As

described for Polygon D, occupied habitat was deemed by buffering the observations by 100-feet. This results in 0.33 acres of occupied habitat.

Polygon G

There was a single observation of a track, not associated with a coverboard, recorded within this polygon. As described for previous polygons, occupied habitat was determined by buffering the observations by 100-feet. This results in 0.20 acres of occupied habitat.

Polygon H

There was a single observation of a track recorded under a coverboard within this polygon. As described for previous polygons, occupied habitat was determined by buffering the observations by 100-feet. This results in 0.30 acres of occupied habitat.

Polygon N

Sand skinks were documented in the western portion of Polygon N during coverboard deployment and therefore this area was considered occupied sand skink habitat. Preceding west to east, this polygon changed composition from a mixture of sandy soils interspersed with bahiagrass to an extremely dense bahiagrass sub-area towards the eastern end of the survey polygon. The ground vegetation in the middle and particularly eastern ends of the polygon was extremely difficult to remove for coverboard surveys. Due to the thick vegetation, plus lack of sand skink observations, the majority of Polygon N was not considered sand skink habitat. Occupied habitat was determined by considering both the 100-foot buffer as previously described, but also by considering the microhabitat vegetation characteristics, resulting in 0.52 acres of assumed habitat occupancy.

Polygon R

There were four observations of sand skink tracks within Polygon R under four unique boards. All observations occurred within the eastern portion of this large, potential SMF site. In this case, occupied habitat was determined by comparing the habitat where sand skinks were documented to the habitat where sand skinks were not documented. Proceeding east to west in Polygon R, the eastern occupied area has shorter rows of fewer pine trees with citrus trees intermixed and a saw palmetto fringe. The result is a lighter pine needle groundcover over sandy soils with some open sand patches. The western portion of Polygon R has a higher density of pine trees which has created a thick layer of pine needle duff and also contains decomposing and fresh pine bark/branches. In some areas the duff layer is several inches deep. It is believed that the sand skinks likely inhabit the adjacent open sandy field (outside Polygon R) which provides suitable

habitat and occasionally enter the pine plantation. These characteristics, coupled with the negative survey results throughout the western portion of the plantation, indicate that 0.96 acres of the total 12.38-acre polygon provide habitat for and support skinks. This determination was also based on the 100-foot buffer of documented observation points. Photos of unoccupied and occupied areas of Polygon R are provided in **Appendix G**.

Survey Polygon B was not considered sand skink habitat despite its adjacency to survey Polygon C and the 2013 skink observation recorded by others. A notable soil change occurs in this location at the ROW fence, where soils in Polygon C are characterized by rocky, inclusion material and evidence of regular vehicular impact (e.g. tire tracks). Survey Polygon C soils are notably more sandy and undisturbed.

Based on the documented skink observation recorded by others in the area south of Polygon B where coverboards were not deployed due to lack of mapped skink soils, occupied habitat was determined by utilizing the 100-foot buffer as previously described. However, it was further manipulated to continue to, but not include, the swale located near the US 27 on-ramp to I-4. This resulted in 0.23 acres of occupied habitat to be deemed at this location.

7.0 EFFECT DETERMINATION

The FDOT previously determined in the Draft October 2014 ESBA (Florida Department of Transportation 2014a) that pending the results of a coverboard survey the project "may affect" the sand skink and the bluetail mole skink. Live sand skinks and sand skink tracks have now been documented within some areas of the I-4 project limits, totaling 8.24 acres. No bluetail mole skinks were observed in the project area prior to or during the 2015 sand skink survey.

Due to the location of the existing roadway and the proposed design concept, direct impacts to habitat occupied by threatened skink species are unavoidable. Consequently, the FDOT finds that the "may affect" determination remains appropriate for the proposed roadway improvements.

8.0 PROPOSED HABITAT COMPENSATION

To offset impacts to 8.24 acres of occupied skink habitat within the project corridor, the FDOT commits to the purchase of 16.48 credits from a species conservation bank with a service area that covers the project limits. The total credits to be purchased is based on two credits for each acre of impacted habitat (8.24 acres x 2 credits per acre = 16.48 credits).

Known conservation banks whose service areas cover the project area are: Hatchineha Ranch, Sebring Scrub, Morgan Lake Wales Preserve, and Tiger Creek. The Hatchineha Ranch Conservation Bank is a 161-acre parcel located in Polk County while the Sebring Scrub

Conservation Bank includes 77 acres in Highlands County. The Morgan Lake Wales Preserve Conservation Bank includes 487 acres in Polk County and the Tiger Creek Conservation Bank includes 276 acres in Polk County. All potential options are located on the Lake Wales Ridge which is on the same ridge as the proposed impacts. The banks have the same service area which ranges from north of Eustis (north end) to Glades County (south end) along the US 27 corridor. At the time of credit purchase, some of these conservation bank options may not be viable due to low credit availability. Any future/new conservation banks meeting the criteria of USFWS and FDOT may also be utilized for mitigation.

FDOT will advertise the mitigation requirements in an invitation to bid and then follow the state selection process. Documentation of credit purchase will be submitted to the USFWS when the transaction has been completed.

9.0 ADDITIONAL INFORMATION

As previously described, the coverboards were left in place and checked each week after sand skink presence was confirmed in an effort to gather supplemental information regarding the survey process. Notable observations are described below.

Polygon C exhibited high sand skink activity and many more tracks were observed under coverboards than in open sand. Given the high number of observations (over 100 individual tracks) under coverboards at this site, project biologists expected that a similarly high presence of tracks would have been observed in open areas. This was not the case since only three recorded tracks were not associated with a coverboard. In this instance, the use of coverboards confirmed initial observations and provided additional data. Potential explanations for the higher prevalence of tracks under coverboards are that wind, rain, and other elements more quickly reduce the likelihood of detection of tracks in open sand. Additionally, the coverboards may provide microhabitat characteristics that are favorable to sand skinks including lower temperature and decreased sand compaction due to clearing for board installation. Both of these potential explanations are consistent with what researchers have previously suggested.

Findings from Polygon G are contradictory to those from Polygon C. Within Polygon G, no sand skink tracks were observed under coverboards during the duration of monitoring but one track was observed in open sand. Reasons for these results are unknown. It is possible that there is a very small population or only an occasional sand skink venturing into this habitat. Low skink use of a site could result in unexpected detection results.

Habitats varied throughout the project footprint from very sandy, open soils which appeared to be suitable sand skink habitat, to denser grass-covered areas which appeared to be unsuitable

sand skink habitat. It is notable that at the locations where removing thick grass and roots for the coverboard installation required intensive effort, no sand skink tracks were found during the course of the survey. In all instances, the polygons exceedingly vegetated by bahiagrass (Polygons A, middle and eastern portions of N, S, T, U, V, and Z) did not yield evidence of sand skink presence. However, not all polygons characterized by known sand skink habitat preferences (open, bare sandy soils) were found to be occupied by sand skinks.

10.0 REFERENCES

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Table 1. Survey Polygon Acreages and Number of Coverboards

Survey Polygon	Size (acres)	Number of Coverboards	Coverboard Density (coverboards per acre)
A	2.17	88	40.53
B	8.97	371	41.36
C	3.64	152	41.76
D	1.40	57	40.78
E	0.55	22	40.00
G	0.55	22	40.00
H	1.98	81	40.97
I	3.72	150	40.27
J	0.30	12	40.27
K	4.02	162	40.30
L	0.85	35	41.25
M	4.07	163	40.08
N	2.70	92	34.08*
O	2.31	97	42.06
P	4.07	163	40.10
Q	11.34	461	40.65
R	14.52	589	40.56
S	9.19	368	40.04
T	0.87	35	40.39
U	0.49	20	40.77
V	4.18	170	40.68
Z	1.75	71	40.51
Totals	**83.63**	**3,381**	**Average = 40.43**

*Coverboards were not placed in the western end of survey polygon N (totaling 0.53 acres) because sand skink tracks were observed here during the initial placement of coverboards; therefore this area was considered occupied sand skink habitat. A total of 92 coverboards were placed in the remainder of survey polygon N (2.17 acres) resulting in a coverboard density of 42.40 boards per acre for this survey polygon.

Note: this table depicts acreage values to the hundredth decimal place, but coverboard density was calculated using the thousandth decimal place. As a result of this table rounding, coverboard densities and total project size may appear to have slight differences than if calculated by hand using this table alone.

Table 2. Coverboard Survey Results

Date	Coverboard ID / Polygon ID if in Open Sand	Sand Skink Evidence	Notes
3/10/2015	N	Track	2 observed during coverboard deployment
3/11/2015	C	Track	3 observed during coverboard deployment
3/25/2015	C-116	Tracks (coverboard)	
3/25/2015	C-92	Tracks (coverboard)	
3/25/2015	C-7	Tracks (coverboard)	
3/25/2015	C-8	Tracks (coverboard)	
4/2/2015	C-5	Tracks (coverboard)	
4/2/2015	C-7	Tracks (coverboard)	
4/2/2015	C-35	Tracks (coverboard)	
4/2/2015	C-41	Tracks (coverboard)	
4/2/2015	C-54	Tracks (coverboard)	
4/2/2015	C-61	Tracks (coverboard)	
4/2/2015	C-92	Tracks under coverboard & live individual	
4/2/2015	C-94	Tracks (coverboard)	
4/2/2015	C-116	Tracks (coverboard)	
4/2/2015	C-99	Tracks (coverboard)	
4/2/2015	C-102	Tracks (coverboard)	
4/2/2015	C-108	Tracks (coverboard)	
4/2/2015	C-106	Tracks (coverboard)	
4/2/2015	C-131	Tracks (coverboard)	
4/2/2015	C-141	Tracks (coverboard)	
4/6/2015	D-14	Tracks (coverboard)	
4/6/2015	D-25	Tracks (coverboard)	many tracks surrounding coverboard
4/6/2015	D-26	Tracks (coverboard)	
4/6/2015	D-29	Tracks (coverboard)	
4/6/2015	D-41	Tracks under coverboard & live individual	
4/6/2015	E-13	Tracks (coverboard)	
4/6/2015	E-8	Tracks (coverboard)	
4/6/2015	G	Track	
4/8/2015	C-18	Tracks (coverboard)	
4/8/2015	C-32	Tracks (coverboard) & 2 live individuals	
4/8/2015	C-35	Tracks (coverboard)	
4/8/2015	C-36	Tracks (coverboard)	
4/8/2015	C-37	Tracks (coverboard)	

Table 2 Continued. Coverboard Survey Results

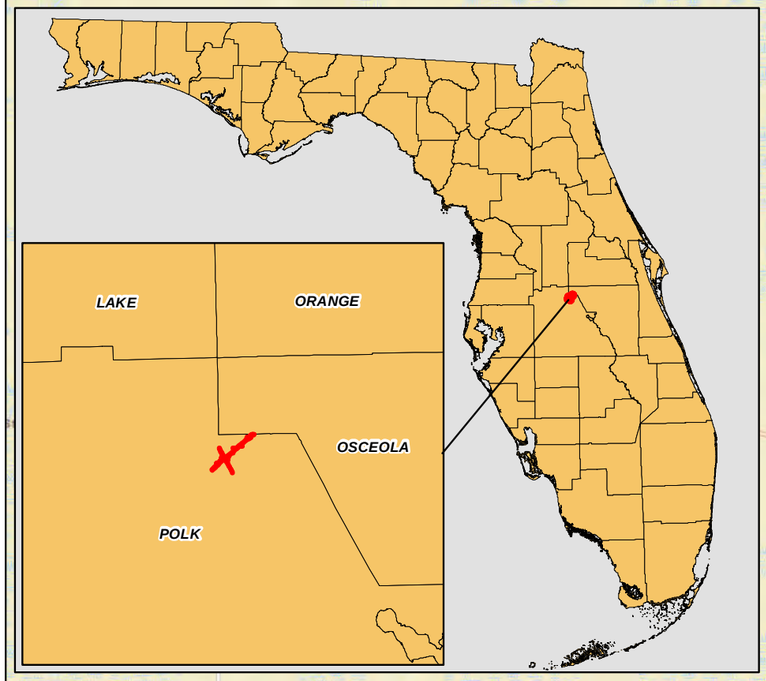
Date	Coverboard ID / Polygon ID if in Open Sand	Sand Skink Evidence	Notes
4/8/2015	C-41	Tracks (coverboard)	
4/8/2015	C-46	Tracks (coverboard)	
4/8/2015	C-50	Tracks (coverboard)	
4/8/2015	C-54	Tracks (coverboard)	
4/8/2015	C-61	Tracks (coverboard)	
4/8/2015	C-62	Tracks (coverboard)	
4/8/2015	C-70	Tracks (coverboard)	
4/8/2015	C-77	Tracks (coverboard)	
4/8/2015	C-83	Tracks (coverboard)	
4/8/2015	C-94	Tracks (coverboard)	
4/8/2015	C-99	Tracks (coverboard)	
4/8/2015	C-102	Tracks (coverboard)	
4/8/2015	C-104	Tracks (coverboard)	
4/8/2015	C-106	Tracks (coverboard)	
4/8/2015	C-110	Tracks (coverboard)	
4/8/2015	C-116	Tracks (coverboard)	
4/8/2015	C-131	Tracks (coverboard)	
4/8/2015	C-141	Tracks (coverboard)	
4/8/2015	C-148	Tracks (coverboard)	
4/8/2015	R-507	Tracks (coverboard)	
4/8/2015	R-524	Tracks (coverboard)	
4/8/2015	R-547	Tracks (coverboard)	
4/13/2015	D-26	Tracks (coverboard)	
4/13/2015	D-29	Tracks (coverboard)	
4/13/2015	D-42	Tracks (coverboard)	
4/13/2015	D-18	Tracks (coverboard)	
4/13/2015	H-14	Tracks (coverboard)	
4/15/2015	C-39	Tracks (coverboard) & live individual	
4/15/2015	C-41	Tracks (coverboard)	
4/15/2015	C-46	Tracks (coverboard)	
4/15/2015	C-57	Tracks (coverboard)	
4/15/2015	C-50	Tracks (coverboard)	
4/15/2015	C-80	Tracks (coverboard)	
4/15/2015	C-77	Tracks (coverboard)	
4/15/2015	C-75	Tracks (coverboard)	
4/15/2015	C-114	Tracks (coverboard)	
4/15/2015	C-131	Tracks (coverboard)	
4/15/2015	C-138	Tracks (coverboard)	
4/15/2015	C-139	Tracks (coverboard)	

Table 2 Continued. Coverboard Survey Results

Date	Coverboard ID / Polygon ID if in Open Sand	Sand Skink Evidence	Notes
4/15/2015	C-142	Tracks (coverboard)	
4/15/2015	C-117	Tracks (coverboard)	
4/15/2015	C-102	Tracks (coverboard)	immediately next to coverboard
4/15/2015	C-128	Tracks (coverboard)	
4/15/2015	C-5	Tracks (coverboard)	
4/15/2015	C-7	Tracks (coverboard)	
4/15/2015	C-8	Tracks (coverboard)	
4/15/2015	C-18	Tracks (coverboard)	
4/15/2015	C-32	Tracks (coverboard)	
4/15/2015	C-105	Tracks (coverboard)	next to coverboard
4/15/2015	C-110	Tracks (coverboard)	
4/15/2015	C-120	Tracks (coverboard)	
4/15/2015	R-552	Tracks (coverboard)	

Table 3. Sand Skink Occupied Habitat Summary

Polygon	Total Area (Ac)	Area Occupied (Ac)	Area Unoccupied (Ac)
D	1.40	0.77	0.63
E	0.55	0.33	0.22
F	4.93	4.93	0.00
G	0.55	0.20	0.35
H	1.98	0.30	1.68
N	2.70	0.52	2.18
R	14.52	0.96	13.56
non-surveyed polygon with 2013 observation	2.24	0.23	2.01
Totals	**28.87**	**8.24**	**20.63**



Project ROW

End Project

Begin Project

Figure 1 - Project Location Map

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 4,000 8,000 12,000 Feet

N

Data Source:
- FDOT
Imagery Source:
- ESRI Base Map

Coordinate System:
NAD 1983 Florida
State Plane West

Centennial FDOT 1915 ★ 2015

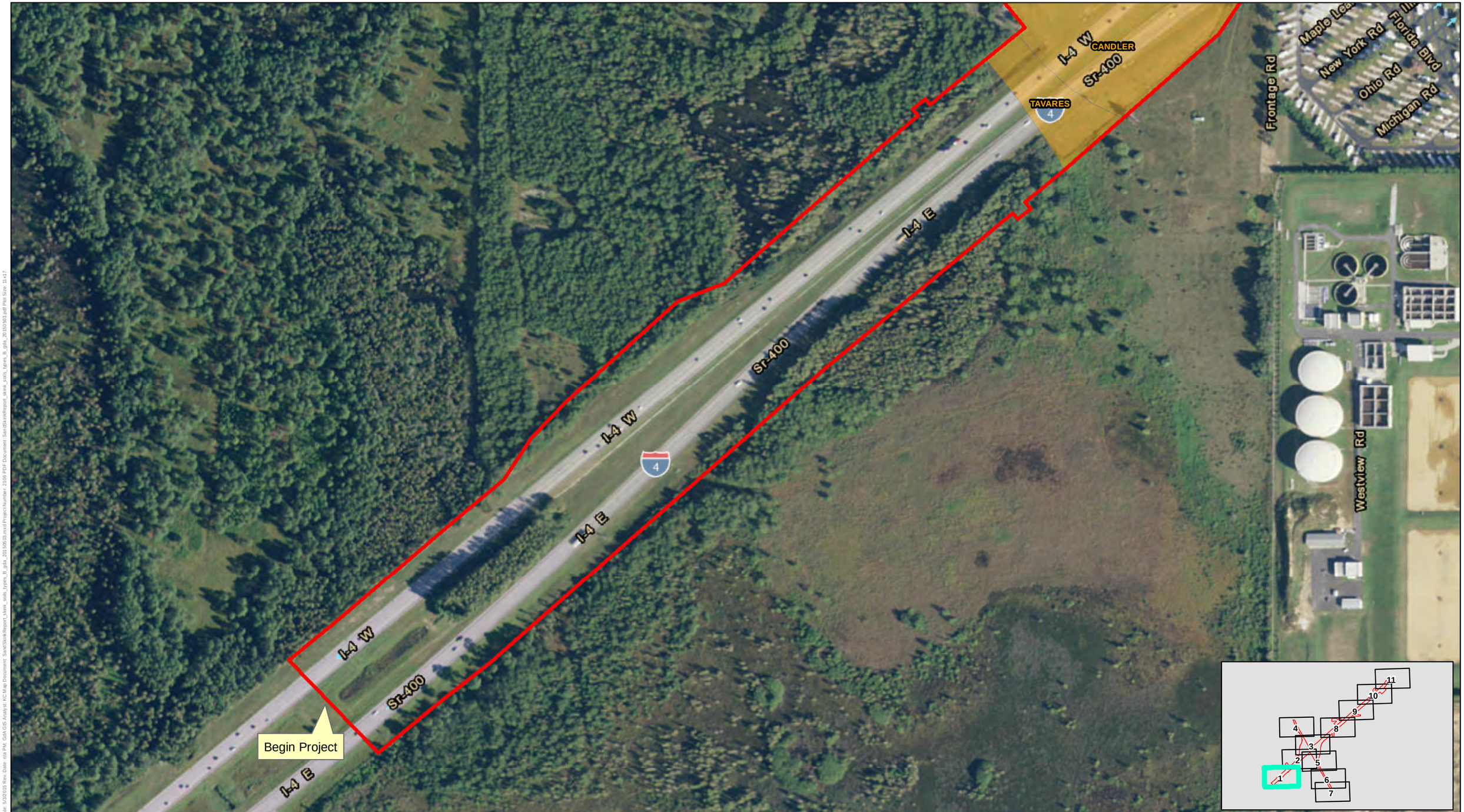


Figure 2 - USFWS Sand Skink Soil Types Map

Page 1 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

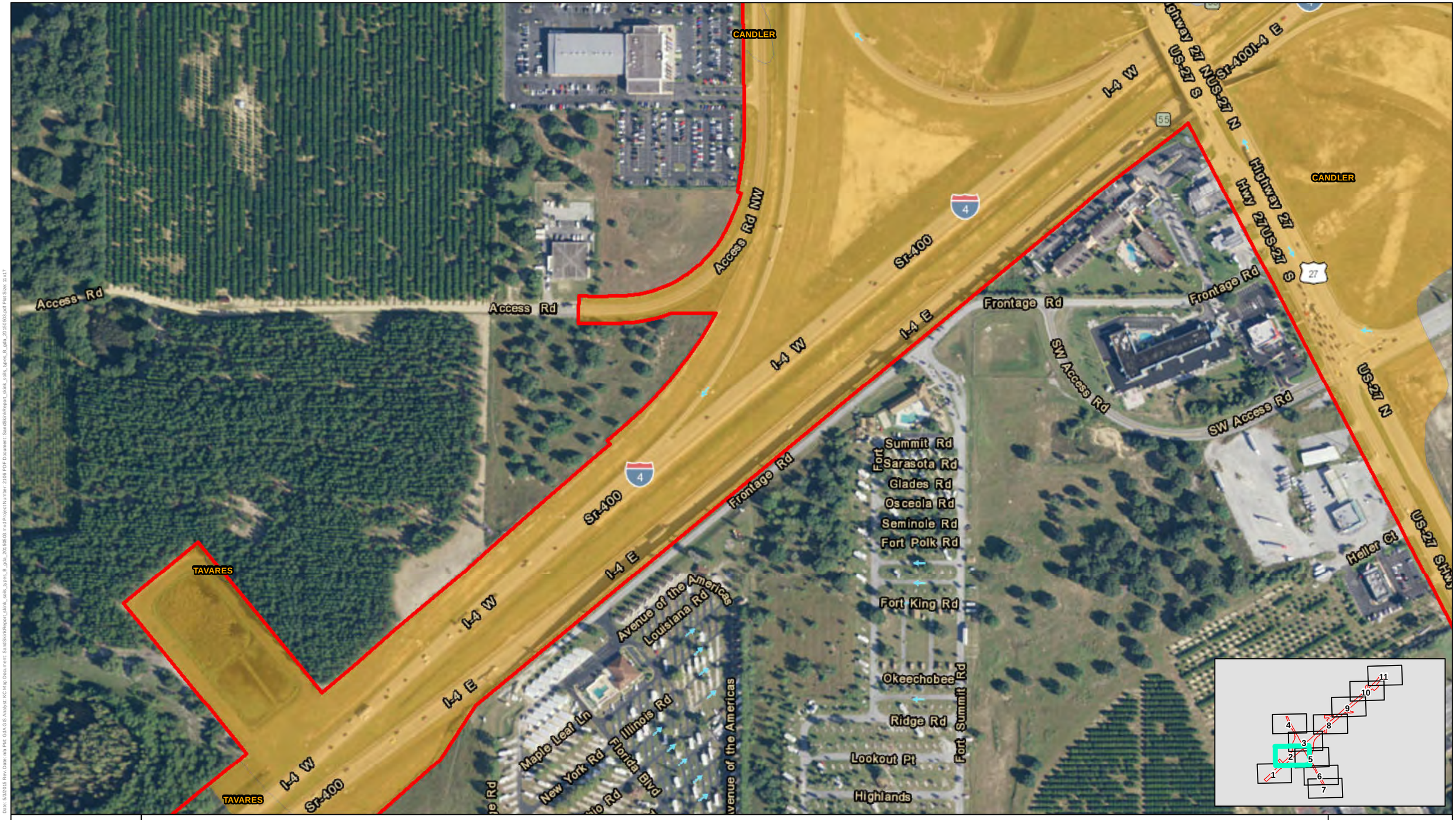
0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



