

FINAL PRELIMINARY STORMWATER MANAGEMENT FACILITY REPORT

**SR 50 (CORTEZ BOULEVARD)
PROJECT DEVELOPMENT AND ENVIRONMENT STUDY**

**SR 50 (Cortez Boulevard)
from Lockhart Road to US 301 (SR 35/Treiman Boulevard)
Hernando County, Florida**

**ETDM Project Number: 3391
Work Program Item Segment Number: 416732-2
Federal-Aid Project Number: TBD**



**Florida Department of Transportation
11201 North McKinley Drive
Tampa, Florida 33612**

January 2014

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Prepared for:



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January 2014

NOTE: CHANGE IN PROJECT TERMINI**JANUARY 2014**

The Florida Department of Transportation (FDOT), District Seven, conducted a Project Development and Environment (PD&E) Study to determine the engineering and environmental effects of the proposed improvement to State Road 50 (SR 50) [Cortez Boulevard] from Lockhart Road to US 301 (SR 35/Treiman Boulevard) in Hernando County, Florida. The Preferred Alternative involves widening SR 50 (Cortez Boulevard) from four to six lanes from west of I-75 to US 98 (SR 700/McKethan Road), and from two to four lanes from US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard).

Initially, there were no plans for federal funding of the project since it was developer-driven. The original project was to result in approval of a State Environmental Impact Report (SEIR) with study limits from Lockhart Road (west of I-75) to US 301 (SR 700/McKethan Road). However, the slowed economy has delayed the initiation of the planned developments, so developers will not be making roadway improvements. In addition, after the September 27, 2012 Public Hearing, the Hernando County Metropolitan Planning Organization (MPO) elevated this project in its list of priorities. As a result, FDOT is seeking approval from the Federal Highway Administration in order to qualify the project for federal funding. Therefore, in order to maintain logical termini, the western project limit was revised from Lockhart Road to west of I-75.

The portion of SR 50 (Cortez Boulevard) in the area of the I-75 interchange (from station 968+50 to station 1027+00) is exempt from this study, as it was evaluated under the I-75 PD&E Study (FPID 411014-1). The portion of SR 50 (Cortez Boulevard) west of I-75 that is not included in the I-75 PD&E Study will be evaluated under a future PD&E study from SR 50 from Brooksville Bypass/SR 50A (Eastern Intersection)/East Jefferson Street to I-75, currently programmed for fiscal year 2013/2014. Therefore, the proposed western study limit is now identified as west of I-75 (see Project Location Map).

Consequently, please note that supporting documents, including Traffic Report, Noise Study Report, Historic Resources Update Survey Technical Memorandum, Air Quality Technical Memorandum, Comments and Coordination Report, and Preliminary Stormwater Management Facility Report evaluated the original study limits.

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District Seven is planning to widen SR 50 (Cortez Boulevard) from Lockhart Road to US 301 (SR 35/Treiman Boulevard) in Hernando County, with the exception of the segment 3,150 feet (ft) west of I-75 to 2,100 ft east of I-75, see **Figure 1-1**. The roadway will be widened from four lanes to six lanes from Lockhart Road to US 98 (SR 700/McKethan Road) and from two lanes to four lanes from US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard).

According to the scope for this project the following constraints applied to the stormwater management efforts:

- From Lockhart Road to Kettering Road, no analysis was performed.
- From Kettering Road to US 98 (SR 700/McKethan Road), verify existing ponds can accommodate six-lane section.
- From US 98 to US 301, sized, but did not site, one stormwater management facility per basin.

These efforts were part of a State Environmental Impact Report (SEIR) level PD&E study and a full Alternative Stormwater Management report will be performed at a later date. The stormwater treatment and attenuation from Lockhart Road to Kettering Road will be accommodated in the proposed ponds for the I-75 project (FPID: 411011-2-52-01). The stormwater from Kettering Road to US 98 (SR 700/McKethan Road) discharges to offsite stormwater management facilities (SMF), which ultimately discharge into the Withlacoochee River. The analysis determined that the SMF's were designed to provide treatment for six lanes of directly connected impervious area (DCIA), and that they generally overattenuated for the Southwest Florida Water Management District (SWFWMD) required 25-year, 24-hour discharge rate. The final design phase will need to evaluate whether the existing SMF's are sufficient to meet the SWFWMD water quality and quantity criteria in place at the time of design.

The last basin (SMF G) in the segment of roadway from Kettering Road to US 98 (SR 700/McKethan Road) extends past US 98 in the existing condition. The initial analysis showed that SMF G is not sufficient to handle the existing roadway impervious area. For the purpose of this report, this basin was considered Basin 1 in the US 98 to US 301 section of the analysis and a sufficient pond was sized to treat 100% of the DCIA.

A wet detention system was assumed for sizing efforts from US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard). However, smaller dry ponds may be a viable option depending on actual site condition.

The wet pond sizes ranged from 1.7 ac to 3.9 ac. Depending on the placement of the pond in the design phase, a dry retention system could also be feasible in Basins 1, 3 and 4. The SHWT in Basin 2 appeared to be too high for a dry pond design. The estimated pond sizes are found in **Table 1** as follows:

Table ES-1 – Estimated Pond Sizes

Basin	Begin Station	End Station	Basin Length (ft)	Treatment Depth required (ft)	Attenuation Depth Required (ft)	Pond Size Estimate (ac)	Square Dimension (ft)
1	1150+00.00	1187+30.00	3,730	1	1.4	3.4	386
2	1183+70.00	1213+00.00	2,930	0.4	0.8	3.9	413
3	1213+00.00	1239+00.00	2,600	1.3	2.2	1.7	276
4	1239+00.00	1261+68.00	2,268	1.1	1.8	2.7	344
FPC	920+00.00	1261+68.00	34,168	NA	NA	9.0	NA

Note: The square dimensions include the maintenance berm and tie downs.

A hydraulic gradient was established from the lowest point in the roadway to the farthest point on the roadway within Basin 2 and 3. For Basins 1 and 4 the hydraulic gradient was established along US 98 (SR 700/McKethan Road) and US 301 (SR 35/Treiman Boulevard) as this was the furthest point away from the assumed pond location. This resulted in larger ponds due to limiting the height in which the treatment and attenuation depth can be stacked.

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1.0 GENERAL PROJECT INFORMATION

1.1 INTRODUCTION

The Florida Department of Transportation (FDOT), District Seven, conducted a Project Development and Environment (PD&E) Study to determine the engineering and environmental effects on the proposed improvement to State Road (SR) 50 (Cortez Boulevard) from Lockhart Road to US 301 (SR 35/Treiman Boulevard) in Hernando County, Florida.

The following scope constraints applied to the stormwater management efforts:

- From Lockhart Road to Kettering Road, no analysis was performed.
- From Kettering Road to US 98 (SR 700/ McKethan Road), verified existing pond could accommodate a six-lane configuration.
- From US 98 to US 301 (SR 35/Treiman Boulevard), sized, but did not site, one stormwater management facility per basin.

1.2 PURPOSE

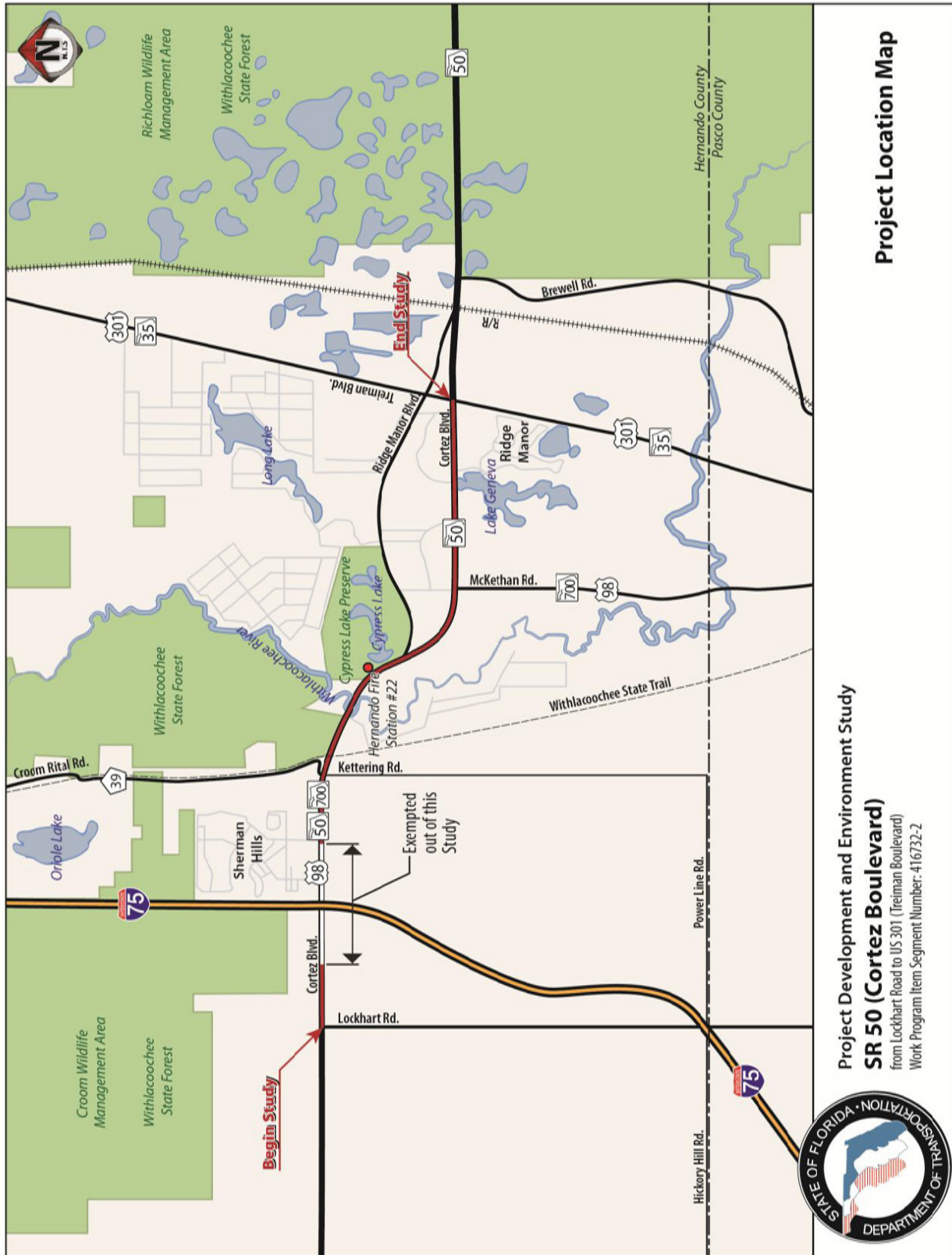
The purpose of the study was to provide documented environmental and engineering analyses to assist FDOT in reaching a decision on the type, location, and conceptual design of the necessary improvements in order to accommodate future traffic demand in a safe and efficient manner. The study also satisfied the requirements of FDOT and followed the process outlined in the FDOT *Project Development and Environment Manual*.

This study documented the need for the improvements and presented the procedures utilized to develop and evaluate various improvement alternatives. Information relating to the engineering and environmental characteristics essential for development of alternative alignments and analytical decisions was collected. Design criteria were established and preliminary alternative alignments were developed. The comparison of alternative alignments was based on a variety of parameters utilizing a matrix format. This process identified the Recommended Alternative that minimizes natural, physical, and socio-economic impacts, while providing the necessary future transportation improvements. The study also solicited input from the community and users of the facility. The design year for the analysis is 2035.

1.3 PROJECT DESCRIPTION

SR 50 (Cortez Boulevard) is proposed to be widened from four to six lanes from Lockhart Road to US 98 (SR 700/Treiman Boulevard) and from two to four lanes from US 98 (SR 700/Treiman Boulevard) to US 301 (SR 35/Treiman Boulevard) within Hernando County, Florida (Roadway ID 08 070 000). The study limits extend from Lockhart Road easterly to US 301 (SR 35/Treiman Boulevard), as shown in **Figure 1-1**. I-75 ramp terminal intersections and approaching segments (length 0.9 miles) were exempted out of this study since those improvements were analyzed as part of the I-75 PD&E Study, Federal Project Identification (FPID): 411014-1. The total length of the project (including the I-75 interchange area) is approximately 6.3 miles (mi).

Figure 1-1: Project Location Map



Project Development and Environment Study
SR 50 (Cortez Boulevard)
 from Lockhart Road to US 301 (Treiman Boulevard)
 Work Program Item Segment Number: 416732-2



The project is within the *Brooksville SE* and *Saint Catherine* United States Geological Survey (USGS) quadrangle maps (map numbers 3719 and 3718, respectively). The project is within Township 22 South, Range 20 East, Section 36; Township 22 South, Range 21 East, Sections 31,32, and 33; and Township 23 South, Range 21 East, Sections 1, 2, 3, 4, 5, 6 ,10, 11, and 12 of the Public Land Survey System (PLSS).

A prior PD&E study was approved on September 28, 1989 for SR 50 (Cortez Boulevard) from SR 50/SR 50A to US 301 (SR 35/Treiman Boulevard). That study recommended the roadway be widened to four lanes. The only segment that has not been improved to four lanes is from US 98 (SR 700/McKethan Road) to US 301 (SR 30/Treiman Boulevard), which currently remains a two-lane undivided rural roadway.

1.4 EXISTING DESIGNATIONS

SR 50 (Cortez Boulevard) is part of the State Highway System (SHS) and has a Functional Classification of Rural Principal Arterial. There are no grade separated interchanges (other than I-75) along the project. The facility’s access management classification is Access Class 3, Restrictive, from Lockhart Road to east of Kettering Road (MP 5.250) and Access Class 4, Non-Restrictive, from east of Kettering Road (MP 5.250) to US 301 (SR 35/Treiman Boulevard).

SR 50 (Cortez Boulevard) has a Strategic Intermodal System (SIS) designation of SIS Corridor and also a Florida Intrastate Highway System (FIHS) designation from US 19 to I-75. SR 50 (Cortez Boulevard) is a Federal Aid Road in the National Highway System (NHS) from US 19 to I-75, and is part of the Surface Transportation Program (STP) from I-75 to US 301 (SR 35/Treiman Boulevard). In addition, the entire length of SR 50 within Hernando County has been designated a hurricane evacuation route by the Florida State Emergency Management Response Team (SERT) and is identified as an evacuation route in the Hernando County Comprehensive Plan. The Hernando County Metropolitan Planning Organization (MPO) *Congestion Management Process 2010 State of the System Report* has also designated SR 50 (Cortez Boulevard) in the study area as a truck route.

