ADDITIONAL BACKUP
FOR PUBLIC HEARING #22
Sunbridge Parkway – Preliminary Design Study (PDS)

Interoffice Memorandum

February 23, 2018

TO: Mayor Teresa Jacobs
-AND-
Board of County Commissioners

FROM: Jon V. Weiss, P. E., Director
Community, Environmental and Development Services Department

CONTACT PERSON: Renzo Nastasi, AICP, Manager
Transportation Planning Division
(407) 836-8072

SUBJECT: March 20, 2018 – Public Hearing
Sunbridge Parkway Preliminary Design Study

The Orange County Transportation Planning Division has completed the Preliminary Design Study for Sunbridge Parkway, from Dowden Road to the Osceola County line. This study has been completed pursuant to the Transportation Agreement for Sunbridge Parkway approved by the Board on April 25, 2017.

The purpose of the study was to develop the most appropriate road alignment with stormwater facilities and bicycle and pedestrian accommodations while minimizing environmental impacts. The need for this roadway is based on a variety of factors including future traffic operations, safety and social and economic demands. The recommended roadway improvements are consistent with the Innovation Way Overlay criteria and related Comprehensive Plan Goals, Policies and Objectives.

The backup documentation for this item has been delivered under separate cover.

The study is also available under the Roadway Project section of the county's Traffic and Transportation webpage.

http://www.orangecountyfl.net/TrafficTransportation/SunbridgeParkway.aspx

ACTION REQUESTED: **Approval of the findings and recommendations of the Sunbridge Parkway Preliminary Design Study, find it consistent with the Comprehensive Plan and advance the project to the roadway design and construction phase. District 4.**

RN/bh/am

c: Mark V. Massaro, P.E., Director, Public Works Department
Diana Almodovar, P.E., County Engineer, Public Works Department
Renzo Nastasi, AICP, Manager, Transportation Planning Division

APPROVED BY ORANGE
COUNTY BOARD OF COUNTY
COMMISSIONERS

BCC Mtg. Date: March 20, 2018

SUNBRIDGE PARKWAY SEGMENTS 2, 3, AND 4

PRELIMINARY DESIGN STUDY REPORT

Prepared for:

ORANGE COUNTY GOVERNMENT
FLORIDA

And

Tavistock East Services, LLC

Prepared by:
Donald W. McIntosh Associates, Inc.
2200 Park Avenue North
Winter Park, Florida 32789

With
Breedlove, Dennis & Associates, Inc.
Kittelson & Associates, Inc.
Professional Services Industries, Inc.
SEARCH, Inc.

March 8, 2018

I hereby certify that the material and data contained in this document was prepared under the supervision and direction of the undersigned, whose seal as a Registered Professional Engineer in the State of Florida is affixed below.

As to Chapters I – IX and Appendices K, L, N – S and V:

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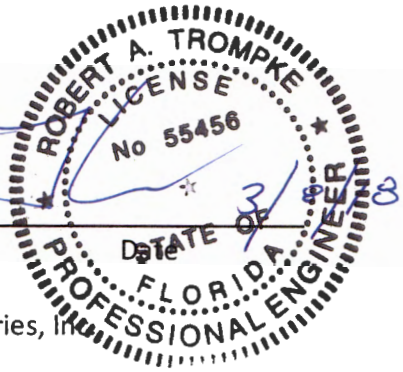
As to Appendix G:



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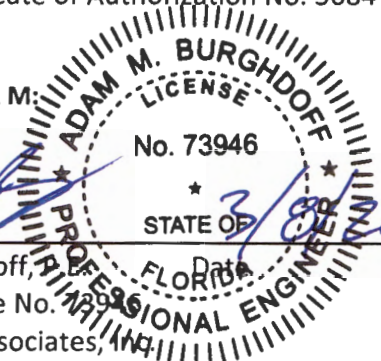
As to Appendix M:



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I. PURPOSE OF REPORT

This report has been prepared by Donald W. McIntosh Associates, Inc. (DWMA) in order to assist Tavistock East Services, LLC (Tavistock) and Orange County, Florida in their evaluation of a corridor for Sunbridge Parkway Segments 2, 3 and 4 (Project). The purpose of this report is to recommend a roadway improvement concept that provides a safe and cost effective route extending south from the intersection of Sunbridge Parkway with Aerospace Parkway/Dowden Road to the Orange County/Osceola County line, where the roadway will ultimately be extended into Osceola County's Northeast District to provide connectivity between two large areas of Tavistock's Sunbridge community. The planning of this corridor must take into account the long range plans of both Orange County and Osceola County as well as a number of physical, geometric and environmental constraints affecting the planned corridor. This report includes a compilation of several reports prepared by the consultant team for the Project, which are presented in their entirety as appendices prefaced by a summary discussion in this report.

II. GENERAL

a. NEED FOR IMPROVEMENT

The Sunbridge Master Planned Development in southeast Orange County and northeast Osceola County requires a north/south roadway to accommodate that development. Orange County and Tavistock East Services, LLC are working together to construct Sunbridge Parkway Segments 2, 3 and 4 to service that need through a public-private partnership arrangement as set forth in the *Transportation Agreement for Sunbridge Parkway (From Dowden Road to Osceola County Line; Orange County Records, Document# 20170253449)* ("Road Agreement"; Appendix A) executed by the owners (through their representatives) of these parcels and Orange County. Development projects in the region as illustrated on the Planning Context Map, Figure II-1, include:

- In Orange County:
  - Sunbridge PD (fka Innovation Way East (IWE) and International Corporate Park (ICP))
  - Storey Park (fka Innovation Place)
  - Starwood
  - Camino Reale South (CRS)
- In Osceola County
  - Sunbridge (aka Northeast District (NED))
  - Narcoossee Community Overlay

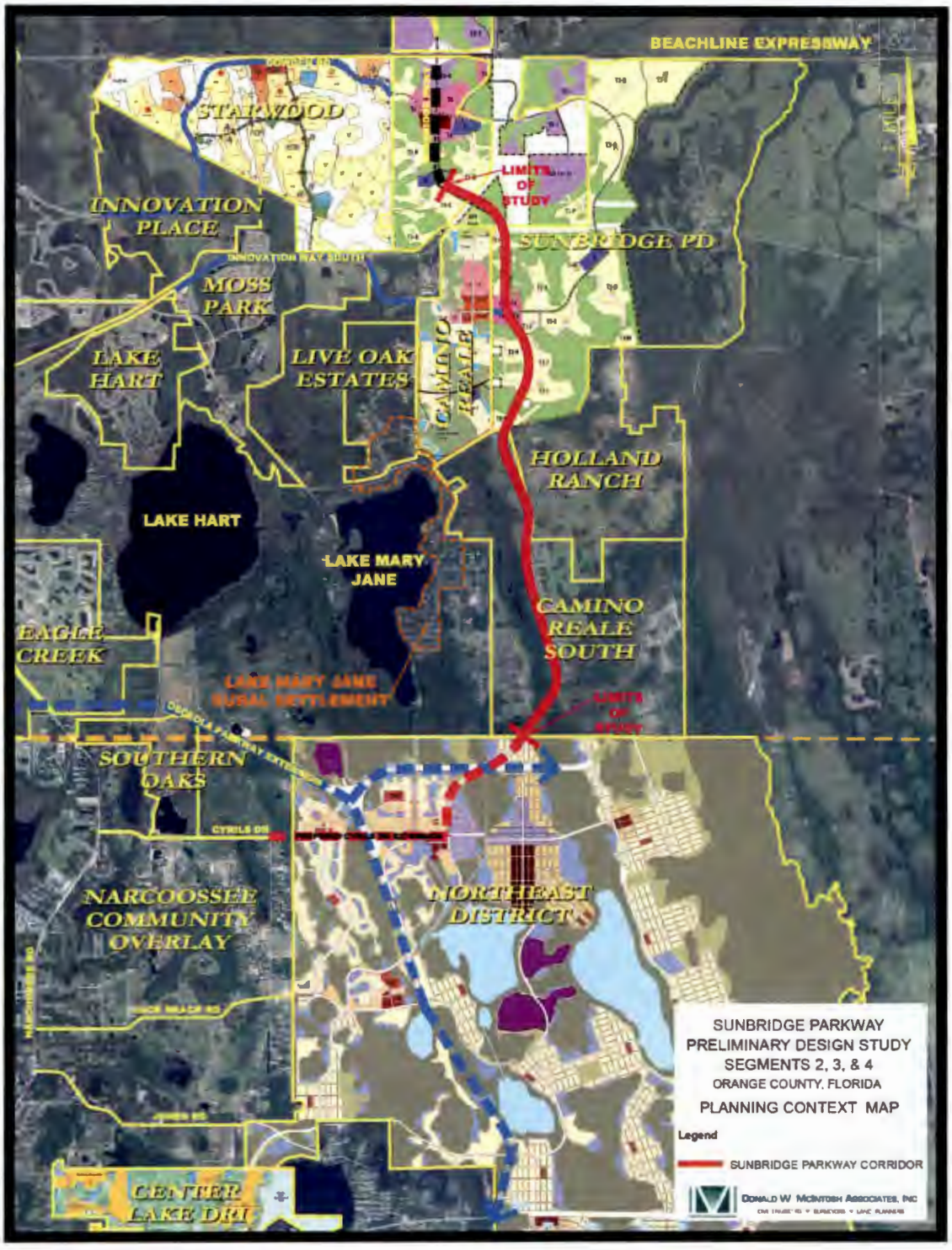


FIGURE II-1: PLANNING CONTEXT MAP

The location of the recommended Sunbridge Parkway corridor as selected by this study is also depicted on that map. The map illustrates the significance of Sunbridge Parkway as a connective transportation link for all of the development areas noted above when connected to the east-west roadways including Cyrils Drive and the Osceola Parkway Extension in Osceola County and Innovation Way South, Dowden Road (Aerospace Parkway) and the full interchange with the Beachline Expressway (SR 528) in Orange County.

b. The Study Area

Proposed Sunbridge Parkway, Segments 2, 3 and 4, will lie within the Sunbridge PD (fka International Corporate Park (ICP) and Innovation Way East (IWE)) and Camino Real South (CRS) properties in east Orange County in accordance with the Road Agreement. Segment 1, which is located to the north of Segments 2, 3 and 4, is currently in the design and permitting stage. Segment 1 begins south of the interchange of Sunbridge Parkway and the Beachline Expressway (SR-528), at the intersection of Sunbridge Parkway and Aerospace Parkway, and runs roughly 4,466 feet southerly to a point roughly 1,300 feet northwest of the Orlando Utilities Commission (OUC) railroad. Segments 2, 3 and 4 continue southerly from that point to the Orange County/Osceola County line. (See Project Location Map, Figure II-2 and Segments Map, Fig II-3).

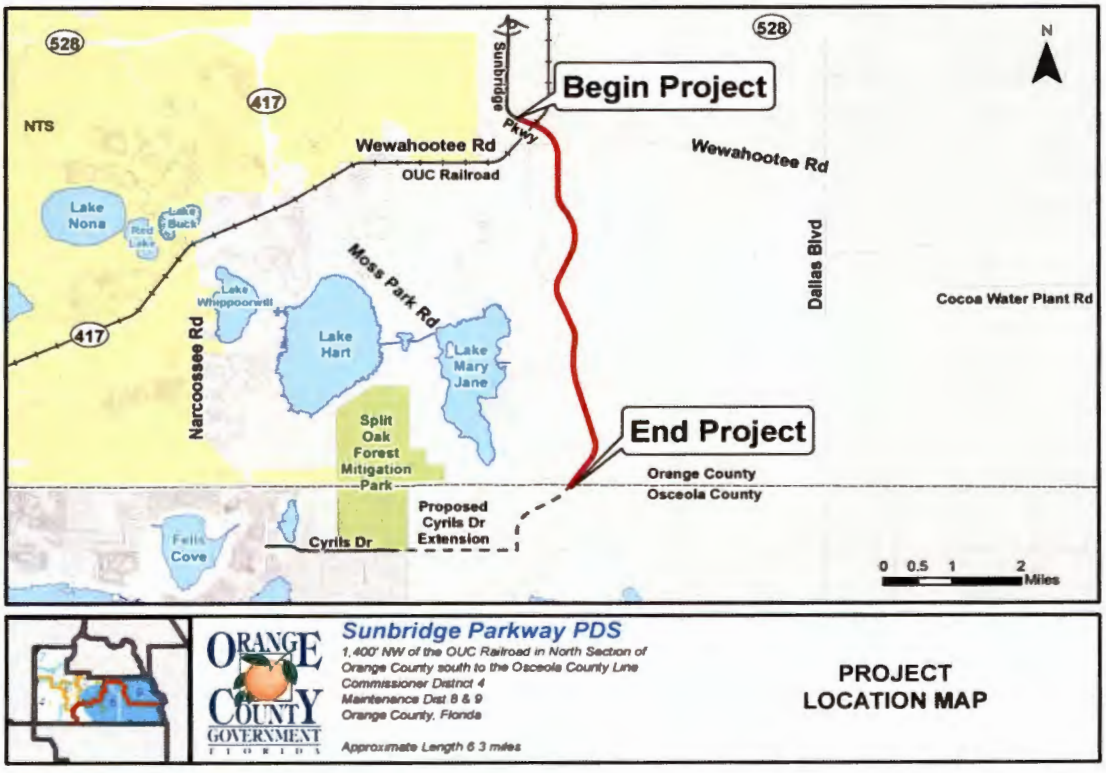


FIGURE II-2: PROJECT LOCATION MAP

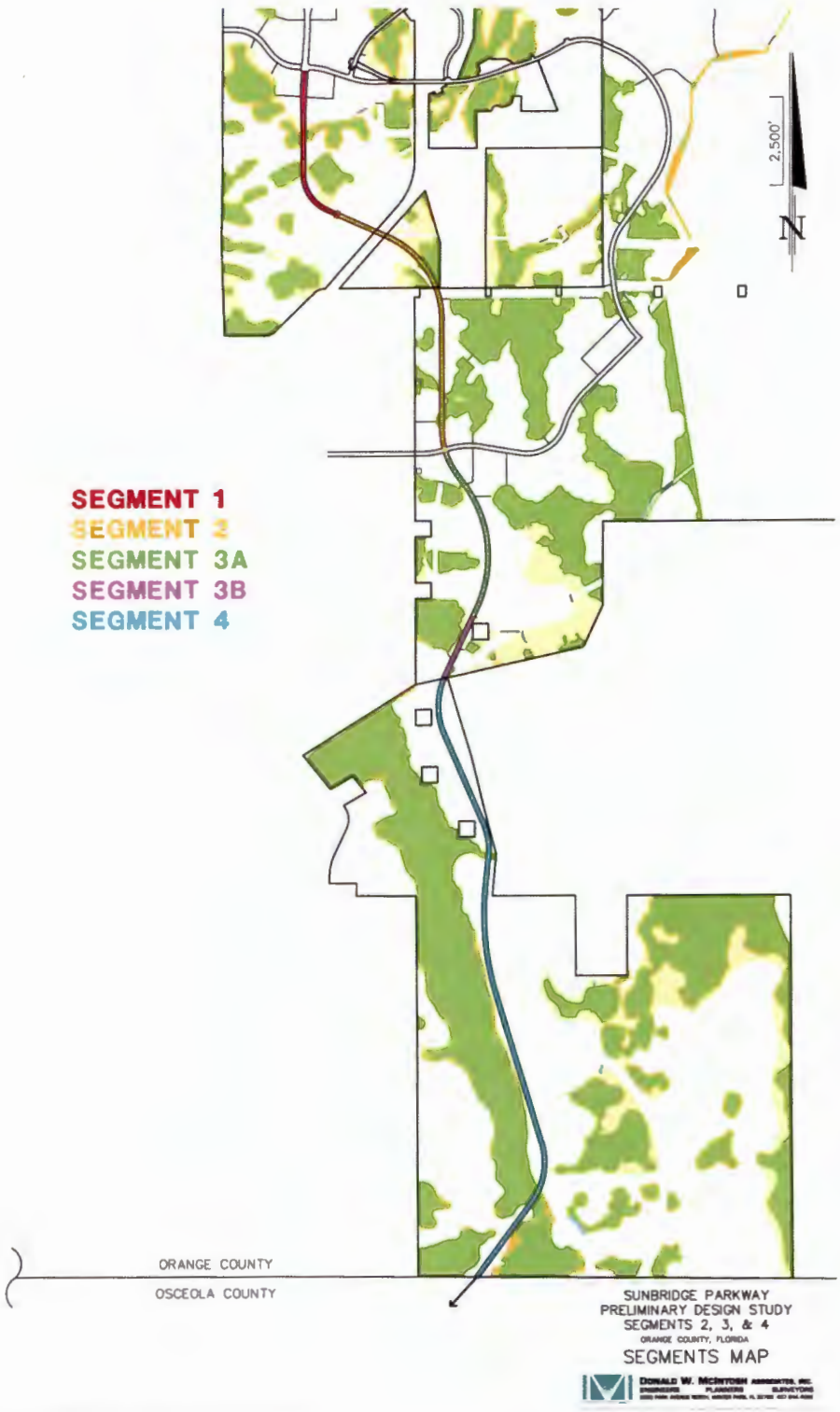


FIGURE II-3: SEGMENTS MAP

c. Conformance with Transportation and Long Range Plans

The Sunbridge Parkway project is consistent with the Transportation Element of the Orange County Comprehensive Plan. Specific policies supporting the consistency are reproduced below with discussion shown in *italics font*.

OBJ T1.1 The County adopts the Long-Range Transportation Plan (LRTP), the County's long-term transportation improvement program, as Map 1 of the Transportation Element. This plan includes the 10-year Capital Improvement Schedule, a 5-year Capital Improvement Program, state roadway projects, and other needed County transportation improvement projects inclusive of proposed partnership projects. This annually-updated plan represents a cost feasible project plan that addresses current and future roadway deficiencies within the planning horizon.

Sunbridge Parkway is depicted on Map 1 of the Transportation Element of the Comprehensive Plan as "North-South Rd" and designated on the map as "County Partnership." The recommended corridor is substantially consistent with the LRTP. See Figure II-4, Excerpt from Orange County LRTP – Map 1.

T1.3.3 Orange County shall consider all available funding sources, including those at the State and Federal levels, gasoline taxes, impact fees, development-related, and public/private initiatives for transportation projects.

The Roadway Agreement is an example of the County working with developers to accomplish development related and public/private initiatives for transportation projects to develop regional infrastructure.

T1.1.1 The County shall implement the LRTP by utilizing the following four-step process: Roadway Conceptual Analysis (RCA), which confirms roadway and corridor needs, recommends the most suitable alignment and design characteristics, provides refined cost estimates and analyzes social/environmental land use impacts; Roadway Design; Right-of-Way Acquisition; and Roadway Construction.

This PDS and its review process has been performed to fulfill the RCA component of this policy.

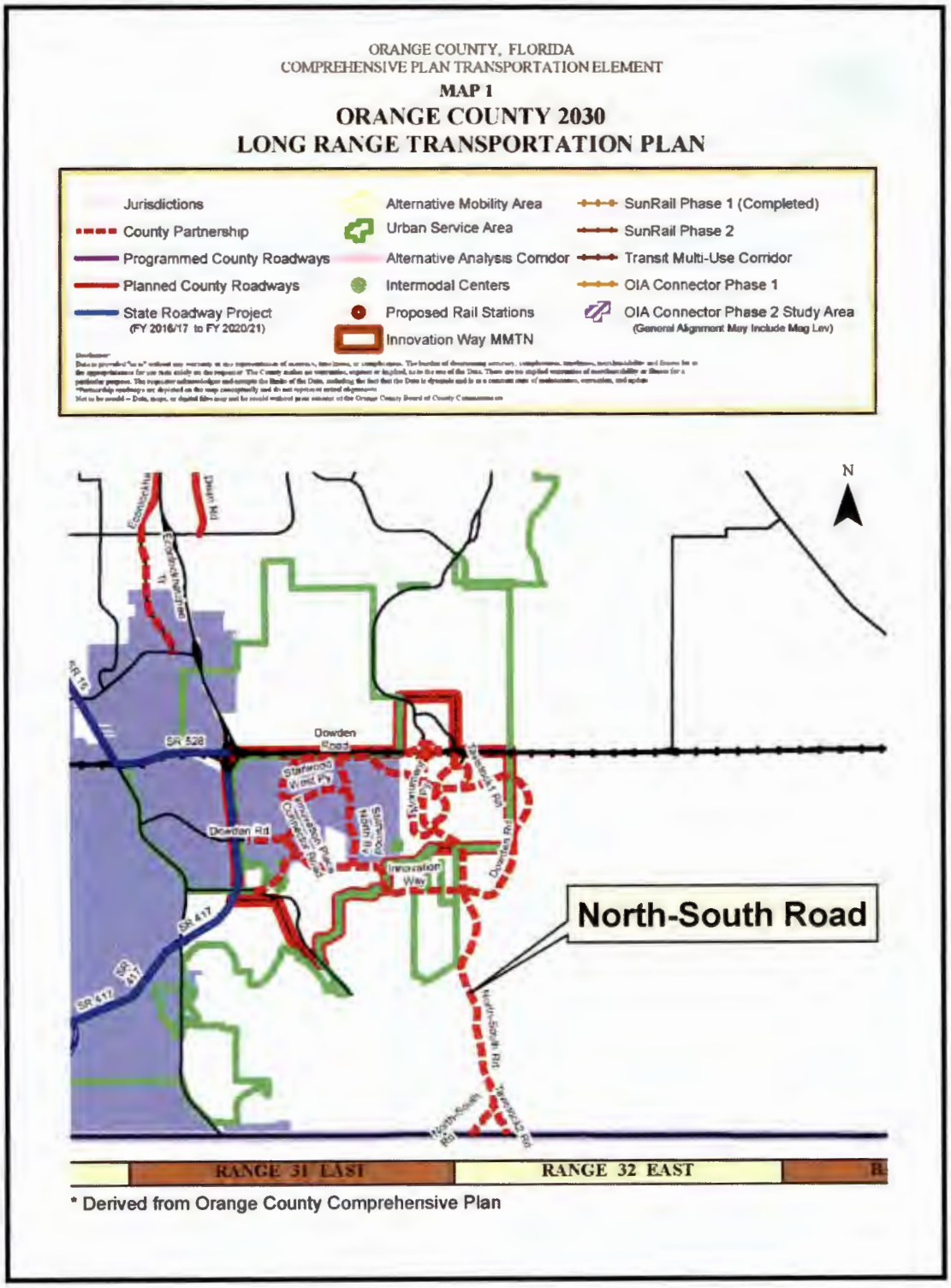


FIGURE II-4: EXCERPT FROM LRTP MAP 1

T1.1.1.2 The planning, design, construction, and operation of roadway corridors shall reflect the context of the communities and environment through which the corridors pass to the fullest extent possible.

The recommended roadway corridor and cross-sections have been selected to balance the transportation needs of the developing region with the environmental protections established by the County, other regulatory agencies and Tavistock. Sunbridge Parkway is comprised of both urban and rural cross-sections to reflect the urban development context of the Sunbridge PD in the northern area and the rural ranch context of CRS in the southern area.

T1.1.1.2 Through the RCA process, or other appropriate method, the County will seek public involvement throughout the process to determine measures to mitigate adverse impacts to adjacent land uses and established neighborhoods to the extent possible.

This PDS and its review process has been performed to conform with this policy. This PDS process has engaged the public at a Small Group Meeting on November 10, 2017 and at a Public Information Meeting on November 30, 2017. A Newsletter has been issued and public notices have been published. Ongoing public involvement through newsletters, workshops and public hearings will continue through the completion of the study.

T1.2.1 Orange County shall use the official transportation modeling structure as adopted by METROPLAN Orlando.

The PDS transportation engineering consultant, Kittelson & Associates, has been coordinating with Orange County engineering staff to ensure that the traffic models are prepared consistent with methodologies acceptable to the County.

T1.3.2 To ensure the Capital Improvements Program is responsive to transportation demands, priority for funding County transportation improvement projects shall be based on factors such as:

A. Safety for all users;
B. Capacity deficiency;
C. Right-of-Way availability/preservation;
D. Partnership potential;
E. Consistency with the Comprehensive Plan and METROPLAN Orlando's Long Range; Transportation Plan;
F. Supports the use of alternative modes of transportation;
G. Located within the County's Urban Service.

The Sunbridge Parkway project is consistent with the above stated objectives. The new multimodal corridor will be designed in accordance with current design criteria for safety and will provide adequate capacity based on the traffic analysis through the study period to 2040. Bicycle lanes will be provided along the entire length of the corridor and multi-purpose pathways will be provided on both sides in the urban area and on one side in the rural area. Coordination of the project through the public-private partnership process represented by the existing roadway agreement with the engaged property owners provides for acquiring right-of-way from undeveloped properties sufficient to serve long term capacity demands. The process, objectives and conceptual designs are consistent with the Comprehensive Plan and the long term transportation plans of the County and Metroplan. While only the northern portion of the corridor is located within the Orange County Urban Services Area (USA), the entirety of the proposed roadway is essential for connectivity between the Orange County and Osceola County urbanized areas of Sunbridge.

T1.3.3 Orange County shall consider all available funding sources, including those at the State and Federal levels, gasoline taxes, impact fees, development-related, and public/private initiatives for transportation projects.

The Sunbridge Parkway Segments 2, 3 and 4 project is the result of the public-private partnership process represented by the existing Roadway Agreement with the engaged property owners.

T1.3.6 To provide for an efficient and cost-effective transportation system, Orange County shall continue to acquire rights-of-way for timely management or acquisition of property to the extent financially practical and permitted by law.

The Project and the associated Roadway Agreement provides for the acquisition of sufficient right-of-way for future traffic capacity demands to be serviced by the four-lane divided roadway with northbound and southbound bicycle lanes and multi-purpose pathways and for a future overpass at the OUC railroad should it ever be warranted.

T1.3.7 The County will continue to participate in Interlocal agreements, Joint Participation Agreements, and other coordinated funding efforts with other local jurisdictions and public/private partnerships with private developers as a means of funding necessary transportation projects identified in the LRTP and that are consistent with the County's adopted comprehensive plan and METROPLAN Orlando's LRTP.

The Road Agreement is a public/private partnership as anticipated by this Policy.

T3.2.2 The County shall ensure that existing and new developments are connected by pedestrian, bikeways and roadways systems to encourage travel between adjoining properties and minimize trips on major roadways.

