

DRAFT
LOCATION HYDRAULICS REPORT

Florida Department of Transportation

Florida's Turnpike Enterprise

Turnpike at I-95 Direct Connection Interchange Project Development and Environment Study

Limits of Project: Approximately 2 miles north and south of SE Bridge Road (CR 708) along
Florida's Turnpike (SR 91) and I-95 (SR 9)

Martin County, Florida

Financial Management Number: 446975-1

ETDM No. 14444

September 2025

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

EXECUTIVE SUMMARY

Florida's Turnpike Enterprise (FTE) is conducting a Project Development and Environment (PD&E) study to evaluate the potential for a new system-to-system direct connection interchange between Florida's Turnpike (SR 91) and Interstate 95 (I-95) at SE Bridge Road (CR 708) in Martin County, Florida. The study area begins approximately two miles south of SE Bridge Road at Mile Post (MP) 123.44 and extends approximately two miles north of SE Bridge Road to MP 127.53. The proposed interchange concept aims to improve traffic operations for the north-south through trips in the project area and to enhance traffic conditions on existing local roadways that currently serve as connections between SR 91 and I-95. A Type 2 Categorical Exclusion is being prepared as part of this PD&E study, which will satisfy all applicable federal and state environmental requirements, including the National Environmental Policy Act (NEPA), to qualify the project for federal-aid funding in future phases such as design, right-of-way acquisition, and construction.

The purpose of this PD&E study is to evaluate engineering and environmental data and document information that will aid FTE in determining the location, type, and preliminary design of the proposed improvements. The total project length is approximately 4 miles. The preferred alternative for the Turnpike at I-95 direct connection interchange study includes the construction of four system-to-system ramps to accommodate all directional movements between SR 91 and I-95 near SE Bridge Road in Martin County.

In the existing condition, there are two bridge culverts, a bridge over Phipp Canal, and two non-qualifying bridge cross drains within the immediate vicinity of the proposed direct connector. Replacement and/or extensions of drainage structures for this project are anticipated to be limited to hydraulically equivalent structures which are not expected to increase the backwater surface elevations. The limitations to the hydraulic equivalence being proposed are due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered since it does not meet the project's purpose and need or is economically unfeasible. There are no reported flooding problems within the project area. Any localized areas of ponding offsite are inherent in the topography or area as a result of other outside contributing sources, and there is no feasible alternative to eliminating localized flooding problems. Existing offsite flooding will not increase as a result of the construction of this project, and on-site conveyance will be designed to meet the FDOT's level of service standards.

In the proposed condition, the bridge culvert and a SR 91 bridge over Phipp Canal will be widened to accommodate the proposed improvements. Two new bridges are being proposed over Phipp Canal, Bridge 4A and 4B. A bridge hydraulics report will be required for these structures during the design phase. In addition, an existing cross drain will require widening and there are 12 proposed cross drains associated with the new interchange.

Floodplain considerations for the project are based on the current effective Flood Insurance Study (FIS) for Martin County (February 19, 2020). The entirety of the study area is shown to be within FEMA Flood Zone X; therefore, there are no floodway encroachments associated with this project. The Martin County floodplain coordinator was contacted to confirm the limits of Flood Zone X within the county and to ensure the proposed action would be consistent with their water management plan.

Every wetland and cross drain have an associated floodplain per the Florida Department of Transportation and the Federal Highway Administration. Cross drain extensions are associated with transverse floodplain impacts. These impacts to flood elevations will be minimized by designing cross drain facilities in accordance with the FDOT Drainage Manual and no adverse impacts to floodplains are anticipated as a result of this project. Modifications to existing drainage structures, extending cross drains, and widening of bridges included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency services or emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant.

No sovereign submerged lands were identified within the project corridor based on the Florida Department of Environmental Protection's Map Direct Gallery.

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1.0 INTRODUCTION

The project involves the evaluation of a new connection via a system-to-system direct connection interchange to/from SR 91 and I-95 at SE Bridge Road in Martin County, Florida. The study area begins approximately two miles south of SE Bridge Road at Mile Post (MP) 123.44 and extends approximately two miles north of SE Bridge Road to MP 127.53. A map of the project limits is shown in **Figure 1**.

The existing limited-access right-of-way along SR 91 is generally 300 feet wide. SR 91 is classified as a Rural Principal Arterial Expressway. The existing typical section consists of a four-lane divided facility with 12-foot travel lanes. As part of the mainline widening, the proposed typical section for SR 91 will include an eight-lane divided facility with 12-foot travel lanes. The posted speed limit along the project corridor is 70 miles per hour. A Florida Gas Transmission (FGT) easement runs along the east side of SR 91 for the entire project limits. A Type 2 Categorical Exclusion is being prepared. The PD&E study satisfies all applicable requirements, including the National Environmental Policy Act (NEPA), to qualify for federal-aid funding of subsequent development phases (design, right-of-way acquisition, and construction).

1.1 PURPOSE & NEED

The purpose of this project is to improve traffic operations for north-south through trips in the project area and to improve traffic operations on existing local roadways that provide a connection between I-95 and SR 91 near the existing I-95/SE Bridge Road interchange in Martin County, Florida.



Figure 1: Project Location Map

1.2 PREFERRED ALTERNATIVE

The preferred alternative for the Turnpike at I-95 direct connection interchange study includes the construction of four system-to-system ramps to accommodate all directional movements between SR 91 and I-95 near SE Bridge Road in Martin County. South of SE Bridge Road, the ramps will serve northbound I-95 to northbound SR 91 and southbound SR 91 to southbound I-95 movements. North of SE Bridge Road, ramps will accommodate northbound SR 91 to northbound I-95 and southbound I-95 to southbound SR 91 movements. Additionally, SR 91 will be widened from four to eight lanes, with all widening occurring to the west side to avoid impacts to existing Florida Gas Transmission (FGT) infrastructure located along the east side of SR 91. A two-lane collector-distributor (CD) road is proposed between the northbound SR 91 to northbound I-95 and northbound I-95 to northbound SR 91 ramps to facilitate safe and efficient weaving operations. No geometric changes are proposed for I-95, as all ramp tie-ins will occur at the outer edges of the existing facility. While the SE Bridge Road typical section will remain unchanged, the existing bridge will be reconstructed to accommodate SR 91 widening and to span the southbound SR 91 to southbound I-95 ramp. Two tolling points are proposed—one on the ramp from the CD road to

northbound I-95 and the other on the ramp from southbound I-95 to southbound SR 91. All ramps will be single-lane facilities, with a 15-foot-wide lane and a design speed of 50 miles per hour. **Figure 2** shows the proposed interchange alternative.



Figure 2: Proposed Turnpike at I-95 Direct Connection Interchange Alternative

2.0 PROJECT DESCRIPTION

The intent of this Location Hydraulics Report (LHR) is to document existing drainage conditions, including a preliminary analysis of the cross culverts within the project area. Additionally, this report identifies any potential 100-year (base) floodplain encroachments resulting from the proposed roadway and bridge improvements evaluated in this study. In accordance with 23 Code of Federal Regulation (CFR) 650 Subpart A, Section 650.111, floodplains are to be protected. The intent of these regulations is to avoid possible long and short-term adverse impacts associated with the modification of floodplains as a result of development. These regulations urge that where impacts are anticipated, alternatives should be sought out where practical and that development incompatible with floodplain values should be avoided. Conclusions and recommendations were developed using the best available data and conceptual roadway alignment and typical sections. The exact locations and lengths of cross drains shall be verified during the design phase when survey data becomes available.

The study limits fall within Martin County between MP 123.44 to MP 127.53. Refer to **Appendix F** for a USGS Quadrangle Map. The project is located within the sections, townships, and ranges provided in **Table 1**. A Project Location Map is provided in Section 1 above.

Table 1: Section, Township, and Range Data

Range	Township	Section(s)
41E	40S	11
41E	40S	2
41E	40S	3
41E	39S	34
41E	39S	33
41E	39S	27
41E	39S	28
41E	39S	22
41E	39S	21
41E	39S	16

The datum used for this study is North American Vertical Datum of 1988 (NAVD 88). To convert from NAVD 88 to National Geodetic Vertical Datum of 1929 (NGVD 29), add 1.503 feet. Please refer to **Appendix B** for the datum conversion.

The study includes the addition of one (1) new interchange access location at SE Bridge Road (MP 125.5) to provide north/south bound connections between SR 91 and I-95. There is no connection between the interchange and SE Bridge Road.

The existing bridge structures that SE Bridge Road uses to cross the Florida Turnpike will need to be reconstructed along with the roadway.

3.0 EXISTING CONDITIONS

The existing Turnpike roadway within the project limits consists of four travel lanes with a 20-foot paved median, including a 2-foot concrete barrier wall, and 10-foot paved outside shoulders on both sides. **Figure 3** shows the Existing Mainline Typical Section.

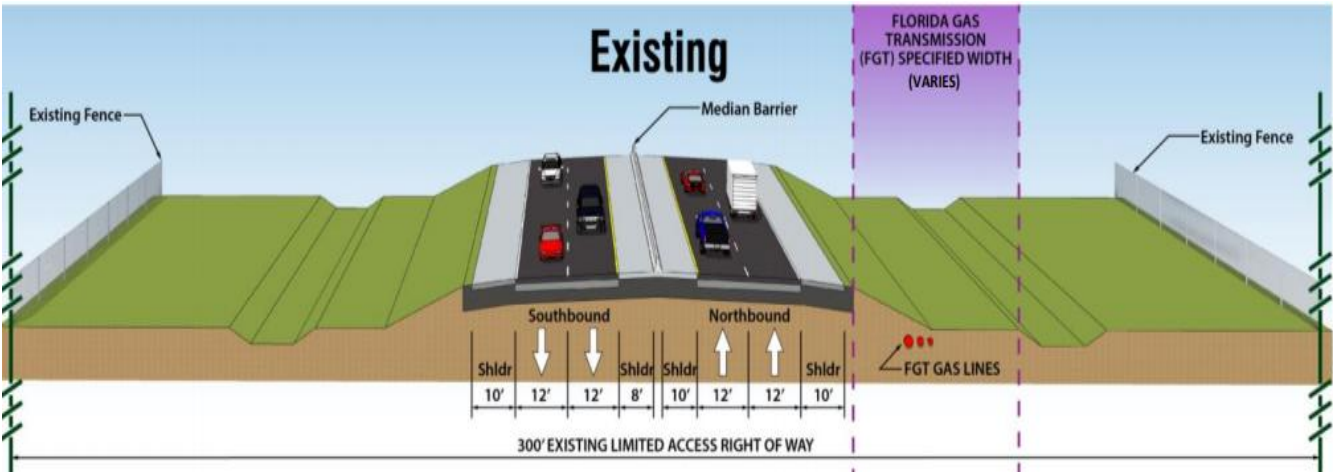


Figure 3: Existing Mainline Typical Section

Stormwater runoff sheet flows from the roadway into roadside ditches, which flow into existing culverts and cross drains throughout the corridor. The culverts and cross drains discharge to existing canals or creeks, which carry the flow to two main water bodies: the Kitching Creek and the South Fork St. Lucie River prior to discharging into the Atlantic Ocean. The general flow of surface waters within the project limits is from west to east. The Loxahatchee River is classified as an Outstanding Florida Waters (OFW) and a Wild and Scenic River.

The project area is divided into four sub-basins based on the existing roadway profile, ditch configurations, and the locations of culverts and cross drains. Refer to **Appendix H** for the Straight Line Diagrams and **Appendix A** for the Drainage Map.

Table 2 identifies the project limits and corresponding stationing for the proposed improvements. For reference within this report, the existing project limits and proposed interchange ramps have been delineated according to the respective basin boundaries, with locations specified using mile markers and stationing references.

The cross drains and bridge structures discussed below are within the study area but will not necessarily be impacted as part of the proposed improvements. See **Section 4.0 Proposed Improvements** for proposed structure depictions.

Table 2: Project Stationing Split by Basin and Project Section

Project Section	Basin 1	Basin 2	Basin 3	Basin 4
Turnpike	MP 124.59 – MP 125.39	n/a	MP 125.39 – MP 126.5	MP 126.5 – MP 127.68
I-95	n/a	MP 95.0 – MP 96.33	MP 96.33 – MP 96.93	MP 96.93 – MP 97.81
Ramp A	n/a	n/a	STA 100+00.00 – STA 123+21.30	STA 123+21.30 – STA 144+39.73
Ramp B	n/a	n/a	STA 200+00.00 – STA 234+40.00	STA 234+40.00 – STA 246+08.93
Ramp C	STA 323+56.37 – STA 360+41.14	n/a	STA 360+41.14 – STA 414+20.00	n/a
Ramp D	STA 435+70.00 – STA 469+00.00	n/a	n/a	n/a

BASIN 1

Basin 1 begins at Turnpike Baseline of Survey Station 124.59 and ends at Station 125.39. The drainage area includes the roadway right-of-way between these stations, as well as a portion of land between the Turnpike and I-95 that will be incorporated into the proposed improvements.

Within the existing Turnpike right-of-way, stormwater runoff is collected by roadside ditches and conveyed through two culverts and two bridge culverts before discharging to a wetland that drains into Kitching Creek, a tributary of the Loxahatchee River. The names and locations of the drainage structures have been listed in **Table 3**. Stormwater runoff within the infield area generally flows from east to west, ultimately draining into the existing stormwater management ponds.

Table 3: Existing Drainage Structures Within Basin 1

Structure Identification	Location	Waterbody Crossing
Bridge Culvert #890084	MP 124.6	Unnamed Drainage Ditch
Culvert #89Q006	MP 124.6	Unnamed Drainage Ditch
Bridge Culvert #890075	MP125.2	Unnamed Drainage Ditch
Box Culvert #89Q007	MP125.3	Unnamed Drainage Ditch

BASIN 2

Basin 2 begins at I-95 Baseline of Survey Station 95.0 and ends at Station 96.33. The drainage area includes the roadway right-of-way between these stations, as well as a portion of SE Bridge Road and a small section of land between the Turnpike and I-95 that will be incorporated into the proposed improvements.

Stormwater runoff within the existing I-95 right-of-way is managed through grassed roadside swales and median swales, which serve to detain runoff within the right-of-way. Median drains have not been evaluated as part of this study. It is recommended that a detailed analysis be conducted during the design phase. The small section of land between the Turnpike and I-95 generally flows from east to west, into a series of wetlands. The I-95/SE Bridge Road (SR 708) interchange includes four infield “sedimentation areas”, or sediment basins, which detains stormwater runoff associated with the interchange for water quality purposes.

BASIN 3

Basin 3 begins at Turnpike Baseline of Survey Station 125.39 and ends at Station 126.5. The drainage area includes the Turnpike right-of-way between these stations, a section of the I-95 right-of-way between Milepost 96.33 and Milepost 96.93, and the infield area between the two corridors, which will be incorporated into the proposed improvements.

Within the existing Turnpike right-of-way, stormwater runoff is collected by roadside ditches and conveyed to three primary discharge points, depending on location:

- *South of SE Bridge Road:* Runoff is conveyed through a bridge culvert to a wetland that drains into Kitching Creek, a tributary of the Loxahatchee River.
- *North of SE Bridge Road:* Runoff is conveyed through a bridge culvert to a wetland draining into the South Fork of the St. Lucie River. The South Fork flows from south to north and discharges into the Atlantic Ocean via the St. Lucie Canal (C-44) and the St. Lucie River. Notably, the C-44 Canal is listed as impaired for copper.
- *Near MP 96.92:* Runoff is directed through a concrete box culvert and a bridge culvert to Phipp Canal, which drains eastward to the South Fork of the St. Lucie River.

Stormwater runoff from the infield area generally flows from east to west, ultimately draining into existing stormwater management ponds.

Stormwater within the existing I-95 right-of-way is managed using grassed roadside swales and median swales, which provide detention within the right-of-way. Additionally, dual bridges have been utilized to maintain the existing flow of Phipp Canal. The names and locations of all drainage structures within the basin are listed in **Table 4**.

Table 4: Existing Drainage Structures Within Basin 3

Structure Identification	Location	Waterbody Crossing
Box Culvert #89Q007	MP 125.3	Unnamed Drainage Ditch
Bridge Culvert #890076	MP 125.9	Unnamed Drainage Ditch
Concrete Box Culvert #89Q008	MP 126.5	Phipp Canal
Bridge #890082	MP 126.5	Phipp Canal
Bridge #890131/#890130	MP 96.9	Phipp Canal

BASIN 4

Basin 4 begins at Turnpike Baseline of Survey Station 126.5 and ends at Station 127.68. The drainage area includes the Turnpike right-of-way between these stations, a section of the I-95 right-of-way between Milepost 96.93 and Milepost 97.81, and the infield area between the two corridors, which will be incorporated into the proposed improvements.

Within the existing Turnpike right-of-way, stormwater runoff is collected by roadside ditches and conveyed to two primary discharge points, divided at a natural high point located near Milepost 127.5 on the Turnpike:

- *South of the high point:* Runoff is conveyed via roadside ditches through two culverts and a bridge culvert to Phipps Canal, which drains to the South Fork of the St. Lucie River.
- *North of the high point:* Runoff is conveyed through roadside ditches and discharged via a bridge culvert over an unnamed drainage canal into adjacent Turnpike-owned ditches. The flow ultimately reaches the South Fork of the St. Lucie River.

Stormwater runoff from the infield area generally flows from east to west, ultimately discharging into the existing stormwater management ponds.

Within the existing I-95 right-of-way, stormwater is managed through grassed roadside swales and median swales, which provide detention within the corridor. Additionally, this basin utilizes portions of the same bridges identified in the previous section for maintaining the flow of Phipp Canal.

The names and locations of all drainage structures within Basin 4 are listed in **Table 5**.

Table 5: Existing Drainage Structures Within Basin 4

Structure Identification	Location	Waterbody Crossing
Bridge #890082	MP 126.5	Phipp Canal
Culvert #89Q009	MP 127.0	Unnamed Drainage Ditch
Bridge Culvert #890077	MP 127.3	Unnamed Drainage Canal
Bridge #890131/#890130	MP 96.92	Phipp Canal

3.1 SOILS

The predominant soils within and adjacent to the project corridor consist of poorly drained sandy soils. Soil types were identified using the Natural Resources Conservation Service (NRCS) Web Soil Survey for Martin County, which indicates that the corridor is primarily underlain by mineral (sandy) soils. While the presence of organic soils beneath the existing roadway embankment is uncertain, it is believed they were removed and replaced with granular fill during original construction.

A Geotechnical Technical Memorandum prepared by Tierra, Inc. in September 2024 utilized the USDA Soil Survey and existing soil borings from the general vicinity of the project. As of this report, no site-specific borings have been conducted at the proposed interchange. Preliminary findings indicate that near-surface subsurface conditions consist predominantly of sandy soils within the top 7 feet, with occasional plastic soils encountered 3 to 4 feet below natural grade. Although organic soils are not indicated in the USDA Soil Survey, surficial organic material may be present in low-lying or ponded areas. Refer to **Appendix E** for the Geotechnical Technical Memorandum and USDA Soil Survey Report.

While soil conditions appear generally favorable for roadway improvements, isolated deposits of organic subsoil may be encountered during construction of the Turnpike mainline widening. A geotechnical investigation during the design phase should consider the use of muck probes to confirm the presence of organics beneath existing and proposed embankments and to identify areas that may require removal or soil improvement.

Refer to **Appendix F** for the Soils Map. **Table 6** summarizes the identified soil types along with their associated hydrologic soil groups and drainage characteristics.

