Centennial FDOT 1915 ★ 2015 District Seven

US 301 (Gall Blvd.) Project Development & Environment Study

from SR 56 (Proposed) to SR 39 (Buchman Hwy.)

Pasco County, Florida

Work Program Item Segment Number: 416564-1

Draft Preliminary Pond Sizing Report

August 2015

DRAFT

PRELIMINARY POND SIZING REPORT (PPSR)
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY
US 301 (GALL BOULEVARD) FROM SR 56 (PROPOSED)
TO SR 39 (PAUL BUCHMAN HIGHWAY)
PASCO COUNTY, FLORIDA

Work Program Item Segment Number: 416564-1

Prepared for:

Florida Department of Transportation
District Seven
11201 North McKinley Drive
Tampa, Florida 33612-6456

Prepared by:

URS Corporation
7650 West Courtney Campbell Causeway
Tampa, Florida 33607-1462

August 2015

TABLE OF CONTENTS

Section **Page**

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
ac-ft.	Acre-Feet
BFE	Base Flood Elevation
BLS	Below Land Surface
CBC	Concrete Box Culverts
CCC	Chairs Coordinating Committee
CNs	Curve Numbers
CRAS	Cultural Resources Assessment Survey
CSER	Contamination Screening Evaluation Report
D.S.	Downstream
DCIA	Directly Connected Impervious Area
DEMs	Digital Elevation Models
DOQQ	Digital Orthophotography Quarter Quads
ERP	Environmental Resource Permits
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FPC	Flood Plain Compensation
FY	Fiscal Year
GIS	Geographic Information System
HCM	Highway Capacity Manual
LHR	Location Hydraulics Report
LOS	Level of Service
LRTP	Long Range Transportation Plan
MP	Mile Post
mph	Miles Per Hour
MPO	Metropolitan Planning Organization
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PCPT	Pasco County Public Transportation
PD&E	Project Development and Environment
PPSR	Preliminary Pond Sizing Report
ROW	Right-of-Way
SB	Sub-Basin
SCS	Soil Conservation Service
SEIR	State Environmental Impact Report
SHWT	Seasonal High Water Table
SLD	Straight Line Diagrams
SR	State Road
SWFWMD	Southwest Florida Water Management District
TAZ	Traffic Analysis Zones
TBRPM-ML	Tampa Bay Regional Planning Model for Managed Lanes

TR	Technical Report
TSP	Transit Signal Priority
U.S.	Upstream
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	United States Geologic Survey
vpd	Vehicles Per Day
WBID	Watershed Basin I.D.
WEBAR	Wetland Evaluation and Biological Assessment Report

Section 1.0
PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study to consider the proposed widening of a portion of US 301 (Gall Boulevard). The PD&E Study includes a State Environmental Impact Report (SEIR) for the study corridor. Located in Pasco County, the limits of this study are the proposed future connection of State Road (SR) 56 on the south (approximately Mile Post (MP) 1.600) to just south of the proposed future realigned SR 39 (Buchman Highway) intersection on the north (MP 3.554), a distance of approximately two miles. The project location map is included as **Figure 1-1.**

1.1 EXISTING CONDITIONS

The existing US 301 (Gall Boulevard) corridor within the study area is currently a two-lane undivided north/south facility. Within the study area, US 301 (Gall Boulevard) is functionally classified as:

- **Rural Principal Arterial - Other** from MP 1.600 (project southern termini) to MP 2.452 (just north of Shamrock Place), for a distance of 0.852 mile, and
- **Urban Principal Arterial - Other** from MP 2.452 (just north of Shamrock Place) to MP 3.554 (project northern termini), for a distance of 1.102 mile.

The existing posted speed limit is 55 miles per hour (mph) south and 45 mph north of Chancey Road, respectively. The existing right-of-way (ROW) width is approximately 100 feet. **Figure 1-2** depicts the existing roadway typical section.

1.2 PROPOSED IMPROVEMENTS

The proposed improvements would consist of two typical sections, both of which are suburban typicals. The first typical section **(Figure 1-3)** would have:

- Four, 12-foot lanes;
- A 54-foot median;
- Two, 7-foot paved shoulders that could also be used by bicycles;
- Type E curbs and gutters; as well as,
- 5-foot sidewalks.

This typical section begins at the future SR 56 intersection and ends at Chancey Road. In addition, this typical section is expandable to six lanes by adding two lanes to the inside reducing the overall medium width to 24 feet.

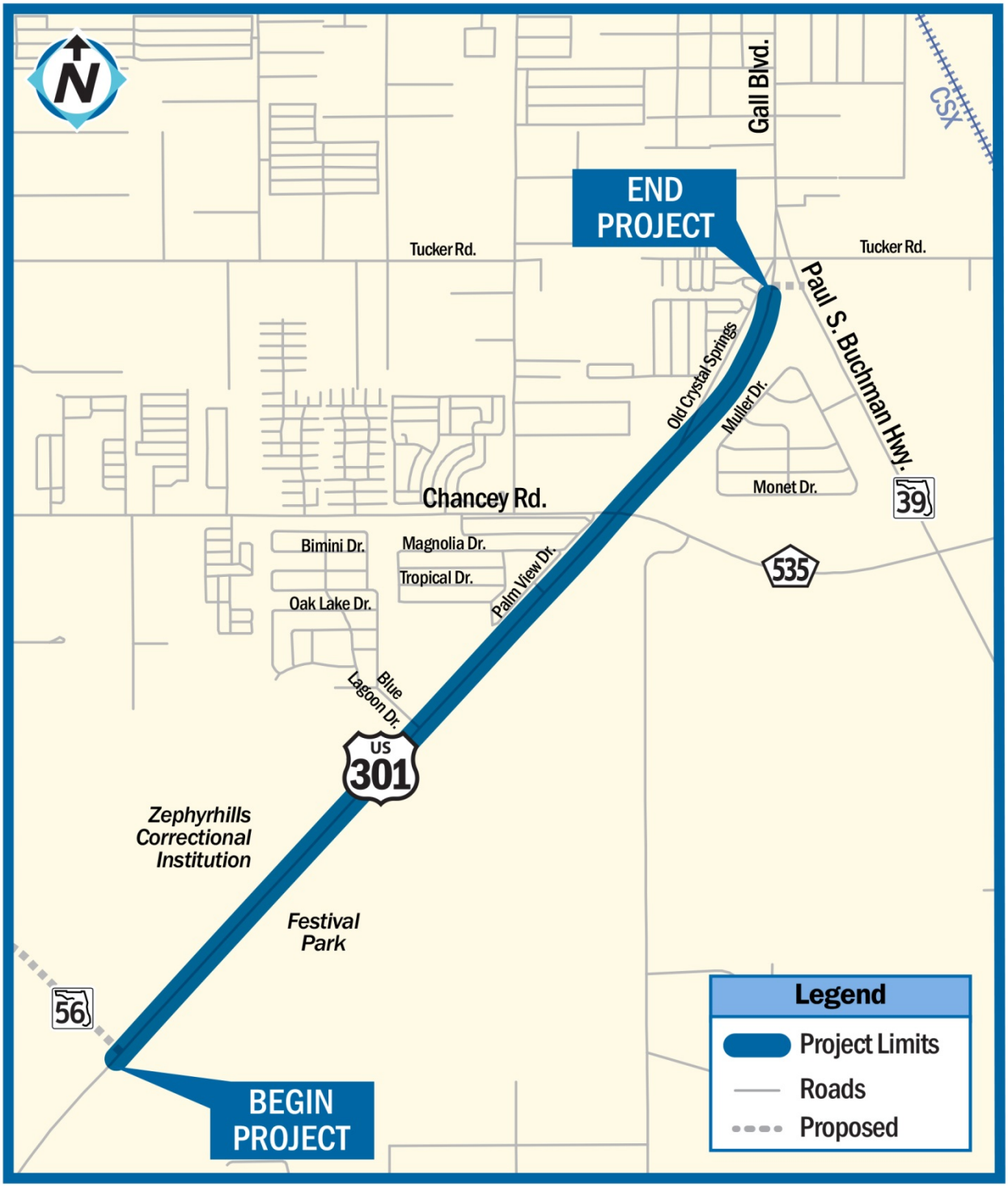
The second typical section **(Figure 1-4)** consists of four, 11-foot lanes; a variable width median; two, 7-foot paved shoulders that could be used for bicycles and bordered by Type E curb and gutter; as well as, two, 5-foot sidewalks. This typical section would serve as a transition between US 301 (Gall Boulevard) and the ultimate 4-lane section of US 301 (Gall Boulevard) that begins just south of the proposed realigned SR 39 (Buchman Highway) intersection at US 301 (Gall Boulevard). Both typical sections would hold the existing west ROW line and expand the project corridor to the east.

Proposed improvements include: widening US 301 (Gall Boulevard) to four lanes, as well as intersection improvements at the following Intersections.

- US 301 (Gall Boulevard) and Chancey Road
- US 301 (Gall Boulevard) and the Proposed SR 56

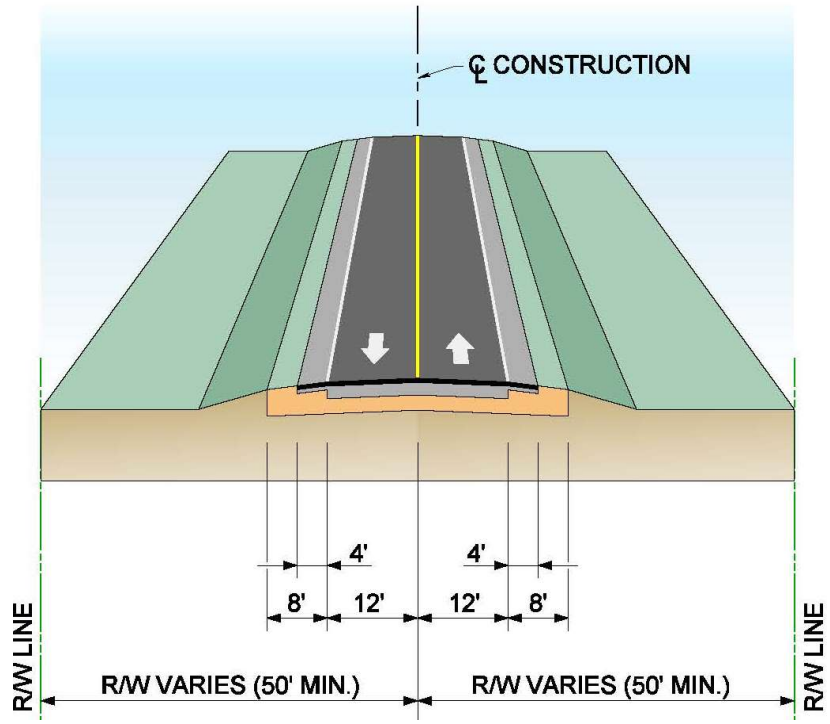
Improvements would also include stormwater management facilities and floodplain compensation sites.

FIGURE 1-1
PROJECT LOCATION MAP



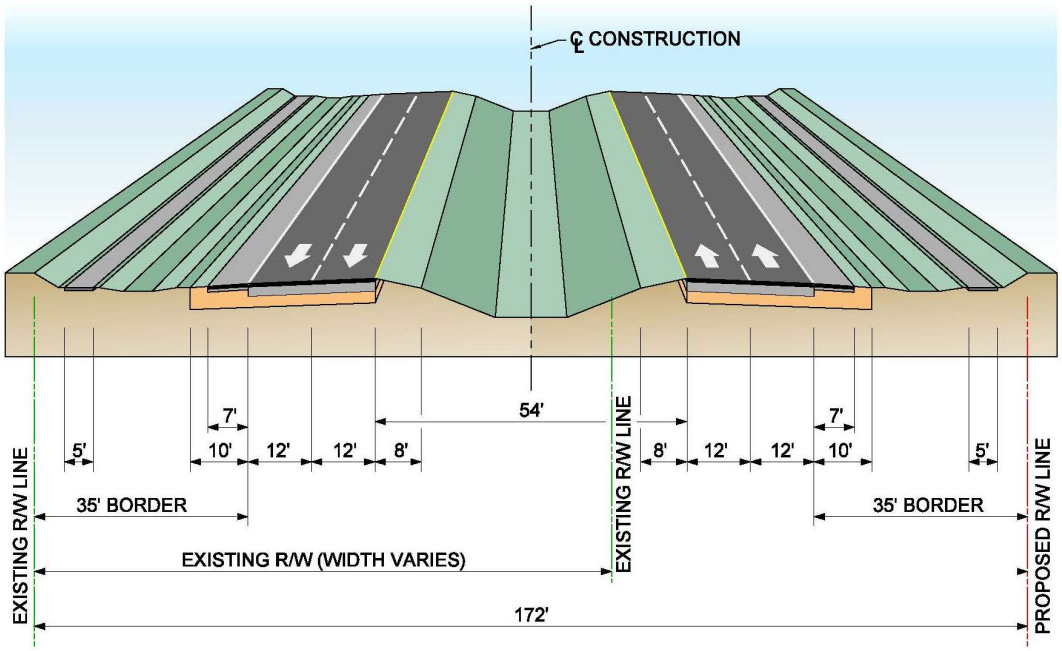
Source: URS, 2015.

FIGURE 1-2
EXISTING TYPICAL SECTION



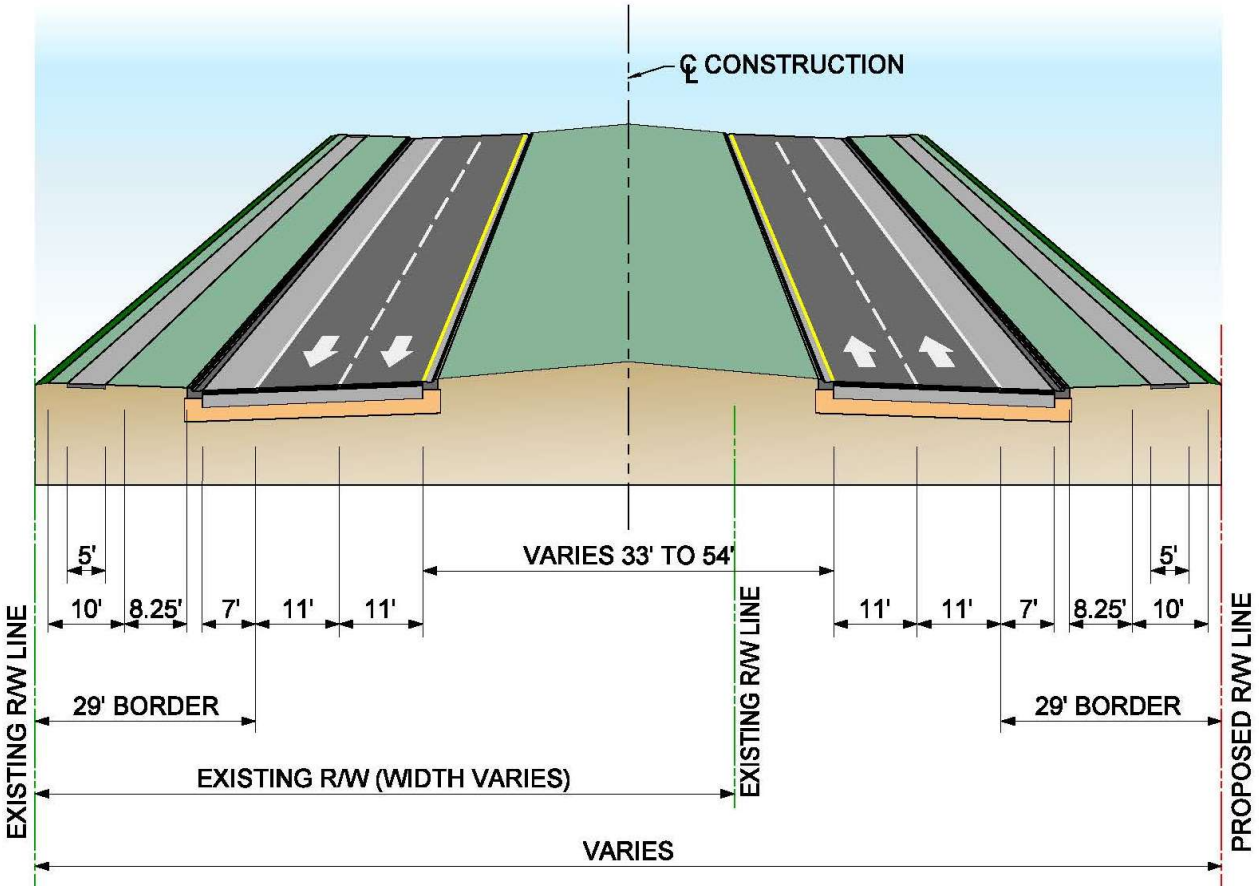
Source: URS, 2015.

FIGURE 1-3
PROPOSED TYPICAL SECTION (PROPOSED SR 56 TO CHANCEY ROAD)



Source: URS, 2015.

FIGURE 1-4
PROPOSED TYPICAL SECTION (CHANCEY ROAD TO SOUTH OF PROPOSED REALIGNED SR 39 (BUCHMAN HIGHWAY))



Source: URS, 2015.

Section 2.0
PROJECT PURPOSE AND NEED

2.1 REGIONAL CONNECTIVITY

US 301 (Gall Boulevard) is a major north-south arterial located in East Pasco County. It is a regional truck route and provides excellent north-south access to distribution centers. US 301 (Gall Boulevard) is an important connection to the regional and statewide transportation network that links the Tampa Bay region to the remainder of the state and the nation. US 301 (Gall Boulevard) was identified as a regional roadway by the West Central Florida Metropolitan Planning Organizations (MPOs) Chairs Coordinating Committee (CCC) and included in the Regional Roadway Network. As shown in **Section 2.5**, the 2040 design year expected Average Annual Daily traffic (AADT) is 39,500 vehicles per day (vpd). The measured percentage of daily truck traffic is 15.10 percent. Therefore, the projected truck traffic on US 301 (Gall Boulevard) is approximately 6,000 trucks per day in 2040.

2.2 PLAN CONSISTENCY

The widening of US 301 (Gall Boulevard) from SR 56 (Proposed) to the proposed realignment of SR 39 (Buchman Highway) is identified as a 'Cost-Affordable Capital Improvement' (construction 2031 – 2040) in the *Pasco County MPO Mobility 2040*. The project has also been identified on the latest *Pasco County Transportation Capital Improvement Projects (2014-2028)* map. It should additionally be noted that $2.5 million is programmed for the design phase in Fiscal Year (FY) 2018 within the FDOT Five Year Work Program. Further, the project is reflected on *Map 7-22: Future Number of Lanes (2035)* in the Transportation Element of the adopted Pasco County Comprehensive Plan.

2.3 EMERGENCY EVACUATION

US 301 (Gall Boulevard) is designated as a parallel evacuation route to I-75 for the length of Pasco County.

2.4 FUTURE POPULATION AND EMPLOYMENT GROWTH IN CORRIDOR

In the Tampa Bay Regional Planning Model for Managed Lanes (TBRPM-ML) "Starter Projects" Traffic Analysis Zones (TAZs) located within one quarter-mile of the US 301 (Gall Boulevard) project corridor were used to document the socioeconomic data. The study area's population is projected to grow from 4,973 in year 2006 to 13,638 in year 2035 (an increase of

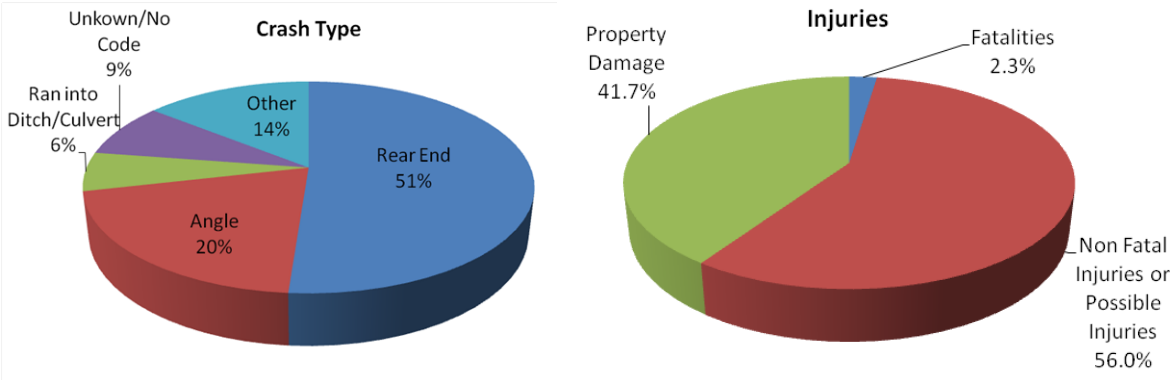
8,665). Employment is also expected to increase during the same period from 1,337 to 5,392 (an increase of 4,055).

2.5 FUTURE TRAFFIC

In 2013, US 301 (Gall Boulevard) from Chancey Road to SR 39 (Buchman Highway) carried 12,500 vpd. By the design year 2040, segments within this section of US 301 (Gall Boulevard) are expected to reach a volume of 39,500 vpd. The roadway segment was analyzed using the FDOT's HIGHPLAN software which incorporates methodologies contained within the 2010 Highway Capacity Manual (HCM) 2010. Based on this analysis, the existing level of service (LOS) is C. Without the proposed improvement, the operating conditions will continue to deteriorate to a failing LOS of F. With the proposed improvement to widen this roadway to four lanes and other proposed improvements, the LOS for 2040 is projected to be C; with one exception in the northbound PM peak hour, the LOS would be D.