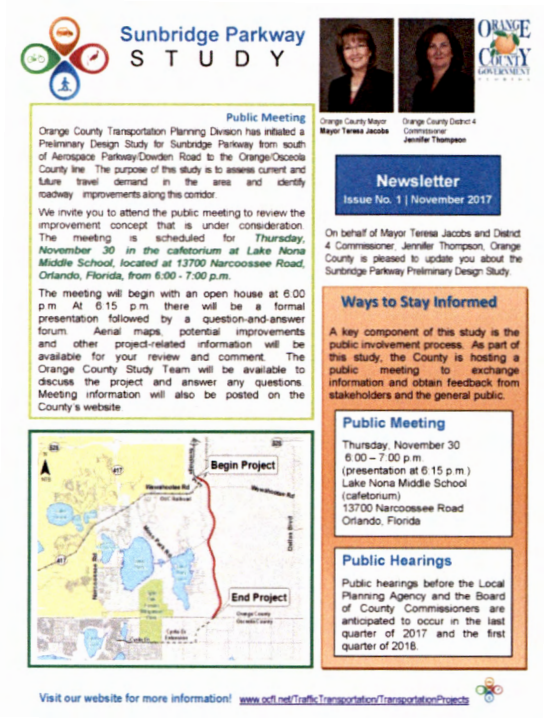
Sunbridge Parkway will be built with continuous, 7-foot wide buffered bicycle lanes for the entire six-mile roadway. Additionally, a 14-foot wide trail will be constructed on the west side of the roadway for the entire length of Sections 2 – 4 and a 10-foot wide multi-purpose path will be constructed on the east side of the urban section.

III. PUBLIC INVOLVEMENT

a) NEWSLETTERS

A series of newsletters is being issued to the public throughout the study to provide status updates of this Preliminary Design Study. The initial Newsletter was mailed to over 1,400 recipients prior to the public meeting in November 2017. The second newsletter was mailed in advance of the February 2018 Local Planning Agency Public Hearing and the third newsletter was mailed in advance of the March 2018 Board of County Commissioners public hearing.

Copies of the previously issued newsletters are provided in Appendix B. A fourth and final newsletter will be issued at the conclusion of the study.


Sunbridge Parkway
STUDY

Public Meeting

Orange County Transportation Planning Division has initiated a Preliminary Design Study for Sunbridge Parkway from south of Aerospace Parkway/Dowden Road to the Orange/Osceola County line. The purpose of this study is to assess current and future travel demand in the area and identify roadway improvements along this corridor.

We invite you to attend the public meeting to review the improvement concept that is under consideration. The meeting is scheduled for *Thursday, November 30 in the cafetorium at Lake Nona Middle School, located at 13700 Narcoossee Road, Orlando, Florida, from 6:00 - 7:00 p.m.*

The meeting will begin with an open house at 6:00 p.m. At 6:15 p.m. there will be a formal presentation followed by a question-and-answer forum. Aerial maps, potential improvements and other project-related information will be available for your review and comment. The Orange County Study Team will be available to discuss the project and answer any questions. Meeting information will also be posted on the County's website.

Orange County Mayor Mayor Teresa Jacobs

Orange County District 4 Commissioner Jennifer Thompson

ORANGE COUNTY GOVERNMENT

Newsletter
Issue No. 1 | November 2017

On behalf of Mayor Teresa Jacobs and District 4 Commissioner, Jennifer Thompson, Orange County is pleased to update you about the Sunbridge Parkway Preliminary Design Study.

Ways to Stay Informed

A key component of this study is the public involvement process. As part of this study, the County is hosting a public meeting to exchange information and obtain feedback from stakeholders and the general public.

Public Meeting

Thursday, November 30
6:00 – 7:00 p.m.
(presentation at 6:15 p.m.)
Lake Nona Middle School
(cafetorium)
13700 Narcoossee Road
Orlando, Florida

Public Hearings

Public hearings before the Local Planning Agency and the Board of County Commissioners are anticipated to occur in the last quarter of 2017 and the first quarter of 2018.

Visit our website for more information! www.ocfl.net/TrafficTransportation/TransportationProjects

b) PUBLIC MEETINGS

Public meetings were held as listed below to exchange information with interested parties.

Copies of the mailing list and public notices are provided in Appendix C.

Small Group Meeting: A small group meeting occurred on November 10, 2017, at 1:30 p.m. at the offices of Tavistock Development Company 6900 Tavistock Lakes Boulevard, Suite 200,

Orlando 32827. A copy of the attendees' sign-in sheet together with meeting minutes are provided in Appendix D.

Public Information Meeting: A Public Information Meeting occurred on November 30, 2017, at 6:00 p.m. in the cafetorium at Lake Nona Middle School, 13700 Narcoossee Road, Orlando, 32832. Orange County Staff presented the Recommended Improvement Concept at that time. A copy of the attendees' sign-in sheet together with written comments from the public and the County responses are presented in Appendix E.

Orange County Local Planning Agency (LPA) Work Session: A work session before the Orange County LPA was held on December 21, 2017, at 10:00 a.m. in the Orange County Board of County Commissioners' chambers. No official minutes were published for this work session.

Orange County Board of County Commissioners (BCC) Work Session: A work session before the Orange County BCC was held on March 6, 2018, at 2:00 p.m. in the Orange County Board of County Commissioners' chambers. No official minutes were published for this work session.

c) Public Hearings

Orange County LPA Public Hearing: A public hearing before the Orange County LPA to consider the recommended design concept was held on February 15, 2018, at 9:00 a.m. in the Orange County Board of County Commissioners' chambers. One member of the public spoke in support of the roadway corridor and made the following requests for consideration as the project proceeds into final design:

- The Lake Mary Jane Alliance desires that the land between proposed roadway corridor and Roberts Island Slough be placed in permanent conservation;
- The County's Environmental Land Stewardship Program should endeavor to maintain significant wildlife connections to the TM Econ Mitigation Bank and the Hal Scott Preserve.

The LPA voted unanimously to find the Sunbridge Parkway Preliminary Design Study consistent with the comprehensive plan and recommend approval of the study to the Orange County BCC.

Orange County BCC Public Hearing: A public hearing before the Orange County BCC to consider approval of this study and the recommended improvement concept is tentatively scheduled for March 20, 2018.

d) Utility Company and Regulatory Agency Coordination

Initial contacts and coordination to inform utility companies having facilities and regulatory agencies having authority in the project area have been conducted to solicit input. The

companies and agencies contacted are listed below; copies of the correspondences are provided in Appendix F.

- South Florida Water Management District (SFWMD);
- Orange County Utilities Department (OCU);
- Orange County Environmental Protection Department (OCEPD);
- Osceola County Community Development Department (Osceola);
- United States Fish & Wildlife Service (USFWS);
- U.S. Army Corps of Engineers, (USACOE);
- Florida Department of Environmental Protection (FDEP);
- Florida Fish & Wildlife Conservation Commission (FWC);
- Orange County Public Schools (OCPS);
- Orange County Fire Rescue (OCFR);
- Central Florida Expressway Authority (CFX);
- Florida Department of Transportation (FDOT);
- Florida's Turnpike Enterprise (FTE);
- Orlando Utilities Commission (OUC);
- Florida Gas Transmission (FGT);
- TECO Peoples Gas (TECO);
- Duke Energy.

A second round of coordination was initiated as the Recommended Improvement Concept Map evolved to address potential conflicts and future needs in a more specific and targeted manner. Copies of the meeting minutes are provided in Appendix F.

IV. Existing Conditions

The Recommended Alignment is located in generally vacant property. However, there are several existing conditions affecting the selection of the recommended alignment. These can be divided into five groups of constraints: the OUC railroad, existing utilities, land ownership, environmental management (wetlands and wildlife) and existing and planned roadways that will intersect the Parkway. Improvements within the corridor include the OUC Railroad within its 300 wide right-of-way and various utility facilities and easements, typically located in the vicinity of the railroad.

a. Physical Constraints

1. Railroad

   The OUC railroad runs southwest-northeast across the roadway corridor within a 300-foot wide right-of-way. It is desirable to cross the railroad bed at as close to perpendicular as possible. An at-grade crossing will require proper markings, signage and protective equipment. Long term, it is possible that a bridge crossing will be required if warranted by additional traffic. As it is recommended that adequate right-of-way to accommodate the bridge crossing be acquired in the initial right-of-way acquisition, it is included and accounted for in this report.

2. Existing Utilities

   Existing utilities that may affect the roadway design include (See Figure IV-1, Existing and Proposed Utility Map):

   - OUC 230 kV electric transmission facilities (lines and towers): The existing transmission facilities run within an existing 300-foot wide OUC right-of-way, generally parallel to the existing railroad.
   - OCU potable water main: A 24-inch DIP water main runs along the north side of the OUC railroad right-of-way in a 30-foot wide sewer and water line easement adjacent to the railroad right-of-way. The Sunbridge Parkway corridor crosses the main in the vicinity of the anticipated roadway/railroad crossing.
   - OCU wastewater force main: A 16-inch PVC force main runs along the north side of the OUC railroad right-of-way in a 30-foot wide sewer and water line easement adjacent to the railroad right-of-way. The Sunbridge Parkway corridor crosses the main in the vicinity of the anticipated roadway/railroad crossing.

- Florida Gas Transmission Company high pressure gas transmission system and facilities: A gate station is located at the south side of the roadway corridor and two gas transmission mains cross the roadway corridor in the vicinity of the anticipated roadway/railroad crossing. A 26-inch high pressure (975 psi) main runs generally east-west (south of and adjacent to the Duke Energy easement) and extends to Florida Power and Light's Cape Canaveral Clean Energy Center as its sole source of fuel. This main is valved in and around the gate station, including a blow down valve and metering facility. A 16-inch main runs along the east side of the OUC railroad right-of-way and extends to OUC's Curtis Stanton Energy Plant as a secondary source of fuel.
- TECO gas distribution system facilities: Extending from the gate station and crossing the Sunbridge Parkway corridor are one 6-inch main running northeasterly in a 10-foot wide easement on the north side of the railroad right-of-way (adjacent to the 30-foot wide sewer and water line easement; see above).
- Duke Energy 96 kV electric transmission facilities (lines and poles): The overhead line runs generally east-west within a 55-foot wide easement, crossing the Sunbridge Parkway corridor near the anticipated roadway/railroad crossing.
- City of Cocoa potable water supply well sites and raw water mains: The City of Cocoa has nine (9) well sites, both fee simple and within easements, generally running along the roadway corridor study area. The raw water main runs between these sites, generally along the property lines, and continues easterly to the City of Cocoa's Claud H. Dyal water treatment plant. The roadway corridor crosses the main at the IWE/ICP property boundary.

In addition to the listed existing utilities, proposed potable water, wastewater and reclaimed water utility lines are depicted on the Existing and Proposed Utilities Map; however, these are not anticipated to be funded with the road construction are not included in the PDS project scope or cost projections.

The proposed electric power distribution, telecommunications line extensions and gas main extensions noted on the Existing and Proposed Utilities Map are similarly not anticipated to be funded with the road construction and are not included in the PDS project scope or cost projections.

FIGURE IV-1: EXISTING & PROPOSED UTILITIES

3. Land Ownership

   The most significant element controlling the roadway alignment is the commonly agreed upon objective that the road right-of-way lands shall be obtained from lands controlled by Tavistock. The current Owners of these lands include: Suburban Land Reserve, Inc.; Farmland Reserve, Inc.; Central Florida Property Holdings 100, LLC; and

Central Florida Property Holdings 200, LLC. Additionally, there are nine (9) City of Cocoa water supply well sites located along the corridor, seven (7) of which are on sites owned by the City of Cocoa and two (2) of which are within easement areas. (See Figure IV-1, Existing and Proposed Utility Map). The selected alignment must provide sufficient wellhead protection in accordance with State, County and City of Cocoa requirements.

Fee ownership of the land underlying the privately gated portion of Wewahootee Road in the vicinity of the recommended roadway corridor appears to be vested in Suburban Land Reserve, Inc. and Central Florida Property Holdings 100, LLC. This interpretation was made utilizing title information obtained in connection with the preparation of sketches of description for the proposed ROW&E, as described in the Road Agreement for Sunbridge Parkway (see Appendix A). Future dedication of ROW&E to Orange County will need to accommodate existing easement rights associated with existing utility facilities (e.g., City of Cocoa, Sprint, etc.). Access rights benefiting individuals that were created by the Wewahootee Road Easement Agreement (ORB 5761, PG 3567) terminate roughly 600 feet west of the proposed west right-of-way line of Sunbridge Parkway and therefore do not appear to affect the proposed right-of-way dedication.

Although the fee ownership of the lands from which ROW&E are to be acquired resides with the parties to the Roadway Agreement, the roadway corridor is affected by several existing easements and/or rights-of-way associated with existing utility facilities and the existing OUC railroad that benefit other parties. There is no alternative alignment that would provide a roadway corridor connecting the proposed end of Segment 1 to the proposed roadway network within Osceola County's Northeast District that does not cross these existing easements and/or rights-of-way. Therefore, an alternatives analysis will not produce an alignment that avoids the impact of these encumbrances. The proposed alignment minimizes the impact to these easements and/or rights-of-way to the greatest extent practicable.

4. Environmental Management

   Environmental constraints are imparted by the requirement for avoidance and minimization of impacts to the existing wetland areas and wildlife corridors. The recommended alignment for Sunbridge Parkway is located within the Innovation Way Overlay of the Orange County Comprehensive Plan. Extensive planning efforts, including consideration of the goals, policies, and objectives of the Innovation Way Overlay and the associated Environmental Land Stewardship Program (ELSP) Ordinance, were undertaken to identify and direct the siting of the Parkway alignment in order to minimize its impact to sensitive environmental areas including wildlife corridors. See Figure IV-2.

5. Roadway Intersections

   Roadway Intersections with Sunbridge Parkway that will affect the alignment and the access management plan include:

   - Wewahootee Road (Private Road);
   - Innovation Way South (Proposed);
   - Various entry drives serving City of Cocoa water supply well sites;
   - TM Ranch Road;
   - Access road to Holland Ranch;
   - Various access drives to adjacent ranch lands;
   - Osceola County/Northeast District proposed alignment of Sunbridge Parkway.

   A more detailed discussion of these major physical controls governing the recommended alignment is as follows (Proceeding southerly from the southern end of Sunbridge Parkway – Segment 1. See Figure IV-3, Corridor Constraints for location references):

6. Ranching Operations

   It is desirable to minimize the adverse impact to ongoing Ranch operation's by maximizing contiguous available pasture east of the roadway corridor. A consequential benefit of such an alignment is the minimization of available pasture lands to the west of the corridor adjacent to Robert's Island Slough, thereby providing greater protection of the slough from the impacts of cattle grazing.

   <u>Segment 2</u>

   - Orlando Utilities Commission (OUC) 300-foot wide right-of-way containing both railroad facilities (tracks and appurtenances) and 230 kV electric transmission facilities (lines and towers). The crossing of the railroad will initially be at grade and as near to perpendicular as possible. Consideration must also be given to the projected future need for a grade separated crossing, although such a need is not anticipated to occur within the long term (design year 2040) study period.
   - Orange County Utilities (OCU) potable water main adjacent to the OUC right-of-way.
   - OCU wastewater force main adjacent to the OUC right-of-way.
   - Florida Gas Transmission Company high pressure gas transmission system easements and facilities, including metering station, blow-down and other appurtenances.
   - TECO gas distribution system easements and facilities.
   - Duke Energy (fka Florida Power Corp) easements and 96 kV electric transmission facilities (lines and poles).
   - Limited boundary contiguity between ICP and IWE (574± feet).
   - City of Cocoa potable water supply well sites and raw water mains.

- Wetlands and wildlife corridors – avoid/minimize impacts and conform to the intent of the Orange County Environmental Land Stewardship Program (ELSP).
- Near perpendicular orientation to Innovation Way South, which enters IWE from the adjacent Master Planned Community of Camino Reale.

Segment 3

- Wetlands and wildlife corridors – avoid/minimize impacts and conform to the intent of the Orange County Environmental Land Stewardship Program (ELSP).
- City of Cocoa potable water supply well sites and raw water mains.
- Limited boundary contiguity between IWE and CRS (931± feet).

Segment 4

- The Disston Canal, which separates segments 3 and 4, must be crossed in a manner that does not impede the function of the canal.
- The entirety of Segment 4 is subject to the horizontal curve design guidelines for a 60 mph design speed.
- The entire segment length is also subject to consideration of a possible future electric power transmission easement along the west side of the corridor.
- The northern portion of this segment is constrained by three City of Cocoa potable water supply well sites and raw water mains.
- Wetlands and wildlife corridors – avoid/minimize impacts and conform to the intent of the Orange County Environmental Land Stewardship Program (ELSP).
- Consideration should be given to the use of the adjacent lands for cattle pasture or other agricultural pursuits, maximizing the contiguous area of available land in order to minimize the impact of the road on agricultural operations.
- The bend to the southwest at the southern end of the segment should be located to minimize impacts to Roberts Island Slough by crossing in the approximate location of an existing roadway crossing.
- The proposed roadway corridor should be aligned to be consistent with the approved master plan for the portion of Sunbridge lying within Osceola County (aka The Northeast District).

FIGURE IV-2: ELSP LAND AND WILDLIFE CORRIDORS

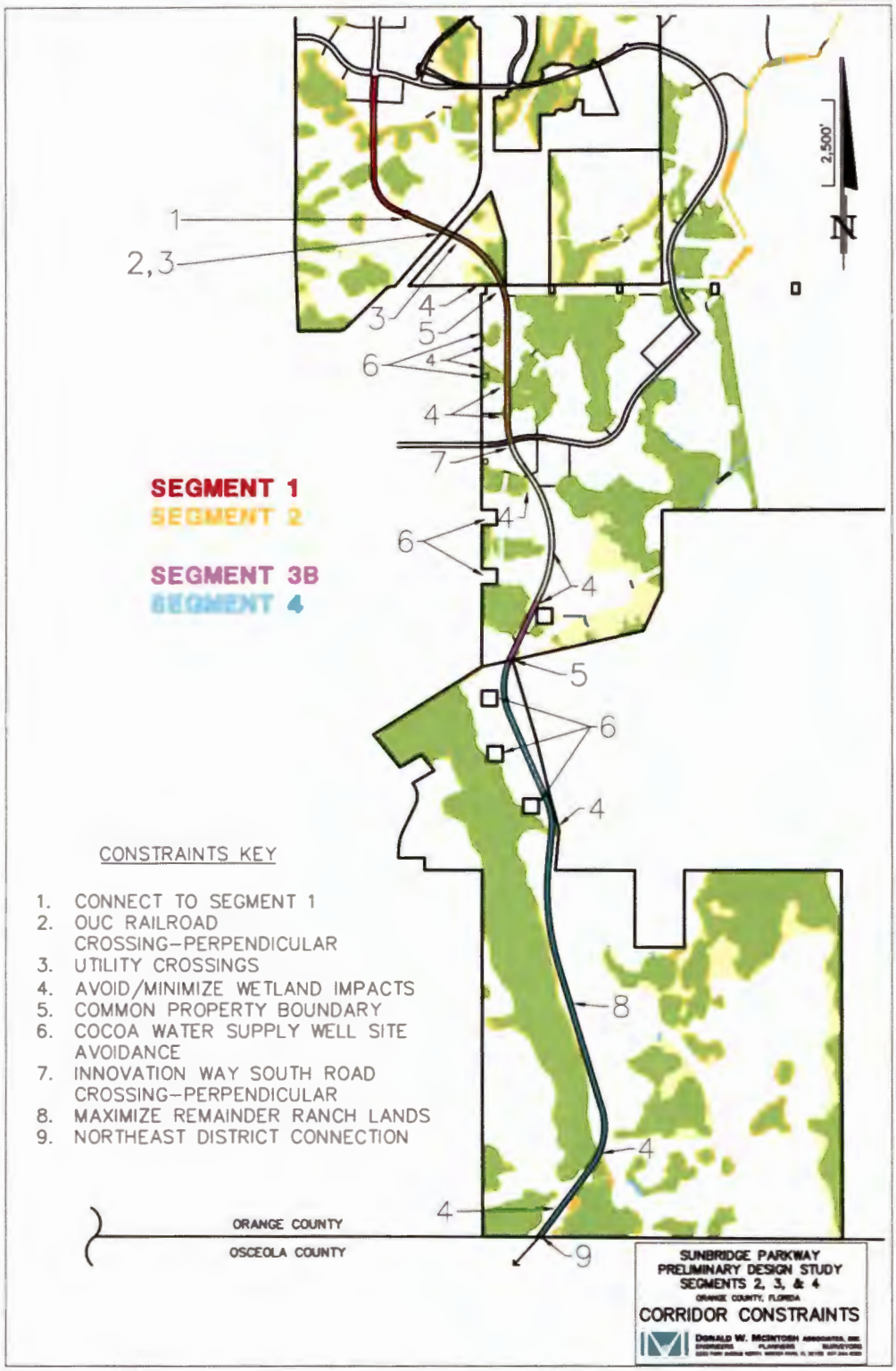


FIGURE IV-3: CORRIDOR CONSTRAINTS

In addition to the physical constraints affecting the alignment of the roadway, there are also design constraints detailed in the Orange County Code and in the Florida Department of Transportation Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways ("Florida Greenbook") to which the roadway design must adhere.

City of Cocoa Well Sites – Wellhead Protection Zones

A 500-foot diameter wellhead protection zone as set forth in Chapter 62-521, Florida Administrative Code (FAC) exists at each of the nine (9) City of Cocoa wells located along the study corridor. These protection zones preclude certain uses that have been deemed by the State of Florida to be potential sources of contamination, and are therefore prohibited within the protection zone. None of the uses/actions defined in 62-521.400 FAC as prohibited or requiring additional defined compliance measures are proposed within the right-of-way.

Orange County Comprehensive Plan policies PW2.1.9 and AR 2.1.7 both provide for the protection of potable water wells. However, nothing in these policies appears to prohibit or in any way restrict the construction of a road that is at least 200 feet from the wellhead. Based on guidance received from the Orange County Attorney's Office, the construction of a roadway within the 500-foot zone is not considered a violation of the protection zone.

Finally, the City of Cocoa has stated that they prohibit development of any kind within 150 feet of the wellhead.

b. Geotechnical Conditions

Refer to Preliminary Report Geotechnical Engineering Services, Sunbridge Parkway PDS dated October 26, 2017 by Professional Services Industries, Inc. (PSI) (Appendix G)

PSI reported that typical soils in the three strata identified area suitable as select fill with the qualifications that soils from strata 2 may retain excess moisture and be difficult to compact and the cemented sands in strata 3 must be fully pulverized/crushed.

Muck probes performed in the wetland areas along the alignment generally encountered compressible organic soils ranging from 0 to 4 feet in thickness. Compressible soils on the order of 5 to 7 feet in thickness were encountered at a limited number of locations. Subsoil excavation to remove organic soils should be anticipated where the roadway crosses wetland areas.

Groundwater levels encountered in the Standard Penetration Tests (SPTs) and auger borings generally ranged from 0 to 5 feet below the existing grade, with a majority of the groundwater depths ranging from 1 to 3.5 feet below existing grade. The average wet season water level for use in designing the wet bottom ponds is anticipated to be 1 foot below the estimated normal seasonal high groundwater elevations. Excavation of stormwater management ponds, compensating storage areas and deeper utility and drainage trenches will require dewatering.

Very dense sands and cemented sands (jointly referred to hereafter as "hardpan") were encountered during the field exploration over almost the entire length of the corridor and may be encountered at other locations along the roadway alignment and in the pond locations between and away from PSI's borings. The contractor should be prepared to use special equipment and or procedures to facilitate excavations, dewatering and other earthwork operations.

Based on the review of available data, it is PSI's opinion the project area is at a low risk for future sinkhole development.

c. Environmental Site Assessment

See Contamination Screening Evaluation Report dated July 28, 2017 by Professional Services Industries, Inc., Appendix H.

Based on PSI's review of the EDR Radius Map Report, site reconnaissance, aerial photograph review, city directory review, interviews, and file review conducted on the FDEP's on-line database, they report that "no High or Medium Risk sites were identified within the study area extending 250 feet in all directions of the study corridor centerline and five pond locations. "One Low Risk site [the OUC railroad crossing] was identified within the study corridor" (See Figure IV-4). PSI concludes that, based on investigation of the property for evidence of potential contamination issues and other environmental issues, "no additional assessment appears warranted at this time."

d. Cultural Resource Assessment Survey

See Desktop Analysis of the Sunbridge Parkway and Ponds for the Preliminary Design Study dated August, 2017 by SEARCH, Inc., Appendix I.

SEARCH reports one potential historic site within the study area, a 1960 single–family residence, shed and barn (referenced from the Property Appraiser's website). This site is located within the proposed right-of-way and would be impacted by the roadway. The Disston Canal is also noted as a historic linear resource. The previously recorded and not previously recorded sites identified by SEARCH are mapped on Figures IV-6, Figure IV-7 and IV-8.

SEARCH recommends evaluation of the Disston Canal, unimproved roads and the 1960 single-family residence for historic significance. Search also states that there is moderate probability of encountering intact historic or prehistoric archaeological deposits in the portions of the project area with moderately well drained to somewhat poorly drained soils.

SEARCH concludes that "during the [water management district] permitting process, the permit application will be reviewed by the Florida Division of Historical Resources (FDHR) under the legal authority of Chapter 373, Florida Statutes. Given the presence of recorded and unrecorded cultural resources in the vicinity of the project, it is the opinion of SEARCH that FDHR is likely to request that a Phase I cultural resource assessment survey (CRAS) be conducted of the project Area of Potential Effect "APE" and that if the project would "result in an adverse effect to an NRHP-eligible resource, it would be necessary to develop a mitigation strategy in consultation with FDHR."