Table 6: Soil Types

Soil Name	NRCS Map Unit	Hydrologic Soil Group	Drainage Class, Dominant Condition	Depth to SHWT (ft)
Waveland and Immokalee fine sands	4	A/D	Poorly drained	1
Wabasso sand, 0 to 2 percent slopes	17	C/D	Poorly drained	1
Winder sand, frequently ponded, 0 to 1 percent slopes	19	C/D	Very poorly drained	0
Pineda-Riviera fine sands association, 0 to 2 percent slopes	21	A/D	Poorly drained	0
Okeelanta muck, Frequently ponded, 0 to 1 percent slopes	22	A/D	Very poorly drained	0
Floridana fine sand, frequently ponded, 0 to 1 percent slopes	38	C/D	Very poorly drained	0
Cypress Lake fine sand, 0 to 2 percent slopes	44	A/D	Poorly drained	1
Pinellas fine sand, 0 to 2 percent slopes	47	B/D	Poorly drained	1
Riviera fine sand, frequently ponded, 0 to 1 percent slopes	49	A/D	Very poorly drained	0
Malabar fine sand, high, 0 to 2 percent slopes	52	A/D	Poorly drained	1
Wabasso and Oldsmar	56	C/D	Very poorly drained	0

Soil Name	NRCS Map Unit	Hydrologic Soil Group	Drainage Class, Dominant Condition	Depth to SHWT (ft)
fine sands, depressional				
Chobee muck, frequently ponded, 0 to 1 percent slopes	57	C/D	Very poorly drained	0
Gator and Tequesta mucks	58	C/D	Very poorly drained	0

3.2 LAND USE

The land use within the right-of-way throughout the study limits is classified as Commercial General. The areas adjacent to the project right-of-way consist of the following land uses as defined by Martin County's Growth Management Department:

- Land use directly along the project corridor includes agricultural and general institutional.
- Surrounding the project corridor, land uses are labelled as the following:
 - Agricultural Ranchette
 - Commercial General
 - Commercial Limited
 - Public Conservation Area
 - Estate Density -up to 1 UPA
 - Estate Density -up to 2 UPA
 - General Institutional
 - Recreational
 - Rural Density -up to 0.5 UPA
 - Rural Lifestyle

Please refer to **Appendix F** for the Future Land Use Map.

3.3 CROSS CULVERTS

There are 5 existing culverts and 5 existing bridge culverts within the study area. **Table 7** provides a summary of the existing culverts; **Table 8** provides a summary of the existing bridge culverts.

Table 7: Existing Culverts within Project Limits on Turnpike Mainline

Approx. Mile Post	Number of Barrels	Cross Culvert Size	Existing Length (ft)	Turnpike Structure Number
124.1	1	36"	156	Unnamed Culvert
124.7	1	12'x10'	149	89Q006
124.9	1	36"	159	Unnamed Culvert
125.4	1	10'x5'	128	89Q007
127.0	1	10'x10'	132	89Q009

Table 8: Existing Bridge Culverts within Project Limits on Turnpike Mainline

Structure Description	Approx. Mile Post	Turnpike Structure Number	Bridge Culvert # of Barrels	Bridge Culvert Existing Width (ft)	Bridge Culvert Existing Height (ft)	Bridge Culvert Existing Length (ft)
Bridge Culvert over Drainage Ditch	123.9	890074	2	12.0	4.5	102
Bridge Culvert over Drainage Ditch	124.6	890084	2	11.2	8.5	141
Bridge Culvert over Drainage Ditch	125.2	890075	2	11.0	7.0	130
Bridge Culvert over Drainage Ditch	125.9	890076	2	12.0	7.2	102
Bridge Culvert over Drainage Ditch	127.3	890077	2	11.2	7.0	115

3.4 BRIDGE STRUCTURES

There are 3 bridges within the project limits. **Table 9** and **Table 10** provide a summary of the bridges and their locations.

Table 9: Existing Bridges within Project Limits on Turnpike Mainline

Structure Description	Approx. Mile Post	Turnpike Structure Number
Bridge over Phipp Canal	126.5	890082

Table 10: Existing Bridges within Project Limits on I-95 Mainline

Structure Description	Approx. Mile Post	FDOT Structure Number
Bridge over Phipp Canal	96.9	890131
Bridge over Phipp Canal	96.9	890130

3.5 FLOODPLAINS AND FLOODWAYS

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for Martin County were reviewed to determine the extents of the FEMA floodplains within the project limits. **Table 11** provides a summary of the FEMA FIRMs, including their effective dates. The FEMA FIRMs are provided in **Appendix D**. Refer to **Appendix F** for a FEMA map that includes the project limits.

Table 11: Summary of FEMA FIRMs

FEMA Panel Name	FEMA Panel Number	Effective Date
FIRM Martin County, Florida and Incorporated Areas	12085C0315G	March 16, 2015
FIRM Martin County, Florida and Incorporated Areas	12085C0284H	February 19, 2020
FIRM Martin County, Florida and Incorporated Areas	12085C0303H	February 19, 2020

The applicable Flood Insurance Studies (FIS) for this project is Martin County FIS 12085CV001C (effective February 19, 2020). The Flood Insurance Studies have information concerning the floodways' drainage area, discharge, and flood profile. Additionally, at the time of this report, the Florida Department of Environmental Protection's Map Direct Gallery did not indicate the presence of any sovereign submerged lands (SSLs) within the project corridor.

4.0 PROPOSED CONDITIONS

In addition to the proposed system-to-system connection from SR 91 to I-95 outlined in this PD&E, the improvements involving the widening of SR 91 mainline from four 12-foot lanes to eight 12-foot lanes by adding two general toll lanes in each direction and widening both the inside and outside shoulders from 10-feet to 12-feet have been incorporated. The proposed Typical Mainline Section for the mainline is shown in **Figure 4**.

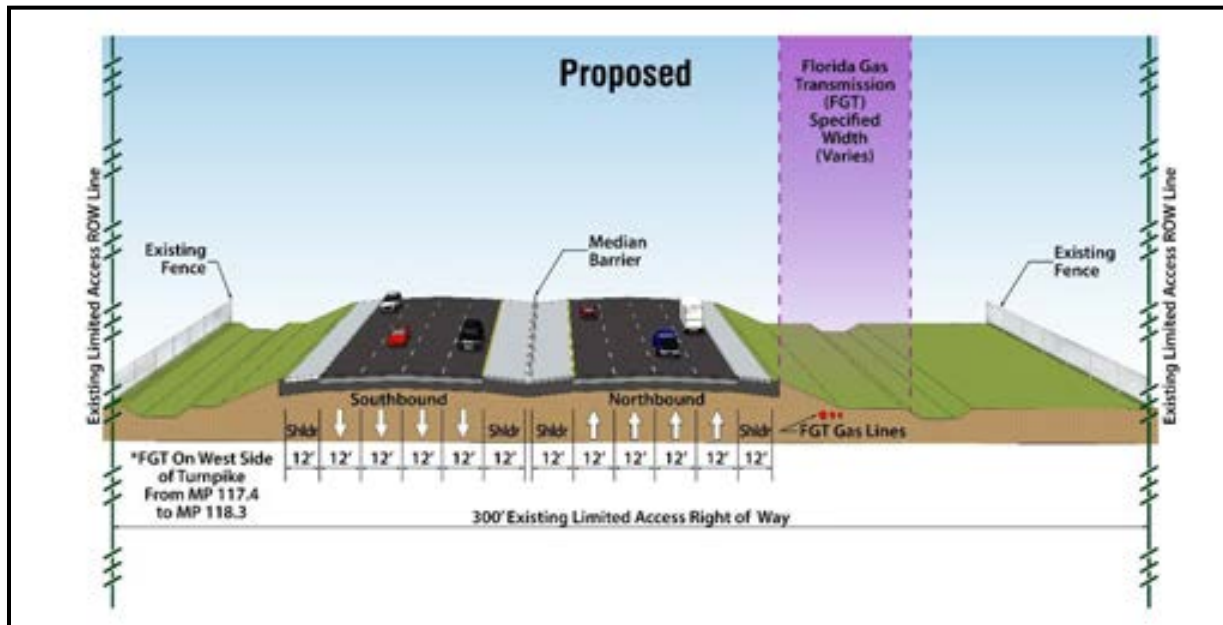


Figure 4: Proposed Mainline Typical Section

4.1 CANALS

Existing drainage canals will be affected by the proposed improvements and will need to be relocated. Specifically, in the southwest quadrant of the existing intersection at SE Bridge Road and the Turnpike, the proposed Ramp C and emergency access lanes will impact a drainage canal that currently borders the adjacent parcel (Parcel ID: 33-39-41-000-001-00000-1) and the Turnpike. Additionally, a drainage canal located just south of Phipp Canal on Parcel ID: 28-39-41-000-001-00020-7 will be impacted by the construction of Ramp C and the Turnpike widening. The eastern portion of this canal will need to be relocated outside the right-of-way limits.

4.2 CROSS CULVERTS

The proposed roadway widening will require extensions to most existing cross drains along the Turnpike mainline. **Table 12** provides the projected improvements and modifications to each cross culvert. Based on As-Built plans, the original Turnpike mainline was constructed in 1955. Assuming the box culverts were designed for a 100-year service life for concrete box culverts, the existing culverts have approximately 30 years of service life remaining. The existing box culverts are recommended to be extended rather than

replaced; however, this should be analyzed further during the design phase based on the culvert inspection reports and history of maintenance repairs for each culvert. Note that this report does not address median drains. They will be further assessed during design.

Table 12: Improvements to Existing Cross Culverts

Approx. Mile Post	Turnpike Structure Number	Cross Culvert Size	Number of Barrels	Existing Length (ft)	Approx. Proposed Extension (ft)	Proposed Improvement or Modification	Notes
125.4	89Q007	10'x5'	1	128	155	Extension	
126.5	89Q008	10'x5'	1	106	260	Extension	

4.2.1 INTERCHANGE CULVERTS

The recommended improvements include the addition of one interchange which will include four (4) new ramps. Proposed cross drains are necessary at the ramps to maintain existing flow patterns. **Table 13** provides the anticipated cross drains for each ramp alternative. The exact location, size, and length of the proposed cross drains and box culverts will need to be determined during the design phase.

Table 13: Proposed Cross Drains per Ramp

Ramp	Proposed Improvement	Approx. Sta.	Approximate Length (ft)	Notes
A	New Cross Drain	106+50	220	
	New Cross Drain	118+60	128	
B	New Cross Drain	230+65	60	
C	New Cross Drain	316+10	120	
	New Cross Drain	321+25	140	
	New Cross Drain	336+20	155	
	New Cross Drain	334+80	278	
	New Cross Drain	339+80	55	
D	New Cross Drain	439+00	44	
	New Cross Drain	463+00	100	

Ramp	Proposed Improvement	Approx. Sta.	Approximate Length (ft)	Notes
D	New Cross Drain	484+10	45	
	New Cross Drain	486+20	45	

4.3 BRIDGE STRUCTURES

All bridge culverts and bridges within the project limits will be modified or replaced as necessary to accommodate the proposed improvements. Characteristics of proposed structures will be determined during design.

Table 14: Proposed Bridge Structures within Project Limits

Structure Description	Approx. Mile Post	Turnpike/FDOT Structure Number	Type	Modification
Bridge Culvert over Drainage Ditch	125.2	890075	Bridge Culvert	Extension
Bridge Culvert over Drainage Ditch	125.9	890076	Bridge Culvert	Extension
Bridge over Phipp Canal (SR 91)	126.5	890082	Bridge	Widen
Bridge over Phipp Canal (4A)	126.5	-	Bridge	New
Bridge over Phipp Canal (4B)	126.5	-	Bridge	New

4.4 FLOODPLAINS AND FLOODWAYS

Floodplain considerations for the project are based on the current effective Flood Insurance Study (FIS) for Martin County (February 19, 2020). The entirety of the study area is shown to be within FEMA Flood Zone X; therefore, there are no floodway encroachments associated with this project. The Martin County floodplain coordinator was contacted to confirm the limits of Flood Zone X within the county and to ensure the proposed action would be consistent with their water management plan.

Every wetland and cross drain have an associated floodplain per the Florida Department of Transportation and the Federal Highway Administration. Cross drain extensions are associated with transverse floodplain impacts. These impacts to flood elevations will be minimized by designing cross drain facilities in accordance with the FDOT Drainage Manual and no adverse impacts to floodplains are anticipated as a result of this project. Modifications to existing drainage structures, extending cross drains, and widening of bridges included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination

of emergency services or emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant.

4.5 RISK EVALUATION

The proposed improvements were evaluated to determine whether there would be adverse floodplain impacts. The culverts and box culverts should be reviewed during the design phase, once survey is available and a more thorough hydrologic method of analysis is utilized, to determine the impact of the extensions on the headwaters.

Replacement drainage structures for this project are anticipated to be limited to hydraulically equivalent structures which are not expected to increase the backwater surface elevations. Any limitations to hydraulic equivalency would be due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered since it does not meet the project's purpose and need or is economically unfeasible. There are no reported flooding problems within the project area. Any localized areas of ponding offsite are inherent in the topography or area as a result of other outside contributing sources, and there is no feasible alternative to eliminating localized flooding problems. Existing offsite flooding will not increase as a result of the construction of this project, and on-site conveyance will be designed to meet the FDOT's level of service standards.

Furthermore, the project will not affect existing flood heights or floodplain limits. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of construction of this project. Therefore, it has been determined that this encroachment is not significant.

4.6 COORDINATION WITH LOCAL AGENCIES

The Project Development and Environment (PD&E) Study has included coordination with local agencies and South Florida Water Management District (SFWMD). A Pre-Application Meeting was held with SFWMD on November 16, 2017. Meeting Minutes are provided in **Appendix C**.

Through the Environmental Look Around (ELA) process, emails were distributed to SFWMD and the Hobe-St. Lucie Conservancy District on October 8, 2019. The purpose of the coordination was to explore watershed-wide stormwater needs and alternative permitting approaches based on regional stormwater needs and opportunities. The Hobe-St. Lucie Conservancy District replied stating they were not aware of any regional stormwater needs or opportunities. The email correspondence is included in **Appendix G**.

Stakeholder coordination is on-going and is discussed in the Pond Siting Report submitted under separate cover. ELA meetings have been requested, and schedules are currently being coordinated.

4.7 PD&E REQUIREMENTS

4.7.1 HISTORY OF FLOODING

At the time of the corridor-wide PD&E study, information provided by the FTE Drainage and Maintenance offices indicates no documented history of flooding within the project limits.

Coordination with the FTE Drainage and Maintenance offices will be performed to verify that this is still the case.

5.0 RECOMMENDATIONS AND CONCLUSIONS

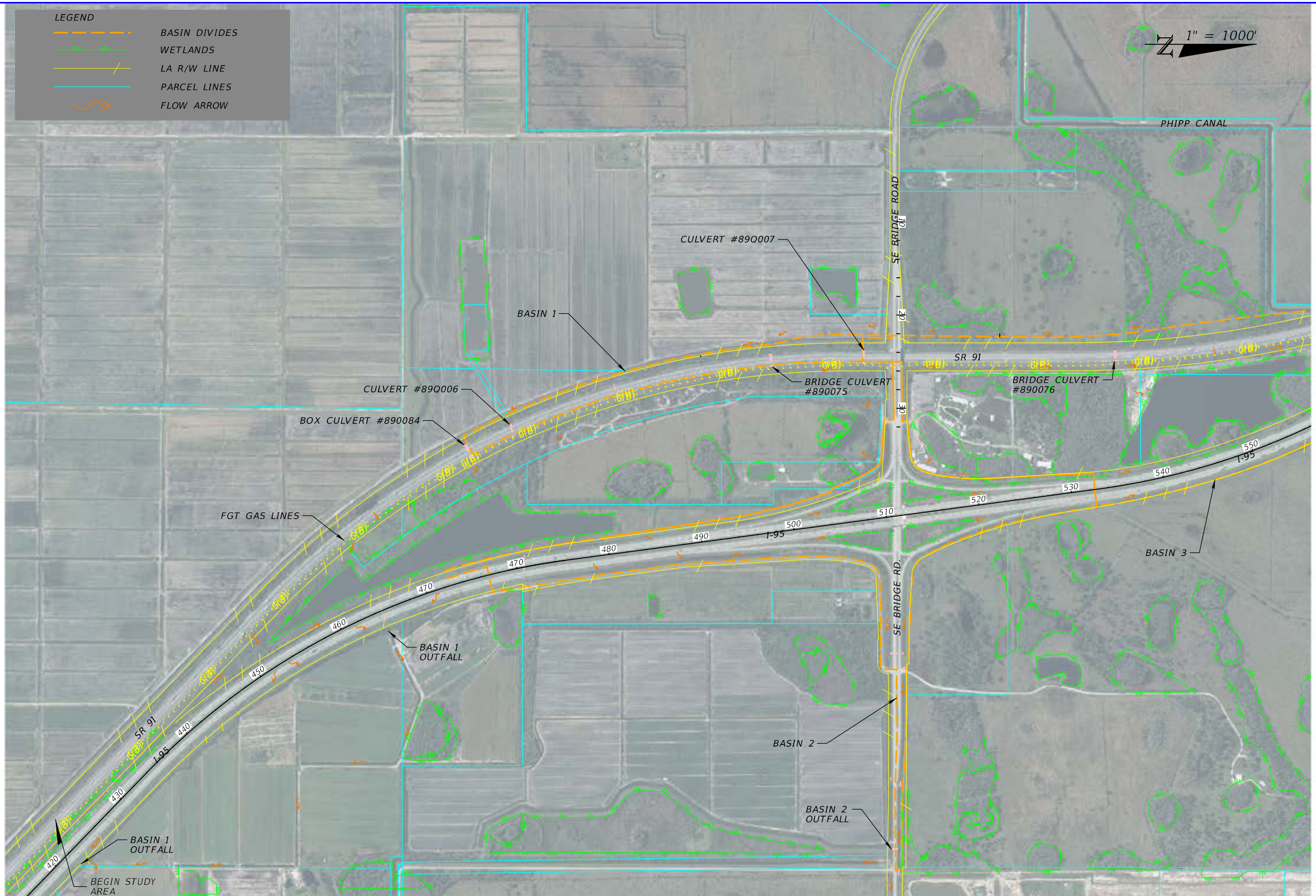
Every wetland and cross drain have an associated floodplain per the Florida Department of Transportation and the Federal Highway Administration. Cross drain extensions are associated with transverse floodplain impacts. These impacts to flood elevations will be minimized by designing cross drains facilities in accordance with the FDOT Drainage Manual and no adverse impacts to floodplains are anticipated as a result of this project. Modifications to existing drainage structures, extending cross drains, and widening of bridges included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency services or emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant.