2.6 SAFETY

For the five-year period (2009-2013), there were 84 crashes reported along the corridor with an average of 16.8 crashes per year. Rear-end collisions were the most common crash type recorded for the corridor with 43 or 51.2 percent of total crashes, followed by 17 angle collisions (including two left-turn collisions) or 20.2 percent of the total crashes. Out of the 84 total crashes, 47 or 56.0 percent were crashes with injuries and 35 or 41.7 percent were crashes with property damage only.



Source: FDOT Unified Base Map Repository, 2014.

There were two fatal crashes recorded along the US 301 (Gall Boulevard) corridor (2.3 percent). Further, four out of 84 total crashes (4.8 percent) were related to medium or heavy trucks. Among the truck-related incidents, three crashes involved injuries.

Safety within the US 301 (Gall Boulevard) corridor would be enhanced due to the additional capacity that would be provided. Roadway congestion would be reduced, thereby decreasing potential conflicts with other vehicles.

2.7 TRANSIT

The existing Pasco County Public Transportation (PCPT) bus Route 30 terminates at Tucker Road just north of the study area, and serves activity centers to the north including downtown Zephyrhills and Dade City from 4:45 am to 7:45 pm. In addition, this segment of US 301 (Gall Boulevard) to downtown Zephyrhills is part of the proposed SR 54 Cross County Express Route that is included in the *Pasco County's Mobility 2040 Cost Affordable Transit Plan* for implementation in 2031. Also planned is a Major Transit Station/Stop and Transit Signal Priority (TSP) along the corridor.

2.8 ACCESS TO INTERMODAL FACILITIES AND FREIGHT ACTIVITY CENTERS

Access to intermodal facilities and movement of goods and freight are important considerations in the development of the Pasco County transportation system. US 301 (Gall Boulevard) is a regional truck route. The Zephyrhills Airport Industrial Area, a designated freight activity center, is located just northeast of the northern terminus of the study area. This industrial area has five major manufacturing facilities with approximately 700,000 square feet of industrial space. These companies generate approximately 200 trucks per day. Improvements to US 301 (Gall Boulevard) would enhance access to activity centers in the area and the movement of freight in eastern Pasco County.

2.9 RELIEF TO PARALLEL FACILITIES

The planned widening of US 301 (Gall Boulevard) between Chancey Road and the proposed realigned SR 39 (Buchman Highway) intersection is part of an overall plan to improve access and relieve traffic congestion on such parallel facilities as I-75, the Suncoast Parkway, and US 41. Safety, emergency access, and truck access would all be enhanced by this improvement.

2.10 BIKEWAYS AND SIDEWALKS

Integration of bicycle facilities and sidewalks are planned on all Pasco County and state road projects; including, new roads, widening of existing roads, and the resurfacing of state roads. These projects are planned to be constructed to include a minimum of a 7-foot wide paved shoulder to allow for bicycle safety.

Section 3.0
ALTERNATIVES CONSIDERED

The US 301 (Gall Boulevard) PD&E study originally considered two alternatives. These include:

No Build Alternative:

The No-Build Alternative assumes that traffic volumes will continue to increase with no changes to US 301 within the study area. The No-Build Alternative requires no additional expenditure of funds and has no environmental impacts. Although the No-Build Alternative does not meet the purpose and need and offers no future operational improvements, it will remain a viable alternative throughout the study process and serve as the basis of comparison for the build alternatives.

Build Alternative:

As shown in the Typical Section **Figure 1-3**, the Build Alternative improvements would consist of two suburban typical sections. The first typical section beginning at the future SR 56 intersection and ending at Chancey Road would have: four 12-foot lanes; a 54-foot median; two 7-foot paved shoulders that could also be used by bicycles and Type E curbs and gutters; as well as, 5-foot sidewalks. This typical section is expandable to six lanes by adding two lanes to the inside reducing the overall medium width to 24 feet.

The second typical section begins at Chancey Road and ends just south of the proposed realigned SR 39 (Buchman Highway) intersection at US 301 (Gall Boulevard) and is shown in **Figure 1-4**. This typical section consists of four 11-foot lanes, variable width median, and two 7-foot paved shoulders that could be used for bicycles and bordered by Type E curb and gutter; as well as two 5-foot sidewalks. This typical section would serve as a transition between the ultimate 6-lane section of US 301 (Gall Boulevard) and the ultimate 4-lane section of US 301 (Gall Boulevard). Both typical sections would hold the existing west ROW line and expand the project corridor to the east.

Section 4.0
DATA COLLECTION

For completion of the review of the existing hydraulics within the US 301 (Gall Boulevard) study area corridor, data from diverse sources was obtained. Data included geographic information system (GIS) coverages for roadways, Federal Emergency Management Agency (FEMA) flood studies, Southwest Florida Water Management District (SWFWMD) Environmental Resource Permits (ERPs) and coverages for wetlands, surface water bodies, land use and topography. A list of data collected and sources is presented in **Table 4-1**.

TABLE 4-1
LIST OF DATA COLLECTED

DATA	SOURCE	AGENCY
GIS Base Layers, such as county boundaries, highways, roadways, etc.	Florida Geographic Data Library	FDOT
FEMA Flood Plain Maps (effective September 26, 2014)	Florida Geographic Data Library	FEMA
Hydrology GIS layers, such as surface water, wetlands	Florida Geographic Data Library	SWFWMD
Land Use Maps (effective 2014)	Florida Geographic Data Library	SWFWMD
Topographic information (5-ft. contours)	Pasco County	Pasco County
Soil Survey maps (effective 2015)	Florida Geographic Data Library	Natural Resources Conservation Service (NRCS)
Surface Drainage Basins	Florida Geographic Data Library	SWFWMD
Digital Orthophotography Quarter Quads (DOQQ)	United States Geologic Survey (USGS)	USGS
Aerial Photographs (effective 2014)	Pasco County	Pasco County
Parcels	Pasco County	Pasco County Property Appraiser
Environmental Resource Permits	SWFWMD	SWFWMD

Source: URS, 2014.

Section 5.0
EXISTING CONDITIONS

5.1 PROJECT CORRIDOR

The U.S. 301 (Gall Boulevard) project corridor extends through southern Pasco County from the proposed extension of SR 56 (Sta. 254+73.87) to the proposed realigned SR 39 (Paul Buchman Highway – Sta. 380+00), a distance of approximately two miles. U.S. 301 (Gall Boulevard) currently exists as a two-lane non-divided roadway with surface drainage conveyed by sheet flow to roadside drainage ditches. The existing drainage also contributes flow to wetlands and low-lying areas along the roadway as well as Zephyr Creek, which flows beneath the roadway at Sta. 360+80 through concrete box culverts (CBCs). Currently, there are no stormwater management facilities (ponds) within this segment of the study area, but there exist several other cross drains beneath the existing roadway that convey flow generally from west to east toward the Hillsborough River.

The project entails the transitioning of the existing two-lane suburban roadway section to a 4-lane divided highway with paved shoulders, sidewalks and a grassed median, within a 172-foot wide proposed ROW. The existing ROW varies in width between 100 and 120 feet. The proposed west ROW line is the existing west ROW line, and all new pavement and associated construction would occur to the east of this line. Turning lanes and other pavement areas would also be added where the roadway intersects major driveways and the signalized intersection of US 301 (Gall Boulevard) of the proposed SR 56, Chancey Road, and the proposed realigned SR 39. All of the roadway improvements would be completed along the current roadway alignment within the expanded ROW.

The existing stormwater ditches along both sides of the existing roadway south of Chancey Road discharge into various wetland and flood plain areas located adjacent to the roadway. The portion of the roadway north of Chancey Road to the project limit does not have an established system of roadside ditches. Stormwater runoff in this portion is discharged to wetland and flood plain areas adjacent to the roadway and ultimately flows to Zephyr Creek, which crosses beneath the existing roadway at approximately Sta. 368+80 within the study area. There are no closed drainage basins along the existing roadway alignment, and the entire regional drainage system flows generally to the east-southeast toward the Hillsborough River.

The proposed drainage system along the widened roadway would include new roadside swales that would convey runoff from the impervious surface to stormwater ponds located within each drainage sub-basin. A total of six drainage sub-basins were delineated along the project corridor, and seven new stormwater management ponds (Pond 1 through Ponds 6A and 6B) would be constructed to manage stormwater runoff. Flood plain impacts due to the expansion of the

impervious areas will be compensated for in three flood plain compensation (FPC) areas located adjacent to the roadway. Also, existing cross drains beneath the roadway would be evaluated and lengthened to account for the proposed expanded ROW. Details of the proposed flood plain impacts and proposed expansion of the existing cross-drains are presented in a Draft *Location Hydraulics Report* (LHR) submitted under separate cover.

5.2 SOILS

Pasco County is characterized by discontinuous highlands in the form of ridges separated by broad valleys. The ridges are above the static level of the water in the aquifer, but the valleys are below it. Broad shallow lakes are common in the valley floors, and smaller, deep lakes are on the ridges. Based on physiography, the study area is located in the Western Valley – Zephyrhills Gap region of the Tampa Bay Basin. This area comprises a low land region which transects the Brooksville Upland (north of Zephyrhills), Polk Upland and Lakeland Ridge (both southeast of the city). The elevations within the valley range from 40 feet to 100 feet above sea level, and the valley includes the western extent of the Green Swamp and the headwaters of the Hillsborough and Withlacoochee Rivers.

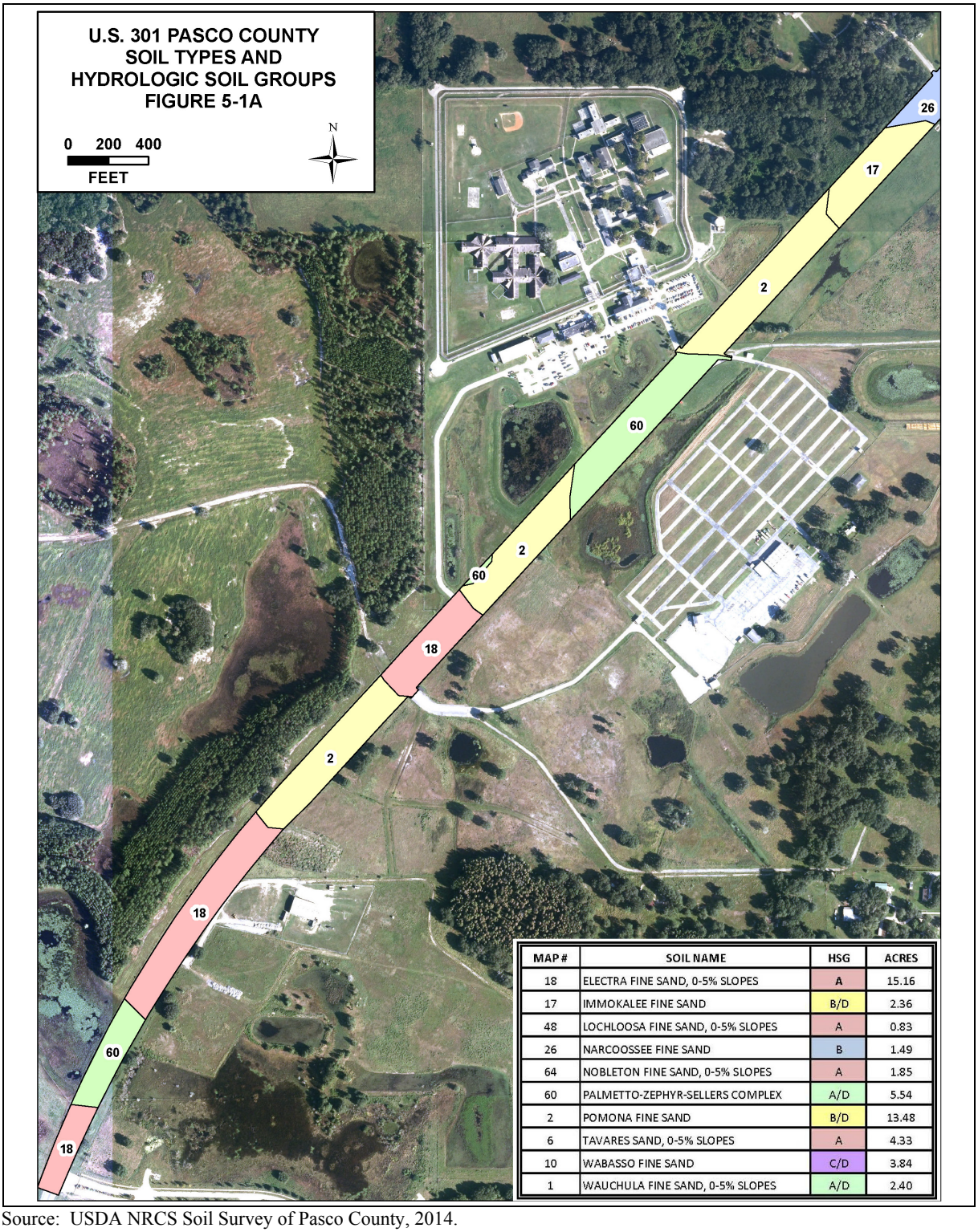
The soils in the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey of Pasco County, Florida within the study area were reviewed. The various soil types encountered across the study area are predominantly fine sands, with variations in permeability and water table depth due to topography and proximity to surface water bodies or wetlands. Generally, soils in the study area are gently sloping and poorly drained, with relatively shallow water tables regardless of topography. The soil types encountered within the proposed ROW limits are summarized in **Table 5-1** and **Figures 5-1A and 5-1B**. A *Web Soil Survey* report for the study area from the NRCS is included in **Appendix A**.

TABLE 5-1
SOILS DATA

SOIL TYPE	MAP SYMBOL	HYDROLOGIC GROUP	PERMEABILITY	SOIL AREA WITHIN ROW (ACRES)
Electra fine sand, 0-5% slopes	18	A	Somewhat poorly drained	15.16
Immokalee fine sand	17	B/D	Poorly drained	2.36
Lochloosa fine sand, 0-5% slopes	48	A	Somewhat poorly drained	0.83
Narcoossee fine sand	26	B	Somewhat poorly drained	1.49
Nobleton fine sand, 0-5% slopes	64	A	Somewhat poorly drained	1.85
Palmetto-zephyr-sellers complex	60	A/D	Poorly drained	5.54
Pomona fine sand	2	B/D	Poorly drained	13.48
Tavares sand, 0-5% slopes	6	A	Moderately well drained	4.33
Wabasso fine sand	10	C/D	Poorly drained	3.84
Wauchula fine sand, 0-5% slopes	1	A/D	Poorly drained	2.40

Source: USDA NRCS Soil Survey of Pasco County, 2014.

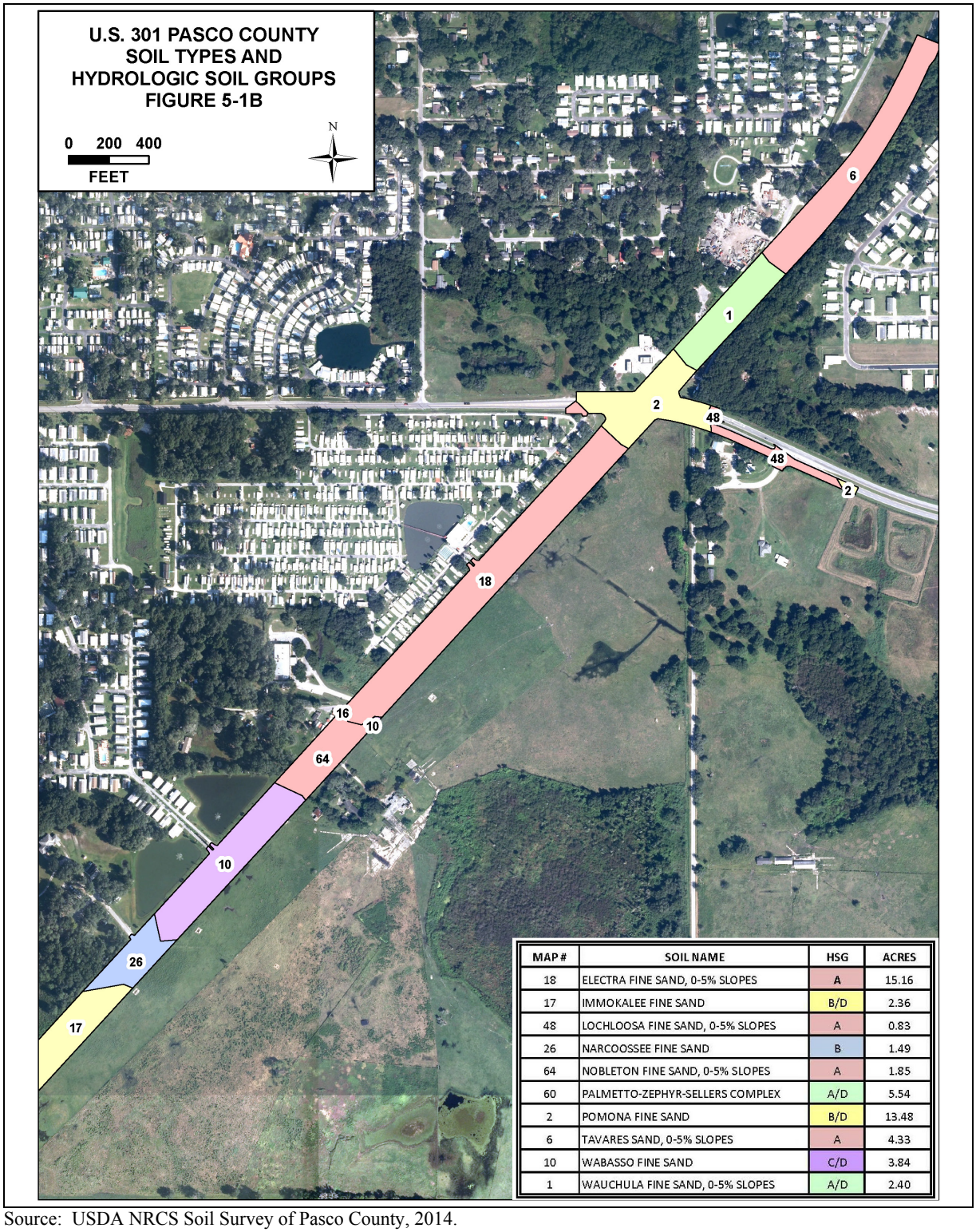
FIGURE 5-1A
SOIL TYPES AND HYDROLOGIC SOIL GROUPS



MAP #	SOIL NAME	HSG	ACRES
18	ELECTRA FINE SAND, 0-5% SLOPES	A	15.16
17	IMMOKALEE FINE SAND	B/D	2.36
48	LOCHLOOSA FINE SAND, 0-5% SLOPES	A	0.83
26	NARCOOSSEE FINE SAND	B	1.49
64	NOBLETON FINE SAND, 0-5% SLOPES	A	1.85
60	PALMETTO-ZEPHYR-SELLERS COMPLEX	A/D	5.54
2	POMONA FINE SAND	B/D	13.48
6	TAVARES SAND, 0-5% SLOPES	A	4.33
10	WABASSO FINE SAND	C/D	3.84
1	WAUCHULA FINE SAND, 0-5% SLOPES	A/D	2.40

Source: USDA NRCS Soil Survey of Pasco County, 2014.

FIGURE 5-1B
SOILS TYPE AND HYDROLOGIC SOIL GROUPS



MAP #	SOIL NAME	HSG	ACRES
18	ELECTRA FINE SAND, 0-5% SLOPES	A	15.16
17	IMMOKALEE FINE SAND	B/D	2.36
48	LOCHLOOSA FINE SAND, 0-5% SLOPES	A	0.83
26	NARCOOSSEE FINE SAND	B	1.49
64	NOBLETON FINE SAND, 0-5% SLOPES	A	1.85
60	PALMETTO-ZEPHYR-SELLERS COMPLEX	A/D	5.54
2	POMONA FINE SAND	B/D	13.48
6	TAVARES SAND, 0-5% SLOPES	A	4.33
10	WABASSO FINE SAND	C/D	3.84
1	WAUCHULA FINE SAND, 0-5% SLOPES	A/D	2.40

Source: USDA NRCS Soil Survey of Pasco County, 2014.

5.3 LAND USE

A combination of aerial photography, GIS-based FLUCCS data and field inspections were utilized to determine land use in the study area. A 400-foot wide buffer was established surrounding the ROW extent for the proposed US 301 (Gall Boulevard) project alignment, and the GIS data were clipped to that buffer. Existing land use through the southern one-half of the study area is correctional (Zephyrhills Correctional Institution), improved pastures/open land and commercial (Festival Park). The northern portion of the study area is dominated by high density residential areas and mixed wetlands and freshwater marshes. The distribution of land use within the study area is presented on figures included in **Appendix B**.

5.4 EXISTING PROJECT DRAINAGE BASINS

The US 301 (Gall Boulevard) proposed alignment traverses approximately two miles across southern Pasco County. The roadway passes through two major drainage basins as defined by the SWFWMD. The SWFWMD drainage basins, traveling from south to north across the alignment, are summarized in **Table 5-2** and are depicted on **Figure 5-2**.