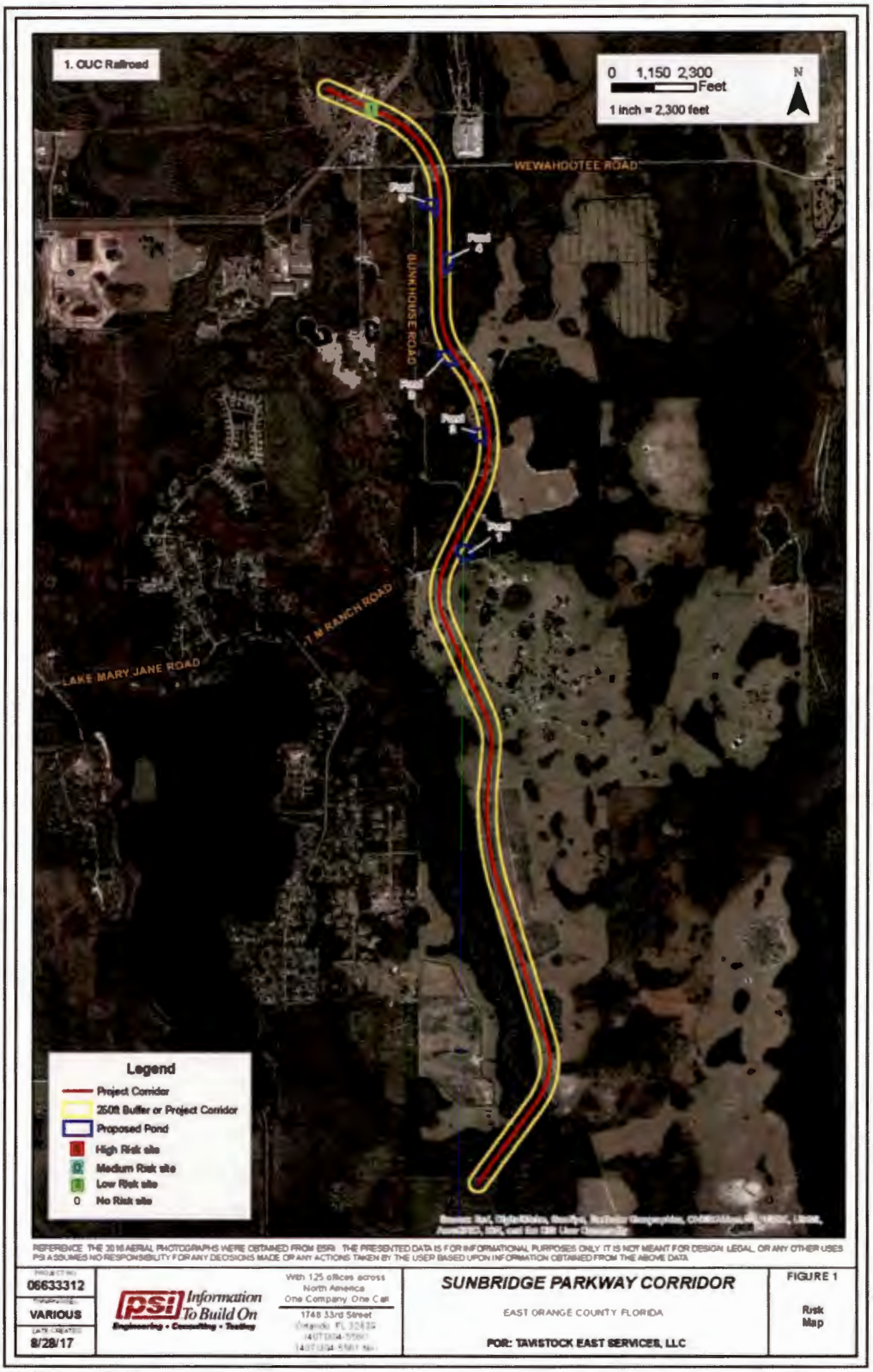


FIGURE IV-4: SITE CONTAMINATION RISKS

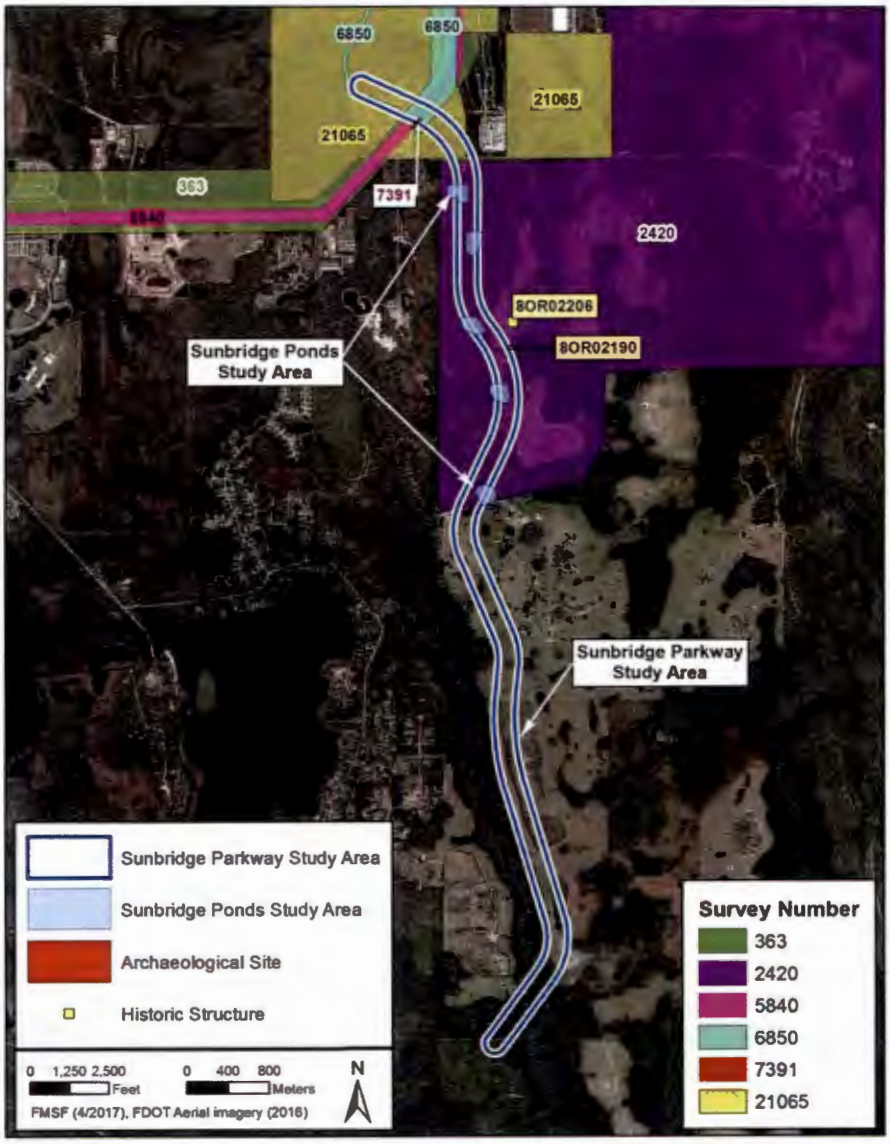


Figure 2. Previous cultural resource surveys intersecting the Sunbridge Parkway and Ponds study areas and previously recorded cultural resources in the study area vicinity.

FIGURE IV-5: PREVIOUS CULTURAL RESOURCES AND SURVEYS

Figure 3. Potential historic buildings that have not been recorded within the Sunbridge Parkway and Ponds study areas.

FIGURE IV-6: POTENTIAL HISTORIC BUILDING

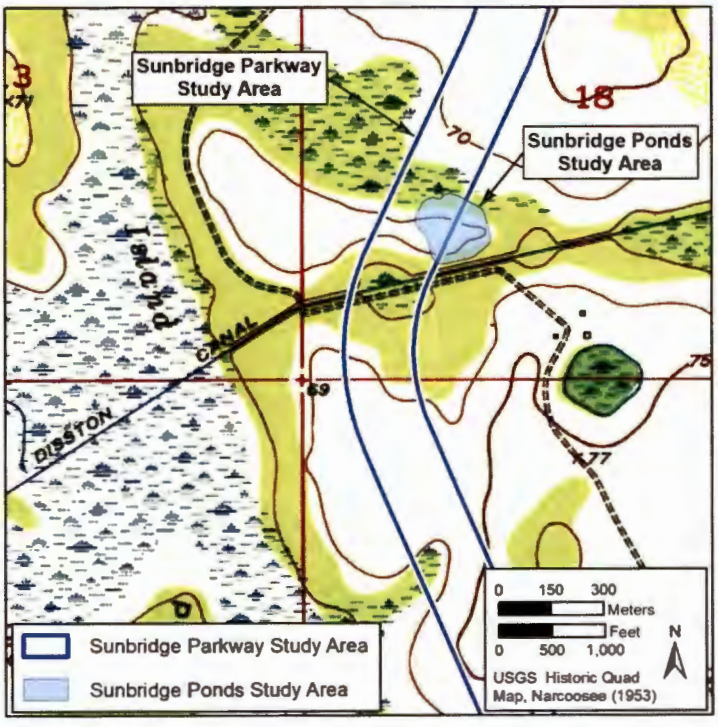


Figure 4. Unrecorded Disston Canal within the Sunbridge Parkway and Ponds study areas.

FIGURE IV-7: DISSTON CANAL, POTENTIAL CULTURAL RESOURCE SITE

e. Hydrologic and Natural Features

See Preliminary Design Study, Environmental Considerations dated July 25, 2017, by Breedlove Dennis & Associates, Inc., Appendix J, and Hydrologic and Natural Features report dated July 31, 2017 by DWMA, Appendix K.

a. Wetlands:

Jurisdictional limits of wetlands occurring within the study area north of Disston Canal have been approved by the Orange County Environmental Protection Division (OCEPD), the associated water management districts including South Florida Water Management District (SFWMD) and St. Johns River Water Management District (SJRWMD), and the Department of the Army, Corps of Engineers (USACOE). Wetlands occurring south of Disston Canal have been approved through OCEPD.

The selected roadway alignment will result in encroachment impacts to several of the existing wetland strands throughout the alignment corridor. Mitigation will be required.

The wetland mapping is presented in Figures IV-8 through IV-19.

b. Critical and Strategic Habitat Impacts

As reported in BDA's Environmental Considerations report there are no significant (Priority 1 or 2) strategic habitat areas is in the recommended roadway corridor. See Figure IV-20.

c. Stormwater and Natural Drainage Patterns:

See Conceptual Drainage, Floodplain Impact Analysis, Pond Siting Report dated October 2017, by DWMA, Appendix L (Stormwater Report) and Hydrologic and Natural Features report dated July 31, 2017 by DWMA.

The project is located within both the St. Johns River Water Management District and the South Florida Water Management District. Stormwater management will be subject to the applicable regulations of both Water Management Districts and Orange County.

The project area generally drains into two major water bodies, Lake Hart to the west and the Econlockhatchee River to the east. Runoff flowing east travels through a series of wetlands to the Econlockhatchee River Swamp, eventually reaching the Econlockhatchee River. A small portion of the southern end of the road drains to the Myrtle/Joel/Preston chain of lakes, which discharge into Lake Mary Jane and Lake Hart.