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Centennial FDOT 1915 ★ 2015

Figure 2 - USFWS Sand Skink Soil Types Map

Page 2 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 2 - USFWS Sand Skink Soil Types Map

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida
State Plane West

Centennial FDOT 1915 ★ 2015

Figure 2 - USFWS Sand Skink Soil Types Map

Page 4 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 2 - USFWS Sand Skink Soil Types Map

Page 5 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

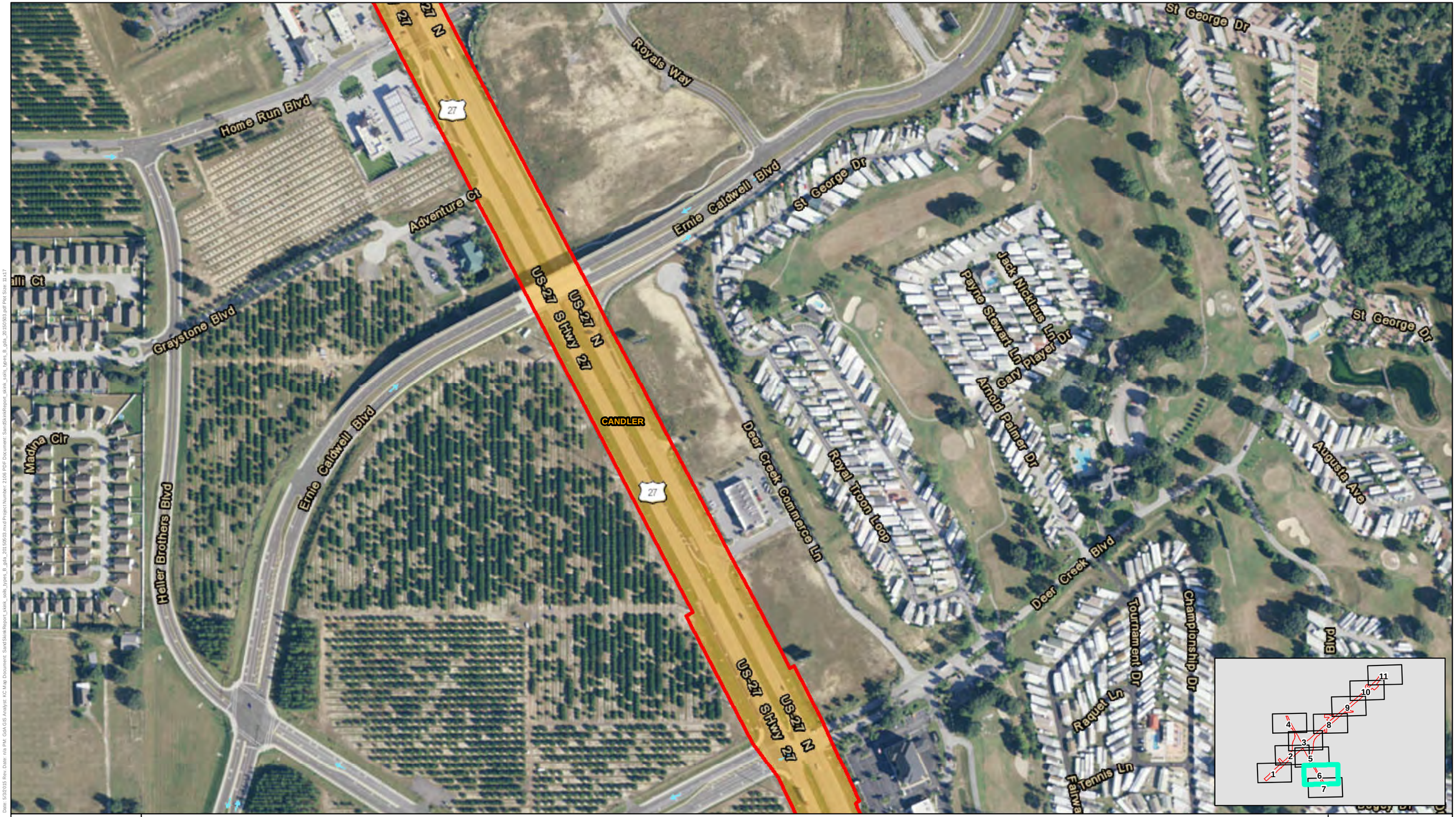
Project ROW

Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Centennial FDOT 1915 ★ 2015

Figure 2 - USFWS Sand Skink Soil Types Map

Page 6 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

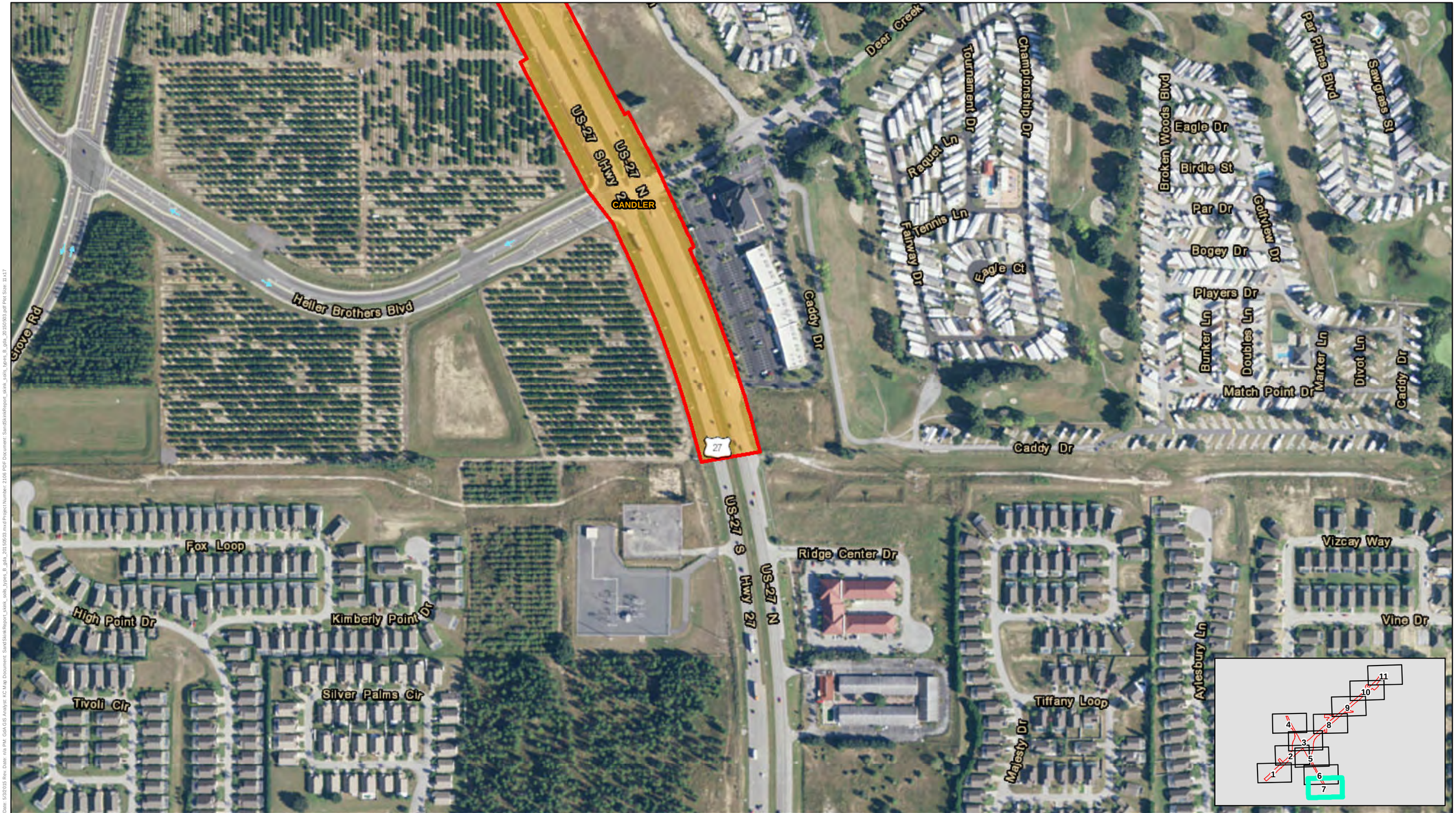


Figure 2 - USFWS Sand Skink Soil Types Map

Page 7 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

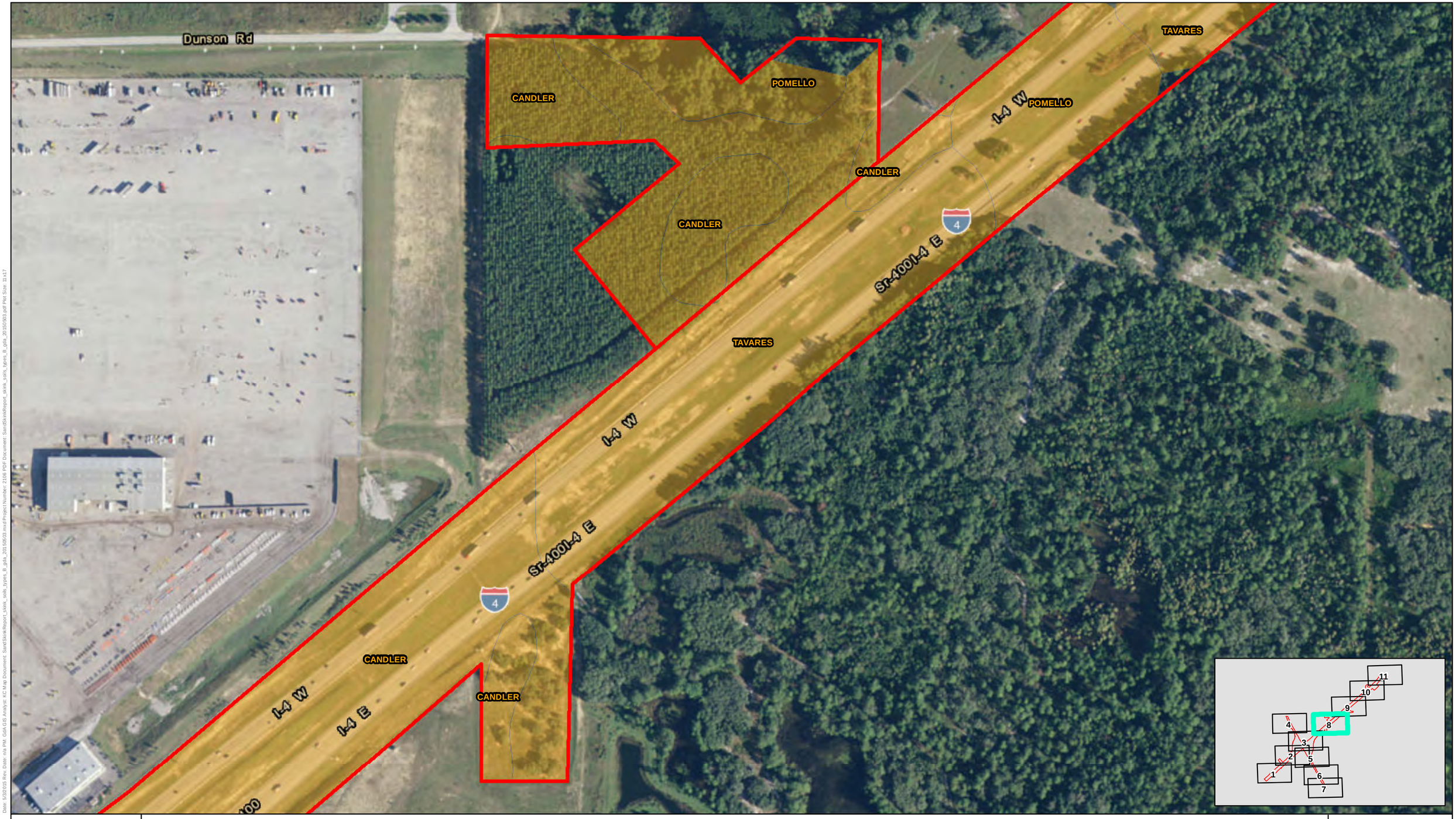
0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Centennial FDOT 1915 ★ 2015

Figure 2 - USFWS Sand Skink Soil Types Map

Page 8 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

Feet
0 300 600 900

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida
State Plane West

Figure 2 - USFWS Sand Skink Soil Types Map

Page 9 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW

Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

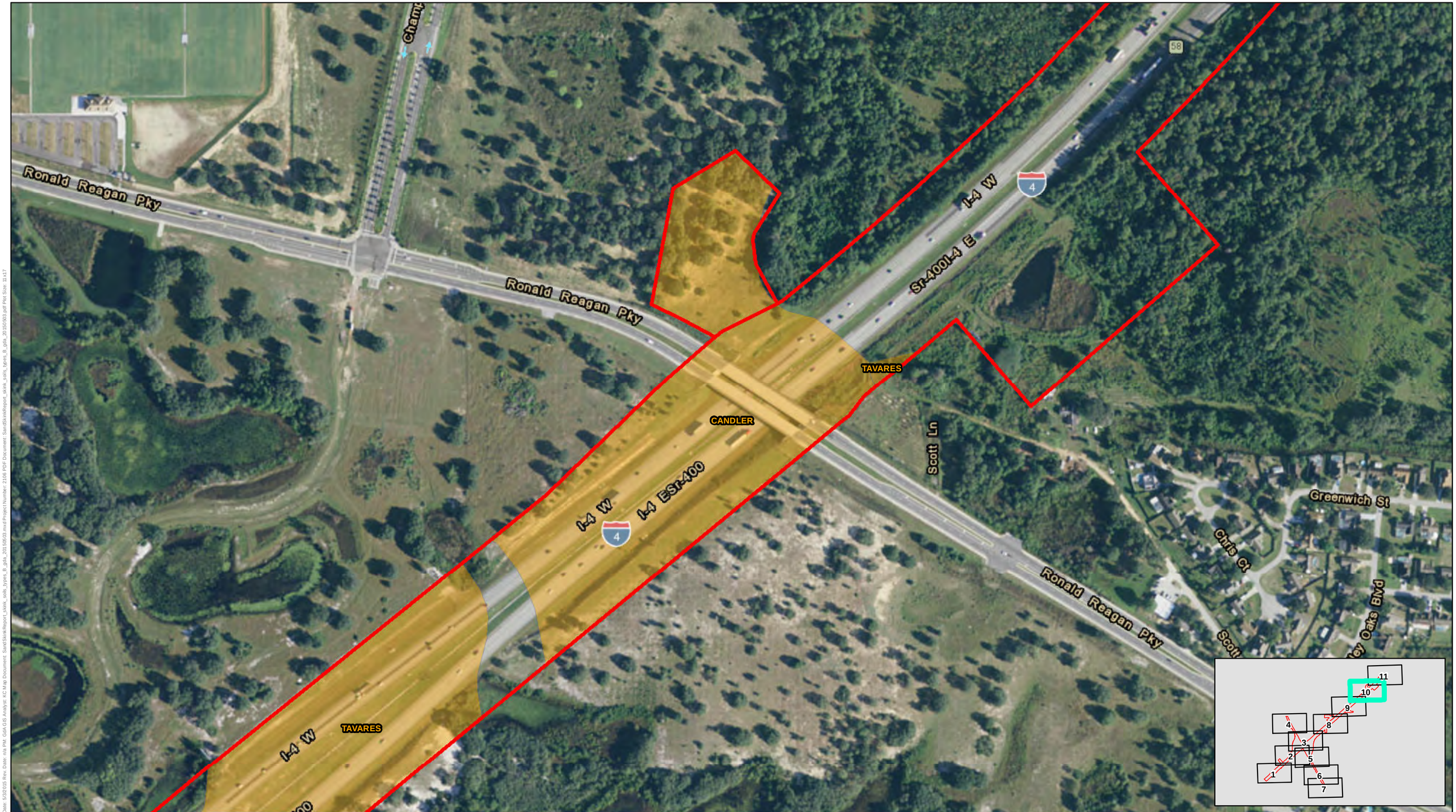


Figure 2 - USFWS Sand Skink Soil Types Map

Page 10 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Legend

S Good

I-4

Laura Ln

Champions Gate Blvd

I-4 W

SR-400/I-4 E

Kemp Rd

Osceola Polk Line Rd

Gentile Rd

End Project

4

CANDLER

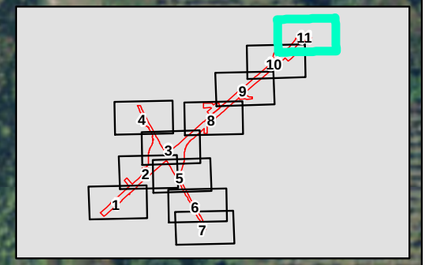
TAVARES

I-4 W

SR-400/I-4 E

58

Osceola Polk Line Rd



Centennial FDOT 1915 ★ 2015

Figure 2 - USFWS Sand Skink Soil Types Map

Page 11 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW

Suitable Sand Skink Soil as Mapped by NRCS

N

Data Source:
- FDOT
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida
State Plane West

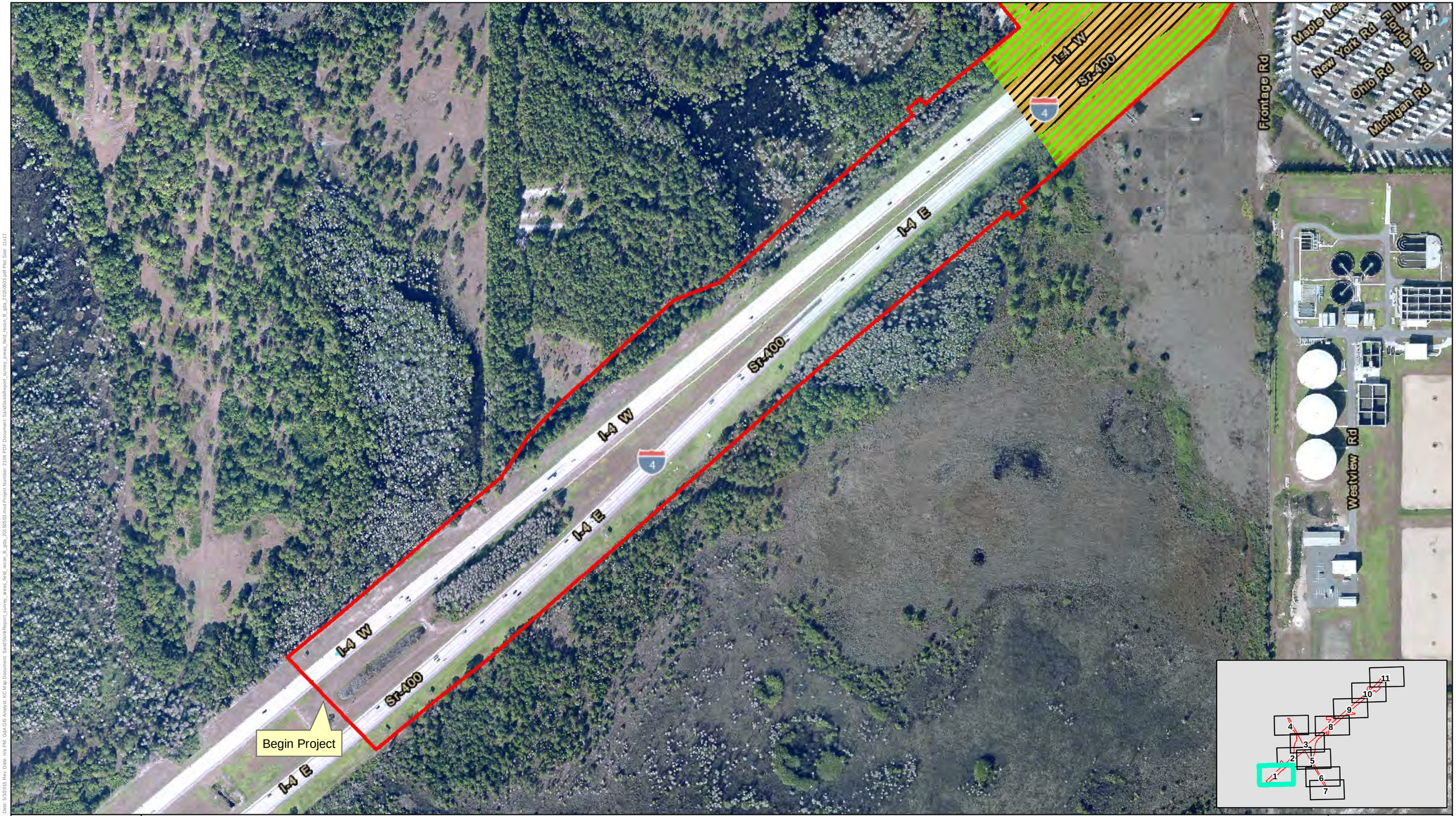


Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

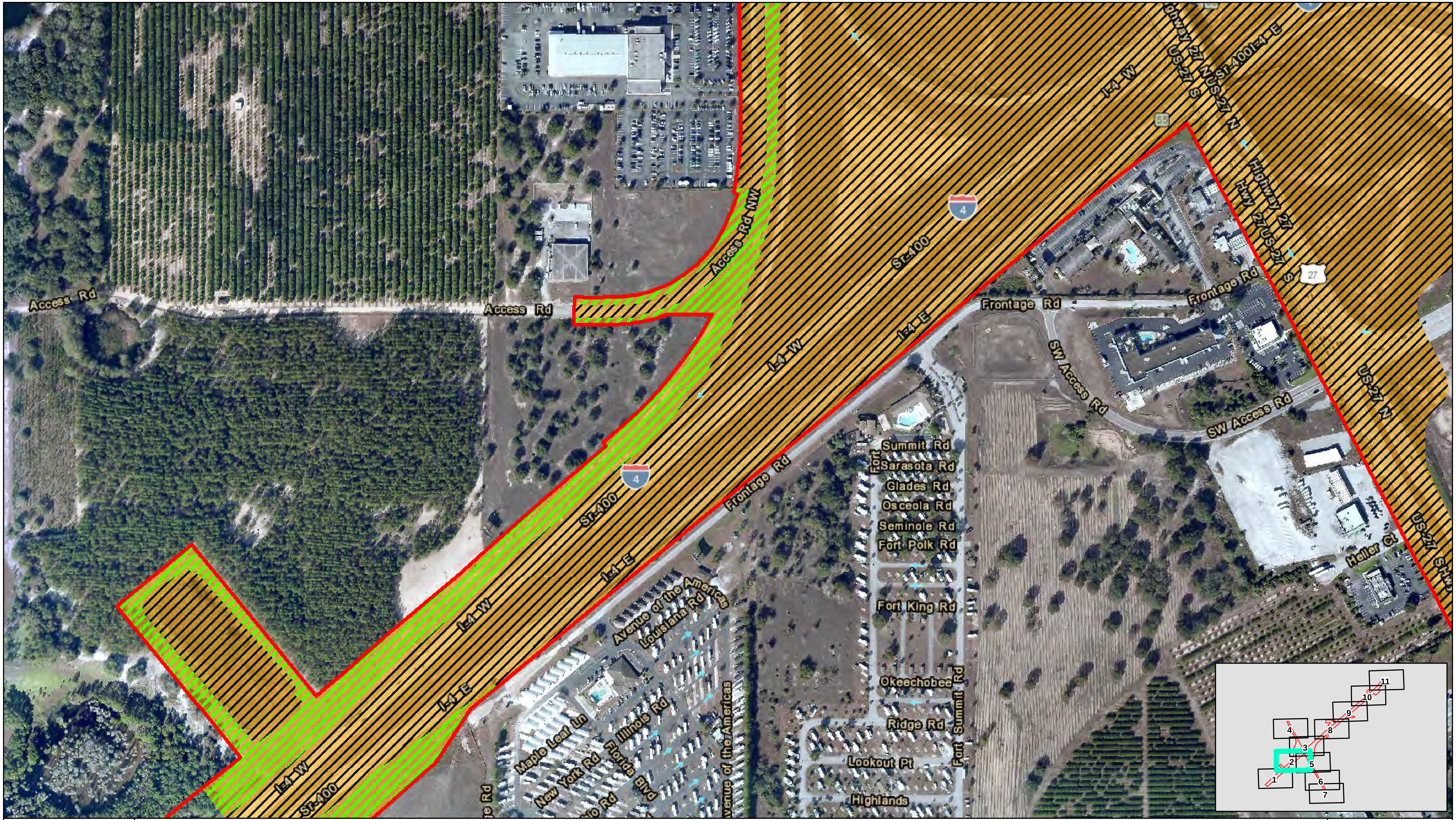


Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Suitable Sand Skink Soil as Mapped by NRCS
Suitable Sand Skink Soil as Observed by Project Biologists
No Survey Needed
Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS
Imagery Source:
- 2014 FDOT
Coordinate System:
NAD 1983 Florida
State Plane West