1.5 SOIL CHARACTERISTICS

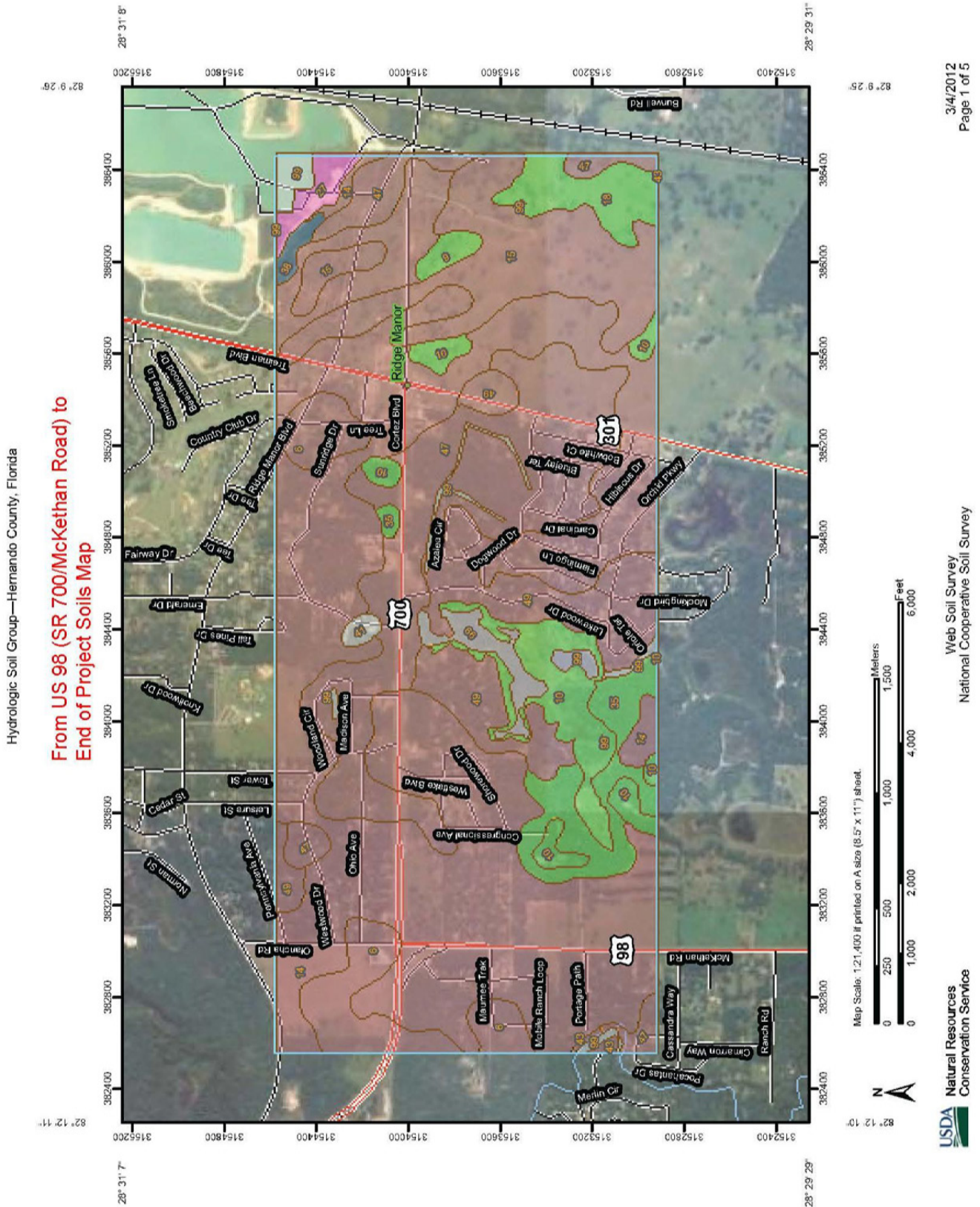
The soil types, as found in the National Cooperative Soil Survey (NRCS) for Hernando County provided in **Figure 1-2**, are tabulated in **Table 1-1** below. The soil types are listed as well as the Hydrologic Soil Group and the approximate depth and elevation of the Seasonal High Water Table (SHWT).

Table 1-1: Soils/SHWT Information for Each Basin


Basin	Soil Symbol	Soil Name	Hydrologic Soil Group	Depth to SHWT (ft)	Approx. SHWT Elev. (ft)
1	14	Candler	A	>6.5	104
2	47	Sparr	A/D	2.5	68.5
3	14	Candler	A	>6.5	65
4	14	Candler	A	>6.5	64


Note: SHWT determined from the SWFWMD Aerial 1' contours and the Soil Survey

Figure 1-2: National Cooperative Soil Survey (NRCS) for Hernando County











MAP LEGEND


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

Soils
 Soil Map Units






Soil Ratings

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

Political Features
 Cities

Water Features
 Streams and Canals

Transportation

	Rails
	Interstate Highways
	US Routes
	Major Roads
	Local Roads

MAP INFORMATION

Map Scale: 1:21,400 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000. Please rely on the bar scale on each map sheet for accurate map measurements.

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

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

Soil Survey Area: Hernando County, Florida
 Survey Area Data: Version 6, Jan 27, 2010
 Date(s) aerial images were photographed: 8/13/2007

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Hernando County, Florida (FL053)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6	Arredondo fine sand, 0 to 5 percent slopes	A	78.6	4.9%
9	Basinger fine sand	A/D	8.2	0.5%
10	Basinger fine sand, depressional	A/D	83.5	5.2%
14	Candler fine sand, 0 to 5 percent slopes	A	726.3	45.3%
15	Candler fine sand, 5 to 8 percent slopes	A	142.6	8.9%
18	EauGallie fine sand	A/D	36.9	2.3%
27	Hydraquents	D	14.0	0.9%
35	Myakka fine sand	A/D	58.3	3.6%
38	Paisley fine sand	C/D	6.0	0.4%
41	Pits		4.5	0.3%
43	Pomello fine sand, 0 to 5 percent slopes	A	2.4	0.1%
47	Sparr fine sand, 0 to 5 percent slopes	A	266.8	16.7%
49	Tavares fine sand, 0 to 5 percent slopes	A	132.6	8.3%
99	Water		41.6	2.6%
Totals for Area of Interest			1,602.3	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

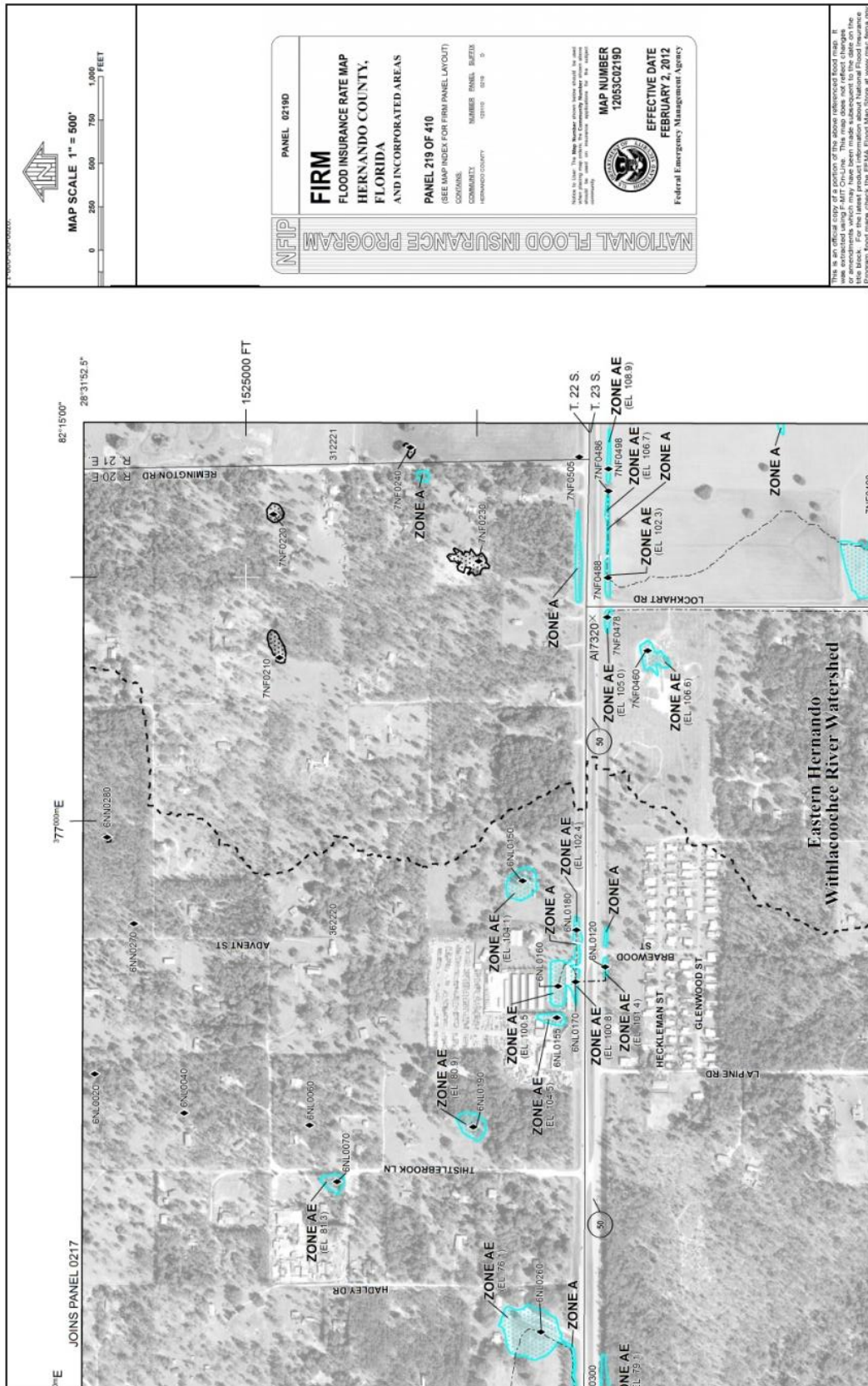
Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

1.6 FLOODPLAIN INFORMATION

The majority of floodplain impacts are along the segment of SR 50 (Cortez Boulevard) between US 98 (SR 700/McKethan Road) and US 301 (SR 35/Tremain Boulevard). The impacts were calculated in aggregate for the entire project. The flood risks associated with the encroachment upon the 100-year floodplain were evaluated for this study. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel numbers 12053C0219D, 12053C0238D, 12053C0239D, and 12053C0243D, dated February 2, 2012, are provided as **Figures 1-3 through 1-9**. Portions of the project were located with the 100-year floodplain elevation designated as Flood Zone AE, where the base elevations had been determined and are shown at selected intervals within the zone on the FEMA Firmettes. Floodplain compensation may be required for this project. Based upon the widening of the roadway footprint into the floodplain, it was estimated that roughly 9.0 acres (ac) of floodplain compensation could be required. There are areas outside the 100-year floodplain available for pond sites for each of the four basins in the US 98 (SR 700/McKethan Road) to US 301 (SR 35/Tremain Boulevard) segment. However, in some cases it may be advantageous to place the pond within the floodplain. The floodplain compensation estimate will increase if ponds are placed within the 100-year floodplain.

Figure 1-3: FEMA FIRM Map # 12053C0219D



SR 50 (Cortez Boulevard) from Lockhart Road to US 301 (SR 35/Treiman Boulevard)
 Work Program Item Segment Number: 416732-2
 1-10 Final Preliminary Stormwater Management Facility Report