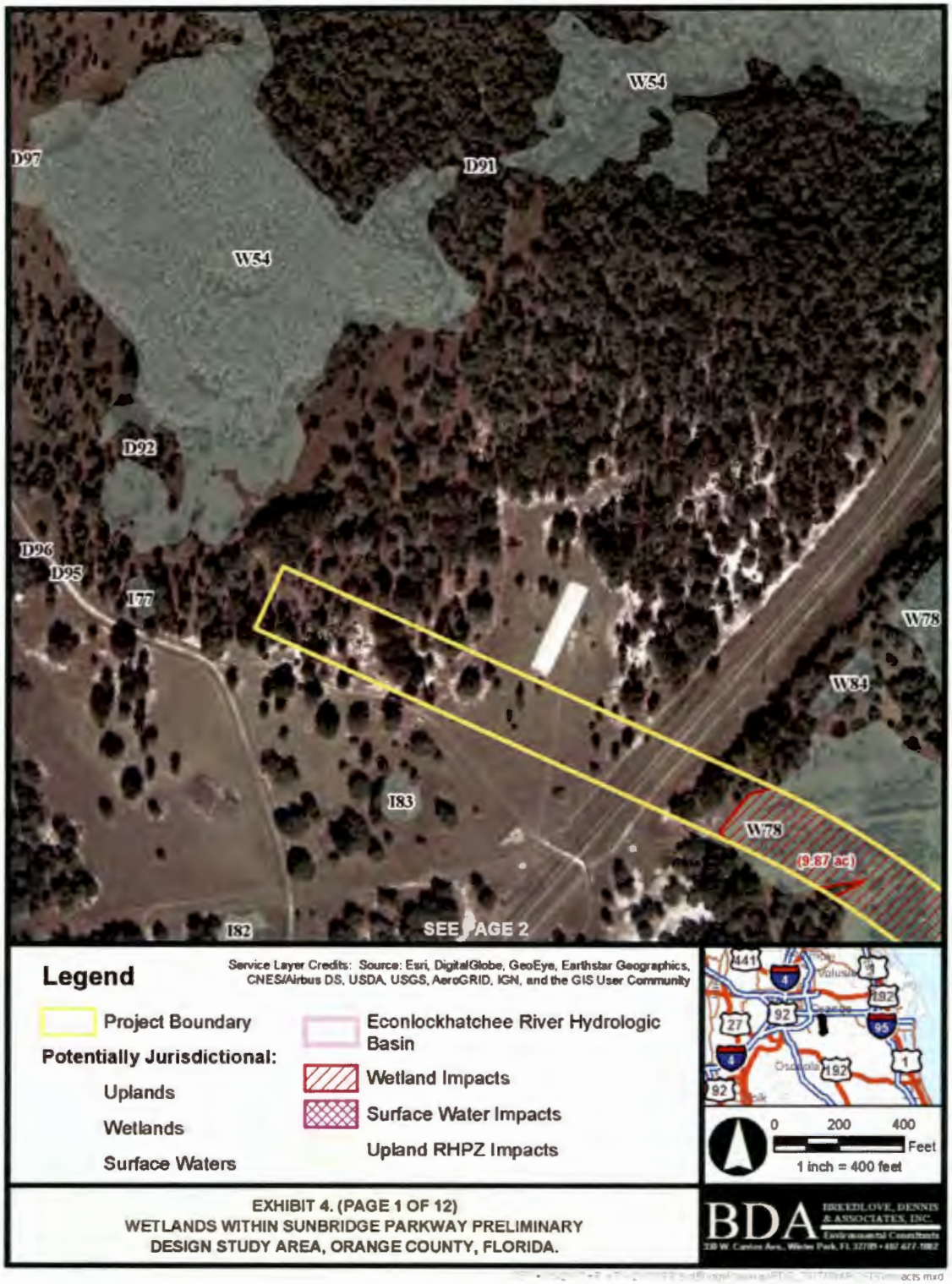


FIGURE IV-8: WETLANDS 1

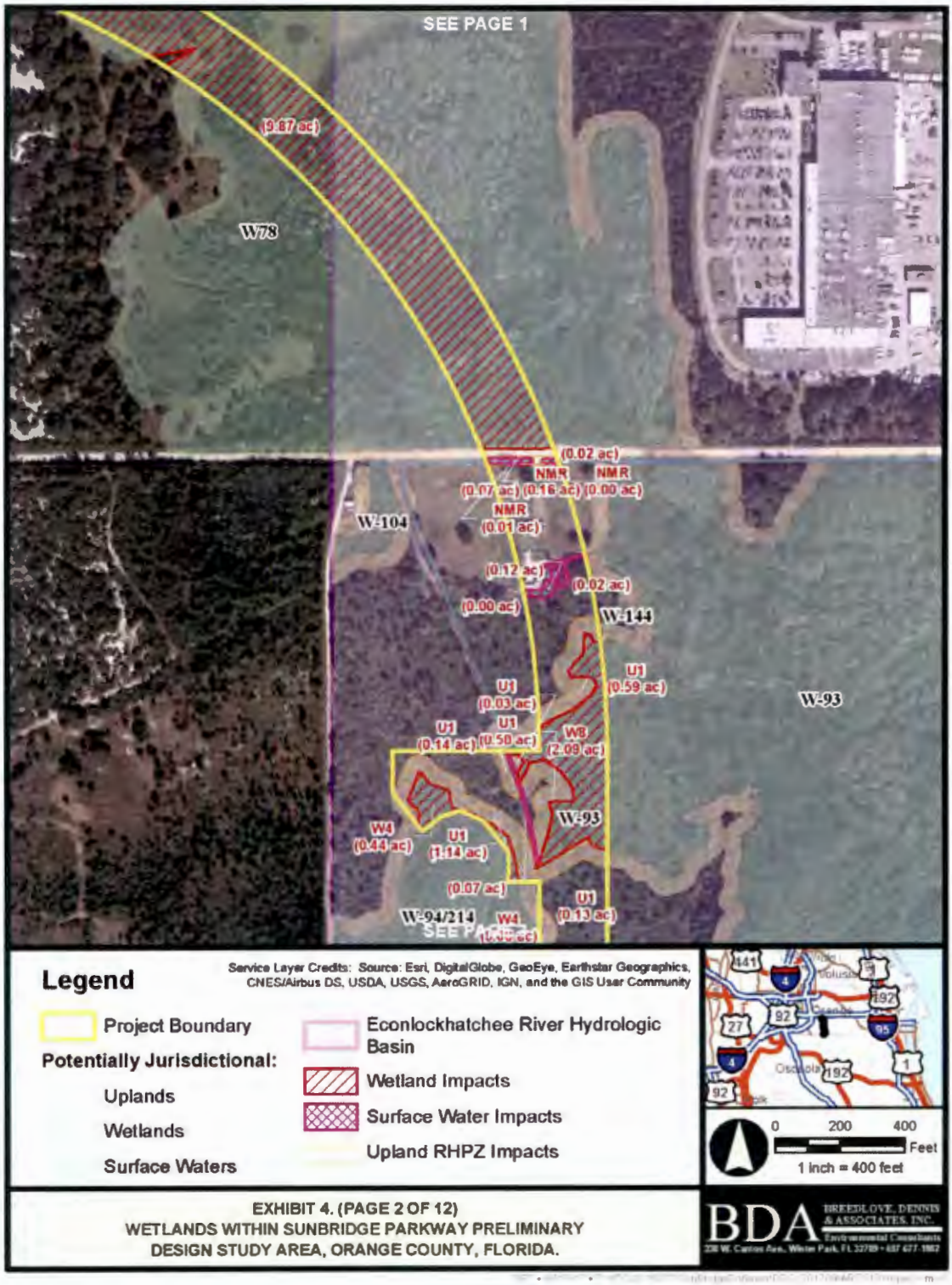


FIGURE IV-9: WETLANDS 2

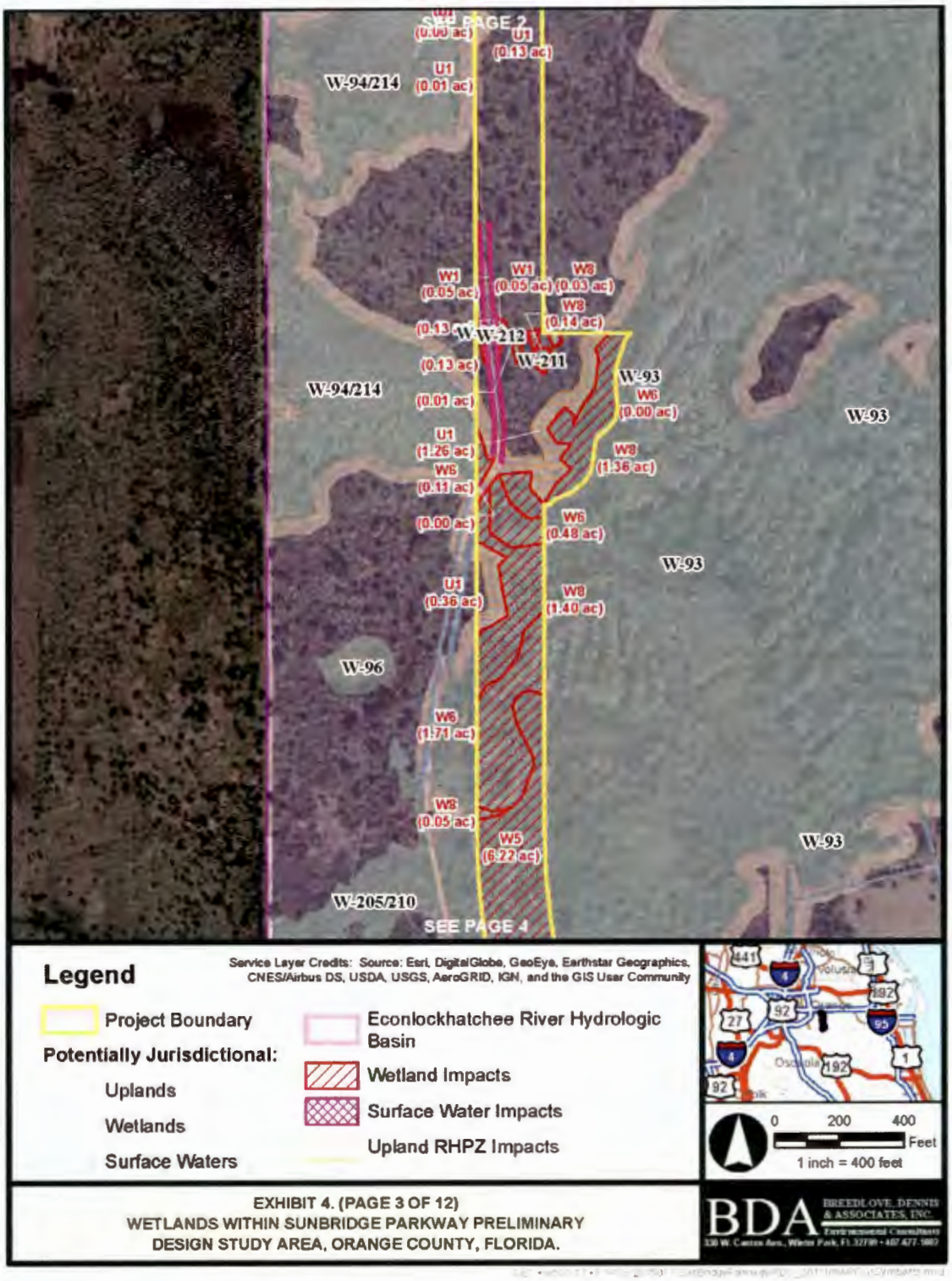


FIGURE IV-10: WETLANDS 3

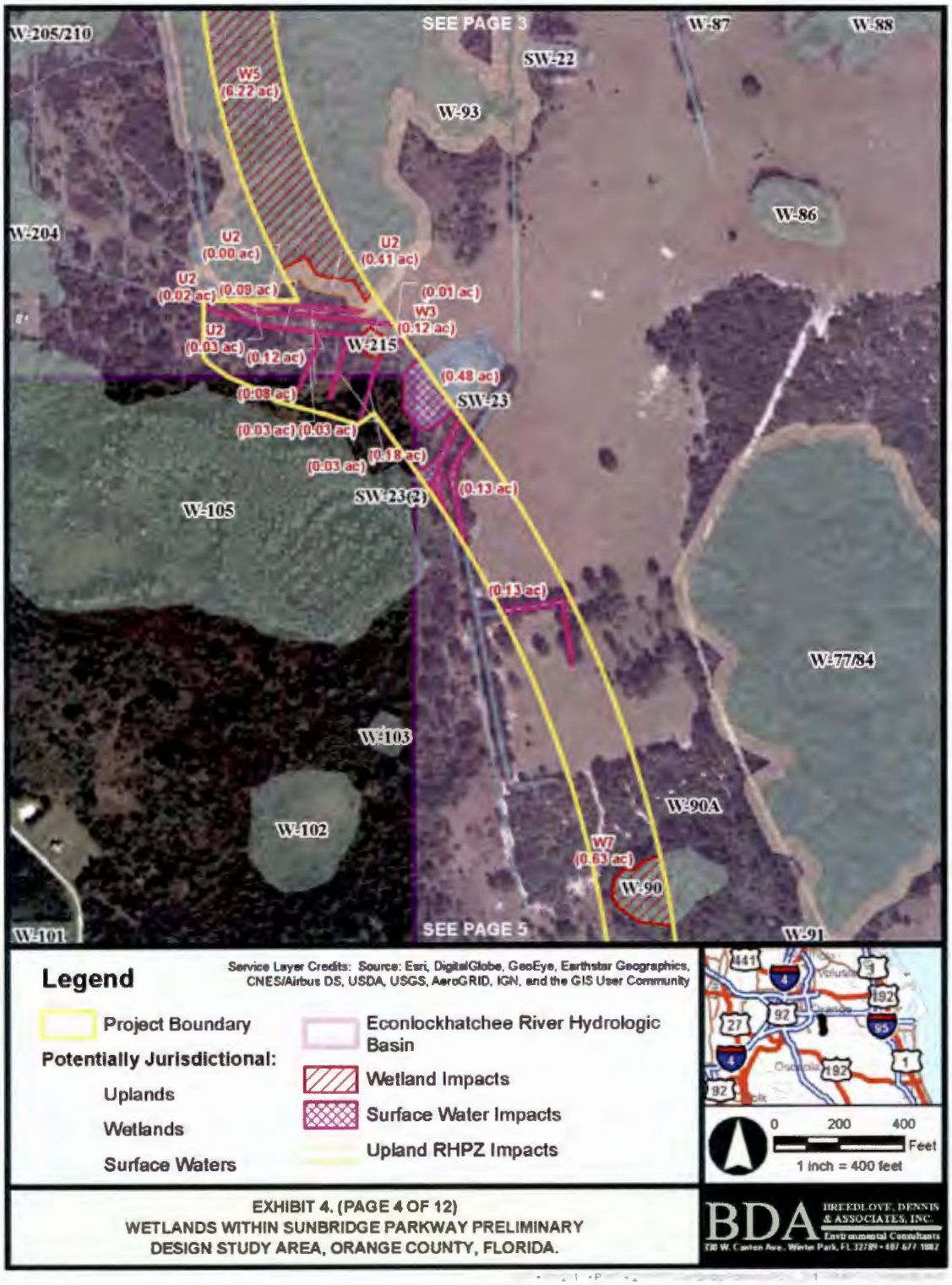


FIGURE IV-11: WETLANDS 4

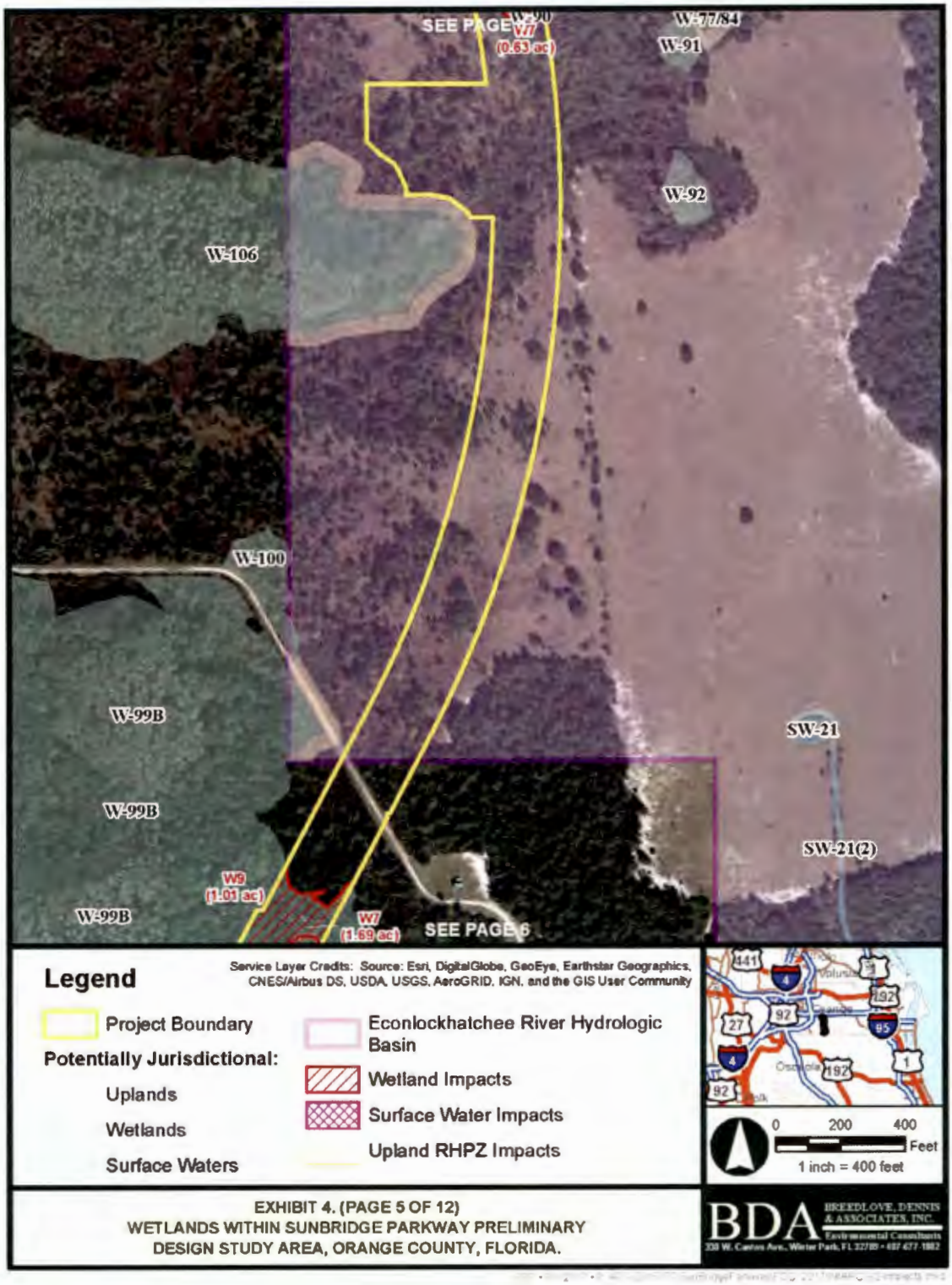


FIGURE IV-12: WETLANDS 5

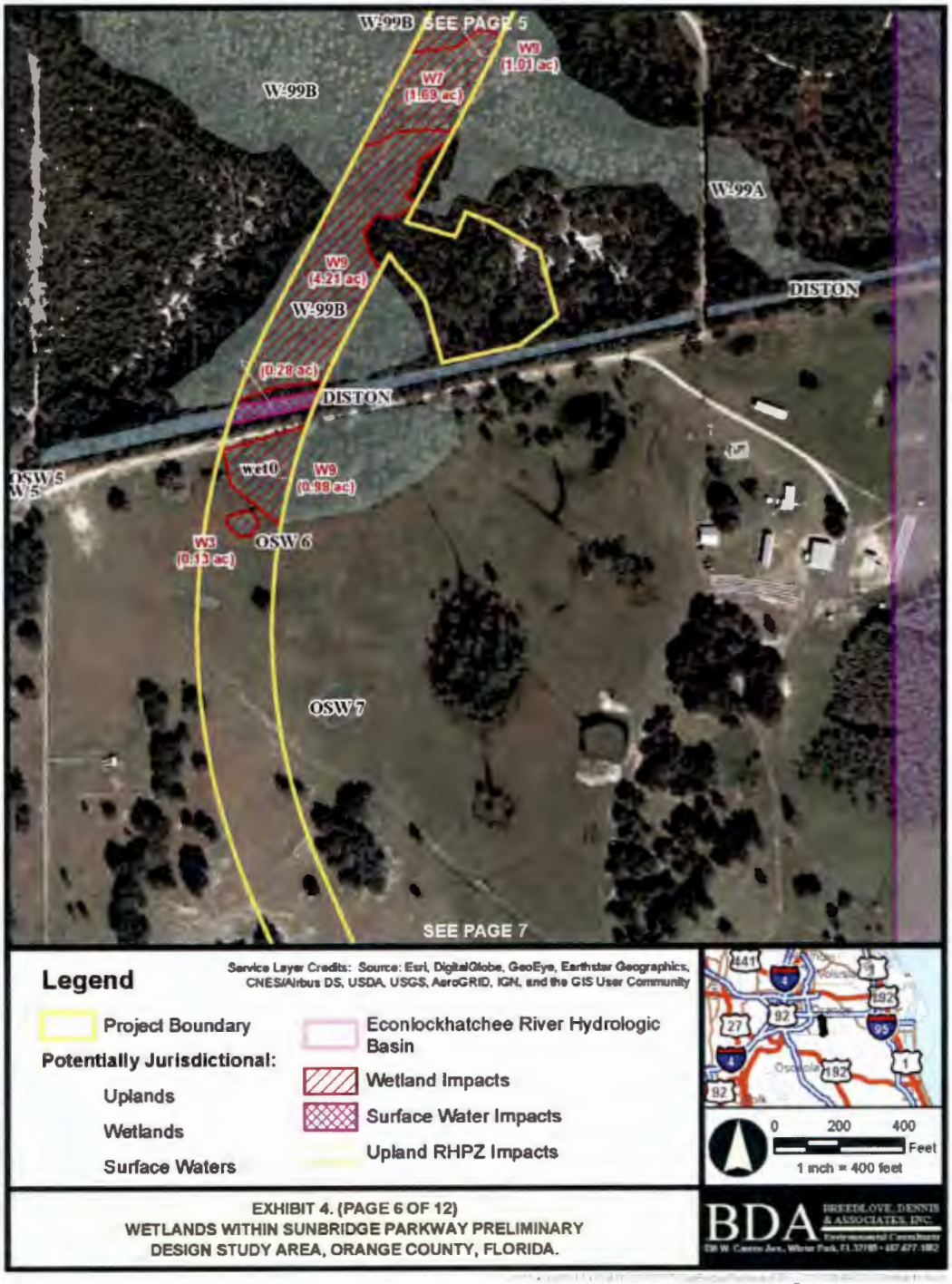


FIGURE IV-13: WETLANDS 6

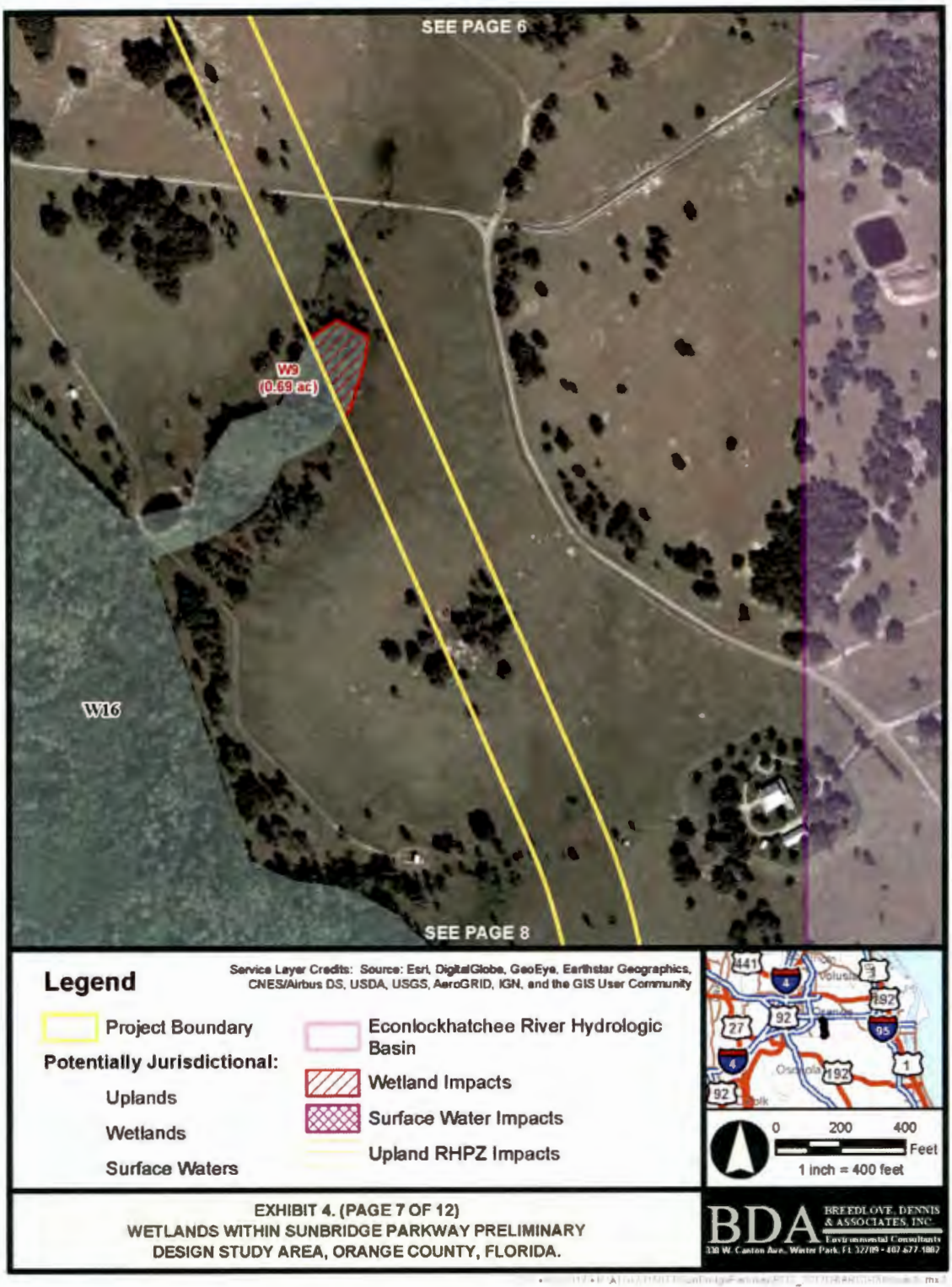


FIGURE IV-14: WETLANDS 7

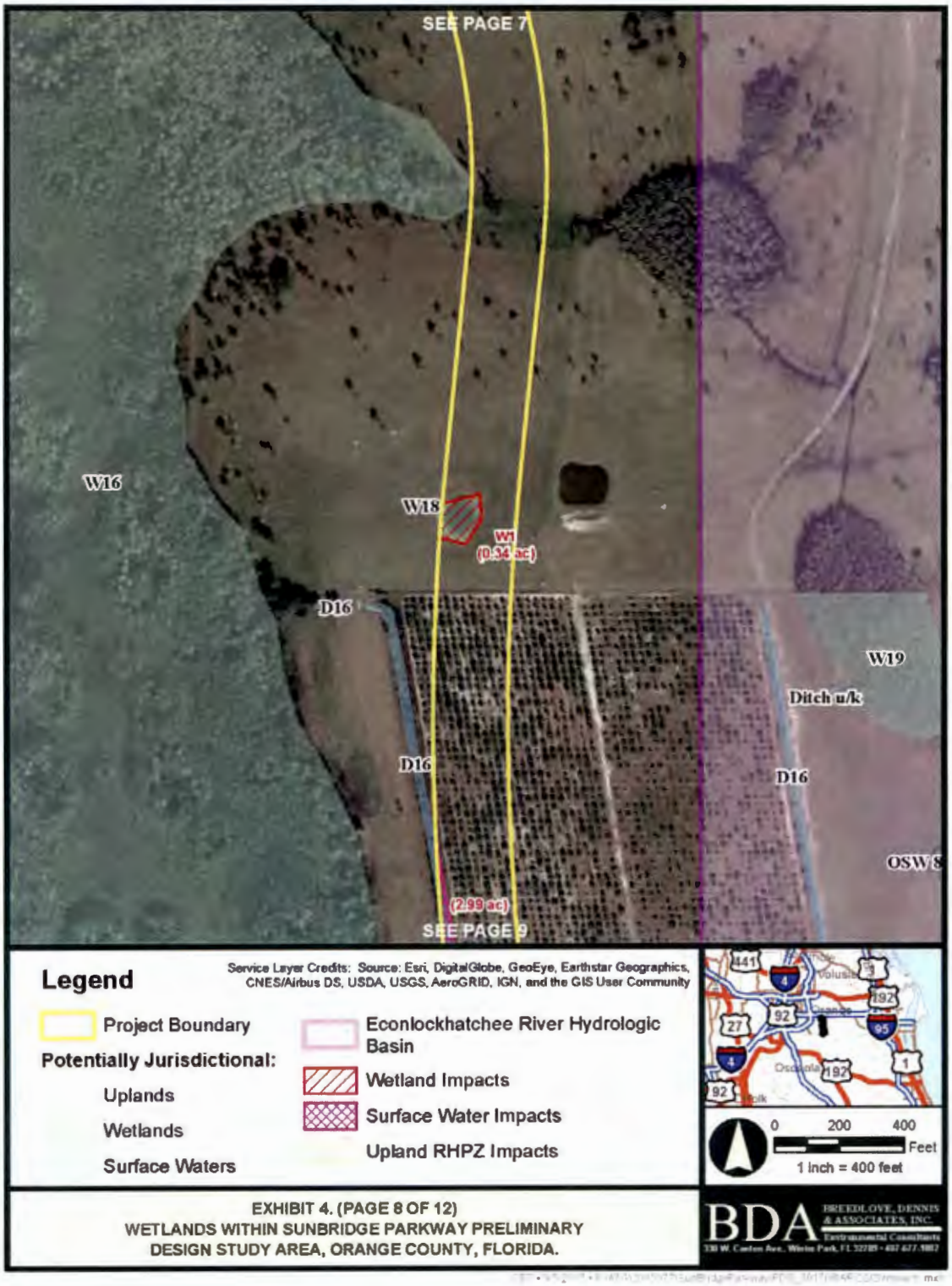


FIGURE IV-15: WETLANDS 8

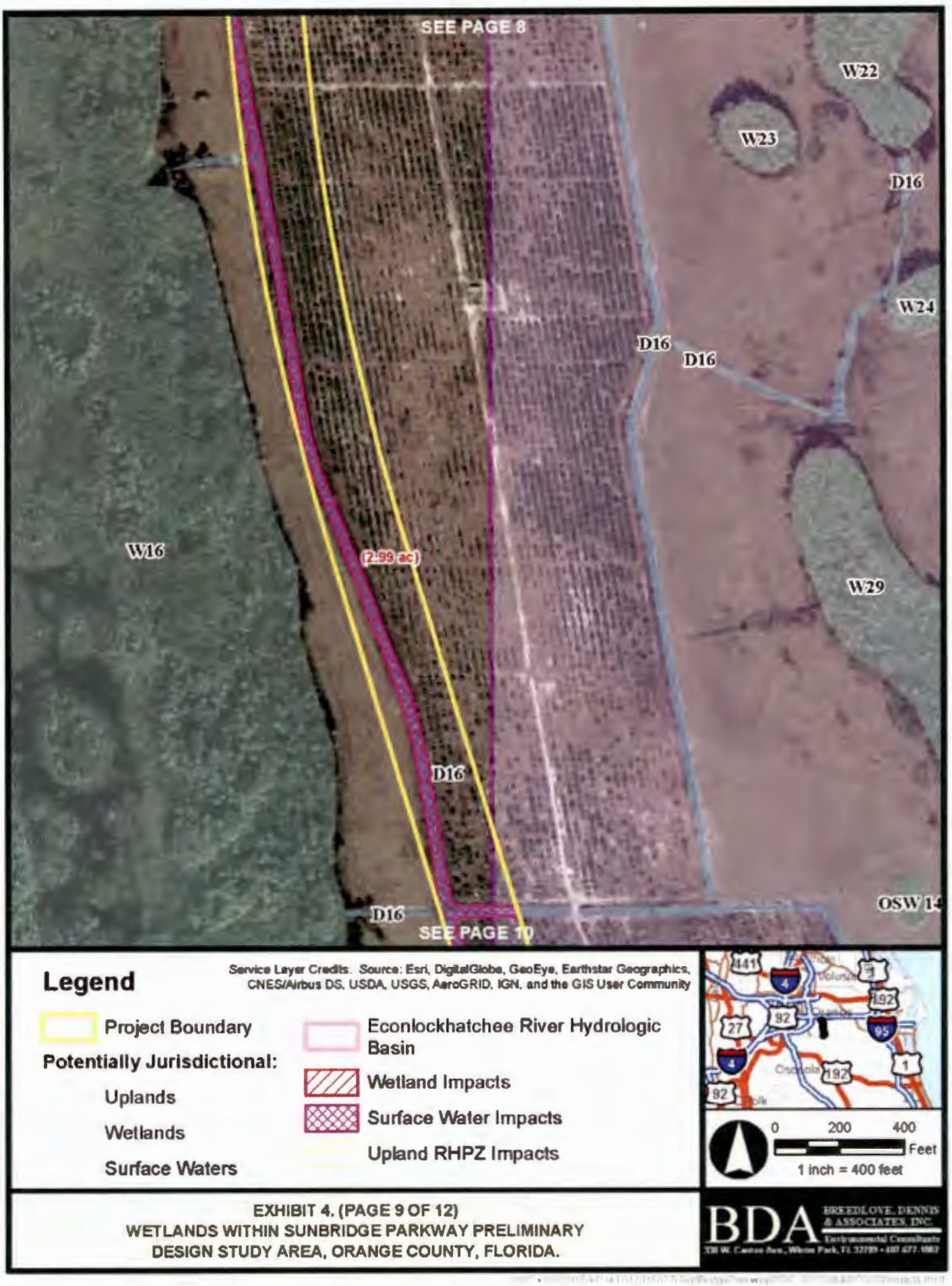


FIGURE IV-16: WETLANDS 9

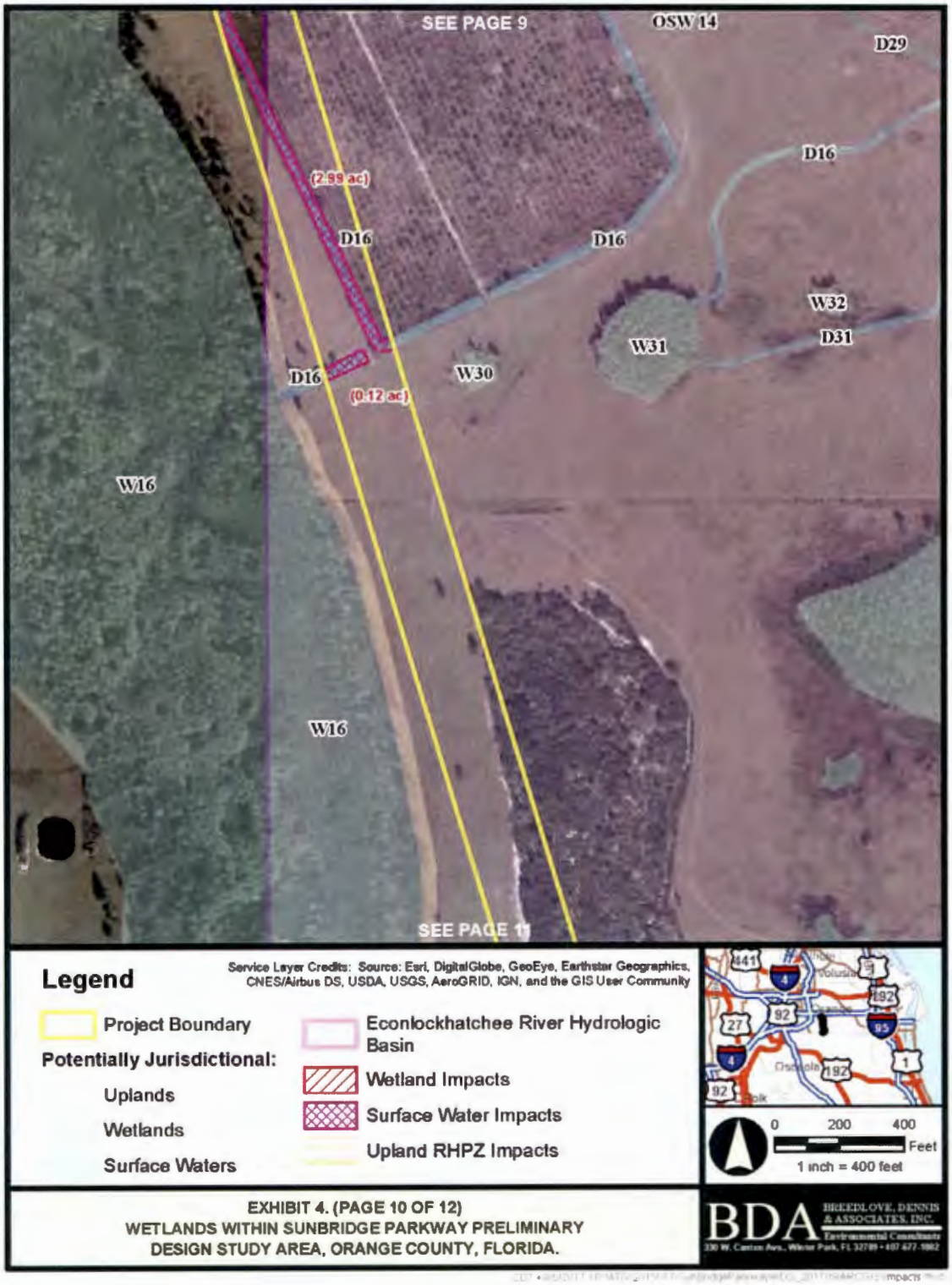


FIGURE IV-17: WETLANDS 10

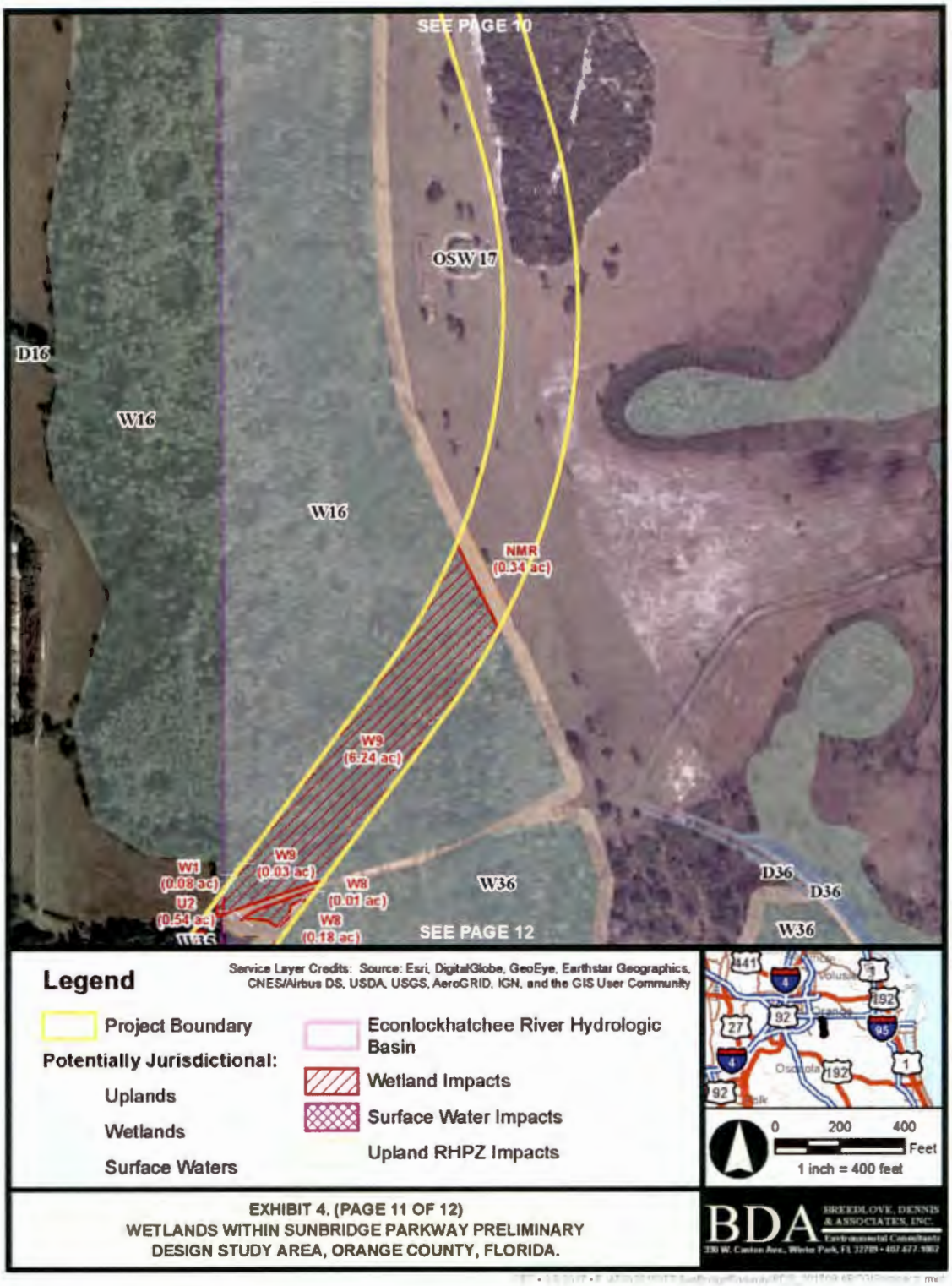


FIGURE IV-18: WETLANDS 11

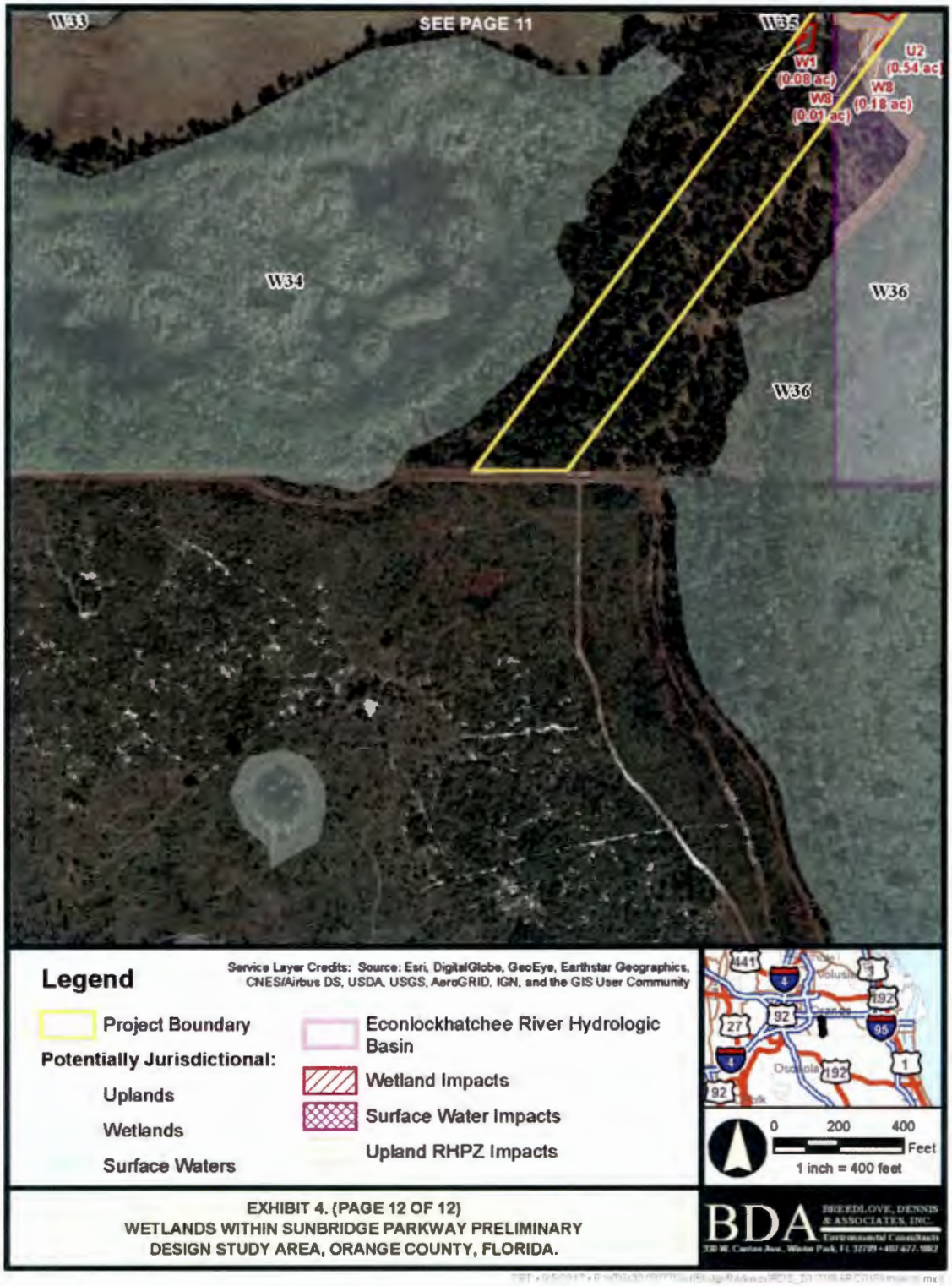


FIGURE IV-19: WETLANDS 12

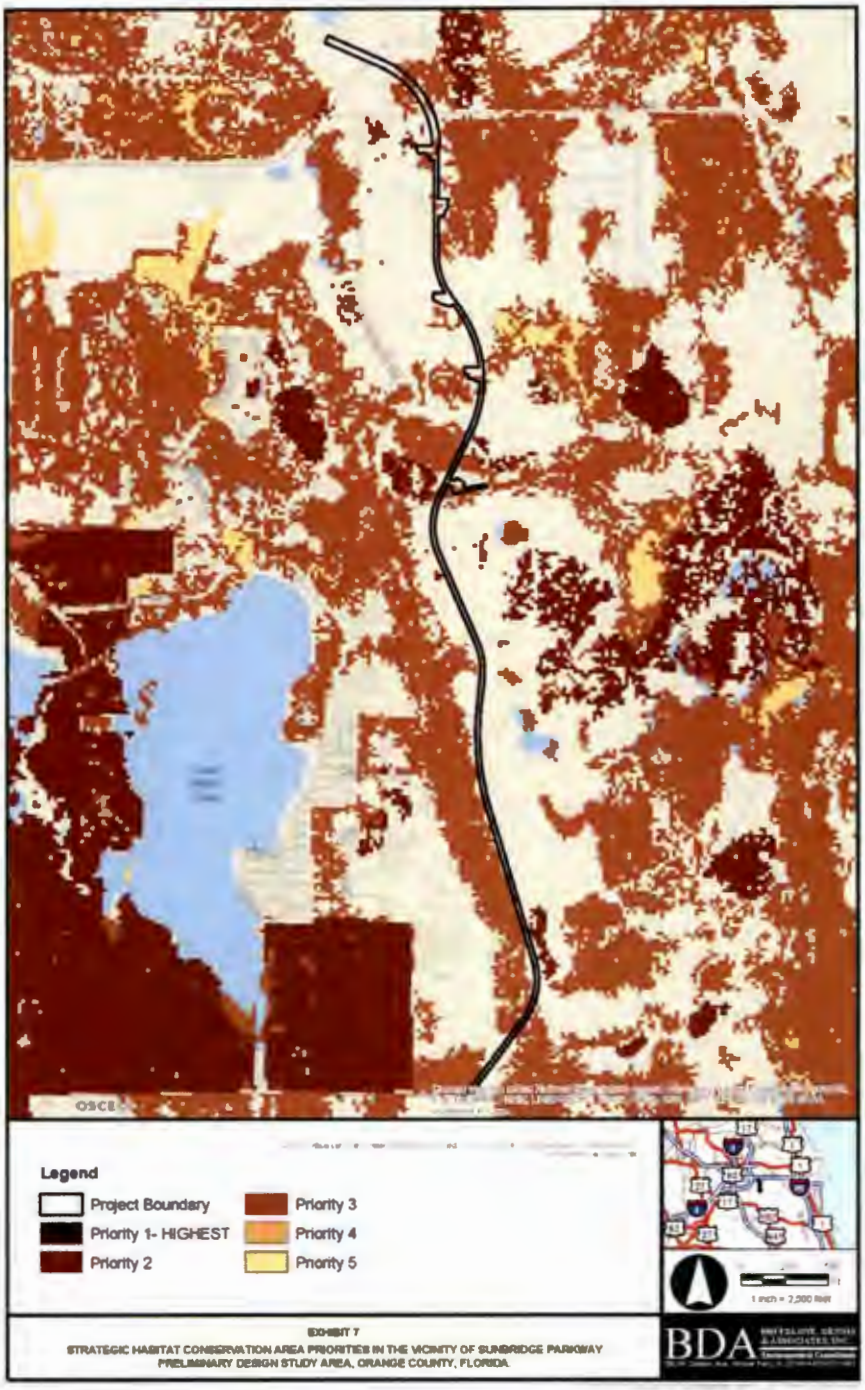


FIGURE IV-20: STRATEGIC HABITAT CONSERVATION PRIORITIES

Runoff flowing westerly from the project area flows through Robert's Island Slough, the Disston Canal or various other wetlands into Lake Mary Jane and Lake Hart ultimately flowing to Lake Okeechobee.

The majority of the portion of the project located within the SJRWMD is located within the Econlockhatchee River basin, which is listed as an Outstanding Florida Water (OFW). As a result and as a condition of approval for the Sunbridge Parkway PD, the facilities serving the roadway corridor must treat stormwater runoff to OFW standards. This generally consists of providing an additional 50% of the required treatment and permanent pool volumes in all systems within the SJRWMD regulatory boundary.

The portion of the project lying within the SFWMD is located within the Upper Kissimmee River basin, which eventually flows to Lake Okeechobee, an impaired water body (IWB). As a result of the IWB design criteria, an additional 50% water quality treatment volume will be required. A site-specific pollutant analysis for the pollutant of concern (phosphorous) is also required for all project systems within the SFWMD regulatory boundary in addition to meeting IWB criteria, this portion of the road will also be required to meet OFW criteria consistent with the Sunbridge PD conditions of approval.

The roadway corridor will cross through several wetland strands and will cross over the Disston Canal. To maintain the natural flow patterns and general hydrology, appropriately located and sized cross-culverts will be needed. Drainage basins, points of discharge and cross-culverts have been selected in the conceptual stormwater design to route stormwater discharges in a manner that reflects the existing conditions.

Please refer to the Pre-Development Basin and Nodal Map in Appendix B of the Stormwater Report for further information on existing drainage patterns.

d. Floodplains:
See Conceptual Drainage, Floodplain Impact Analysis, Pond Siting Report dated October 2017, by DWMA, Appendix L (Stormwater Report)

There are multiple areas of 100-year floodplain, typically associated with the wetland areas affecting the roadway corridor. There is no floodway within the corridor. As of this writing, a Conditional Letter of Map Revision (CLOMR; April 29, 2011) covering the portion of the corridor north of Wewahootee Road has been approved by FEMA, providing a basis for future establishment of Zone AE elevations. A Letter of Map Revision (LOMR; effective September 22, 2017) covering the portion of the corridor south of Wewahootee Road has been approved by FEMA, establishing the Zone AE floodplain elevations along that portion of the corridor. The map revisions associated with this LOMR do not currently appear on the FEMA FIRMS. (See Figure IV-21, Floodplain Map, Appendix L). Approximately 24 acres of floodplain area will be impacted by the roadway corridor. The locations and elevations of

the FEMA floodplain as derived from the FIRMs and the additional mapping and floodplain elevations as approved in the referenced LOMR are depicted on Figure IV-21, FEMA Flood Zone Map.

f. Threatened & Endangered Species

See Preliminary Design Study, Environmental Considerations dated July 25, 2017 by Breedlove Dennis & Associates, Inc., Appendix J.

As part of the USACOE permit process, additional federal agencies including, but not limited to, the U.S. Environmental Protection Agency, USFWS, and National Marine Fisheries Service may review and provide comments. Wetland impacts and mitigation will be reviewed and evaluated as part of the process. Table 3, page 30 of the BDA Environmental Considerations report, provides a summary.

The likelihood of occurrence of protected plants within the study area is reported to be typically "unlikely," with the likelihood of a few species reported to be "low".