Centennial FDOT 1915 ★ 2015

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 3 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Centennial FDOT 1915 ★ 2015

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 4 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 5 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

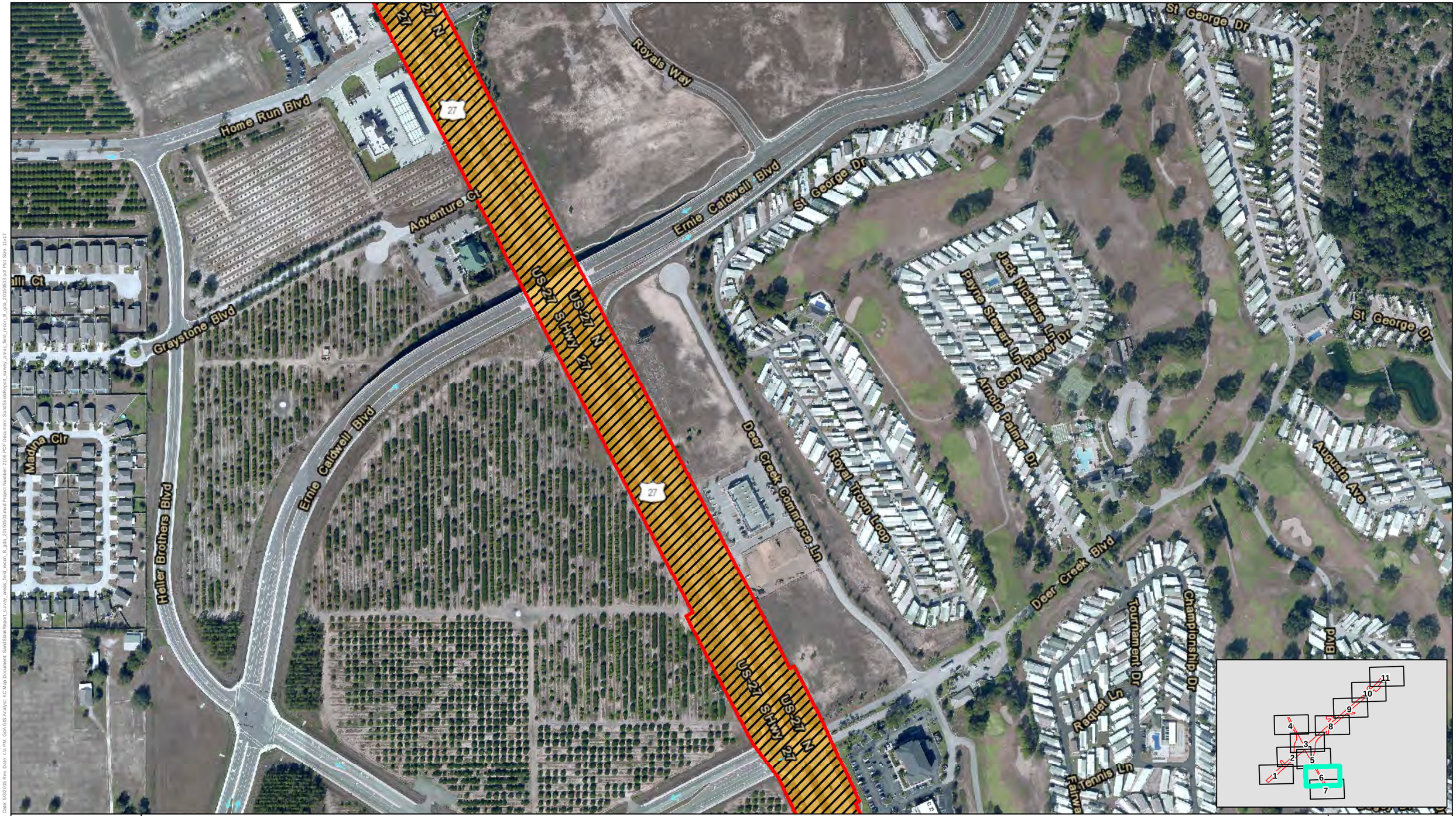
- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Centennial FDOT 1915 ★ 2015

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 6 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

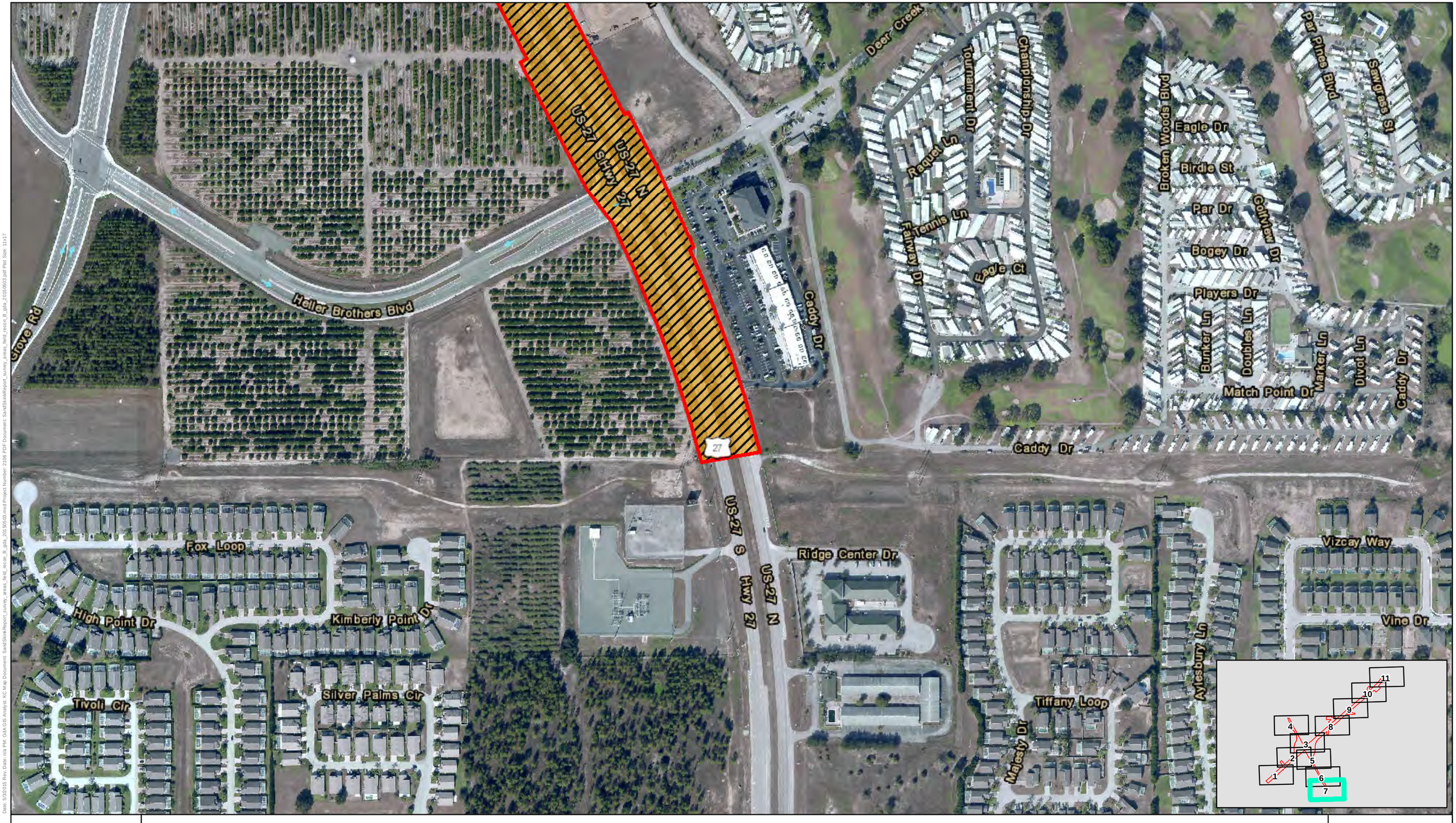


Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 7 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

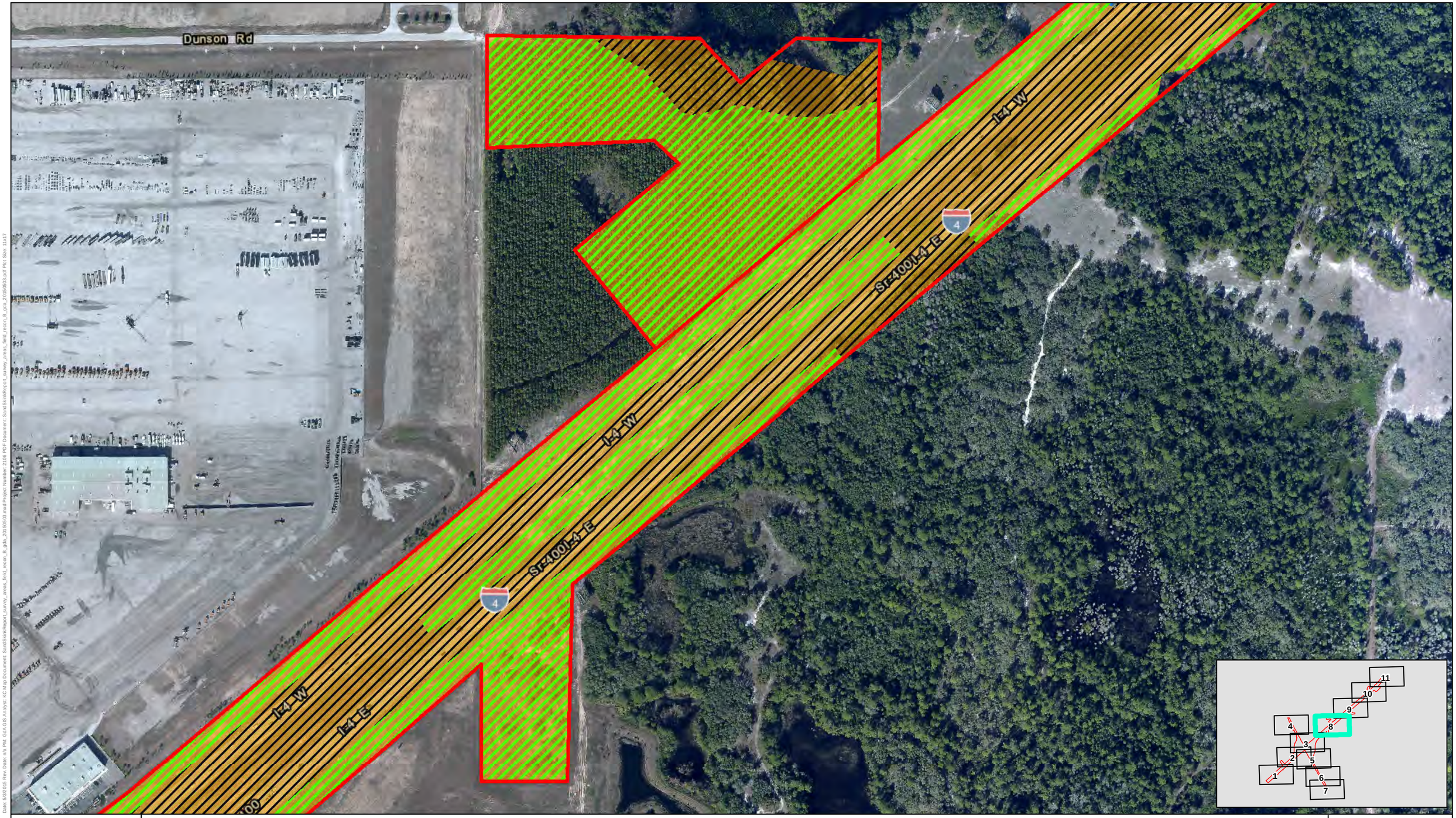
- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Date: 5/32/035 Rev. Date: n/a PM: GdA GIS Analyst: KC Map Document: SandSkinkReport_survey_areas_field_recon_B_gda_2015r503.mxd Project Number: 2106 PDF Document: SandSkinkReport_survey_areas_field_recon_B_gda_2015r503.pdf Plot Size: 11x17

Centennial FDOT 1915 ★ 2015

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

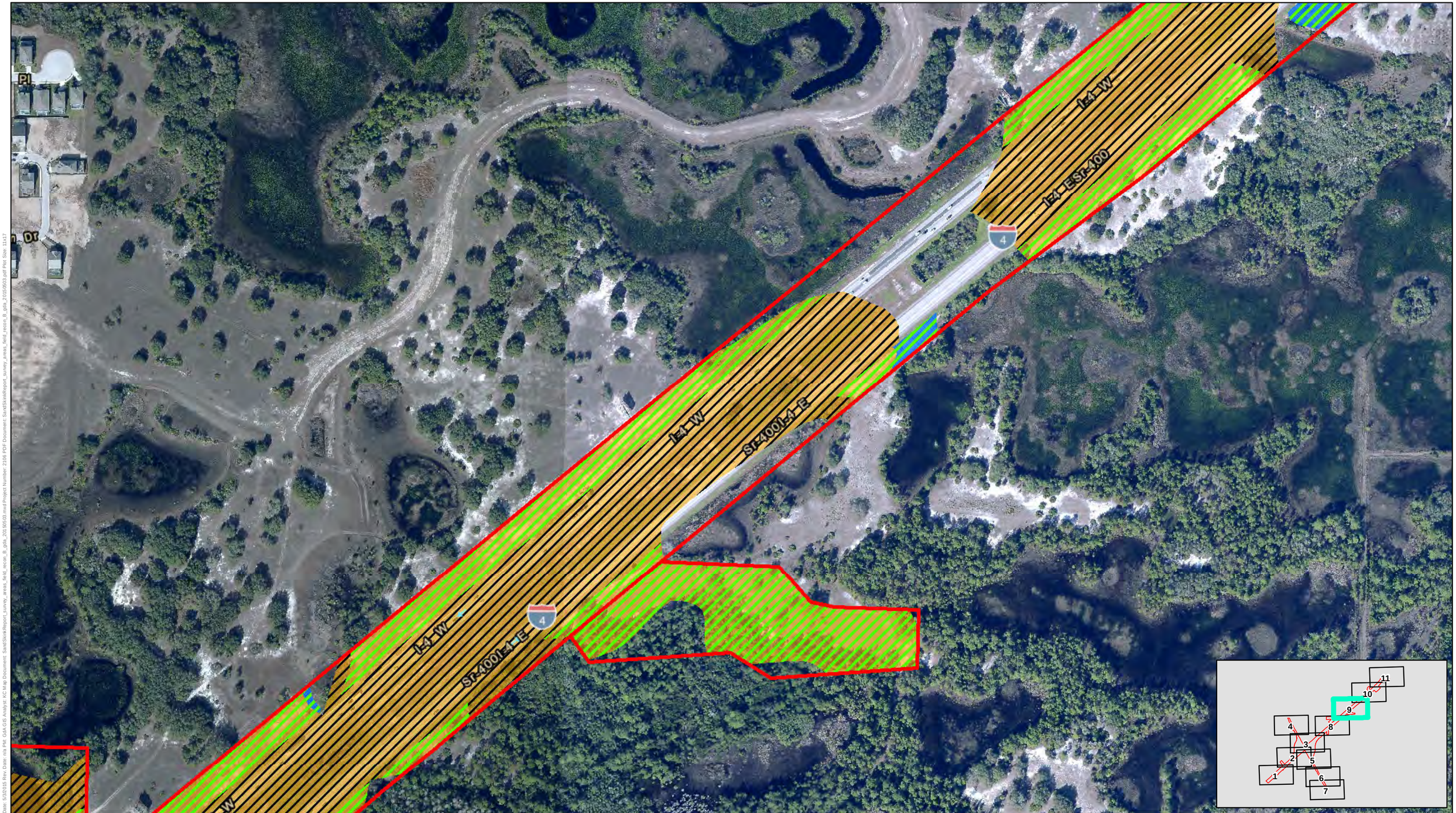
Feet
0 300 600 900

- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



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Centennial FDOT 1915 ★ 2015

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 9 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

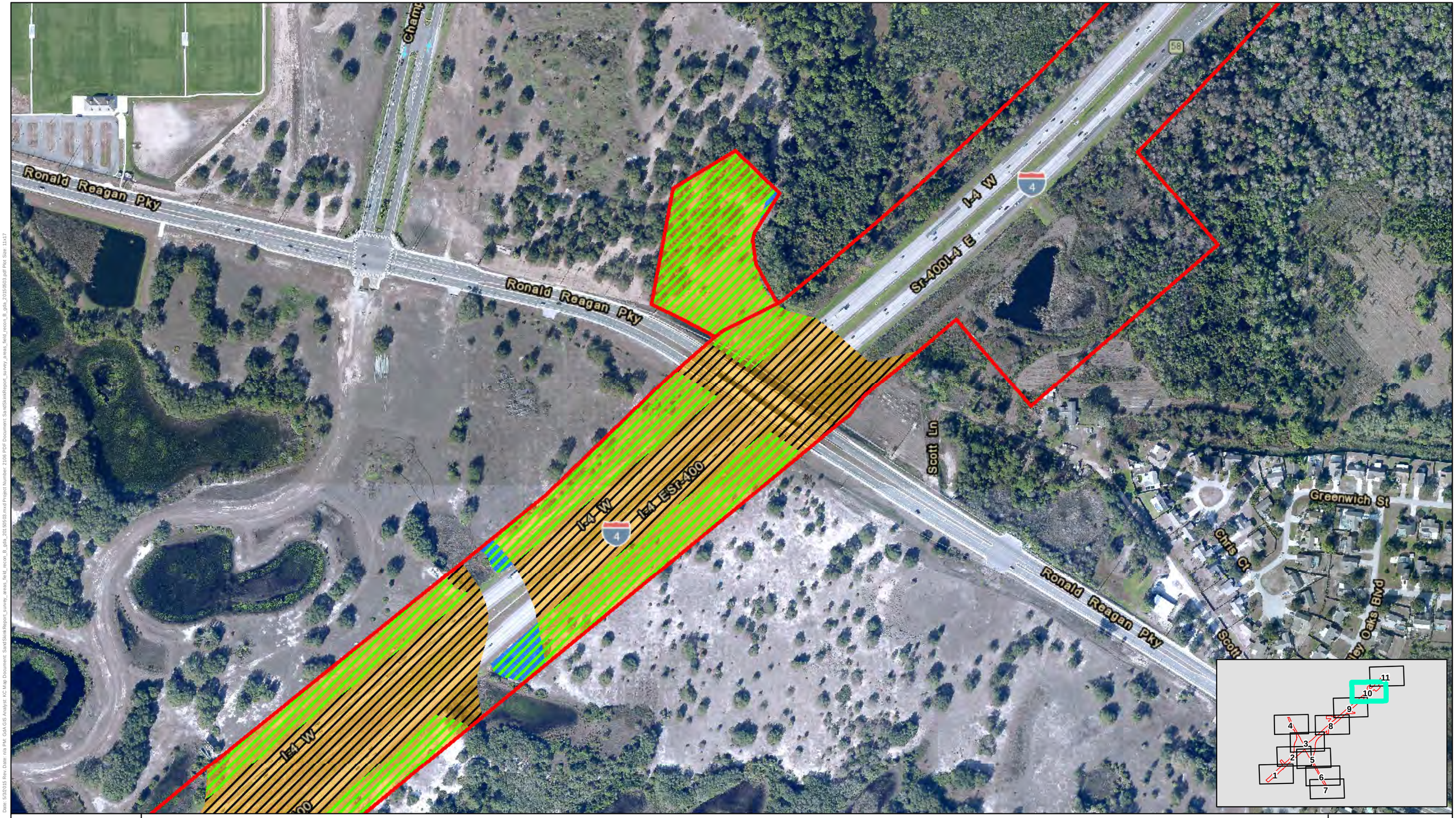
- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Centennial FDOT 1915 ★ 2015

Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 10 of 11

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

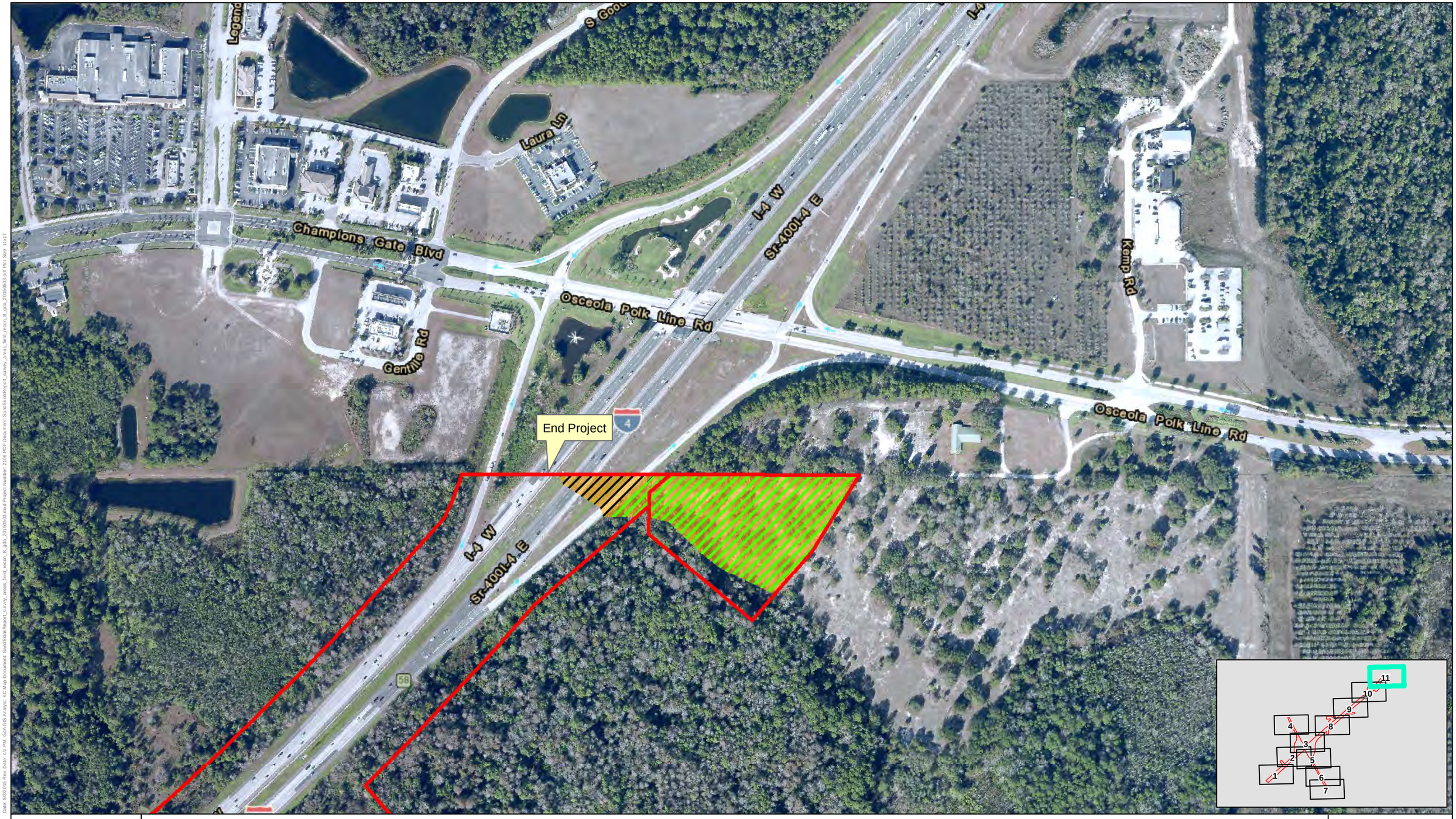


Figure 3 - Sand Skink Survey Area Based on Field Reconnaissance and Suitable Soils Map