Figure 1-5: FEMA FIRM Map # 12053C0238D

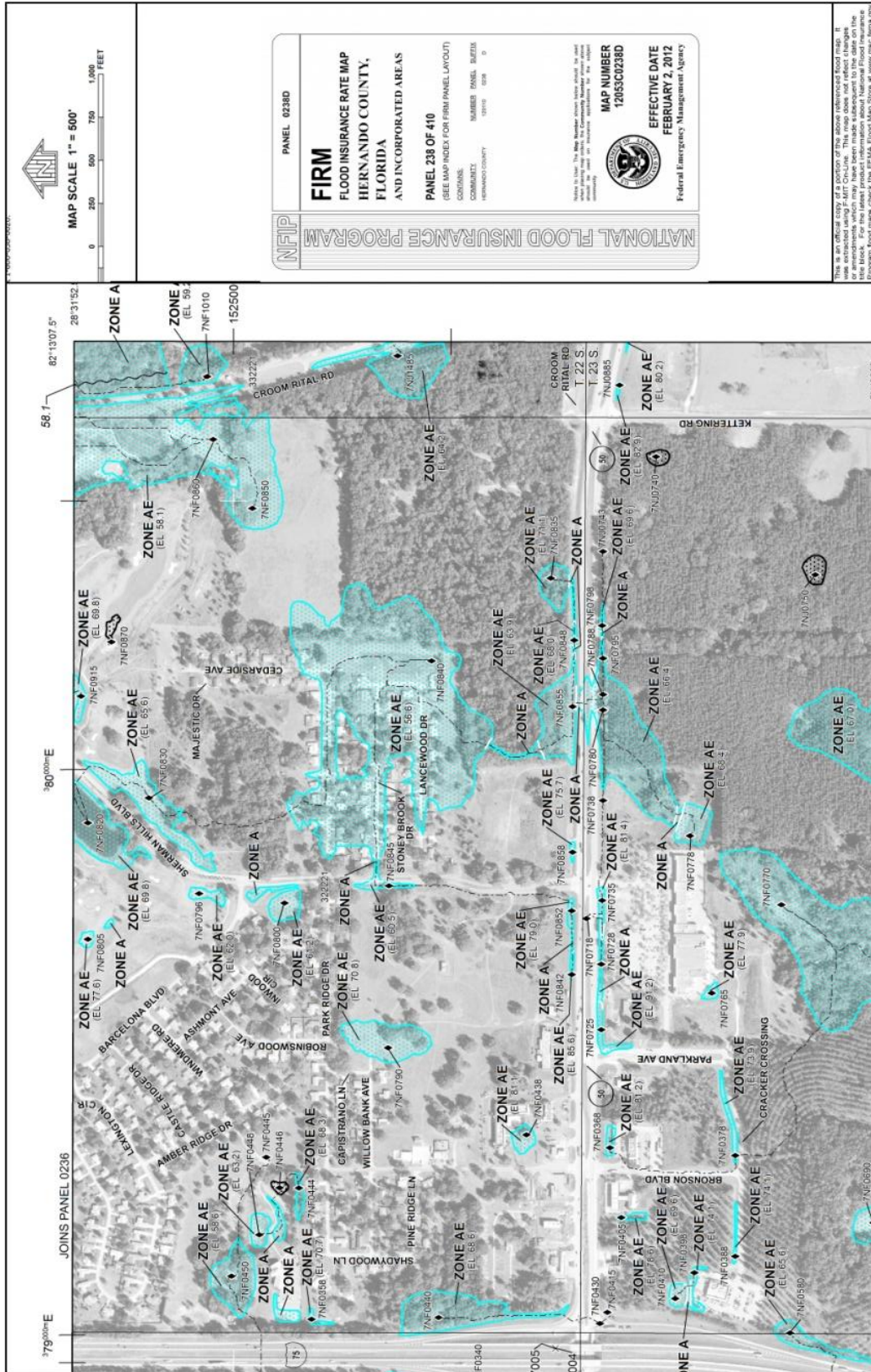


Figure 1-7: FEMA FIRM Map # 12053C0239D

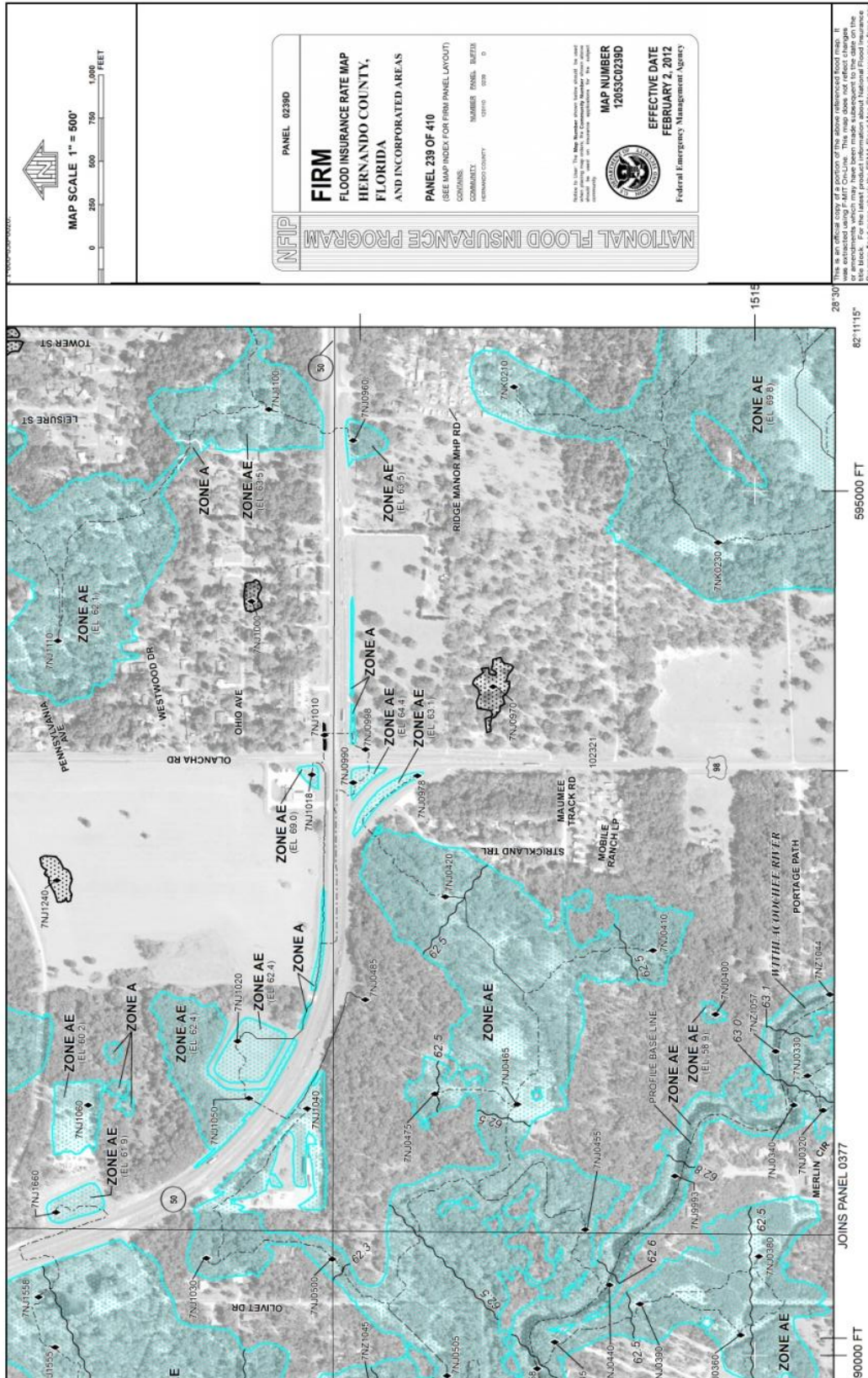
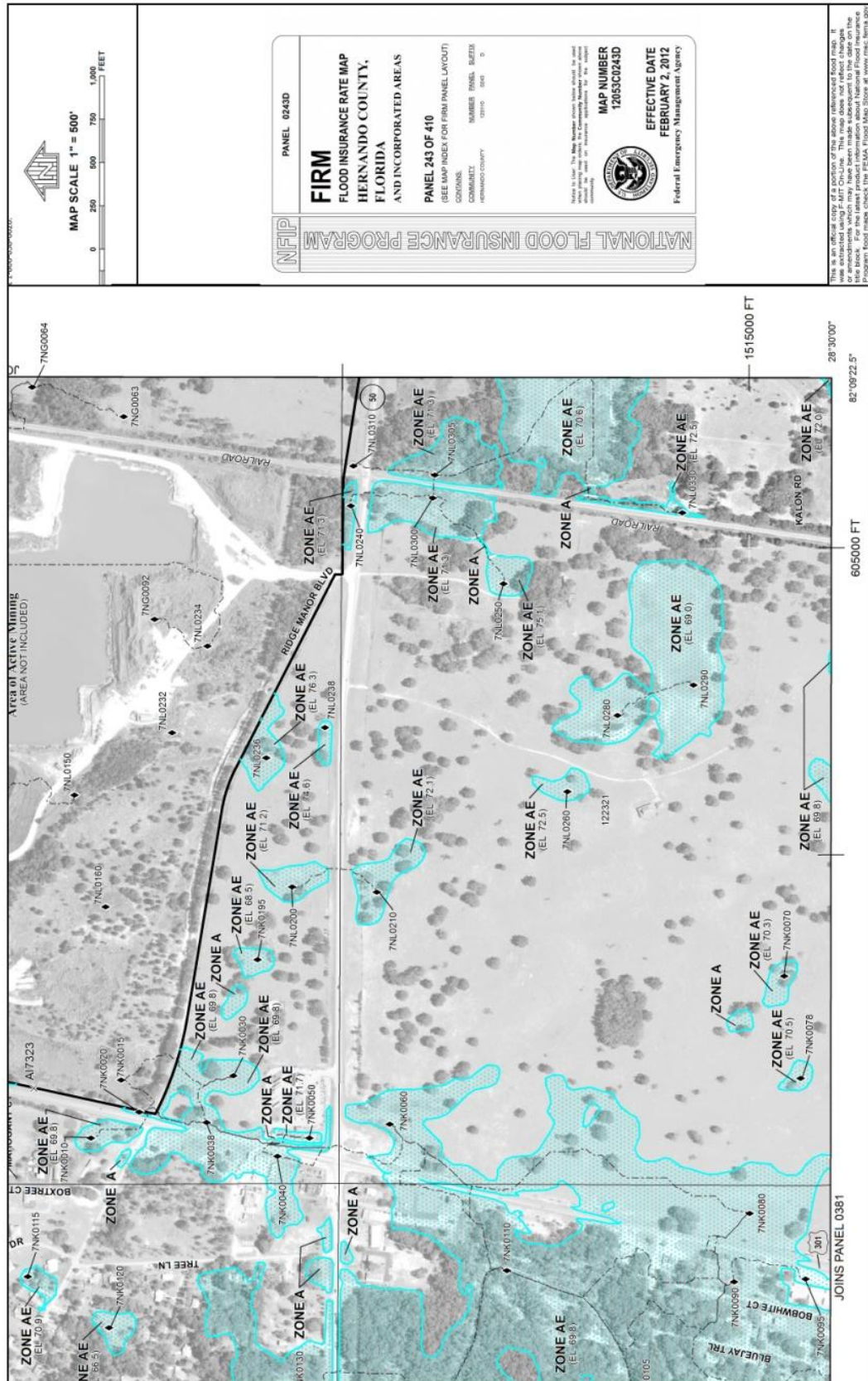


Figure 1-9: FEMA FIRM Map # 12053C0243D



2.0 DRAINAGE REFERENCE AND RESOURCE INFORMATION

2.1 RAINFALL

The existing and proposed ponds were sized for the SWFWMD 25-year, 24-hour storm events with a rainfall depth of 8.8 inches (in). The project lies within Precipitation Zone 6 of the FDOT intensity-duration-frequency (IDF) curves and will be sized to meet FDOT 14-86 requirements.

2.2 RESOURCES FOR ANALYSIS

The resources used for this report included:

- SWFWMD Basis of Review
- FDOT Stormwater Management Handbook
- FDOT Hydrology Handbook
- Urban Hydrology for Small Watersheds (TR-55)
- FDOT Project Development and Environment Handbook
- NRCS Soil Survey For Hernando County
- FDOT Drainage Manual
- FEMA Maps
- USGS Quadrangle Maps
- Existing ERP Permit 444720-02
- SWFWMD contour maps – ERP Information Manual (Part D)
- SWFWMD Data and Maps

3.0 EXISTING DRAINAGE CHARACTERISTICS

3.1 EXISTING TYPICAL SECTION AND LAND USE

The existing typical section along SR 50 (Cortez Boulevard) from Lockhart Road to US 98 (SR 700/McKethan Road) consists of four 12-foot (ft) travel lanes with 4-ft inside paved shoulders, and 5-ft outside paved shoulders in each direction with a 45-ft grassed median. From US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard) the existing typical section includes two 12-ft travel lanes with 5-ft outside paved shoulders.

3.2 EXISTING DRAINAGE PATTERNS

The existing drainage patterns were determined using the United States Geological Survey (USGS) quadrangle maps, SWFWMD contour aeriels, field review, and FDOT drainage maps for SR 50 (Cortez Boulevard).

From Lockhart Road to Kettering Road, with the exception of the I-75 interchange, the stormwater runoff from the roadway sheet flows into roadside ditches where it is treated and attenuated.

From Kettering Road to US 98 (SR 700/McKethan Road), the stormwater runoff from the roadway sheet flows into roadside ditches and then outfalls to existing stormwater management facilities (SMFs) along SR 50 (Cortez Boulevard). All of the project runoff in this area ultimately drains into the adjacent Withlacoochee River and Withlacoochee River wetland system, which is classified as an Outstanding Florida Water (OFW) by the Florida Department of Environmental Protection (FDEP).

From US 98 (SR 700/McKethan Road) to the end of the project, the stormwater runoff from the roadway either sheet flows directly into adjacent wetland areas or into roadside ditches that then discharge into adjacent wetland areas via cross drains. These wetland areas drain into Lake Geneva and ultimately to the Withlacoochee River.

3.3 SEASONAL HIGH WATER TABLE ELEVATIONS

The SHWT elevations for the project area are tabulated in Table 1-1. The elevations were estimated from the NRCS Soils Survey for Hernando County. When using the NRCS Soils Survey, the median value in the SHWT depth range given in the Soils Survey was used along with the approximate ground level elevations from the 1-ft SWFWMD Aerial contours to calculate the general SHWT elevation. Excerpts of the NRCS report can be found in **Appendix A**.

3.4 EXISTING STORMWATER MANAGEMENT FACILITIES

From Kettering Road to US 98 (SR 700/McKethan Road) the runoff is collected via roadside ditches and conveyed into seven existing stormwater management facilities (SMF's A-G)

which ultimately discharge into the Withlacoochee River and surrounding wetland system. The SMF's are comprised of 2 dry detention ponds and 5 wet detention ponds. Pond A and G, the dry retention ponds, retain and infiltrate 0.75 in of the impervious area. Ponds B-F were designed to treat 1.5 in of the impervious area. All of the existing ponds were designed for the SWFWMD 25-year, 24-hour rainfall event of 8.8 in for peak discharge and attenuation. All of the stormwater management facilities appear to accommodate the ultimate six-lane typical section with the exception of Pond G. The drainage basin for Pond G includes half of the roadway for SR 50 (Cortez Boulevard) from approximately 200' east of the intersection of SR 50 (Cortez Boulevard) and US 98 (SR 700/McKethan Road) to a high point at the end of the transition area east of the intersection. The drainage basin for Pond G also includes the south side of US 98 (SR 700/McKethan Road). A more detailed evaluation will be performed during the design phase. See treatment calculations in **Appendix B**.

4.0 PROPOSED DRAINAGE DESIGN

4.1 PROPOSED TYPICAL SECTIONS

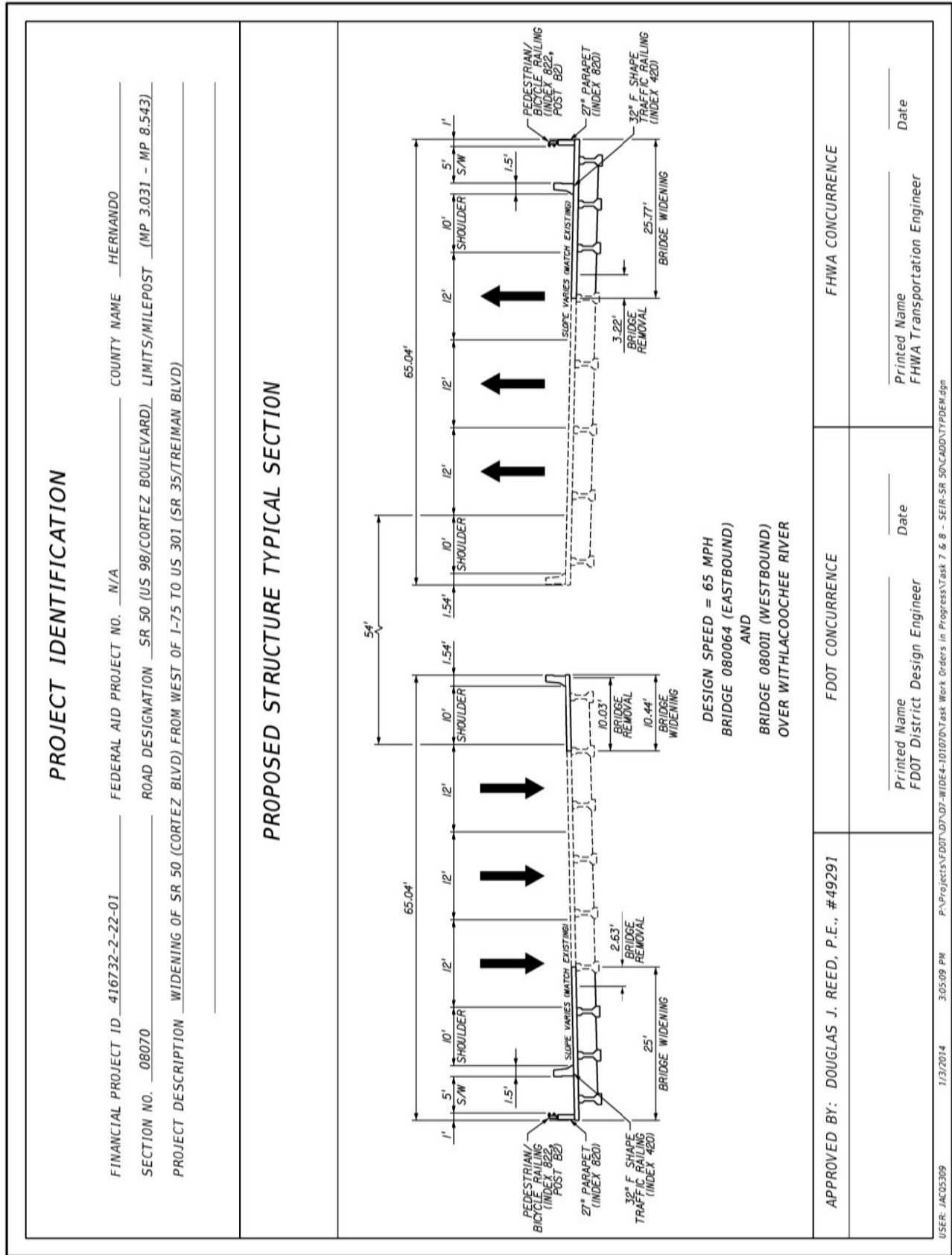
The proposed typical section from Lockhart Road to Kettering Road includes six 12-ft lanes with 5-ft outside paved shoulders and 6.5-ft inside paved shoulders plus 2.25-ft curbs on each side and a 33-ft raised grass median. From Kettering road to US 98 (SR 700/McKethan Road) the typical section includes six 12-ft lanes with 5-ft outside paved shoulders with a 40-ft grassed median. From US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard) the typical section includes four 12-ft lanes with 5-ft outside paved shoulders and a 40-ft grassed median. Each typical section includes 5-ft sidewalks on each side of the roadway; see **Figures 4-1 through 4-4**.