6.0 REFERENCES

- FDEP Map Direct
- FDOT Drainage Manual (2025)
- FDOT Drainage Design Guide (2024)
- FDOT Project Development and Environment Manual (2024)
- FEMA Flood Map Service Center
- NRCS Web Soil Survey

APPENDIX A

DRAINAGE MAP



REVISIONS				LICENSE NUMBER:	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO. 1
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
					SR 91	MARTIN	446975-1-22-01	

EXISTING DRAINAGE MAP

1" = 1000'



LEGEND

BASIN DIVIDES

WETLANDS

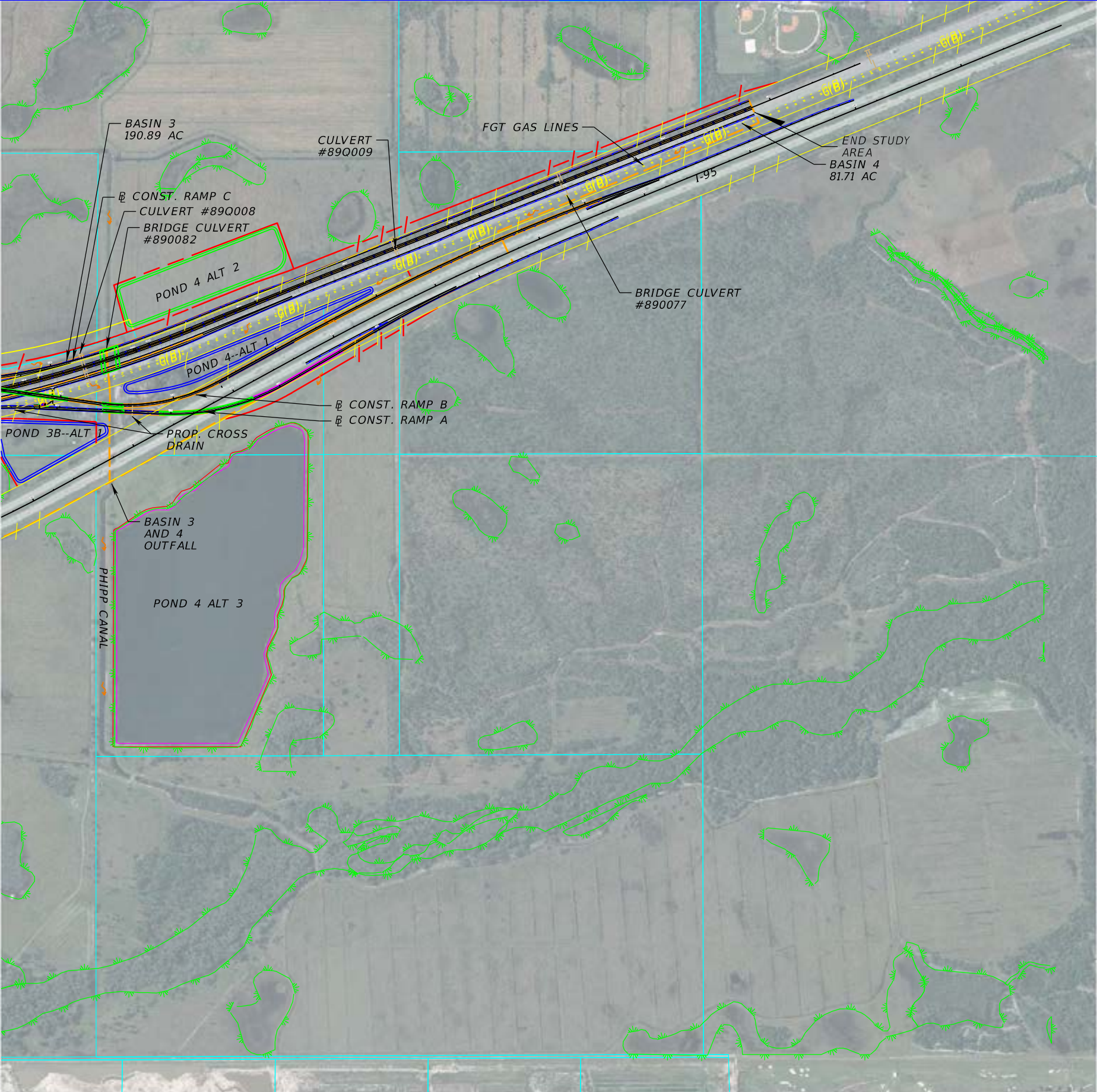
LA R/W LINE

PARCEL LINES

FLOW ARROW

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	EXISTING DRAINAGE MAP		SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION				
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				SR 91	MARTIN	446975-1-22-01	2

1" = 1000'



LEGEND

BASIN DIVIDES

WETLANDS

LA R/W LINE

PROP. LA R/W LINE

PARCEL LINES

FLOW ARROW

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	PROPOSED DRAINAGE MAP		SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION				
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				SR 91	MARTIN	446975-1-22-01	2

APPENDIX B

NOAA ONLINE VERTICAL DATUM TRANSFORMATION

Regional Information

* Region :

Contiguous United States

Horizontal Information

Source

Target

Reference Frame:

NAD83(2011)

NAD 1927

Coor. System:

Geographic (Longitude, Latitude)

Geographic (Longitude, Latitude)

Unit:

meter (m)

meter (m)

Zone:

ALE - 0101

ALE - 0101

Vertical Information

Source

Target

Reference Frame:

NAVD 88

NGVD 1929

Unit:

foot (International) (ft)

foot (International) (ft)

☒ Height
 ☐ Sounding

☐ GEOID model:

☒ Height
 ☐ Sounding

☐ GEOID model:

Point Conversion

ASCII File Conversion

Input

Output

Latitude:

27.043798

Transform

Latitude:

27.0434682755

Longitude:

-80.236864

Reset

Longitude:

-80.2370983116

Height:

DMS

Height:

1.503

e.g. 33.7586 or 33 45 30.9600

e.g. -118.7691 or -118 46 8.7600

e.g. 3.037

Drive to on map

Reset Map

☐ to DMS

Vertical Uncertainty:

☒ 1 sigma
 ☐ 95% Confidence

Vertical Uncertainty (+/-): 0.079 ft

☐ Add Observation Vertical Uncertainty

Vertical_Area: null

☒ Valid Tidal area
 ☒ Non-Tidal area
 ☒ Non-Valid area
 ☒ CRD
 ☒ IGLD85
 ☒ SVU area

APPENDIX C
SFWMD PRE-APPLICATION MEETING MINUTES

Meeting Minutes

Project: FPID 423374-1-22-01

Description: Turnpike Mainline (SR 91) Widening PD&E from Jupiter (Indiantown Road) to Okeechobee Road (SR 70) – Palm Beach, Martin, and St. Lucie Counties

Meeting: SFWMD/USACE/NMFS/FDOT Pre-Application Meeting

Date/Time: 11/16/17 @ 11:10 am

Location: SFWMD HQ, West Palm Beach

Attendees:

Beverly Miller (SFWMD)
Jason Debish (SFWMD)
Beth Kacvinsky (SFWMD)
Carlos de Rojas, PE (SFWMD)
Trisha Stone (SFWMD)
Barbara Conmy (SFWMD)
Tarrie Ostrofsky (USACE)
Jennifer Schull (NMFS)
Erin Yao, PE (FTE) – by phone
Martin Horwitz (FTE) – by phone
Fred Gaines, PWS (Atkins/FTE)
Liz Bartell, PE (PGA)
Tim Polk, PE (PGA)
Sarah Johnson (KCA)
Bill Howell, PE (Lochner) – by phone
Tracy Ellison, PE (Lochner) – by phone
Jack Miller, PE (Lochner) – by phone

1. Background

- a. FTE introduced the project and stated that the PD&E Study limits are Turnpike Mainline (SR 91) from Indiantown Road (SR 706) to Okeechobee Road (SR 70), MP 117 to MP 153.7.
- b. PGA stated that the project will be permitted for the future (8-lane) condition.
- c. PGA stated that the proposed future improvements include widening the mainline from two to four lanes in each direction. The two alternatives being evaluated during the PD&E Study consist of four general toll lanes in each direction or two general toll lanes and two express toll lanes in each direction. FTE plans to account for the added impervious necessary for express lanes when permitting the project, even though the express lanes may not be constructed at this time.
- d. PGA stated that the project will also include improvements to the following interchanges: Stuart (SW Martin Highway/SR 714), Becker Road, Port St. Lucie Boulevard (SR 716), and Okeechobee Road (SR 70). The PD&E will also evaluate the potential for new interchanges. The major bridges within the project limits are the Loxahatchee River and Thomas B. Manuel Bridge over the St. Lucie

Canal. The project will also include bridge improvements over several other creeks and canals.

2. Existing Permits

- a. Turnpike mainline is permitted from MP 137.676 to 152.610 (Permit No. 56-00912-S). SFWMD confirmed that this permit should be modified for the proposed improvements. Several other permits exist within the 37-mile project for interchanges, the service plaza, bridges, and canal protection.

3. Water Quality

- a. SFWMD confirmed that the required water quality volume is 2.5" over the new impervious area in areas of reconstruction and widening but clarified that full treatment of new and existing impervious should be provided, if feasible. SFWMD stated that the required water quality volume shall also include the treatment volume provided in the existing condition, whether permitted or not. PGA confirmed that the new impervious area will be calculated for the future condition.
- b. SFWMD confirmed that an additional 50% of treatment shall be provided for any direct discharge to Outstanding Florida Waters (OFWs).
- c. SFWMD confirmed that nutrient loading is required for any direct discharge to water bodies that are impaired for nitrogen (TN) or phosphorus (TP). SFWMD clarified that although Dissolved Oxygen impairment is not typically a roadway impairment, there are times that it is related to high nutrient levels.
- d. PGA stated that there is a BMAP for St. Lucie River and Estuary Basin, but FTE is a de minimus stakeholder and has not been assigned an allocation for TN nor TP.
- e. PGA stated that the Loxahatchee TMDL Planning Unit (from Indiantown Road to SE Bridge Road) will be reviewed during the PD&E phase but stated that there are no current TMDLs within the project limits.

4. Water Quantity

- a. SFWMD confirmed that the proposed peak discharge for the 25-year, 3-day design shall not exceed that of the existing condition.
- b. PGA stated that she was aware of the following allowable discharge rates: C-23 Canal (31.5 csm for the 10-year design frequency) and C-24 Canal (30.25 csm for the 10-year design frequency). SFWMD stated that any widening of the bridges over these canals, or the C-18 and C-25 canals, will require a right-of-way permit.
- c. C-18, C-23 and C-24 will be handled by SFWMD WPB staff, while the C-25 will be handled by SFWMD Okeechobee staff.

5. Environmental Look Around (ELA)

- a. PGA stated that the ELA will be started during the PD&E phase. The PD&E Team plans to coordinate with the following Special WMDs: Northern Palm Beach County Improvement District, Loxahatchee River Environmental Control District, Hobe-St. Lucie Conservancy District, and North St. Lucie River Water Control District.
- b. PGA asked whether SFWMD was aware of any regional opportunities within the project limits, such as funding a SFWMD project for nutrient removal credit, and

discussed some alternative permitting approaches that may be necessary where the project is adjacent to sensitive lands to avoid off-site ponds?

- i. The project corridor is adjacent to two miles of SFWMD-owned property and two miles of Florida Forever lands. One alternative is to make use of SFWMD-owned lands and Florida Forever acquisitions. SFWMD stated that there may be an opportunity for funding of the pepper farm restoration located on the SFWMD-owned lands (Martin County is part owner). SFWMD added that the pepper farm could also provide a potential for floodplain compensation by reconnecting Cypress Creek. SFWMD stated that there is also a plan to construct a flow through marsh on the Florida Forever land to capture agricultural discharge and provide attenuation. PGA stated that this project would also be suitable for floodplain compensation and pollutant loading reductions, and SFWMD agreed. The Florida Forever property was purchased with Comprehensive Everglades Restoration Plan (CERP) funds. SFWMD stated that there are no current opportunities for funding the flow through marsh, but there may be an opportunity for funding in the future. SFWMD indicated that there is bridge culvert system connecting the east and west sides of the Florida Forever property that is important for access and requested that the connection not be removed in the future.
 - ii. Another alternative PGA presented was to provide attenuation in the State-owned lands. PGA stated that this approach was used for the SR 710 from Martin/Palm Beach County Line to Pratt and Whitney Entrance (SFWMD Permit No. 50-04716-P), which was successfully permitted through SFWMD. The SR 710 project provided full treatment on-site, but attenuation was provided off-site in adjacent wetlands to avoid the need for off-site ponds within sensitive lands. Modeling was used to demonstrate a negligible stage increase in the wetlands and no adverse impacts to adjacent properties. SFWMD concurred.
 - iii. PGA said that another alternative that may be reviewed is the use of Bio-Sorption Activated Media (BAM) filters. SFWMD said they were not familiar with this new technology and would need more information before granting approval to use for TN reduction. PGA stated that BAM has been permitted in other water management districts and additional information would be provided if the PD&E study identifies this alternative as a recommended approach.
 - iv. PGA stated that Martin County has been implementing septic-to-sewer conversions and asked whether nutrient removal credit could be obtained by funding a similar project. SFWMD said it would need to be discussed further if the PD&E study identifies this alternative as a recommended approach.
 - v. SFWMD does not know of any additional opportunities and reminded FTE that water quality and quantity aspects will need to stay within the basins impacted.
- c. PGA stated that the PD&E will look at potential joint-use opportunities with the adjacent golf course and the City of Port St. Lucie.

6. **Floodplain**

- a. PGA stated that there are several floodways within the project limits: Roebuck Creek, Danforth Creek, Bessy Creek, North Fork St. Lucie, and Tenmile Creek.
- b. PGA stated that the FEMA floodplains within the project limits are riverine and compensation would be provided for any impacts to these floodplains; however, a portion of the project is downstream of a SFWMD weir control structure. Floodplain impacts at this location would not require compensation, as they are considered tidal.
- c. SFWMD added that the proposed improvements shall not create a backwater increase nor reduce the cross-sectional area at the bridges.

7. Wetlands/Surface Waters

- a. KCA presented the types of wetlands anticipated within the project limits: freshwater marsh, forested wetlands, shrub wetlands, reservoirs, natural rivers, and drainage ditches and canals.
- b. SFWMD indicated that impacts to wetlands associated with OFWs need to show Avoidance and Minimization. Potential mitigation options exist with restoration/enhancement of OFWs and associated wetlands.
- c. KCA stated that the following mitigation options will be reviewed: Loxahatchee Mitigation Bank, Bluefield Ranch Mitigation Bank, R.G. Reserve Mitigation Bank, and DuPuis Reserve (Martin County). A cumulative impact analysis may be necessary based on the location of impacts and mitigation bank service area. SFWMD added that credits may be low or out at the R.G. Reserve Mitigation Bank.
- d. COE agreed with approach.

8. Protected Species

- a. KCA stated that no species-specific surveys have been conducted.
- b. KCA stated that there is a potential for the following protected species:
 - i. Federal
 - 1. Eastern indigo snake
 - 2. Wood stork
 - 3. Crested caracara*
 - 4. Snail kite*
 - 5. Manatee*
 - 6. Wood stork (5 CFAs)
 - 7. Red-cockaded woodpecker*
 - 8. Florida scrub-jay*
 - 9. Florida grasshopper sparrow*
 - (* project in species consultation area)
 - ii. State
 - 1. Wading birds
 - 2. Rookery at Okeechobee Road (SR 70) Toll Plaza
 - 3. Florida sandhill crane
 - 4. Gopher tortoise
 - 5. Southeastern American kestrel
 - 6. Sherman's fox squirrel
 - iii. Other
 - 1. Osprey
 - 2. Bald eagle

- c. FTE stated that the Florida Bonneted Bat Consultation Area (CA) may have recently changed, and the USFWS is in the process of expanding the CA and removing the focal areas, but it is currently still in a draft form.
- d. NMFS inquired about tidal systems and Essential Fish Habitat. Assumed to be minimal. FTE will research further and address in detail during design.

9. Loxahatchee Wild and Scenic River

- a. KCA discussed the project's Loxahatchee River involvement.
- b. Implemented under the Wild and Scenic River Act
 - i. SFWMD confirmed that Section 7a approval is needed.
- c. National Park Service is lead federal agency.
- d. SFWMD/FDEP develop and administer management plan – coordinate with Beth Kacvinsky
- e. Supported by Loxahatchee River Management Coordinating Council (25 members)
 - i. Three Federal Agencies
 - ii. Eight State Agencies
 - iii. Nine Local Agencies
 - iv. Five Non-Governmental Organizations
- f. Extends from southern end of Jonathan Dickinson State Park to southern end of Riverbend Park (Martin and Palm Beach Counties)
- g. Road crosses scenic segment of river.
- h. Addresses Impacts:
 - i. Free Flow Nature
 - ii. Water Quality
 - iii. Remarkable Values – (scenic, recreational, geological, fish & wildlife, historical, cultural)
- i. SFWMD added that Cypress Creek connects to the Loxahatchee River, but it is not considered part of wild and scenic river. KCA stated that the location of the Loxahatchee River within this PD&E project is considered scenic only (not wild).

10. Cultural Resources

- a. KCA stated that a CRAS will be completed as part of this PD&E.

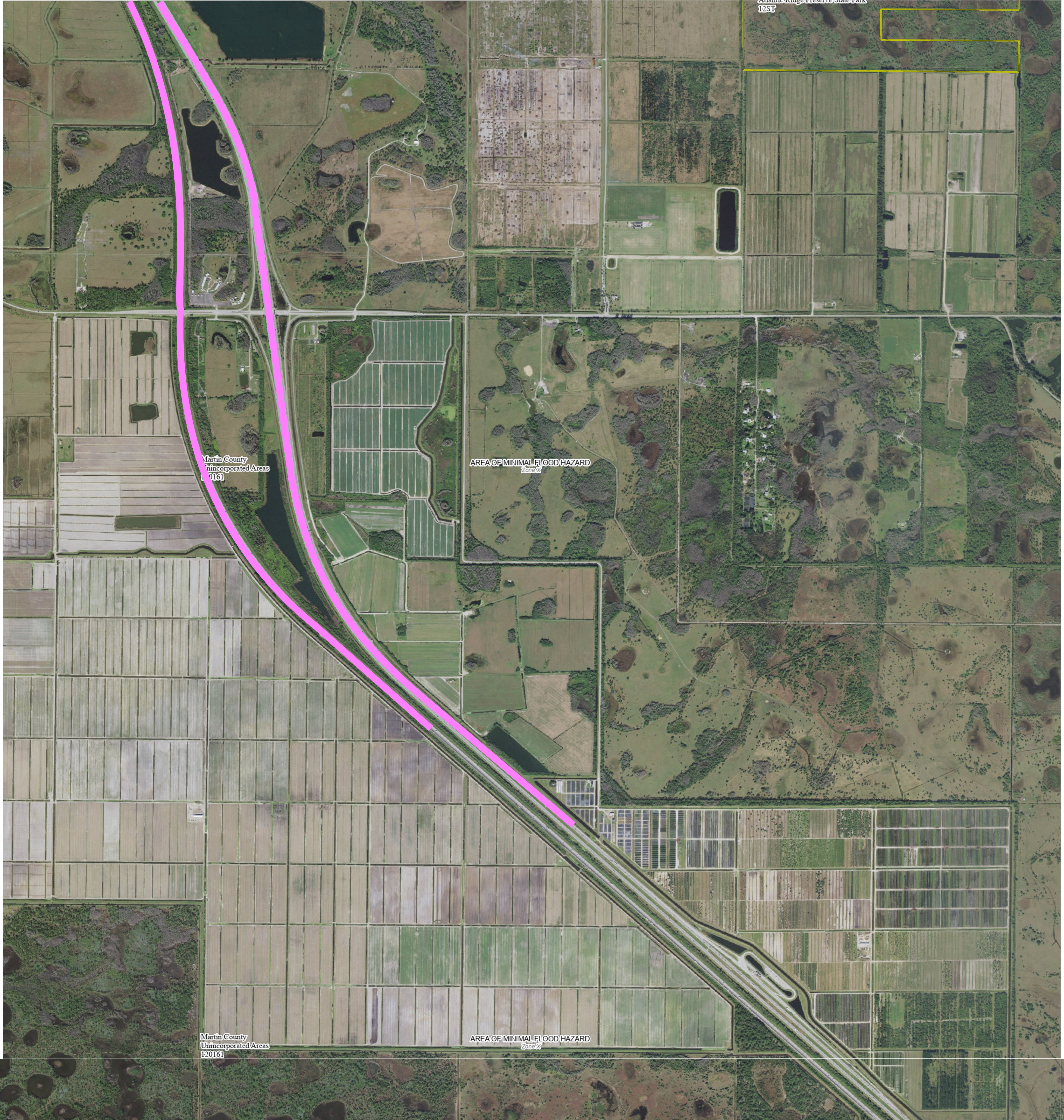
11. Permits and Approvals

- a. KCA stated that the following permits and approvals are anticipated:
 - i. USACE – Section 404 Dredge and Fill Permit
 - ii. USACE – Section 408 Alteration of a USACE Civil Works Project
 - 1. SFWMD said that a Section 408 will be needed for the C-23 canal.
 - iii. US Coast Guard - General Bridge Act of 1946 (33 USC 525)
 - iv. NPS – Section 7a Wild and Scenic Rivers Act Approval
 - v. SFWMD – Environmental Resource Permit
 - vi. SFWMD - Right-of-Way Occupancy Permit
 - 1. SFWMD said that a Right-of-Way Occupancy permit will be necessary for the following canals: C-18 (if within the project limits), C-23 upstream of weir, C-24 downstream of weir, and C-25 downstream of weir.
 - vii. FDEP - Sovereign Submerged Lands Easements

1. This will be submitted with the ERP, and SFWMD will process.
- viii. FDEP – NPDES – Obtained by Construction Contractor
- ix. FWC - Gopher Tortoise Relocation Permit
- x. FWC - Incidental Take Permit (Permitting requirements to be coordinated w/ FWC)
- b. FTE added that the ETDM number for this project is #14295.