BDA reports that "the study area is located within the U.S. Fish and Wildlife Service (USFWS) consultation area of several federally listed species" and provides statements as to the likelihood of species occurrences. BDA concludes that, based on their "review of existing databases, recent site inspections, and location of the proposed Sunbridge Parkway alignment associated and identified with this PDS, no wetland or listed species constraints have been identified that would not be anticipated to be approved in the normal course of agency review and permitting."

BDA comments regarding those animals whose likelihood of occurrence is higher than "low" and their specific recommendations, including:

- American Alligator
- Eastern Indigo Snake
- Florida Pine Snake
- Gopher Tortoise
- Florida Burrowing Owls
- Florida Sandhill Crane Southeastern American Kestrels
- Wood Storks
- Sherman's Fox Squirrels

The provision of adequate crossings for wildlife is among the stated objectives of the ELSP. BDA advises that the wildlife crossings associated with the recommended improvement concept as presented herein are consistent with the intent and principles of the ELSP.

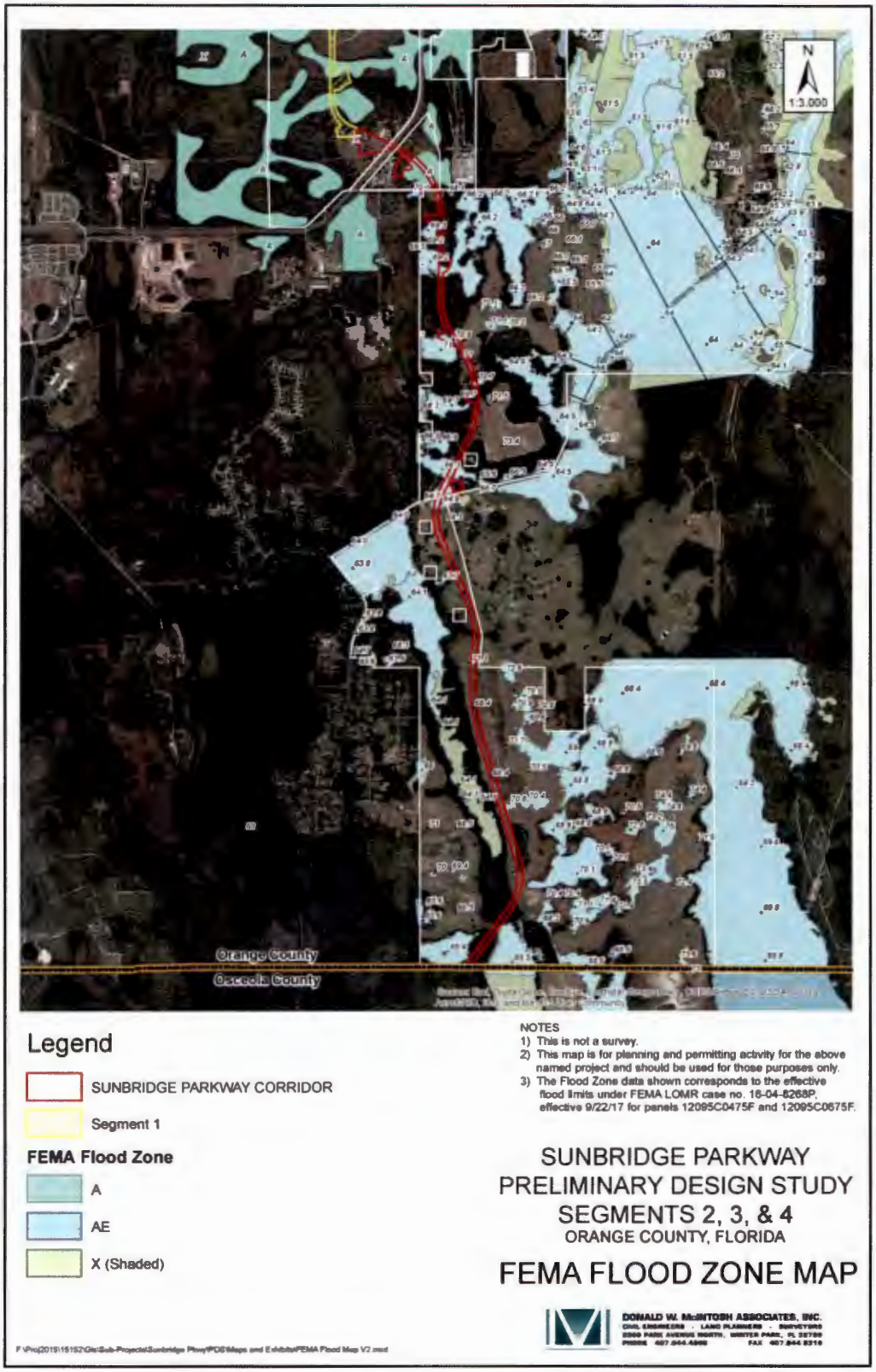


FIGURE IV-21: FEMA FLOOD ZONE MAP

V. FUTURE TRAFFIC CONDITIONS

a. GENERAL

A summary of the findings presented in the Design Traffic Technical Memorandum by Kittelson & Associates, Inc., dated January 25, 2018, is presented below. Please refer to the report (Appendix M) for supporting data and a more detailed discussion.

The "Design Traffic Technical Memorandum evaluates traffic operations for the short-term (2025) scenario and design-year (2040) scenario for nine intersections along the corridor correlated to Innovation Way South and significant intersections depicted on the Sunbridge PD Regulating Plan. The intersection at Wewahootee Rd (located north of Intersection A) and at a utility/well access road, located between Intersection H and Intersection I, are not included in the analysis as they function primarily as driveways accessing dirt/undeveloped roads and serving ranch/farm land uses. Traffic conditions for proposed Sunbridge Parkway were analyzed by dividing the roadway into four study segments (not to be confused with the roadway segments 2, 3 and 4). These intersections and roadway segments are illustrated and described in Figure V-1 (KAI Fig 2) and the table below.

Roadway Segments for Traffic Analysis	
From	To
Northern project limit	Wewahootee Road
Wewahootee Road	Innovation Way South
Innovation Way South	South of Intersection G
South of Intersection G	County Line

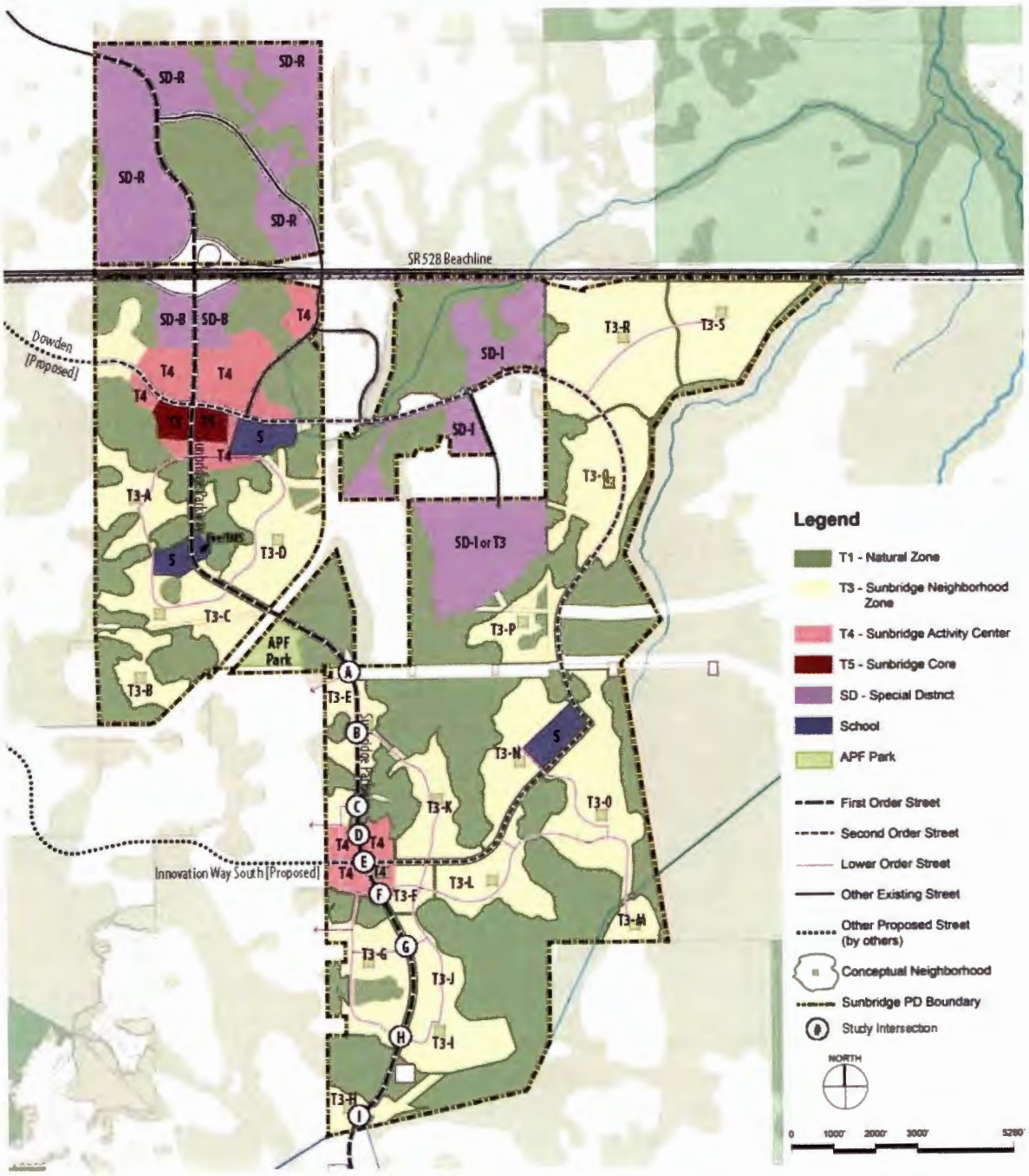
Future traffic volumes, for both the short-term (2025) and design-year (2040) analysis were taken from analyses performed for the Sunbridge Development's Comprehensive Plan Amendment and supplemented by the Camino Reale Planned Development Transportation Network Evaluation.

The three northernmost segments are categorized as urban signalized arterials and the southernmost segment is categorized as a rural uninterrupted flow highway. The design speed of the northern portion of Sunbridge Parkway is anticipated to be 45 mph, resulting in Class I designation for the signalized arterial segments per FDOT's Generalized Level of Service Table. In accordance with the Orange County Road Agreement for Sunbridge Parkway, the designated LOS threshold is LOS E for all segments.

b. TRAFFIC FORECASTING

1. Average Annual Daily Trips (AADTs)

   Forecasted AADTs for 2025 and 2040 throughout the corridor are provided in Figure V-2 (KAI Fig 3).

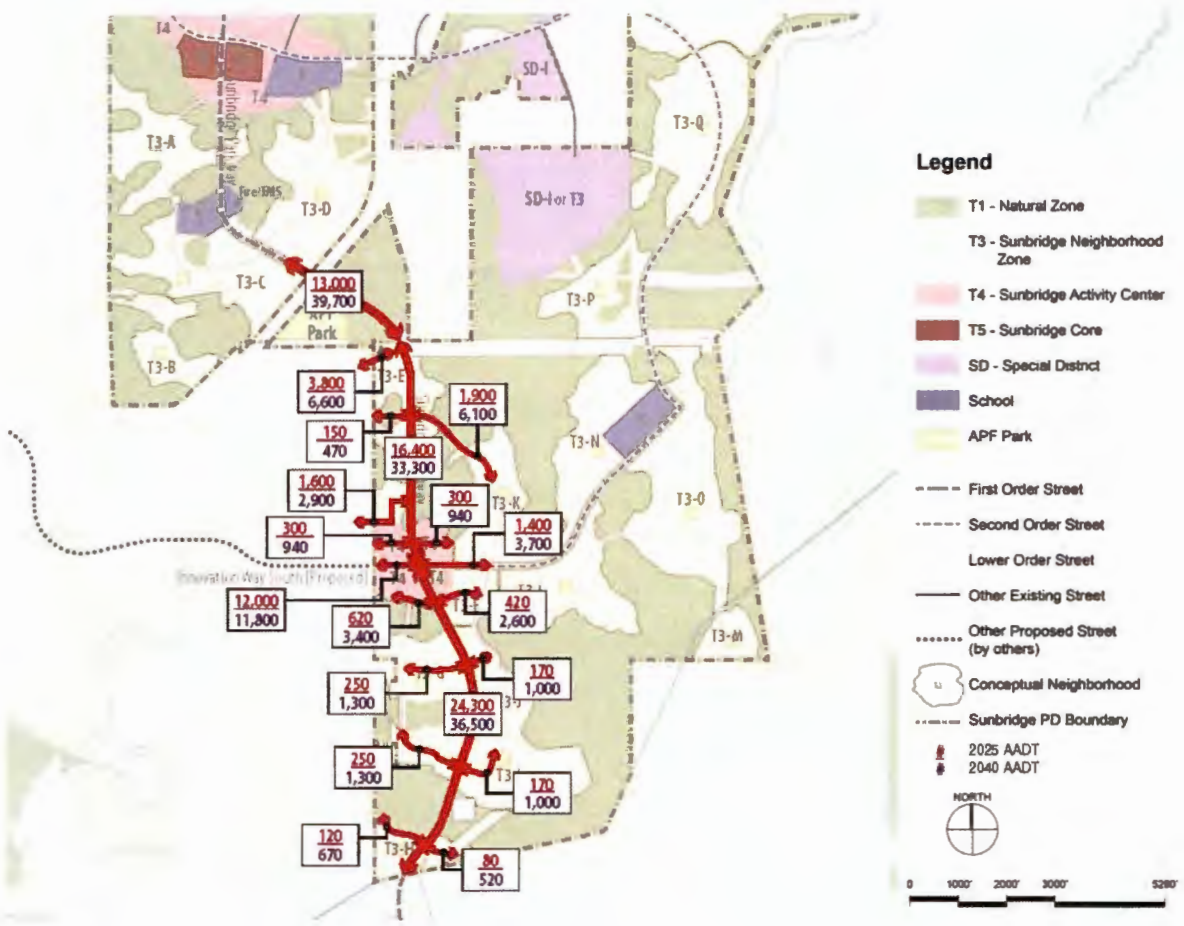


Study Intersections

NOTE: Access locations and roads that impact wetlands and rare uplands are only approximations and are **not approved with this plan. The exact location of these roadways will be determined during the Orange** County Conservation Area Determination and impact permit process.

SOURCE FOR PLANNED DEVELOPMENT: Sunbridge Planned Development Regulating Plan, October 19, 2016

FIGURE V-1: STUDY INTERSECTIONS AND ROAD SEGMENTS



AADT

NOTE: Access locations and roads that impact wetlands and rare uplands are only approximations and are **not approved with this plan. The exact location of these roadways will be determined during the Orange** County Conservation Area Determination and impact permit process.

SOURCE FOR PLANNED DEVELOPMENT: Sunbridge Planned Development Regulating Plan, October 19, 2016

FIGURE V-2: AVERAGE ANNUAL DAILY TRIPS (AADTS)

2. Future Intersection Turning Movement Volumes

Future intersection turning movement volumes for the 2025 and 2040 PM peak hours were developed following the procedures described in NCHRP Report 255. This method is consistent with acceptable tools described in FDOT's *Project Traffic Forecasting Handbook (2014)*. PM characteristics were selected for use in establishing the design hour. Future turning movement volumes are provided in Figures V-3 and V-4.