4.2 DESIGN CRITERIA

The SWFWMD Basis of Review was used in preparation of this report. A wet detention design approach requires that the ponds treat the total runoff of 1.0 in over the entire directly connected impervious area, with a minimum 35% littoral zone. For a dry retention pond (off-line treatment system), the first 0.5 in of runoff for the entire directly connected impervious area shall be treated. An additional 50% of the original criteria will likely be required since the ultimate outfall is the Withlacoochee River. This is a conservative approach as the SWFWMD may not require additional treatment for an OFW if outfalls are located a sufficient distance away from the river. Attenuation is also required by the SWFWMD and calculations are provided in **Appendix C**.

There were several Water Body Identification Numbers (WBID's) located with the project limits, they are 1390, 1390A, and 1329F. The only one that is located on the final verified impaired list is 1329F. It is located within the Withlacoochee River hydrologic unit, Group 4, Cycle 2 and is impaired for Mercury only; therefore, this project may not be held to nutrient loading requirements. See the excerpt from the Florida Department of Environmental Protection (FDEP) Final Verified List in **Appendix A**.

**Figure 4-3: Proposed Roadway Typical Section
 Bridge 080011 (westbound) and Bridge 080064 (eastbound) over Withlacoochee River**



4.3 TREATMENT REQUIREMENTS

The ultimate typical section was used to calculate the treatment requirements from US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard). The proposed typical section includes two 12-ft lanes and 5-ft sidewalks and 5-ft paved outside shoulders in each direction. The proposed ultimate roadway typical section is assumed to include three 12-ft travel lanes, a 5-ft sidewalk and 5-ft outside shoulders in each direction. The ultimate condition total impervious width is 92 feet. The sidewalks were included in the DCIA calculations for the pond sizes for conservatism. The proposed design shows that there are left and right turn lanes that run almost the entire length of the roadway from US 98 (SR 700/McKethan Road) to US 301 (SR 35/Treiman Boulevard); therefore, the total impervious width used was 104 ft to include one more lane. Basin 1 has a total length of 6,780 ft resulting in a total impervious area of 20 ac. Basin 2 has a total length of 2,930 ft resulting in a total impervious area of 7.0 ac. Basin 3 has a total length of 2,600 ft resulting in a total impervious area of 7.1 ac. Basin 4 has a total length of 6,018 ft, this includes US 301 (SR 35/Treiman Boulevard), resulting in a total imperious area of 11.4 ac.

4.4 STORMWATER MANAGEMENT DESIGN APPROACH

From Kettering Road to US 98 (SR 700/ McKethan Road) treatment and attenuation for the proposed improvements will be provided in the seven existing stormwater management facilities (SMF's A-G). An analysis was performed to determine if the ponds were designed to accommodate the ultimate six-lane typical section. The analysis included examining the existing SWFWMD Environmental Resource Permit (ERP) (Permit Number 444220 02) calculations to determine how much pavement can be treated in the existing SMF's. It was determined that all of the ponds except for Pond G are currently treating enough pavement to account for the ultimate typical section. See the calculations in **Appendix B**.

The segment of roadway from US 98 (SR 700/McKethan Road) to US 301 (US 35/Treiman Boulevard) is located in a hydrologically open basin that ultimately discharges into the Withlacoochee River, which is classified as an OFW. This basin is divided into four sub-basins. The segment from just west of US 98 (SR 700/McKethan Road) to the high point in the roadway at approximate Station 1183+70 is currently being handled by existing Pond G (FPN: 254808-1-52-01). Since it has been determined that SMF G is not adequate, the existing basin including the portion of US 98 that will be widened will be Basin 1 and a pond will be sized as part of this report. The proposed ponds have been sized for both wet retention and dry detention, since depending on actual site conditions; a smaller dry pond may be viable.

5.0 EVALUATIONS

When evaluating each basin to determine a pond size, assumptions were made to ensure a viable site given that pond sites are not being specified. Generally, the pond placement was assumed to be the furthest away from the low, causing a large hydraulic gradient. Typically pond sites are chosen closer to the low, if possible, to reduce the required hydraulic gradient required. For Basin 2 a hydraulic grade line of 0.08% was used due to the flat slope and high ground water in the basin. There is high ground water and the assumed location of the pond between the low area and the beginning of the basin. For Basins 1, 3 and 4 a hydraulic grade line of 0.1% was assumed. It is also assumed that the ponds will not be placed in the 100-year floodplain. If ponds are placed within the 100-year floodplain a compensation area of roughly the same size of the pond will need to be provided. Roughly 50% of the property along SR 50 (Cortez Boulevard) in Basins 1 and 2 is comprised of 100-year floodplain and around 70% for Basin 3. Basin 4 had minimal floodplain encroachment.

5.1 BASIN 1

Basin 1 begins west of US 98 at approximate Station 1150+00 and ends at Station 1183+70 with a low point at around Station near the intersection. This pond will also accommodate the widening proposed along US 98 (SR 700/McKethan Road). In this area the roadway is drained by swales to a cross drains into Pond G at the intersection. Using the SWFWMD Aerial 1 ft contours, the low edge of pavement is estimated to be 69.5 ft. The estimated hydraulic clearance needed is 3.1 ft, assuming a 0.1% hydraulic grade line for 3039 ft along US 98 (SR 700/McKethan Road). Using the NRCS soils report the SHWT at the assumed location of the pond is 64.6 ft below existing ground. This leaves only 2.4 ft of depth for the treatment and attenuation volume. To meet the attenuation and treatment requirements, a 3.4 ac wet detention pond will be necessary. A dry pond may also be feasible in this basin. See the calculations in Appendix B.

5.2 BASIN 2

Basin 2 begins at approximately Station 1183+70 and ends at Station 1213+00 with a low point at around Station 1205+21. In this area the roadway is drained by swales to a cross drain at the low that discharges into an adjacent wetland. Using the SWFWMD Aerial 1 ft contours, the low edge of pavement is estimated to be 70.5 ft. The estimated hydraulic clearance needed is 0.8 ft, assuming a 0.08% hydraulic grade line for 1,021 ft. The estimated SHWT at the assumed location of the pond is 68.5 ft leaving 1.2 ft of depth for the treatment and attenuation volume. It might be reasonable to evaluate putting in a pond liner during the design phase to reduce the pond size. To meet the attenuation and treatment requirements, a 3.9 ac wet detention pond will be necessary. Due to the height of the SHWT in this area, a dry pond is not practical. See the calculation in **Appendix B**.

5.3 BASIN 3

Basin 3 begins at Station 1213+00 and ends at US 301 (SR 35/Treiman Boulevard) [Station 1238+00] with a low point near Station 1225+00. In this segment of roadway the runoff sheet flows into adjacent wetlands and then makes its way to a canal and then Lake Geneva. Using the SWFWMD Aerial 1 ft contours, the low edge of pavement is estimated to be 70.5 ft. The assumed location of the pond is at the beginning of the basin around Station 1213+00. The SHWT in this area is greater than six ft below existing ground; it is estimated that the SHWT is at elevation 65.5 ft at the location of the assumed pond. The estimated hydraulic clearance needed is 1.2 ft, assuming a 0.1% hydraulic grade line for 1,200 ft. This will leave about 3.5 ft of depth for the treatment and attenuation volume. To meet the attenuation and treatment requirements a 1.7 ac pond will be necessary. A dry pond could be used in this area depending on the placement due to the low groundwater. See the calculations in **Appendix B**.

5.4 BASIN 4

Basin 4 begins at Station 1238+00 to the end of the project, Station 1261+68.43, it also includes 3750 ft of US 301 (SR 35/Treiman Boulevard). This segment of SR 50 (Cortez Boulevard) is mostly the taper back down to two lanes and the proposed improvements along US 301 (SR 35/Treiman Boulevard) is widening. The pavement area was measured using shapes in microstation. Using the SWFWMD Aerial 1 ft contours, the low edge of pavement is estimated to be 69.5 ft at the beginning of the basin around Station 1240+00. The assumed location of the pond is near the low in the southeast corner of the intersection. The SHWT in this area is greater than six ft below existing ground; it is estimated that the SHWT is at elevation 64.0 ft. The estimated hydraulic clearance required is 2.4 ft assuming a 0.1% hydraulic grade line for 2,400 ft along the south side of US 301 (SR 35/Treiman Boulevard). This will leave about 3 ft for the treatment depth and attenuation depth. To meet the treatment and attenuation requirements, a 2.7 ac wet pond will be necessary. A dry pond may also be feasible. See the calculations in **Appendix B**.

The portion of US 301 (SR 35/Treiman Boulevard) that drains north away from SR 50 (Cortez Boulevard) is roughly 1,924 ft including widening. The treatment volume required for this segment is 0.24 ac to ft and is proposed to be treated in the roadside ditches using ditch blocks. It has been calculated that there is sufficient volume in the ditches to accomplish this. See the calculations in **Appendix B**.

6.0 CONCLUSION

6.1 CONCLUSION

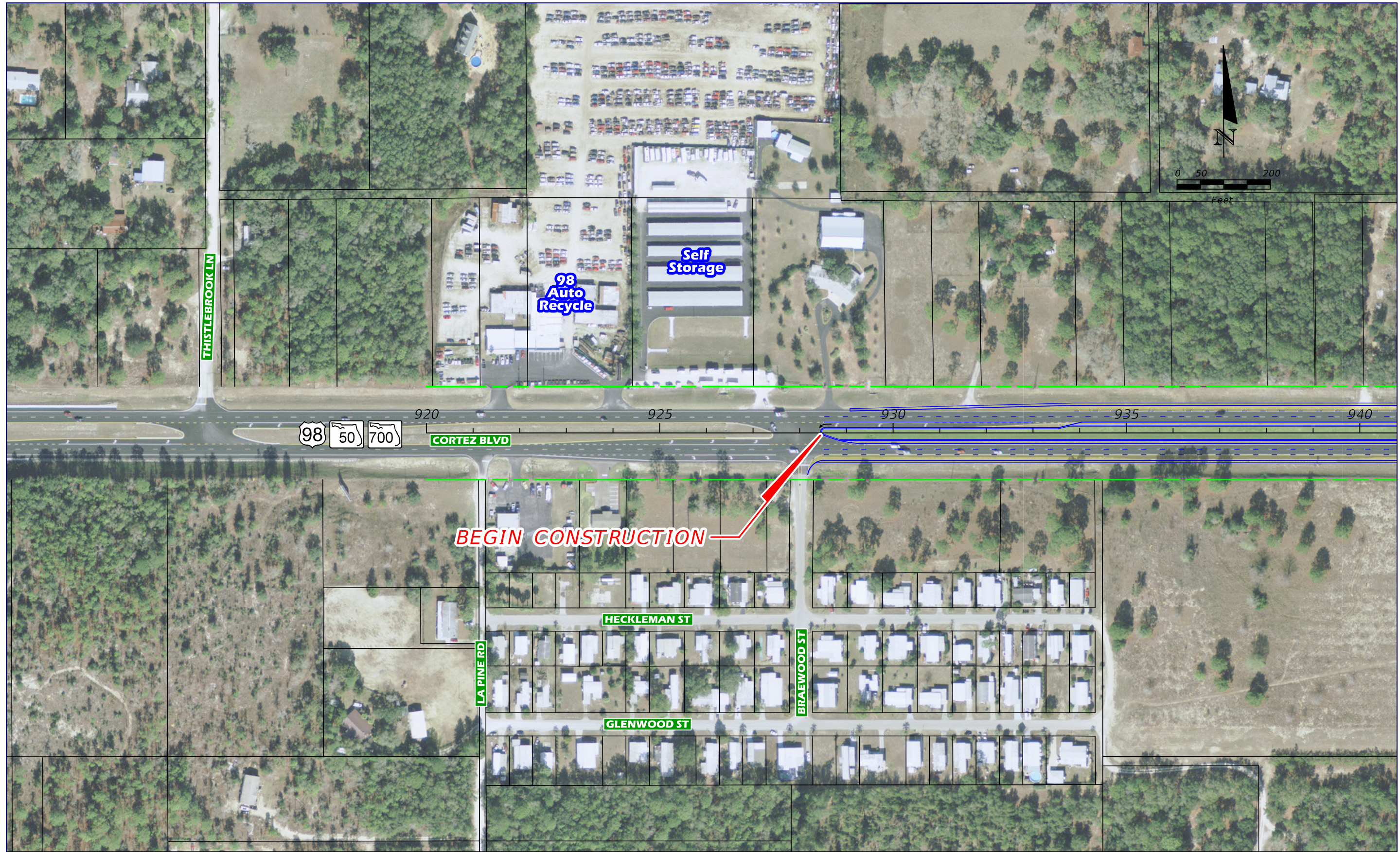
Because actual pond site locations were not determined, a worst case approach was utilized for sizing. There are options to provide more treatment depth and to reduce the pond size. One would be to strategically place the pond closer to the low area of each basin if possible. This would reduce the hydraulic losses. Another would be to line the pond, therefore allowing for a lower water table in the pond and reducing the SHWT controls. Also, if allowed by the SWFWMD, compensating treatment could be used for the low areas in the basin. This would permit the runoff in the low areas to discharge directly to the outfall, and increase the hydraulic clearance.