Page 11 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

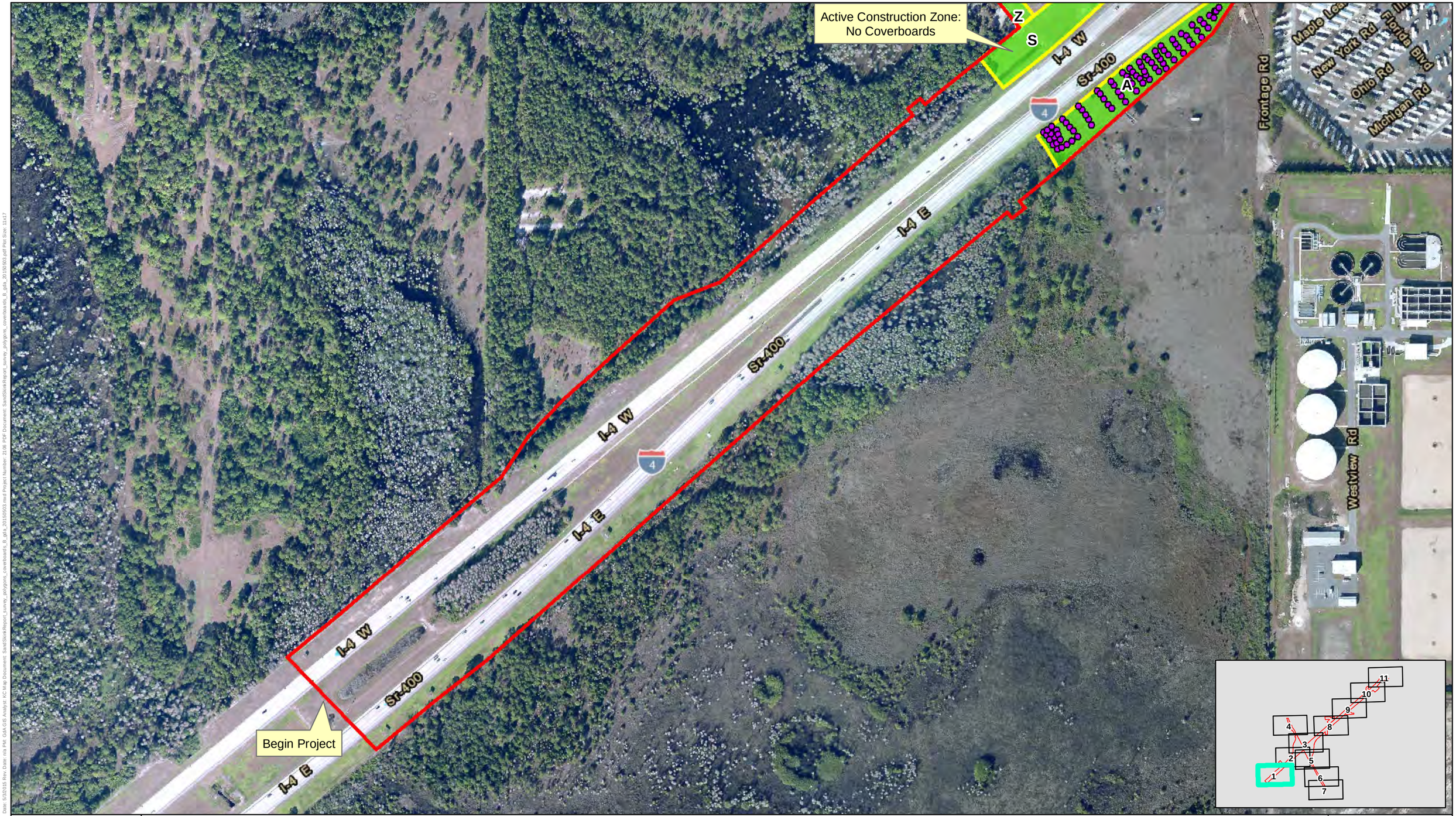
- Project ROW
- Suitable Sand Skink Soil as Mapped by NRCS
- Suitable Sand Skink Soil as Observed by Project Biologists
- No Survey Needed
- Survey Needed

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Date: 5/3/2015 Rev. Date: n/a PM: GdA GIS Analyst: KC Map Document: SandSkinkReport_survey_polygons_coverboards_B_gdA_20150503.mxd Project Number: 2156 PDF Document: SandSkinkReport_survey_polygons_coverboards_B_gdA_20150503.pdf Plot Size: 11x17

Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 1 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

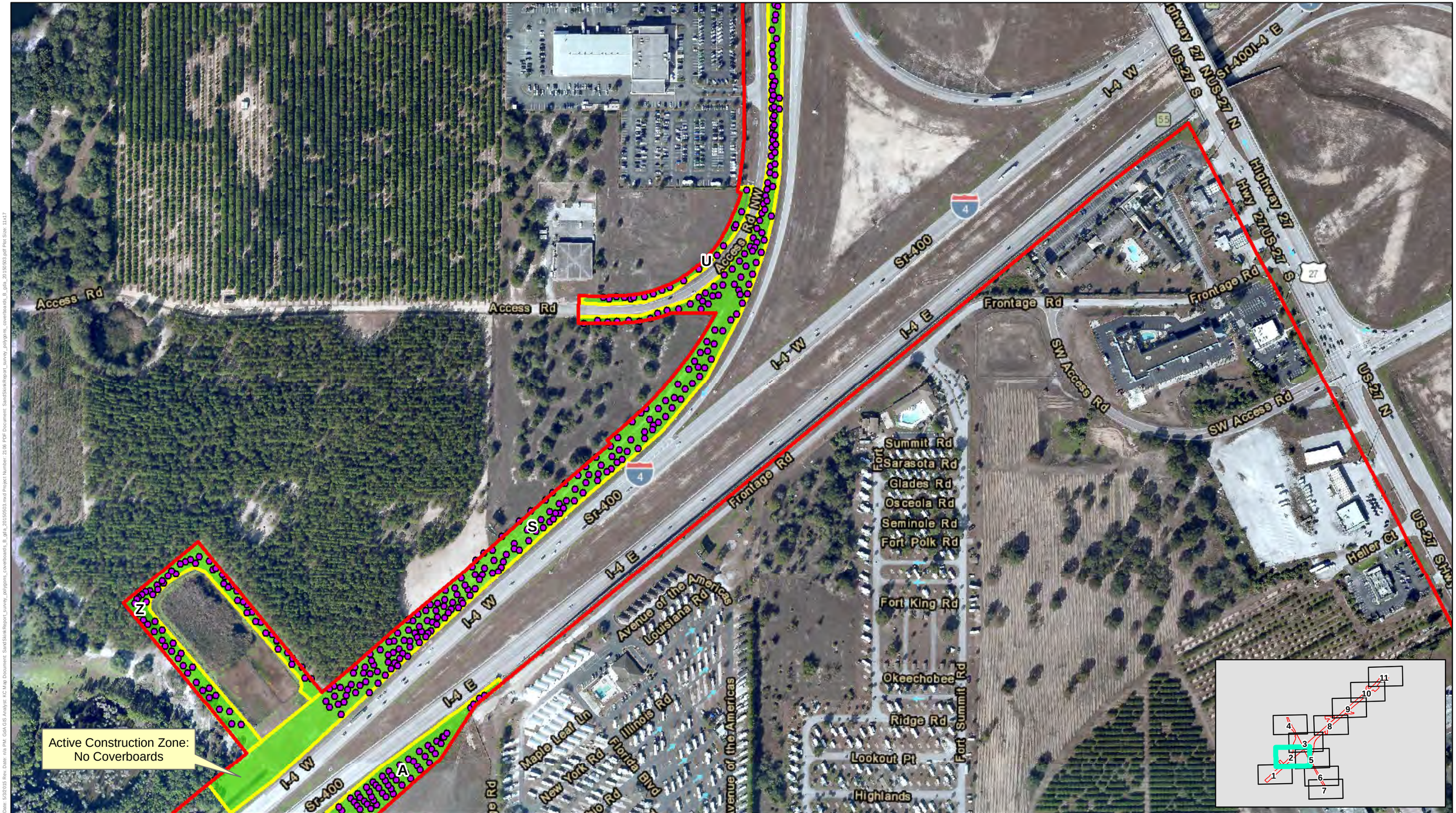
Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

FPID #: 201210-2-22-01
SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)
Polk County, Florida

0 300 600 900 Feet

Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS
Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Date: 5/12/2015 Rev. Date: n/a PM: GdA GIS Analyst: KC Mxd Document: SandSkinkReport_survey_polygons_coverboards_B_gdA_20150503.mxd Project Number: 2106 PDF Document: SandSkinkReport_survey_polygons_coverboards_B_gdA_20150503.pdf Plot Size: 11x17

Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 4 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 5 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 6 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

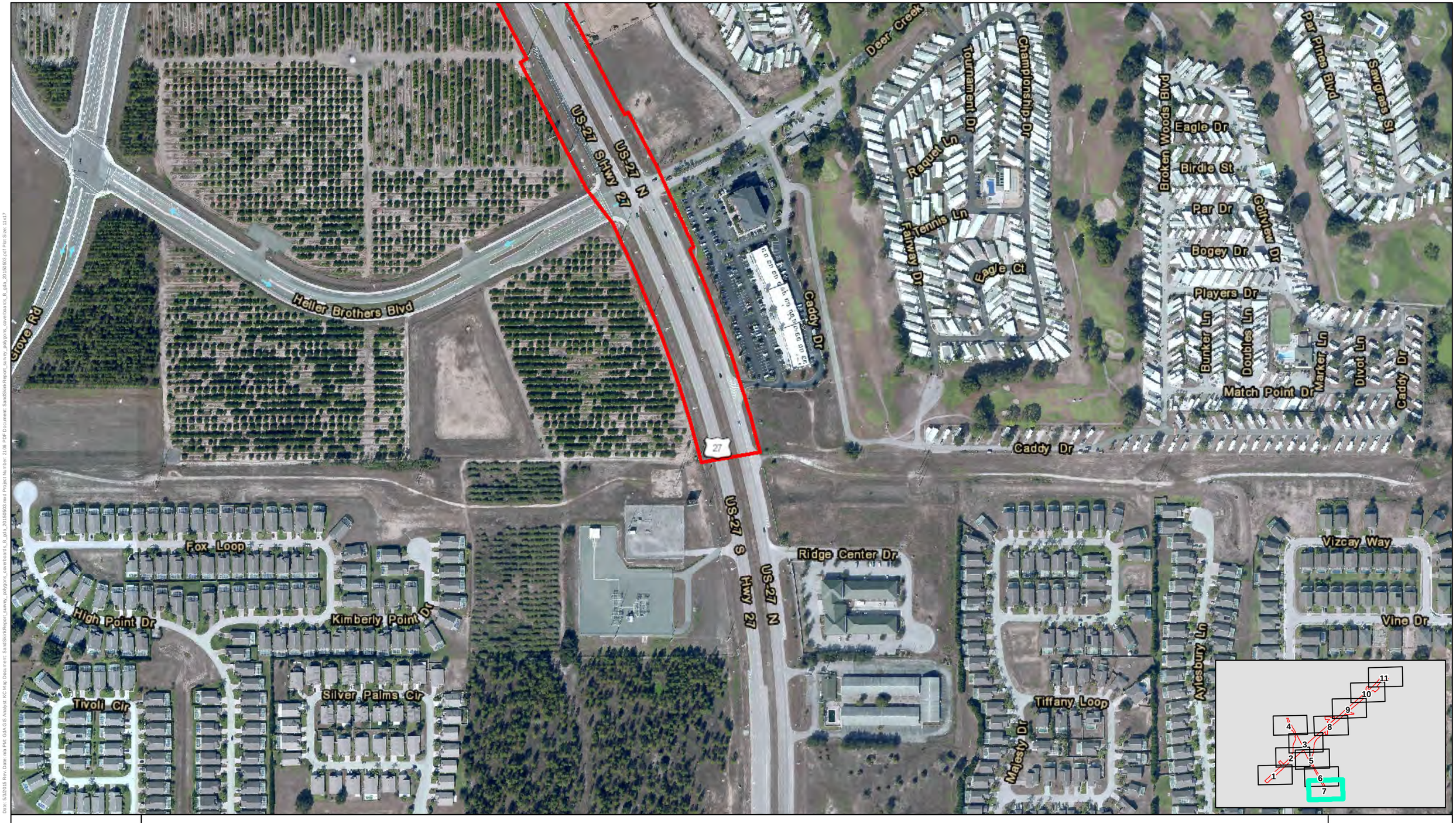
Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

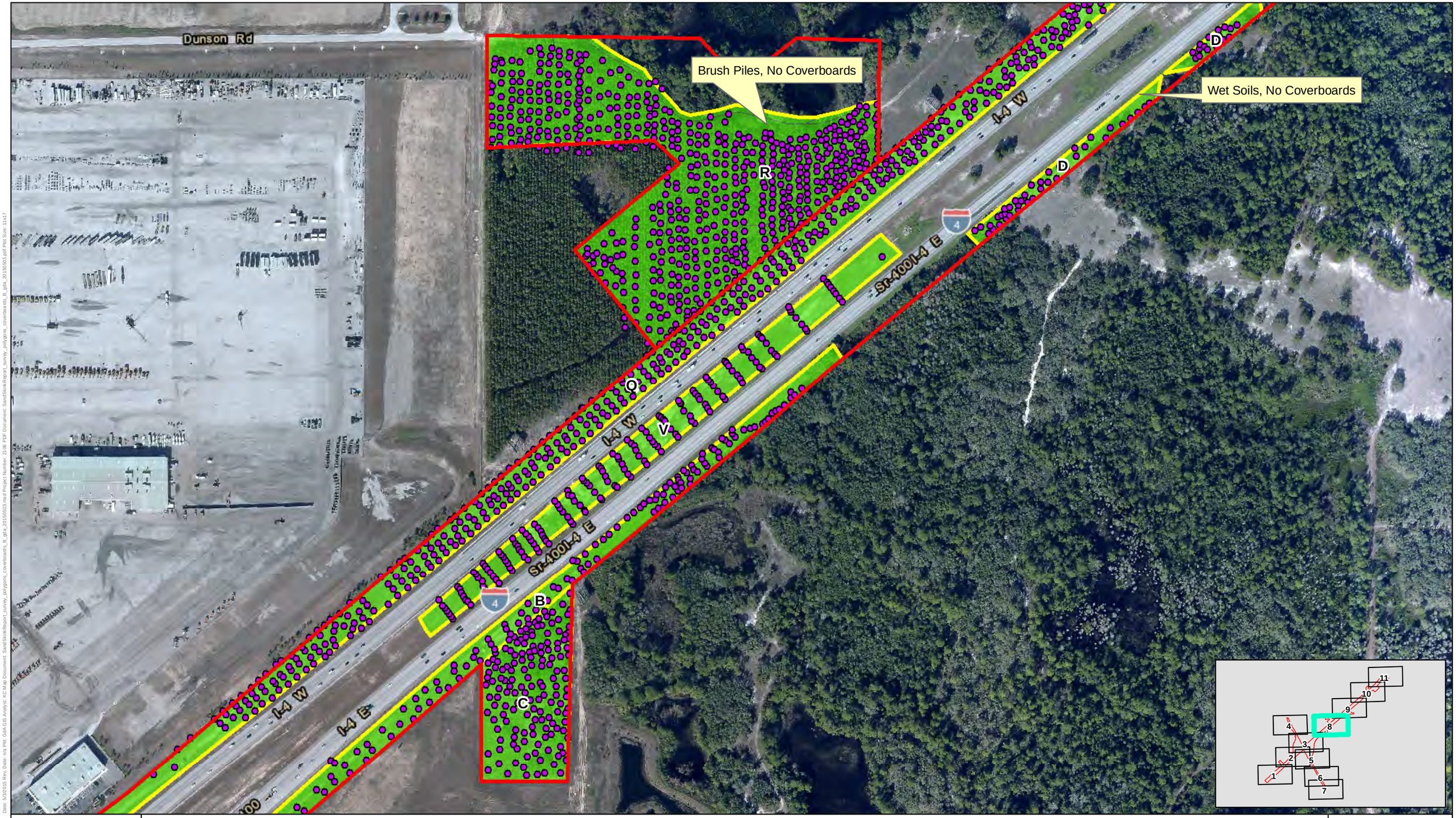
Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



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Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 8 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW
Coverboard Location
Survey Polygon
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Wet Soils, No Coverboards

Wet Soils, No Coverboards

Wet Soils, No Coverboards

Access Permission Not Granted in Time: No Coverboards

I-4 W

I-4 E

SR-400

SR-400

I-4 W

I-4 E

SR-400

I-4 W

I-4 E

SR-400

Pl

Dr

verboards

R

W

O

O

P

E

F

D

D

G

H

I

4

4

4

1

2

3

4

5

6

7

8

9

10

11

Date: 5/32/035 Rev. Date: n/a PM: GdA GIS Analyst: KC Map Document: SandSlinkReport_survey_polygons_coverboards_B_gdA_20150503.mxd Project Number: 2106 PDF Document: SandSlinkReport_survey_polygons_coverboards_B_gdA_20150503.pdf Plot Size: 11x17

Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW

Coverboard Location

Survey Polygon

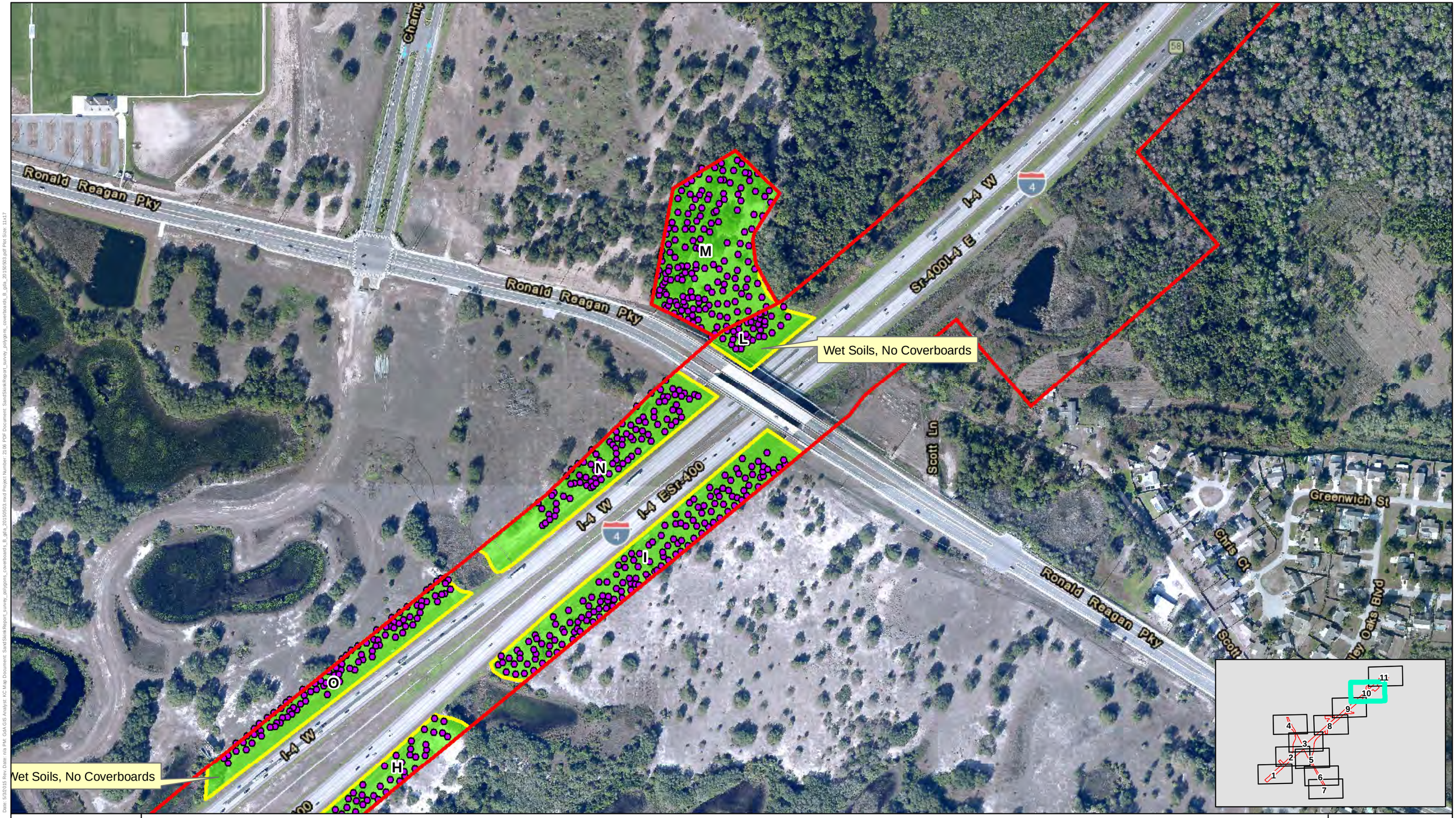
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



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Centennial FDOT 1915 ★ 2015

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 10 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW
Coverboard Location
Survey Polygon
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