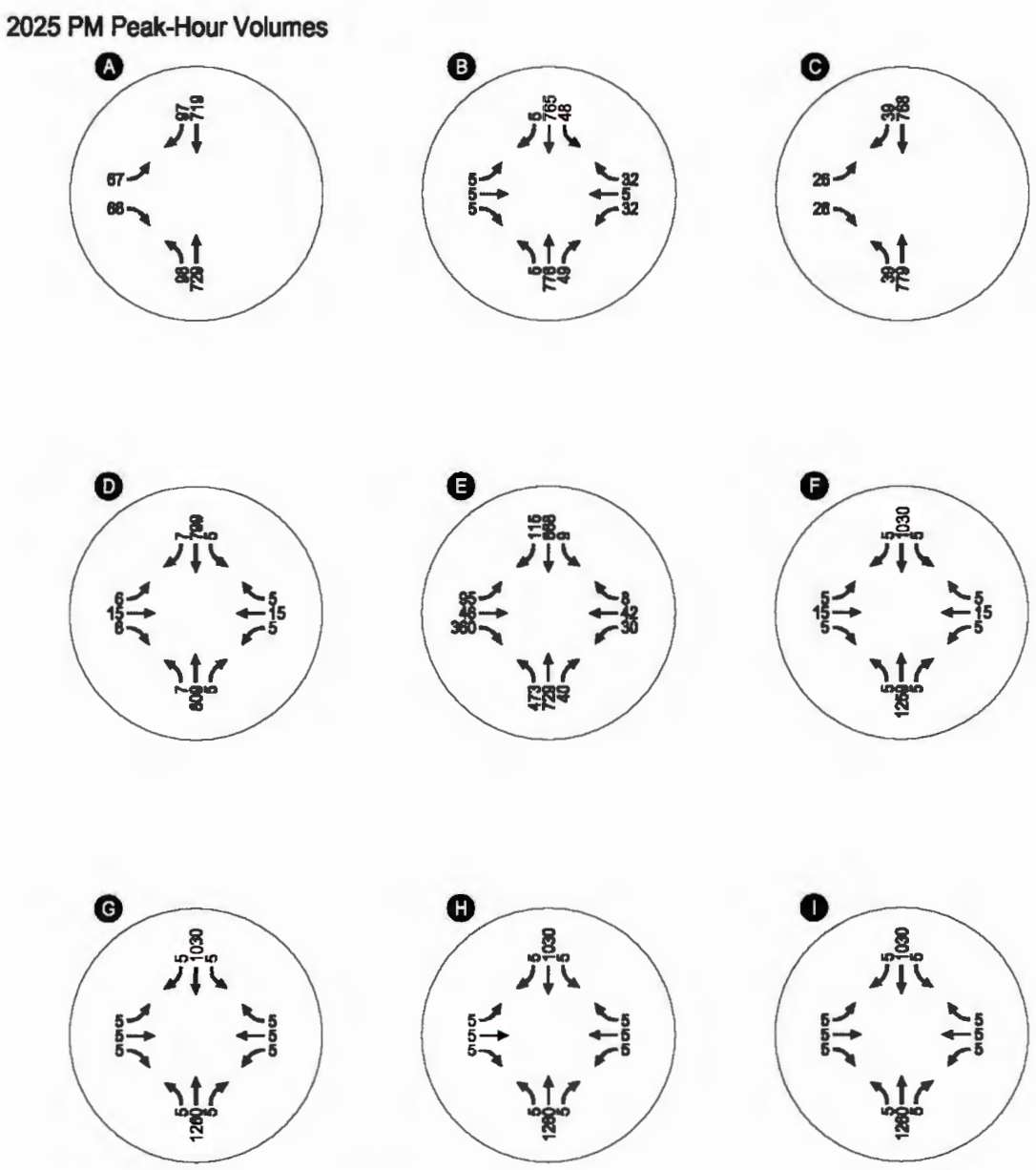


FIGURE V-3: PEAK HOUR VOLUMES FOR YEAR 2025

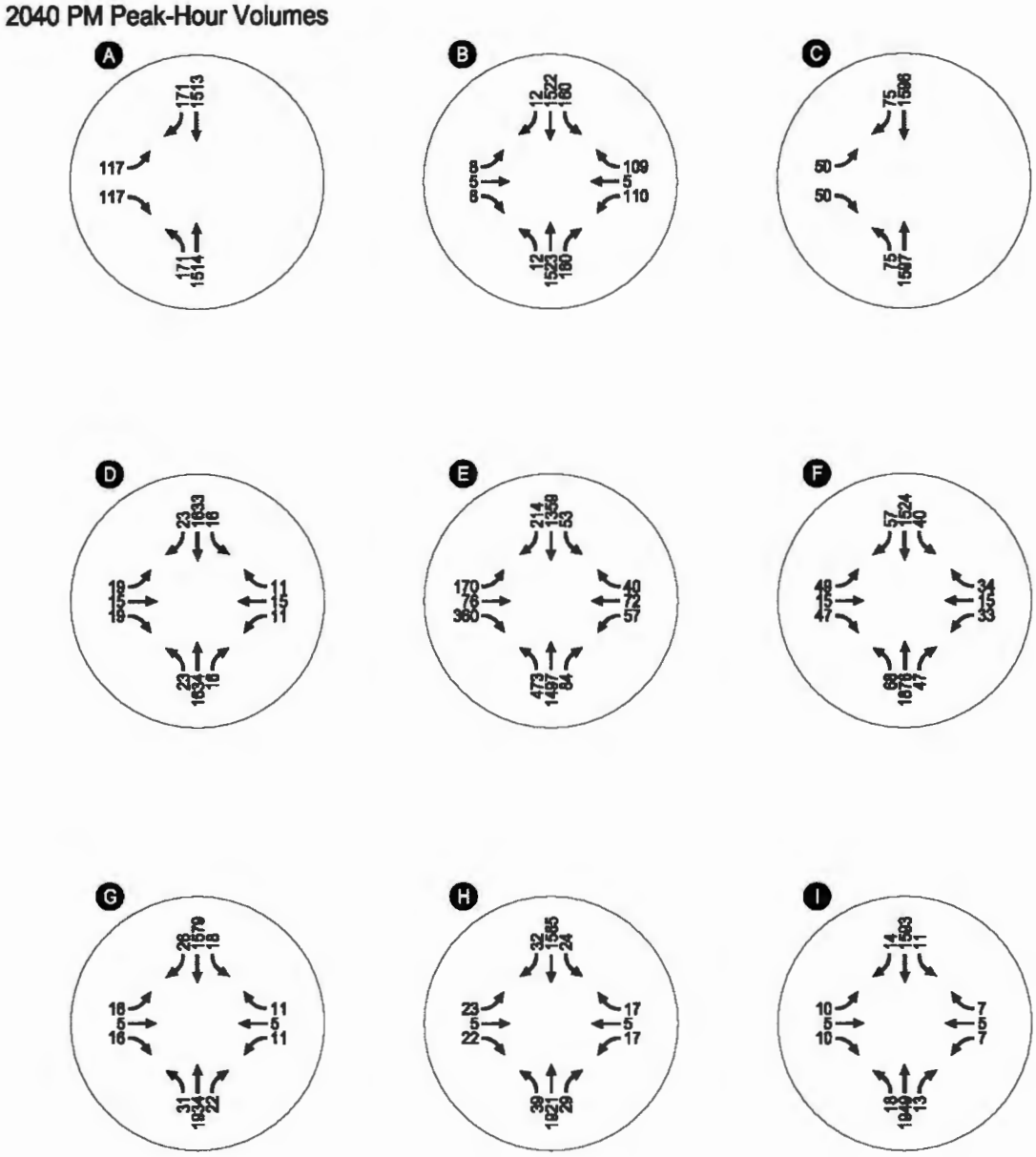


FIGURE V-4: PEAK HOUR VOLUMES FOR YEAR 2040

3. Laneage

Using Level of Service (LOS) E as the threshold for acceptable level of service in accordance with the Road Agreement, KAI reports as follows: "In 2025, the majority of the segments operate within the designated level of service threshold as a two-lane facility. A section from Innovation Way South to south of Intersection G is projected to require four lanes to achieve an acceptable level of service." "Sunbridge Parkway is anticipated to require four lanes in 2040 in order to maintain an acceptable level of service."

4. Intersection Operations

In the short-term (2025) scenario, intersection E (Innovation Way South) is expected to require signalization due to delay on the minor street approaches. The remaining intersections can remain un-signalized through 2025. In the design-year (2040) scenario intersections A, B, E and F are expected to require signalization. All intersections should be monitored and signalized when warranted. With the addition of these signals, all intersections operate at LOS D or better in 2040.

The required turn lane geometry at the intersections is presented in Figures V-5 and V-6 and the recommended queue lengths for the selected intersections are presented in the table below.

2025 PM Peak-Hour LOS

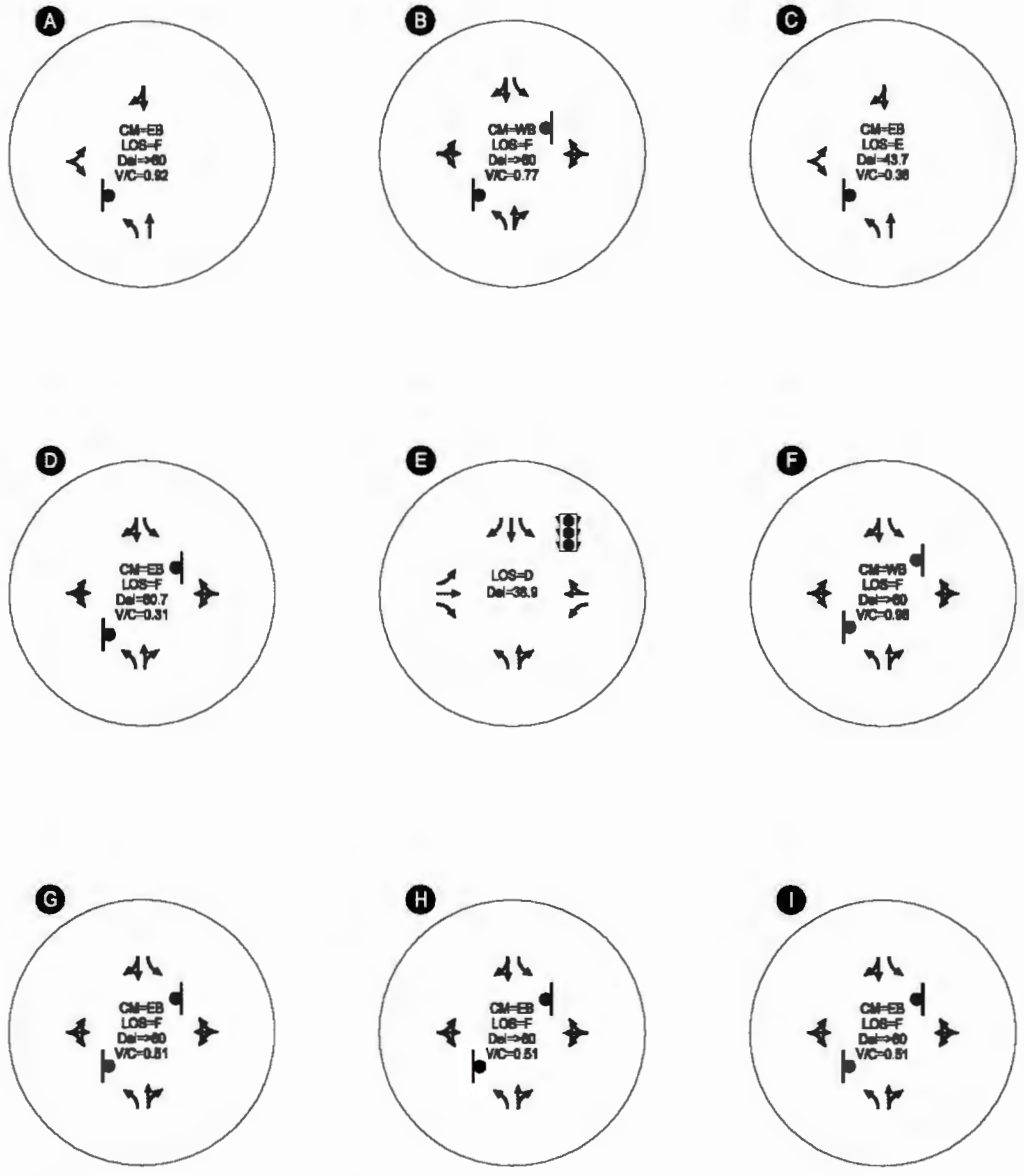


FIGURE V-5: FUTURE LOS AND LANE CONFIGURATIONS 2025

2040 PM Peak-Hour LOS

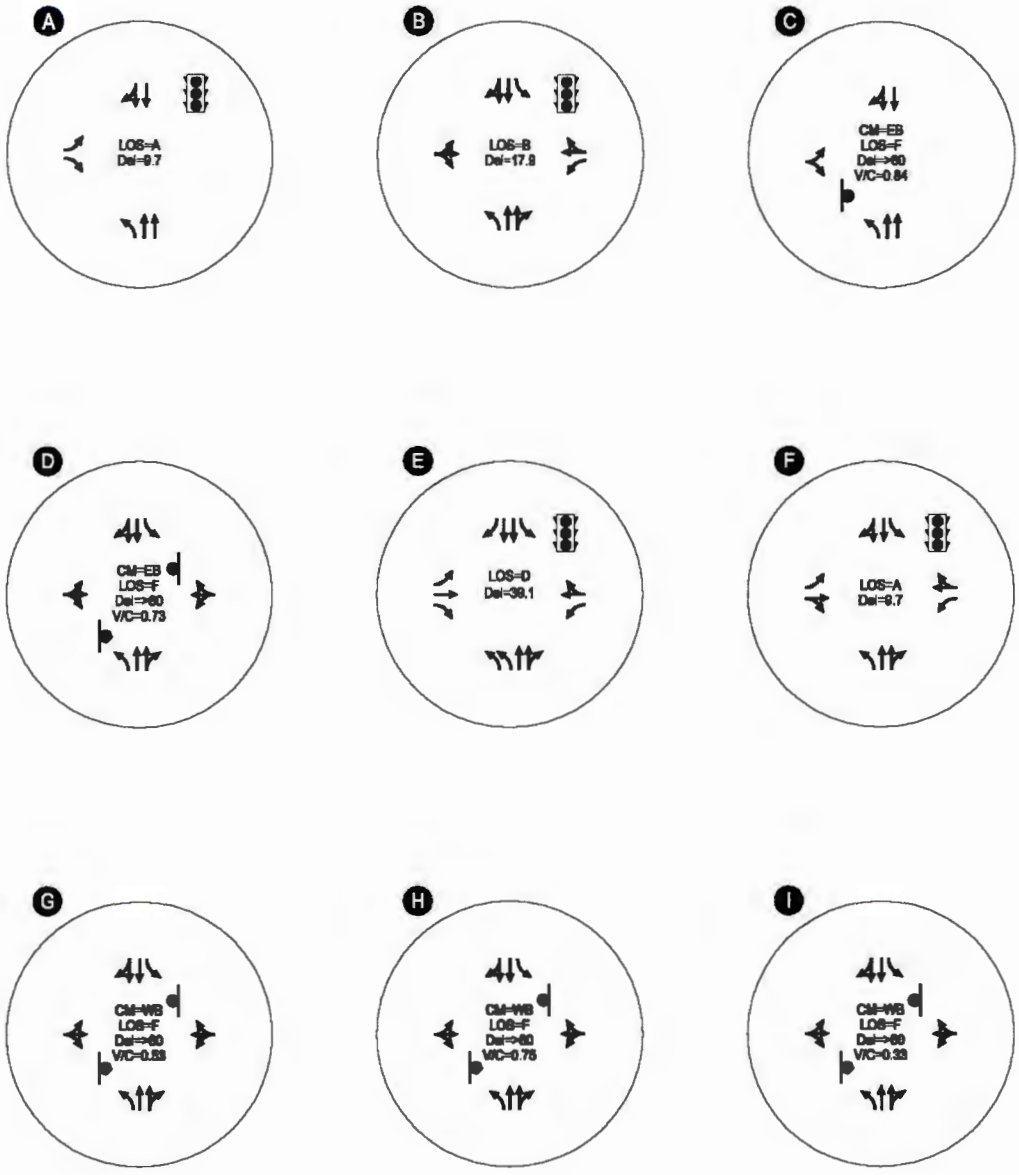


FIGURE V-6: FUTURE LOS AND LANE CONFIGURATIONS 2040

c. Access Management

KAI reports that access management should be governed by "the Orange County minimum standards of 600 feet of separation between median openings. However, the current regulating plan depicts a higher degree of access management with a minimum full-access median opening spacing of approximately 1,000 feet." Although a 600-foot minimum separation is consistent with Orange County Code (§34-177), current Orange County policy requires a minimum separation of 660 feet. For the purposes of this study, a minimum separation of 660 feet, consistent with Orange County policy, was utilized to determine sufficient intersection spacing. Turn lane queues were determined using Synchro and are shown in the following table.

Synchro Queue Analysis Results

Sunbridge Parkway Intersection	Movement	95th Percentile Queue (ft)		Recommended Length (ft)	
		2025	2040	2025	2040
A	EBL	120	143	280	305
	NBL	< 25	120	235	310
B	WBL	N/A	133	N/A	305
	NBL	33	< 25	235	235
	SBL	< 25	98	235	285
C	NBL	< 25	< 25	235	235
D	NBL	< 25	< 25	235	235
	SBL	< 25	< 25	235	235
E	EBL	< 25	83	235	285
	EBR	363	363	375	560
	WBL	40	55	235	260
	NBL	640	250 (dual)	835	435 (dual)
	SBL	< 25	35	235	235
	SBR	110	208	295	410
F	EBL	N/A	58	N/A	220
	WBL	N/A	40	N/A	195
	NBL	< 25	< 25	235	235
	SBL	< 25	< 25	235	235
G	NBL	< 25	< 25	235	235
	SBL	< 25	< 25	235	235
H	NBL	< 25	< 25	235	235
	SBL	< 25	< 25	235	235
I	NBL	< 25	< 25	235	235
	SBL	< 25	< 25	235	235

d. Railroad Crossing

Considering the potential need for a grade separated crossing at the OUC railroad KAI reports that "FDOT recommends conducting a benefit/cost analysis for grade separation when the average daily traffic (ADT) on the roadway reaches 30,000. Based on current AADT projections, the AADT on Sunbridge Parkway is not expected to reach 30,000 vehicles until 2035 or beyond."

VI. Design Criteria

The design criteria utilized to develop the Recommended Improvement Concept are as follows:

a. Design Speed

The 2011 AASHTO Green Book (12.3.6) recommends running speeds of 20 mph to 45 mph and design speeds of 30 mph to 60 mph for urban arterials with an upper limit of 45 mph for low speed designs. A design speed of 45 mph is selected for the urban roadway segments. This standard is also consistent with the FDOT Greenbook.

FDOT Greenbook Table 3-1 recommends design speed of 60 to 70 mph for a rural arterial road. A design speed of 60 mph is selected for the rural roadway segments.

b. Right-of-way

A right-of-way width of 133 feet is selected for the urban segments based on a four-lane divided cross-section.

A right-of-way width of 160 feet is selected for the rural segments based on a four-lane divided cross-section.

c. Horizontal Curvature

Horizontal curvature for the urban segments of the roadway, described by KAI as urban signalized arterial, is selected to avoid excessive superelevation in order to simplify future roadway connections of future development parcels while allowing flexibility to accommodate the physical constraints of the corridor for the 45 mph design speed. Superelevation beyond the 2% reverse crown crossgrade is deemed undesirable for the proposed future development.

The minimum curve radii selected for the urban segments in accordance with FDOT Design Standards, Index 511, Superelevation Urban Highways and Streets are:

- Standard (2% normal crown) - 2,200 feet
- Reverse Crown (2% superelevation) - 1,005 feet.

The rural segments of the roadway, described by KAI as rural uninterrupted flow highway, are generally not anticipated to provide permanent access to future development parcels.

The minimum curve radii selected for the rural segments in accordance with FDOT Design Standards, Index 510, Superelevation Rural Highways are:

- Standard (2% normal crown) - 11,500 feet
- Reverse Crown (2% superelevation) - 7,700 feet;
- Minimum radius (8% superelevation) – 1,050 feet.

The Recommended Improvement Concept Map provides adequate tangent lengths for standard 80%/20% superelevation transitions in all but one case. The tangent between curves C6 and C7 (See Appendix N, Baseline Geometry) is slightly short of that required for 80%/20% superelevation transitions. 70%/30% transitions will work and are more than what is needed, yet above the minimum allowable of 50%/50% under constrained conditions.

The minimum radii are applied at the radially inside edge of travelway.

d. Vertical Geometry

The vertical gradient along the six-miles of roadway varies only mildly and is not expected to create any significant concerns with regard to vertical curves with exception of the possible future bridge crossing of the OUC railroad track, which is discussed below.

e. Bridge

- Approach and departure longitudinal grades: Approximately 3% to 4% selected
- Embankment slope: 2H:1V maximum; 3H:1V recommended
- Clearance above track rails 23.5 feet top of rail to lowest obstruction
- Clearance from pavement to overhead power lines: 27 feet (to powerline lowest sag)
- Clearance between Duke energy and OUC power lines: 5 feet

f. Access Management

Although a 600-foot minimum separation is consistent with Orange County Code (§34-177), current Orange County policy requires a minimum separation of 660 feet. For the purposes of this study, a minimum separation of 660 feet, consistent with Orange County policy, was utilized to determine sufficient intersection spacing.

g. Stormwater Management and Compensating Storage

Stormwater management and compensating storage criteria are discussed comprehensively in Existing Condition and Recommended Improvement Concept sections of this report. Also, a copy of Conceptual Drainage, Floodplain Impact Analysis, Pond Siting Report is provided in Appendix L which includes detailed design criteria

h. Miscellaneous Design Elements

Functional Classification:	Minor Arterial
Access Management:	660' min. full urban 1,320 min. full rural
Design Speed (DS):	45 mph, urban; 60 mph rural
Level of Service:	LOS E (minimum)
Vehicle Lane Width:	11' urban; 12' rural
Number of Lanes:	Ultimate Buildout -4 (2 in each direction)
Bicycle Lane On-Road;	7' wide; buffered
Pathways:	14' wide trail west side, urban & rural 10' wide multi-purpose path east side, urban only
Median Width:	42.5' urban; 40' rural
Clear Zone Width:	4' urban; 36' rural
Curb Type:	Urban: Type E (median); Type F (outside) Rural: no curb
Allowable Inlets:	P-1, P-2, P-3, & P-4
Bridge Embankment Side Slope:	2' horizontal (minimum):1' vertical
Multi-Purpose Easement Width:	16' urban; 18' rural
Pavement Design	Orange County Public Works and FDOT Flexible Pavement Design Manual

VII. Recommended Improvement Concept

The Recommended Improvement Concept is depicted on the Recommended Improvement Concept Map (29 sheet set) prepared by Donald W. McIntosh Associates, Inc. presented in Appendix O. The elements of the concept are discussed below:

a. The Overall Alignment of the Recommended Roadway Right Of Way

As discussed in the Existing Conditions Section of this report, the most significant element controlling the roadway alignment is the commonly agreed upon objective that the road right-of-way lands shall be obtained from those properties controlled by Tavistock in accordance with the Road Agreement. For a discussion of Wewahootee Road ownership, see Section IV.a.3 of this report.

Supplementary to that objective there are numerous physical and environmental constraints, including conformance with Orange County Environmental Land Stewardship Program, that have been considered and which result in the alignment as currently

proposed. The selected alignment of Sunbridge Parkway Segments 2, 3 and 4 has been developed in response to these constraints as discussed in the Existing Conditions section of this report.

The recommended baseline of construction is presented in Appendix N.

b. Typical Sections

Various alternative roadway typical sections were evaluated during the development of the recommended improvement concept, with the right-of-way for urban sections ranging from 125 feet to 145 feet in width and for rural sections ranging from 160 feet to 172 feet in width. These various typical sections included alternative accommodations for travel lane widths, bicycle lane widths, pedestrian facilities, drainage, utilities, construction phasing and possible future multimodal facilities.

The right-of-way width was ultimately selected to accommodate the proposed ultimate 4-lane roadway cross-sections (see Appendix P):

- Four-lane divided urban section for Segments 2 and 3A; 133 feet minimum width
- Four-lane divided rural section for Segment 4; 160 feet minimum width

After consideration of various alternatives, it was determined that the preferred pedestrian facility on the west side of the right-of-way would be a 14-foot wide trail extending along the entire length of the study corridor to the Orange County / Osceola County line. The preferred surface of this trail is asphalt because "the hard surface [of concrete] is taxing on runners' lower limbs, and is thus unpopular with that significant user group." (www.railstotrails.org) Since buffered bike lanes are provided adjacent to the vehicular travelway, the primary users of the trail will likely be walkers, runners and younger cyclists. In addition to the harder surface of concrete, the joints in concrete surfaces also tend to shift over time and cracking can occur due to settlement, tree roots, etc., which can make concrete trails less desirable to these users. The Orange County Public Works Department does not typically maintain asphalt trails; therefore, it was agreed that the proposed asphalt trail would be placed in an easement adjacent to the road right-of-way and will be privately owned and maintained. Since the northern portion of roadway corridor will require a wider right-of-way to accommodate embankment slopes associated with a future potential grade-separated crossing of the OUC railroad, the trail will be located within the right-of-way in order to maintain the spatial relationship between the trail and the roadway. Where this occurs, the trail will be constructed of concrete and maintained by Orange County. Along the east side of the urban segments of the roadway, a 10-foot wide concrete "multi-purpose path" will be constructed within the road right-of-way and will be maintained by Orange County. The proposed typical road sections for the ultimate configurations are depicted in Figures VII-1 through VII-5 and in Appendix P.

The roadway sections are comprised of the following improvements:

- The four-lane divided urban section is comprised of an asphalt trail on the west side (14 feet wide) within a trail and utility easement and a multi-purpose path on the east side (10 feet wide) separated from the back of curb by a grassed parkway, 7-foot wide buffered bicycle paths adjacent to the outside curbs, four 11-foot wide through lanes, a 42.5-foot wide median (inclusive of median curbs and turn lanes), standard curb and gutter (FDOT Type F) at the outside lane edges and median curb and gutter (FDOT Type E) at the median edge.
- The four-lane divided rural section is comprised of 14-foot wide asphalt trail within a trail easement on the east side separated from the roadway by a grassed drainage swale, combination 12-foot wide outside shoulders each comprised of a 5-foot wide stabilized shoulder and a 7-foot wide paved buffered bicycle lane, four 12-foot wide through lanes, 7-foot wide paved and 1-foot wide interior stabilized shoulder on the southbound lanes, 4-foot wide paved and 4-foot wide interior stabilized shoulder on the northbound lanes, a 40-foot wide median with a depressed grassed swale and grassed drainage swales on both sides.
- Permanent slope/fill easements and temporary construction easements with 37.5' width are provided adjacent both sides of the right-of-way to accommodate anticipated fill slopes.
- Additional right-of-way width is provided at the railroad crossing to accommodate fill slopes associated with a potential future grade separate crossing.
- Cattle fencing is provided to preserve the ranching function of the adjacent properties. Fencing would be temporary in Segments 2 and 3 while the initial rural roadway section is in place and would be removed with construction of the urban roadway section. Future design of urban areas adjacent to the urban roadway segments could potentially introduce walls, berms, fences and/or landscaped areas adjacent to the road right-of-way; however, such designs would be determined with future development proposals and are outside of the scope of this study. Cattle fences would be permanent along the rural segment.

c. PHASING

The four-lane divided ultimate cross-section was selected based on the Road Agreement and the supporting traffic analysis. Also in accordance with the Road Agreement, the roadway will initially be constructed with a two-lane rural cross-section. Multi-purpose pathways and on-road buffered bicycle lanes will be provided throughout all phases of the roadway development. The ultimate 4-lane divided configuration will be constructed in phases as depicted on the typical-section drawings.

All segments will initially be constructed by Tavistock East Services, LLC with a 2-lane rural configuration within the western portion of the right-of-way. The initial phase of

construction transitions from the four-lane divided urban section (Segment 1) to the two-lane undivided rural section (Segment 2) and the alignment transition of the two-lane undivided rural sections between the urban segments (Segments 2 & 3a) and the rural segments (Segment 4) take place within Segment 3b and are depicted in Appendix Q.