APPENDIX A

Project References and Documentation

APPENDIX A

- Drainage Maps – this includes drainage basins from US 98 to US 301, existing pond locations, and existing cross-drain information
- Soils Maps from NRCS
 - Hydrologic Soils Group – Entire Project
 - Depth to Water Table – Entire Project
 - Depth to Water Table – From US 98 to End of Project
- Runoff Curve Numbers from TR-55
- Impaired Water Body (WIBD's) Verified List from FDOT Website



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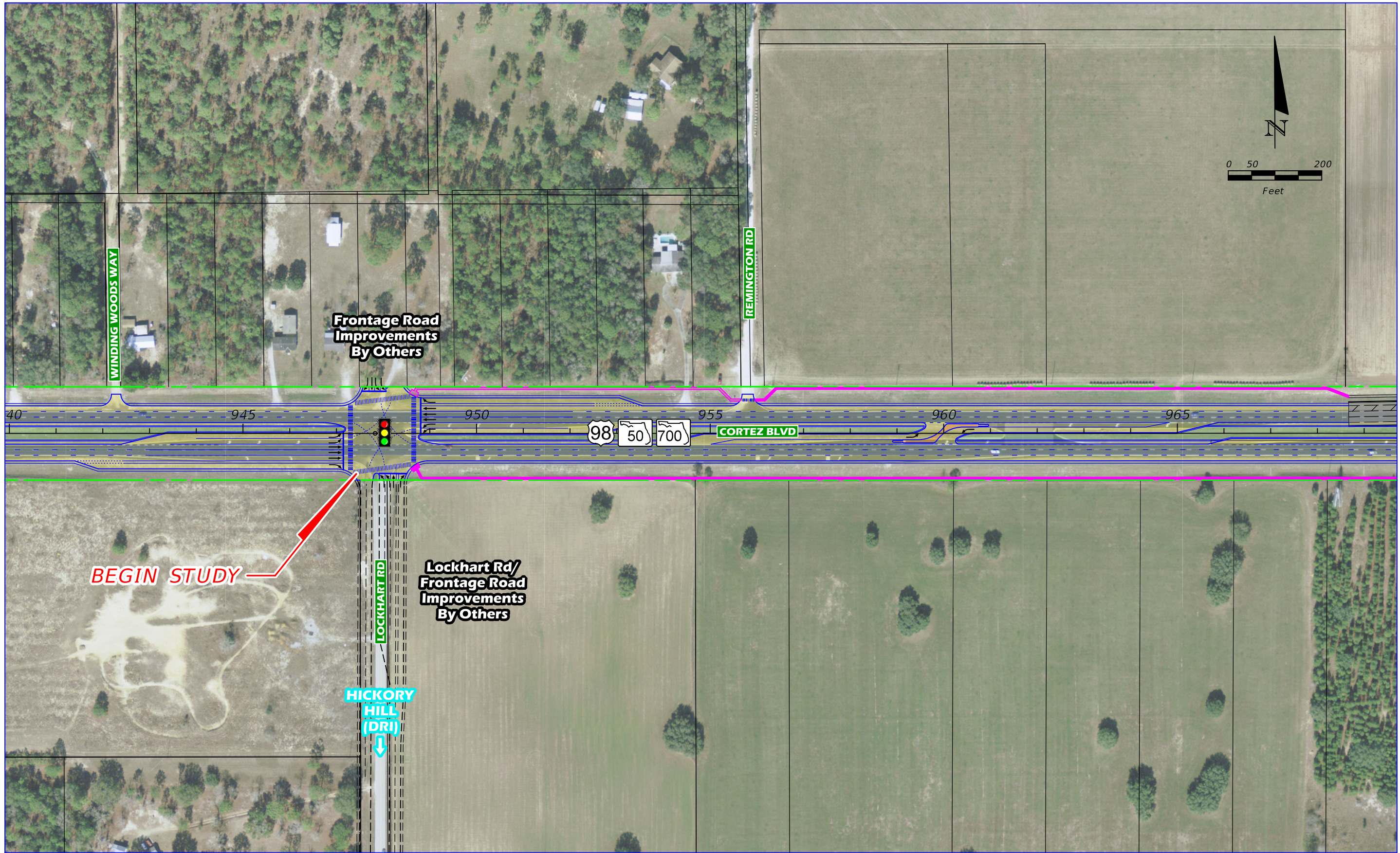
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	EXISTING ROW		PROPOSED EASEMENT (BY OTHERS)		OFW		CONSERVATION LAND
	EXISTING EASEMENT		PROPOSED ROW		BASINS		
	PARCEL BOUNDARY		PROPOSED PAVEMENT/WIDENING				

ATKINS
 4030 WEST BOY SCOUT BLVD
 SUITE 700
 TAMPA, FL 33607

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 50	HERNANDO	416732-2

*SR 50 (CORTEZ BLVD)
 FROM LOCKHART ROAD
 TO US 301 (TREIMAN BLVD)*

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	PARCEL BOUNDARY						

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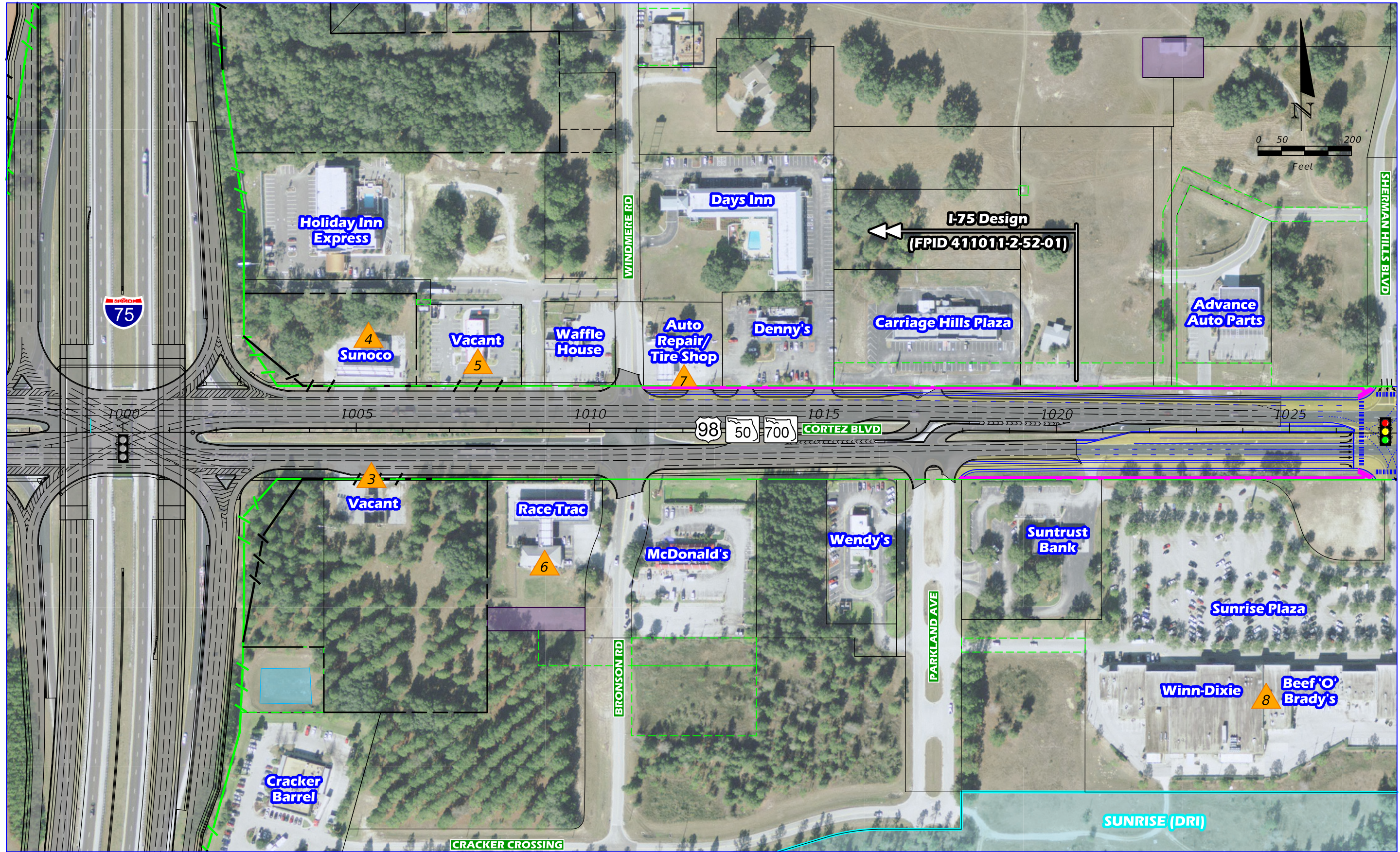
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PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

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 TO US 301 (TREIMAN BLVD)

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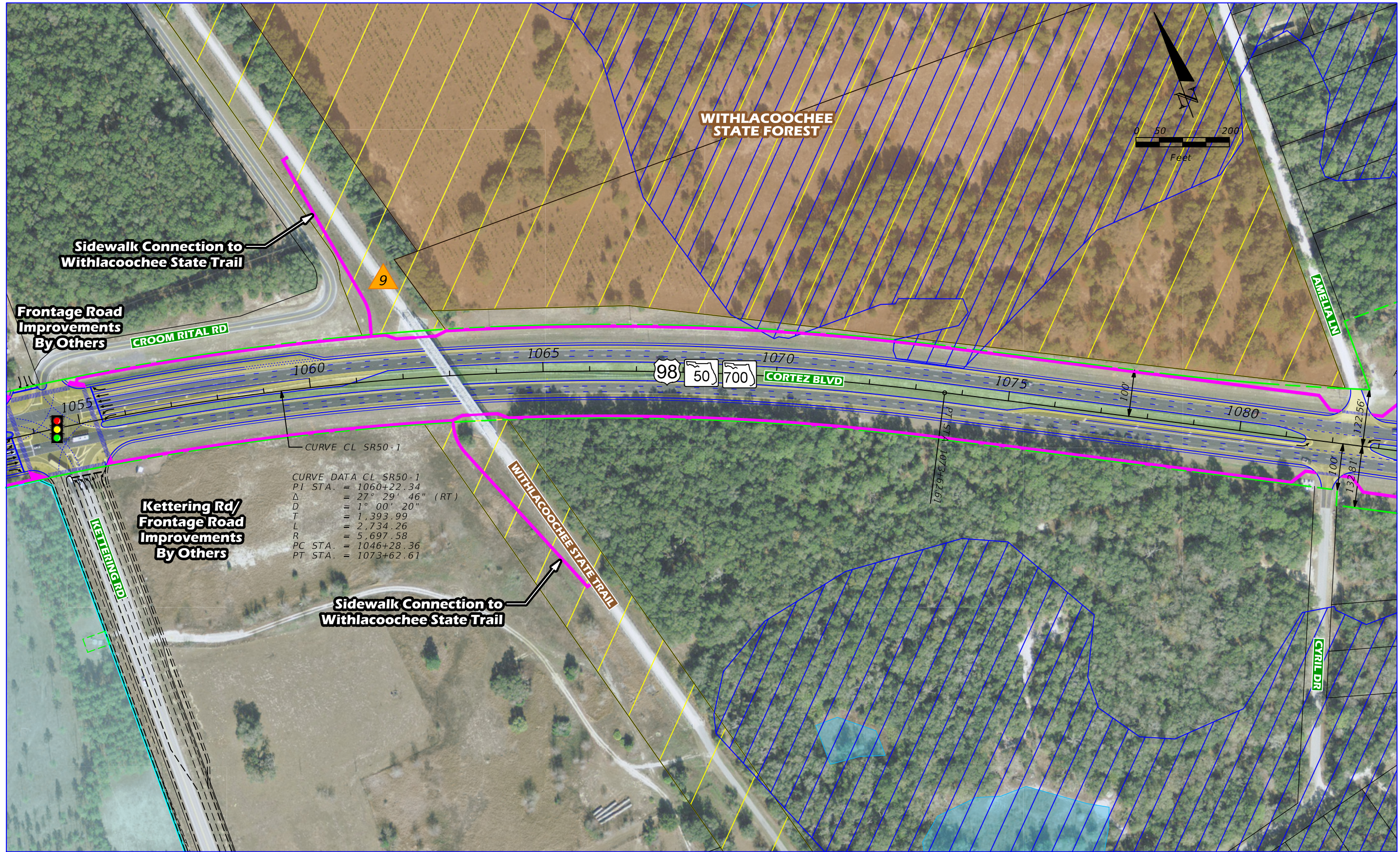
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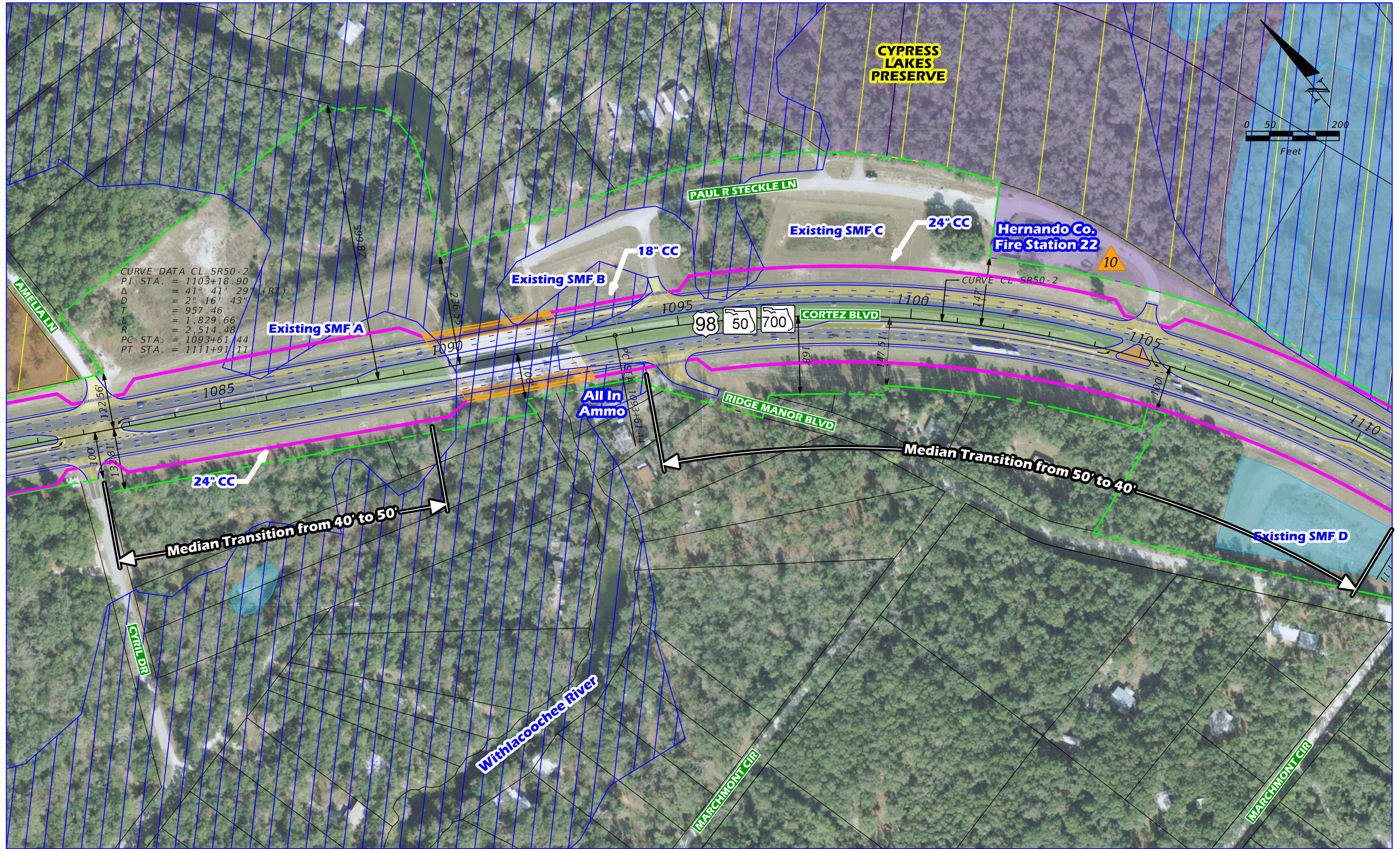
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	EXISTING EASEMENT		PROPOSED ROW		BASINS		BASINS
	PARCEL BOUNDARY		PROPOSED PAVEMENT/WIDENING				