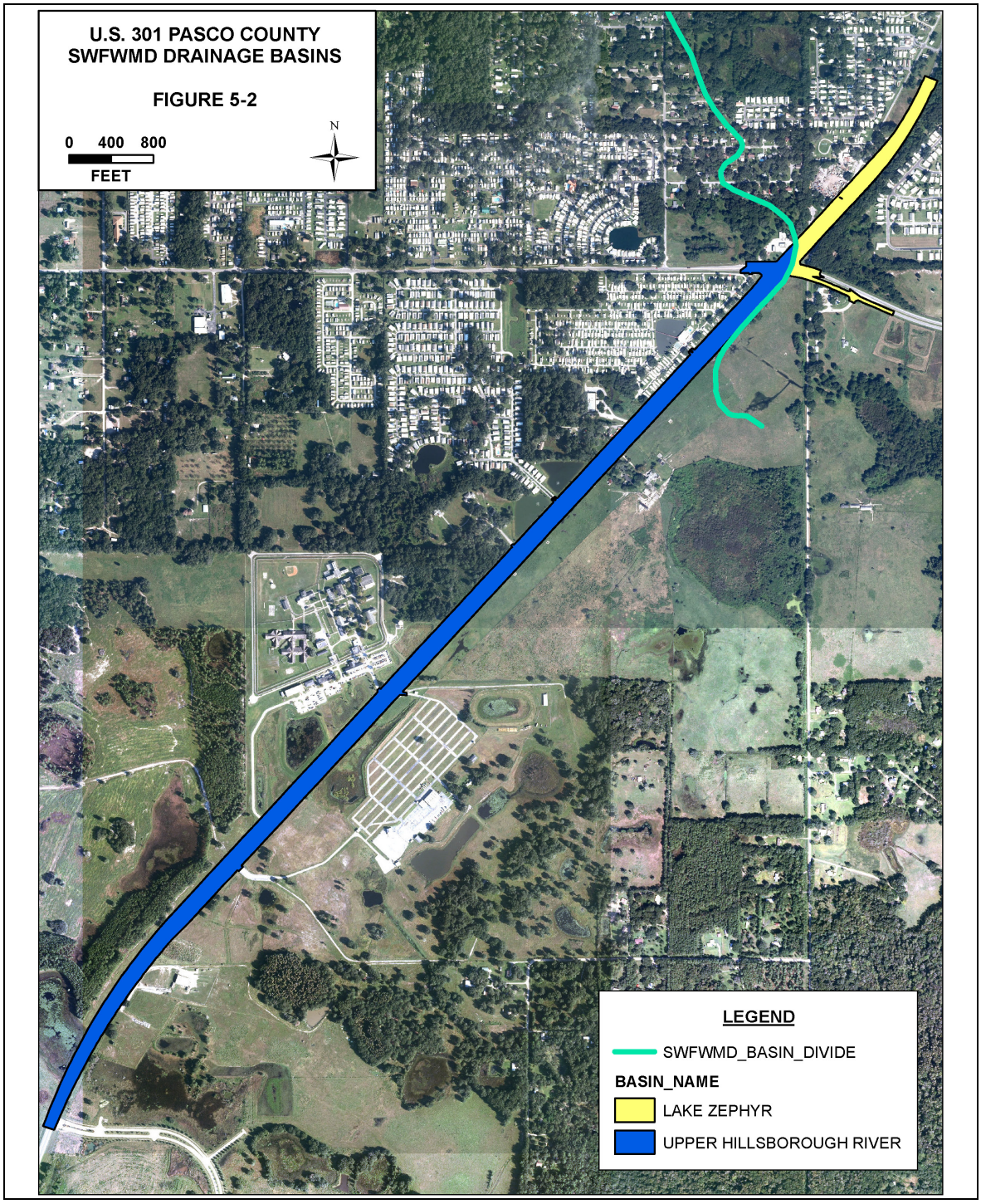
TABLE 5-2
SWFWMD DRAINAGE BASINS WITHIN THE PROJECT CORRIDOR

SWFWMD BASIN NAME	BASIN AREA (ACRES)
Upper Hillsborough River	42.47
Lake Zephyr	8.81

Source: SWFWMD, 2015.

In general, surface drainage in the Lake Zephyr basin flows toward Zephyr Creek, the major surface water feature within the basin. Zephyr Creek originates at Lake Zephyr approximately one mile north of the study area. The creek flows south from the lake to the cross drains beneath US 301 (Gall Boulevard), then south-southeast through several wetland areas until it meets the Hillsborough River near Crystal Springs, approximately two miles southeast of the study area. The wetlands and flood plains located adjacent to US 301 (Gall Boulevard) all eventually drain to the Hillsborough River, which outfalls into Tampa Bay and the Gulf of Mexico.

FIGURE 5-2
SWFWMD DRAINAGE BASINS



Source: SWFWMD, 2015.

5.5 FLOOD PLAINS AND FLOODWAYS

The following FEMA Flood Insurance Rate Maps (FIRMs) were reviewed for this study.

- 12101C0458F, effective September 26, 2014
- 12101C0454F, effective September 26, 2014
- 12101C0462F, effective September 26, 2014

A review of the currently effective FIRM maps reveals several portions of regulatory flood plains or floodways within the existing and proposed project ROW. Detailed explanations of flood plain impacts are included in the LHR under separate cover. The flood plain impacts are summarized in **Table 5-3**, and the locations of the flood plain impacts are depicted on figures included in **Appendix C**. FIRMETTE maps encompassing the entire study area are also included in **Appendix C**.

TABLE 5-3
FEMA FLOOD ZONE IMPACTS WITHIN PROPOSED ROW

SUB-BASIN	SUB-BASIN EXTENT		FLOOD ZONE A IMPACT (ACRES)	FLOOD ZONE AE IMPACT (ACRES)	BASE FLOOD ELEVATION (FT.-NAVD)
	FROM STATION	TO STATION			
SB-1	252+65.72	267+31.05	0.23	---	---
SB-2	267+31.05	306+36.06	0.06 0.22	---	---
SB-3	306+36.06	338+69.12	0.00	---	---
SB-4	338+69.12	364+14.37	---	---	---
SB-5	364+14.37	370+65.27	---	0.02 0.10	70.90 70.90
SB-6	370+65.27	385+00	0.13	0.22 0.42	73.30 73.30

Source: FEMA FIS, September 2014.

A total of 0.64 acres of impact to Flood Zone A and 0.12 acres (Base Flood Elevation (BFE) = 70.9 ft.-NAVD) and 0.64 acre (BFE = 73.3 ft.-NAVD) of impacts to Flood Zone AE are included within the proposed ROW. Three FPC ponds are proposed for the study area. FPC-1 is located within sub-basin SB-3 (at Sta. 316+00) and has a surface area of 0.53 acres. FPC-2 is located within sub-basin SB-5 (at Sta. 367+00) and has a surface area of 0.18 acres, and FPC-3 is located within sub-basin SB-6 (at Sta. 380+00) and has a surface area of 0.47 acres. The locations of the FPC areas are depicted on figures located within **Appendix C**.

5.6 FLOODING PROBLEMS

Due to limited channel capacity, and hydraulically inadequate structures within the Zephyr Creek channel, flooding occurs during significant rainfall events within some parts of the Lake Zephyr Watershed in Pasco County. A previously prepared *East Pasco Watershed Management Plan* for SWFWMD and Pasco County, which included the Zephyr Creek Design Unit 1 area,

provided several options for potential improvements. The remainder of the project alignment has not been the site of frequent flooding.

5.7 CROSS DRAINS AND BRIDGES

There currently exist a total of seven cross drains locations along the US 301 (Gall Boulevard) project corridor. Because the proposed new alignment includes expanding the ROW, the cross drains within the study area would all require lengthening to accommodate the new typical roadway section. It is assumed that no additional cross drains would be required. Limited information is currently available pertaining to the existing cross drains within the study area from Straight Line Diagrams (SLDs) dated June 2011; that information is summarized in **Table 5-4**. Upstream (U.S.) and downstream (D.S.) inverts for the cross drains without available surveyed elevations were estimated from SWFWMD Digital Elevation Models (DEMs) for the study area. A detailed discussion of wetland impacts along the project alignment is included in the Draft *Wetland Evaluation and Biological Assessment Report (WEBAR)*, submitted under separate cover. The location of each individual cross drain is presented graphically on the project plan sheets included in **Appendix D**.

TABLE 5-4
SUMMARY OF CROSS DRAINS

NAME	SUB-BASIN	APPROX. STATION	MATERIAL	APPROX. SIZE	APPROX. LENGTH (FT.)	U.S. INVERT (FT.-NAVD)	D.S. INVERT (FT.-NAVD)
CD-1	SB-1	260+76	CBC	4' X 3'	119.23	63.00	62.90
CD-2	SB-2	288+95	CBC	4' X 2'	84.02	65.25	64.88
CD-3	SB-3	301+80	RCP	(2) 30" dia.	84.94	61.57	61.51
CD-4	SB-3	314+64	RCP	30" dia.	74.13	64.04	63.87
CD-5 *	SB-4	353+95	RCP	30" dia.	78.02	70.78	70.59
CD-6 *	SB-4	353+95	RCP	24" dia.	74.81	70.78	70.59
CD-7	SB-5	368+56	CBC	(2) 4' x 2'	122.46	N – 68.85 C – 68.85 S - blocked	N – 67.67 C – 67.73 S – 67.58

Source: Pasco County, 2014.
URS, 2014.

NOTES: * Denotes existing cross drains that share an existing headwall
CD-7 comprises three CBCs, but only two are operational per SWFWMD requirements
% Survey data for CD-7 obtained from URS study "Zephyr Creek Unit 1, Design & Permitting", dated April 2011.

5.8 WATER QUALITY

Portions of the US 301 (Gall Boulevard) project corridor, from the southern end of the project to the north side of the intersection of US 301 (Gall Boulevard) and Chancey Road, are located within an area of impaired water quality. This portion of the project lies within Watershed Basin I.D. (WBID) No. 1443A (Tampa Bay Tributaries), and comprises a portion of the watershed for the Hillsborough River. This reach of the river is a Class 3F water body, and the river is classified as impaired with respect to nutrients and dissolved oxygen. The FDEP has not adopted any TMDLs for this portion of the river.

Section 6.0
PROPOSED CONDITIONS

6.1 CRITERIA AND METHODOLOGY

The drainage system for this project would be designed in accordance with FDOT drainage standards and procedures to carry stormwater runoff away from the roadway and sidewalks in the natural flow directions of that particular basin. The proposed ROW has a width of 172 feet, and specific criteria assumed for this study is that the proposed conditions analysis for the drainage design should assume entirely impervious surface from ROW to ROW (an ultimate paved section), even though the typical section includes a grassed median and grassed swales between the edge of pavement and the sidewalk. This assumption was made to support future expansion. Because of these special criteria, a safety factor in the sizing of the stormwater ponds was not used.

The runoff generated within a particular drainage sub-basin would be managed in a stormwater pond located within the sub-basin. The typical section of the proposed roadway would be graded such that runoff from the roadway and sidewalk would be managed within roadside drainage swales located between the edge of pavement and the sidewalks. The roadside swales would convey collected runoff to a series of stormwater culverts, ultimately discharging the stormwater into detention ponds. The existing cross drains that maintain connections to wetland areas or other surface waters that are bifurcated by the roadway would be lengthened to conform to the proposed ROW. The purpose of the cross drains would be to maintain the existing hydrology and hydraulics of the natural system while allowing for construction of the proposed roadway. The location of each individual stormwater pond, FPC area, cross drain and the areas of wetland impact within the study area are presented graphically on the plan sheets included in **Appendix D**. Detailed descriptions of the typical section and alignment for the project are included in **Section 1** of this report, and **Section 3** discusses the two alternative roadway alignments considered prior to selection of the Build Alternative. The pond sites discussed in this Draft Preliminary Pond Sizing Report (PPSR) as well as the hydrology and hydraulics within the study area discussed in this section are based upon the Recommended Build Alternative.

6.2 ENVIRONMENTAL RESOURCE PERMITS

Some portions of the US 301 (Gall Boulevard) proposed alignment are located within the limits of projects permitted by SWFWMD. A total of 10 projects with approved ERPs are located adjacent to the proposed alignment. These ERPs are summarized in **Table 6-1**.

TABLE 6-1
ENVIRONMENTAL RESOURCE PERMITS
ADJACENT TO PROJECT CORRIDOR

ERP NUMBER	PROJECT NAME	ROADWAY LIMITS	EXISTING CONSTRUCTION
43027103.001 - .012	Riverwood	Sta. 252+65.72 – Sta. 272+00	Yes
43004464.000	Asbel Commercial Development	Sta. 265+00 – Sta. 272+00	No
43000361.001- .002	Festival Park	Sta. 272+00 – Sta. 306+00	Yes
430209749.000 - .003	Zephyrhills Correctional Institution	Sta. 290+00 – Sta. 316+00	Yes
43026505.002	Rucks Parcel	Sta. 307+00 – Sta. 361+00	No
43004266.000 - .002	Pasco Co. – Zephyrhills Bypass	Sta. 101+00 – Sta. 110+00 (Chancey Road)	Yes
43007543.000	Pell Powers Building	Sta. 369+00 – Sta. 372+50	No
43003499.000	Pasco Co. – SE Force Main	Sta. 98+00 – Sta. 101+50 (Chancey Road)	Yes
43017671.000	Johnson Trust – Office Building	Sta. 104+50 – Sta. 108+50 (Chancey Road)	No
43027931.000	FDOT	Sta. 364+00 – Sta. 385+00	No

Source: Pasco County, 2014.
URS, 2014.

Section 7.0
POND SIZING ANALYSIS

An analysis of the Pre-Development and Post-Development drainage conditions for the US 301 (Gall Boulevard) study area was conducted using the NRCS (formerly Soil Conservation Service (SCS)), method as outlined in the SCS Technical Report No. 55 (TR-55), Urban Hydrology for Small Watersheds. Within the project limits, each of the drainage sub-basins has natural discharge pathways into other sub-basins or surface water bodies. Therefore, the ponds were designed using a 25-year, 24-hour storm event (SWFWMD criteria for open drainage basins). For the study area, this design storm would consist of 8.5 inches of rainfall in a 24-hour timeframe.

For the Pre-Development condition analysis, the total area of proposed alignment within the proposed ROW limits and the total area of impervious (paved) surface were calculated, with the difference between the two areas equaling the existing pervious surface. For the Post-Development condition analysis, based upon the FDOT District 7 special criteria established for this study, the entire project area within the proposed ROW limits was assumed to consist of impervious (paved) surface, with no pervious surface within the project limits. This assumption was made to support future expansion. Because of this conservative criterion, no safety factor for the design of the stormwater ponds was used.

Based upon LiDAR topographic data and the SWFWMD DEM for the study area, a total of six drainage sub-basins (SB-1 through SB-6) were defined for the project corridor, with four sub-basins located south of Chancey Road and two sub-basins located north of Chancey Road. Runoff from the six drainage sub-basins delineated along the alignment would be routed to seven stormwater ponds. Each sub-basin would contain one pond for quantity attenuation and water quality treatment, with the exception of SB-6 that would have two ponds due to land constraints. The ponds are designed to accommodate attenuation and treatment of 100 percent of the runoff generated within each sub-basin from ROW to ROW, with all off-site drainage routed to the existing cross drains to maintain the hydrology of the area. Weighted curve numbers (CNs) were calculated for the Pre-Development and Post-Development conditions within each of the six sub-basins based upon the percentage of Directly Connected Impervious Area (DCIA) within the proposed ROW. The calculated CNs were used to calculate the quantity of stormwater runoff generated from the roadway typical section, using the NRCS method.

7.1 WATER QUALITY AND WATER QUANTITY CRITERIA

In order to meet applicable state water quality standards, the design of the stormwater management system for US 301 (Gall Boulevard) will comply with rules outlined in the SWFWMD ERP Information Manual (February 2004, updated 2014). The SWFWMD water

quantity criteria provides for limits of Post-Development off-site discharges to no greater than the Pre-Development condition discharge. For the US 301 (Gall Boulevard) project, the required detention volume was calculated as the difference between the NRCS method Pre-Development and Post-Development runoff volume. The SWFWMD water quality treatment criteria for wet detention ponds in open basins requires the detention of the first one inch of rainfall falling on the entire area of impervious surface.

7.2 POND LOCATION CRITERIA

The selection of suitable sites for stormwater management ponds was based upon criteria such as economic feasibility, the presence of hazardous materials, archaeological resources, current and proposed land use, parcel boundaries and hydrologic characteristics, among others. The following general criteria were considered as part of the pond site selection process for the proposed US 301 (Gall Boulevard).

- The use of state- or county-owned lands is preferred;
- Minimize the number of parcels (i.e., affected landowners) occupied by stormwater ponds;
- Avoid splitting parcels, creating remnant pieces;
- Avoid wetlands, archaeological sites, historic structures, and potentially contaminated sites;
- One stormwater pond per drainage sub-basin, if possible.

The preliminary ponds were located and sized based upon the following assumptions.

- Ponds were located in parcels owned by Pasco County or the FDOT where available;
- The pond depth was based upon the estimated depth, in feet below land surface (BLS), to the seasonal high water table (SHWT). The SHWT depth was assumed to be no greater than three feet BLS. Therefore, the proposed ponds all have a design depth of three feet;
- The SHWT values for the alignment were estimated from soils data for the region; as well as, data from past studies in the vicinity of the project conducted for Pasco County, FDOT and the SWFWMD;
- The ponds were preliminarily sized to generally provide for approximately one foot of freeboard;

- The pond geometry was based upon regular-shaped rectangular ponds with 20-foot wide maintenance berms surrounding the top of the pond and side slopes within the pond of 4:1 (h:v);

- No surplus volume for the ponds was included due to the conservative design assumption set forth for this study.

7.3 NRCS METHODOLOGY

The NRCS method for calculation of stormwater runoff involves the development of a hydrologic and hydraulic conceptual model based upon measurable watershed characteristics, including sub-basin areas, soil type, antecedent moisture conditions, and land use. The methods and sources used to determine these characteristics are summarized in the following paragraphs.

7.3.1 Drainage Sub-Basin Areas

The six drainage sub-basins areas were delineated based upon the existing topography along the roadway alignment, and each individual sub-basin comprises less than 20 acres located entirely within the proposed ROW. The stormwater ponds were then sized based upon the percentage of DCIA within the ROW width for each sub-basin, as determined from the GIS analysis.

7.3.2 Curve Numbers

Pre-Development and Post-Development runoff CN calculations for each sub-basin were based on a review of land use, land cover and hydrologic soil group, with an antecedent moisture condition of II. An area-weighted CN value was then computed for each sub-basin using the procedure outlined in TR-55. Impervious areas in the Pre-Development condition analysis for the existing paved roadway included the present extent of the roadway and associated mixed-use trails and sidewalks. The Post-Development analysis used the proposed ROW for the proposed roadway and assumed the extent of impervious coverage equaled the entire area within the ROW, based upon the assumption to allow for future expansion.

7.4 NRCS RUNOFF CALCULATIONS

Using the total pervious acreage and impervious acreage of each sub-basin, the 25-year, 24-hour rainfall depth for the region (8.5 inches of rainfall in 24 hours), and the weighted CN for the sub-basin, the runoff attenuation volume in acre-feet (ac-ft.) for each sub-basin was calculated using the NRCS method for both the Pre-Development and the Post-Development condition. The runoff attenuation volume is equal to the net increase, in ac-ft., of runoff from the Pre-Development to the Post-Development condition. The water quality treatment volume for each SB was calculated to be the first one inch of rainfall over the entire area of DCIA, for wet detention ponds. The total required storage volume for each sub-basin was calculated by adding

together the runoff attenuation volume and the water quality treatment volume. The calculated required storage volume for each sub-basin was used as a guide in the preliminary sizing of the proposed stormwater ponds located adjacent to the roadway.

7.5 FLOOD PLAIN COMPENSATION AREAS

A total of 0.64 acres of impact to Flood Zone A and 0.76 acres of impact to Flood Zone AE resulted from the proposed roadway expansion. FPC volumes were not added to the calculated pond sizes but were, instead, calculated separately. Three FPC sites are proposed for the project corridor (FPC-1 through FPC-3), with FPC-1 located in SB-3, FPC-2 located in SB-5, and FPC-3 located in SB-6.

The presence of wetlands and established flood zones within SB-5 and SB-6 limits the size of stormwater ponds and FPC sites that can be constructed in the affected areas. Additionally, an update of a PD&E study (Work Program Item Segment No. 256422-2, dated February 2012) has been completed by the FDOT for US 301 (Gall Boulevard) from SR 39 to South of CR 54, which is located immediately north of this project corridor and includes a new proposed termination of SR 39 at US 301 (Gall Boulevard) at the northern end of the project alignment. This project has now progressed from the study phase to the design phase. The FDOT study earmarked several locations within SB-6 for FPC sites from that project area. However, the FDOT study provided three alternative FPC sites within SB-6. Therefore, stormwater Pond 6A is located within one of the alternative FPC sites and FPC site FPC-3 is located within another of the alternative FPC sites. This will leave available one of the three alternative FPC sites detailed in the FDOT February 2012 update; the precise location of the available FPC site will become known following completion of the project design phase. The project floodplain and wetland and protected species impacts are discussed in greater detail in the LHR and the WEBAR, both under separate cover. An evaluation of the pond sites with respect to the proximity of hazardous waste sites and cultural resources are discussed in the *Contamination Screening Evaluation Report* (CSER) and the *Cultural Resources Assessment Survey* (CRAS), respectively, both under separate cover.