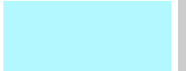
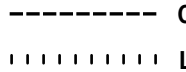
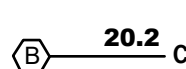
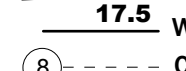
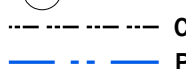
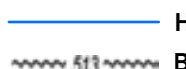
APPENDIX D

FEMA FIRMS



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP
FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE)
		With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS		Area with Flood Risk due to Levee Zone D
		NO SCREEN Area of Minimal Flood Hazard Zone X
OTHER AREAS		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance
		Water Surface Elevation
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-6627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

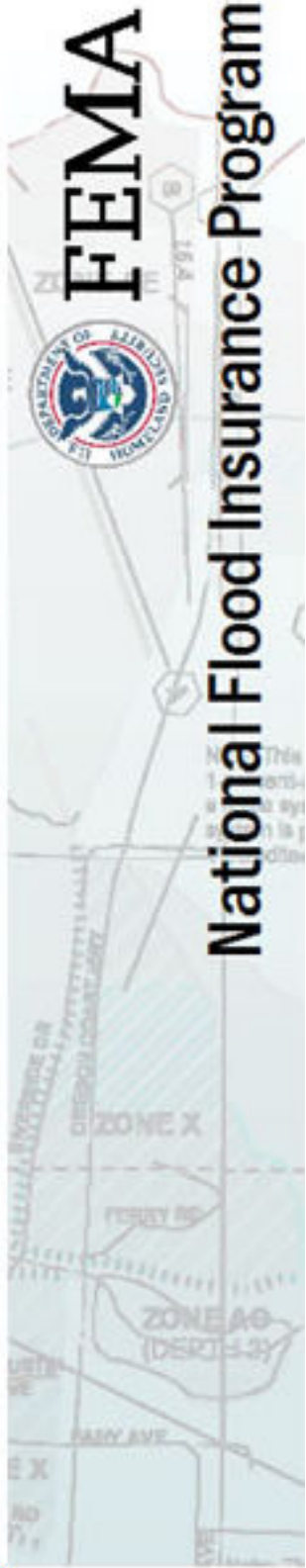
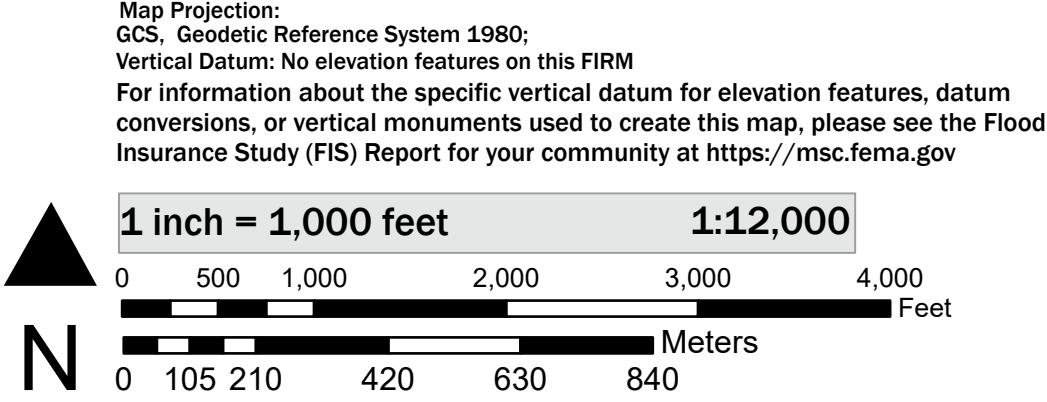
To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **1/29/2025 8:23 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at <https://www.fema.gov/media-library/assets/documents/118418>

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

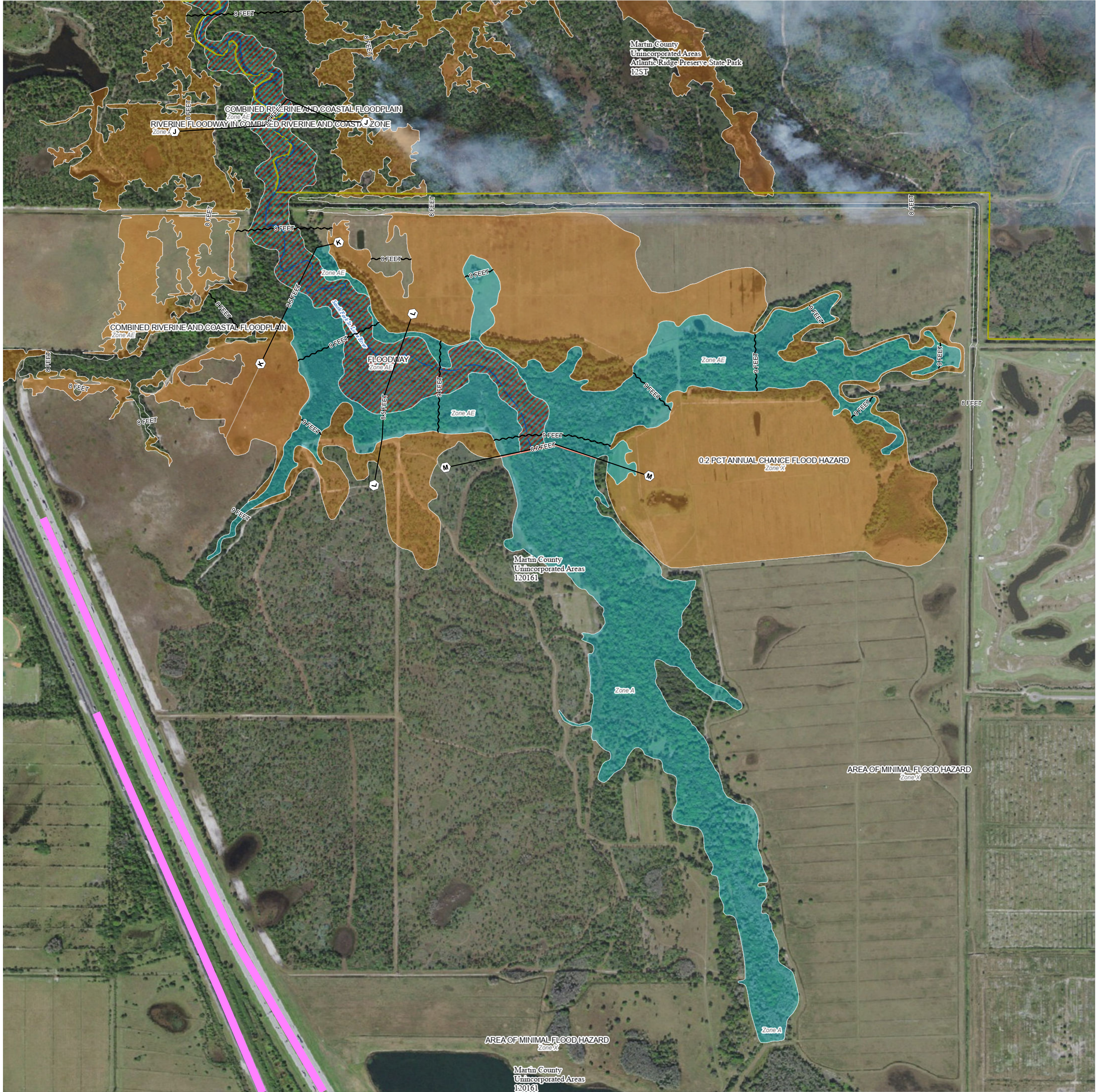
SCALE



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

PANEL 315 OF 527

Panel Contains:		
COMMUNITY	NUMBER	PANEL
MARTIN COUNTY	120161	0315



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE)
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee See Notes Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		8 Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

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For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

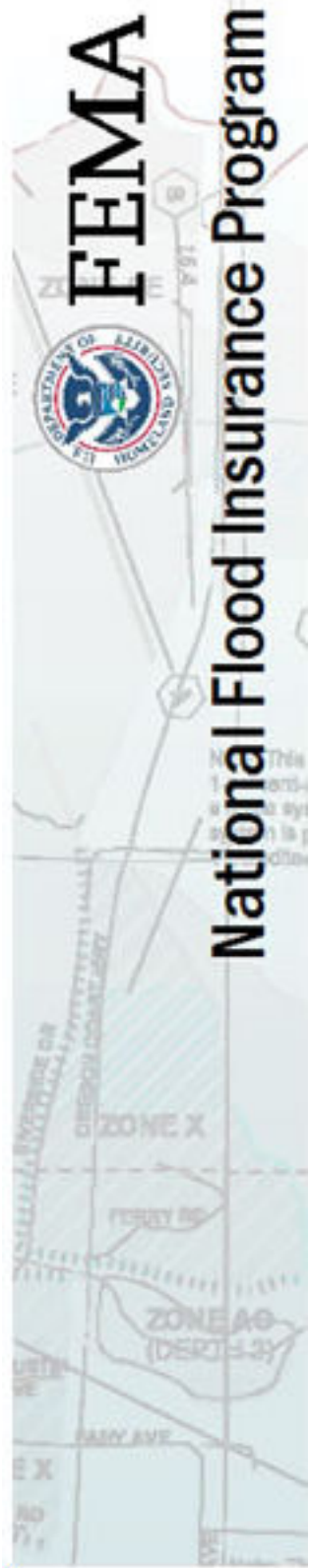
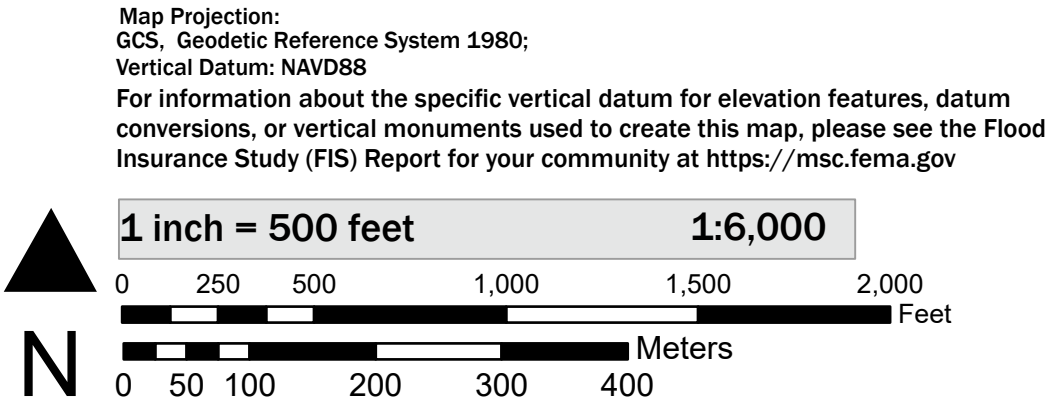
To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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SCALE



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

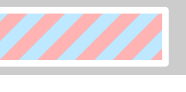
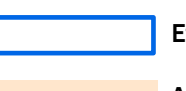
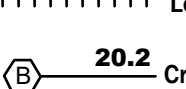
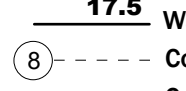
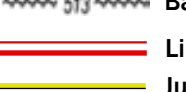
PANEL 303 OF 527

Panel Contains:		
COMMUNITY	NUMBER	PANEL
MARTIN COUNTY	120161	0303



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee See Notes <i>Zone X</i>
OTHER AREAS OF FLOOD HAZARD		Area with Flood Risk due to Levee <i>Zone D</i>
		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
OTHER AREAS		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		8 Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
OTHER FEATURES		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-6627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

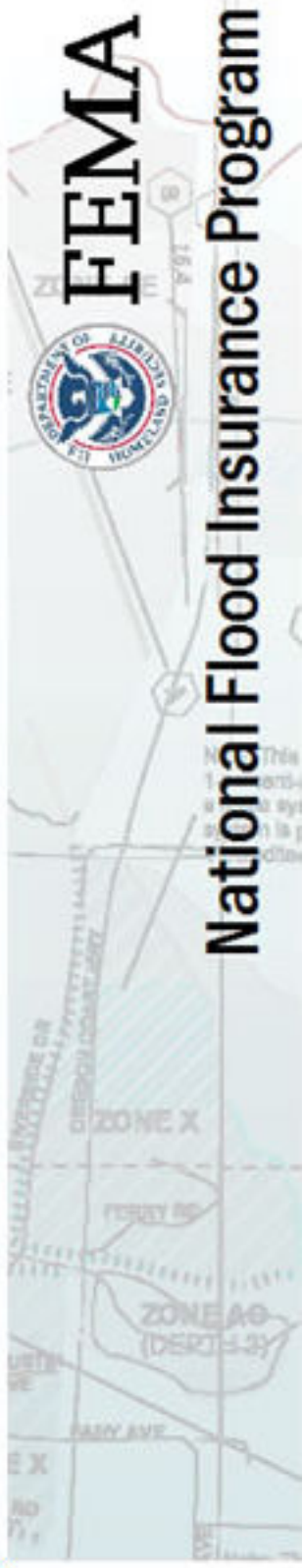
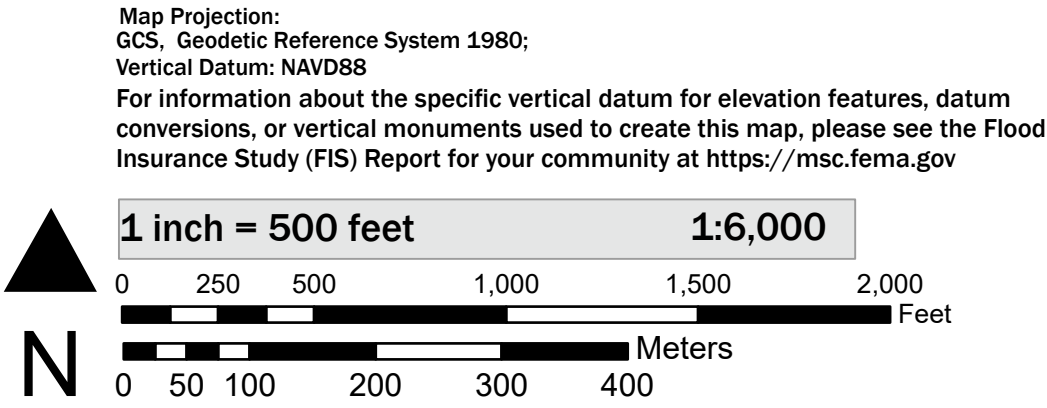
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SCALE



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

PANEL 284 OF 527

Panel Contains:		
COMMUNITY	NUMBER	PANEL
MARTIN COUNTY	120161	0284

APPENDIX E

SOILS DATA

GEOTECHNICAL TECHNICAL MEMORANDUM

September 5, 2024

Lochner, Inc.
4300 West Cypress Street, Suite 500
Tampa, FL 33607

Attn: Mr. Bill Howell, P.E.

**RE: Geotechnical Technical Memorandum – CRAVE Submittal
PD&E I-95 Direct Connect
Martin County Florida
FPID: 446975-1-22-01
Tierra Project No. 6511-22-149**

Mr. Howell:

Tierra, Inc. (Tierra) has reviewed published soil information from the USDA Soil Survey of Martin County, as-built information at the subject site, and borings we have completed in the general project vicinity. Below are our general geotechnical considerations for the soil conditions at the interchange site. It is important to note, Tierra has not performed any site-specific soil borings at the interchange site.

Roadway

Based on a review of the USDA Soils Survey, the near-surface subsurface conditions are anticipated to consist predominantly of sandy soils within the top 7 feet with occasional plastic soils at depths of 3 to 4 feet below natural grades. Organic soils are not indicated in the USDA Soil Survey but low-lying areas that are ponded have the potential to contain surficial organics.

The pre-development (natural) seasonal high groundwater table (SHGWT) levels are reported to be within 1.5 feet of the natural ground surface and some soil units with natural above grade SHGWT.

Bridge Structures

Based on our knowledge of the area and borings in the vicinity, the subsurface conditions will likely consist of sandy soils with varying amounts of shell and silt and varying density to depths of approximately 100 feet below existing grade. The foundation systems for new bridge structures are anticipated to consist of pre-stressed concrete piles. The piles will be driven to achieve the required nominal bearing resistances and likely pile tip levels are estimated at depths of approximately 80 feet below existing grade.

Tierra appreciates the opportunity to provide our services to H.W. Lochner, Inc (Lochner) and the Florida's Turnpike Enterprise (FTE) on this project.

Respectfully Submitted,

TIERRA, INC.



Marc E. Novak, P.E.
Senior Geotechnical Engineer
Florida License No. 67431

TIERRA, Inc.

7351 Temple Terrace Highway • Tampa, Florida 33637
Phone (813) 989-1354 • Fax (813) 989-1355



CUSTOM NRCS SOIL REPORT FOR MARTIN COUNTY



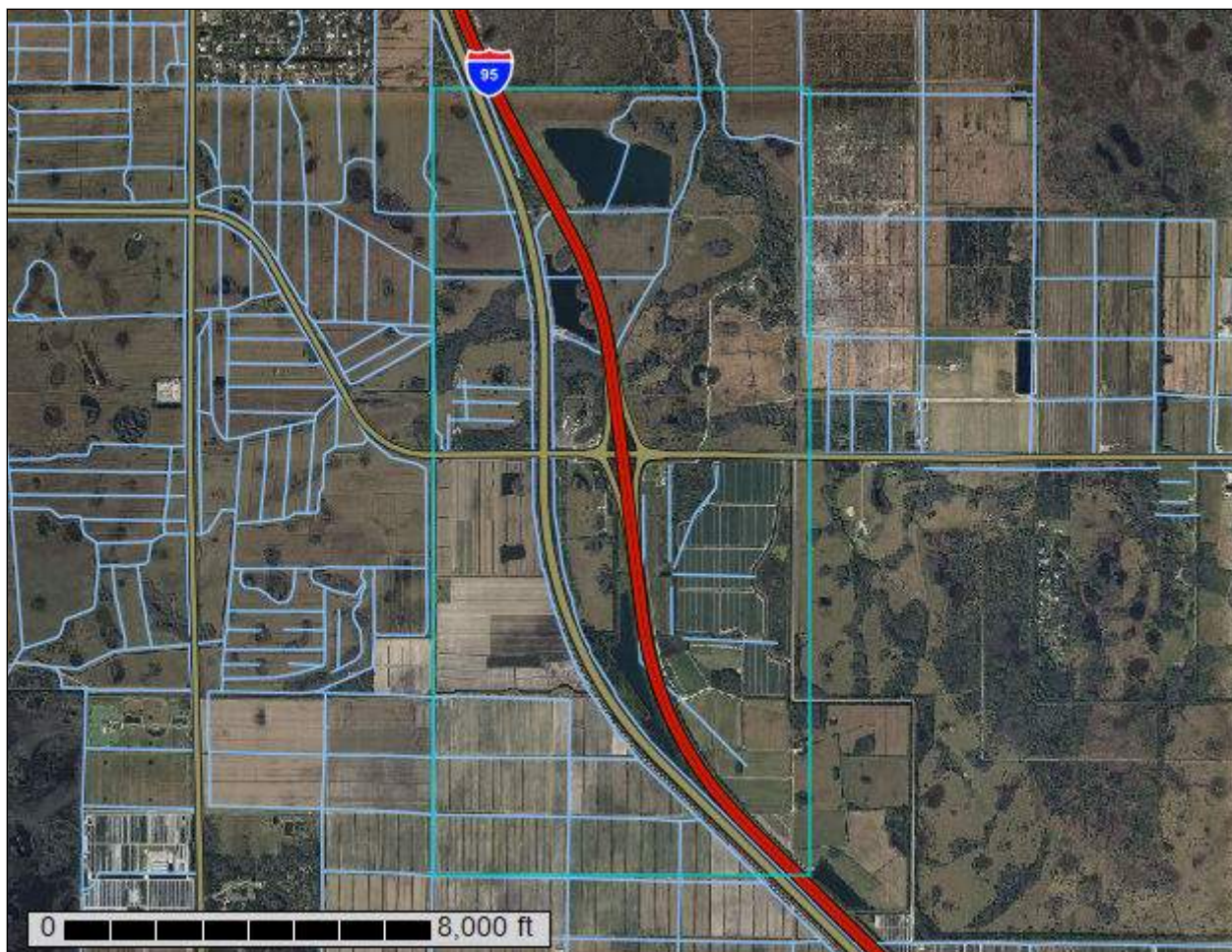
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Martin County, Florida