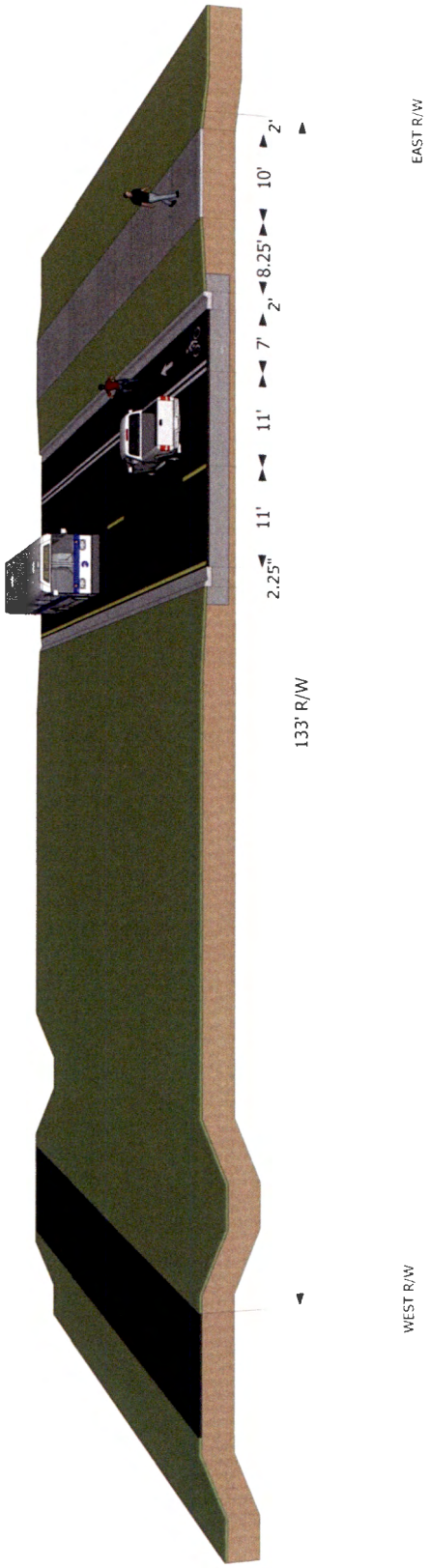
In conjunction with adjacent urban development along Segments 2 and 3A, a 2-lane urban configuration will be constructed by Tavistock East Services, LLC or a successor developer within the eastern portion of the right-of-way and the 2-lane rural roadway will be demolished if the timing of such urban development occurs prior to the need for the additional 2 lanes (2 lane rural to 4 lane urban improvement). A transition will be required to reduce from the 4-lane Segment 1 to the 2-lane Segment 2 before the railroad crossing. Likewise, a transition will be required at the southern end of the urban improvement to accommodate a shift in the alignment from 2-lane urban to 2-lane rural or to transition from 4-lane urban to 2-lane rural.

Ultimately, a second 2-lane urban configuration will be constructed within the western portion of Segments 2 and 3A, completing the 4-lane urban segments. This improvement is to be undertaken by Orange County or by private land developers proposing traffic impacts that warrant the additional 2 travel lanes. A transition will be made in Segment 3B to accommodate the alignment shift from 4-lane urban to 2-lane rural.

When warranted, a second 2-lane rural section will be constructed by Orange County within the eastern portion of Segment 4, thereby completing its 4-lane divided configuration.

FIGURE VII-1: CROSS SECTION PHASE 1; 2-LANE RURAL SEGMENTS 2 AND 3

FIGURE VII-2: CROSS SECTION PHASE 1; 2-LANE RURAL SEGMENT 4



FIGUREVII-3: CROSS SECTION PHASE 2 INTERIM 2-LANE URBAN

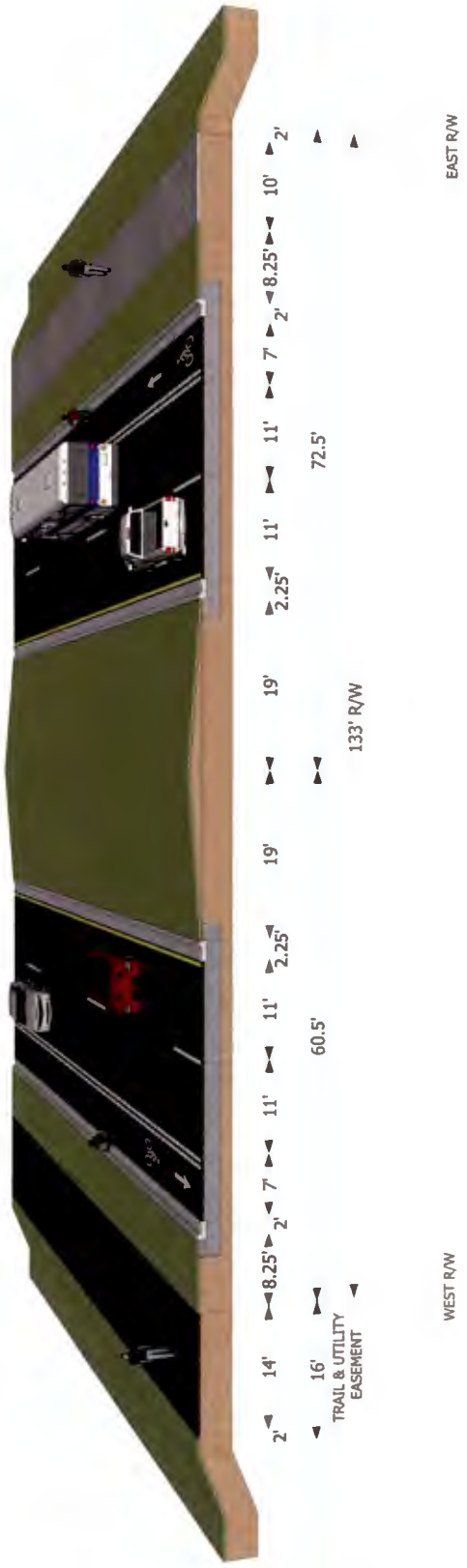


FIGURE VII-4: CROSS SECTION ULTIMATE 4-LANE URBAN

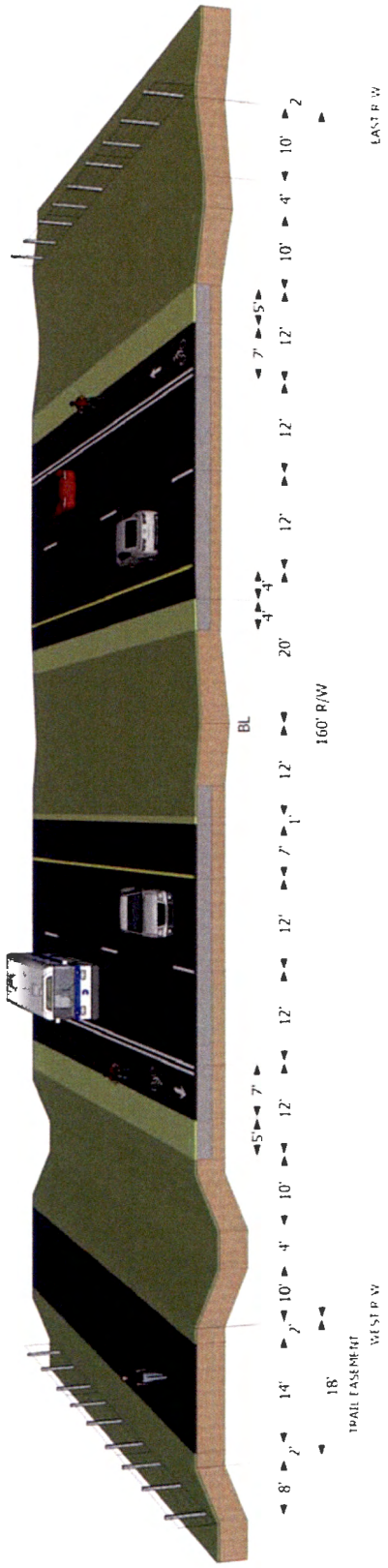


FIGURE VII-5: CROSS SECTION ULTIMATE 4-LANE RURAL

d. Access Management - Locations of Median Openings

The locations of anticipated median openings are depicted on the Access Management Plan, (Fig. VII-6) and in more detail on the Recommended Improvement Concept Map (Appendix O). The table below lists the station locations of the median openings and the separations between them. Locations were selected with regard to the current Sunbridge PD Regulating Plan and existing points of access routes to adjacent properties including the City of Cocoa water supply well sites and the adjacent ranch lands. The access management design criterion for median opening separation along the urban roadway segments is 660 feet minimum pursuant to Orange County standards (See Section V.c). Due to the increased design speed and rural nature of Segment 4, an increased median opening separation of 2,640 feet is recommended; however, a minor deviation from this standard is proposed along the northerly portion of Segment 4 in order to accommodate existing points of access into the adjacent Holland Ranch. In this instance, the separation between these median openings is 2,100 feet. A listing of the proposed locations of the median openings is provided in the table below. Adjustments to the access points as shown in the Regulating Plan were made to better accommodate the surveyed wetland locations and better serve all of the remainder development parcels, resulting in some median opening spacings being less than those depicted on the Regulating Plan but in no instance being less than the 660-foot minimum. The Regulating Plan is used as the base for the Access Management Plan so that the proposed locations can be readily compared.

A detail depicting the intersection of Sunbridge Parkway with Innovation Way South is presented in Appendix R.

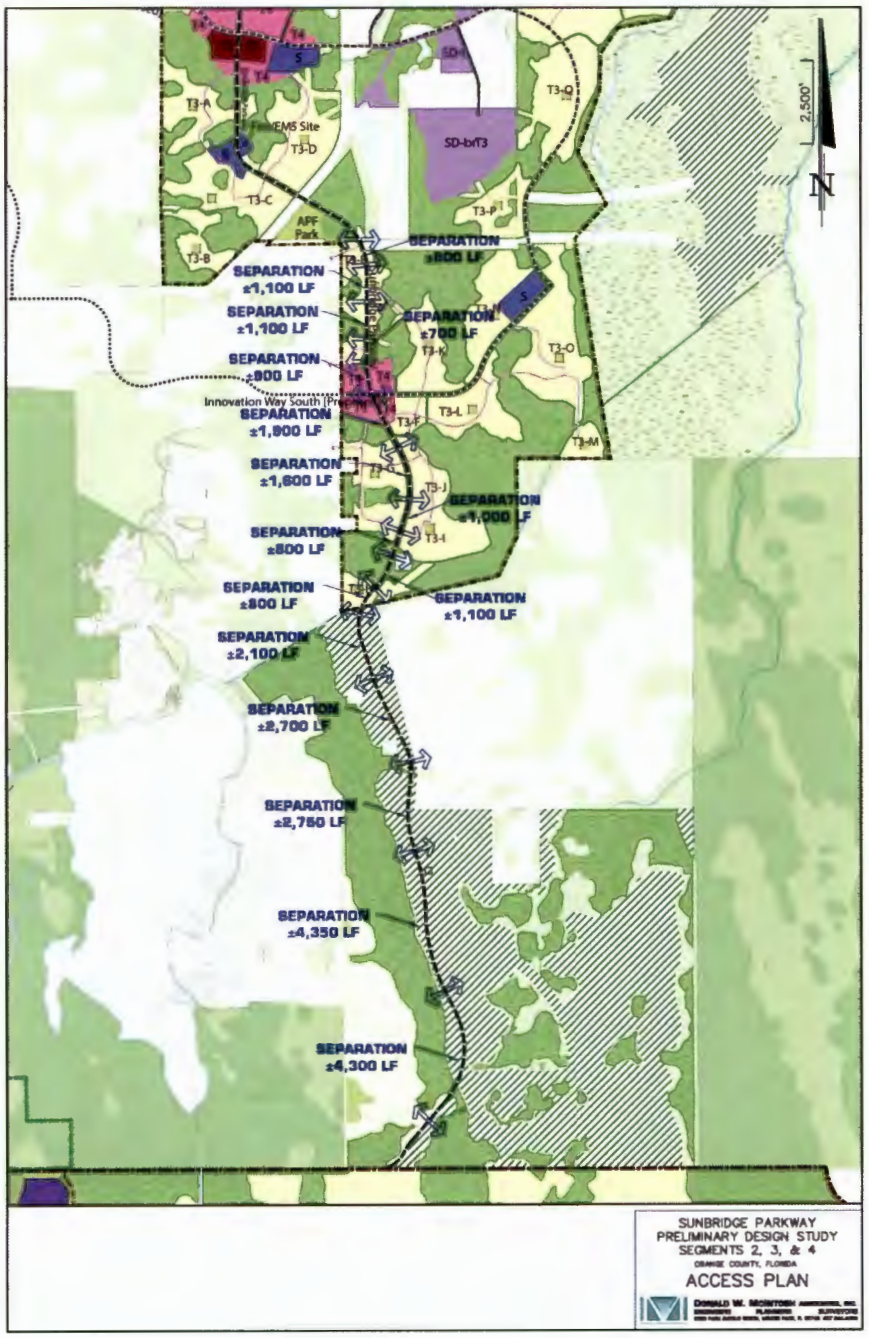


FIGURE VII-6: ACCESS PLAN

Access Management - Median Opening Locations		
Median Opening Station	Median Opening Separation	Notes
579.95		Begin Project
597.00		
	4300	
640.00		
	4350	
683.50		
	2750	
711.00		
	2700	
738.00		
	2100	
759.00		
	800	
767.00		
	1100	
778.00		
	800	
786.00		KAI- Intersection F*
	1000	
796.00		KAI-Intersection F
	1600	
812.00		KAI-Intersection E
	1900	
831.00		Innovation Way South (KAI Intersection D)
	900	
840.00		
	700	
847.00		KAI Intersection C
	1100	
858.00		KAI Intersection B
	1100	
869.00		KAI Intersection B
	800	
877.00		Wewhootee Road (KAI Intersection A)
	3743	
914.43		Connect to Segment 1
*Based on Kittelson & Associates Traffic Study Intersection Designation		

e. Utility Strips

Although the construction of utilities to serve future development is not included in the roadway project, the right-of-way and /or adjacent utility easements must accommodate it. Along the urban segments of Sunbridge Parkway, utilities may be accommodated in the following locations:

- Within the 16' trail and utility easement along the westerly right-of-way
- Within the median
- Within the easterly right-of-way under the 10' multi-purpose path
- Under the roadway pavement (gravity sewer only)

The proposed utility placements are depicted in Figure VII-7 below:

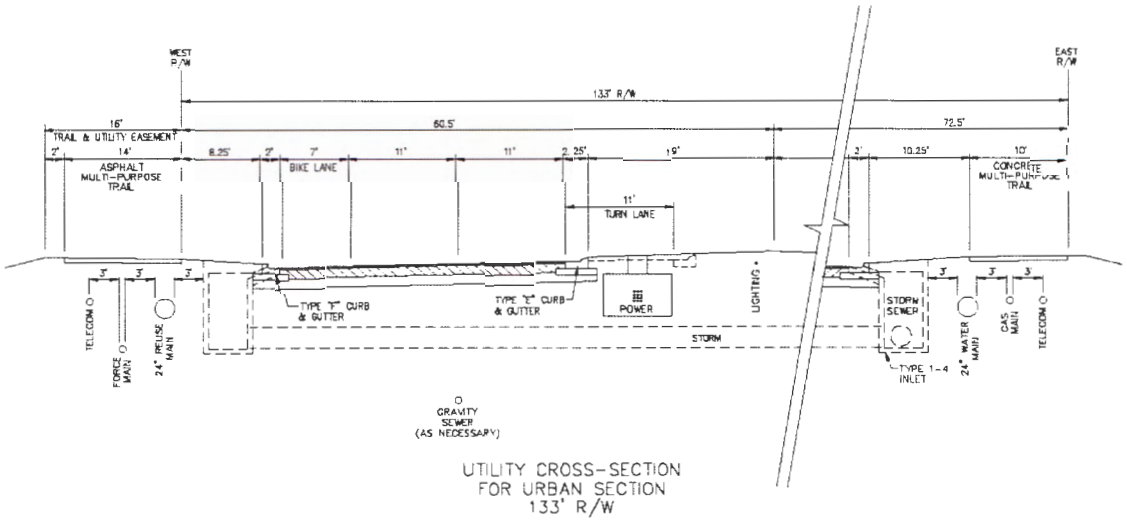


FIGURE VII-7: UTILITY CROSS SECTION

f. Pond Siting for Stormwater & Floodplain Management

Stormwater management pond locations were selected for the portion of Segment 2 north of Wewahootee Road (Ponds 6C-2, 6C-3 and 13) in accordance with existing SFWMD Conceptual Environmental Resource Permit for ICP and the pending preliminary subdivision plan for Sunbridge Neighborhoods A-D. These ponds will be used to accommodate drainage from both Sunbridge Parkway and the proposed residential subdivision.

The five ponds serving the portion of Segment 2 located south of Wewahootee Road and Segment 3A were located for consistency with land planning objectives for the adjacent property, proximity to the wetland areas into which they will discharge and topography.

No ponds will be used along Segments 3B and 4 where management of stormwater will occur within a system of roadside ditches with check dams.

The stormwater management system concept as presented maintains the existing natural drainage patterns. Drainage basins and points of discharge are selected to route stormwater runoff to the same locations as in the existing condition. Cross-drains are designated at locations where natural flow patterns cross the roadway corridor.

Floodplain management related to the roadway construction project should be consistent with the floodplain management requirements set forth in the County's Comprehensive Plan, Objective C1.3, Policies C1.3.1, C1.3.3, SM1.1.5 and SM1.5.2 requiring that compensating storage be provided to offset floodplain encroachment, that floodway encroachment be restricted and that retention/detention facilities do not reduce the existing flood storage of the floodplain. Filling of floodplain areas will require the provision of compensating storage (or other satisfactory mitigation) for any fill encroaching into and displacing existing floodplain volume.

VIII. Analysis of the Improvement Concept

a. Opinion of Cost

The Opinion of Probable Cost for Construction inclusive of right-of-way of the 4-lane divided project based on total buildout in one construction phase, with an at-grade railroad crossing and inclusive of signalization at Innovation Way South is $48,924,760.00.

See Appendix S for additional details.

b. Wetland Impacts

See Preliminary Design Study, Environmental Analysis, dated November 2, 2017, by Breedlove Dennis & Associates, Inc., Appendix T

Wetlands [Jurisdictional Limits] occurring within the study area north of Disston Canal have been approved by the Orange County Environmental Protection Division (OCEPD), the associated water management districts including South Florida Water Management District (SFWMD) and St. Johns River Water Management District (SJRWMD), and the Department of the Army, Corps of Engineers (USACOE). Wetlands occurring south of Disston Canal have been approved through OCEPD.

The recommended alignment has been selected to avoid and minimize wetland encroachments while accommodating other alignment constraints discussed in this Report. Conformance to the Environmental Land Stewardship Plan is a design objective and has been accomplished to the

maximum extent reasonable and practicable. A modification of the ELSP may ultimately be required in those areas where alterations were deemed beneficial.

The Parkway and associated surface water management system will result in direct impact to approximately 40.34 acres of wetlands and 5.27 acres of surface waters, as well as 5.67 acres of upland Riparian Habitat Protection Zone (RHPZ) impact. Secondary impacts pursuant to Section 10.2.7 of FDEP A.H. Volume I are expected within approximately 11.59 acres of adjacent wetlands and 2.03 acres of RHPZ uplands as a result of the proposed Parkway.

A total of 9.87 acres of wetland impact associated with the roadway corridor and the associated mitigation have been previously approved in conjunction with the environmental permitting of ICP.

Based on the UMAM analysis, a total functional loss of 21.36 units was calculated for the Sunbridge Parkway impacts (direct and secondary) not previously permitted with ICP. Two mitigation options are proposed to address the functional loss associated with the potential project impacts not previously permitted with ICP. These options can be used individually or in combination.

1. Purchase of 21.36 UMAM mitigation credits at TM Econ Mitigation Bank for the non -ICP impacts: $1.9 million estimated cost.

2. Preservation and vegetative enhancement of 240 acres of the 629-acre Robert's Island Slough: $1.04 million estimated cost, plus land costs, if applicable. Perpetual management and maintenance would be the responsibility of the management entity following agency release.

Based on BDA review of existing databases, recent site inspections, and location of the proposed Parkway alignment associated and identified with this study area, no wetland constraints have been identified that would not be anticipated to be approved in the normal course of agency review and permitting.

In accordance with the Road Agreement for Sunbridge Parkway, Tavistock East Services, LLC is responsible for mitigation associated with the construction of the initial 2-lane rural roadway within Segments 2-4. Mitigation associated with future improvements beyond the initial 2-lane rural roadway will be the responsibility of the entity constructing the improvements.

c. Floodplain Impacts

Approximately 24 acres of floodplain area will be impacted by the roadway corridor. The estimated volume of floodplain fill is 30,400 cubic yards based on the Conceptual Drainage and Floodplain Impact Analysis. The conceptual master stormwater management system together with stand-alone floodplain compensation areas are designed to provide roughly 34,300 cubic yards of compensating storage to mitigate for the volume of floodplain filled.

Where feasible, volumetric compensating storage for floodplain encroachment is provided within the stormwater management ponds. Where additional volume is needed, sites comprising roughly 15 acres have been selected where topography provides the necessary excavation benefits and connectivity to the impacted floodplain. Within the rural segments, the roadside ditches were not used for compensating floodplain storage. Compensating Storage Area easements will be placed over the compensating storage areas with Orange County as a benefitted party. Compensating Storage Area easements will be placed over the compensating storage areas with Orange County as a benefitted party.

d. Critical and Strategic Habitat Impacts

As reported in BDA's Environmental Considerations report there are no significant (Priority 1 or 2) strategic habitat impacts. See Figure IV-20.

e. Wildlife Corridor Impacts

See Preliminary Design Study, Environmental Analysis, dated November 2, 2017, by Breedlove Dennis & Associates, Inc., Appendix T.

The Parkway alignment design and mitigation options are consistent with the planning principles and mapped ELSP lands in Orange County. Implementation of either mitigation option will preserve the ecological conditions of the upland and wetland and provide viable, sustainable, ecological, and hydrological functions in the post-development condition for both wetland resources and wetland-dependent and wetland-independent wildlife species utilizing the project site.

Implementation of the ELSP principles on the Parkway and surrounding properties will not only provide for these species, but for listed species as well as for other species with smaller area requirements.

The wildlife corridors and associated environmental stewardship lands provide important ecological connections and establish a greenway corridor that will extend off-site to neighboring preservation lands. Provisions should be made for wildlife corridor connectivity and wildlife crossings, including creating suitable design features for the transportation corridor in accordance with the ELSP.

Two wildlife crossings that were identified as important wildlife corridors across the Parkway study area include where the proposed alignment crosses within the vicinity of the Disston Canal and the southern portion of the Slough.

The factors utilized to consider for the need, type, and location of the wildlife crossings for the Sunbridge Parkway study area include proximity of proposed transportation to designated preserve areas, size and location of the preserve areas, upland or wetland communities that

may be affected, species most likely to inhabit the preserved areas adjacent to the transportation corridor, and whether the preserve functionally connects to other designated preserve areas (i.e. public lands).

Based on these factors, wet and dry circular culverts are recommended to facilitate the movement of wildlife. Wet culverts that facilitate the passage of wetland dependent species should be based on the hydrologic needs at the crossings. Dry culverts that facilitate the passage of terrestrial species should be installed at the interface between wetland and upland habitats on each side of the wet culvert crossing and should be 24 to 36 inches in diameter. The locations and appropriate sizing of the wildlife crossings should be reviewed and finalized with Orange County, FWC, and USFWS at the time of final roadway construction plan submittals.

Accordingly, wildlife crossings are shown in the recommended improvement plan at two locations as depicted on the Recommended Improvement Concept Map, Appendix O. They are comprised of a mix of normally dry and normally wet pipe crossings consistent with the guidelines above.

f. Threatened & Endangered Species Impacts

The presence or the potential for the presence of listed plant or animal species was assessed and included in the Preliminary Design Study, Environmental Considerations dated July 25, 2017, by Breedlove Dennis & Associates, Inc., Appendix J.

Species discussed below are those that are expected to require updated species-specific surveys, agency coordination, permitting, or may be impacted by the construction of the Parkway in its current alignment.

Listed wildlife observed within the Parkway study area includes the gopher tortoise and Sherman's fox squirrel.

Eastern Indigo Snake (Federally Threatened, Florida Fish & Wildlife Commission; Threatened, United States Fish & Wildlife Service): There are two areas of high probability of eastern indigo snake habitat in the vicinity of the proposed alignment: to the north of the Osston Canal and at the southern portion of the Slough. These are the locations of the proposed wildlife crossings. Implementation of the Standard Protection Measures for the Eastern Indigo Snake are expected to be a condition of the federal permit authorization for construction activities on the Parkway to minimize potential adverse effects from construction to the eastern indigo snake.

Gopher Tortoise (State-designated Threatened, Florida Fish & Wildlife Commission; Candidate, United States Fish & Wildlife Service): The gopher tortoise is listed as State-designated Threatened by the Florida Fish & Wildlife Commission but is not listed as threatened or endangered by the United States Fish & Wildlife Service. A survey of 100% of suitable gopher

tortoise habitat will be required prior to development stages in accordance with the Gopher Tortoise Permitting Guidelines (April 2008, revised January 2017) (Florida Fish & Wildlife Guidelines) to determine the population size and distribution of gopher tortoises within the final alignment and evaluate management options available for this species. Gopher tortoise relocation is expected to be the most viable option for this project. The Florida Fish & Wildlife Commission will require a conservation permit prior to conducting the relocation. The application fee, relocation costs, and recipient site fees will be dependent on the number of gopher tortoises located within the final Parkway alignment.

Florida Sandhill Crane (State-designated Threatened, Florida Fish & Wildlife Commission): In accordance with the Florida Fish & Wildlife Commission (Integrated Conservation Strategies for Multiple Species and their Shared Habitats), Florida Sandhill Crane Species Guidelines (Sandhill Crane Guidelines), the recommended survey methodology within Florida Sandhill Crane breeding habitat should be conducted prior to any development phases located within the Parkway site to identify any new nesting locations, if present. Recommended conservation measures one through four listed in the Sandhill Crane Guidelines have been considered for the proposed project. If Florida Sandhill Crane nests are documented during preconstruction surveys, the proper avoidance measures indicated in measures five and six of the Sandhill Crane Guidelines should be followed:

- Take steps when possible to avoid disturbing active nests and flightless young (e.g., conduct activities outside of the breeding season or outside of a 400-foot buffer around active nests when feasible) when conducting land management activities beneficial to wildlife in accordance with Rule 68A-27.007(2)(c), F.A.C.
- Maintain open areas for foraging through cattle grazing, mowing, or other means.