The results of the drainage analyses and the preliminary pond sizes determined for the study area are summarized in **Table 7-1**. The preliminary locations and relative sizes of the pond footprints and impacted wetlands for the roadway project are depicted on the figures included in **Appendix D**. The calculations for the preliminary pond sizing for the alignment are included as **Appendix E**.

TABLE 7-1
STORMWATER DRAINAGE ANALYSES SUMMARY

SUB-BASIN NAME	BASIN AREA (ACRES)	PRE-DEVELOPMENT		POST-DEVELOPMENT		REQUIRED STORAGE VOLUMES		POND SURFACE AREA (ACRES)	POND FOOTPRINT AREA (ACRES)
		IMPERVIOUS (ACRES)	PERVIOUS (ACRES)	IMPERVIOUS (ACRES)	PERVIOUS (ACRES)	25-YR, 24-HR ATTENUATION (AC –FT)	1-IN. RUNOFF TREATMENT (AC -FT)		
SB-1	4.05	1.54	2.51	4.05	0.00	0.79	0.34	0.66	1.05
SB-2	15.13	3.66	11.47	15.13	0.00	2.98	1.26	1.60	2.18
SB-3	12.79	2.79	10.00	12.79	0.00	1.87	1.07	1.14	1.69
SB-4	10.51	3.39	7.12	10.51	0.00	2.92	0.88	1.45	1.96
SB-5	4.23	1.54	2.69	4.23	0.00	0.37	0.35	0.32	0.63
SB-6	4.58	1.20	3.38	4.58	0.00	1.59	0.38	0.42 (Pond 6A) 0.39 (Pond 6B)	0.73 (6A) 0.61 (6B)

Source: URS, 2014.
NOTES: Pond Surface Area = Area at top of bank elevation
Pond Footprint Area = Land surface area occupied by pond, including 20-foot wide maintenance berms

Section 8.0
REGULATORY AGENCY COORDINATION

8.1 PERMITS REQUIRED

It is anticipated that the following permits would be required for the proposed US 301 (Gall Boulevard) improvements:

- SWFWMD Environmental Resource Permit
- U.S. Army Corps of Engineers (USACE) 404 Dredge and Fill Permit
- Florida Department of Environmental Protection (FDEP) National Pollutant Discharge Elimination System (NPDES) Permit for Construction Activities

8.2 LOCAL AGENCIES

Pasco County is the local agency with jurisdiction for portions of the project corridor for the proposed improvements to US 301 (Gall Boulevard). Coordination with this agency will likely occur during final design.

8.3 STATE AGENCIES

The state agencies involved in the permitting process for the US 301 (Gall Boulevard) drainage system will be the SWFWMD and the FDOT.

A Pre-Application meeting will be held with SWFWMD to discuss the proposed projects improvements and how to submit permits during the construction phase of the project. The project may require a standard general construction permit with the FDOT as the applicant.

8.4 FEDERAL AGENCIES

Federal agencies which may require permits for the proposed US 301 (Gall Boulevard) improvements are the USACE and the U.S. Environmental Protection Agency (USEPA). The USACE would be involved in permitting dredge and fill activities in the waters of the United States. In Florida, the NPDES permit process is administered by the FDEP for stormwater discharges into Waters of the United States.

Section 9.0
REFERENCES

1. Federal Emergency Management Agency, *Flood Insurance Rate Maps for Pasco County (unincorporated), Florida, effective September 26, 2014*

2. Florida Department of Transportation*, Drainage Manual*, 2006

3. Florida Department of Transportation, *Culvert Handbook,* 2004

4. Florida Department of Transportation, *PD&E Manual*, Part 2, Chapter 24 – Floodplains, April 22, 1998

5. Southwest Florida Water Management District, *Environmental Resource Permitting Information Manual,* 2004

6. Southwest Florida Water Management District, Aerials with contours

APPENDIX A

Soils Maps

United States Department of Agriculture

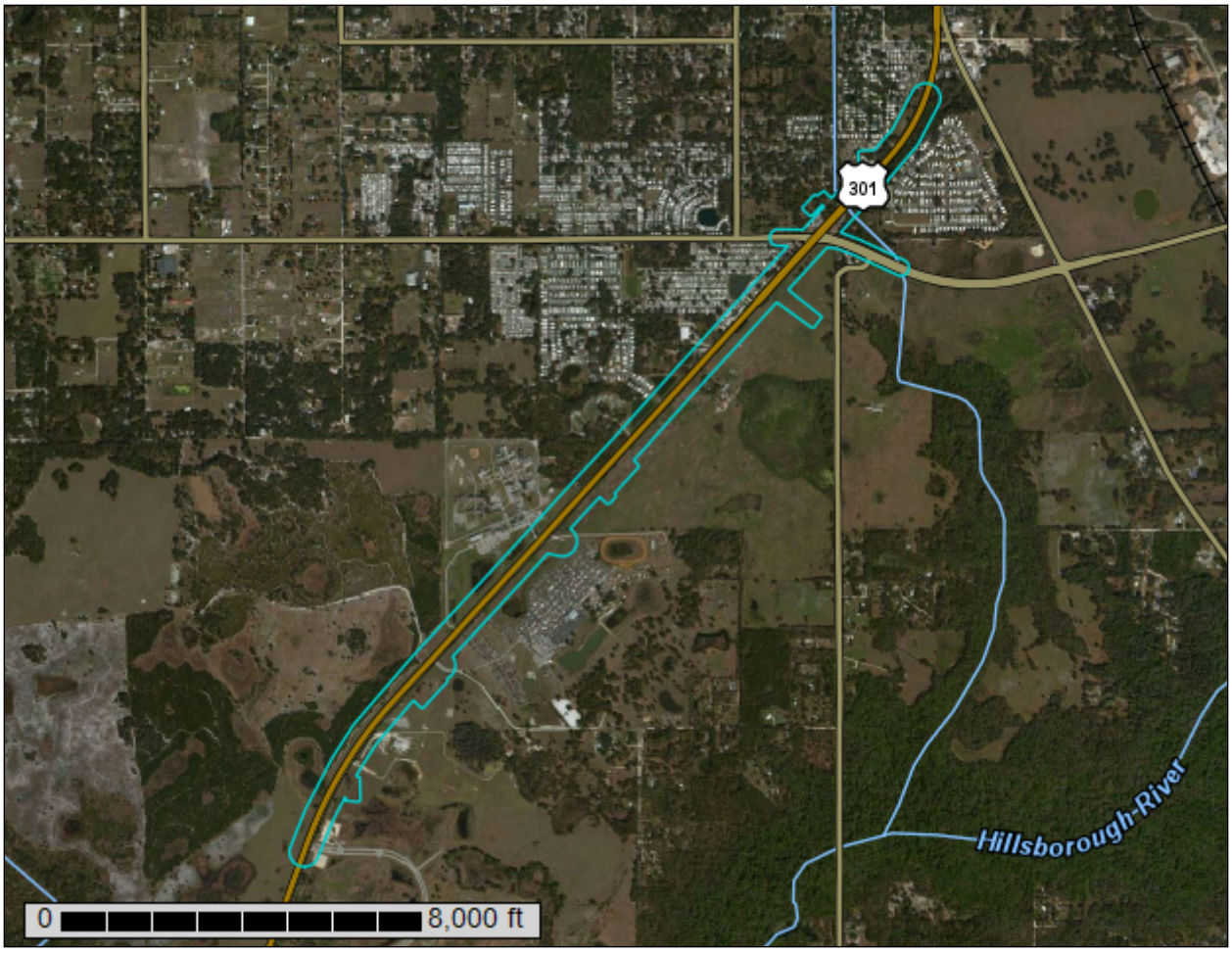
NRCS

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 Pasco County, Florida

U.S. 301 (GALL BLVD) from SR 56 to SR 39

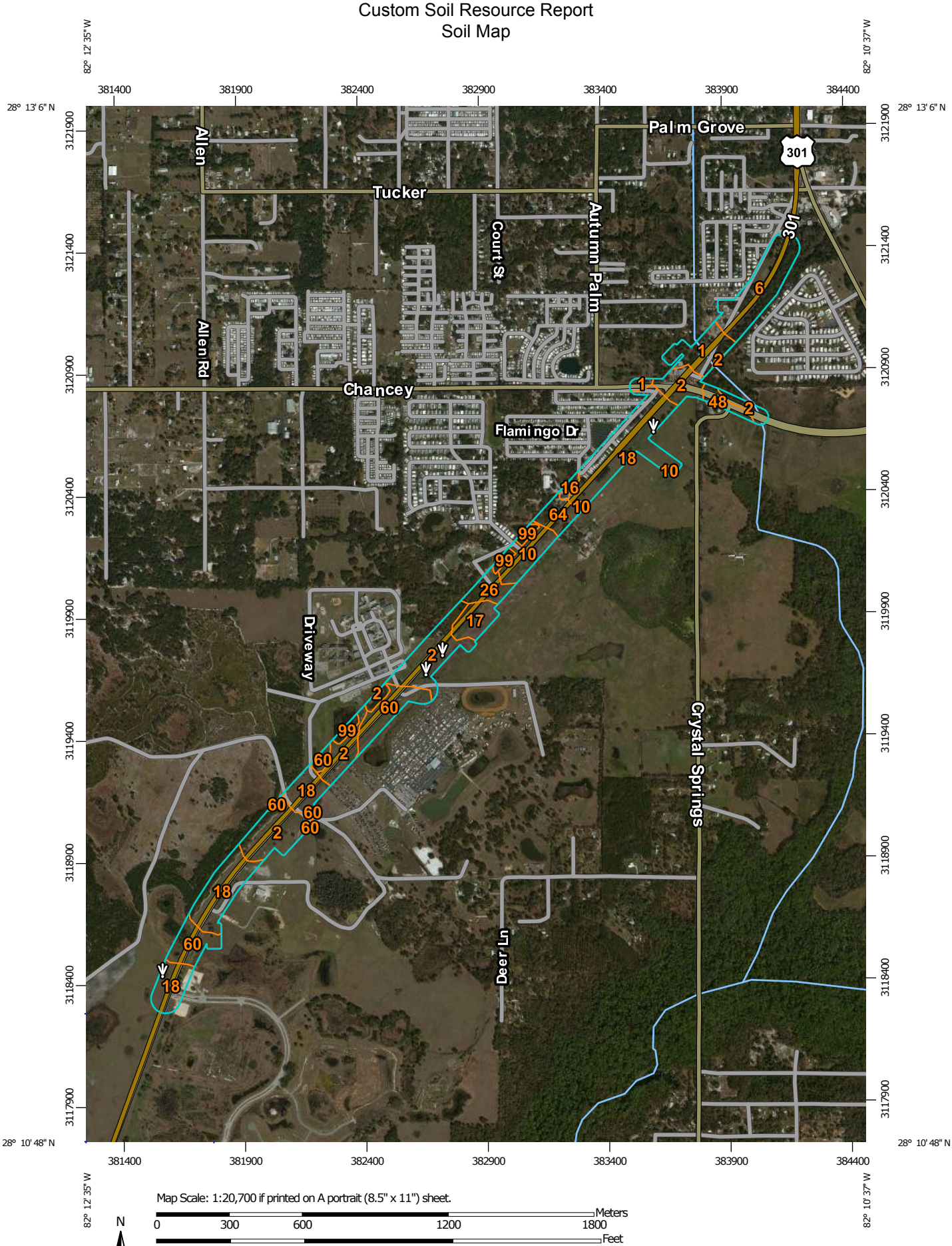


March 17, 2015

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



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: http://websoilsurvey.nrcs.usda.gov
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: Pasco County, Florida
Survey Area Data: Version 11, Sep 23, 2014

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

Date(s) aerial images were photographed: Feb 13, 2010—Mar 13, 2011

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

Pasco County, Florida (FL101)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1	Wauchula fine sand, 0 to 5 percent slopes	8.6	6.0%
2	Pomona fine sand	35.1	24.4%
6	Tavares sand, 0 to 5 percent slopes	14.9	10.4%
10	Wabasso fine sand	7.3	5.1%
16	Zephyr muck	1.0	0.7%
17	Immokalee fine sand	5.1	3.6%
18	Electra Variant fine sand, 0 to 5 percent slopes	41.8	29.0%
26	Narcoossee fine sand	4.1	2.8%
48	Lochloosa fine sand, 0 to 5 percent slopes	2.5	1.7%
60	Palmetto-Zephyr-Sellers complex	15.1	10.5%
64	Nobleton fine sand, 0 to 5 percent slopes	4.2	2.9%
99	Water	4.2	2.9%
Totals for Area of Interest		**143.8**	**100.0%**

Pasco County, Florida

1—Wauchula fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: bv92
Elevation: 20 to 120 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Wauchula, non-hydric, and similar soils: 75 percent
Wauchula, hydric, and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wauchula, Non-hydric

Setting

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

Typical profile

A - 0 to 8 inches: fine sand
E - 8 to 19 inches: fine sand
Bh - 19 to 26 inches: fine sand
E' - 26 to 34 inches: fine sand
Btg - 34 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)

Description of Wauchula, Hydric

Setting

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

Typical profile

A - 0 to 8 inches: fine sand
E - 8 to 19 inches: fine sand
Bh - 19 to 26 inches: fine sand
E' - 26 to 34 inches: fine sand
Btg - 34 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)

Minor Components

Myakka, non-hydric

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Wabasso, non-hydric

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Pomona, non-hydric

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

2—Pomona fine sand

Map Unit Setting

National map unit symbol: bv9f
Elevation: 20 to 120 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomona, non-hydric, and similar soils: 75 percent
Pomona, hydric, and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomona, Non-hydric

Setting

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

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 22 inches: fine sand
Bh - 22 to 36 inches: fine sand
E/Bw - 36 to 52 inches: fine sand
B'tg - 52 to 60 inches: fine sandy loam
Cg - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Description of Pomona, Hydric

Setting

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

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 22 inches: fine sand
Bh - 22 to 36 inches: fine sand
E/Bw - 36 to 52 inches: fine sand
B'tg - 52 to 60 inches: fine sandy loam
Cg - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Minor Components

Myakka, non-hydric

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Smyrna, non-hydric

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Wauchula, non-hydric

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)

6—Tavares sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: bvbt
Elevation: 10 to 150 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Tavares and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 3 inches: sand

C - 3 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Minor Components

Adamsville

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL)

Millhopper

Percent of map unit: 2 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Sparr

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Candler

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex

Across-slope shape: Convex
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Astatula

Percent of map unit: 2 percent
Landform: Hills on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Sand Pine Scrub (R154XY001FL)

10—Wabasso fine sand

Map Unit Setting

National map unit symbol: bv93
Elevation: 30 to 100 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabasso, non-hydric, and similar soils: 70 percent
Wabasso, hydric, and similar soils: 10 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso, Non-hydric

Setting

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

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 23 inches: fine sand
Bh - 23 to 30 inches: fine sand
B/Cg - 30 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 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 in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Description of Wabasso, Hydric

Setting

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

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 23 inches: fine sand
Bh - 23 to 30 inches: fine sand
B/Cg - 30 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Minor Components

Eaugallie, non-hydric

Percent of map unit: 7 percent
Landform: Rises on marine terraces

Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Aripeka

Percent of map unit: 7 percent
Landform: Rises on karstic marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G154XB521FL), Cabbage Palm Flatwoods (R154XY005FL)

Paisley, non-hydric

Percent of map unit: 6 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL), South Florida Flatwoods (R154XY003FL)

16—Zephyr muck

Map Unit Setting

National map unit symbol: bv99
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Zephyr and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zephyr

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 13 inches: muck

A - 13 to 31 inches: fine sand
Btg - 31 to 61 inches: sandy clay loam
Cg - 61 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)

Minor Components

Anclote

Percent of map unit: 10 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)

Felda

Percent of map unit: 10 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), Slough (R154XY011FL)

17—Immokalee fine sand

Map Unit Setting

National map unit symbol: bv9b
Elevation: 20 to 120 feet
Mean annual precipitation: 50 to 58 inches

Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee, non-hydric, and similar soils: 70 percent
Immokalee, hydric, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee, Non-hydric

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 4 inches: fine sand
E - 4 to 33 inches: fine sand
Bh - 33 to 45 inches: fine sand
C - 45 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Description of Immokalee, Hydric

Setting

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

Typical profile

A - 0 to 4 inches: fine sand

E - 4 to 33 inches: fine sand
Bh - 33 to 45 inches: fine sand
C - 45 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Minor Components

Myakka, non-hydric

Percent of map unit: 8 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Pomona, non-hydric

Percent of map unit: 7 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

18—Electra Variant fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: bv9c
Mean annual precipitation: 50 to 58 inches

Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Electra variant and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Electra Variant

Setting

Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits over soft limestone

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 39 inches: fine sand
Bh - 39 to 51 inches: fine sand
E' - 51 to 70 inches: fine sand
B'tg - 70 to 78 inches: sandy clay loam
2Cr - 78 to 82 inches: weathered bedrock

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 60 to 80 inches to paralithic bedrock
Natural drainage class: Somewhat 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 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL)

Minor Components

Narcoossee

Percent of map unit: 12 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL)

26—Narcoossee fine sand

Map Unit Setting

National map unit symbol: bv9n
Elevation: 10 to 100 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Narcoossee and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narcoossee

Setting

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

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 9 inches: fine sand
Bh - 9 to 12 inches: fine sand
C - 12 to 75 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL)

Minor Components

Adamsville

Percent of map unit: 10 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL)

Smyrna, non-hydric

Percent of map unit: 10 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

48—Lochloosa fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: bvbd
Elevation: 30 to 160 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Lochloosa and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lochloosa

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 36 inches: fine sand
Bt1 - 36 to 42 inches: fine sandy loam
Bt2 - 42 to 63 inches: sandy clay loam
Btg3 - 63 to 71 inches: sandy clay loam

Btg4 - 71 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
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 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Other vegetative classification: Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)

Minor Components

Blichton, non-hydric

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy, loamy, or clayey soils on flats and rises of hydric uplands (G154XB441FL)

Kendrick

Percent of map unit: 3 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)

Sparr

Percent of map unit: 3 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

60—Palmetto-Zephyr-Sellers complex

Map Unit Setting

National map unit symbol: bvbv
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Palmetto and similar soils: 60 percent
Zephyr and similar soils: 15 percent
Sellers and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palmetto

Setting

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

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 10 inches: fine sand
Bh - 10 to 28 inches: fine sand
E' - 28 to 46 inches: fine sand
B'tg - 46 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 to 30 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

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

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Slough (R154XY011FL)

Description of Sellers

Setting

Landform: Flats on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A1 - 0 to 5 inches: mucky loamy fine sand
A2 - 5 to 28 inches: fine sand
C - 28 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)

Description of Zephyr

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 5 inches: muck
A - 5 to 22 inches: fine sand
Btg - 22 to 59 inches: sandy clay 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
Natural drainage class: Very 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 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)

Minor Components

Basinger, depressional
Percent of map unit: 10 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)

64—Nobleton fine sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: bvbz
Elevation: 30 to 160 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition
Nobleton and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nobleton

Setting
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 29 inches: fine sand
Bt1 - 29 to 36 inches: sandy clay loam
Bt2 - 36 to 47 inches: sandy clay
Btg3 - 47 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)

Minor Components

Kendrick

Percent of map unit: 3 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)

Blichton, non-hydric

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy, loamy, or clayey soils on flats and rises of hydric uplands (G154XB441FL)

Sparr

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Millhopper

Percent of map unit: 2 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Lochloosa

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)

99—Water

Map Unit Composition

Water (fresh): 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water (fresh)

Interpretive groups

Land capability classification (irrigated): None specified
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

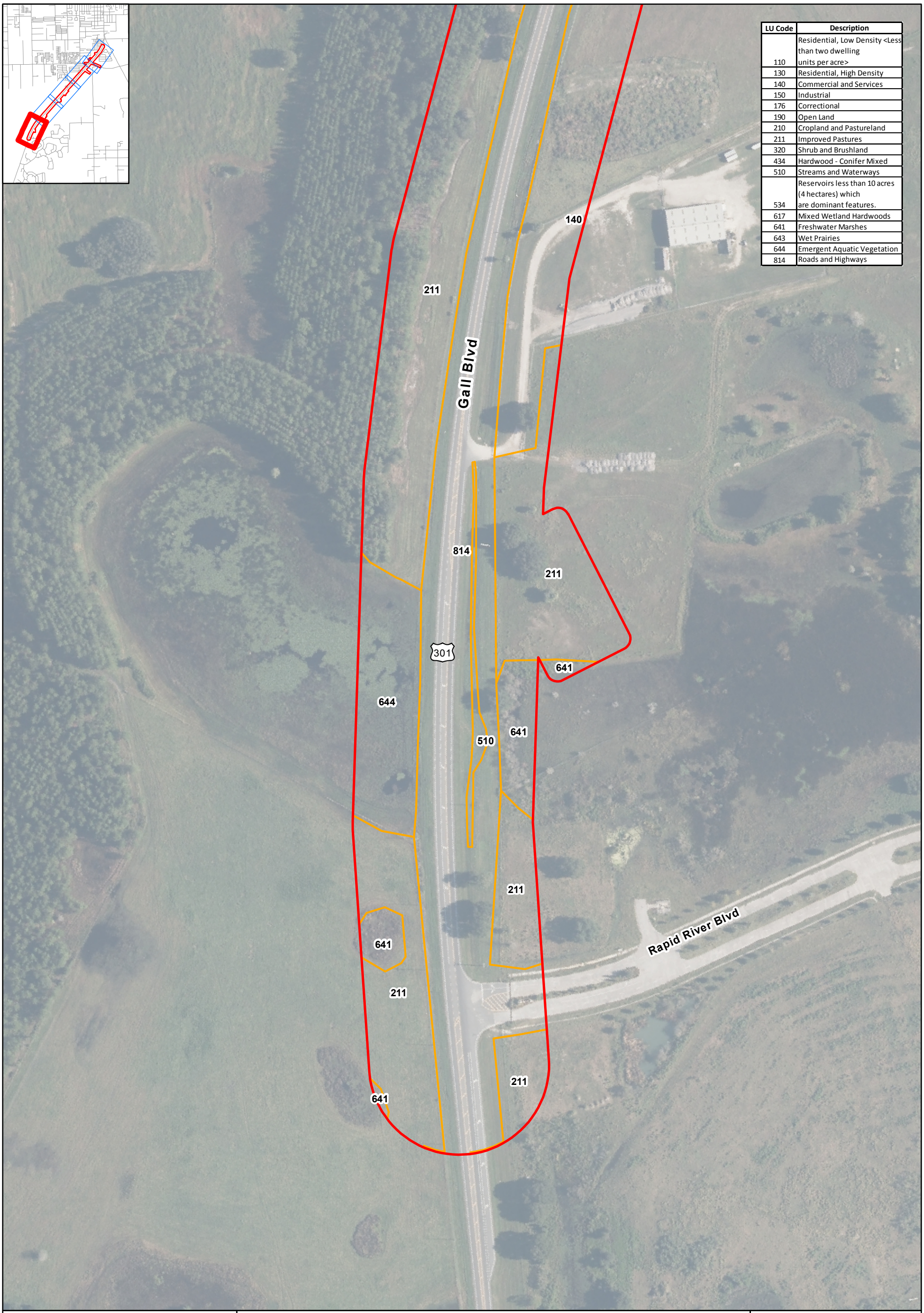
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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 B