May 29, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

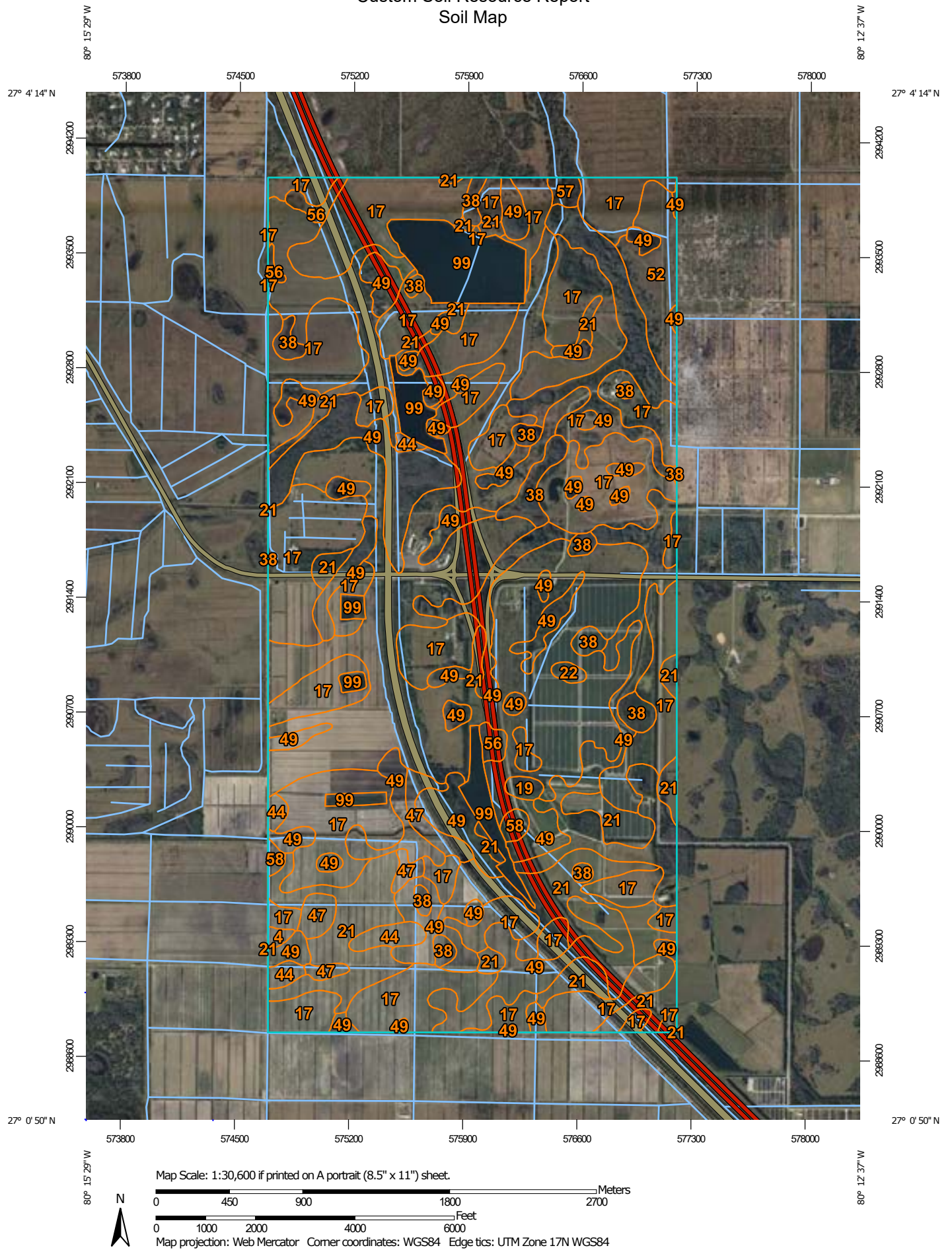
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Martin County, Florida

Survey Area Data: Version 23, Aug 21, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 7, 2019—Jan 30, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
4	Waveland and Immokalee fine sands	3.6	0.1%
17	Wabasso sand, 0 to 2 percent slopes	1,069.7	33.0%
19	Winder sand, frequently ponded, 0 to 1 percent slopes	6.7	0.2%
21	Pineda-Riviera fine sands association, 0 to 2 percent slopes	1,057.3	32.6%
22	Okeelanta muck, frequently ponded, 0 to 1 percent slopes	4.9	0.2%
38	Floridana fine sand, frequently ponded, 0 to 1 percent slopes	76.9	2.4%
44	Cypress Lake fine sand, 0 to 2 percent slopes	29.2	0.9%
47	Pinellas fine sand, 0 to 2 percent slopes	42.7	1.3%
49	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	708.7	21.9%
52	Malabar fine sand, high, 0 to 2 percent slopes	62.2	1.9%
56	Wabasso and Oldsmar fine sands, depressional	19.4	0.6%
57	Chobee muck, frequently ponded, 0 to 1 percent slopes	7.7	0.2%
58	Gator and Tequesta mucks	10.7	0.3%
99	Water	142.3	4.4%
Totals for Area of Interest		3,242.1	100.0%

Map Unit Descriptions

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

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

including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

Custom Soil Resource Report

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Martin County, Florida

4—Waveland and Immokalee fine sands

Map Unit Setting

National map unit symbol: 1jq7n
Elevation: 0 to 80 feet
Mean annual precipitation: 56 to 64 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Waveland and similar soils: 41 percent
Immokalee and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waveland

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 43 inches: fine sand
Bh1 - 43 to 47 inches: fine sand
Bh2 - 47 to 77 inches: loamy fine sand
Cg1 - 77 to 91 inches: fine sand
Cg2 - 91 to 99 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 30 to 50 inches to ortstein
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Custom Soil Resource Report

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL), South Florida Flatwoods (R156BY003FL)

Hydric soil rating: No

Description of Immokalee

Setting

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand

E - 6 to 35 inches: fine sand

Bh - 35 to 54 inches: fine sand

BC - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL), South Florida Flatwoods (R156BY003FL)

Hydric soil rating: No

Minor Components

Lawnwood

Percent of map unit: 4 percent

Landform: Marine terraces on flatwoods

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL), South Florida Flatwoods (R156BY003FL)

Custom Soil Resource Report

Hydric soil rating: No

Basinger

Percent of map unit: 4 percent

Landform: Drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Concave

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL), Slough (R156BY011FL)

Hydric soil rating: Yes

Nettles

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL), South Florida Flatwoods (R156BY003FL)

Hydric soil rating: No

Salerno

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156BC141FL), South Florida Flatwoods (R156BY003FL)

Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent

Landform: Rises on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G156BC121FL), South Florida Flatwoods (R156BY003FL)

Hydric soil rating: No

Placid

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G156BC145FL)

Hydric soil rating: Yes

17—Wabasso sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svyr

Elevation: 0 to 70 feet

Mean annual precipitation: 46 to 55 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 355 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Wabasso and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso

Setting

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand

E - 6 to 25 inches: sand

Bh - 25 to 30 inches: sand

Btg - 30 to 58 inches: sandy clay loam

Cg - 58 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: 9 to 50 inches to strongly contrasting textural stratification

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Minor Components

Brynwood

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

19—Winder sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9f9

Custom Soil Resource Report

Elevation: 0 to 80 feet

Mean annual precipitation: 45 to 64 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 355 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Winder and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Winder

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave, linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 3 inches: sand

E - 3 to 13 inches: sand

Btg/E - 13 to 35 inches: sandy clay loam

Btg - 35 to 71 inches: sandy loam

Ckg - 71 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C/D

Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps

Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)

Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Minor Components

Felda

Percent of map unit: 5 percent

Landform: Depressions on marine terraces, flats on marine terraces

Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Linear

Across-slope shape: Concave, linear

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Pineda

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)

Hydric soil rating: Yes

Copeland

Percent of map unit: 2 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps

Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Wabasso

Percent of map unit: 2 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Tread, talf

Down-slope shape: Convex, linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: No

Brynwood

Percent of map unit: 2 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Tread, talf

Custom Soil Resource Report

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)

Hydric soil rating: Yes

Gator

Percent of map unit: 1 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

21—Pineda-Riviera fine sands association, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9fy

Elevation: 0 to 40 feet

Mean annual precipitation: 46 to 64 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 360 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Pineda and similar soils: 45 percent

Riviera and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pineda

Setting

Landform: Flats on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Tread, tal, dip

Down-slope shape: Linear

Across-slope shape: Linear, concave

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 1 inches: fine sand

E - 1 to 5 inches: fine sand

Bw - 5 to 36 inches: fine sand

Btg/E - 36 to 54 inches: fine sandy loam

Cg - 54 to 80 inches: fine sand

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Description of Riviera

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 28 inches: fine sand
Bt/E - 28 to 36 inches: fine sandy loam
Btg - 36 to 42 inches: sandy clay loam
C - 42 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Minor Components

Malabar

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Oldsmar

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Pinellas

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Cabbage Palm Flatwoods (R155XY005FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Custom Soil Resource Report

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

22—Okeelanta muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzw8
Elevation: 0 to 160 feet
Mean annual precipitation: 41 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Okeelanta and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Okeelanta

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa - 0 to 31 inches: muck
Cg - 31 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Custom Soil Resource Report

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very high (about 14.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)

Hydric soil rating: Yes

Minor Components

Lauderhill

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)

Hydric soil rating: Yes

Terra ceia

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, convex

Across-slope shape: Concave, linear

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Floridana

Percent of map unit: 2 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Pompano

Percent of map unit: 1 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Linear

Across-slope shape: Concave, linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), Slough (R155XY011FL)

Hydric soil rating: Yes

Tequesta

Percent of map unit: 1 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)

Hydric soil rating: Yes

38—Floridana fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2sm53

Elevation: 0 to 90 feet

Mean annual precipitation: 42 to 64 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Floridana and similar soils: 85 percent

Minor components: 15 percent

Custom Soil Resource Report

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Floridana

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 19 inches: fine sand
Eg - 19 to 25 inches: fine sand
Btg - 25 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Minor Components

Tequesta

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Gator

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Felda

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

44—Cypress Lake fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zldq
Elevation: 0 to 40 feet

Custom Soil Resource Report

Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cypress lake, nonhydric, and similar soils: 70 percent
Cypress lake, hydric, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cypress Lake, Nonhydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits over limestone over sandy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 25 inches: fine sand
Btg - 25 to 32 inches: fine sandy loam
2R - 32 to 40 inches: bedrock
3C1 - 40 to 50 inches: fine sand
3C2 - 50 to 81 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 9 to 58 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G156BC241FL)
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G156BC241FL), South Florida Flatwoods (R156BY003FL)
Hydric soil rating: No

Description of Cypress Lake, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Concave, linear

Parent material: Sandy and loamy marine deposits over limestone over sandy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

E - 7 to 25 inches: fine sand

Btg - 25 to 32 inches: fine sandy loam

2R - 32 to 40 inches: bedrock

3C1 - 40 to 50 inches: fine sand

3C2 - 50 to 81 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: 9 to 58 inches to lithic bedrock

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: A/D

Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks

Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G156BC241FL)

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G156BC241FL), South Florida Flatwoods (R156BY003FL)

Hydric soil rating: Yes

Minor Components

Brynwood

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: Yes

Pineda

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Pinellas

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Cabbage Palm Flatwoods (R155XY005FL)
Hydric soil rating: No

Riviera

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

47—Pinellas fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzw0
Elevation: 0 to 80 feet

Custom Soil Resource Report

Mean annual precipitation: 45 to 64 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Pinellas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pinellas

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, tal
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 18 inches: fine sand
Bk - 18 to 34 inches: fine sand
Bt_{kg} - 34 to 46 inches: fine sandy loam
2C_{kg} - 46 to 80 inches: paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Cabbage Palm Flatwoods (R155XY005FL)
Hydric soil rating: No

Minor Components

Riviera

Percent of map unit: 6 percent
Landform: Flats on marine terraces, drainageways on marine terraces

Custom Soil Resource Report

Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Brynwood

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Holopaw

Percent of map unit: 2 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

49—Riviera fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzwl

Elevation: 0 to 80 feet

Mean annual precipitation: 44 to 64 inches

Mean annual air temperature: 68 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Riviera and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riviera

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand

E - 4 to 36 inches: fine sand

Bt/E - 36 to 42 inches: fine sandy loam

Cg1 - 42 to 56 inches: fine sand

Cg2 - 56 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D

Custom Soil Resource Report

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)

Hydric soil rating: Yes

Minor Components

Chobee

Percent of map unit: 7 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G156BC345FL)

Hydric soil rating: Yes

Tequesta

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)

Hydric soil rating: Yes

Wabasso

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Tread, talf

Down-slope shape: Convex, linear

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)

Hydric soil rating: No

52—Malabar fine sand, high, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svz4
Elevation: 0 to 80 feet
Mean annual precipitation: 42 to 64 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Malabar, high, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malabar, High

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 17 inches: fine sand
Bw - 17 to 42 inches: fine sand
Bt - 42 to 59 inches: fine sandy loam
Cg - 59 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Custom Soil Resource Report

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Minor Components

Oldsmar

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Felda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

56—Wabasso and Oldsmar fine sands, depressional

Map Unit Setting

National map unit symbol: 1jq96
Elevation: 0 to 60 feet
Mean annual precipitation: 56 to 64 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabasso and similar soils: 45 percent
Oldsmar and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 31 inches: fine sand
Bh - 31 to 35 inches: fine sand
Bt - 35 to 43 inches: sandy clay loam
Cg - 43 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w

Custom Soil Resource Report

Hydrologic Soil Group: C/D

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G156BC145FL)

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G156BC145FL)

Hydric soil rating: Yes

Description of Oldsmar

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 12 inches: fine sand

E - 12 to 34 inches: fine sand

Bh - 34 to 52 inches: fine sand

Bt - 52 to 68 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G156BC145FL)

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G156BC145FL)

Hydric soil rating: Yes

Minor Components

Floridana

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Custom Soil Resource Report

Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G156BC245FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G156BC245FL)
Hydric soil rating: Yes

Tequesta

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Organic soils in depressions and on flood plains (G156BC645FL)
Hydric soil rating: Yes

Winder

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G156BC345FL)
Hydric soil rating: Yes

57—Chobee muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzwg

Elevation: 0 to 130 feet

Mean annual precipitation: 43 to 64 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Chobee and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chobee

Setting

Landform: Depressions on flatwoods on marine terraces

Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Parent material: Loamy alluvium

Typical profile

Oa - 0 to 4 inches: muck

A - 4 to 16 inches: loamy sand

Btg1 - 16 to 28 inches: fine sandy loam

Btg2 - 28 to 42 inches: sandy clay loam

Btg3 - 42 to 53 inches: fine sandy loam

Cg - 53 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 7 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0

Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C/D

Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps

*Forage suitability group: Organic soils in depressions and on flood plains
(G155XB645FL)*

*Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL),
Organic soils in depressions and on flood plains (G155XB645FL)*

Hydric soil rating: Yes

Minor Components

Riviera

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps

*Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL),
Sandy over loamy soils on stream terraces, flood plains, or in depressions
(G155XB245FL)*

Hydric soil rating: Yes

Gator

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R156BY020FL - Histisol Isolated Marshes and Swamps

*Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL),
Organic soils in depressions and on flood plains (G155XB645FL)*

Hydric soil rating: Yes

Tequesta

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps

*Other vegetative classification: Organic soils in depressions and on flood plains
(G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)*

Hydric soil rating: Yes

58—Gator and Tequesta mucks

Map Unit Setting

National map unit symbol: 1jq98

Elevation: 0 to 60 feet

Custom Soil Resource Report

Mean annual precipitation: 56 to 64 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Gator and similar soils: 50 percent
Tequesta and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gator

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over loamy and sandy marine deposits

Typical profile

Oa - 0 to 24 inches: muck
Cg1 - 24 to 48 inches: fine sandy loam
Cg2 - 48 to 56 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G156BC645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Organic soils in depressions and on flood plains (G156BC645FL)
Hydric soil rating: Yes

Description of Tequesta

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip

Custom Soil Resource Report

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Stratified sandy and loamy marine deposits

Typical profile

Oa - 0 to 14 inches: muck

A - 14 to 26 inches: sand

Eg - 26 to 30 inches: sand

Btg - 30 to 40 inches: sandy clay loam

B/C - 40 to 48 inches: loamy sand

Cg - 48 to 64 inches: sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C/D

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Forage suitability group: Organic soils in depressions and on flood plains (G156BC645FL)

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL),
Organic soils in depressions and on flood plains (G156BC645FL)

Hydric soil rating: Yes

Minor Components

Chobee

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL),
Loamy and clayey soils on stream terraces, flood plains, or in depressions (G156BC345FL)

Hydric soil rating: Yes

Floridana

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Custom Soil Resource Report

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G156BC245FL)

Hydric soil rating: Yes

99—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Forage suitability group: Forage suitability group not assigned (G156BC999FL)

Other vegetative classification: Forage suitability group not assigned (G156BC999FL)

Hydric soil rating: Unranked

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

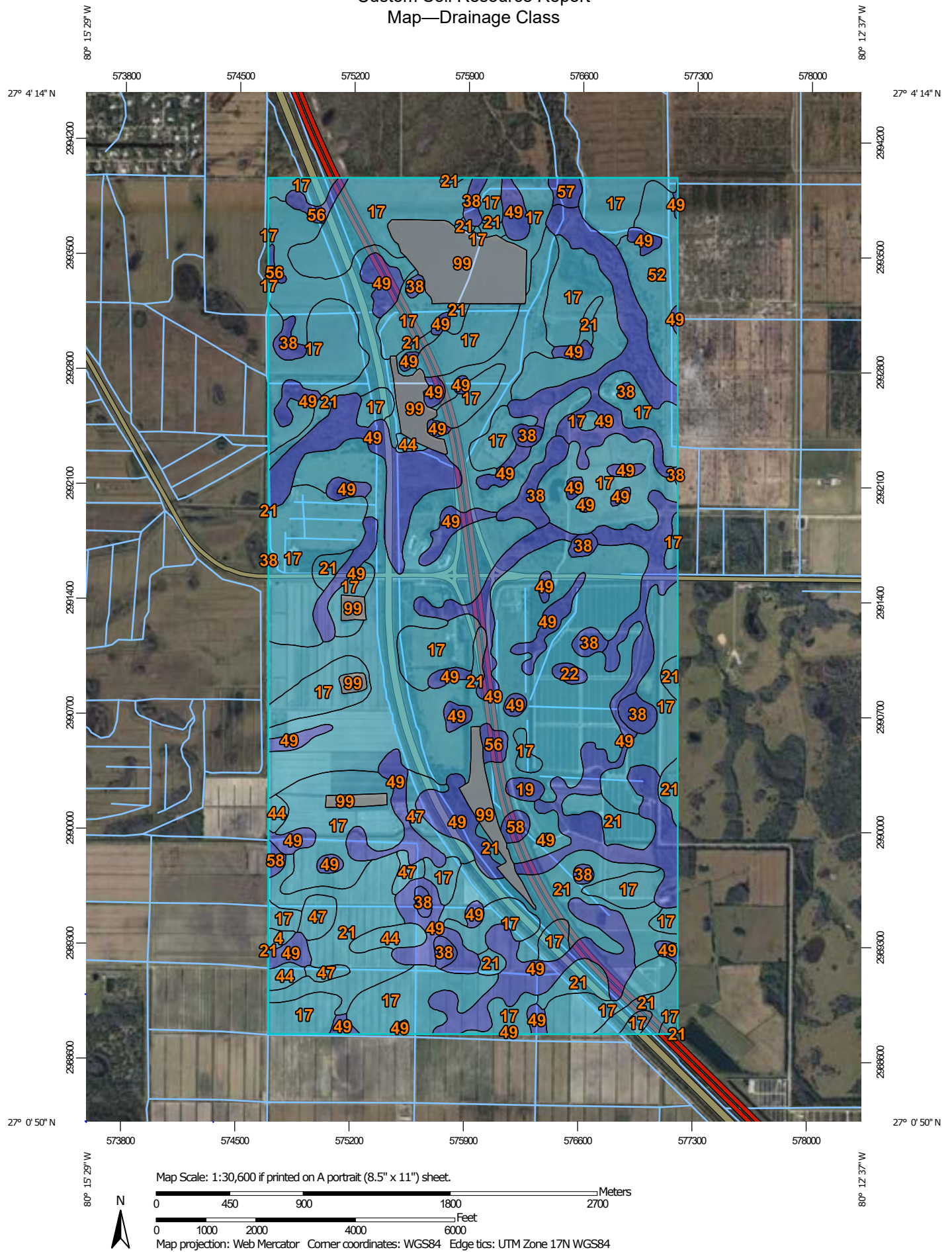
Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Drainage Class