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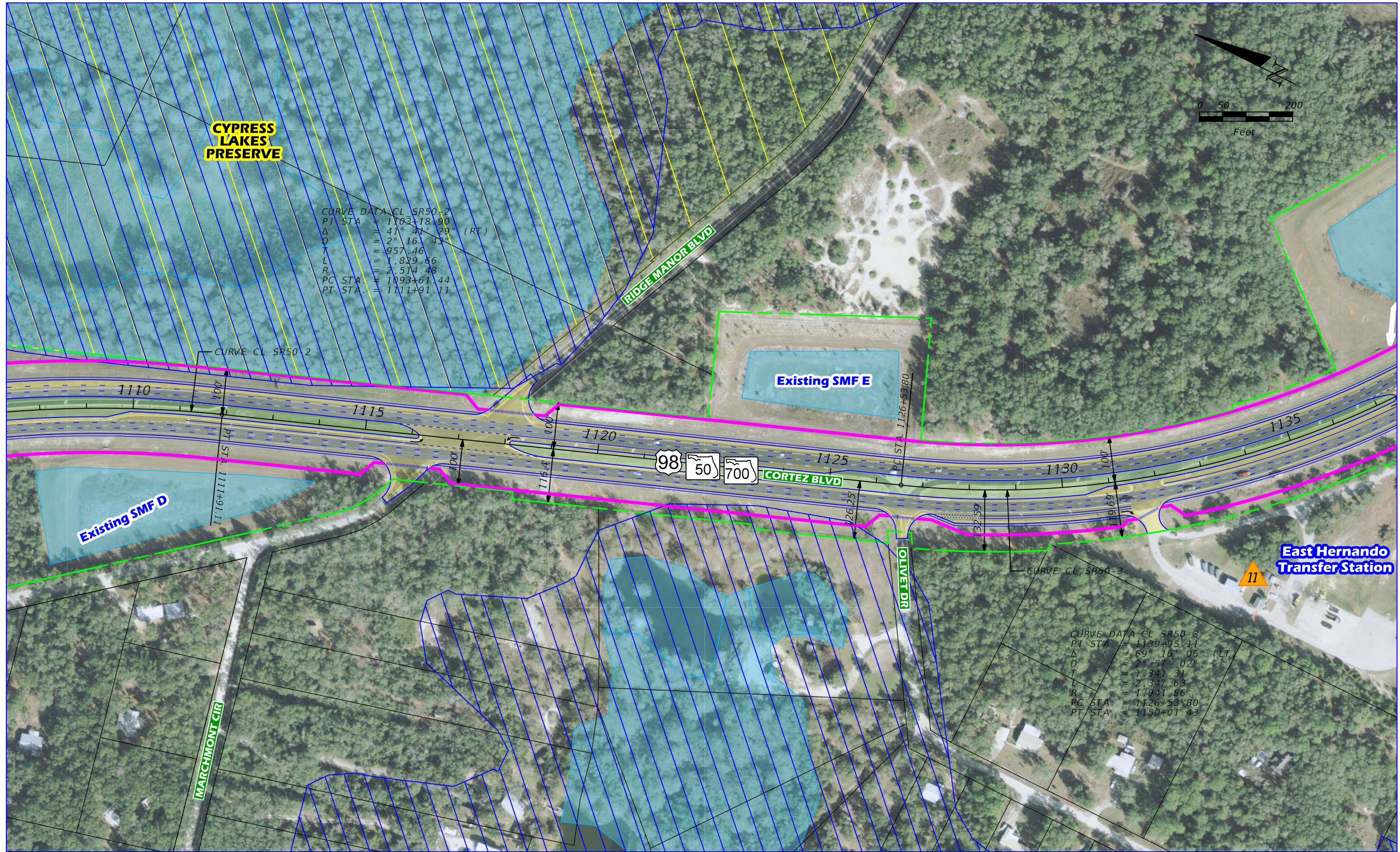
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EXISTING EASEMENT	PROPOSED ROW	BASINS	
PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

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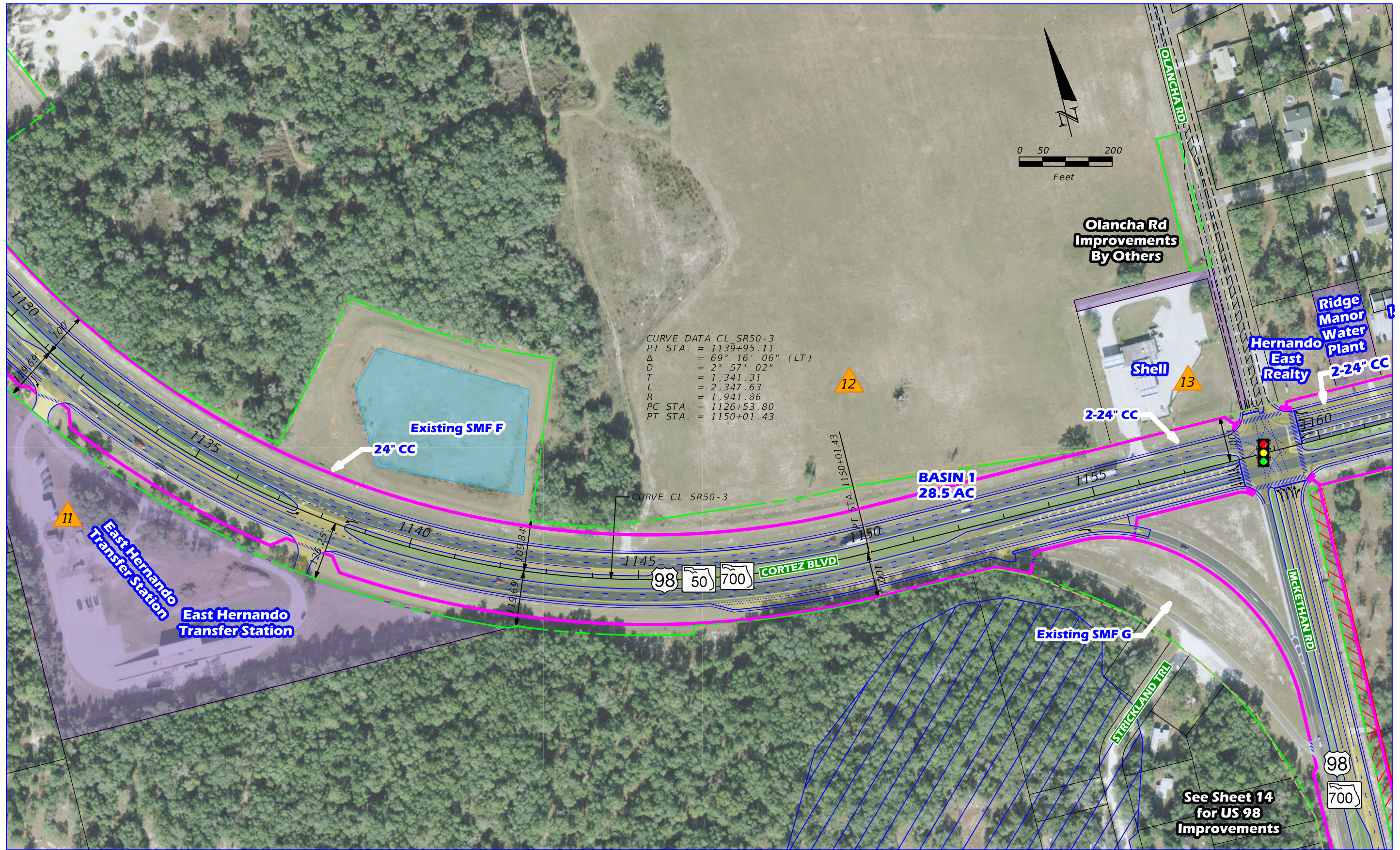
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EXISTING EASEMENT	PROPOSED ROW	BASINS	
PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

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PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

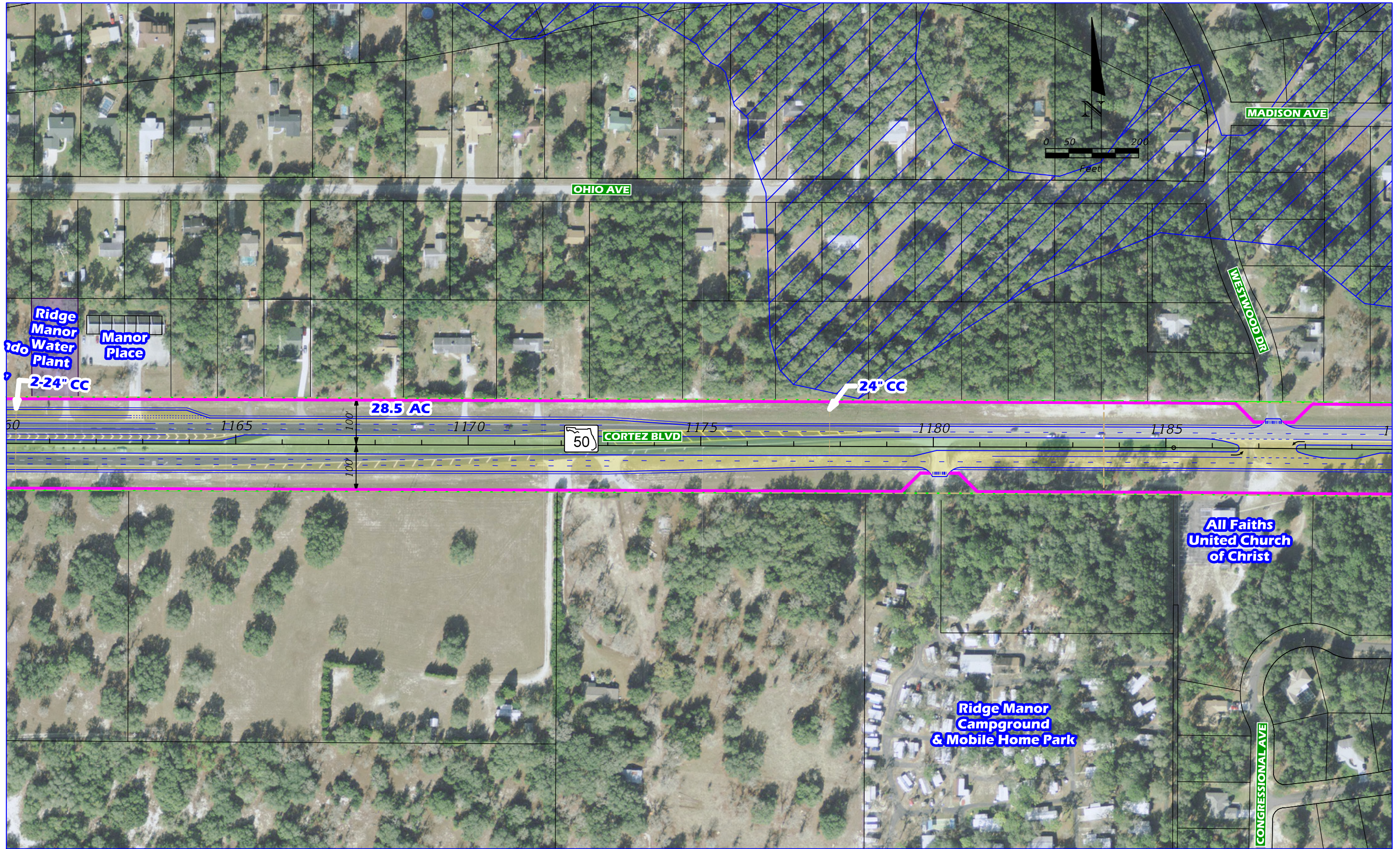
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See Sheet 14
 for US 98
 Improvements



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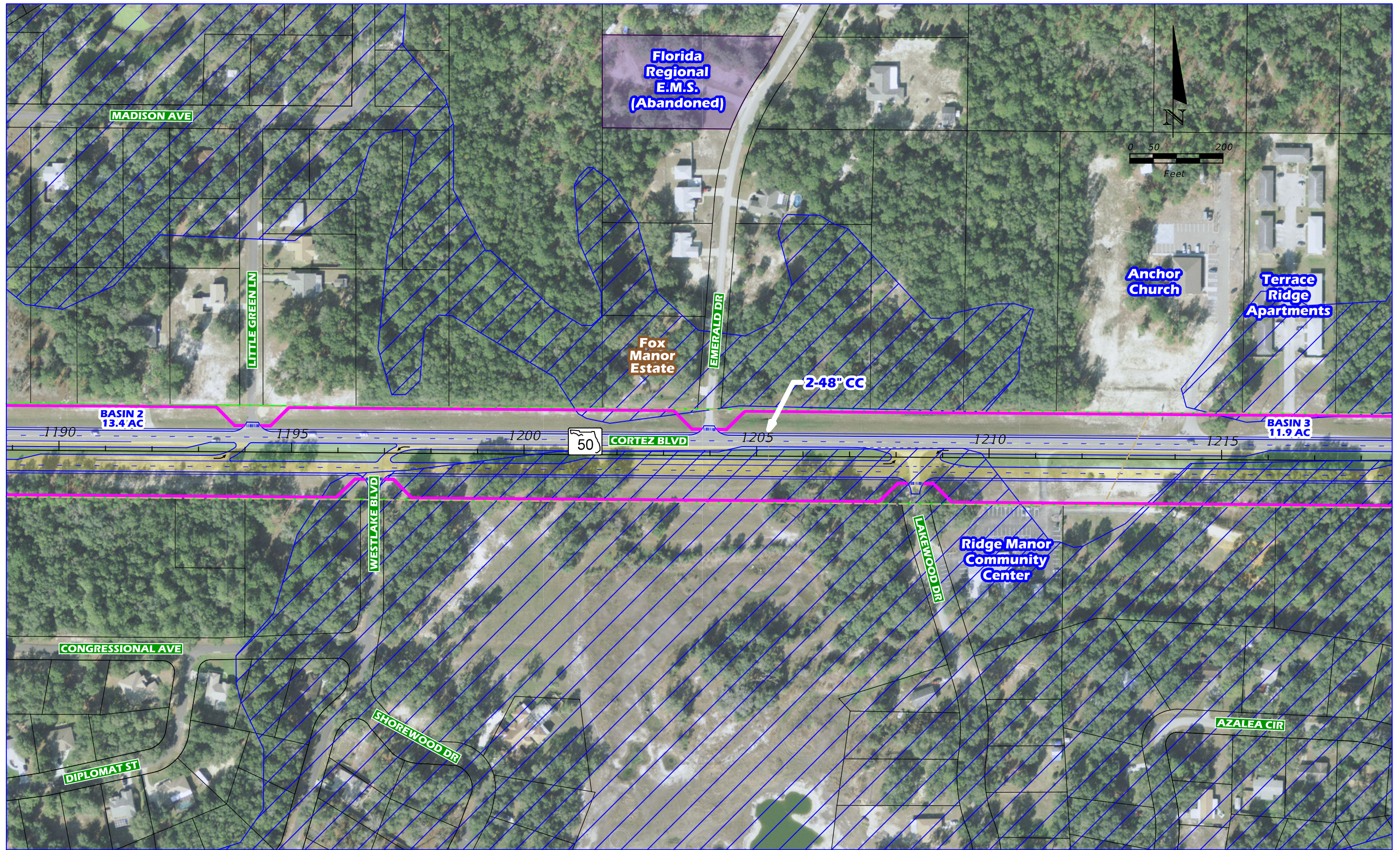
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EXISTING EASEMENT	PROPOSED ROW	BASINS	
PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