Land Use and Vegetated Cover Maps



LU Code	Description
110	Residential, Low Density <Less than two dwelling units per acre>
130	Residential, High Density
140	Commercial and Services
150	Industrial
176	Correctional
190	Open Land
210	Cropland and Pastureland
211	Improved Pastures
320	Shrub and Brushland
434	Hardwood - Conifer Mixed
510	Streams and Waterways
534	Reservoirs less than 10 acres (4 hectares) which are dominant features.
617	Mixed Wetland Hardwoods
641	Freshwater Marshes
643	Wet Prairies
644	Emergent Aquatic Vegetation
814	Roads and Highways

Legend

Project Study Area

Land Use/ Vegetative Cover

Source:
Aerials- FDOT, 2014
Land Use- URS, 2014

US 301 PD&E

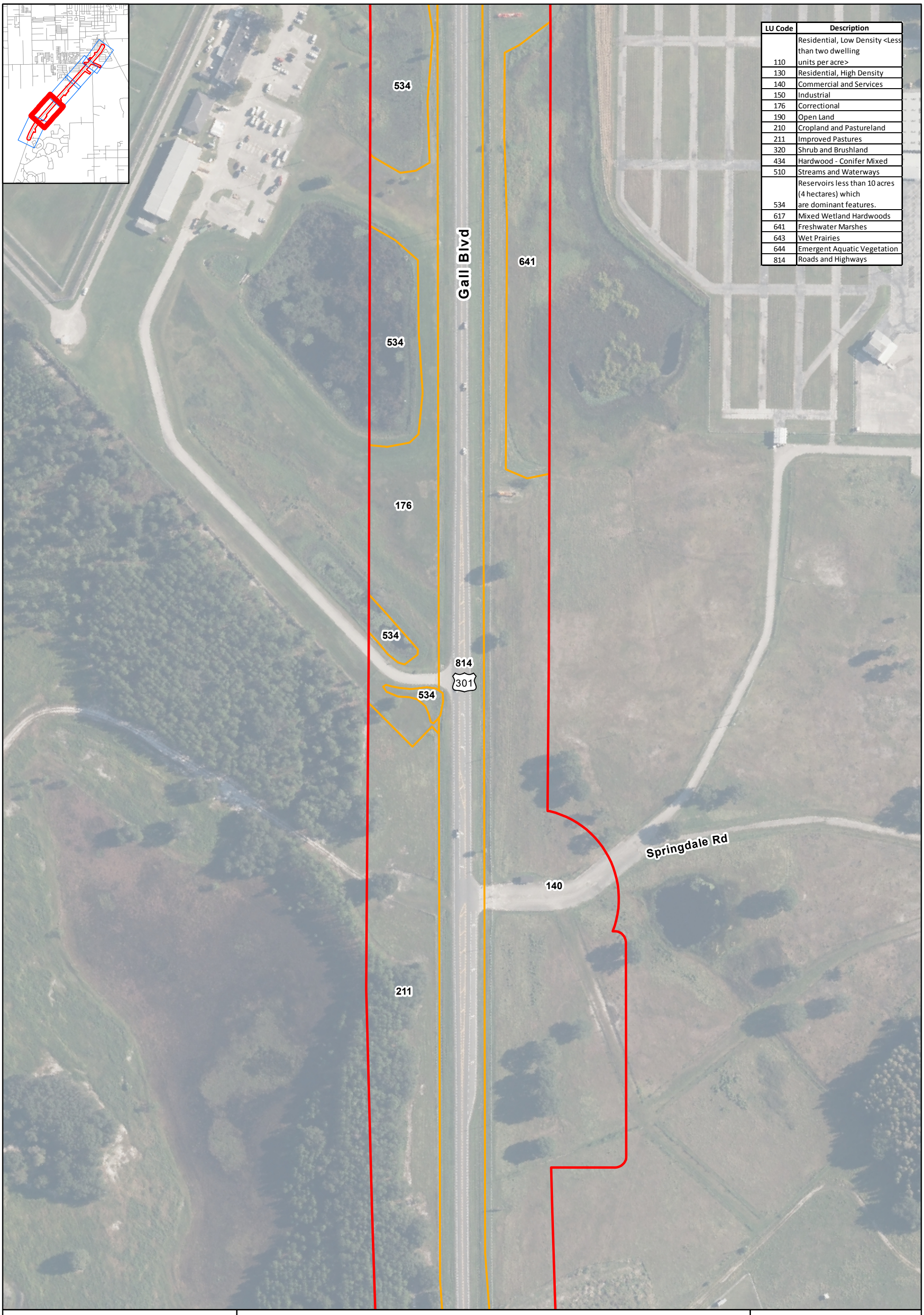
Land Use/ Vegetative Cover within the Project Study Area

Pasco County, FL

N

0 100 200

Feet



LU Code	Description
110	Residential, Low Density <Less than two dwelling units per acre>
130	Residential, High Density
140	Commercial and Services
150	Industrial
176	Correctional
190	Open Land
210	Cropland and Pastureland
211	Improved Pastures
320	Shrub and Brushland
434	Hardwood - Conifer Mixed
510	Streams and Waterways
534	Reservoirs less than 10 acres (4 hectares) which are dominant features.
617	Mixed Wetland Hardwoods
641	Freshwater Marshes
643	Wet Prairies
644	Emergent Aquatic Vegetation
814	Roads and Highways

Legend

- Project Study Area
- Land Use/ Vegetative Cover

Source:
Aerials- FDOT, 2014
Land Use- URS, 2014

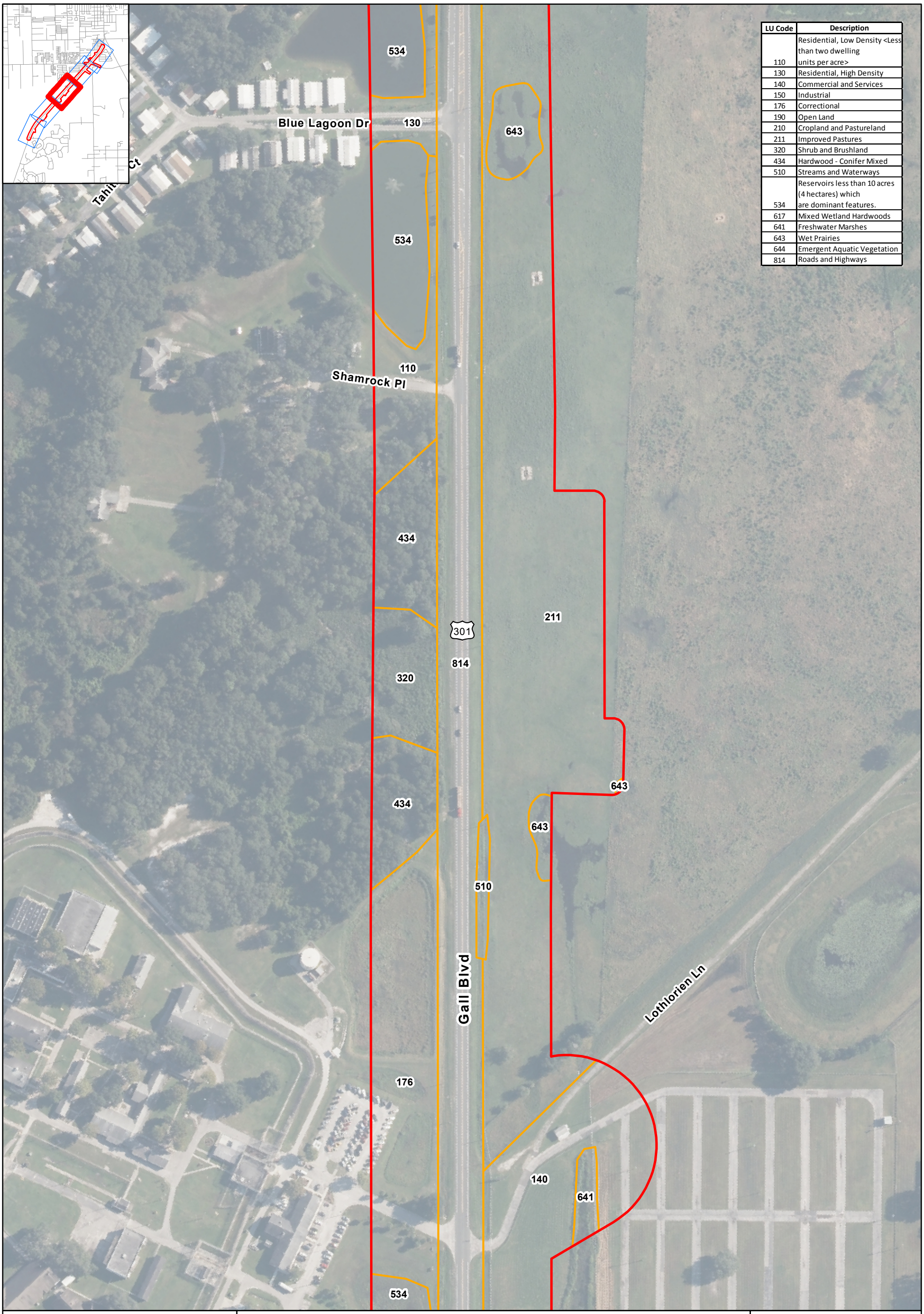
US 301 PD&E

Land Use/ Vegetative Cover within the Project Study Area

Pasco County, FL

N

0 100 200
Feet



LU Code	Description
110	Residential, Low Density <Less than two dwelling units per acre>
130	Residential, High Density
140	Commercial and Services
150	Industrial
176	Correctional
190	Open Land
210	Cropland and Pastureland
211	Improved Pastures
320	Shrub and Brushland
434	Hardwood - Conifer Mixed
510	Streams and Waterways
534	Reservoirs less than 10 acres (4 hectares) which are dominant features.
617	Mixed Wetland Hardwoods
641	Freshwater Marshes
643	Wet Prairies
644	Emergent Aquatic Vegetation
814	Roads and Highways

Legend

Project Study Area

Land Use/ Vegetative Cover

Source:
Aerials- FDOT, 2014
Land Use- URS, 2014

US 301 PD&E

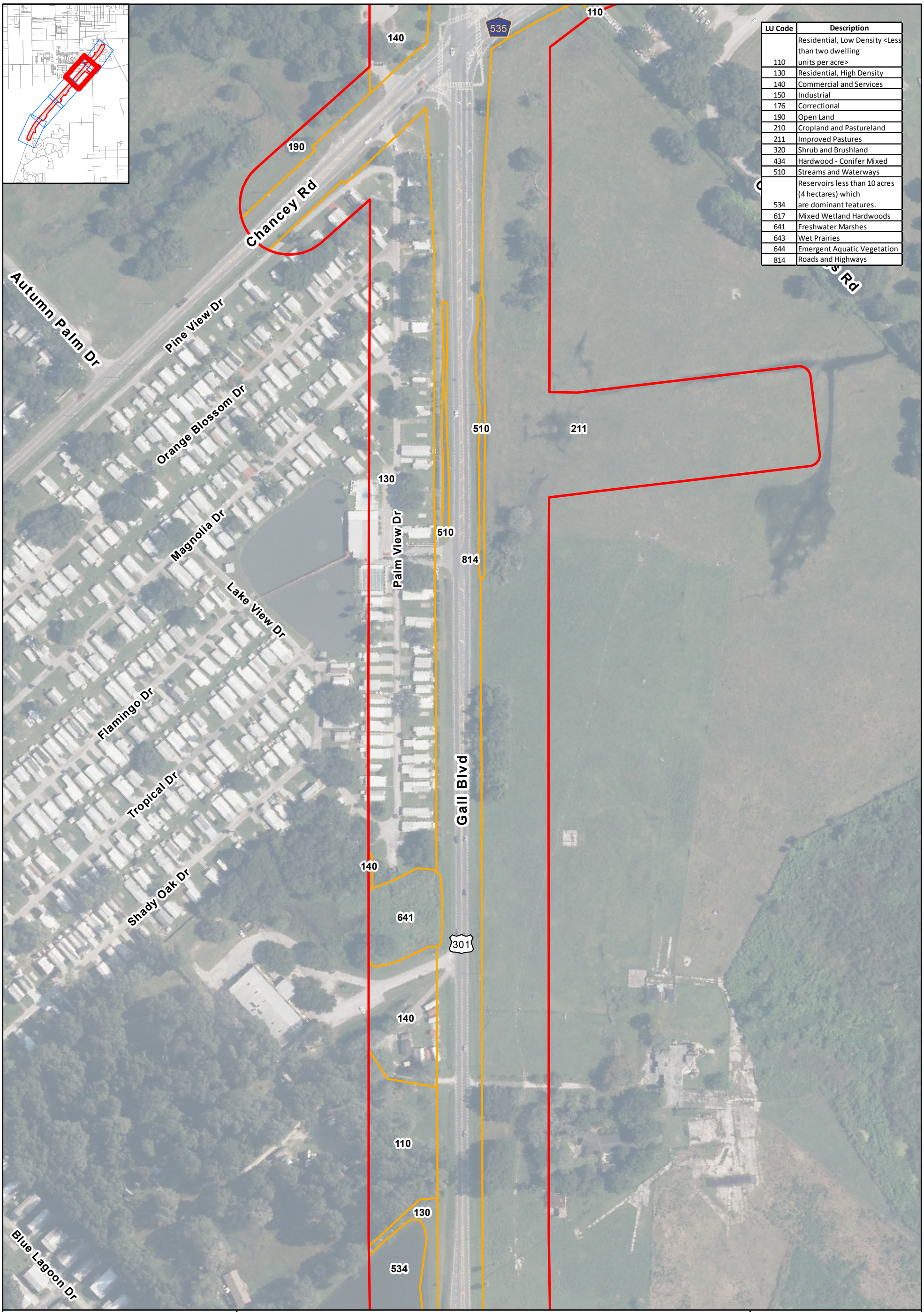
Land Use/ Vegetative Cover within the Project Study Area

Pasco County, FL

N

0 100 200

Feet



LU Code	Description
110	Residential, Low Density <Less than two dwelling units per acre>
130	Residential, High Density
140	Commercial and Services
150	Industrial
176	Correctional
190	Open Land
210	Cropland and Pastureland
211	Improved Pastures
320	Shrub and Brushland
434	Hardwood - Conifer Mixed
510	Streams and Waterways
534	Reservoirs less than 10 acres (4 hectares) which are dominant features.
617	Mixed Wetland Hardwoods
641	Freshwater Marshes
643	Wet Prairies
644	Emergent Aquatic Vegetation
814	Roads and Highways

Legend

Project Study Area

Land Use/ Vegetative Cover

Source:
Aerials- FDOT, 2014
Land Use- URS, 2014

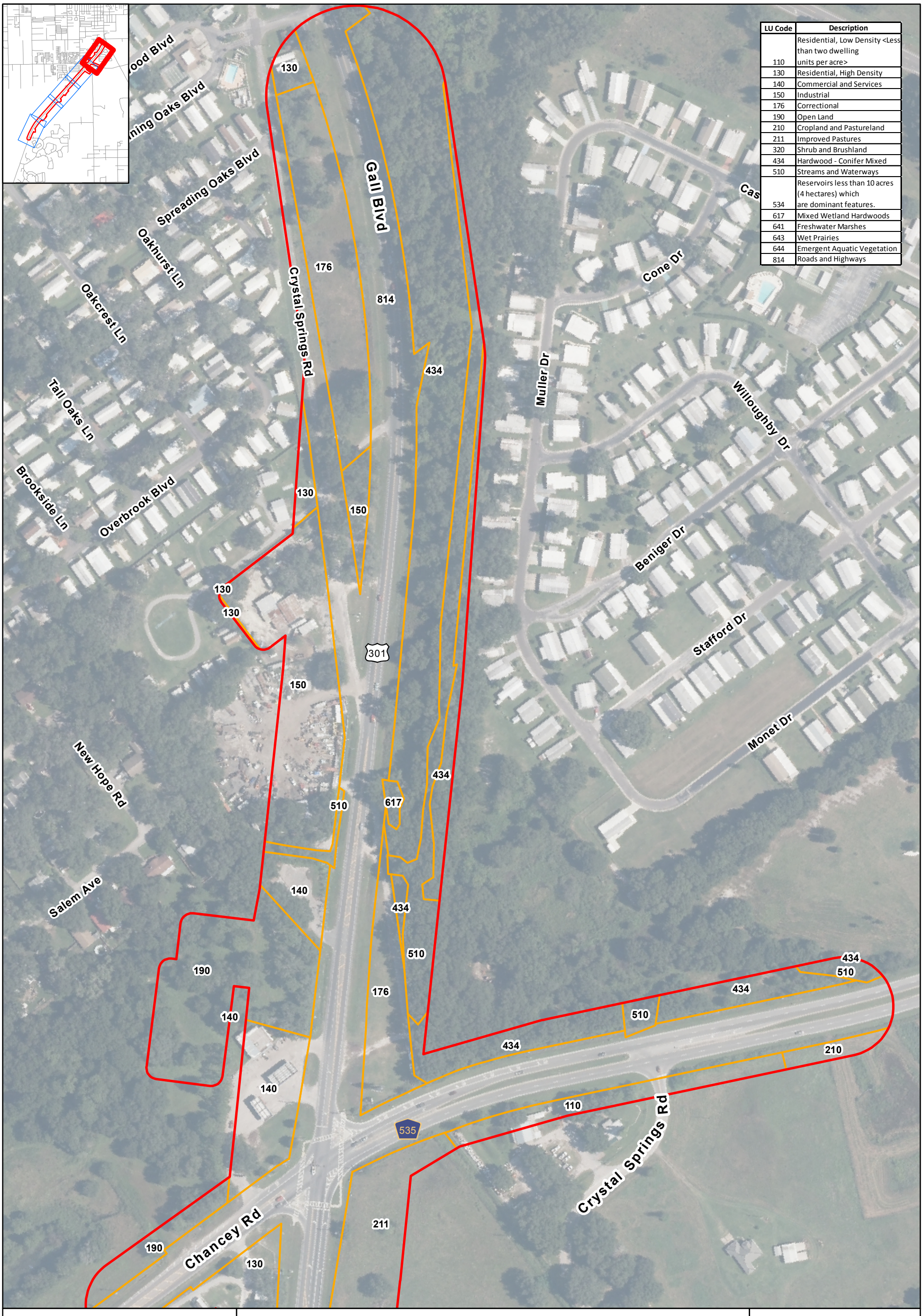
US 301 PD&E

Land Use/ Vegetative Cover within the Project Study Area

Pasco County, FL

N

0 100 200 Feet



LU Code	Description
110	Residential, Low Density <Less than two dwelling units per acre>
130	Residential, High Density
140	Commercial and Services
150	Industrial
176	Correctional
190	Open Land
210	Cropland and Pastureland
211	Improved Pastures
320	Shrub and Brushland
434	Hardwood - Conifer Mixed
510	Streams and Waterways
534	Reservoirs less than 10 acres (4 hectares) which are dominant features.
617	Mixed Wetland Hardwoods
641	Freshwater Marshes
643	Wet Prairies
644	Emergent Aquatic Vegetation
814	Roads and Highways

Legend

- Project Study Area
- Land Use/ Vegetative Cover

Source:
Aerials- FDOT, 2014
Land Use- URS, 2014

US 301 PD&E

Land Use/ Vegetative Cover within the Project Study Area

Pasco County, FL

N

0 100 200 Feet

APPENDIX C

FEMA Flood Plain Maps and Flood Plain Impact Maps

JOINS PANEL 0454

U.S. 301 (Gall Blvd)