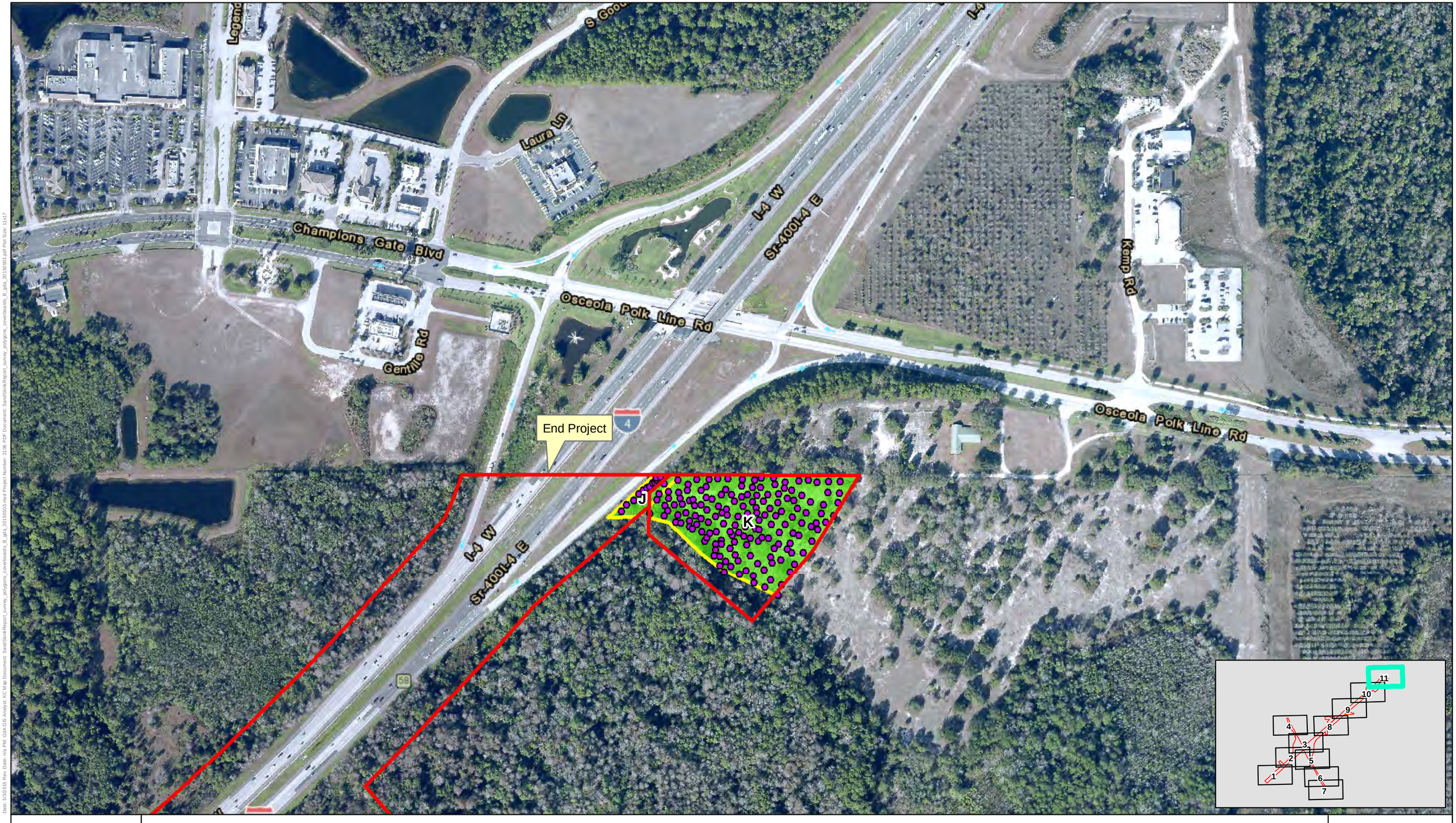

Figure 4 - Survey Polygons and Coverboard Locations Map

Page 11 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Project ROW
Survey Polygon
Coverboard Location
Survey

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Z
S
A
I-4 W
SR-400
I-4 E
Frontage Rd
Maple Leaf
New York Rd
Florida Blvd
Ohio Rd
Michigan Rd
Westview Rd
Begin Project

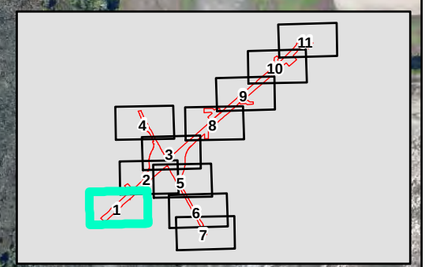

Figure 5 - Sand Skink Track Observations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

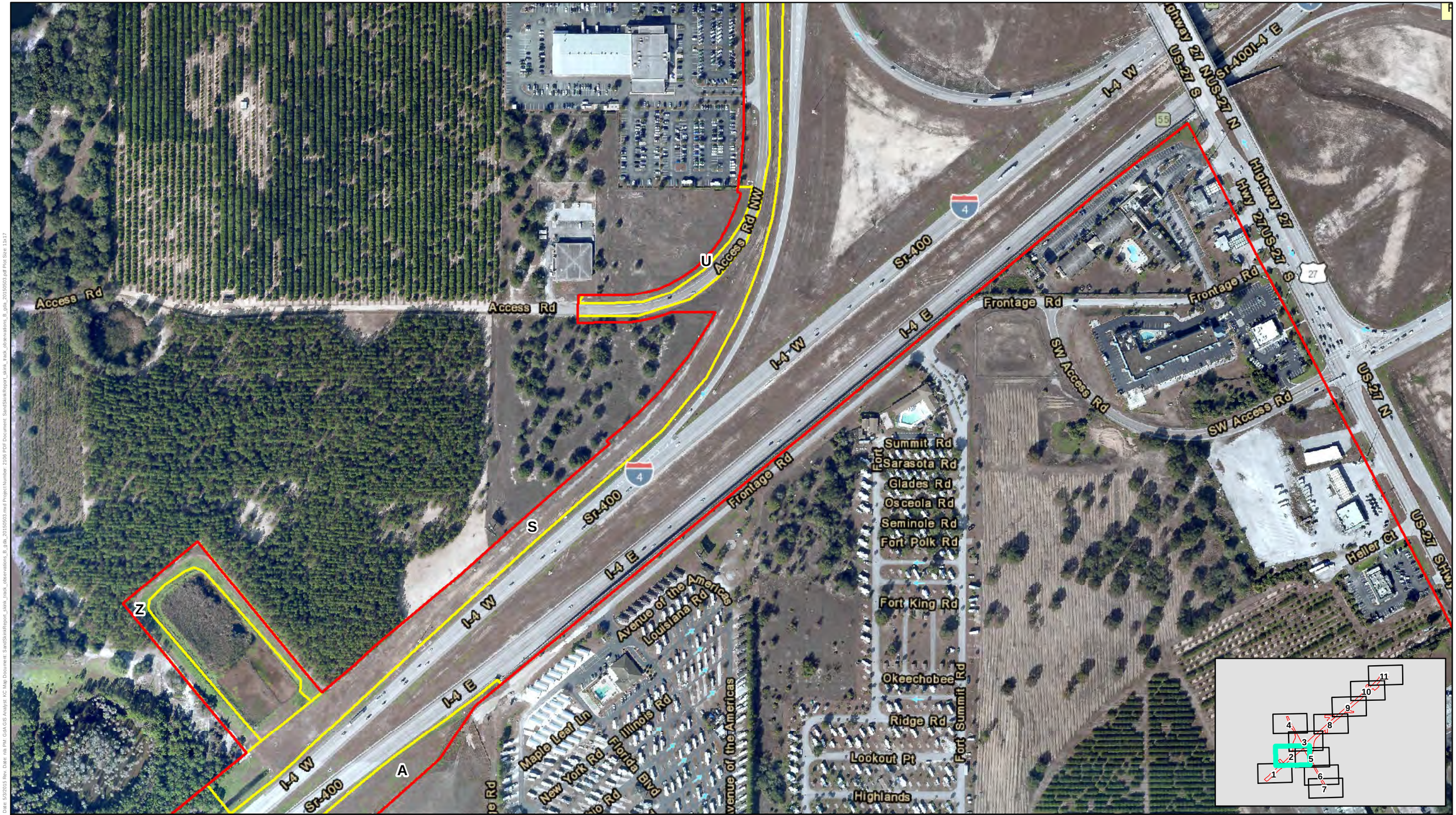

Figure 5 - Sand Skink Track Observations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

Feet

0 300 600 900

Project ROW
Survey Polygon
Observation - Track, Not Under Board
Observation - Live Skink
Observations by Others

Observation - Tracks Under Coverboards

3/25/2015
4/13/2015
4/15/2015
4/16/2015
4/2/2015
4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

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Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

Page 3 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 5 - Sand Skink Track Observations Map

Page 4 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

Page 5 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

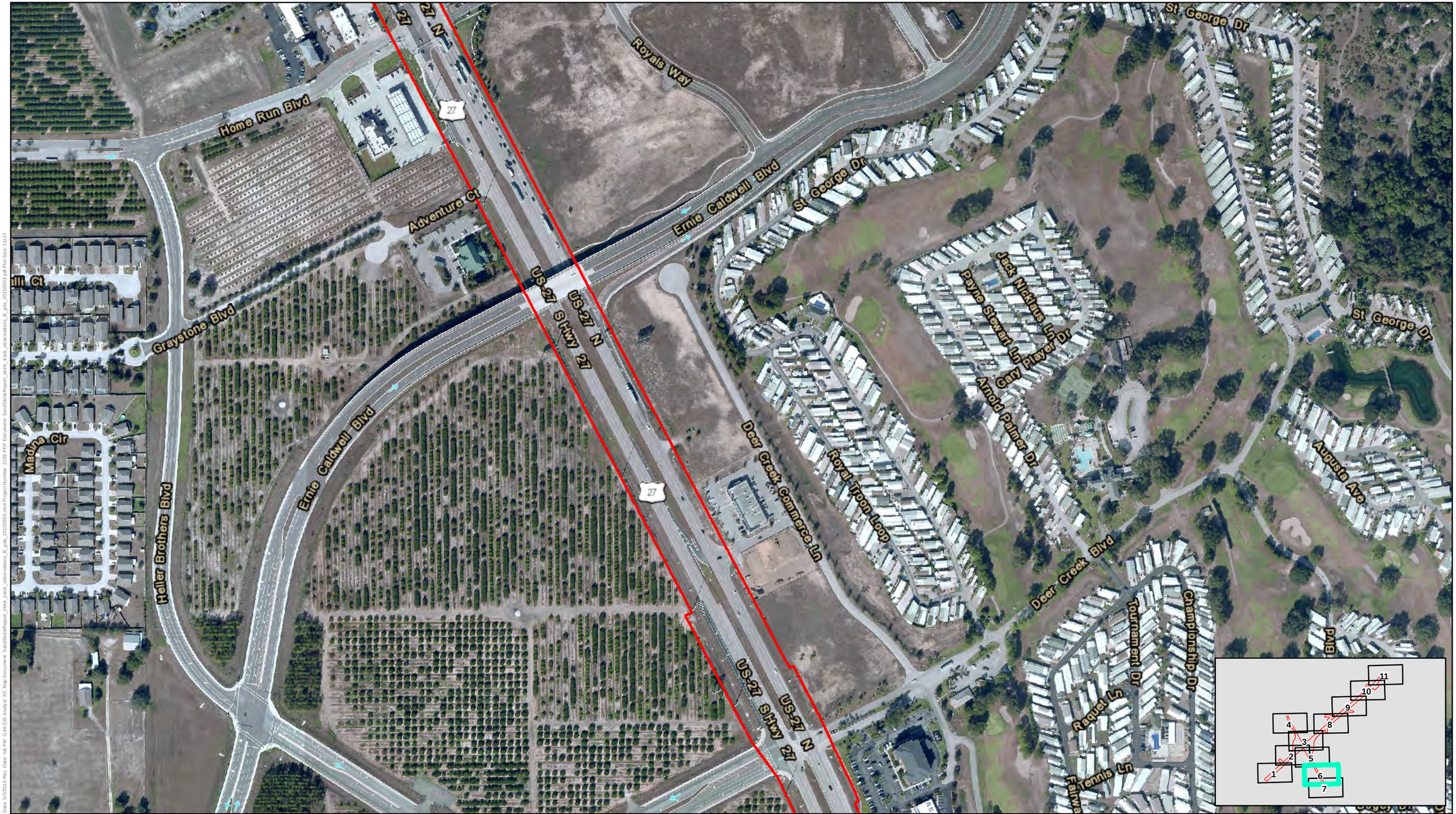
N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Date: 5/3/2015 Rev. Date: n/a PM: GdA GIS Analyst: KC Map Document: SandSkinkReport_skink_track_observations_B_gdb_20150503.mxd Project Number: 2106 PDF Document: SandSkinkReport_skink_track_observations_B_gdb_20150503.pdf Plot Size 11x17



Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

Page 6 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

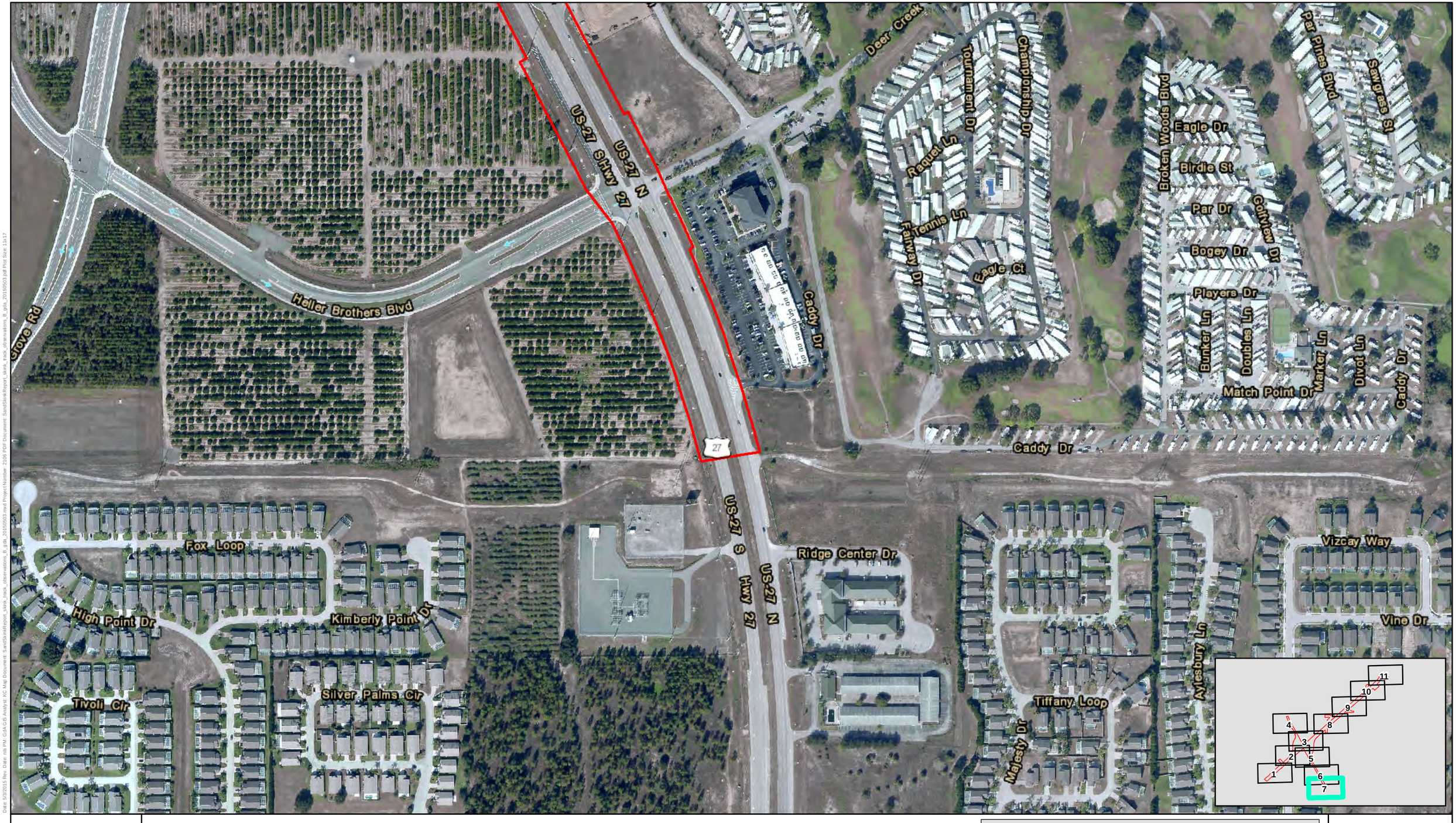


Figure 5 - Sand Skink Track Observations Map

Page 7 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

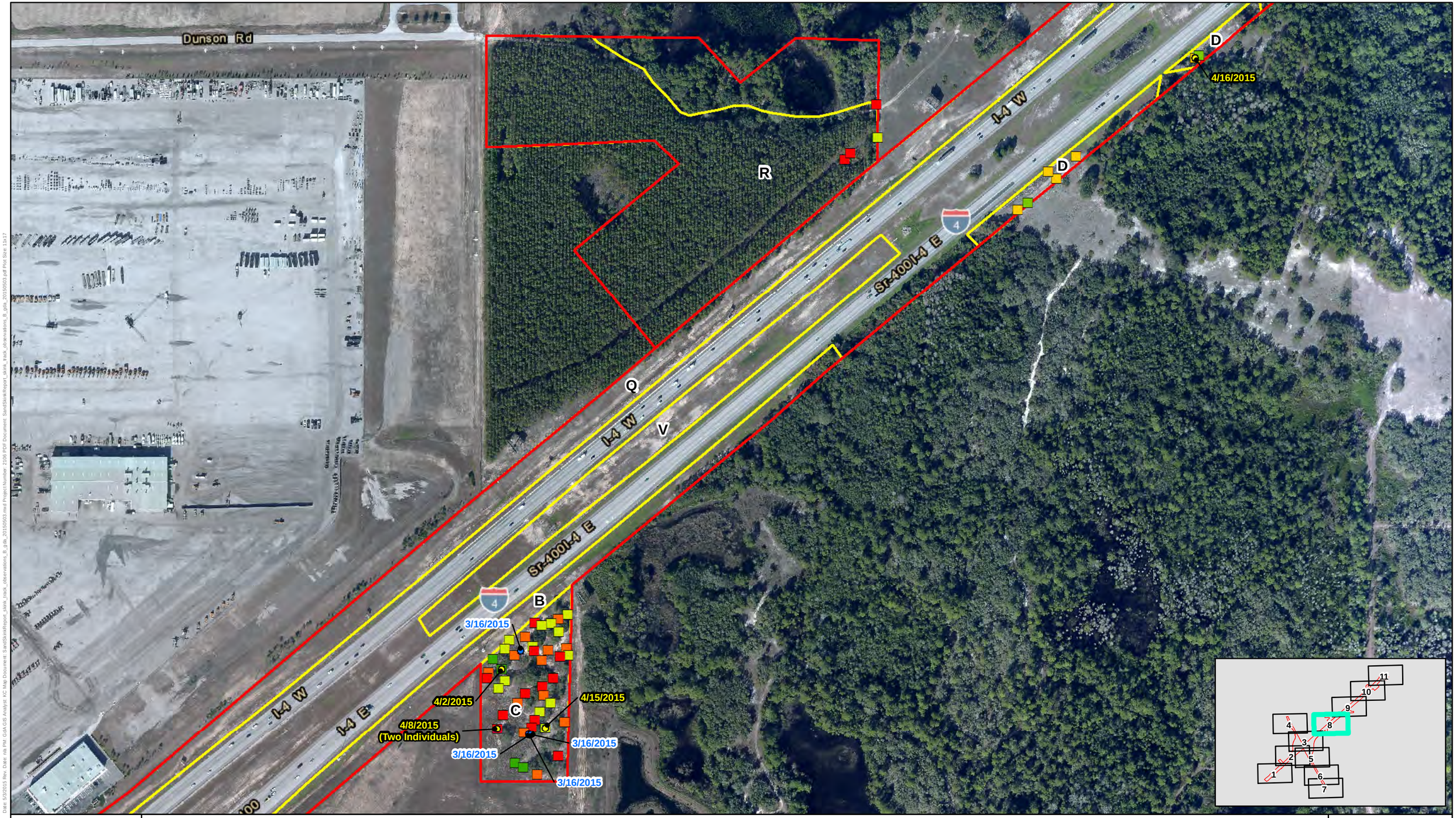
- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



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Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
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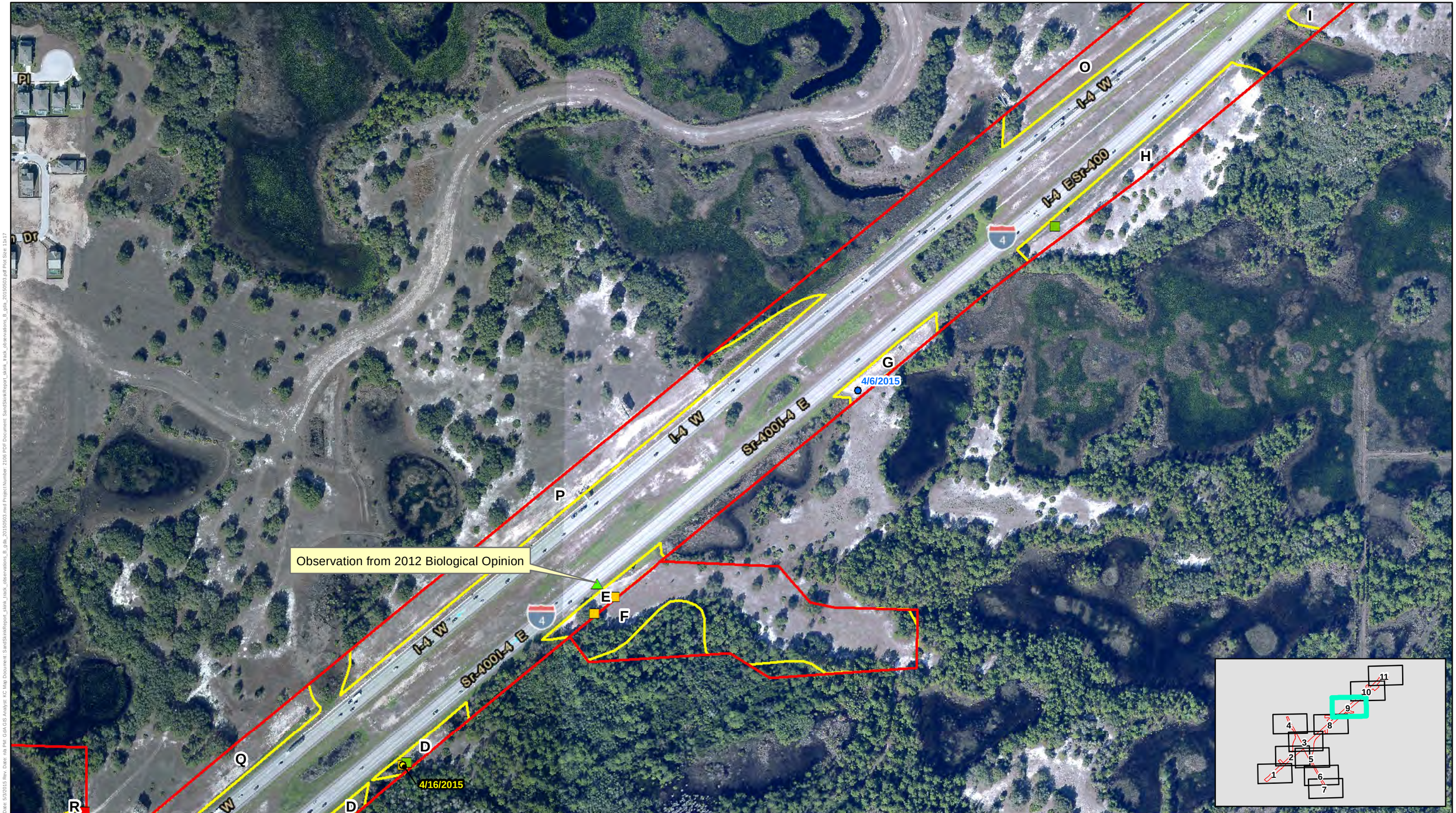

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Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Date: 5/3/2015 Rev. Date: nla PM: GdA GIS Analyst: KC Map Document: SandSkinkReport_skink_track_observations_B_gdb_20150503.mxd Project Number: 2106 PDF Document: SandSkinkReport_skink_track_observations_B_gdb_20150503.pdf Plot Size 11x17

Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

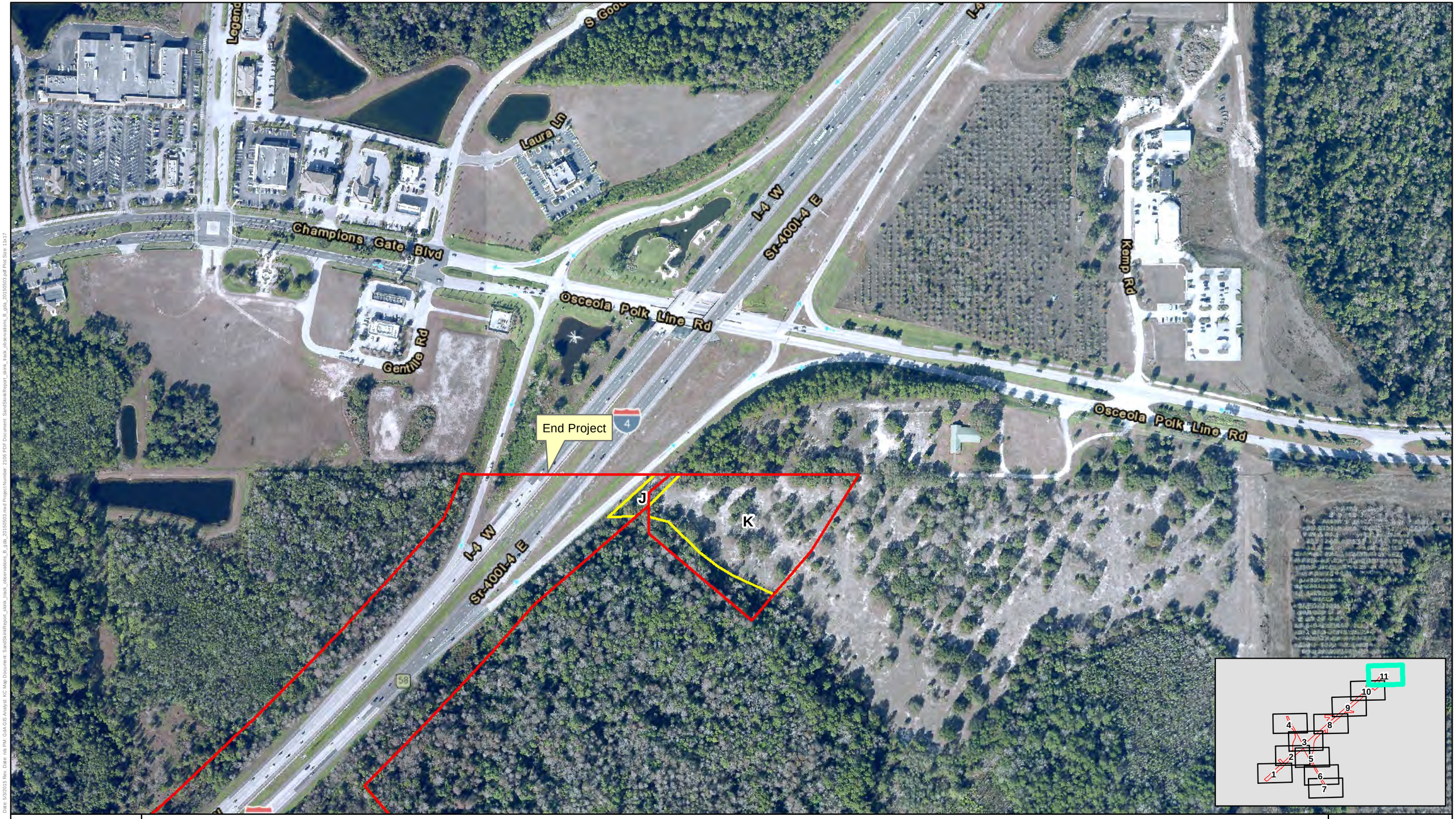
- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



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Centennial FDOT 1915 ★ 2015

Figure 5 - Sand Skink Track Observations Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Project ROW
- Survey Polygon
- Observation - Track, Not Under Board
- Observation - Live Skink
- Observations by Others

Observation - Tracks Under Coverboards

- 3/25/2015
- 4/13/2015
- 4/15/2015
- 4/16/2015
- 4/2/2015
- 4/8/2015

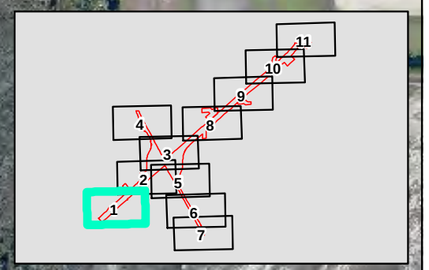
N

Data Source:
- FDOT
- Scheda Ecological
- NRCS

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Z
S
I-4 W
SR-400
A
I-4 E
SR-400
I-4 W
I-4 E
SR-400
I-4 W
SR-400
I-4 E
Begin Project
Frontage Rd
Maple Leaf
New York Rd
Ohio Rd
Michigan Rd
Florida Blvd
Westview Rd



Centennial FDOT 1915 ★ 2015

Figure 6 - Occupied Sand Skink Habitat Map

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FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Occupied Sand Skink Habitat
- Project ROW
- Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 6 - Occupied Sand Skink Habitat Map

Page 2 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Occupied Sand Skink Habitat
Project ROW
Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Centennial FDOT 1915 ★ 2015

Figure 6 - Occupied Sand Skink Habitat Map

Page 3 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Occupied Sand Skink Habitat
- Project ROW
- Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 6 - Occupied Sand Skink Habitat Map

Page 4 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Occupied Sand Skink Habitat
- Project ROW
- Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Date: 5/3/2015 Rev. Date: n/a PM: GdA GIS Analyst KC Map Document: SandSkinkReport_occupied_skink_habitat_B_gda_20150505.mxd Project Number: 2106 PDF Document: SandSkinkReport_occupied_skink_habitat_B_gda_20150505.pdf Plot Size: 11x17

Centennial FDOT 1915 ★ 2015

Figure 6 - Occupied Sand Skink Habitat Map

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Occupied Sand Skink Habitat
- Project ROW
- Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 6 - Occupied Sand Skink Habitat Map

Page 6 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Occupied Sand Skink Habitat
Project ROW
Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Figure 6 - Occupied Sand Skink Habitat Map

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Occupied Sand Skink Habitat

Project ROW

Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Dunson Rd

R

D

I-4 W

SR-400/I-4 E

Q

I-4 W

V

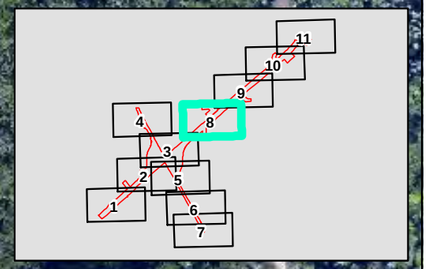
SR-400/I-4 E

B

C

I-4 W

I-4 E



Centennial FDOT 1915 ★ 2015

Figure 6 - Occupied Sand Skink Habitat Map

Page 8 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

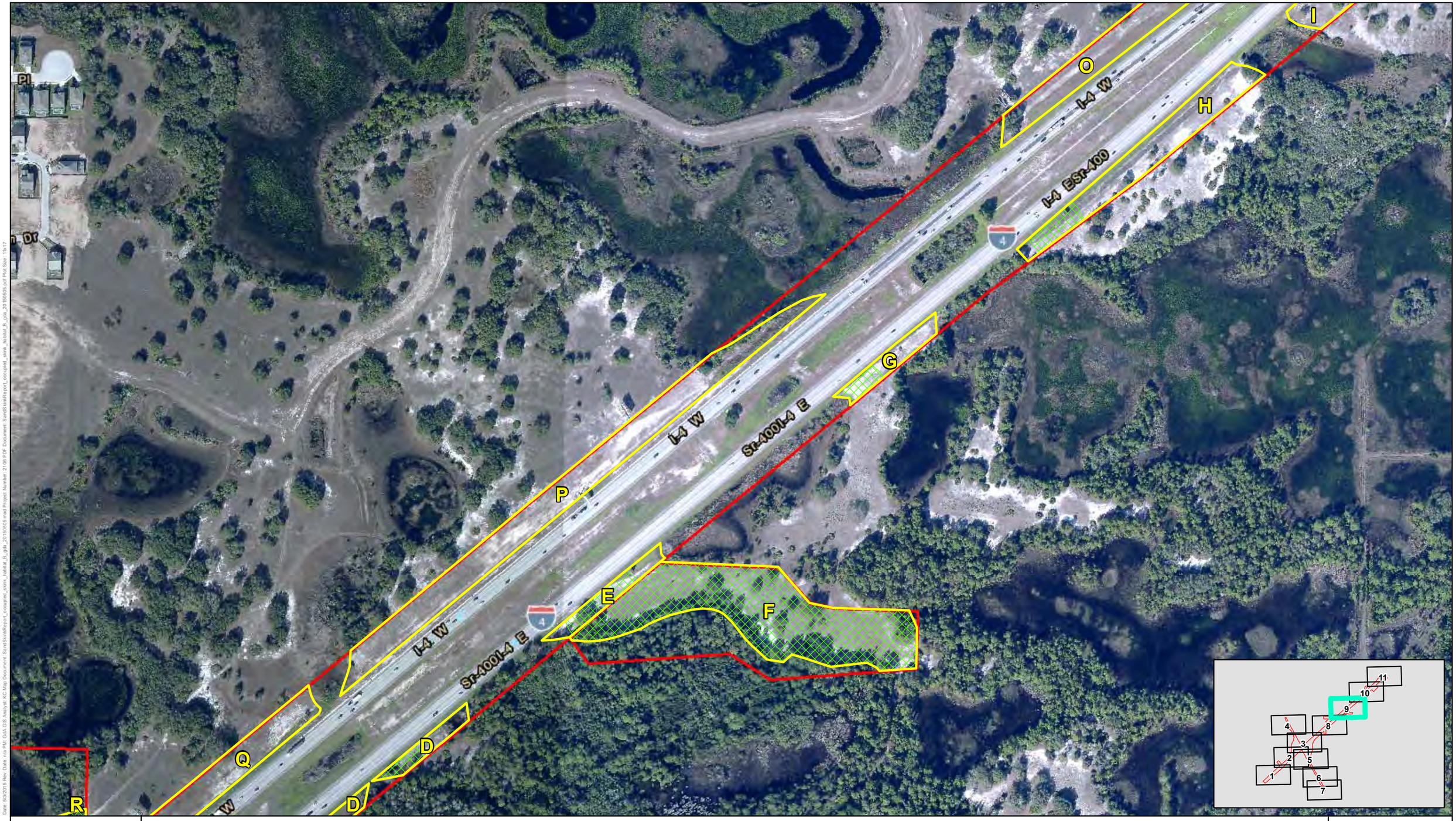
Occupied Sand Skink Habitat
Project ROW
Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West



Date: 5/3/2015 Rev. Date: n/a PM: GdA GIS Analyst: KC Map Document: SandSkinkReport_occupied_skink_habitat_B_gda_20150505.mxd Project Number 2106 PDF Document: SandSkinkReport_occupied_skink_habitat_B_gda_20150505.pdf Plot Size: 11x17

Centennial FDOT 1915 ★ 2015

Figure 6 - Occupied Sand Skink Habitat Map

Page 9 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

Survey Polygon
Occupied Sand Skink Habitat
Project ROW

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

Centennial FDOT 1915 ★ 2015

Figure 6 - Occupied Sand Skink Habitat Map

Page 10 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Occupied Sand Skink Habitat
- Project ROW
- Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

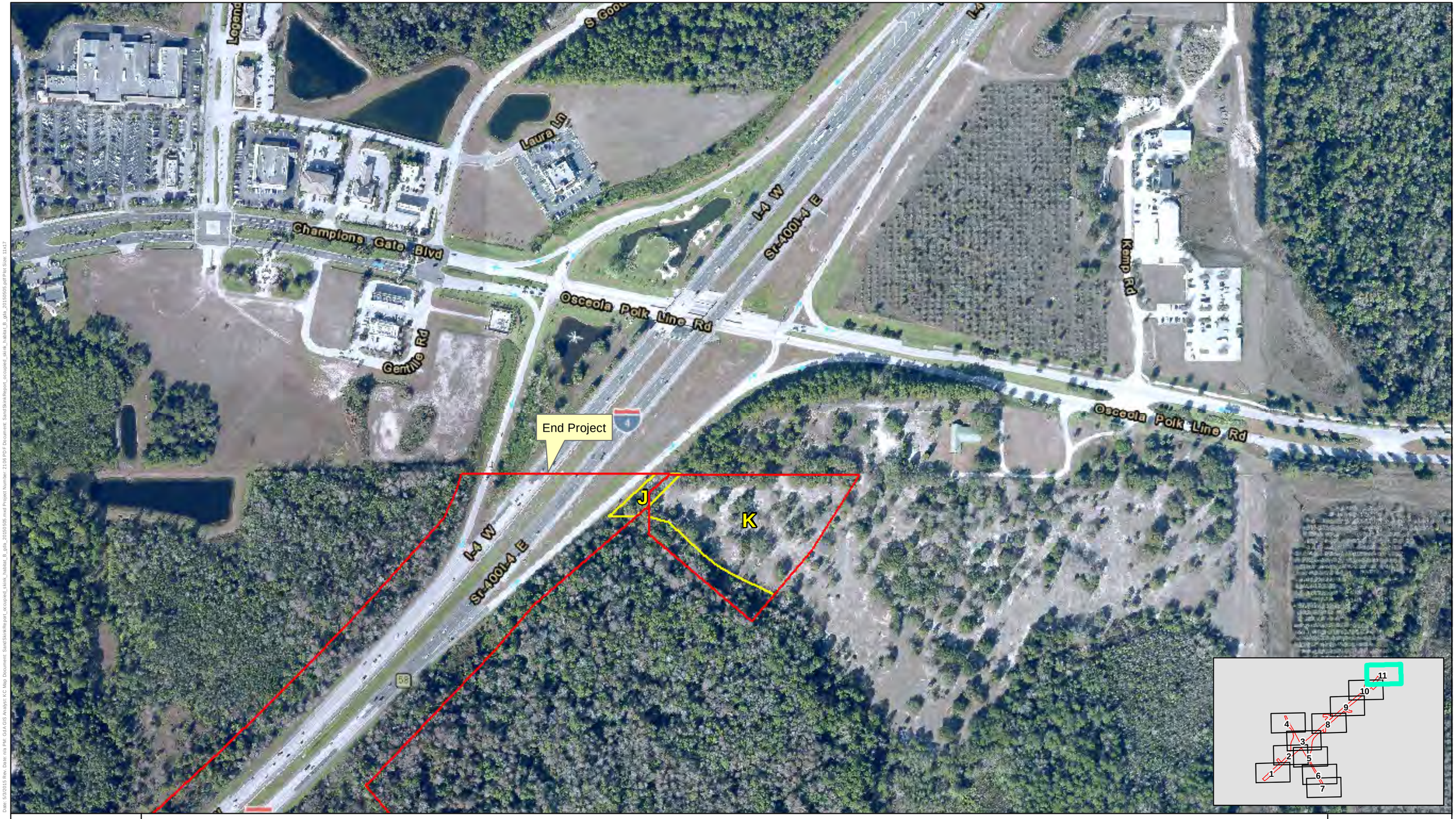


Figure 6 - Occupied Sand Skink Habitat Map

Page 11 of 11

FPID #: 201210-2-22-01

SR 400 (I-4) Segment 5: From West of SR 25 (US 27) to West of CR 532 (Osceola Polk Line Road)

Polk County, Florida

0 300 600 900 Feet

- Occupied Sand Skink Habitat
- Project ROW
- Survey Polygon

N

Data Source:
- FDOT
- Scheda Ecological

Imagery Source:
- 2014 FDOT

Coordinate System:
NAD 1983 Florida State Plane West

APPENDIX A

Sand Skink Soils Investigation Reports

Horwitz, Martin

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Monday, March 23, 2015 9:31 AM
To: Horwitz, Martin
Cc: Bizerra, Marlon; Pipkin, Gwen G; Stys-Palasz, Beata; Diaz, Luis; Mullen, Gordon S; Kristin Caruso
Subject: Re: Interstate 4 Beyond the Ultimate / Soil Investigation Reports

Martin,

I have reviewed the information provided. I concur that the soils in the areas described by the soil surveys have been altered and do not constitute soils suitable for the sand skink. As such, cover board surveys do not need to be conducted in those areas..

John

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

On Wed, Mar 18, 2015 at 12:23 PM, <Martin.Horwitz@dot.state.fl.us> wrote:

You have received 2 secure files from Martin.Horwitz@dot.state.fl.us.
Use the secure links below to download.

John,

Please see the attached soil investigation reports for I-4 BtU project. Based on the results of the two soil investigation reports along I-4 and at US 27 Interchange, FDOT is requesting to be exempt from conducting sand skink coverboard surveys within those areas of the median and US 27 Interchange. There was one area within the median that contained suitable soils at boring SSB-112. Therefore, FDOT will be conducting coverboard surveys in this approximately 3 acrea area between soil boring SSB-111 and SSB-113.

Please review and provide a response by April 1, 2015, if possible.

Thank you,

Martin Horwitz
FDOT D1

Secure File Downloads:
Available until: **02 April 2015**

Click links to download:

I-4_US27 Interchange NRCS Soil Rpt March 2013.pdf
365.53 KB

I-4 BtU Skink Soils Investigation Report 3_18_15.pdf

FLORIDA SAND SKINK SOILS INVESTIGATION REPORT

SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk/Osceola County Line)
Polk County, Florida

Financial Project Identification (FPID) Number: 425032-1-32-01
Task Work Order #68

Prepared for:

Florida Department of Transportation
District Environmental Management Office
801 North Broadway
P.O. Box 1249
Bartow, FL 33831

Prepared by:

Atkins North America, Inc.
482 South Keller Road
Orlando, Florida 32810

March 18, 2015

Field Investigation Dates: February 23 through March 4, 2015

Project / Location: Florida Department of Transportation (FDOT), Florida Sand Skink (*Neoseps reynoldsi*) Soil Investigation / SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk County Line/Osceola County Line, Polk County, Florida

Client: Florida Department of Transportation, District One

Inspection Staff: Soil borings were collected by Tierra Inc., under the direction of Don R. Polanis, CGC, PSSC. Report prepared and submitted by Terry Zable and Gordon Mullen, Atkins

Project Footprint: SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk County Line/Osceola County Line, Polk County, Florida (*Exhibit 1*)

Introduction

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 required to meet the Florida sand skink (*Neoseps reynoldsi*) soils criteria as identified by the U.S. Fish and Wildlife Service (USFWS) within the Polk County Consultation Area. The soil series identified by the USFWS as suitable sand skink habitat soils that have been mapped by the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) as occurring within the project area in Polk County consists of the Candler, Pomello, and Tavares soil series.

The project site has been broken down into various component areas for ease of reference. Representative photos of each segment are included as *Appendix A.* The **western segment** of the project extends from the tie-in of the US 27 on-ramp to westbound (WB) I-4 to approximately 0.87 miles west of this ramp along I-4. This segment contains approximately 40% suitable skink soils (Tavares and Candler sands) as defined by the USFWS. The other 60% is unsuitable wetland and upland soils related to the far eastern portion of the Green Swamp. The **central segment** of the project includes the US 27/I-4 interchange, extending between the ramps from US 27 southbound (SB) to I-4 WB and US 27 northbound (NB) to I-4 eastbound (EB). This includes approximately a 0.90-mile length along I-4 and a 0.80-mile length along US 27. This portion is mapped mainly as Candler sands with inclusions of non-suitable Urban soils. The **northern segment** of the project extends from the US 27 SB to I-4 WB ramp north to Dunson Road (approximately 0.58 mile in length). Although this segment is mapped exclusively as Candler sands, the soils in this segment have been subject to modification as part of a recently completed US 27 roadway widening project (Financial Project ID# 197534-2), such that minimal *in-situ* soil areas remain. The **eastern segment** of the project is sub-divided into two portions: from the US 27 on-ramp tie-in at I-4 EB to the Polk County Road (CR) 54/Ronald Reagan Parkway overpass (approximately 1.9 miles in length), and from the CR 54/Ronald Reagan Parkway overpass to the eastern terminus at the Polk/Osceola County Line, just west of the I-4 interchange at Osceola CR 532/Champions Gate Blvd./Osceola Polk Line Rd. (approximately 0.53 mile in length). The portion from the US 27 on-ramp tie-in at I-4 EB to the Polk County Road (CR) 54/Ronald Reagan Parkway overpass is mapped as Candler and Tavares sands, with a small inclusion of Pomello sands (USFWS suitable)

and sporadic inclusions of unsuitable muck soils associated with local wetland areas. The portion from the CR 54/Ronald Reagan Parkway overpass to the eastern terminus at the Polk/Osceola County Line has small inclusions of Candler sands at the westernmost and easternmost ends, with the majority of the segment comprised of unsuitable wetland and upland soils.

In general, the Candler map unit comprises greater than fifty percent of the project area, and almost the entire western half of the project. The Candler map unit is located in all portions of the project located on the Central Florida Ridge, and is found east until leaving the higher elevations of the ridge, and encountering wetlands areas located north and south of I-4 in the lower elevations (*Exhibit 1*). These wetland areas are adjacent to upland ridges and knolls that are primarily composed of the Candler or Tavares (fine sand) map units.

Because the Candler map unit is mapped as a large contiguous area, the soil boring locations in this map unit were selected to identify project areas that are mapped as supporting USFWS-designated suitable skink soils. However, road-building, development, or other soil surface/sub-surface altering activities may have significantly altered the soil conditions in various locations such that they no longer support the natural profile characteristics described for the map units. The NRCS' *Soil Survey of Polk County* (1990) similarly acknowledges that both non-contrasting (similar) and contrasting (dissimilar) inclusions of soil map units either too small or too numerous/complex to accurately map at the intended scale are likely to occur in each map unit, or may have not been otherwise observed/identified.

Methodology

The entire project area was field-reviewed and soil borings were undertaken in areas 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 basin/pond areas or utility, lighting and/or signage features. In addition, soil borings were also performed to verify areas where natural, unaltered suitable soils were mapped, and road construction activities appeared to have not impacted, or minimally impacted the soil surface.

The boring locations were selected utilizing these criteria through inspections of aerial photographs and field review. Soil borings were collected utilizing a hand bucket auger and were excavated to a depth of seven (7) feet, or refusal where rock, debris, or bore collapse due to groundwater conditions prevented deeper excavation. The borings were field-analysed as they were excavated for soil texture, soil color, soil horizonation, or indicators of soil disturbance. The hand augers were cleaned between each boring location, and the soil bore holes filled. The location of each soil boring was recorded utilizing a Trimble Global Positioning System (GPS) unit. Soil boring locations are shown on the attached soil boring location map (*Exhibit 1*). In addition to the soil bore locations, the boring location points have been color-coded indicating their consistency with the NRCS-mapped soil units and skink soils suitability. Specific details regarding the individual soil borings are detailed in the Soil Boring Table (*Exhibit 2*).

Results

From the field review and soil borings, it can generally be assumed that areas immediately adjacent to paved road surfaces, constructed treatment ponds, ramps or bridge structures or created landscape buffers have been subject to filling activities or other soil disturbance. In addition, areas that were subject to excavation for the creation of ponds, swales, ditches or side-slope contouring typically exhibit truncated soil profiles. In some cases, these areas were also filled after excavation to achieve final grade with installation of limerock, soil stabilizer, or other similar road bedding material. Areas exhibiting intact soil profiles similar to the mapped soil units generally were located along or in close proximity to roadway ROW limits, or are located at the top of ridges were significant side-slope contouring had not taken place. The areas supporting the natural soil profiles are shown in *Exhibit 1*.