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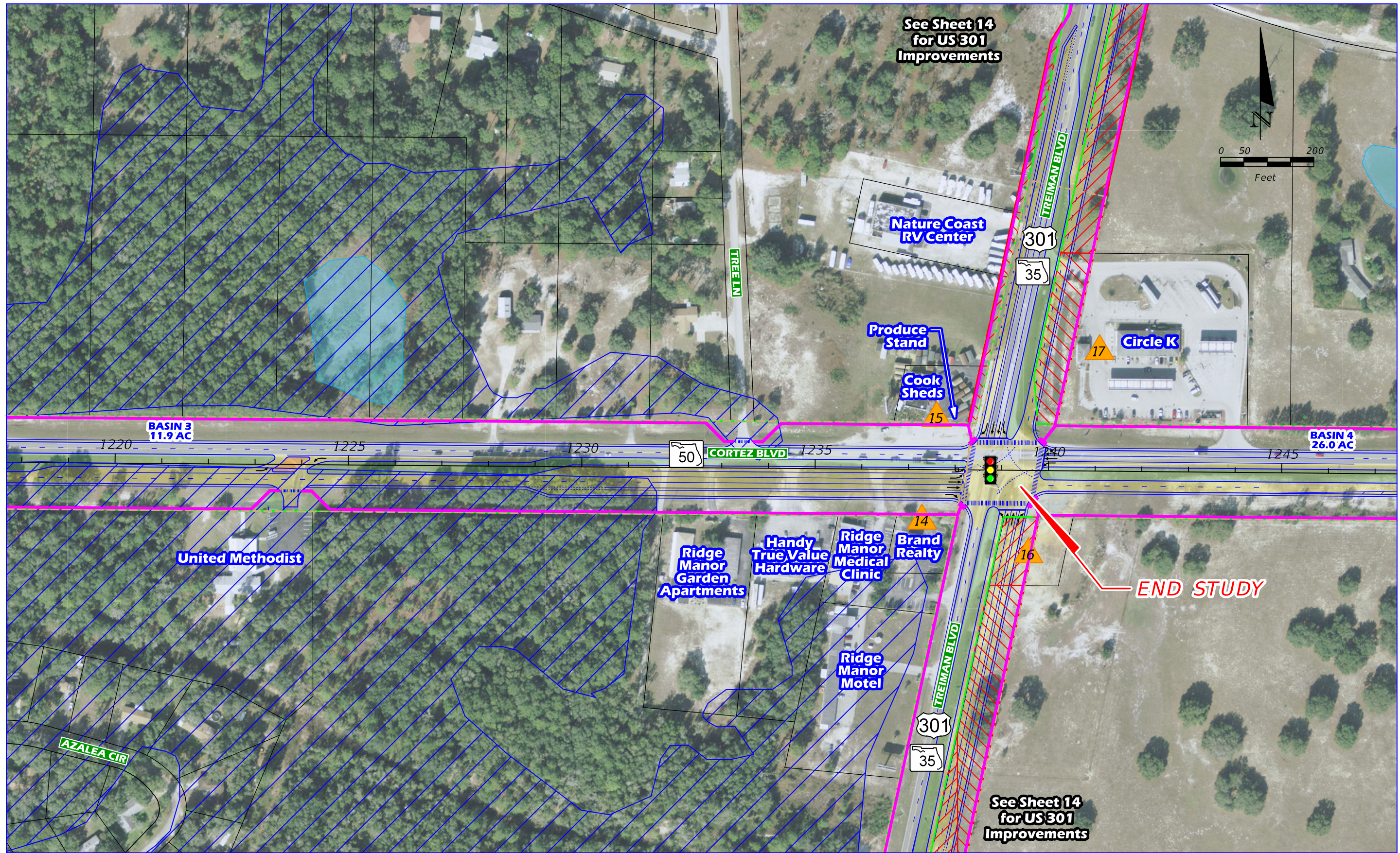
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	EXISTING EASEMENT		PROPOSED ROW						
	PARCEL BOUNDARY								

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See Sheet 14
for US 301
Improvements

See Sheet 14
for US 301
Improvements

END STUDY

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EXISTING ROW	PROPOSED EASEMENT (BY OTHERS)	OFW	CONSERVATION LAND
EXISTING EASEMENT	PROPOSED ROW	BASINS	
PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

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 SUITE 700
 TAMPA, FL 33607

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
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SR 50 (CORTEZ BLVD)
 FROM LOCKHART ROAD
 TO US 301 (TREIMAN BLVD)

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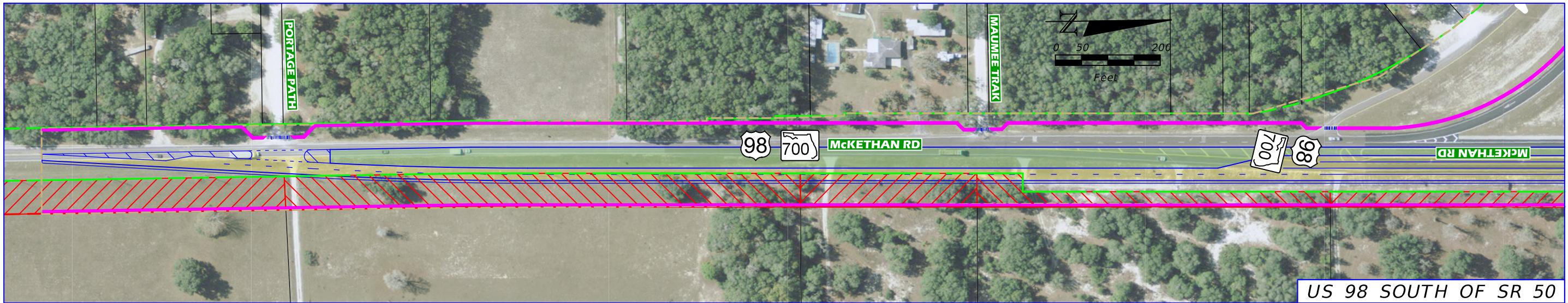
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EXISTING ROW	PROPOSED EASEMENT (BY OTHERS)	OFW	CONSERVATION LAND
EXISTING EASEMENT	PROPOSED ROW	BASINS	
PARCEL BOUNDARY	PROPOSED PAVEMENT/WIDENING		

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 SUITE 700
 TAMPA, FL 33607

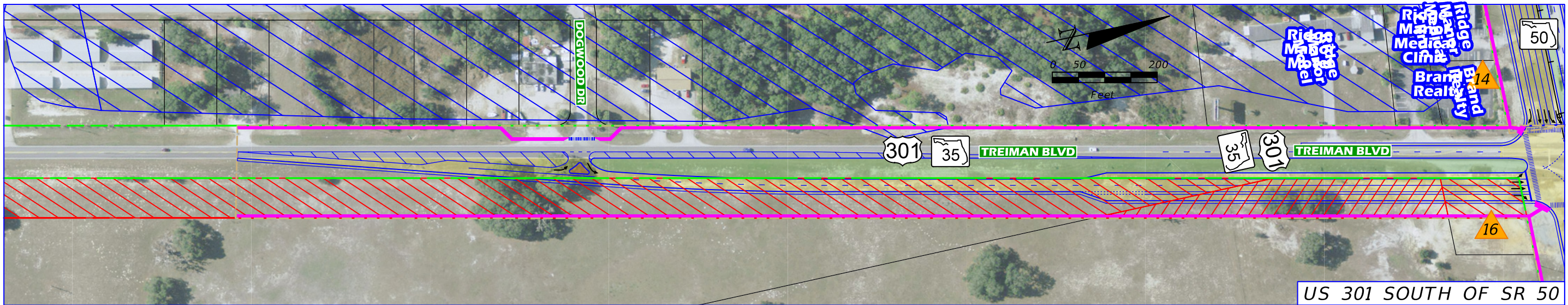
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SR 50 (CORTEZ BLVD)
 FROM LOCKHART ROAD
 TO US 301 (TREIMAN BLVD)

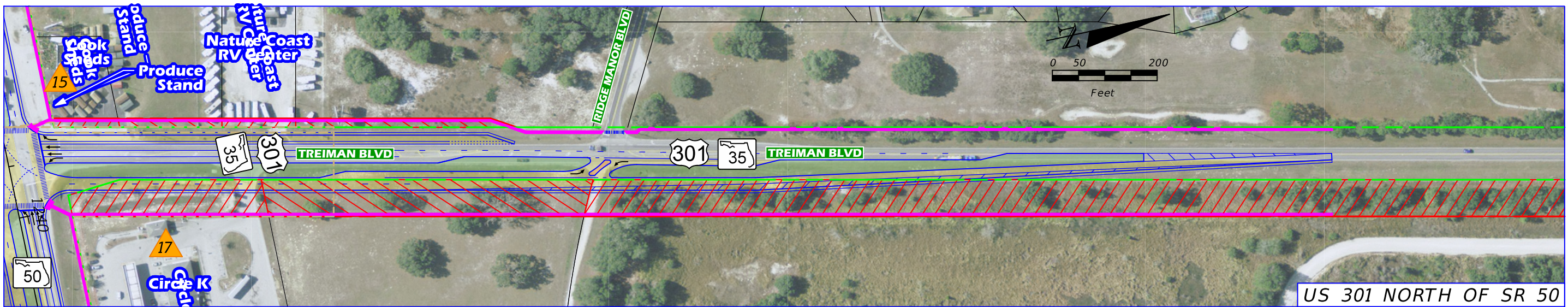
SHEET
 NO.
 13



US 98 SOUTH OF SR 50



US 301 SOUTH OF SR 50



US 301 NORTH OF SR 50

USER: 21871 4/24/2012 2:13:08 PM S:\Projects\FDOT\07-D7-WIDE4-101070\Task Work Orders in Progress\Task 7 & 8 - SEIR-SR 50\CADD\Drainage\PLAN01_14.dgn

990	CENTERLINE OF CONSTRUCTION		PROPOSED L.A. ROW (BY OTHERS)		PROPOSED SIDEWALK		FLOODPLAINS		IMPAIRED WATER
	EXISTING L.A. ROW		PROPOSED ROW (BY OTHERS)		OFW		CONSERVATION LAND		WETLAND
	EXISTING ROW		PROPOSED EASEMENT (BY OTHERS)		PROPOSED PAVEMENT/WIDENING		BASINS		
	EXISTING EASEMENT		PROPOSED ROW						
	PARCEL BOUNDARY								

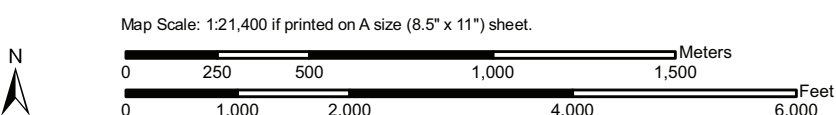
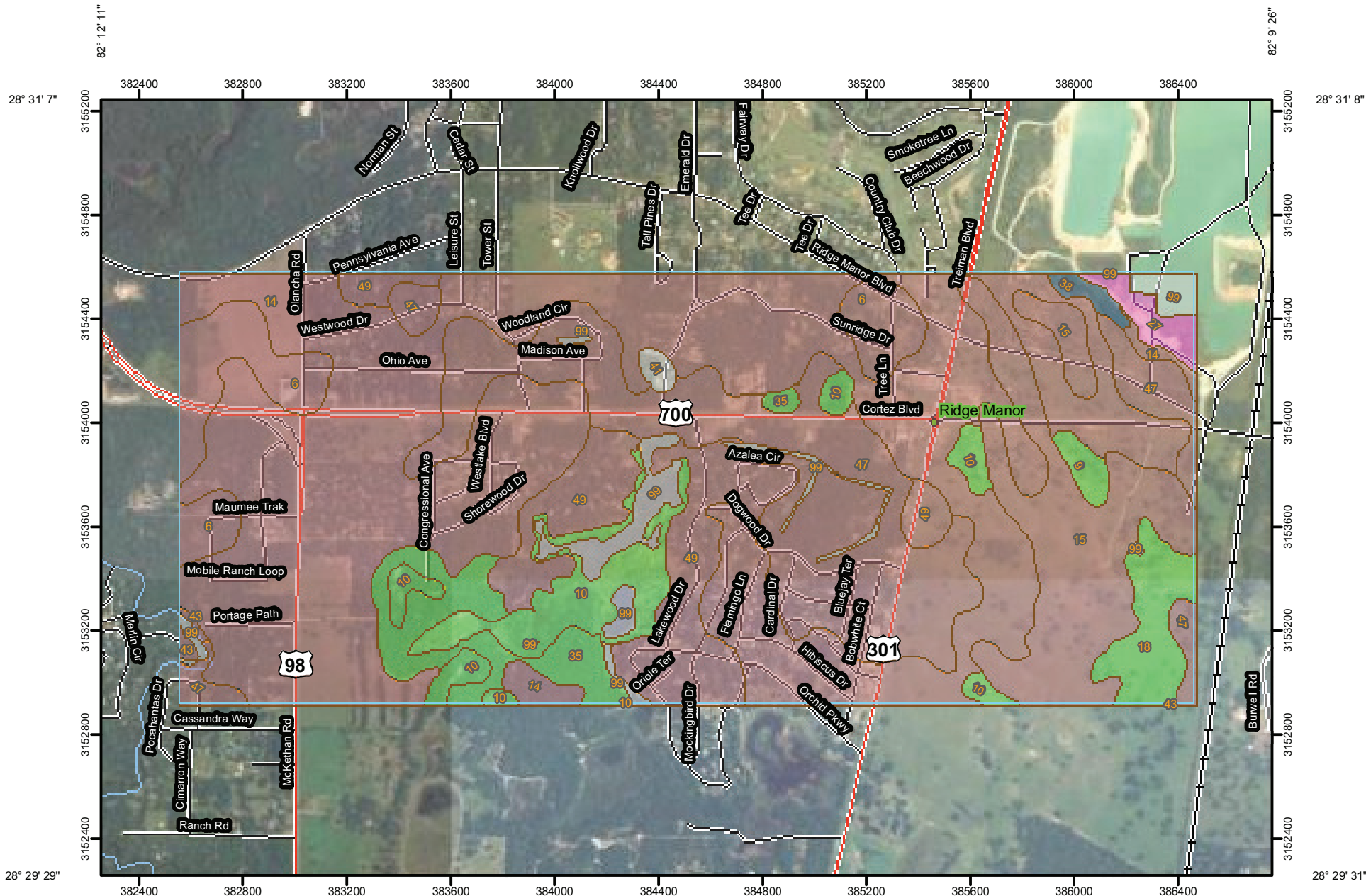
ATKINS
 4030 WEST BOY SCOUT BLVD
 SUITE 700
 TAMPA, FL 33607

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 50	HERNANDO	416732-2

SR 50 (CORTEZ BLVD)
 FROM LOCKHART ROAD
 TO US 301 (TREIMAN BLVD)


SHEET NO.
14

Hydrologic Soil Group—Hernando County, Florida



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units


Soil Ratings

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






Political Features

 Cities

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

MAP INFORMATION

Map Scale: 1:21,400 if printed on A size (8.5" × 11") sheet.