BEGIN PROJECT STA. 252+65.72

AL6447

AL8168

272621

342621

Pasco County Unincorporated Areas 120230

Upper Hillsborough Watershed

ZONE A

YUKON DR
QUACHITA DR
DEER LN
TANANA DR
SABAL WAY
ARTIC RED CIR
SYCAN DR
RAPID RIVER BLVD
ESCALANTE WAY
GENESSEE CIR
AUCILLA WAY
SNAKE RIVER DR
CANISTEO CT
QUINN CT
BRAZOS WAY
JULINGTON CT
ARKANSAS LN
GUNNISON DR
GALL BLVD
KLAMATH CT
KICKING HORSE CT
KAZAZ CT
ROARING RD
ALLAGASH RD
ALLAGASH CT
RIO GRANDE DR
LOSTINE RD

e Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

FIRM PANEL 1 OF 4

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0462F

FIRM

FLOOD INSURANCE RATE MAP

PASCO COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 462 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PASCO COUNTY	120230	0462	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12101C0462F

EFFECTIVE DATE SEPTEMBER 26, 2014

Federal Emergency Management Agency

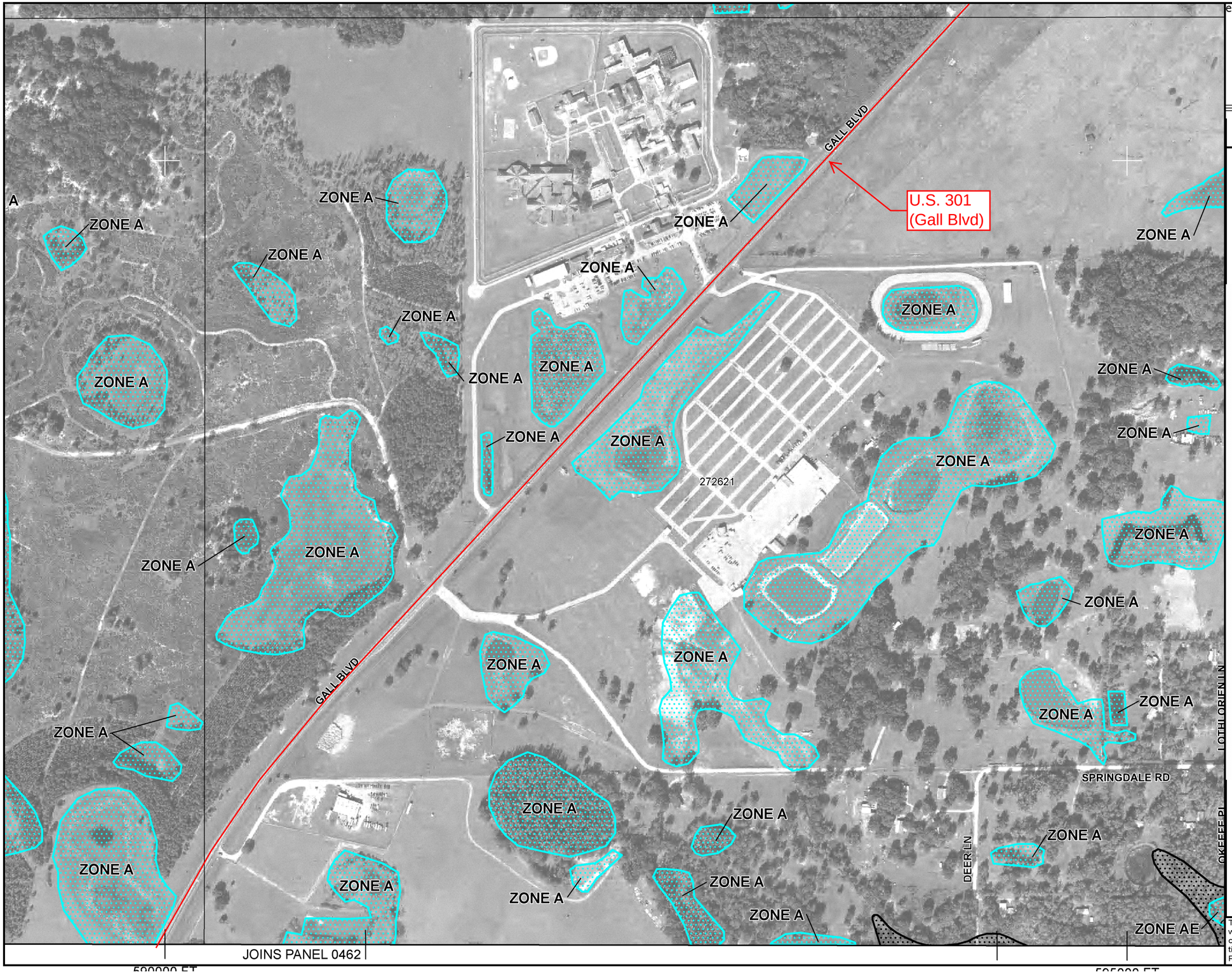
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

e Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

FIRM PANEL 2 OF 4



NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0454F

FIRM

FLOOD INSURANCE RATE MAP

PASCO COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 454 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

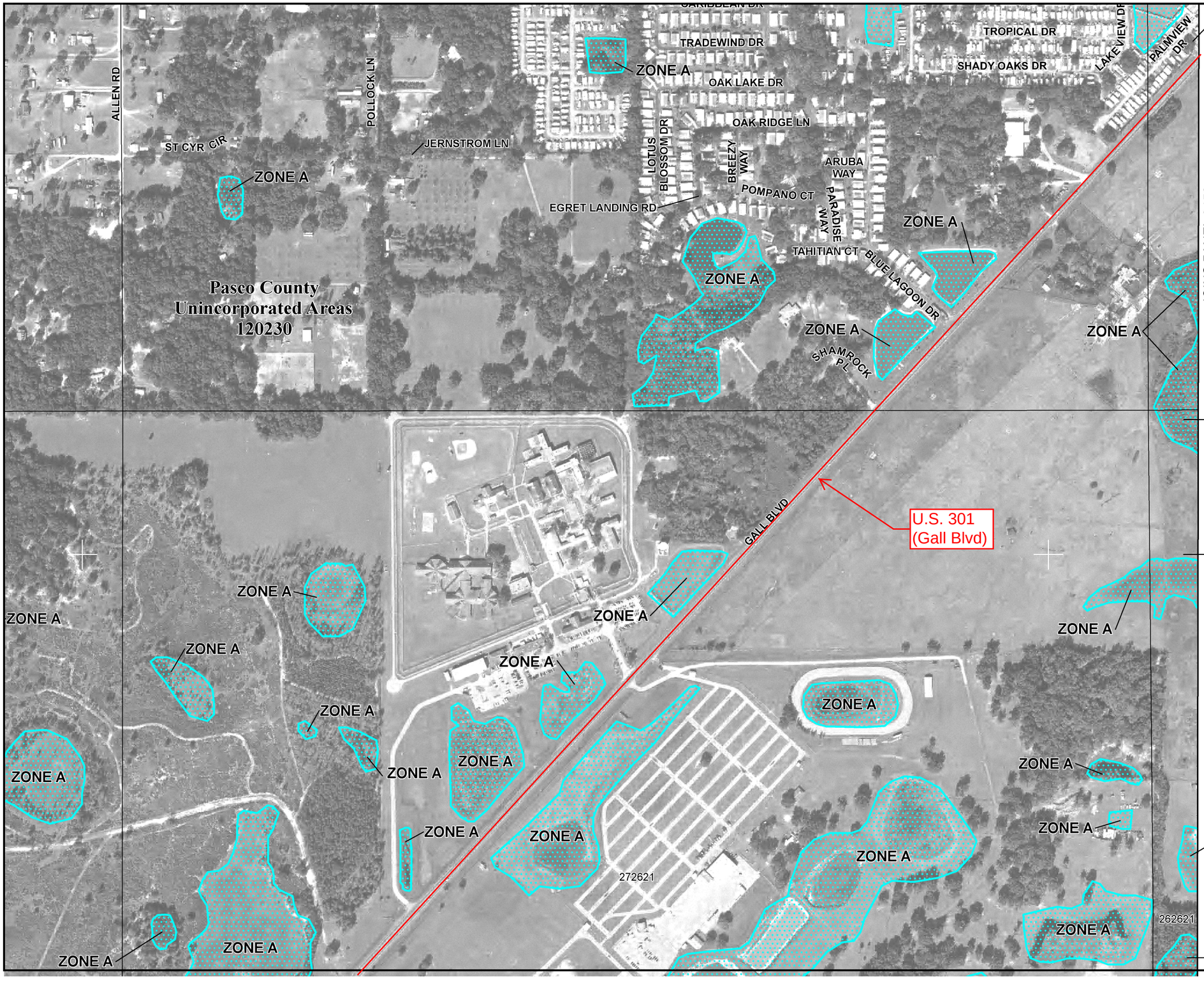
COMMUNITY	NUMBER	PANEL	SUFFIX
PASCO COUNTY	120230	0454	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12101C0454F

EFFECTIVE DATE
SEPTEMBER 26, 2014

Federal Emergency Management Agency



e Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

FIRM PANEL 3 OF 4

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0454F

FIRM

FLOOD INSURANCE RATE MAP

PASCO COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 454 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PASCO COUNTY	120230	0454	F

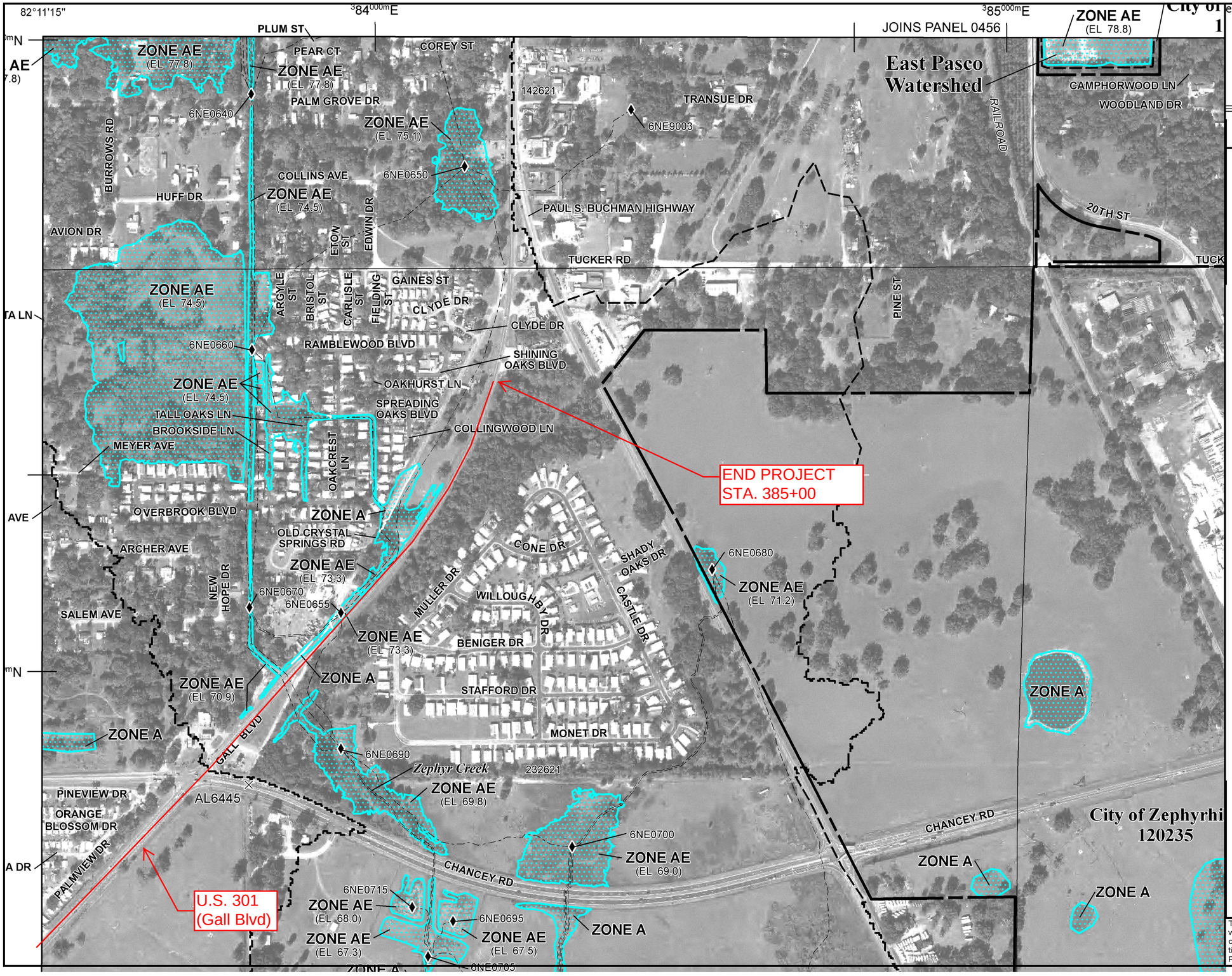
Notice to User: The **Map Number** shown below should be used when placing map orders, the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12101C0454F

EFFECTIVE DATE
SEPTEMBER 26, 2014

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



e Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

FIRM PANEL 4 OF 4

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0458F

FIRM

FLOOD INSURANCE RATE MAP

PASCO COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 458 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PASCO COUNTY	120230	0458	F
ZEPHYRHILLS, CITY OF	120235	0458	F

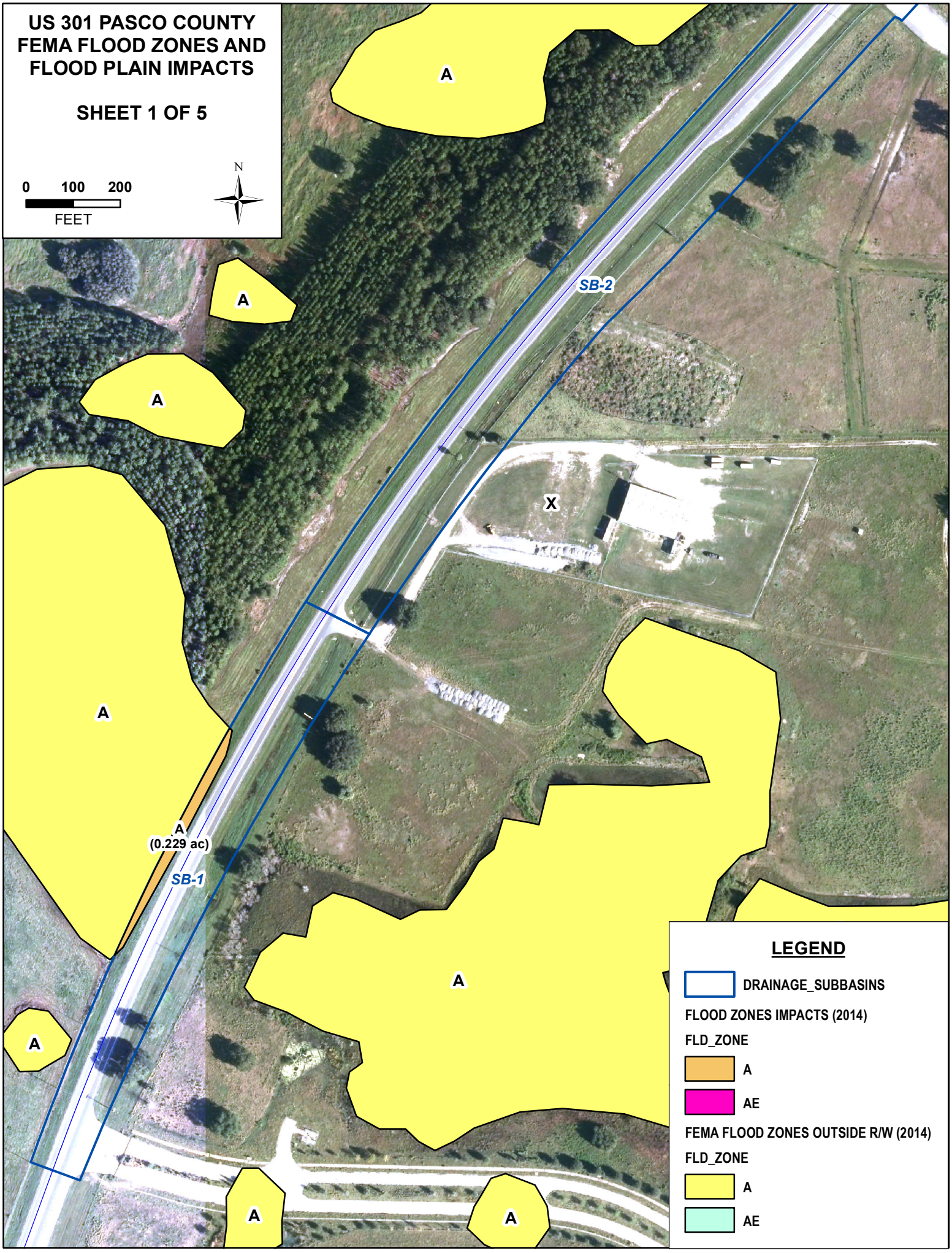
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12101C0458F

EFFECTIVE DATE
SEPTEMBER 26, 2014

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

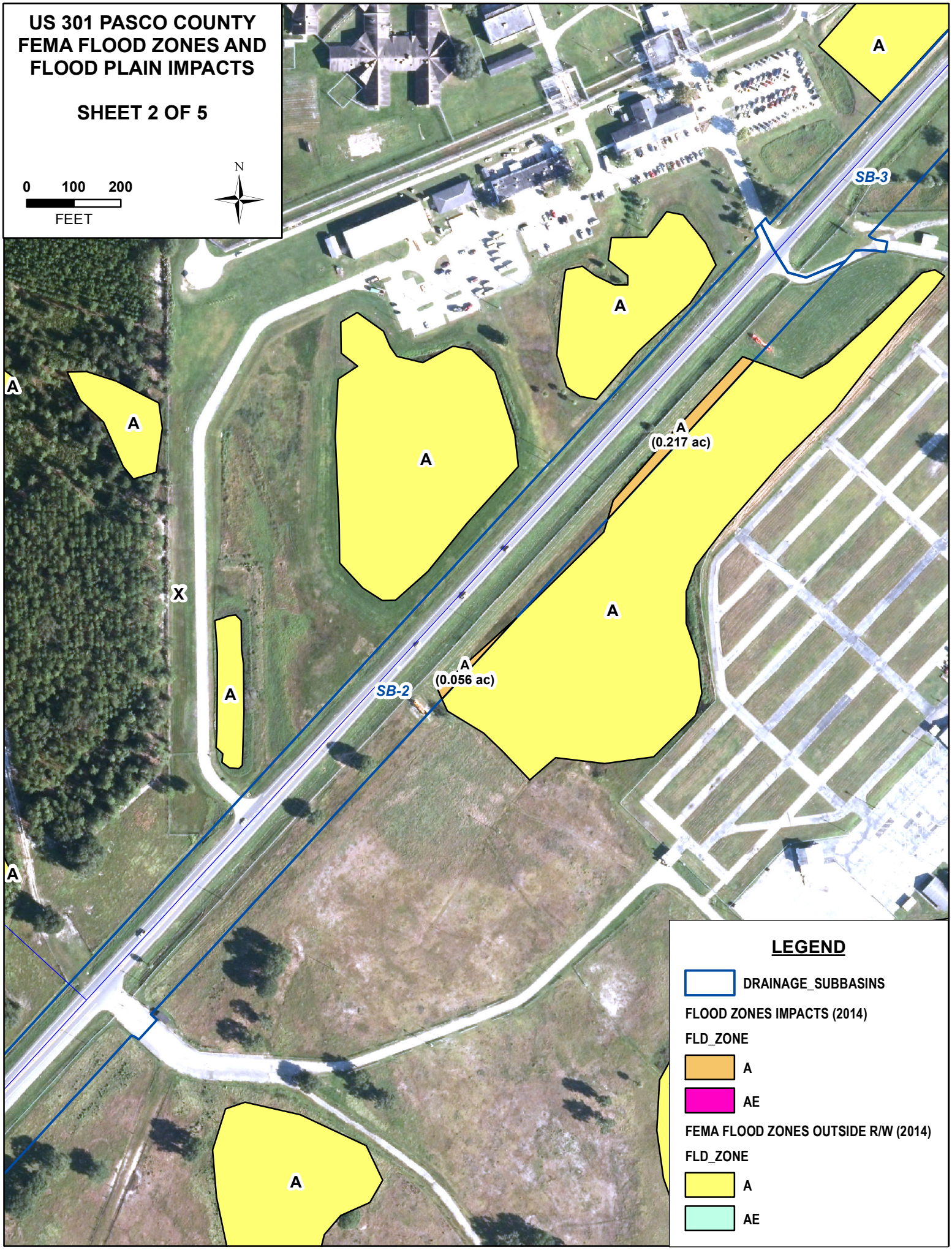

US 301 PASCO COUNTY
FEMA FLOOD ZONES AND
FLOOD PLAIN IMPACTS
SHEET 1 OF 5
0 100 200
FEET
N
A
A
A
A
A
A
A
A
A
X
A
(0.229 ac)
SB-1
SB-2
LEGEND
DRAINAGE_SUBBASINS
FLOOD ZONES IMPACTS (2014)
FLD_ZONE
A
AE
FEMA FLOOD ZONES OUTSIDE R/W (2014)
FLD_ZONE
A
AE