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

Custom Soil Resource Report Map—Drainage Class



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

	Excessively drained		Excessively drained
	Somewhat excessively drained		Somewhat excessively drained
	Well drained		Well drained
	Moderately well drained		Moderately well drained
	Somewhat poorly drained		Somewhat poorly drained
	Poorly drained		Poorly drained
	Very poorly drained		Very poorly drained
	Subaqueous		Subaqueous
	Not rated or not available		Not rated or not available

Soil Rating Lines

	Excessively drained
	Somewhat excessively drained
	Well drained
	Moderately well drained
	Somewhat poorly drained
	Poorly drained
	Very poorly drained
	Subaqueous
	Not rated or not available

Soil Rating Points

Water Features

 Streams and Canals

Transportation

	Rails
	Interstate Highways
	US Routes
	Major Roads
	Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Martin County, Florida

Survey Area Data: Version 23, Aug 21, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 7, 2019—Jan 30, 2022

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

Table—Drainage Class

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Waveland and Immokalee fine sands	Poorly drained	3.6	0.1%
17	Wabasso sand, 0 to 2 percent slopes	Poorly drained	1,069.7	33.0%
19	Winder sand, frequently ponded, 0 to 1 percent slopes	Very poorly drained	6.7	0.2%
21	Pineda-Riviera fine sands association, 0 to 2 percent slopes	Poorly drained	1,057.3	32.6%
22	Okeelanta muck, frequently ponded, 0 to 1 percent slopes	Very poorly drained	4.9	0.2%
38	Floridana fine sand, frequently ponded, 0 to 1 percent slopes	Very poorly drained	76.9	2.4%
44	Cypress Lake fine sand, 0 to 2 percent slopes	Poorly drained	29.2	0.9%
47	Pinellas fine sand, 0 to 2 percent slopes	Poorly drained	42.7	1.3%
49	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	Very poorly drained	708.7	21.9%
52	Malabar fine sand, high, 0 to 2 percent slopes	Poorly drained	62.2	1.9%
56	Wabasso and Oldsmar fine sands, depressional	Very poorly drained	19.4	0.6%
57	Chobee muck, frequently ponded, 0 to 1 percent slopes	Very poorly drained	7.7	0.2%
58	Gator and Tequesta mucks	Very poorly drained	10.7	0.3%
99	Water		142.3	4.4%
Totals for Area of Interest			3,242.1	100.0%

Rating Options—Drainage Class*Aggregation Method: Dominant Condition**Component Percent Cutoff: None Specified**Tie-break Rule: Higher*

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

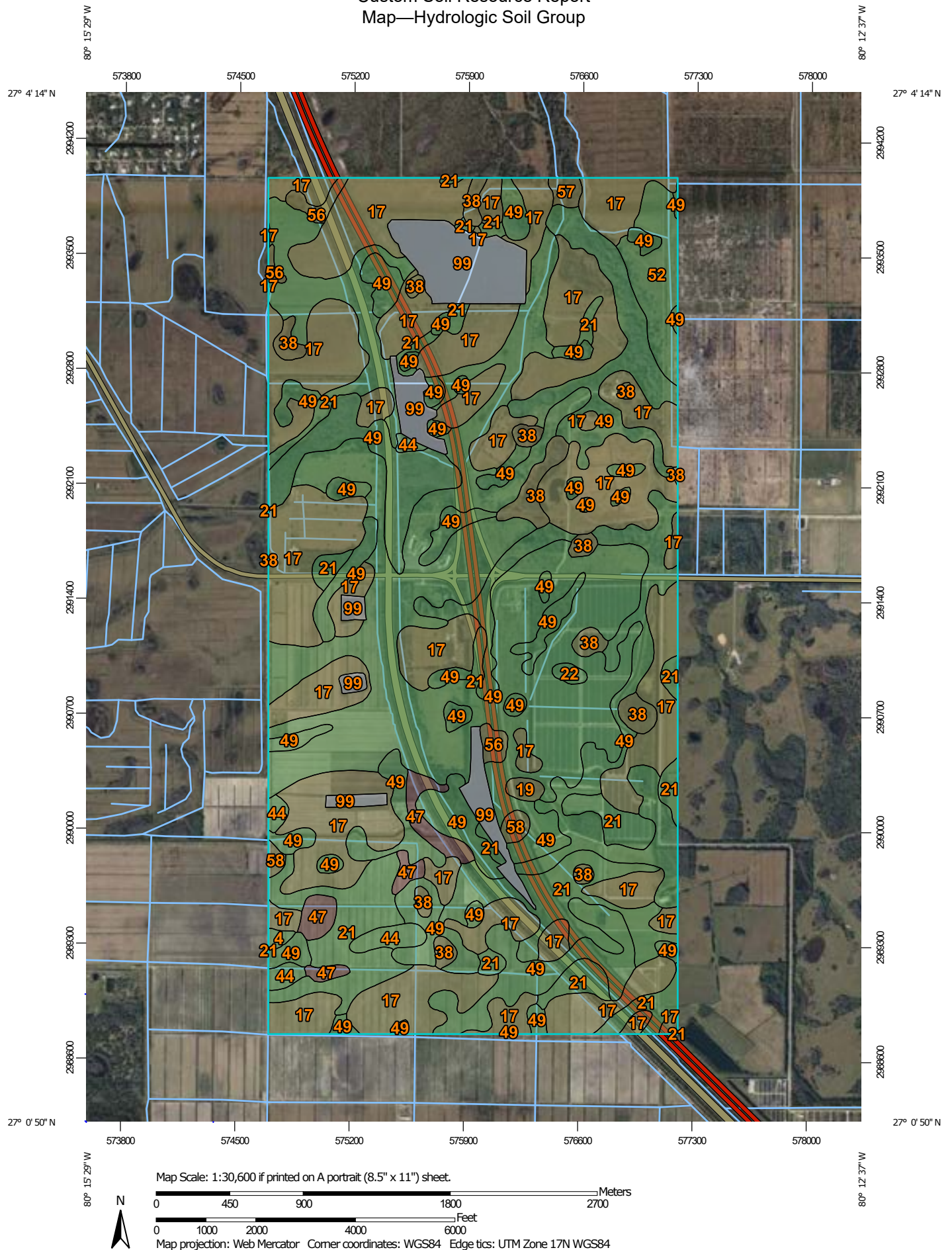
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report

Map—Hydrologic Soil Group



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Martin County, Florida

Survey Area Data: Version 23, Aug 21, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 7, 2019—Jan 30, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Waveland and Immokalee fine sands	A/D	3.6	0.1%
17	Wabasso sand, 0 to 2 percent slopes	C/D	1,069.7	33.0%
19	Winder sand, frequently ponded, 0 to 1 percent slopes	C/D	6.7	0.2%
21	Pineda-Riviera fine sands association, 0 to 2 percent slopes	A/D	1,057.3	32.6%
22	Okeelanta muck, frequently ponded, 0 to 1 percent slopes	A/D	4.9	0.2%
38	Floridana fine sand, frequently ponded, 0 to 1 percent slopes	C/D	76.9	2.4%
44	Cypress Lake fine sand, 0 to 2 percent slopes	A/D	29.2	0.9%
47	Pinellas fine sand, 0 to 2 percent slopes	B/D	42.7	1.3%
49	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	A/D	708.7	21.9%
52	Malabar fine sand, high, 0 to 2 percent slopes	A/D	62.2	1.9%
56	Wabasso and Oldsmar fine sands, depressional	C/D	19.4	0.6%
57	Chobee muck, frequently ponded, 0 to 1 percent slopes	C/D	7.7	0.2%
58	Gator and Tequesta mucks	C/D	10.7	0.3%
99	Water		142.3	4.4%
Totals for Area of Interest			3,242.1	100.0%

Rating Options—Hydrologic Soil Group*Aggregation Method: Dominant Condition**Component Percent Cutoff: None Specified**Tie-break Rule: Higher*

Water Features

Water Features include ponding frequency, flooding frequency, and depth to water table.

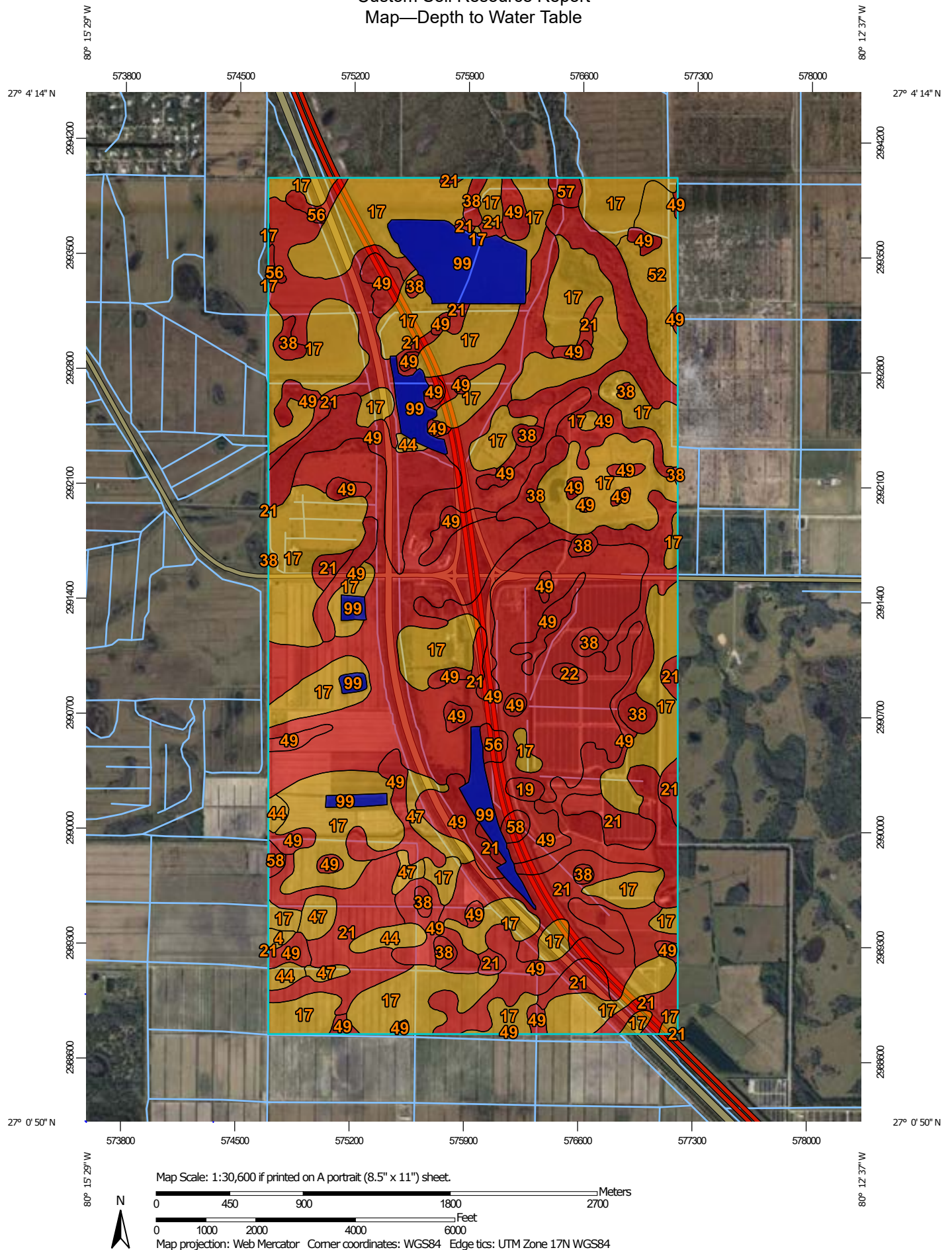
Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report

Map—Depth to Water Table



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

Soil Rating Lines

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

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Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 7, 2019—Jan 30, 2022

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

Table—Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
4	Waveland and Immokalee fine sands	31	3.6	0.1%
17	Wabasso sand, 0 to 2 percent slopes	31	1,069.7	33.0%
19	Winder sand, frequently ponded, 0 to 1 percent slopes	0	6.7	0.2%
21	Pineda-Riviera fine sands association, 0 to 2 percent slopes	0	1,057.3	32.6%
22	Okeelanta muck, frequently ponded, 0 to 1 percent slopes	0	4.9	0.2%
38	Floridana fine sand, frequently ponded, 0 to 1 percent slopes	0	76.9	2.4%
44	Cypress Lake fine sand, 0 to 2 percent slopes	30	29.2	0.9%
47	Pinellas fine sand, 0 to 2 percent slopes	30	42.7	1.3%
49	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	0	708.7	21.9%
52	Malabar fine sand, high, 0 to 2 percent slopes	30	62.2	1.9%
56	Wabasso and Oldsmar fine sands, depressional	0	19.4	0.6%
57	Chobee muck, frequently ponded, 0 to 1 percent slopes	0	7.7	0.2%
58	Gator and Tequesta mucks	0	10.7	0.3%
99	Water	>200	142.3	4.4%
Totals for Area of Interest			3,242.1	100.0%

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

References

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Custom Soil Resource Report

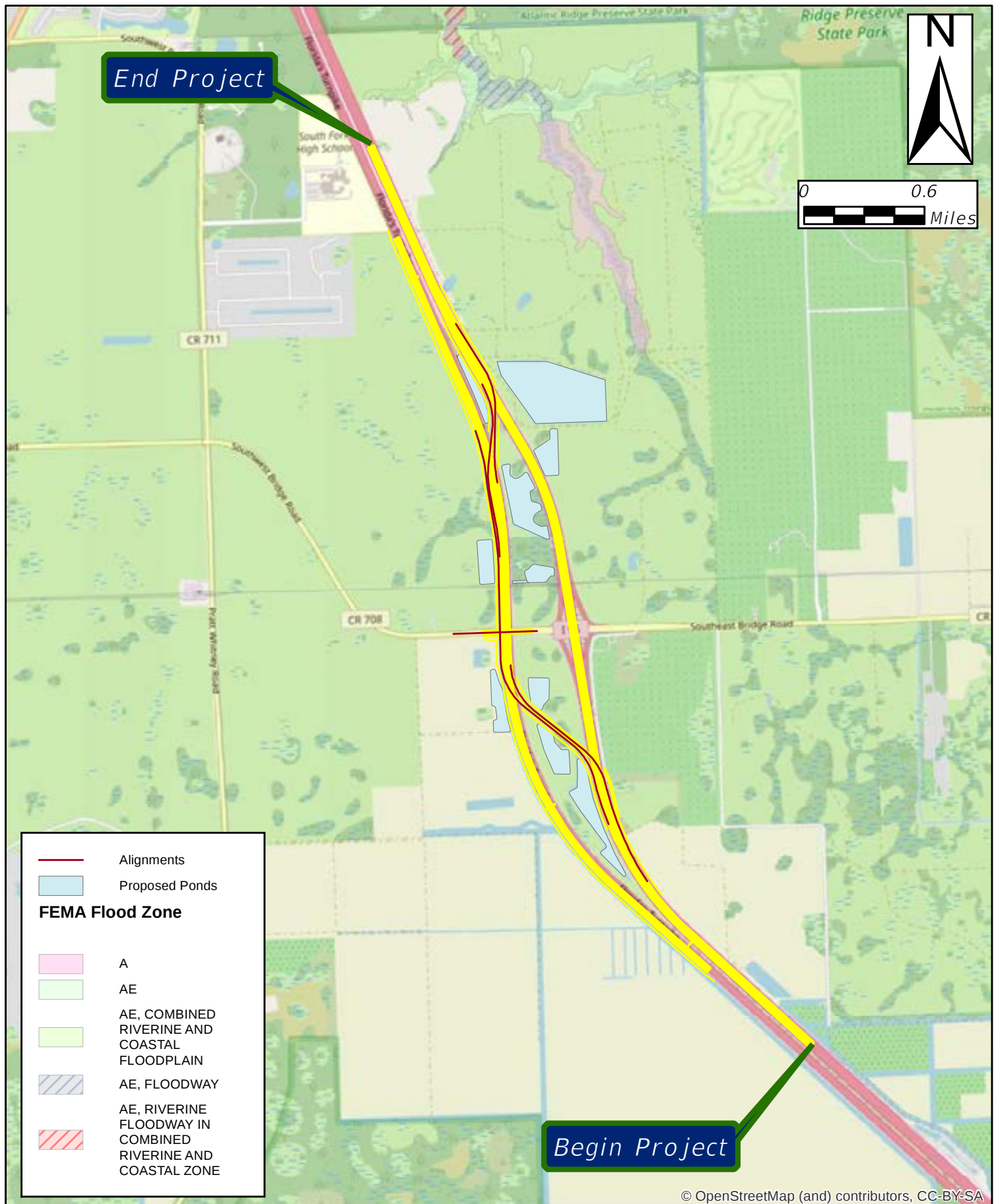
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United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX F

EXHIBITS



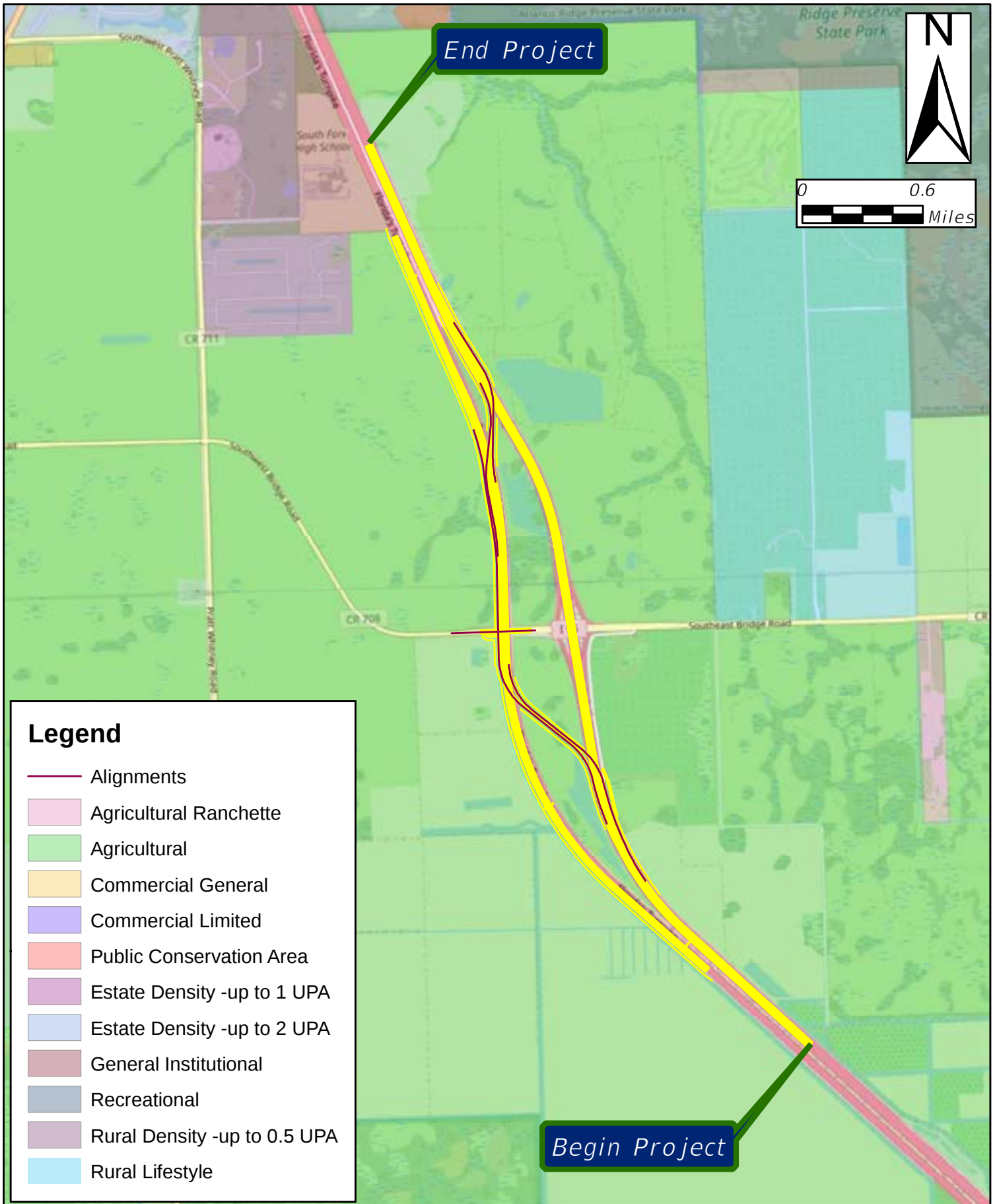
Patel, Greene & Associates, LLC
 12570 Telecom Drive
 Temple Terrace, FL 33637
 Michael A. Holt, P.E. #76111