Wading Bird Rookeries and Wood Storks: The PDS review area is within 9.3 miles of a rookery that includes listed wading bird species and within 15 miles of a wood stork rookery). Wetlands located within those distances to rookeries are considered important to nesting success. Impacts to wetlands associated with the Parkway will require consideration of the impact to the listed wading bird species and wood stork. The United States Fish & Wildlife Service may require additional information regarding impacts and mitigation of wood stork suitable foraging habitat biomass.

The mitigation options proposed both provide long-term conservation benefits for the wood storks and listed wading birds and are expected to offset potential impact.

Sherman's Fox Squirrel (Sciurus niger shermani) (Species of Special Concern, Florida Fish & Wildlife Commission): Sherman's Fox Squirrels have been observed within and north of the study area. In accordance with the Florida Fish & Wildlife Commission (Integrated Conservation Strategies for Multiple Species and their Shared Habitats) Sherman's Fox Squirrel Species

Guidelines (Sherman's Fox Squirrel Guidelines), the recommended survey methodology to determine the presence of Sherman's fox squirrels should be conducted in suitable habitat prior to any development phases located within the Parkway site. For accuracy, surveys should be conducted within 60 days of clearing or construction. If fox squirrel nests are found within the final Parkway alignment, a 125-foot buffer distance from the nest should be maintained until occupancy can be determined. Removal of unoccupied nests is allowed without a permit. If nests are occupied, take of the nest should be avoided until the fox squirrel leaves the nest. If it is necessary to remove a nest tree or work within 125 feet of an occupied nest tree, further coordination with the Florida Fish & Wildlife Commission to discuss permitting alternatives should be conducted. Location of nests may vary due to environmental conditions. No mitigation is required for the take permit.

Based on BDA review of existing databases, recent site inspections, and location of the proposed Parkway alignment associated and identified with this study area, no listed species constraints have been identified that would not be anticipated to be approved in the normal course of agency review and permitting.

g. Archeological & Historic Feature Impacts

See Archeological and Historical Feature Impact Analysis dated September 13, 2017 (Appendix U) and Desktop Analysis of the Sunbridge Parkway and Ponds for the Preliminary Design Study dated August 2017 by SEARCH, Inc., (Appendix I).

The results of the SEARCH Archeological and Historical Feature Impact Analysis are summarized in the two tables below. The sites are depicted on Figures IV-6, Figure VIII-7 and IV-8.

Previously Recorded and Potential Historic Properties within Sunbridge Parkway and Ponds Study Area	
Florida Master Site File Previously Recorded Resources	**Project Impact to Site**
The Magnolia Pump House (8OR02206) site is located approximately 170 meters east of the current study.	Potential for indirect effects; to be assessed during survey.
Orange County Property Appraiser Unrecorded	**Project Impact to Site**
One large parcel containing a single family residence, shed, and barn all constructed in 1960 is within the current study area.	Potential for direct effects; to be assessed during survey.
Historic USGS Quadrangle Maps Unrecorded Resources	**Project Impact to Site**
Disston Canal is evident on the 1953 quad map.	Potential for direct effects; to be assessed during survey.
Unimproved roads/trails.	Potential for direct effects; to be assessed during survey.

Archaeological Probability within Sunbridge Parkway and Ponds Study Area	
Archaeological Probability	**Approximate Percentage**
High	4%
Medium	21%
Low	75%

The archeological probabilities are mapped by SEARCH, see Figures VIII-1 through VIII-4 Below.

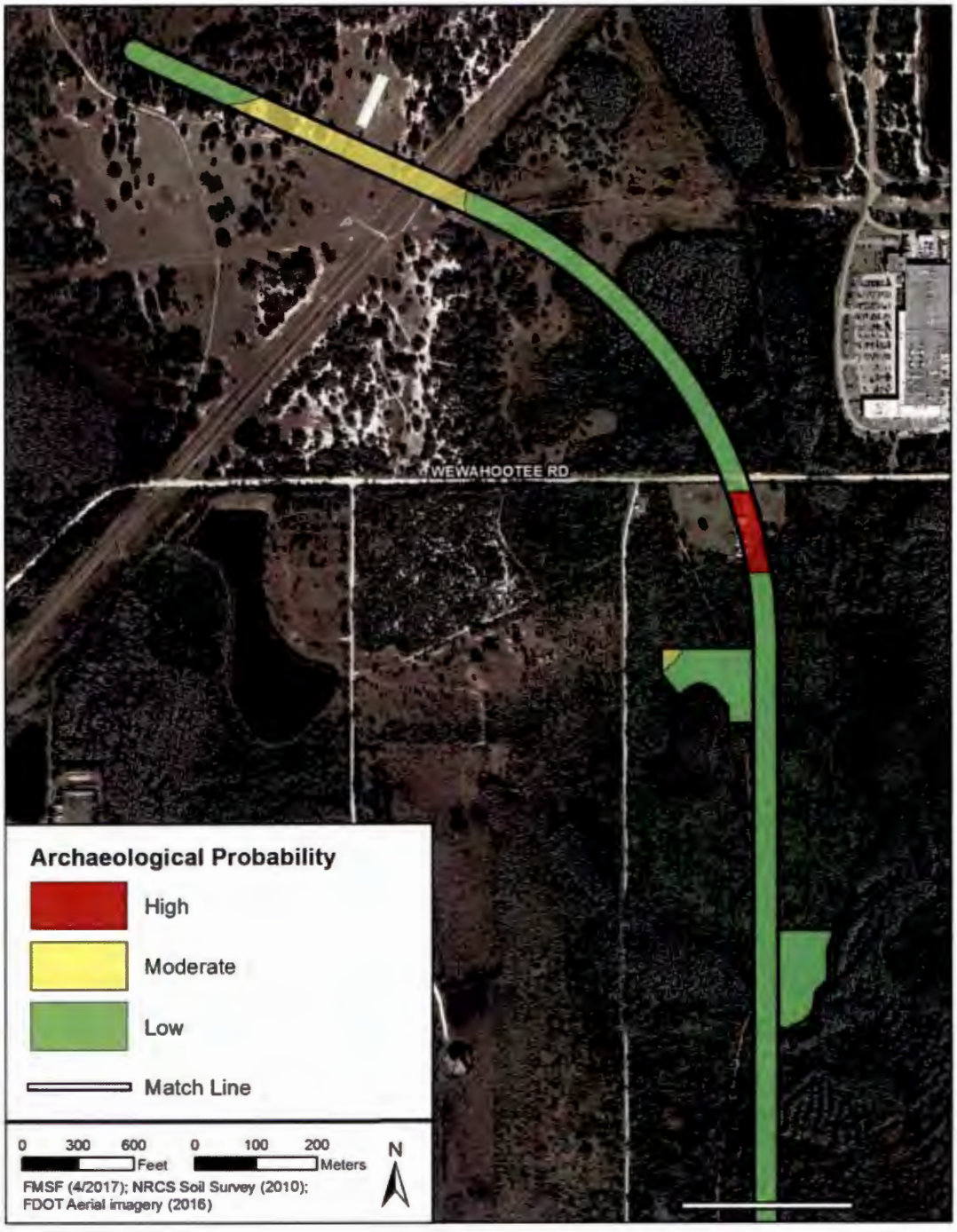


Figure 5. Archaeological probability within the northern portion of the Sunbridge Parkway right-of-way and Pond footprints.

FIGURE VIII-1: ARCHEOLOGICAL PROBABILITY - NORTH

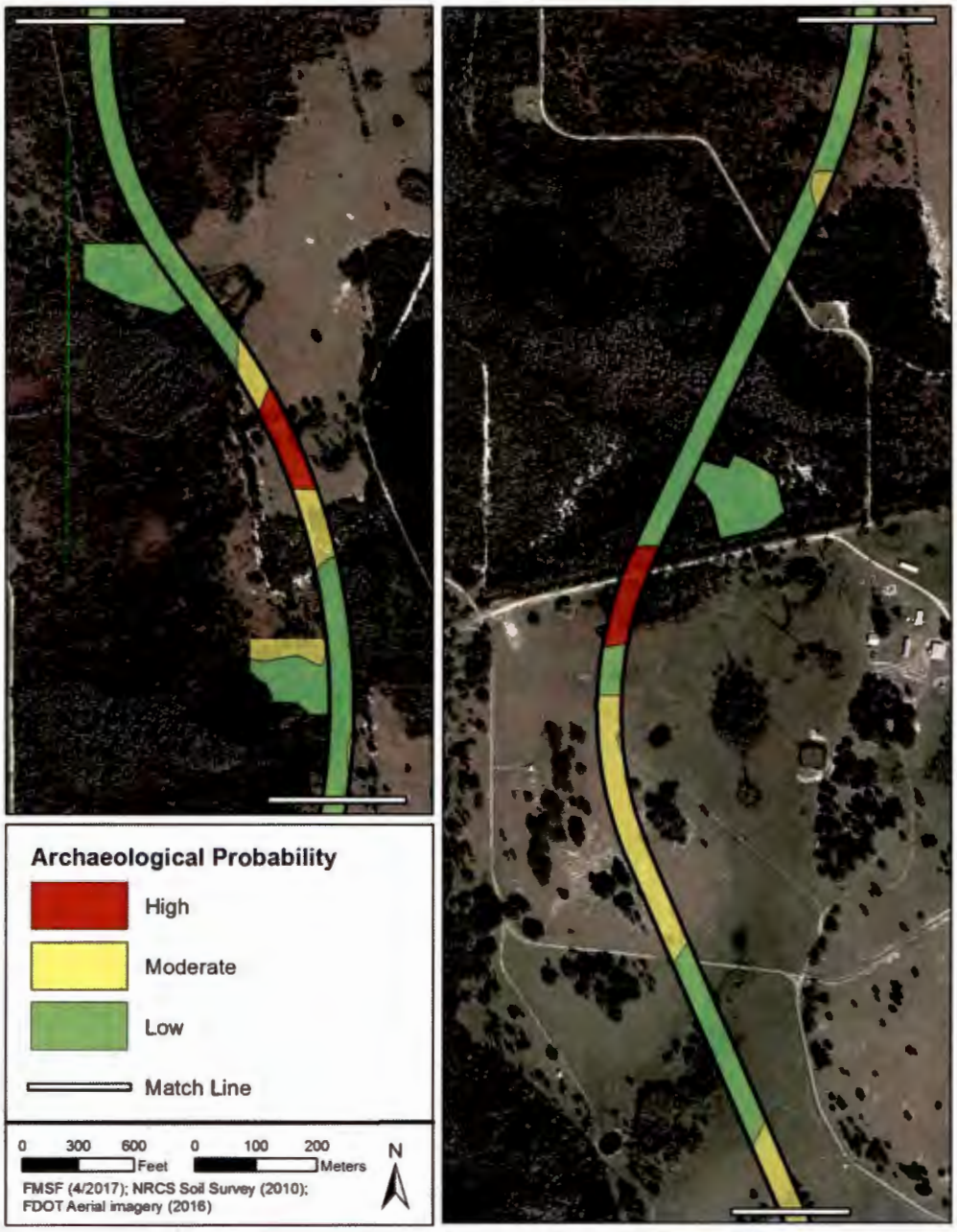


Figure 6. Archaeological probability within the northern-central portion of the Sunbridge Parkway right-of-way and Pond footprints.

FIGURE VIII-2: ARCHEOLOGICAL PROBABILITY – NORTH CENTRAL

Figure 7. Archaeological probability within the southern-central portion of the Sunbridge Parkway right-of-way and Pond footprints.

FIGURE VIII-3: ARCHEOLOGICAL PROBABILITY – SOUTH CENTRAL

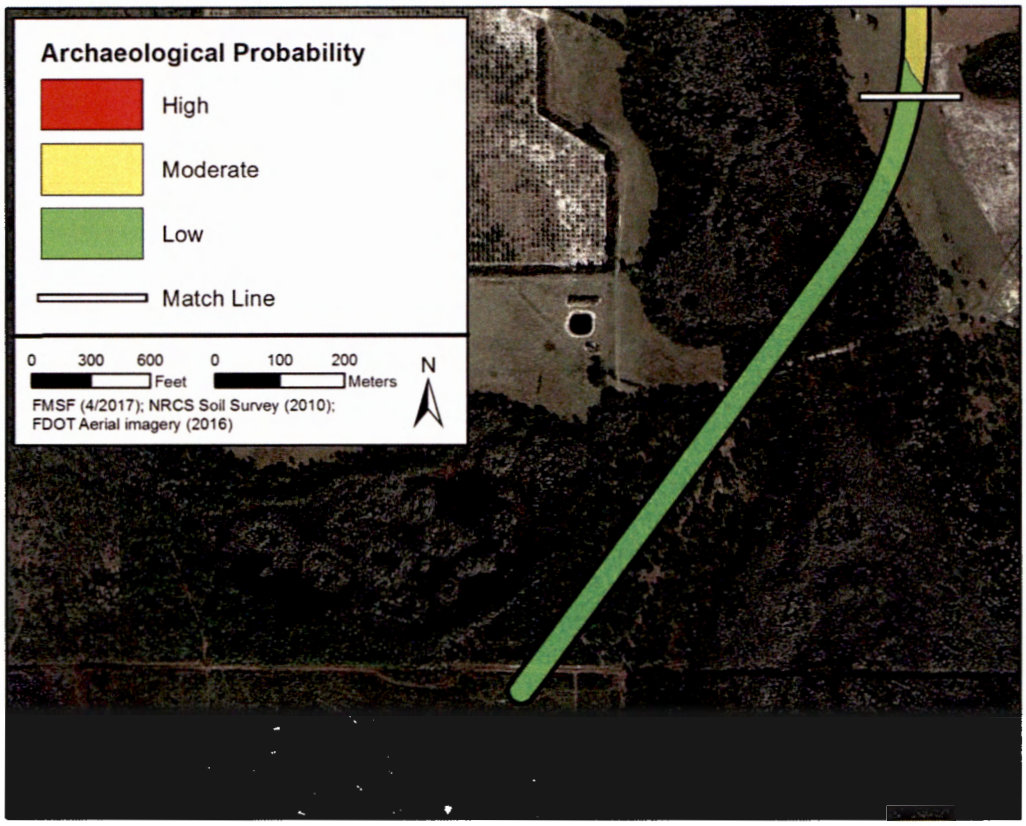


Figure 8. Archaeological probability within the southern portion of the Sunbridge Parkway right-of-way and Pond footprints.

FIGURE VIII-4: ARCHEOLOGICAL PROBABILITY – SOUTH

h. Utility Impacts

There are no significant impacts to existing utilities anticipated for construction of the roadway with an at-grade railroad crossing. However, when and if a grade separated/bridge crossing is warranted, impacts to the existing electrical towers and the high pressure gas main will occur. (See Appendix V):

- OUC 230 kV electric transmission facilities (lines and towers): The existing transmission facilities run within an existing 300-foot wide OUC right-of-way, generally parallel to the existing railroad. The towers and lines will need to be raised to maintain minimum clearance requirements from the power lines to the roadway surface.

- Florida Gas Transmission Company high pressure gas transmission system and facilities: A 26-inch high pressure (975 psi) main runs generally east-west (south of and adjacent to the Duke Energy easement) and extends to Florida Power and Light's Cape Canaveral Clean Energy Center as its sole source of fuel. A 16-inch main runs along the east side of the OUC railroad right-of-way and extends to OUC's Curtis Stanton Energy Plant as a secondary

source of fuel. The mains will lie under the raised roadway embankment for the approach to the bridge. Four alternatives have been defined to address the matter.

- Extend the bridge span to extend beyond the gas mains
- Construct an open-bottom arch culvert over the gas main alignments
- Relocate the gas mains
- Encase the existing mains in concrete

As of this writing the preferred alternative is to construct the open bottom arch culvert over the gas mains.

- Duke Energy 96 kV electric transmission facilities (lines and poles): The overhead line runs generally east-west within a 55-foot wide easement, crossing the Sunbridge Parkway corridor near the anticipated roadway/railroad crossing. The poles will need to be raised to restore minimum clearance requirements from the power lines to the roadway while maintaining the required vertical clearance from the OUC transmission lines.
- OCU potable water main: A 24-inch DIP water main runs along the north side of the OUC railroad right-of-way in a 30-foot wide sewer and water line easement adjacent to the railroad right-of-way. The Sunbridge Parkway corridor crosses the main in the vicinity of the anticipated roadway/railroad crossing. This main will be located within the span of the proposed bridge.
- OCU wastewater force main: A 16-inch PVC force main runs along the north side of the OUC railroad right-of-way in a 30-foot wide sewer and water line easement adjacent to the railroad right-of-way. The Sunbridge Parkway corridor crosses the main in the vicinity of the anticipated roadway/railroad crossing. This main will be located within the span of the proposed bridge.
- TECO gas distribution system facilities: Extending from the gate station and crossing the Sunbridge Parkway corridor is a 6-inch main running northeasterly in a 10-foot wide easement on the north side of the railroad right-of-way. This main will be located within the span of the proposed bridge.

i. Contaminated Sites Impacted

See Contaminated Sites Impact Analysis letter dated August 28, 2017 by Professional Services Industries, Inc., Appendix W.

PSI's reports "no High or Medium Risk sites were identified within the study area extending 250 feet in all directions of the study corridor centerline and five pond locations and "One Low Risk site [the OUC railroad crossing] was identified within the study corridor" (See Figure XX).

As presented in this PDS, an easement or agreement favoring Orange County is assumed over the OUC right-of-way. As a result, no Orange County right-of-way is anticipated to be affected by the "low risk" site.

j. GEOTECHNICAL ANALYSIS

See Preliminary Report Geotechnical Engineering Services, Sunbridge Parkway PDS dated October 26, 2017 by Professional Services Industries, Inc. (PSI) (Appendix G).

Although the excavated soils from all (3) strata are deemed to be acceptable for fill material, PSI advises that soils from strata 2 may retain excess moisture and be difficult to compact and the cemented sands in strata 3 will need to be fully pulverized/crushed.
Subsoil excavation to remove organic soils (muck) occurring in variable depths of 0 to 7 feet observed in the boring locations should be anticipated where the roadway crosses wetland areas. The muck probe data was used to obtain an order of magnitude estimate of 70,000 raw cubic yards (CY) of muck to be removed exclusive of the top 6-inches (this order of magnitude acknowledges that PSI has reported that the data is not adequate for earthwork takeoffs and should be considered accordingly). For purpose of this report it is assumed that the muck will need to be disposed of off-site. Further we have assumed that organic sands can be remediated by mixing with other soil material and so they are treated as ordinary excavation.

Groundwater levels encountered in the SPT and auger borings generally ranged from 0 to 5 feet below the existing grade, with a majority of the groundwater depths ranging from 1 to 3.5 feet below existing grade. The average wet season water level for use in designing the wet bottom ponds is anticipated to be 1 foot below the estimated normal seasonal high groundwater elevations. Excavation of stormwater management ponds, compensating storage areas and deeper utility and drainage trenches will require dewatering.

PSI recommends roadway grades provide at least 2 feet of separation between the estimated normal seasonal high groundwater level and the bottom of the roadway base. If this separation cannot be provided, they recommend that crushed concrete base, asphaltic base (black base) or underdrains may be required.

PSI recommends that the swales be designed with a minimum of 2 feet of separation between the bottom of the swale and the estimated normal seasonal high groundwater elevation.

The very dense sands and cemented sands ("hardpan") were encountered during the field exploration over almost the entire length of the corridor and may be encountered at other locations along the roadway alignment and in the pond locations between and away from PSI's borings. The hardpan and very dense soils encountered raise the following concerns which may result in additional construction costs:

- difficulties during excavation and dewatering operations
- the influence of dewatering well points may be reduced due to restrictive layers and varying permeabilities
- pipe bedding locations may have to be undercut and backfilled to avoid uneven loading (point loads) of pipes and fittings
- difficulty during drilled shaft excavation at proposed sign or signal locations.

The contractor should be prepared to use special equipment and or procedures to facilitate excavations, dewatering and other earthwork operations. The data provided indicates that the surface of the hardpan varies from roughly 2 feet to roughly 18.5 feet below the existing

surface. More typically the higher surfaces appear to occur in the 6 to 8-foot depth range. With the anticipation of several feet of fill for the roadway corridor, it appears that most ordinary utility installations and much of the drainage pipe installations will lie above the hardpan surface. Larger and deeper storm drains and related structures may intercept the higher hardpan surfaces.

Based on the review of available data, it is PSI's opinion that the project area is at a low risk for future sinkhole development.

PSI's recommendations for additional actions for the design phase are:

- Additional borings and permeability testing for the pond (2 borings per acre in ponds) and swale locations (one boring every 100 feet) to assist with final design;
- Additional borings and engineering analysis for the Disston Canal crossing once a preferred structure type is determined;
- Plan review and updating of recommendations;
- Wetland hydroperiod determination for systems adjacent to the roadway;
- Borings spaced at 100-foot intervals along the alignment, even though Orange County Standards state a maximum spacing of 200 feet between borings for final design, due to the width of the roadway and the critical nature of Sunbridge Parkway;
- Additional borings should also be planned in areas where very dense sands and cemented sands may impact the installation of buried utilities or pond excavation.

IX. Legal Descriptions & Title Work

Fee simple rights in favor of Orange County will need to be created for the roadway in the form of road right-of-way for the 160–foot wide rural roadway corridor, the 133-foot wide urban roadway corridor and the widened portion of the urban corridor to accommodate a potential future bridge over the railroad. Compensating storage easements may be needed for those floodplain compensating storage areas that are not included within the stormwater management areas. Slope and Fill easements will be required adjacent to the roadway right-of-way areas currently estimated to be 37.5 feet wide. Temporary Construction Easements will also be needed adjacent to the roadway right-of-way areas to enable slope and fencing construction as well as in the areas where existing roadways/driveways approaching the proposed parkway will require realignment to establish a properly oriented crossing perpendicular to the parkway. These are also currently estimated to be 37.5 feet wide typically and wider at the roadway driveway realignment areas. Stormwater management ponds are anticipated to be joint use facilities that are privately owned and maintained and will therefore require dedication of a drainage easement to Orange County consistent with the Road Agreement. Drainage easements will be required for stormwater outfalls from ponds and for cross-drains that extend beyond the right-of-way lines. Pathway easements will be needed for the 14-foot wide Trail running adjacent to the west right-of-way line. Utility easements will be required over those parts of the Trail/pathway easements within the urban segments.

A summary of the acreages to be encumbered as preliminarily estimated is as follows:

Fee Simple Right-of-Way	120.8 Acres
Stormwater Management Easements	17.3 Acres
Drainage Easement Area	0.6 Acres
Floodplain Compensating Storage Easement Area	26.4 Acres
Permanent Slope Easement Area and Temporary Construction Easement Area	27.6 Acres
Additional Temporary Construction Easement for Roadway/Driveway Connections	1.1 Acres
Pathway and Utility Easement Area (urban)	4.0 Acres
Pathway Easement Area (rural)	8.1 Acres

Notes:

1. Areas of SMA 6C-2, 6C-3 and 13 are pro-rated.
2. Drainage easement areas overlap slope easement areas.
3. Portions of trail and utility easement areas overlap SMA easements.
4. Portion of Slope Easements and Temporary Construction Easements overlap SMA easements.
5. Acreages are approximated from the Recommended Improvement Concept Map and are subject to finalization during preparation of legal descriptions.

Legal descriptions and sketches of description together with associated title work are provided in a separate volume.

Appendices

A. Transportation Agreement for Sunbridge Parkway
B. Public Involvement Documents – Newsletters
C. Public Involvement Documents – Advertisements
D. Public Involvement Documents – Small Group Meeting No. 1
E. Public Involvement Documents – Public Information Meeting
F. Public Involvement Documents – Utility Company and Agency Coordination Memos
G. Preliminary Report Geotechnical Engineering Services, Sunbridge Parkway PDS by Professional Services Industries, Inc.
H. Contamination Screening Evaluation Report by Professional Services Industries, Inc.
I. Desktop Analysis of the Sunbridge Parkway and Ponds for the Preliminary Design Study by SEARCH, Inc.
J. Environmental Analysis by Breedlove, Dennis & Associates, Inc.
K. Hydrologic and Natural Features by Donald W. McIntosh Associates, Inc.
L. Conceptual Drainage, Floodplain Impact Analysis, Pond Siting Report by Donald W. McIntosh Associates, Inc.
M. Design Traffic Technical Memorandum by Kittelson & Associates, Inc.
N. Baseline Geometry
O. Recommended Improvement Concept Map
P. Roadway Cross-sections
Q. Roadway Lane Transition Details
R. Innovation Way South Intersection Detail
S. Opinion of Probable Cost
T. Environmental Analysis by Breedlove, Dennis & Associates, Inc.
U. Archeological And Historical Feature Impact Analysis by SEARCH, Inc.
V. Railroad Crossing Details
W. Contaminated Sites Impact Analysis by Professional Services Industries, Inc.

ORANGE COUNTY GOVERNMENT FLORIDA

MEMORANDUM

February 15, 2018

TO: Mayor Teresa Jacobs
-AND-
Board of County Commissioners

FROM: ~~JaJa Wade~~ James Dunn, Chairman
Planning and Zoning Commission (PZC) /Local Planning Agency (LPA) Members

SUBJ: **Sunbridge Parkway Preliminary Design Study**

On February 15, 2018 the Local Planning Agency (LPA) held a public hearing regarding the Preliminary Design Study for Sunbridge Parkway, Segments 2 through 4. Segment 1 is currently in the design phase as a four-lane urban roadway pursuant to the terms of the Sunbridge Parkway Road Agreement approved by the BCC on April 25, 2017. Sunbridge Parkway is located in eastern Orange County within the Innovation Way Overlay. The overall project limits are from Aerospace Parkway and Dowden Road to the Orange / Osceola County line, a distance of approximately 6.3 miles.

The study recommends the most appropriate road alignment with stormwater facilities and bicycle and pedestrian accommodations while minimizing environmental impacts. The need for this roadway is based on variety of factors including future traffic demand, safety, and social and economic factors.

The LPA approved the findings of the study and found them consistent with the Comprehensive Plan.

cc: Local Planning Agency
Jon V. Weiss, P.E., Director, CEDS Department
Mark V. Massaro, P.E., Director, Public Works Department
Renzo Nastasi, AICP, Manager, Public Works Transportation Planning Division
Raymond L. Williams, P.E., Manager, Public Works Engineering Division

Please see the Comptroller Clerk’s Office for the Sunbridge Parkway Preliminary Design Study CD backup that was provided to the Board.