US 301 PASCO COUNTY FEMA FLOOD ZONES AND FLOOD PLAIN IMPACTS

SHEET 2 OF 5

0 100 200
FEET

N



LEGEND

DRAINAGE_SUBBASINS

FLOOD ZONES IMPACTS (2014)

FLD_ZONE

A

AE

FEMA FLOOD ZONES OUTSIDE R/W (2014)

FLD_ZONE

A

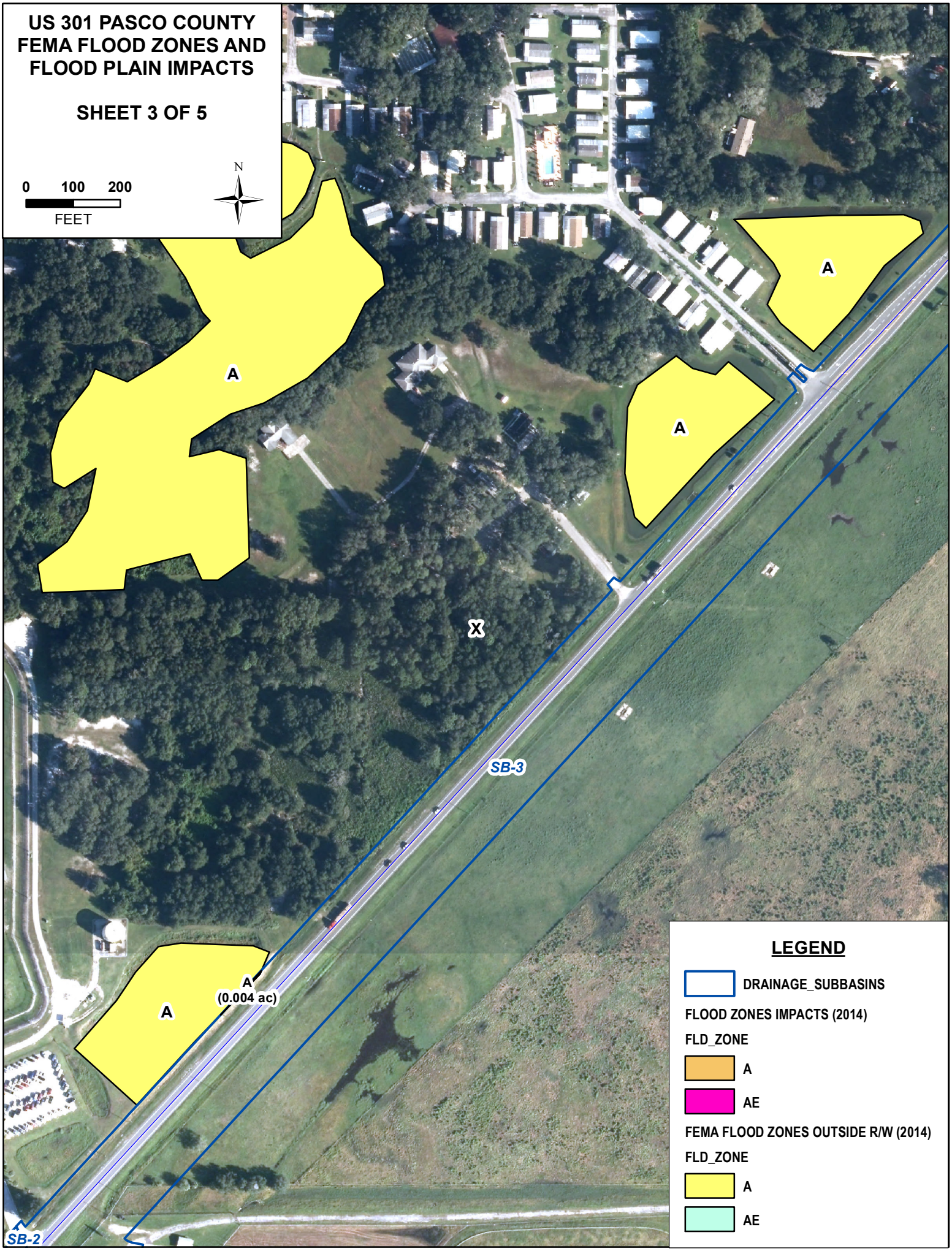
AE

US 301 PASCO COUNTY FEMA FLOOD ZONES AND FLOOD PLAIN IMPACTS

SHEET 3 OF 5

0 100 200
FEET

N



LEGEND

DRAINAGE_SUBBASINS

FLOOD ZONES IMPACTS (2014)

FLD_ZONE

A

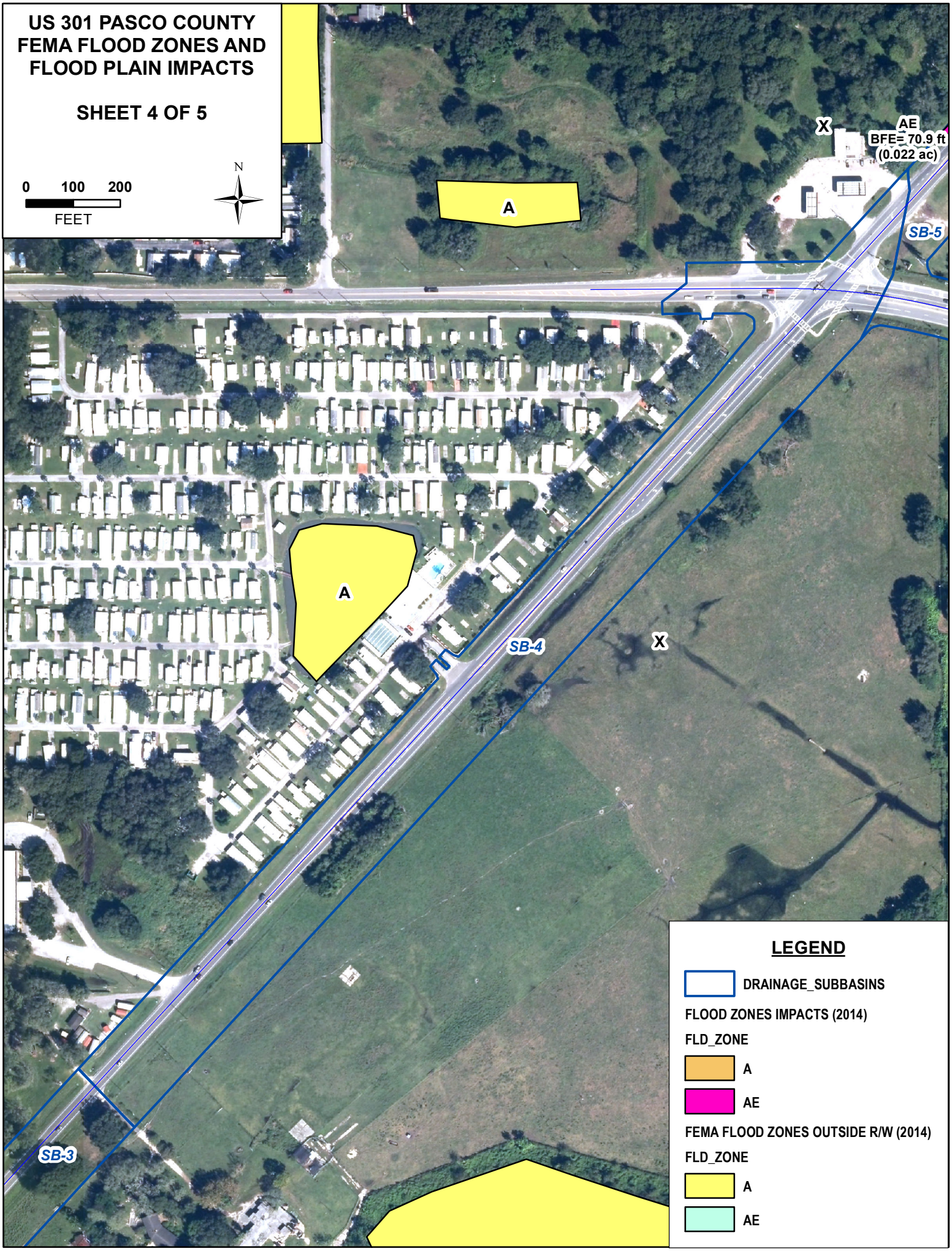
AE

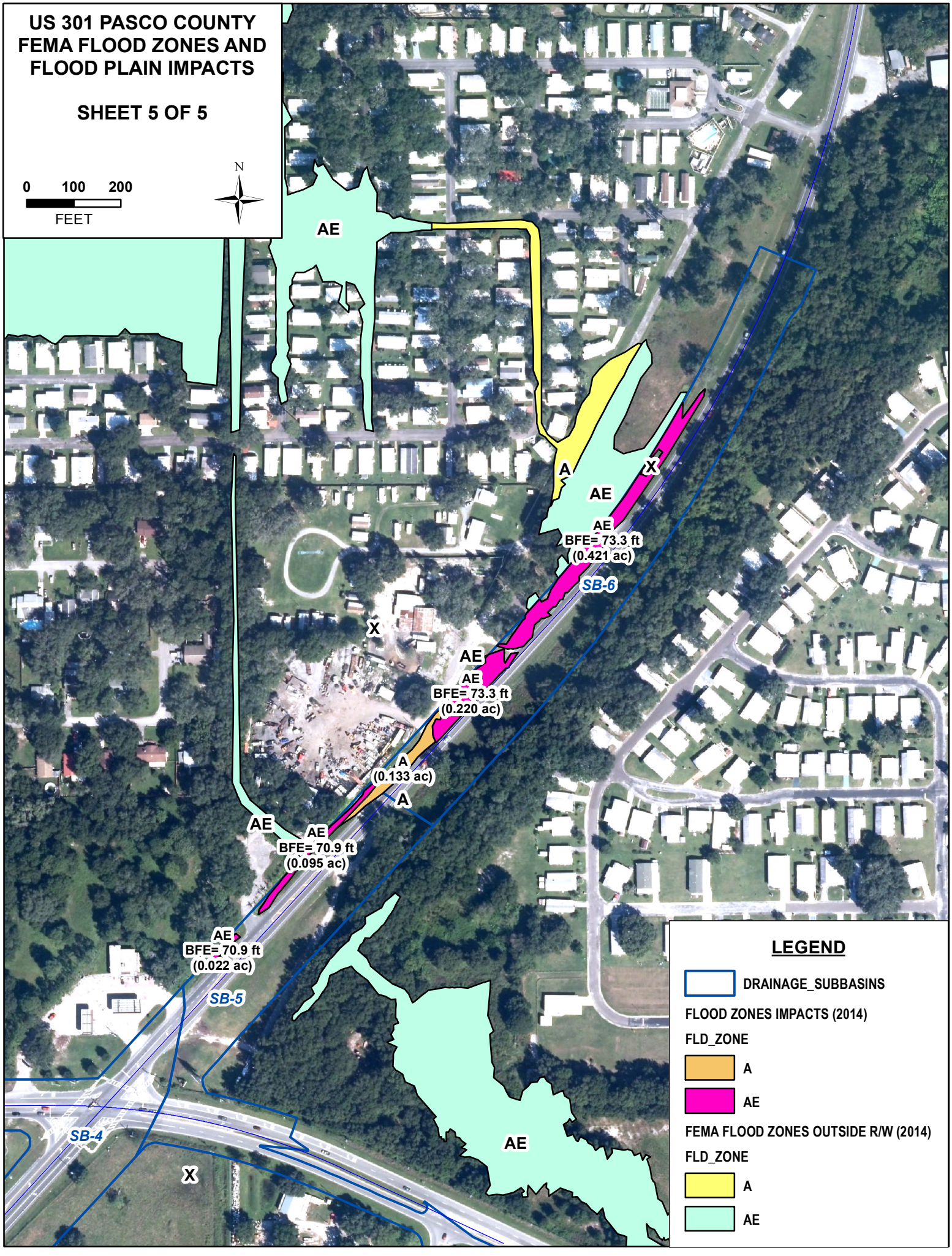
FEMA FLOOD ZONES OUTSIDE R/W (2014)

FLD_ZONE

A

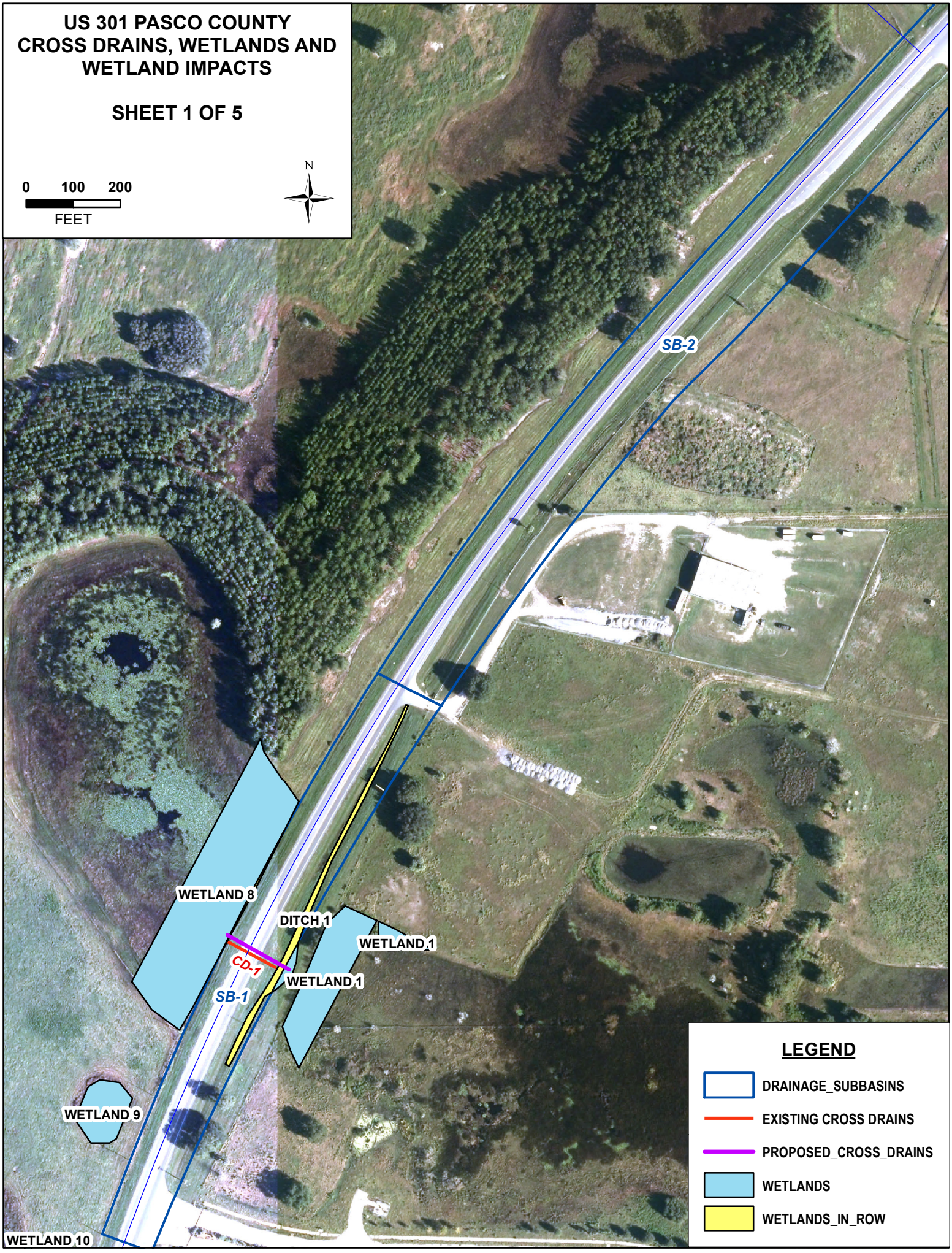
AE

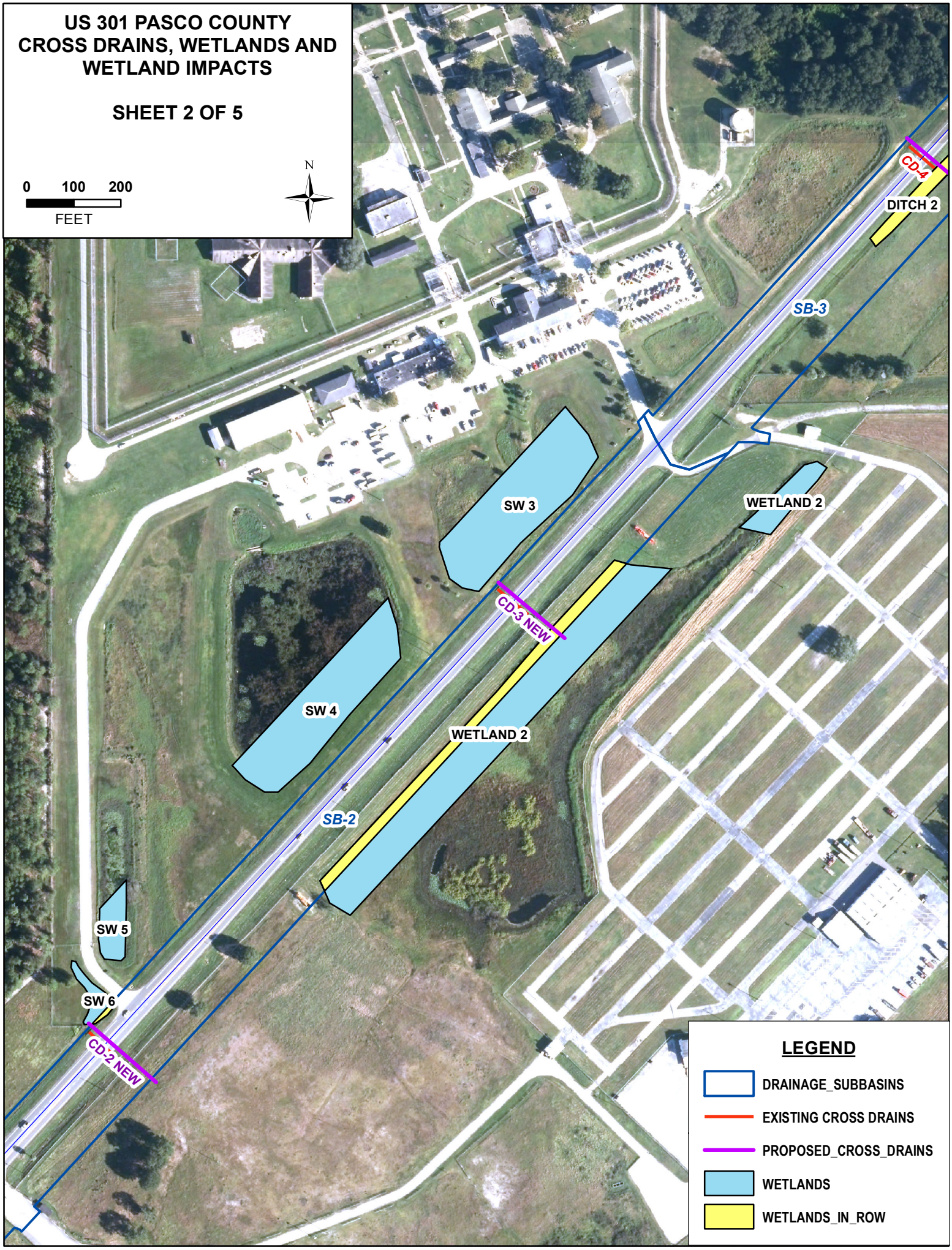

US 301 PASCO COUNTY
FEMA FLOOD ZONES AND
FLOOD PLAIN IMPACTS
SHEET 4 OF 5
0 100 200
FEET
N
A
X
AE
BFE= 70.9 ft
(0.022 ac)
SB-5
A
SB-4
X
SB-3
LEGEND
DRAINAGE_SUBBASINS
FLOOD ZONES IMPACTS (2014)
FLD_ZONE
A
AE
FEMA FLOOD ZONES OUTSIDE R/W (2014)
FLD_ZONE
A
AE


US 301 PASCO COUNTY
FEMA FLOOD ZONES AND
FLOOD PLAIN IMPACTS
SHEET 5 OF 5
0
100
200
FEET
N
AE
A
X
AE
AE
BFE= 73.3 ft
(0.421 ac)
SB-6
X
AE
AE
BFE= 73.3 ft
(0.220 ac)
A
(0.133 ac)
A
AE
AE
BFE= 70.9 ft
(0.095 ac)
AE
BFE= 70.9 ft
(0.022 ac)
SB-5
SB-4
X
AE
LEGEND
DRAINAGE_SUBBASINS
FLOOD ZONES IMPACTS (2014)
FLD_ZONE
A
AE
FEMA FLOOD ZONES OUTSIDE R/W (2014)
FLD_ZONE
A
AE

APPENDIX D

Project Plan Sheets


US 301 PASCO COUNTY
CROSS DRAINS, WETLANDS AND
WETLAND IMPACTS
SHEET 1 OF 5
0
100
200
FEET
N
SB-2
WETLAND 8
DITCH 1
WETLAND 1
CD-1
WETLAND 1
SB-1
WETLAND 9
WETLAND 10
LEGEND
DRAINAGE_SUBBASINS
EXISTING CROSS DRAINS
PROPOSED_CROSS_DRAINS
WETLANDS
WETLANDS_IN_ROW