FEMA Map

I-95 Direct Connection Interchange PD&E Study

FPID: 446975-1-22-01

Date: 5/23/2025



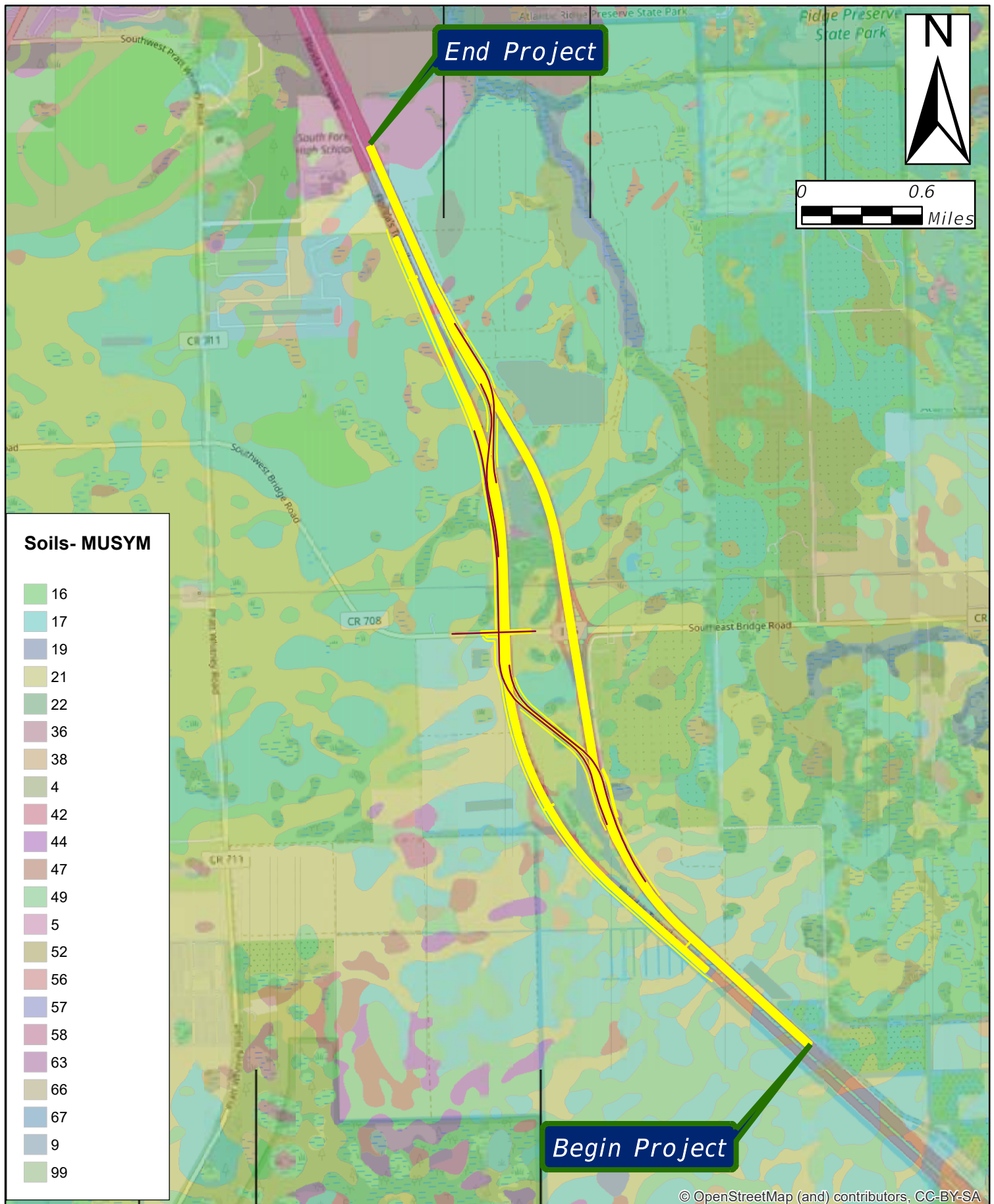
Patel, Greene & Associates, LLC
 12570 Telecom Drive
 Temple Terrace, FL 33637
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Future Land Use Map

I-95 Direct Connection Interchange PD&E Study

FPID: 446975-1-22-01

Date: 5/23/2025



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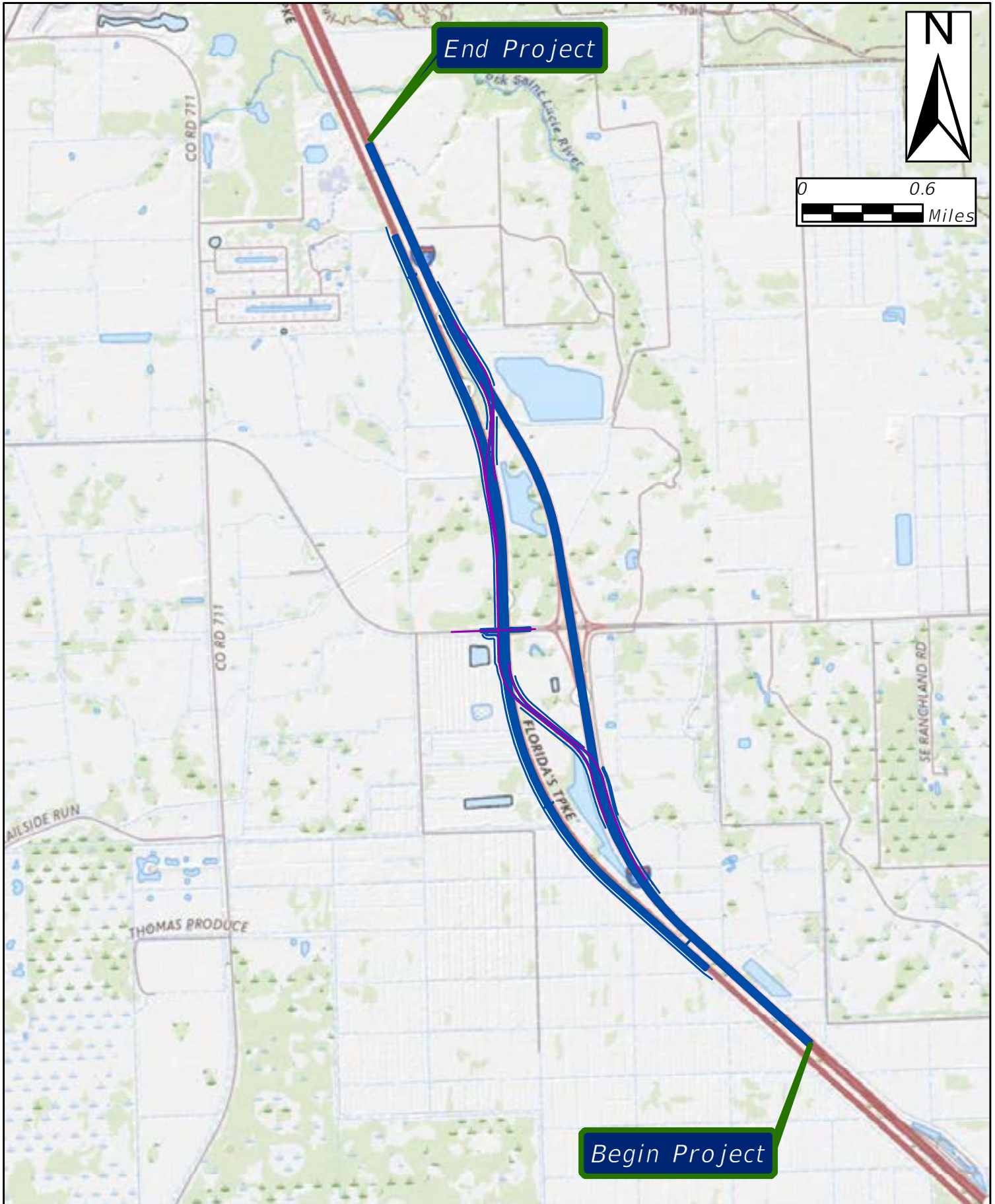
Patel, Greene & Associates, LLC
 12570 Telecom Drive
 Temple Terrace, FL 33637
 Michael A. Holt, P.E. #76111

Soils Map

I-95 Direct Connection Interchange PD&E Study

FPID: 446975-1-22-01

Date: 6/3/2025



Patel, Greene & Associates, LLC
12570 Telecom Drive
Temple Terrace, FL 33637
Michael A. Holt, P.E. #76111

USGS Quad Map

I-95 Direct Connection Interchange PD&E Study

FPID: 446975-1-22-01

Date: 5/23/2025

APPENDIX G

CORRESPONDENCE AND EXCERPTS

Erik Scott

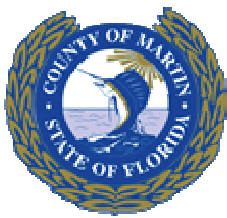
From: Christine Madsen <cmadsen@martin.fl.us>
Sent: Thursday, September 4, 2025 12:50 PM
To: Zack Gross
Cc: Erik Scott; Michael Grzelka
Subject: RE: Floodplain Coordination - Florida's Turnpike (SR 91) Widening in Martin County

Hi Zack,

Thank you for reaching out. The County's online flood map displays all managed floodplains, including properties located within Zone X. Since the project area is entirely within Zone X, no special coordination with the County is required for floodplain purposes. Please note that coordination with other County departments will be needed for this project based on the planned improvements.

Please let me know if you need any additional information.

Thank you,



Christine Madsen, CFM
Engineering Permit Manager
Public Works Department
Engineering Services
772-320-3057
cmadsen@martin.fl.us



From: Zack Gross <zachary.gross@patelgreene.com>
Sent: Thursday, September 4, 2025 11:23 AM
To: Christine Madsen <cmadsen@martin.fl.us>
Cc: Erik Scott <erik.scott@Patelgreene.com>
Subject: Floodplain Coordination - Florida's Turnpike (SR 91) Widening in Martin County



Hi Christine,

We are working with FTE on evaluating a system-to-system direct connection interchange between Florida's Turnpike (SR 91) and Interstate 95 (I-95) at SE Bridge Road (CR 708) in Martin County. The approximate project limits are shown below.



The project is located within FIRM Panel 12085C0315G and listed as “not printed”, and is hence categorized as entirely Zone X. The online Martin County Flood Zone Map also does not show any flood zones within the study area. Does this website display all of Martin County’s managed floodplains, including those located within “not printed” panels?

And should we anticipate any special coordination with Martin County for the proposed improvements in these not printed areas?

Thank you in advance! Let me know if you need any additional information



Zack Gross, PE, CFM | Senior Engineer

12570 Telecom Drive, Temple Terrace, FL, 33637

Cell: (813) 690-3798 | **Office:** (813) 978-3100

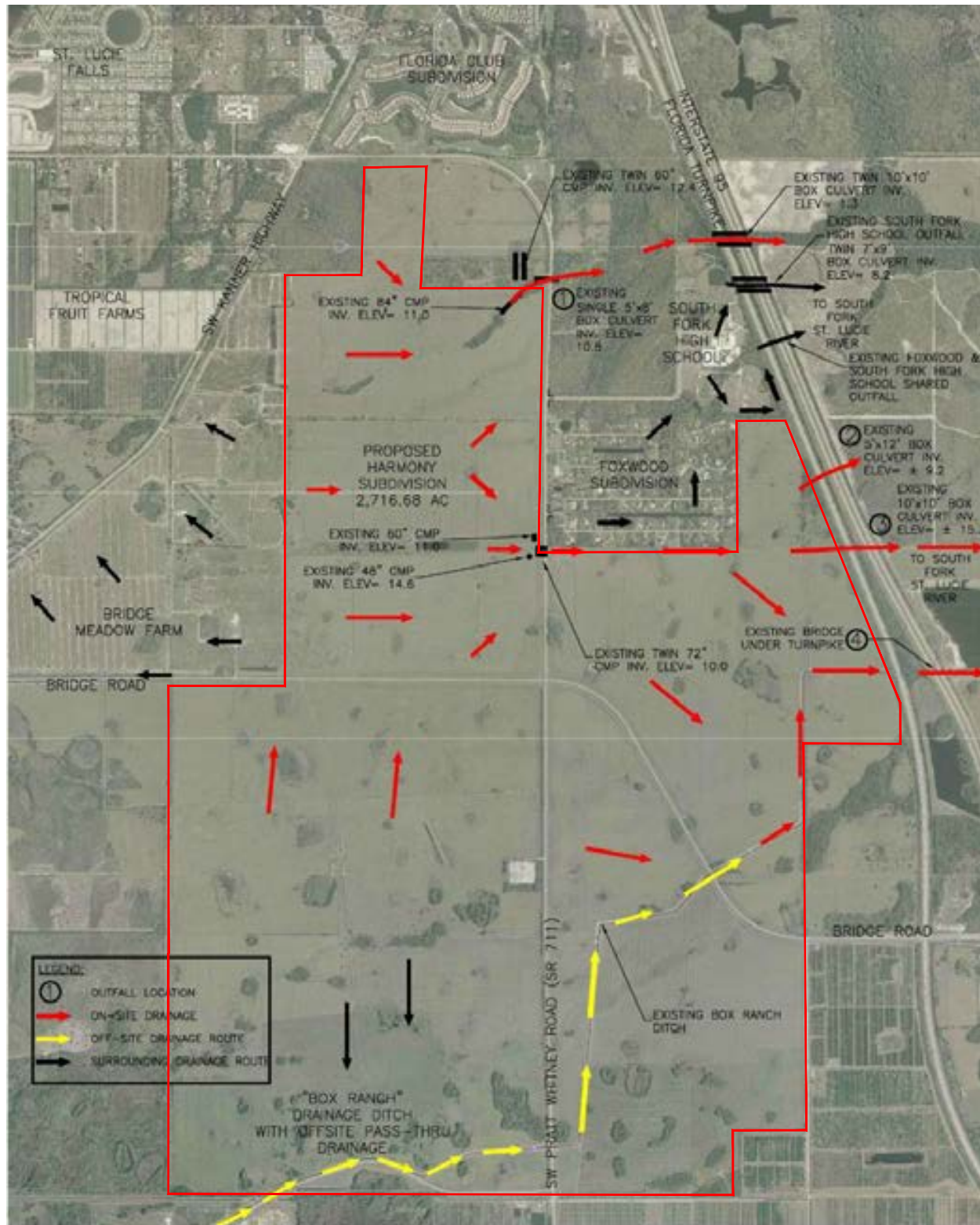
Email: zachary.gross@patelgreene.com

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Designed:	M.G.C.	3-8-15
Drewn:	A.T.	3-8-15
Checked:	M.G.C.	3-8-15
Approved:	M.G.C.	3-8-15
Date: 3-8-15		
Project: SD103		
File:		
harm exp mending		