Map 5

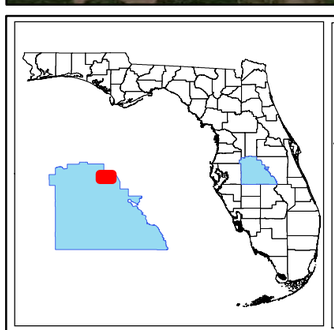
Map 4

Map 2

Map 3

Map 1

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



Sand Skink Soil Evaluations

I-4 BtU
FDOT District 1
Polk County, Florida

Path: O:\Projects\FDOT\I-4 BU Sand Skink Soils\GIS\MXD\Sand Skinks Survey 2015.mxd

USFWS-Designated Sand Skink Suitable Soils Map Units

Proposed Project Limits

Proposed ROW

Existing ROW

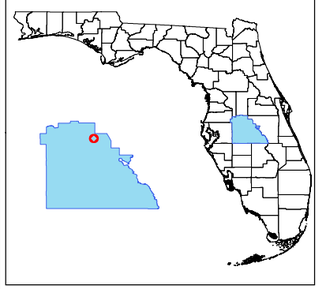
Exhibit 1

1 inch = 2,000 feet

Exhibit Date:
03.13.2015

Section: N/A
Township: N/A
Range: N/A

N



Sand Skink Soil Evaluations

I-4 BtU
FDOT District 1
Polk County, Florida

Path: O:\Projects\FDOT\I-4 BU Sand Skink Soils\GIS\MXD\Sand Skinks Survey 2015.mxd

USFWS-Designated Sand Skink Suitable Soils Map Units

Proposed Project Limits

Proposed ROW

Existing ROW

Soil Bore Locations

Sand Skink Soil

Yes

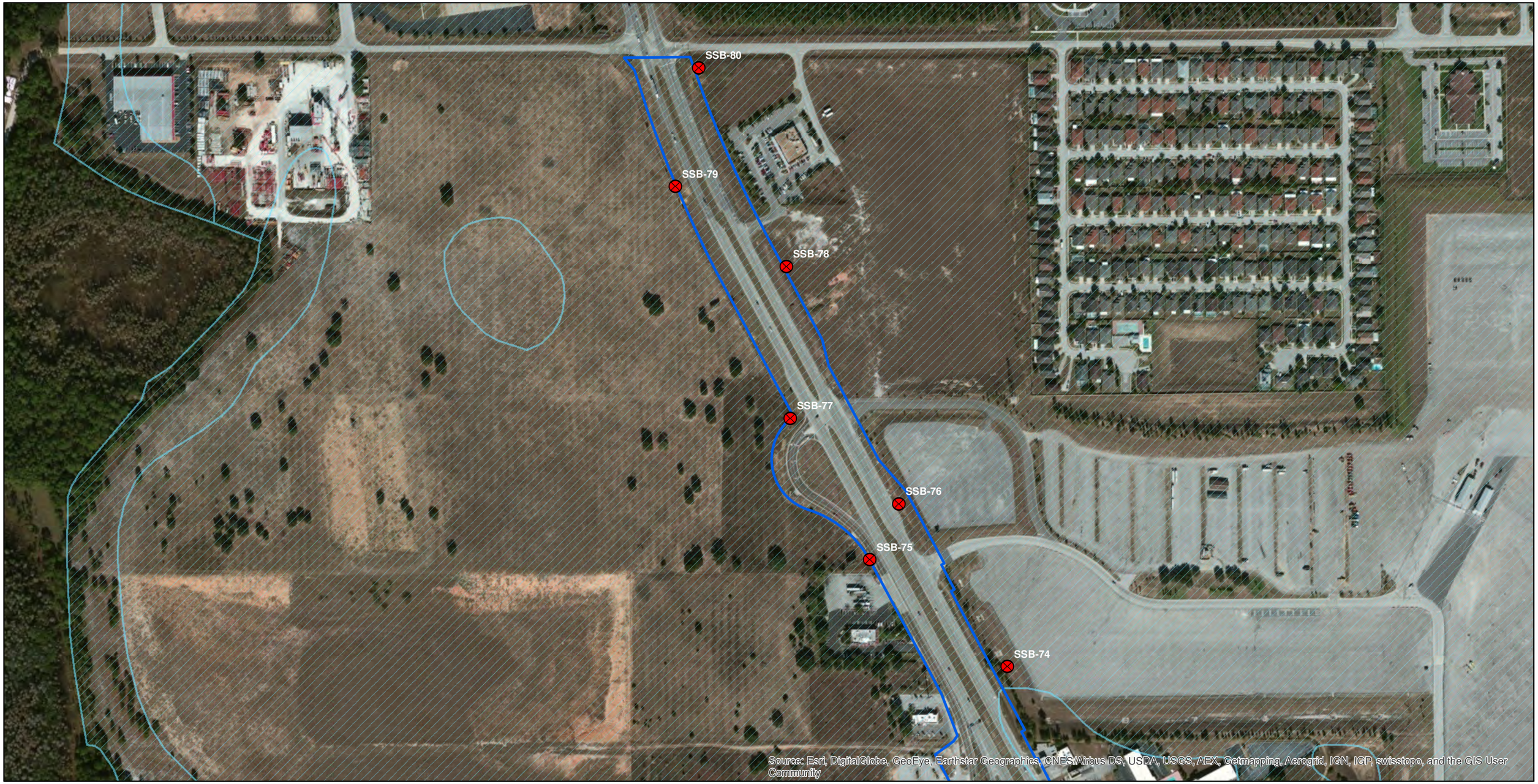
No

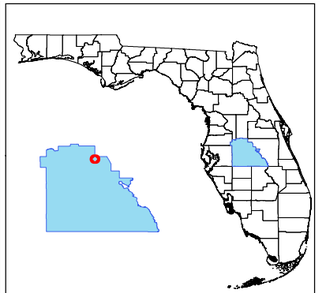
Exhibit 1 - Map 2

1 inch = 250 feet

Exhibit Date:
03.13.2015

Section: 13
Township: 26 South
Range: 26 East





Sand Skink Soil Evaluations

I-4 BtU
FDOT District 1
Polk County, Florida

Path: O:\Projects\FDOT\I-4 BU Sand Skink Soils\GIS\MXD\Sand Skinks Survey 2015.mxd

USFWS-Designated Sand Skink Suitable Soils Map Units

Proposed Project Limits

- Proposed ROW
- Existing ROW

Soil Bore Locations

Sand Skink Soil

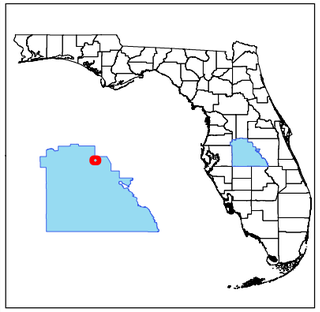
- Yes
- No

Exhibit 1 - Map 2

1 inch = 350 feet

Exhibit Date:
03.13.2015

Section: 12 & 7
Township: 26 South
Range: 26 & 27 East



Sand Skink Soil Evaluations

I-4 BtU
FDOT District 1
Polk County, Florida

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USFWS-Designated Sand Skink Suitable Soils Map Units

Proposed Project Limits

- Proposed ROW
- Existing ROW

Soil Bore Locations

Sand Skink Soil

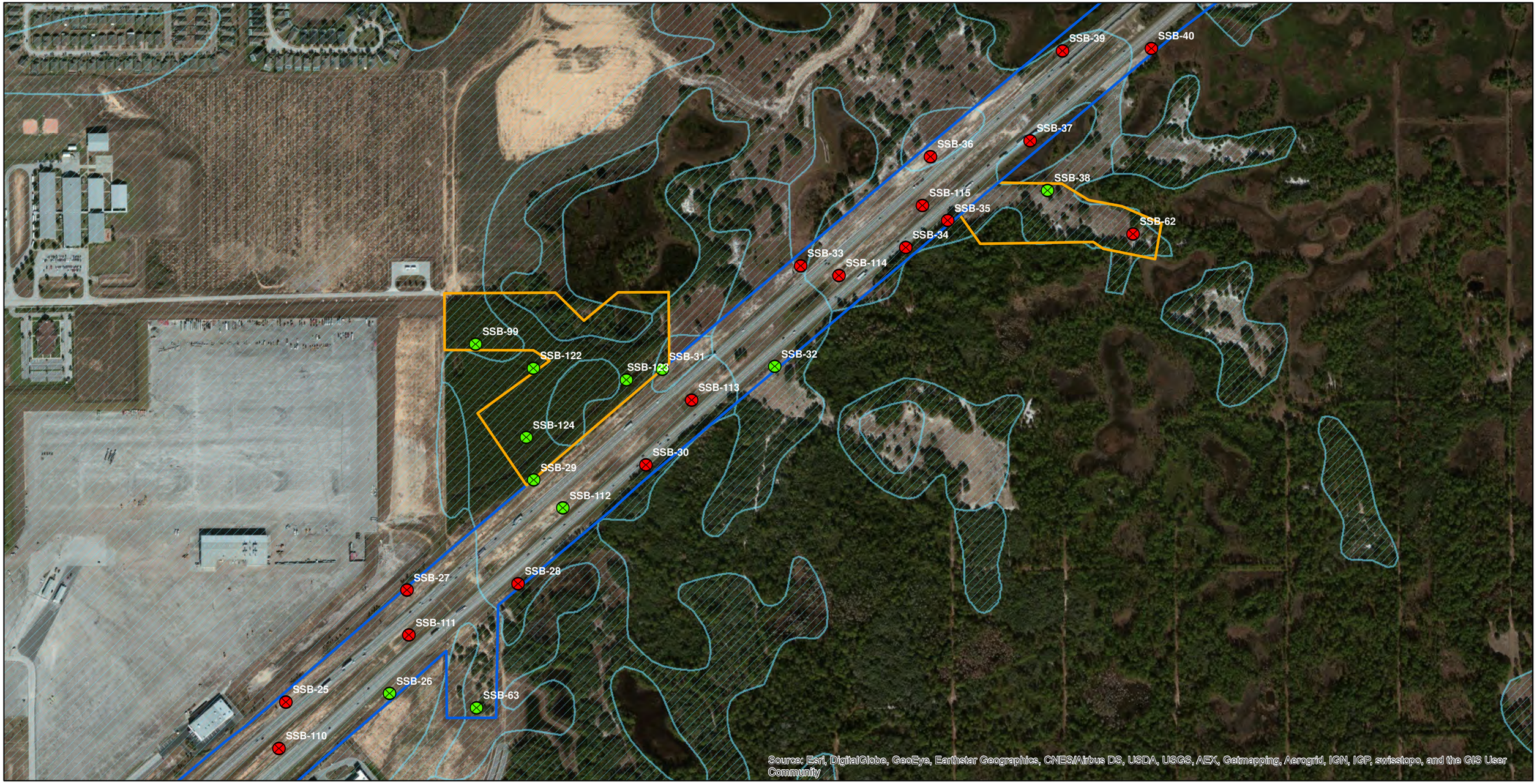
- Yes
- No

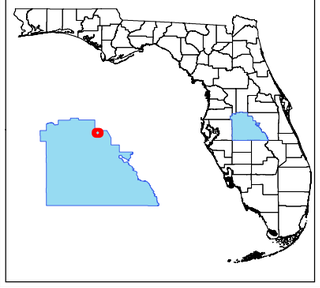
Exhibit 1 - Map 3

1 inch = 550 feet

Exhibit Date:
03.13.2015

Section: 13, 07 & 08
Township: 26 South
Range: 26 & 27 East





Sand Skink Soil Evaluations

I-4 BtU
FDOT District 1
Polk County, Florida

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USFWS-Designated Sand Skink Suitable Soils Map Units

Proposed Project Limits

Proposed ROW

Existing ROW

Soil Bore Locations

Sand Skink Soil

Yes

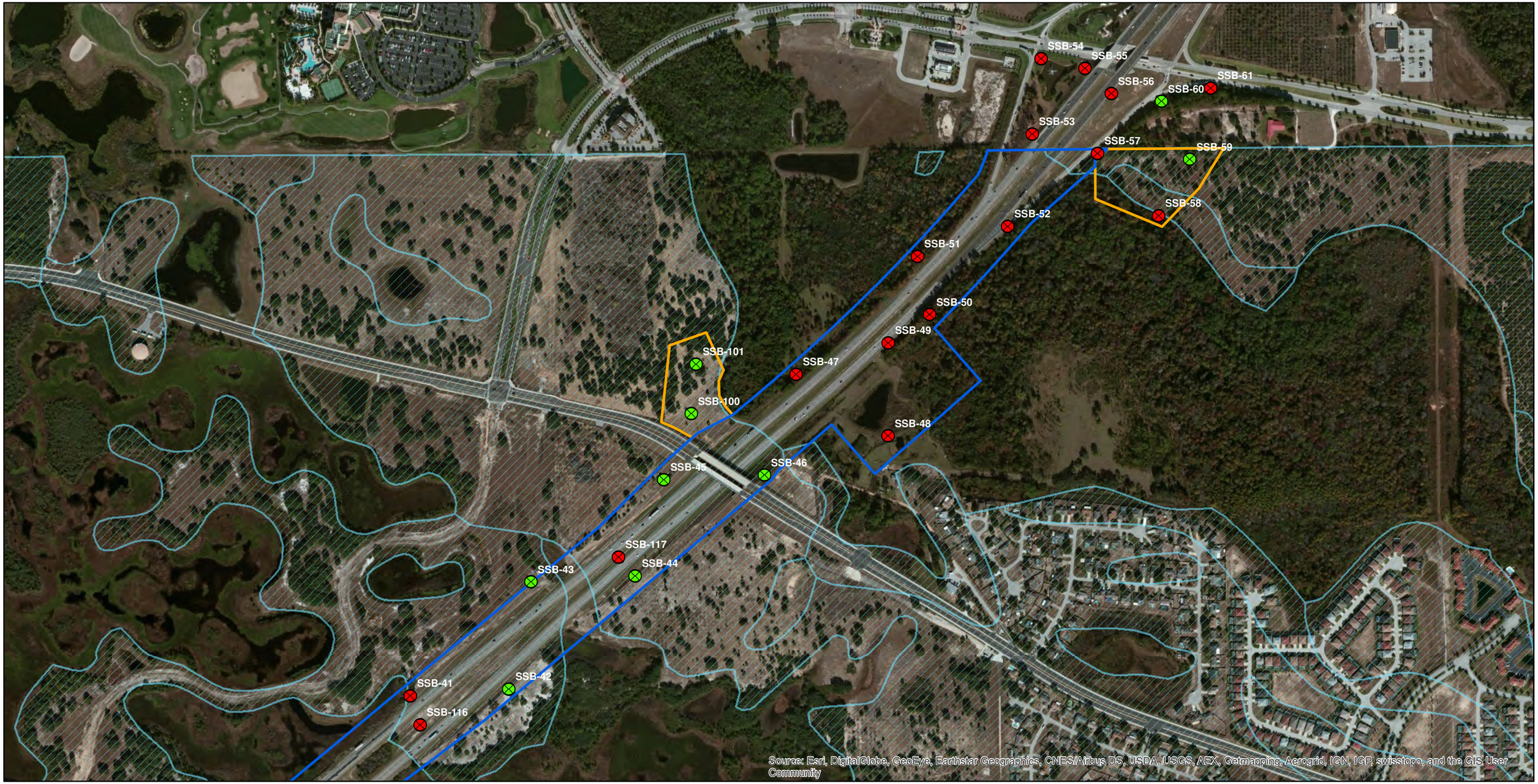
No

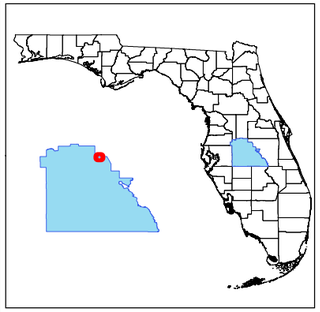
Exhibit 1 - Map 4

1 inch = 550 feet

Exhibit Date:
03.13.2015

Section: 05, 07 & 08
Township: 26 South
Range: 27 East





Sand Skink Soil Evaluations

I-4 BtU
FDOT District 1
Polk County, Florida

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USFWS-Designated Sand Skink Suitable Soils Map Units

Proposed Project Limits

Proposed ROW

Existing ROW

Soil Bore Locations

Sand Skink Soil

Yes

No

Exhibit 1 - Map 5

1 inch = 550 feet

Exhibit Date:
03.13.2015

Section: 33, 04 & 05
Township: 25 & 26 South
Range: 27 East

Exhibit 2 I-4 Soil Suitability Table Polk County			
Soil Boring No.		**Soil Suitability**	**Comments**
SSB	1	N	Sandy road fill
SSB	2	N	Cemented surface
SSB	3	N	Muck, hydric soil unit
SSB	4	N	Profile contains Bh (Spodic) horizon
SSB	5	N	Mucky surface texture
SSB	6	N	Water, excessive wetness
SSB	7	N	Basin/Pond
SSB	8	Y	Suitable
SSB	9	Y	Suitable, limited surface disturbance
SSB	10	Y	Suitable, limited surface disturbance
SSB	11	N	Compacted, limited surface disturbance
SSB	12	N	Basin/Pond slope
SSB	13	Y	Suitable, limited surface disturbance
SSB	14	N	Fill >3"
SSB	15	N	Basin/Pond slope
SSB	16	Y	Suitable, limited surface disturbance
SSB	17	N	Cut slope, truncated soil profile
SSB	18	N	Fill>6" with rocks
SSB	19	N	Sandy road fill
SSB	20	Y	Suitable, limited surface disturbance
SSB	21	N	Sandy road fill
SSB	22	N	Basin/Pond
SSB	23	Y	Suitable, limited surface disturbance
SSB	24	Y	Suitable, limited surface disturbance
SSB	25	N	Fill, rocks at surface, auger refusal
SSB	26	Y	Suitable, limited surface disturbance
SSB	27	N	Fill, rocks
SSB	28	N	Wetland boundary
SSB	29	Y	Suitable, tillage, limited disturbance
SSB	30	N	Silty surface, organics
SSB	31	Y	Suitable, limited surface disturbance
SSB	32	Y	Suitable, limited surface disturbance
SSB	33	N	Profile contains Bh (Spodic) horizon
SSB	34	N	Water, excessive wetness

Exhibit 2 I-4 Soil Suitability Table Polk County			
Soil Boring No.		**Soil Suitability**	**Comments**
SSB	35	N	High ground water
SSB	36	N	Water, excessive wetness
SSB	37	N	Water, excessive wetness
SSB	38	Y	Suitable
SSB	39	N	Water, excessive wetness
SSB	40	N	Organic staining
SSB	41	N	Organic Staining
SSB	42	Y	Suitable, limited surface disturbance
SSB	43	Y	Suitable, limited surface disturbance
SSB	44	Y	Suitable, limited surface disturbance
SSB	45	Y	Suitable, limited surface disturbance
SSB	46	Y	Suitable, limited surface disturbance
SSB	47	N	Water, excessive wetness
SSB	48	N	Muck, excessive wetness
SSB	49	N	Water, excessive wetness
SSB	50	N	Water, excessive wetness
SSB	51	N	Fill, rock
SSB	52	N	Organic material at surface
SSB	53	N	Construction disturbance
SSB	54	N	Construction disturbance, maintained
SSB	55	N	Construction disturbance, maintained
SSB	56	N	Fill, rock, debris
SSB	57	N	High ground water table
SSB	58	N	Water, excessive wetness
SSB	59	Y	Suitable, limited surface disturbance
SSB	60	Y	Suitable, limited surface disturbance
SSB	61	N	Construction disturbance, not in project
SSB	62	N	High ground water, excessive wetness
SSB	63	Y	Suitable, limited surface disturbance
SSB	64	N	Basin/Pond
SSB	65	N	Fill
SSB	66	N	Fill
SSB	67	N	Basin/Pond
SSB	68	N	Construction disturbance
SSB	69	N	Sandy road fill

Exhibit 2 I-4 Soil Suitability Table Polk County			
Soil Boring No.		**Soil Suitability**	**Comments**
SSB	70	N	Fill
SSB	71	N	Construction disturbance
SSB	72	N	Construction disturbance
SSB	73	N	Construction disturbance
SSB	74	N	Construction disturbance
SSB	75	N	Construction disturbance
SSB	76	N	Construction disturbance
SSB	77	N	Construction disturbance
SSB	78	N	Fill, rocks
SSB	79	N	Construction disturbance
SSB	80	N	Construction disturbance, debris
SSB	81	Y	Suitable, limited surface disturbance
SSB	82	N	Disturbance, cut
SSB	83	N	Fill, silty, rocks
SSB	84	N	Disturbance, cut, trucated soil profile
SSB	85	Y	Suitable, limited surface disturbance
SSB	86	Y	Suitable, limited surface disturbance
SSB	87	N	Fill, rocks
SSB	88	N	Fill, silty, rocks
SSB	89	N	Construction disturbance
SSB	90	Y	Basin/Pond
SSB	91	N	Basin/pond
SSB	92	N	Construction disturbance
SSB	93	N	Fill, silty
SSB	94	N	Disturbance, ramp fill
SSB	95	N	Surface disturbance, fill
SSB	96	N	Construction disturbance
SSB	97	N	Disturbance, ramp fill
SSB	98	Y	Suitable, limited surface disturbance
SSB	99	Y	Suitable, limited surface disturbance
SSB	100	Y	Suitable, limited surface disturbance
SSB	101	Y	Suitable, limited surface disturbance
SSB	102	N	Water, excessive wetness
SSB	103	Y	Suitable, limited surface disturbance
SSB	104	N	Fill, silty, rocks

Exhibit 2 I-4 Soil Suitability Table Polk County			
Soil Boring No.		**Soil Suitability**	**Comments**
SSB	105	N	Fill, rocks
SSB	106	N	Fill, rocks
SSB	107	N	Fill, rocks
SSB	108	N	Fill, rocks
SSB	109	N	Fill, rocks
SSB	110	N	Fill, asphalt, soil stabilizer
SSB	111	N	Rocks, rubber mulch
SSB	112	Y	Suitable, limited surface disturbance
SSB	113	N	Water, excessive wetness
SSB	114	N	Fill, rocks, debris
SSB	115	N	Fill, rocks
SSB	116	N	Fill, lime rock
SSB	117	N	Fill, rocks
SSB	118	Y	Suitable, limited surface disturbance
SSB	119	Y	Suitable, limited surface disturbance
SSB	120	Y	Suitable, limited surface disturbance
SSB	121	Y	Suitable, limited surface disturbance
SSB	122	Y	Suitable, limited surface disturbance
SSB	123	Y	Suitable, limited surface disturbance
SSB	124	Y	Suitable, limited surface disturbance

Appendix A. SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk/Osceola County Line) Skink Soils Investigation Report – Representative Site Photos

Western Segment (W. of US 27 to western terminus)

Looking SW along WB I-4, SW of the I-4/US 27 interchange

Looking NE along WB I-4, SW of the I-4/US 27 interchange

Northern Segment (I-4/US 27 interchange north to Dunson Road)

Looking N in the median of US 27, just south of the Cracker Barrel driveway, south of Dunson Road

Looking S in the median of US 27, just south of the Cracker Barrel driveway, south of Dunson Road

Eastern Segment
US 27 on-ramp tie-in at EB I-4 to the Polk County Road (CR) 54/Ronald Reagan Parkway overpass

Looking NE along I-4, within I-4 ROW just E of US 27 on-ramp merge (logged pine plantation/location of proposed Pond Site 505A & Floodplain Compensation Sites 500 A & B at left in the distance)

Looking E across actively logged pine plantation at the east end of Dunson Road (location of proposed Pond Site 505A & Floodplain Compensation Sites 500 A & B)

Looking SW. along WB I-4 from Polk CR 54/Ronald Reagan Parkway overpass

Looking SW along EB I-4 from Polk CR 54/Ronald Reagan Parkway overpass

Eastern Segment
CR 54/Ronald Reagan Parkway overpass to the eastern terminus at the Polk/Osceola County Line

Looking NE along EB I-4 from Polk CR 54/Ronald Reagan Parkway overpass

Looking NE along WB I-4 from Polk CR 54/Ronald Reagan Parkway overpass

NRCS Natural Resources Conservation Service
USDA UNITED STATES DEPARTMENT OF AGRICULTURE
6942 Professional Parkway East • Sarasota, FL 34240 • phone (941) 907-0011 • fax 941-907-0015

SITE AND SOIL INVESTIGATION

PROJECT NAME: **Florida DOT Interchange Improvements at I-4 and US 27**
DATE: March 26th, 2013
AGENT / OWNER: Mark Schultz, Florida DOT; Tom Pride, URS Corporation
ATTENDEES: J. Vega (USDA NRCS); Tom Pride (Agents for DOT) and Gabriel Vega, USDA NRCS volunteer
LOCATION DESCRIPTION: portions of S7; T26S; R27E; Intersection of I-4 and US27
COUNTY: Polk **ACRES: +/-** 67 Ac
REPORT PREPARED BY: Juan A. Vega
TITLE: Area Resource Soil Scientist **USDA-NRCS**
COOPERATING WITH Polk **S&WCD**

Reason for visit: To provide FL DOT and URS Corp with field soils assistance on a site selected by FLDOT for Interchange Improvements at I-4 and SR 27.