US 301 PASCO COUNTY
CROSS DRAINS, WETLANDS AND
WETLAND IMPACTS
SHEET 2 OF 5
0 100 200
FEET
N
CD-4
DITCH 2
SB-3
SW 3
WETLAND 2
CD-3 NEW
SW 4
WETLAND 2
SB-2
SW 5
SW 6
CD-2 NEW
LEGEND
DRAINAGE_SUBBASINS
EXISTING CROSS DRAINS
PROPOSED_CROSS_DRAINS
WETLANDS
WETLANDS_IN_ROW

US 301 PASCO COUNTY CROSS DRAINS, WETLANDS AND WETLAND IMPACTS

SHEET 3 OF 5

0 100 200
FEET

N

LEGEND

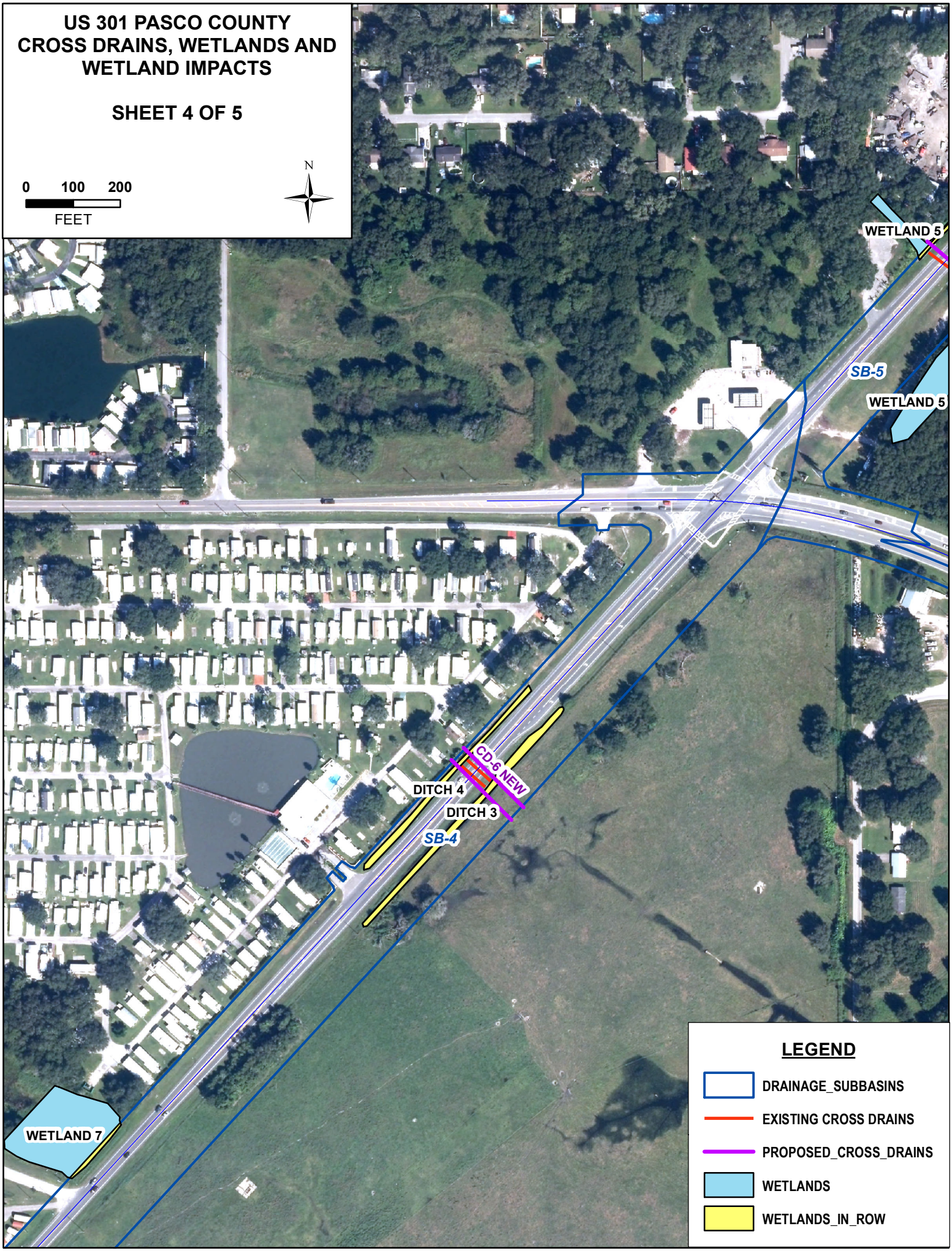
- DRAINAGE_SUBBASINS
- EXISTING CROSS DRAINS
- PROPOSED_CROSS_DRAINS
- WETLANDS
- WETLANDS_IN_ROW

US 301 PASCO COUNTY CROSS DRAINS, WETLANDS AND WETLAND IMPACTS

SHEET 4 OF 5

0 100 200
FEET

N

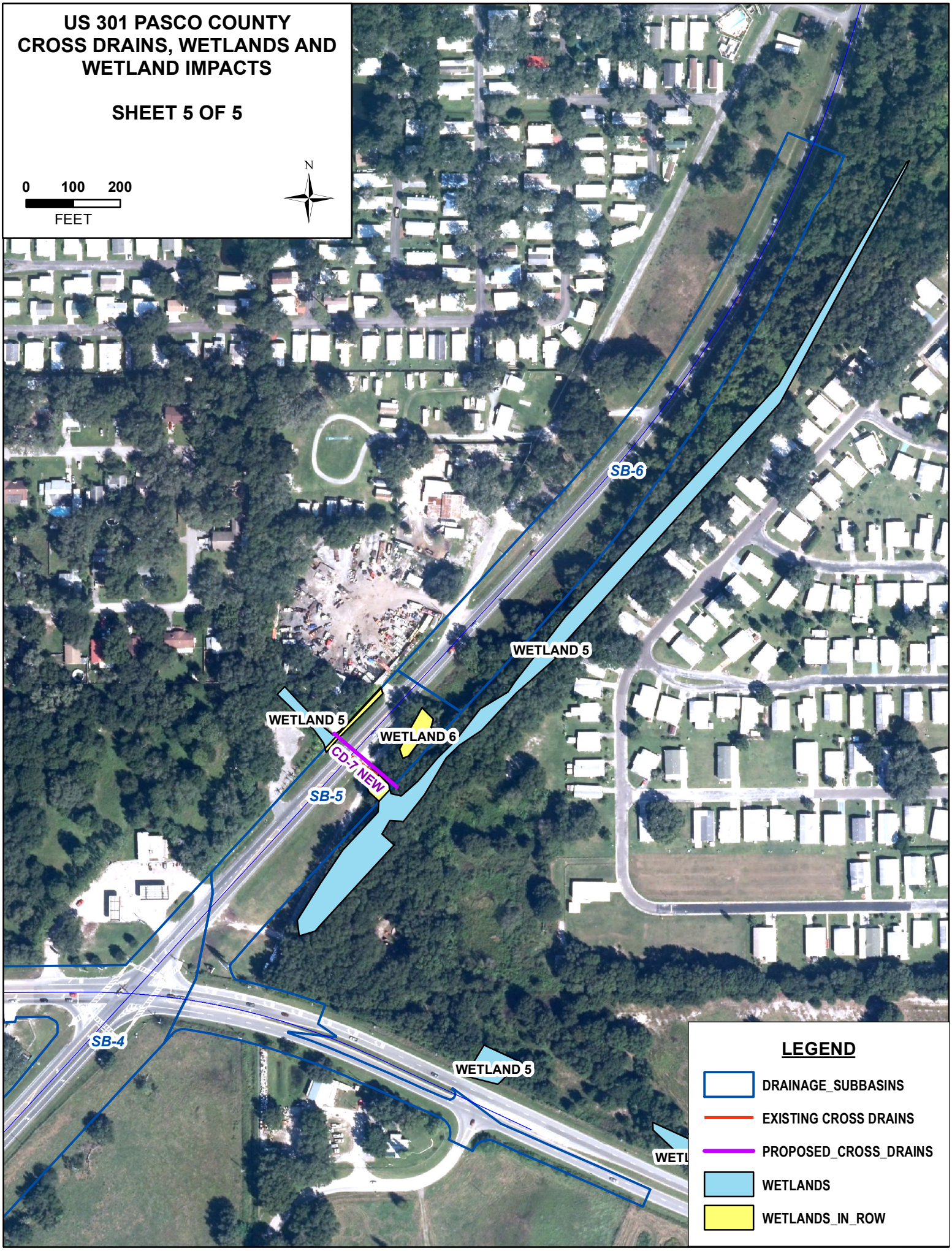


US 301 PASCO COUNTY CROSS DRAINS, WETLANDS AND WETLAND IMPACTS

SHEET 5 OF 5

0 100 200
FEET

N



LEGEND

- DRAINAGE_SUBBASINS
- EXISTING CROSS DRAINS
- PROPOSED_CROSS_DRAINS
- WETLANDS
- WETLANDS_IN_ROW

APPENDIX E

Drainage Calculations

SUB-BASIN SUMMARY AND CN VALUES
US 301 PD&E STUDY, FROM SR 56 (PROPOSED) TO SR 39 (BUCHMAN HIGHWAY)
ZEPHYRHILLS, PASCO COUNTY, FLORIDA

		PRE-DEVELOPMENT			POST-DEVELOPMENT		
SUB-BASIN	TOTAL AREA (ac)	IMPERVIOUS AREA (ac)	PERVIOUS AREA (ac)	CN	IMPERVIOUS AREA (ac)	PERVIOUS AREA (ac)	CN
SB-1	4.05	1.54	2.51	56.00	4.05	0.00	98.00
SB-2	15.13	3.66	11.47	84.00	15.13	0.00	98.00
SB-3	12.79	2.79	10.00	84.00	12.79	0.00	98.00
SB-4	10.73	3.30	7.43	39.00	10.73	0.00	98.00
SB-5	4.01	1.63	2.38	50.67	4.01	0.00	98.00
SB-6	4.58	1.20	3.38	56.39	4.58	0.00	98.00

URS

Project:	U.S. 301 - Zephyrhills PD&E Study	Sheet	1	of	6
Subject:	REVISED NRCS Method Runoff Calculations	Computed By:	RJD	Date:	8/13/2015
Project No:	12011209.00002	Checked By:		Date:	

SUB-BASIN 1

LAND AREA	PRE-DEV ACRES	POST-DEV ACRES
IMPERVIOUS	1.54	4.05
PERVIOUS	2.51	0.00
TOTAL	4.05	4.05

CURVE NUMBERS

PRE-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	A	98	0.89	87.22
		A/D	98	0.65	63.70
Pervious	Open space, fair cond	A	49	1.34	65.66
		A/D	84	0.97	81.48
Water	Water surface/ditch	A	100	0.10	10.00
		A/D	100	0.10	10.00
			TOTALS	4.05	318.06
				WEIGHTED CN	**78.53**

POST-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	A	98	2.35	230.30
		A/D	98	1.70	166.60
			TOTALS	4.05	396.90
				WEIGHTED CN	**98.00**

PRE-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 4.05 ac

Weighted CN = 78.53

$S = (1000/CN)-10$

$= 2.733$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 5.919$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 2.00$ ac-ft

NRCS Runoff Attenuation Volume = 2.00 ac-ft

POST-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 4.05 ac

Weighted CN = 98.00

$S = (1000/CN)-10$

$= 0.204$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 8.260$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 2.79$ ac-ft

NRCS Runoff Attenuation Volume = 2.79 ac-ft

Water Quality Treatment Volume

Water Quality Volume, first one inch of rainfall (V_1) = 0.34 ac-ft

---

Total (Pre-Dev)-(Post-Dev) Sub-Basin Runoff Attenuation Volume = 0.79 ac-ft

= 34414.56 ft^3

Total Sub-Basin Water Quality Treatment Storage Volume = 0.34 ac-ft

= 14701.50 ft^3

TOTAL REQUIRED STORAGE VOLUME = 1.13 ac-ft

URS

Project:	U.S. 301 - Zephyrhills PD&E Study	Sheet	2	of	6
Subject:	REVISED NRCS Method Runoff Calculations	Computed By:	RJD	Date:	8/13/2015
Project No:	12011209.00002	Checked By:		Date:	

SUB-BASIN 2

LAND AREA	PRE-DEV ACRES	POST-DEV ACRES
IMPERVIOUS	3.66	15.13
PERVIOUS	11.47	0.00
TOTAL	15.13	15.13

CURVE NUMBERS

PRE-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	3.66	358.68
Pervious	Open space, fair cond	A	49	3.90	191.10
		A/D	84	2.75	231.00
		B/D	84	4.82	404.88
Water	Water surface/ditch	---	100	0.00	0.00
			TOTALS	15.13	1185.66
			WEIGHTED CN		**78.36**

POST-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	15.13	1482.74
			TOTALS	15.13	1482.74
			WEIGHTED CN		**98.00**

PRE-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 15.13 ac

Weighted CN = 78.36

$S = (1000/CN)-10$

$= 2.761$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 5.899$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 7.44$ ac-ft

NRCS Runoff Attenuation Volume = 7.44 ac-ft

POST-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 15.13 ac

Weighted CN = 98.00

$S = (1000/CN)-10$

$= 0.204$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 8.260$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 10.41$ ac-ft

NRCS Runoff Attenuation Volume = 10.41 ac-ft

Water Quality Treatment Volume

Water Quality Volume, first one inch of rainfall (V_1) = 1.26 ac-ft

---

Total (Pre-Dev)-(Post-Dev) Sub-Basin Runoff Attenuation Volume = 2.98 ac-ft

= 129677.47 ft^3

Total Sub-Basin Water Quality Treatment Storage Volume = 1.26 ac-ft

= 54921.90 ft^3

TOTAL REQUIRED STORAGE VOLUME = 4.24 ac-ft

URS

Project:	U.S. 301 - Zephyrhills PD&E Study	Sheet	3	of	6
Subject:	REVISED NRCS Method Runoff Calculations	Computed By:	RJD	Date:	8/13/2015
Project No:	12011209.00002	Checked By:		Date:	

SUB-BASIN 3

LAND AREA	PRE-DEV ACRES	POST-DEV ACRES
IMPERVIOUS	2.79	12.79
PERVIOUS	10.00	0.00
TOTAL	12.79	12.79

CURVE NUMBERS

PRE-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	2.79	273.42
Pervious	Open space, fair cond	A	49	0.90	44.10
		B	69	1.20	82.80
		B/D	84	4.80	403.20
		C/D	84	2.92	245.28
Water	Water surface/ditch	---	100	0.18	18.00
			TOTALS	12.79	1066.80
			WEIGHTED CN		**83.41**

POST-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	12.79	1253.42
			TOTALS	12.79	1253.42
			WEIGHTED CN		**98.00**

PRE-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 12.79 ac

Weighted CN = 83.41

$S = (1000/CN)-10$

$= 1.989$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 6.505$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 6.93$ ac-ft

NRCS Runoff Attenuation Volume = 6.93 ac-ft

POST-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 12.79 ac

Weighted CN = 98.00

$S = (1000/CN)-10$

$= 0.204$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 8.260$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 8.80$ ac-ft

NRCS Runoff Attenuation Volume = 8.80 ac-ft

Water Quality Treatment Volume

Water Quality Volume, first one inch of rainfall (V_1) = 1.07 ac-ft

---

Total (Pre-Dev)-(Post-Dev) Sub-Basin Runoff Attenuation Volume = 1.87 ac-ft

= 81470.34 ft^3

Total Sub-Basin Water Quality Treatment Storage Volume = 1.07 ac-ft

= 46427.70 ft^3

TOTAL REQUIRED STORAGE VOLUME = 2.94 ac-ft

URS

Project:	U.S. 301 - Zephyrhills PD&E Study	Sheet	4	of	6
Subject:	REVISED NRCS Method Runoff Calculations	Computed By:	RJD	Date:	8/13/2015
Project No:	12011209.00002	Checked By:		Date:	

SUB-BASIN 4

LAND AREA	PRE-DEV ACRES	POST-DEV ACRES
IMPERVIOUS	3.39	10.51
PERVIOUS	7.12	0.00
TOTAL	10.51	10.51

CURVE NUMBERS

PRE-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	3.39	332.22
Pervious	Open space, fair cond	A	49	5.48	268.52
		B/D	84	1.63	136.92
		C/D	84	0.01	0.84
Water	Water surface/ditch	---	100	0.00	0.00
			TOTALS	10.51	738.50
			WEIGHTED CN		**70.27**

POST-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	10.51	1029.98
			TOTALS	10.51	1029.98
			WEIGHTED CN		**98.00**

PRE-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 10.51 ac

Weighted CN = 70.27

$S = (1000/CN)-10$

$= 4.232$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 4.929$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 4.32$ ac-ft

NRCS Runoff Attenuation Volume = 4.32 ac-ft

POST-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 10.51 ac

Weighted CN = 98.00

$S = (1000/CN)-10$

$= 0.204$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 8.260$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 7.23$ ac-ft

NRCS Runoff Attenuation Volume = 7.23 ac-ft

Water Quality Treatment Volume

Water Quality Volume, first one inch of rainfall (V_1) = 0.88 ac-ft

---

Total (Pre-Dev)-(Post-Dev) Sub-Basin Runoff Attenuation Volume = 2.92 ac-ft

= 127089.38 ft^3

Total Sub-Basin Water Quality Treatment Storage Volume = 0.88 ac-ft

= 38151.30 ft^3

TOTAL REQUIRED STORAGE VOLUME = 3.79 ac-ft

URS

Project:	U.S. 301 - Zephyrhills PD&E Study	Sheet	5	of	6
Subject:	REVISED NRCS Method Runoff Calculations	Computed By:	RJD	Date:	8/13/2015
Project No:	12011209.00002	Checked By:		Date:	

SUB-BASIN 5

LAND AREA	PRE-DEV ACRES	POST-DEV ACRES
IMPERVIOUS	1.54	4.23
PERVIOUS	2.69	0.00
TOTAL	4.23	4.23

CURVE NUMBERS

PRE-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	1.54	150.92
Pervious	Open space, fair cond	A/D	84	1.42	119.28
		B/D	84	1.20	100.80
Water	Water surface/ditch	---	100	0.07	7.00
			TOTALS	4.23	378.00
				WEIGHTED CN	**89.36**

POST-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	4.23	414.54
			TOTALS	4.23	414.54
				WEIGHTED CN	**98.00**

PRE-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 4.23 ac

Weighted CN = 89.36

$S = (1000/CN)-10$

$= 1.190$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 7.221$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 2.55$ ac-ft

NRCS Runoff Attenuation Volume = 2.55 ac-ft

POST-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 4.23 ac

Weighted CN = 98.00

$S = (1000/CN)-10$

$= 0.204$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 8.260$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 2.91$ ac-ft

NRCS Runoff Attenuation Volume = 2.91 ac-ft

Water Quality Treatment Volume

Water Quality Volume, first one inch of rainfall (V_1) = 0.35 ac-ft

---

Total (Pre-Dev)-(Post-Dev) Sub-Basin Runoff Attenuation Volume = 0.37 ac-ft

= 15946.79 ft^3

Total Sub-Basin Water Quality Treatment Storage Volume = 0.35 ac-ft

= 15354.90 ft^3

TOTAL REQUIRED STORAGE VOLUME = 0.72 ac-ft

URS

Project:	U.S. 301 - Zephyrhills PD&E Study	Sheet	6	of	6
Subject:	REVISED NRCS Method Runoff Calculations	Computed By:	RJD	Date:	8/13/2015
Project No:	12011209.00002	Checked By:		Date:	

SUB-BASIN 6

LAND AREA	PRE-DEV ACRES	POST-DEV ACRES
IMPERVIOUS	1.20	4.58
PERVIOUS	3.38	0.00
TOTAL	4.58	4.58

CURVE NUMBERS

PRE-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	1.20	117.60
Pervious	Open space, fair cond	A	49	3.21	157.29
		A/D	84	0.17	14.28
Water	Water surface/ditch	---	100	0.00	0.00
			TOTALS	4.58	289.17
				WEIGHTED CN	**63.14**

POST-DEVELOPMENT

USE	DESCRIPTION	SOIL GROUP	CN	AREA (ac)	CN x AREA
Impervious	Pavement, excluding R/W	---	98	4.58	448.84
			TOTALS	4.58	448.84
				WEIGHTED CN	**98.00**

PRE-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 4.58 ac

Weighted CN = 63.14

$S = (1000/CN)-10$

$= 5.838$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 4.082$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 1.56$ ac-ft

NRCS Runoff Attenuation Volume = 1.56 ac-ft

POST-DEVELOPMENT RUNOFF

Rainfall Event (from SWFWMD)

25-year, 24-hour rainfall depth (P) = 8.5 inches

NRCS Runoff Volume

Project Area = 4.58 ac

Weighted CN = 98.00

$S = (1000/CN)-10$

$= 0.204$ inches

25yr, 24 hr Runoff Depth (Q) = $(P-0.2S)^2 / (P+0.8S)$

$= 8.260$ inches

25-Year, 24-Hour Rainfall Volume for Project Area

$V = A * Q$

$= 3.15$ ac-ft

NRCS Runoff Attenuation Volume = 3.15 ac-ft

Water Quality Treatment Volume

Water Quality Volume, first one inch of rainfall (V_1) = 0.38 ac-ft

---

Total (Pre-Dev)-(Post-Dev) Sub-Basin Runoff Attenuation Volume = 1.59 ac-ft

= 69459.64 ft^3

Total Sub-Basin Water Quality Treatment Storage Volume = 0.38 ac-ft

= 16625.40 ft^3

TOTAL REQUIRED STORAGE VOLUME = 1.98 ac-ft