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Web: www.themicorgroup.com

Certificate of Authorization: 28246



PRE-DEVELOPMENT DRAINAGE BASIN MAP

HARMONY

MARTIN COUNTY, FLORIDA

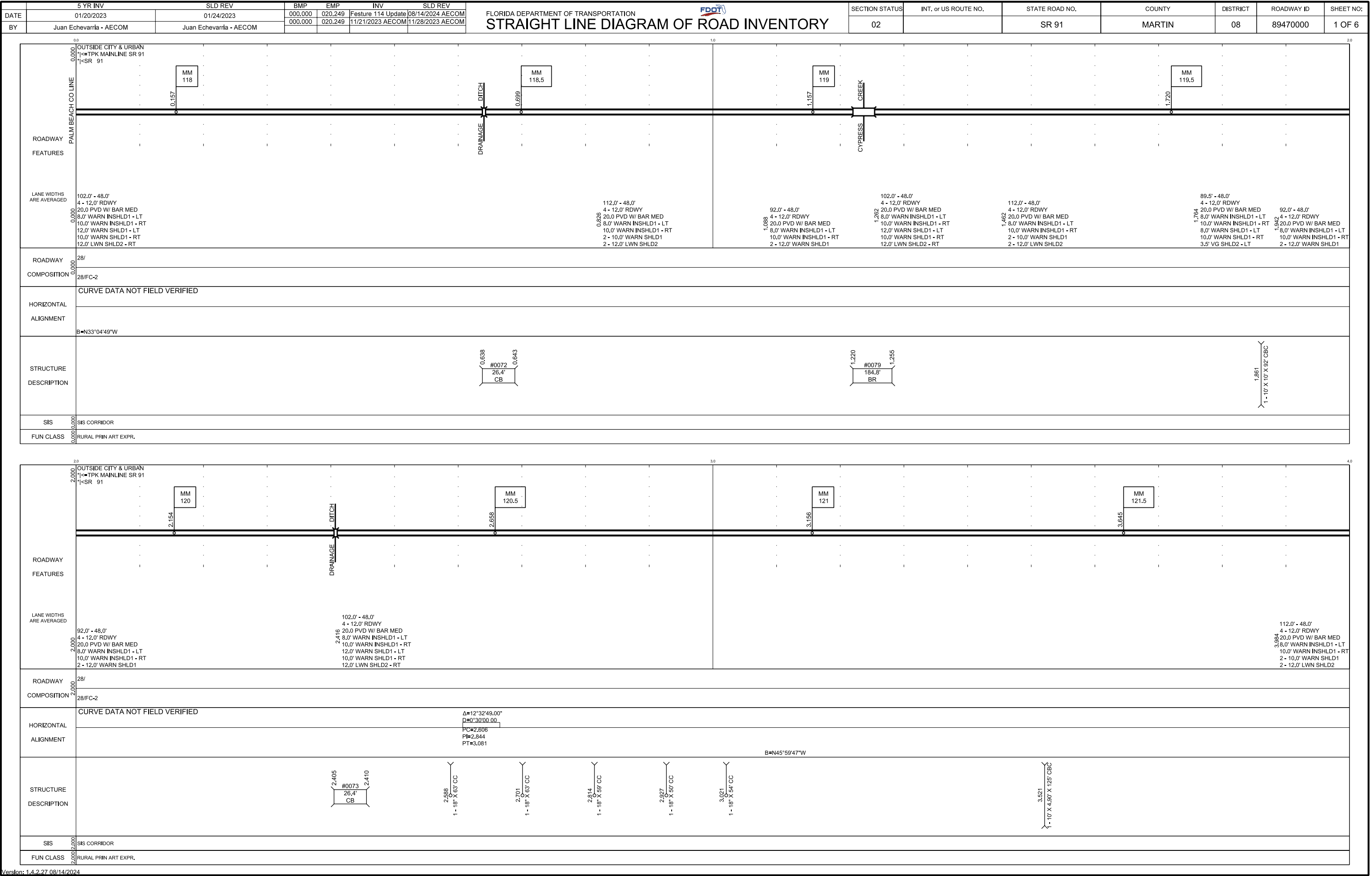
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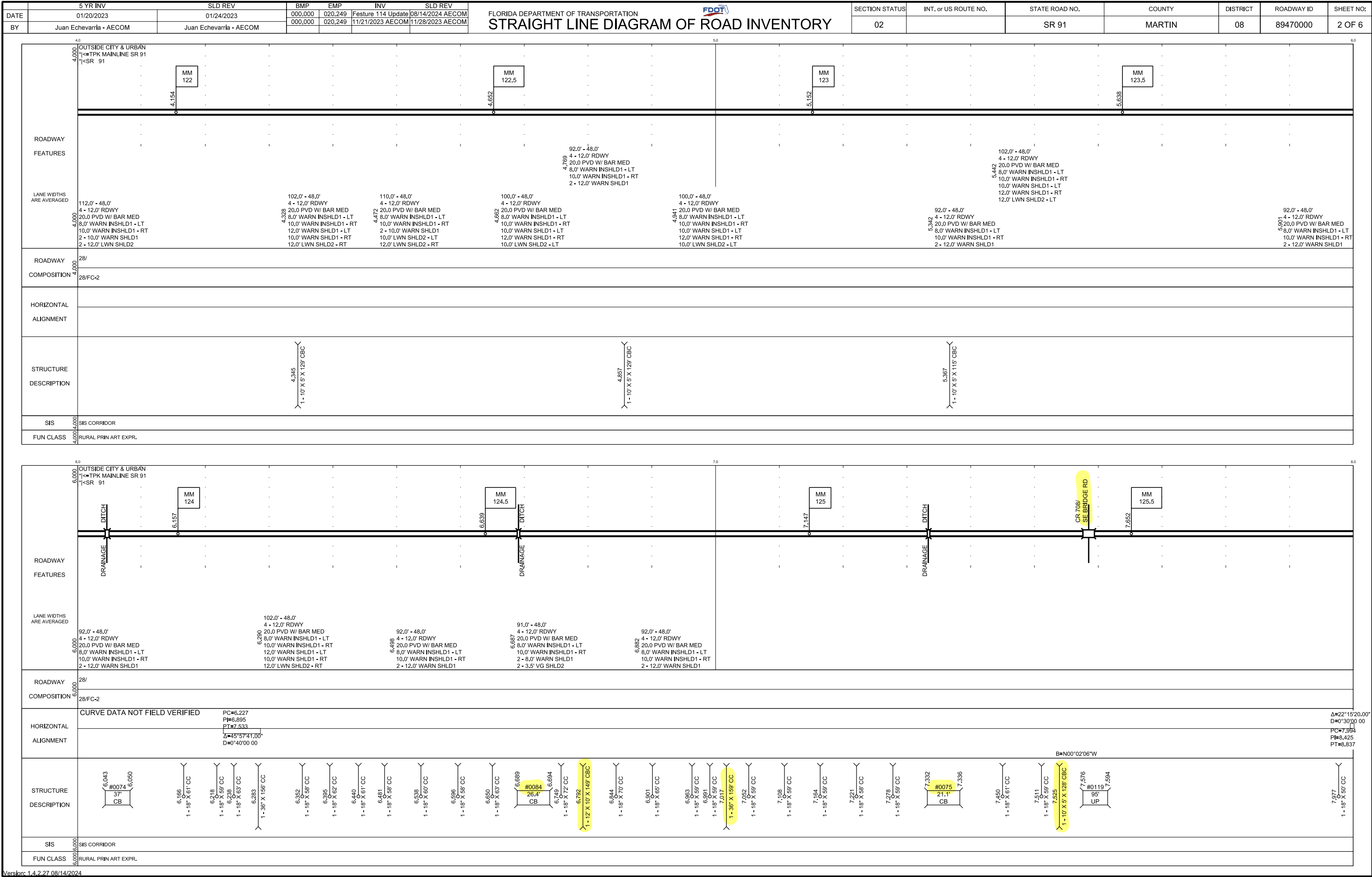
4.5

APPENDIX H

STRAIGHT LINE DIAGRAMS

TURNPIKE STRAIGHT LINE DIAGRAM





Version: 1.4.2.27 08/14/2024

5 YR INV

DATE

BY

01/20/2023

Juan Echevarria - AECOM

SLD REV

01/24/2023

Juan Echevarria - AECOM

BMP

000,000

EMP

020,249

INV

Feature 114 Update

SLD REV

08/14/2024 AECOM

11/28/2023 AECOM

FLORIDA DEPARTMENT OF TRANSPORTATION

FDOT

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS

02

INT. or US ROUTE NO.

STATE ROAD NO.

SR 91

COUNTY

MARTIN

DISTRICT

08

ROADWAY ID

89470000

SHEET NO:

4 OF 6

12.0

12.000

INSIDE CITY, AND URBAN

PORT ST LUCIE

PORT SAINT LUCIE

TPK MAINLINE SR 91

SR 91

MM 130

12.130

76

SR

12.696

MM 130.5

13.121

MM 131

ST LUCIE CANAL C 44

13.636

MM 131.5

13.740

SB

L-95

NB

L-95

14.0

ROADWAY

FEATURES

LANE WIDTHS ARE AVERAGED

92.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

10.0' LWN SHLD2 - LT

2 - 12.0' WARN SHLD1

115.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

15.0' WARN SHLD1 - LT

10.0' LWN SHLD2 - LT

12.0' LWN SHLD2 - RT

99.5' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

10.0' WARN SHLD1 - LT

8.0' WARN SHLD1 - RT

10.0' LWN SHLD2 - LT

3.5' VG SHLD2 - RT

112.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

10.0' WARN SHLD1 - LT

12.0' WARN SHLD1 - RT

24.0' WARN SHLD1 - RT

10.0' LWN SHLD2 - LT

107.5' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

12.0' WARN SHLD1 - LT

24.0' WARN SHLD1 - RT

3.5' VG SHLD2 - LT

114.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

10.0' WARN SHLD1 - LT

20.5' WARN SHLD1 - RT

12.0' LWN SHLD2 - LT

3.5' VG SHLD2 - RT

102.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

10.0' WARN SHLD1 - LT

10.0' WARN SHLD1 - RT

12.0' LWN SHLD2 - RT

112.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

2 - 10.0' WARN SHLD1

2 - 12.0' LWN SHLD2

ROADWAY

COMPOSITION

28/

28/FC-2

12.589

28/

28/

28/FC-2

13.949

28/FC-2

HORIZONTAL

ALIGNMENT

CURVE DATA NOT FIELD VERIFIED

PC=12.374

PI=12.559

PT=12.733

Δ=9°28'18.00"

D=0°30'00.00"

STRUCTURE

DESCRIPTION

12.137

#0126

84.5'

UP

12.153

12.376

1 - 15' X 78' CC

12.448

1 - 18' X 80' CC

12.504

1 - 18' X 96' CC

12.569

1 - 18' X 102' CC

12.617

1 - 18' X 90' CC

12.671

1 - 18' X 86' CC

12.693

1 - 18' X 110' CC

12.780

1 - 18' X 90' CC

12.846

#1000

3199.7'

BR

13.454

12.895

#0066

2941'

BR

13.452

13.585

1 - 18' X 116' CC

13.672

1 - 18' X 96' CC

13.759

#0121

105.6'

UP

13.779

#0122

100.3'

UP

13.800

#0122

100.3'

UP

13.819

#0122

100.3'

UP

SIS

SIS CORRIDOR

SIS CORRIDOR

13.901

SIS CORRIDOR

FUN CLASS

URBAN PRIN ART EXPR.

14.0

14.000

INSIDE CITY, AND URBAN

PORT ST LUCIE

PORT SAINT LUCIE

TPK MAINLINE SR 91

SR 91

MM 132

14.125

MM 132.5

14.626

MM 133

15.128

MM 133.5

15.625

16.000

1955

ROADWAY

FEATURES

LANE WIDTHS ARE AVERAGED

112.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

2 - 10.0' WARN SHLD1

2 - 12.0' LWN SHLD2

102.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

12.0' WARN SHLD1 - LT

10.0' WARN SHLD1 - RT

12.0' LWN SHLD2 - LT

102.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

12.0' WARN SHLD1 - LT

10.0' WARN SHLD1 - RT

12.0' LWN SHLD2 - RT

112.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

2 - 10.0' WARN SHLD1

2 - 12.0' LWN SHLD2

110.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

2 - 10.0' WARN SHLD1

10.0' LWN SHLD2 - LT

12.0' LWN SHLD2 - RT

100.0' - 48.0'

4 - 12.0' RDWY

20.0 PVD W/ BAR MED

8.0' WARN INSHLD1 - LT

10.0' WARN INSHLD1 - RT

10.0' WARN SHLD1 - LT

12.0' WARN SHLD1 - RT

10.0' LWN SHLD2 - LT

ROADWAY

COMPOSITION

28/FC-2

28/FC-2

HORIZONTAL

ALIGNMENT

STRUCTURE

DESCRIPTION

14.068

2 - 8' X 8' X 132' CBC

14.573

1 - 8' X 8' X 132' CBC

SIS

SIS CORRIDOR

FUN CLASS

URBAN PRIN ART EXPR.

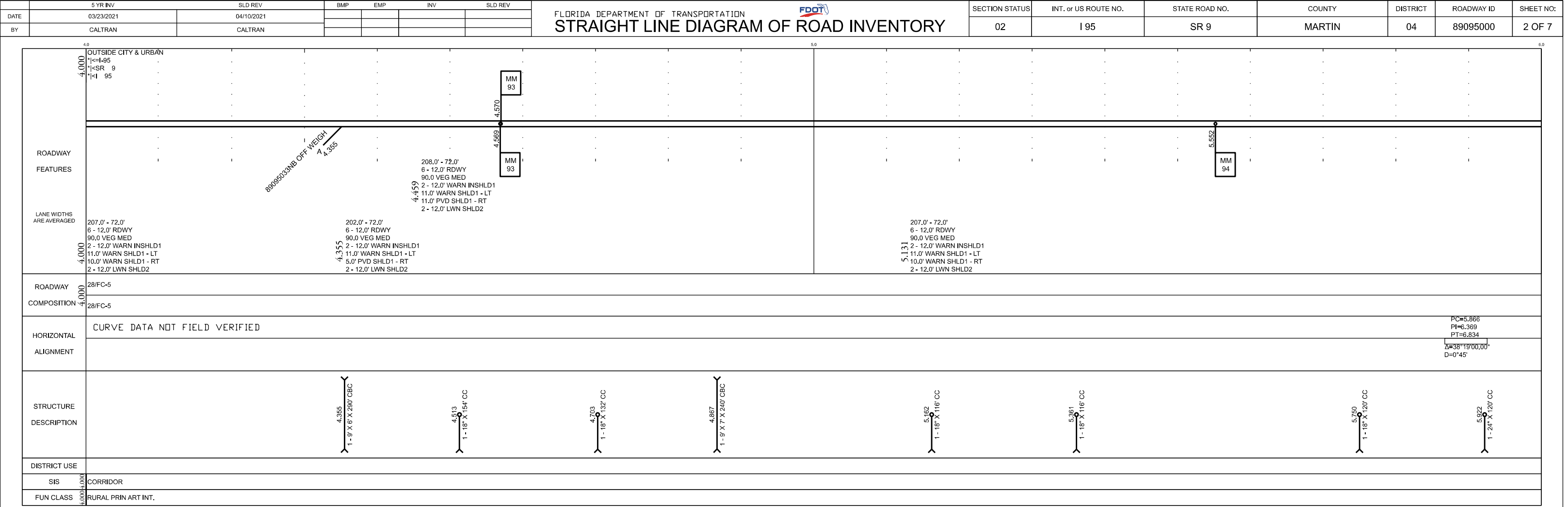
Version: 1.4.2.27 08/14/2024

Version: 1.4.2.27 08/14/2024

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PRINTED: 8/14/2024 10:49:46 AM

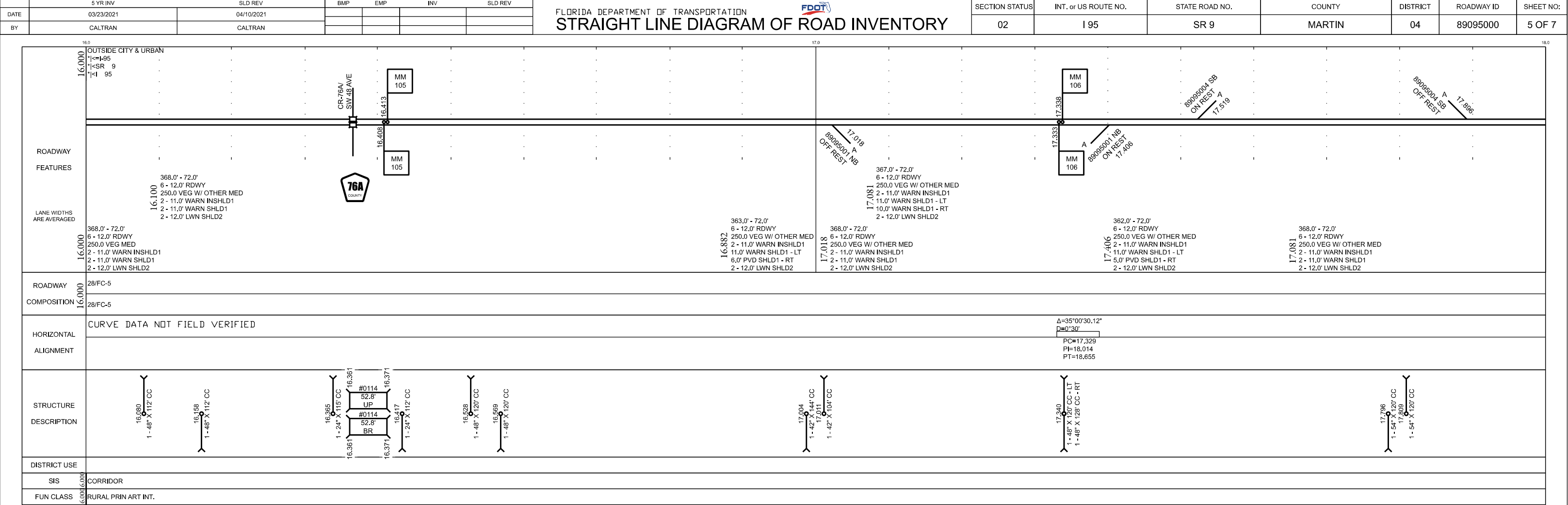


I-95 STRAIGHT LINE DIAGRAM



5 YR INV		SLD REV		BMP		EMP		INV		SLD REV		FLORIDA DEPARTMENT OF TRANSPORTATION										SECTION STATUS		INT. or US ROUTE NO.		STATE ROAD NO.		COUNTY		DISTRICT		ROADWAY ID		SHEET NO.	
DATE	03/23/2021	04/10/2021										STRAIGHT LINE DIAGRAM OF ROAD INVENTORY										02	I 95	SR 9	MARTIN	04	89095000	4 OF 7							
BY	CALTRAN	CALTRAN																																	

ROADWAY	14.000	INSIDE URBAN, OUTSIDE CITY PORT SAINT LUCIE 1<=I-95 1<SR 9 1<I 95	14.002	OUTSIDE CITY & URBAN 1<=I-95 1<SR 9 1<I 95	14.428	MM 103	15.0	15.431	MM 104	15.6
	14.000	185.0' - 72.0' 6 - 12.0' RDWY 90.0 VEG MED 2 - 11.0' WARN INSHLD1 8.0' WARN SHLD1 - LT 11.0' WARN SHLD1 - RT 4.0' VG SHLD2 - LT	14.020	178.0' - 72.0' 6 - 12.0' RDWY 90.0 VEG W/ GRD MED 2 - 11.0' WARN INSHLD1 2 - 4.0' WARN SHLD1 2 - 4.0' VG SHLD2	14.110	208.0' - 72.0' 6 - 12.0' RDWY 90.0 VEG MED 2 - 11.0' WARN INSHLD1 2 - 11.0' WARN SHLD1 2 - 12.0' LWN SHLD2	15.383	368.0' - 72.0' 6 - 12.0' RDWY 250.0 VEG MED 2 - 11.0' WARN INSHLD1 2 - 11.0' WARN SHLD1 2 - 12.0' LWN SHLD2	15.435	
	14.000	28/FC-5	14.000	28/FC-5						
	14.000	28/FC-5								
HORIZONTAL										
ALIGNMENT										
STRUCTURE DESCRIPTION	14.509 1 - 18" X 118" CC 14.679 1 - 36" X 227 CC 14.868 1 - 18" X 114" CC 14.884 1 - 18" X 114" CC 15.152 1 - 18" X 105" CC 15.448 1 - 24" X 120" CC 15.464 1 - 18" X 112" CC 15.646 1 - 24" X 120" CC 15.727 1 - 24" X 114" CC 15.911 1 - 24" X 152" CC									
DISTRICT USE										
SIS	CORRIDOR									
FUN CLASS	URBAN PRIN ART INT. RURAL PRIN ART INT.									



5 YR INV		SLD REV		BMP		EMP		INV		SLD REV		FLORIDA DEPARTMENT OF TRANSPORTATION STRAIGHT LINE DIAGRAM OF ROAD INVENTORY	FDOT	SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
DATE	03/23/2021		04/10/2021											02	I 95	SR 9	MARTIN	04	89095000	7 OF 7
BY	CALTRAN		CALTRAN																	

24.0

24.000

OUTSIDE CITY & URBAN

1<SR 9

1<SR 9

1<SR 9

89095002 SB

OFF WEIGH

24.075

24.419

MM 113

24.416

MM 113

633.0' - 72.0'

6 - 12.0' RDWY

520.0 VEG MED

2 - 11.0' WARN INSHLD1

6.0' PVD SHLD1 - LT

11.0' WARN SHLD1 - RT

2 - 12.0' LWN SHLD2

24.075

638.0' - 72.0'

6 - 12.0' RDWY

520.0 VEG MED

2 - 11.0' WARN INSHLD1

2 - 11.0' WARN SHLD1

2 - 12.0' LWN SHLD2

24.182

208.0' - 72.0'

6 - 12.0' RDWY

90.0 VEG MED

2 - 11.0' WARN INSHLD1

2 - 11.0' WARN SHLD1

2 - 12.0' LWN SHLD2

24.540

197.0' - 72.0'

6 - 12.0' RDWY

90.0 VEG MED

2 - 11.0' WARN INSHLD1

8.0' WARN SHLD1 - LT

11.0' WARN SHLD1 - RT

4.0' VG SHLD2 - LT

12.0' LWN SHLD2 - RT

24.650

184.0' - 72.0'

6 - 12.0' RDWY

90.0 VEG W/ GRD MED

2 - 11.0' WARN INSHLD1

2 - 11.0' PVD SHLD1

24.760

195.0' - 72.0'

6 - 12.0' RDWY

90.0 VEG W/ GRD MED

2 - 11.0' WARN INSHLD1

6.0' WARN SHLD1 - RT

12.0' LWN SHLD2 - LT

4.0' VG SHLD2 - RT

24.710

184.0' - 72.0'

6 - 12.0' RDWY

90.0 VEG W/ BAR MED

2 - 11.0' WARN INSHLD1

2 - 11.0' PVD SHLD1

24.768

INSIDE URBAN, OUTSIDE CITY

* PORT SAINT LUCIE

1<SR 9

1<SR 9

1<SR 9

24.769

24.714

0334

24.714

CANAL

C-23

ST LUCIE COUNTY LINE

END MP: 024.817

NET ROADWAY ID LENGTH: 24.817

ROADWAY

COMPOSITION

HORIZONTAL

ALIGNMENT

STRUCTURE

DESCRIPTION

DISTRICT USE

SIS

FUN CLASS

28/FC-5

28/FC-5

CURVE DATA NOT FIELD VERIFIED

PC=24.317

PI=24.611

PT=24.817

Δ=10°20'46.00"

D=0°20'

24.376

1 - 30" X 156 CC

24.768

#0110

258.7'

BR

#0111

258.7'

BR

24.768

24.817

CORRIDOR

CORRIDOR

RURAL PRIN ART INT.

URBAN PRIN ART INT.