Statement on Soils:
An onsite soils inspection was made on several locations randomly identified as representative of the project variability. A total of seven soil borings were made to a depth of 80 inches and their respective locations documented. Results of the soil Borings taken along the project area indicated that all soils within the project area had been altered by previous roadway construction. Most of this area exhibits extensive excavation work associate with drainage detention areas. Fill material had been placed and compacted at all sampled locations. The fill material varied in its composition and depth from location to location. The sampled project area locations occur within several feet from paved roadways and exhibit mixture of sand, construction debris and organic material near the surface. A project *Location Map* showing soil map units and soil boring locations is appended to this report.

The boring locations were described as follows:

Soil Boring 1 Located south of I-4 and along the west shoulder of the NE bound Exit ramp towards US27. At this location it was determined that approximately 10-inches of fill material had been placed on the side slope. This material consisted of a mix of sand and organic materials. Below the fill material, the remaining profile appeared to be consistent with subsoil layers of Candler fine sand (MU 3).

Soil Boring 2 Located south of I-4 and along the west shoulder of the NE bound Exit ramp from US27. At this location it was determined that approximately 12-inches of fill material had been placed on the side slope. This material consisted of a mix of sand and organic materials. Below the fill material, the remaining profile appeared to be consistent with subsoil layers of Candler fine sand (MU 3).

Soil Boring 3 Located in the infield of the east bound I-4 on ramp on drainage detention pond. This area appeared to have been excavated. This material was sand texture and appeared to be consistent with subsoil layers of Candler fine sand (MU 3).

Soil Boring 4 Located south of I-4 and along the west shoulder of the NE bound Exit ramp towards US27. Within this area, approximately 36-inches of fill material consisting of a mix of sand, organic materials, asphalt and clay lenses had been placed. Below this material the remaining profile appeared to be consistent with subsoil layers of Candler fine sand (MU 3).

Soil Boring 5 Located south of I-4 and along the west shoulder of the NE bound Exit ramp towards US27. Within this area, approximately 14-inches of fill material consisting of a mix of sand, organic materials, asphalt and clay lenses had been placed. Below this material the remaining profile appeared to be consistent with subsoil layers of Candler fine sand (MU 3).

Soil Boring 6 Located north of I-4 and along the west shoulder of the SW bound Exit ramp towards US27. Within this Boring, sand and organics material was found to comprise the top 7-inches. Below this depth, the soil profile appears to be consistent with subsoil layers of Candler fine sand (MU 3).

Soil Boring 7 Located north of I-4 and south of US 27 on the SW bound Exit ramp. Within this area, approximately 30-inches of fill material consisting of a mix of sand, organic materials, asphalt and clay lenses had been placed. . Below this material the remaining profile appeared to be consistent with subsoil layers of Candler fine sand (MU 3).

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USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

FL DOT: I-4 /US 27 Interchange Project
Soil Borings Map

Legend

- I4_27_IA_Project Area
- Soil Borings
- Soils Map

15, Tavares fine sand, 0 to 5 percent slopes
16, Urban land
3, Candler sand, 0 to 5 percent slopes

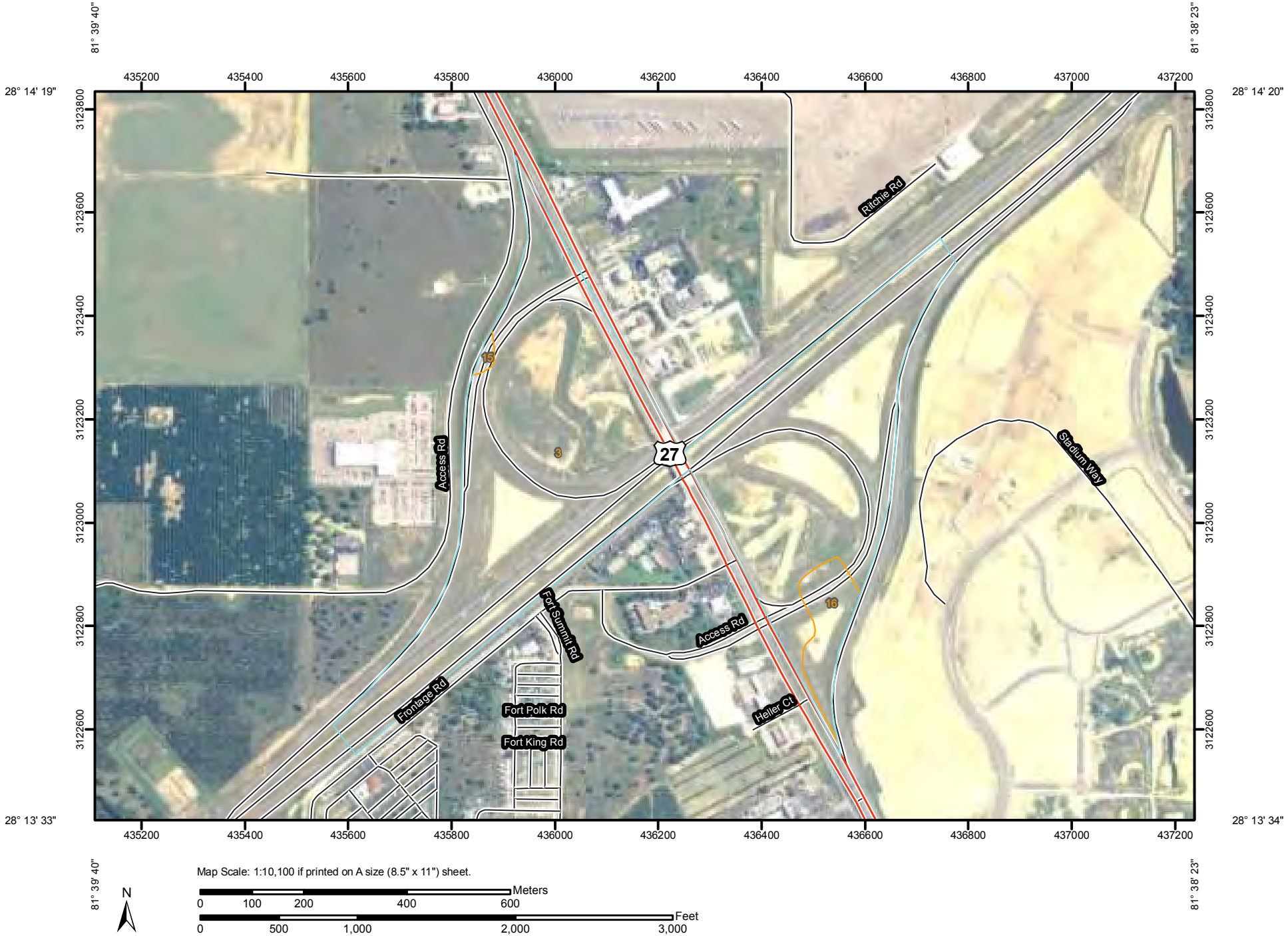
0 500 1,000 1,500 2,000 2,500 Feet

1:9,000 1 inch equals 750 feet

Polk County, FL
Section(s): 7 Township: 28 Range: 27

Prepared By: J Vega
Date: 4/5/2013

(I4_US27 Interchange_soils)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:10,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 8, May 2, 2012

Date(s) aerial images were photographed: 8/8/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Polk County, Florida (FL105)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3	Candler sand, 0 to 5 percent slopes	101.8	94.8%
15	Tavares fine sand, 0 to 5 percent slopes	0.4	0.4%
16	Urban land	5.1	4.7%
Totals for Area of Interest		**107.4**	**100.0%**

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Polk County, Florida

Map Unit: 3—Candler sand, 0 to 5 percent slopes

Component: Candler (85%)

The Candler component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains, knolls on marine terraces on coastal plains. The parent material consists of eolian deposits and/or sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R154XY002FL Longleaf Pine-turkey Oak Hills ecological site. Nonirrigated land capability classification is 4s. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Apopka (4%)

Generated brief soil descriptions are created for major components. The Apopka soil is a minor component.

Component: Astatula (4%)

Generated brief soil descriptions are created for major components. The Astatula soil is a minor component.

Component: Millhopper (4%)

Generated brief soil descriptions are created for major components. The Millhopper soil is a minor component.

Component: Tavares (3%)

Generated brief soil descriptions are created for major components. The Tavares soil is a minor component.

Map Unit: 15—Tavares fine sand, 0 to 5 percent slopes

Component: Tavares (85%)

The Tavares component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains, knolls on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 57 inches during June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 1 percent. This component is in the R154XY002FL Longleaf Pine-turkey Oak Hills ecological site. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Adamsville (3%)

Generated brief soil descriptions are created for major components. The Adamsville soil is a minor component.

Component: Candler (3%)

Generated brief soil descriptions are created for major components. The Candler soil is a minor component.

Component: Millhopper (3%)

Generated brief soil descriptions are created for major components. The Millhopper soil is a minor component.

Component: Narcoossee (3%)

Generated brief soil descriptions are created for major components. The Narcoossee soil is a minor component.

Component: Zolfo (3%)

Generated brief soil descriptions are created for major components. The Zolfo soil is a minor component.

Map Unit: 16—Urban land

Component: Urban land (85%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Adamsville (5%)

Generated brief soil descriptions are created for major components. The Adamsville soil is a minor component.

Component: Apopka (5%)

Generated brief soil descriptions are created for major components. The Apopka soil is a minor component.

Component: Millhopper (5%)

Generated brief soil descriptions are created for major components. The Millhopper soil is a minor component.

Data Source Information

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 8, May 2, 2012

APPENDIX B

Representative Survey Polygon Photos

Polygon A

Polygon B

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix B

Representative Survey Polygon Photos

Polygon C

Polygon D

Polygon E

Polygon F

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix B

Representative Survey Polygon Photos

Polygon G

Polygon H

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix B

Representative Survey Polygon Photos

Polygon I

Polygon J

Polygon K

Polygon L

Polygon M

Polygon N

Polygon O

Polygon P

Polygon Q

Polygon R

Polygon S

Polygon T

Polygon U

Polygon V

Polygon Z

APPENDIX C

Photos of Survey Polygon Microhabitats Excluded from Coverboard Survey

Polygon D – wet soils

Polygon L – wet soils

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix C

Photos of Survey Polygon Microhabitats Excluded from Coverboard Survey

Polygon O – wet soils

Polygon P – wet soils

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix C

Photos of Survey Polygon Microhabitats Excluded from Coverboard Survey

Polygon R – brush piles

APPENDIX D

Field Datasheets

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 3·24·15 Start Time 9:27am End Time 3:10 pm Monitor(s) Lauren Peters
Tim Seiwak

Site Name and Location: I-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

B, L, N, O, Q, S

Other general notes/observation:

6-lined racerunner - B-174, B-212, B-278, B-285 (3 individuals)
B-340, N-114, O-80, S-94, S-46

Oak toad - O-49

Unidentified mouse - Q-80

Fence lizard Q-188, Q-207, Q221

Hornet nest L-12

O-29, 20, 57 in wet area

O-56 completely submerged *heavy rain yesterday

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 3·24·15 Start Time 9:25 AM End Time 3:30 PM Monitor(s) Christine Sciarrino
Stephen Hesterberg

Site Name and Location: ~~A, D, E, G, H, I, P, Q, U~~ 1-4 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

A, D, E, G, H, I, P, Q, U

Other general notes/observation:

A-34 Board moved, replaced to orginal location

G- dead gopher tortoise, multiple 6 lined racerunner burrows/holes

E-9 Narrowmouth toad

H-14, 58, 80 6 lined racerunner

Multiple (≥3) POB at I

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 3:25·15 Start Time 9:43 am End Time 3:15 PM Monitor(s) Christine Sciarrino
Martin Horwitz

Site Name and Location: 1-4 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

S·117 -> S01
R
K

Other general notes/observation:

R-77 glass lizard
R-126, 291, 381, 387 southern toad
R-143 narrowmouth
R-117, 119, 169, 170, 171 moved + replace
R-324, 352, 412, 410, 515 oak toad
K132, 114 6-lined racerunner
K133 POB near

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 3-25-15 Start Time 9:00 AM End Time 3:00 PM Monitor(s) Tori Kuba
Patrick Griffin

Site Name and Location: 1-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
C-116	2	0	80	5MPH ENE	50%	X	
C-92	1	0	"	"	"	"	
C-7	5	0	"	"	"	"	
C-8	5	0	"	"	"	"	

List of all survey polygons checked on this date:

S, R, C, K

Other general notes/observation:

6-lined racerunners + gopher tortoise burrows

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 3-30-15 Start Time 9:12 am End Time 3:05 pm Monitor(s) Lauren Peters
Patrick Griffin

Site Name and Location: I-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

B, J, N, L, P, Q, T

Other general notes/observation:

6-lined racerunner: B-123, B-219, B-223, B-240, B-244, B-264, B-301, B-339
Cuban anole: B-229, J-3
Fence lizards: B-283 (x2)
Garter snake: P-123
Pinewoods treefrog: Q-26
Unidentified mouse: Q-80 (x2)

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 3·30·15 Start Time 9:15 AM End Time 3:05 PM Monitor(s) Angel Wynn
Christine Sciarrino

Site Name and Location: I-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

A, D, E, G, H, I, O, Q, T

Other general notes/observation:

6-lined racerunner: D-16, D-56, G-16, H-24, I-24, T-4

Cuban anole: D-4

Scrub lizard: Q-182, Q-151, Q-140

I-100 board warped, replaced

O: 20, 45, 56, 57 in standing water, moved + re-GPS'd

Team 1:
R
V
K
S (int.)

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4.2.15 Start Time 9:15 am End Time 3:00 pm Monitor(s) AW
TK

Site Name and Location: 1-4 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

R, V

Other general notes/observation:

Race runner – V 121, 64
K 43, 56, 72, 20, 125, 137, 17, 149, 153

Team 2:
R
C
S (ext.)
Z

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4·2·15 Start Time 9:15 am End Time 3:00 pm Monitor(s) Christine Sciamma
Patrick Griffin

Site Name and Location: 1-4 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
C-5	>1		82°F	6mphSE	20%	X	
C-7	>1						
C-35	>1						
C-41	>1						
C-54	>1						
C-61	>1						
C-92	>1	1					
C-94	>1						
C-116	>1						
C-99	>1						
C-102	>1						
C-108	>1						
C-106	>1						
C-131	>1						
C-141	>1						

List of all survey polygons checked on this date:

R, C, S, Z

Other general notes/observation:

Ground skink - R-212
6-lined racerunner - C-13, C-9, C-52, C-76, C-99, S-154
Scrub lizard - C-147
Narrowmouth toad - R-4
Fence lizard - R-56
Southern toad - R-271, R545
Oak toad R-295, R-352 (x2), R-409, R-414
Pinewoods treefrog R-285
Black racer

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4.6.15 Start Time 9:00 am End Time 3:00 pm Monitor(s) Lauren Peters
Angel Wynn

Site Name and Location: I-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

B, I, J, L, N, Q, T

Other general notes/observation:

6-lined racerunner: B-218, B-227

Fence lizard: B-300, B260

Unidentified mouse: Q-109

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4-6-15 Start Time 9:00 am End Time 3:00 pm Monitor(s) Christine Sciarrino
Cuidi Almeida

Site Name and Location: 44 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest	
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)	
D14	1		75°F	7 Mph E	60%	X		Photo 1287
D25	>1		75°F	"	"	"	v surrounding area (many)	1289, 1290
D26	>1		75°F	"	"	"		1288
D29	>1		75°F	"	"	"		
D41	>1	1	75°F	"	"	"	saw tail while sifting, unable to capture	
E13	>1		"	"	"	"	photo	
E8	>1		"	"	"	"	photo	
XG	1		78°F	"	"	"	pedestrian track, photo, GPS, older track	

List of all survey polygons checked on this date:

A, D, E, G, H, O, P, Q, S (int.)

Other general notes/observation:

6-lined racerunner - G-3, E-12, H-6, H-10, H-12, O-35, O-38, O-48

Mouse - O-44

Fence lizard - Q441

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4-8-15 Start Time 11:10 End Time 2:30pm Monitor(s) Angel Wynn
Patrick Griffin

1-4 BTU

Site Name and Location: Polygon C - off-site pond + Z pond berm

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
C18	Multi		81°	6mph SE	44%	none	
C32		2					
C35							
C36							
C37							
C41							
C46							
C50							
C54							
C61							
C62							
C70							
C77							
C83							
C94							
C99							
C102							
C104							
C106							
C110							
C116							
C131							
C141							

List of all survey polygons checked on this date:

C148

C, Z

Other general notes/observation:

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4·8·15 Start Time 9:10am End Time 3:00 pm Monitor(s) Lauren Peters
Christine Sciarrino

Site Name and Location: I-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
R-507	>1		79°F	6mph SSE	40%	X	
R-524	>1		"	"	"	"	
R-547	>1		"	"	"	"	

List of all survey polygons checked on this date:

R, V, K, S (I-4 side)

Other general notes/observation:

Scrub lizard: R-10, K polygon
Ground skink: R-71, R-480
6-lined racerunner: R-152, V-131, V-145, V-95, K-35, K-31, K-65, K-68, S: 151, 154, 190, 124, 146, 144
Cricket frog: R-443
Oak toad: R-443
Unidentified mouse w/ nest: V-13, V-97
Cuban anole: K-66
Unidentified lizard: K-81

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4·13·15 Start Time 9:15 AM End Time 3:30 PM Monitor(s) Christine Sciarrino
Kristin Caruso
Patrick Griffin

Site Name and Location: I-4 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
D-26	>1		80°F	9mph, S	60%	X	photo after partial sift
D-29	>1						photo
D-42	>1						photo
H-14	1						2 photos, old faint tracks
D-18	>1						photo

List of all survey polygons checked on this date:

B, D, E, G, H, I, J, L, N, O, P

Other general notes/observation:

6 lined racerunner: B-163, B-180, B-217, B-289, G-1B, G-6, N-13, O-6

Scrub lizard: B-285, I-19

Black racer: D-10

Oak toad: H-38, H-47, I-90

Mouse: P-93

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4-14-15 Start Time 9:00 am End Time 4:00 pm Monitor(s) Angel Wynn
Patrick Griffin
Lauren Peters

Site Name and Location: 1-4 BTU

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)

List of all survey polygons checked on this date:

Q, S, A, T, U, Z, V

Other general notes/observation:

Fence lizard: Q-140, Q141
6-Lined Racerunner: S-170, S-175
Unidd Frog: Z-60
Board V-49 driven over by vehicle, sticking up out of sand

Sand Skink/Blue-Tailed Mole Skink Monitoring
Cover Board Survey
Field Data Form

Date: 4·15·15 Start Time 9:30am End Time 3:30 pm Monitor(s) Kristin Caruso
Patrick Griffin
Christine Sciarrino

Site Name and Location: I-4 Beyond the Ultimate

	Sand Skink Data		Weather Data				Other Wildlife Observations of Interest
Cover Board #	Number of Tracks	Number of Individuals	Average Temp (°F)	Wind Speed & Direction	% Cloud Cover	Rain	Species (Name, Track/Individual, Number)
C-39	2	1	77°F	1mph SW	30%	X	
C-41	1						
C-46	1						
C-57	1						
C-50	>1						
C-80	1						
C-77	1						
C-75	>1						
C-114	1						
C-131	15						
C-138	9						
C-139	4						
C-142	4						
C-117	6						
C-102	1						immediately next to board
C-128	6						
C-5	2						
C-7	1						
C-8	2						
C-18	1						
C-32	>1						
C-105	1						next to board
C-110	1						

List of all survey polygons checked on this date:
C-120 1
R-552 >1

88F 5mph WNW 50% X

C, K, R

Other general notes/observation:

6-lined racerunner: C-66, C-67, C-1666, K-11, K-37, K-61, K-71, K-88
Oak toad: R-301
Pinewoods treefrog: R-236, R-325

The following boards had been grouped + moved to the northern edge: R-515, R-514, R-519, R-517, R-518, R-516

APPENDIX E

Representative Sand Skink Tracks and Individuals Photos

Polygon C (4-2-15)

Polygon C (4-2-15 under above tracks)

Polygon D (4-6-15)

Polygon E (4-6-15)

Polygon G (4-6-15)

Polygon H (4-13-15)

Polygon N (3-10-15)

Polygon R (4-8-15)

APPENDIX F

Incidental Vertebrate Species under Coverboards

Incidental Vertebrate Species under Coverboards

Common Name	Scientific Name	Number of Observations
Six-lined racerunner	*Aspidoscelis sexlineata*	94
Oak toad	*Anaxyrus quercicus*	16
Eastern fence lizard	*Sceloporus undulatus*	11
Florida scrub lizard	*Sceloporus woodi*	8
Unidentified mouse	NA	8
Southern toad	*Anaxyrus terrestris*	6
Cuban anole	*Anolis sagrei*	4
Pinewoods treefrog	*Hyla femoralis*	4
Eastern narrowmouth toad	*Gastrophryne carolinensis*	3
Ground skink	*Scincella lateralis*	3
Southern black racer	*Coluber constrictor priapus*	2
Cricket frog	*Acris sp.*	1
Eastern garter snake	*Thamnophis sirtalis sirtalis*	1
Eastern glass lizard	*Ophisaurus ventralis*	1
Unidentified frog	NA	1
Unidentified lizard	NA	1
Worm Lizard	*Rhineura floridana*	1

APPENDIX G

Occupied vs. Unoccupied Habitat Photos

Polygon D – occupied

Polygon D – unoccupied (wet soils)

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix G

Occupied vs. Unoccupied Habitat Photos

Sheet 1

Polygon R – occupied

Polygon R – occupied

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix G

Occupied vs. Unoccupied Habitat Photos

Sheet 2

Polygon R – unoccupied (dense pine needle duff)

Polygon R – unoccupied (dense pine needle duff)

SR 400 (I-4) Beyond the Ultimate Segment 5: from West of SR 25 (US 27) to West of CR 532 (Osceola/Polk County Line)

Sand Skink Coverboard Survey
Polk County, Florida
FPID No. 201210-2-22-01

Appendix G

Occupied vs. Unoccupied Habitat Photos

Sheet 3