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

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

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

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

Soil Survey Area: Hernando County, Florida
Survey Area Data: Version 6, Jan 27, 2010

Date(s) aerial images were photographed: 8/13/2007

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Hernando County, Florida (FL053)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6	Arredondo fine sand, 0 to 5 percent slopes	A	78.6	4.9%
9	Basinger fine sand	A/D	8.2	0.5%
10	Basinger fine sand, depressional	A/D	83.5	5.2%
14	Candler fine sand, 0 to 5 percent slopes	A	726.3	45.3%
15	Candler fine sand, 5 to 8 percent slopes	A	142.6	8.9%
18	EauGallie fine sand	A/D	36.9	2.3%
27	Hydraquents	D	14.0	0.9%
35	Myakka fine sand	A/D	58.3	3.6%
38	Paisley fine sand	C/D	6.0	0.4%
41	Pits		4.5	0.3%
43	Pomello fine sand, 0 to 5 percent slopes	A	2.4	0.1%
47	Sparr fine sand, 0 to 5 percent slopes	A	266.8	16.7%
49	Tavares fine sand, 0 to 5 percent slopes	A	132.6	8.3%
99	Water		41.6	2.6%
Totals for Area of Interest			1,602.3	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

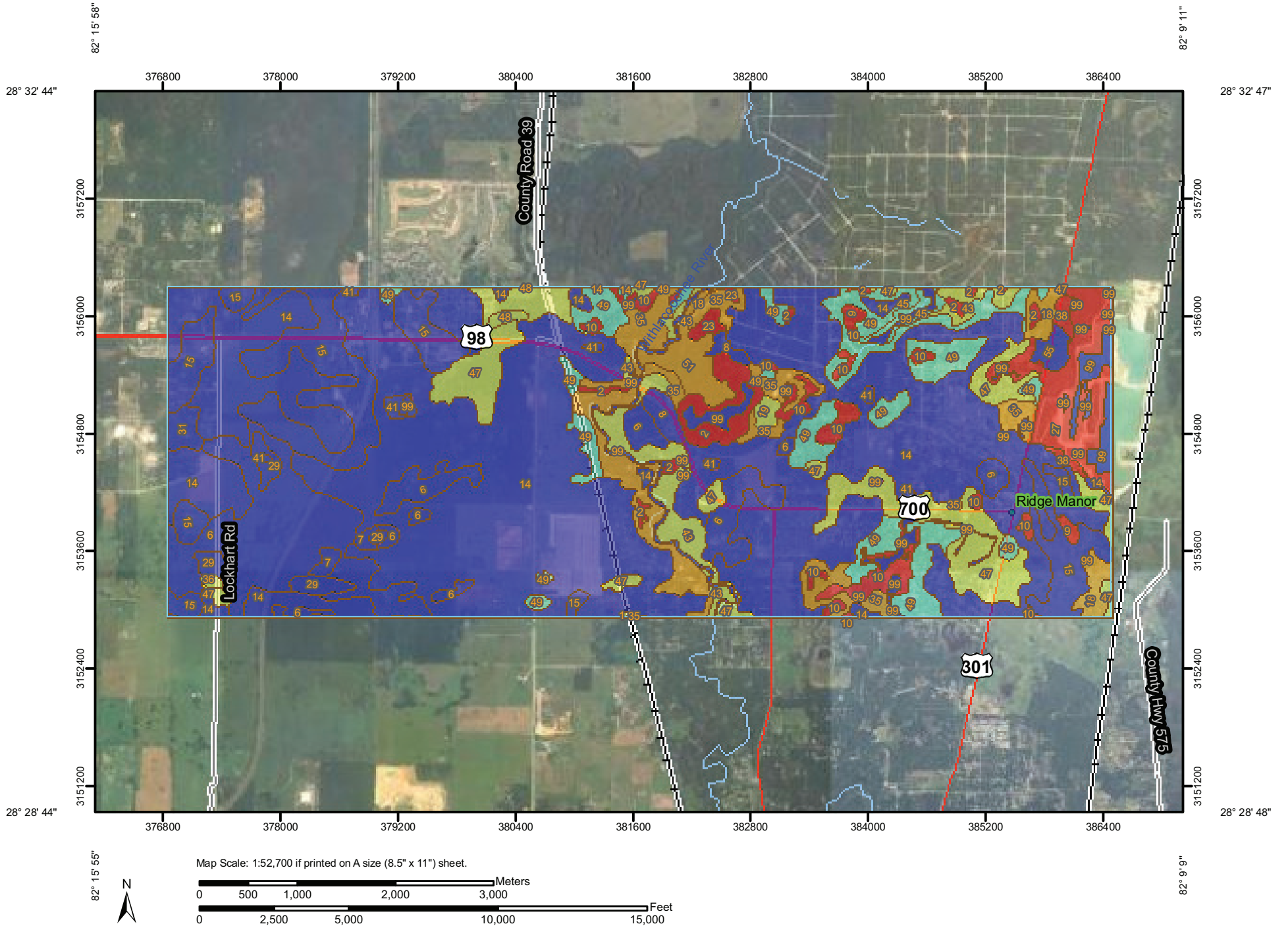
Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher


The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Depth to Water Table—Hernando County, Florida



MAP LEGEND

Area of Interest (AOI)


 Area of Interest (AOI)


Soils


 Soil Map Units


Soil Ratings

 0 - 25

 25 - 50

 50 - 100

 100 - 150


 150 - 200

 > 200

Political Features

 Cities

Water Features


 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

MAP INFORMATION

Map Scale: 1:52,700 if printed on A size (8.5" × 11") sheet.

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

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

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

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

Soil Survey Area: Hernando County, Florida
Survey Area Data: Version 6, Jan 27, 2010

Date(s) aerial images were photographed: 8/8/2007; 8/13/2007

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

Depth to Water Table

Depth to Water Table— Summary by Map Unit — Hernando County, Florida (FL053)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
1	Adamsville fine sand	84	1.0	0.0%
2	Anclothe fine sand	15	119.2	1.5%
6	Arredondo fine sand, 0 to 5 percent slopes	>200	740.1	9.2%
7	Arredondo fine sand, 5 to 8 percent slopes	>200	21.9	0.3%
8	Astatula fine sand, 0 to 8 percent slopes	>200	50.7	0.6%
9	Basinger fine sand	15	18.9	0.2%
10	Basinger fine sand, depressional	15	167.6	2.1%
14	Candler fine sand, 0 to 5 percent slopes	>200	3,780.5	47.1%
15	Candler fine sand, 5 to 8 percent slopes	>200	660.8	8.2%
18	EauGallie fine sand	31	76.1	0.9%
19	Electra variant fine sand, 0 to 5 percent slopes	61	15.7	0.2%
23	Floridana fine sand	15	20.2	0.3%
27	Hydraquents	15	226.2	2.8%
29	Kendrick fine sand, 0 to 5 percent slopes	>200	68.0	0.8%
31	Lake fine sand, 0 to 5 percent slopes	>200	32.9	0.4%
35	Myakka fine sand	31	382.1	4.8%
36	Nobleton fine sand, 0 to 5 percent slopes	77	6.4	0.1%
38	Paisley fine sand	15	22.8	0.3%
41	Pits	>200	34.2	0.4%
43	Pomello fine sand, 0 to 5 percent slopes	84	185.9	2.3%
45	Quartzipsammments, shaped, 0 to 5 percent slopes	122	22.5	0.3%
47	Sparr fine sand, 0 to 5 percent slopes	77	531.6	6.6%
48	Sparr fine sand, 5 to 8 percent slopes	77	11.9	0.1%
49	Tavares fine sand, 0 to 5 percent slopes	145	510.6	6.4%
51	Wabasso fine sand	31	85.2	1.1%
55	Williston loamy fine sand, 2 to 5 percent slopes	>200	29.8	0.4%
99	Water	>200	207.1	2.6%
Totals for Area of Interest			8,030.0	100.0%

Description

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

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

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

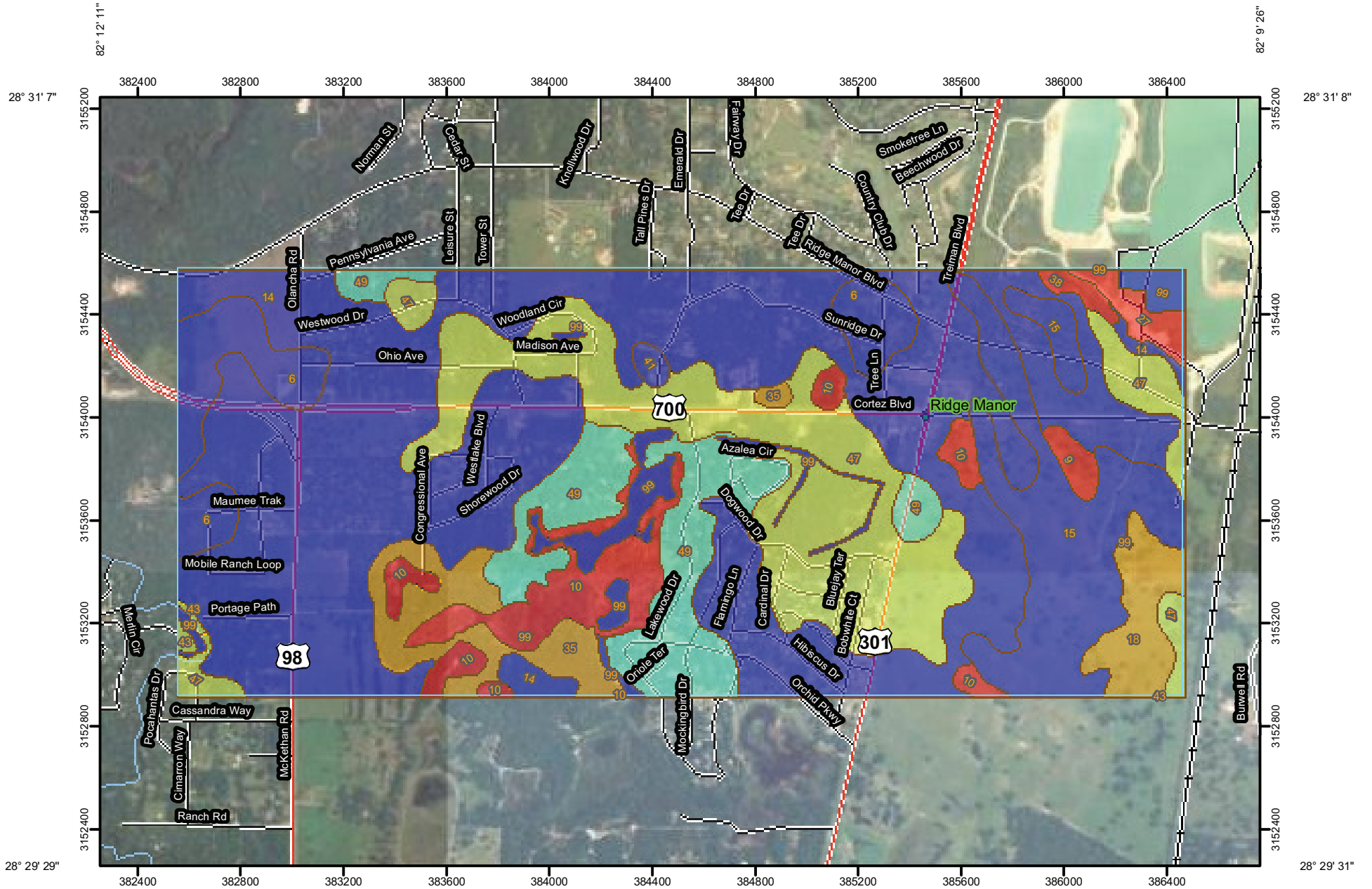
Tie-break Rule: Lower

Interpret Nulls as Zero: No

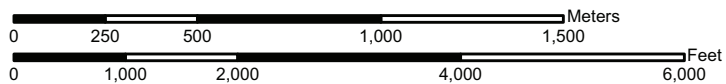
Beginning Month: January

Ending Month: December

Depth to Water Table—Hernando County, Florida




Map Scale: 1:21,400 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)


 Area of Interest (AOI)


Soils

 Soil Map Units


Soil Ratings

 0 - 25

 25 - 50

 50 - 100

 100 - 150


 150 - 200

 > 200

Political Features

 Cities

Water Features

 Streams and Canals


Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

MAP INFORMATION

Map Scale: 1:21,400 if printed on A size (8.5" × 11") sheet.

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

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

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

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

Soil Survey Area: Hernando County, Florida
Survey Area Data: Version 6, Jan 27, 2010

Date(s) aerial images were photographed: 8/13/2007

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

Depth to Water Table

Depth to Water Table— Summary by Map Unit — Hernando County, Florida (FL053)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
6	Arredondo fine sand, 0 to 5 percent slopes	>200	78.6	4.9%
9	Basinger fine sand	15	8.2	0.5%
10	Basinger fine sand, depressional	15	83.5	5.2%
14	Candler fine sand, 0 to 5 percent slopes	>200	726.3	45.3%
15	Candler fine sand, 5 to 8 percent slopes	>200	142.6	8.9%
18	EauGallie fine sand	31	36.9	2.3%
27	Hydraquents	15	14.0	0.9%
35	Myakka fine sand	31	58.3	3.6%
38	Paisley fine sand	15	6.0	0.4%
41	Pits	>200	4.5	0.3%
43	Pomello fine sand, 0 to 5 percent slopes	84	2.4	0.1%
47	Sparr fine sand, 0 to 5 percent slopes	77	266.8	16.7%
49	Tavares fine sand, 0 to 5 percent slopes	145	132.6	8.3%
99	Water	>200	41.6	2.6%
Totals for Area of Interest			1,602.3	100.0%

Description

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

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

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie.

The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Beginning Month: January

Ending Month: December

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Withlacoochee River Group 4 Basin - Southwest District - Cycle 2 FINAL Verified List

Hydrologic Unit: Withlacoochee River

OGC Case Number	Planning Unit	WBID	Water Segment Name	Waterbody Type	Waterbody Class ¹	1998 303(d) Parameter Of Concern	Parameters Assessed Using the Impaired Surface Waters Rule (ISWR)	Dissolved Oxygen/Biology/Pollutant of Concern	DO / Nutrient / Biology - TN, TP, BOD Median Values (mg/L) ²	Concentration of Criterion or Threshold Not Met	Previous EPA Integrated Report Category ¹ - Cycle 1 Assessment ⁴	Current EPA Integrated Report Category ¹ - Cycle 2 Assessment ⁴	Current Integrated Category ¹ - Final Assessment	Current Assessment Status	Priority for TMDL Development ⁴	Verified Period Assessment Data ³	Comments
10-3225	Lake Panasoffkee	1347	Lake Okahumpka	Lake	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3226	Lake Panasoffkee	1351A	Outlet River	Stream	3F		Nutrients (Chlorophyll-a)		TN = 0.982 (n=113) TP = 0.05 (n=110) BOD = 2.25 (n=12)	≤ 20 µg/L	2	5	5	Impaired	Medium	2003 (17 µg/L) 2004 (14 µg/L) 2005 (ID) 2006 (9.3 µg/L) 2007 (17 µg/L) 2008 (17 µg/L) 2009 (22 µg/L)	This river was verified as impaired for nutrients because the annual average chlorophyll-a values exceeded 20 µg/l in 2009. Nitrogen and phosphorus are the limiting nutrients based on a median TN/TP ratio of 20.43 (n=107).
10-3227	Lake Panasoffkee	1351B2	Canal 485A Springs Group	Spring	3F		Nutrients (Algal Mats)		TN = 1.12 (n=17) TP = 0.05 (n=24) BOD = No Data	Balanced natural population of flora.	N/A	5	5	Impaired	Medium	N/A	This spring has been verified as impaired for nutrients based on "other information" that indicated an imbalance in flora or fauna. It is included in a springs report "Florida Springs Initiative Monitoring Network Report 2008" that documents nutrient enrichment is apparent due to abundant algae documented through photography as well as bioassessment methods. Nitrate+nitrite levels range from 0.25 - 1.4 mg/L during the verified period and is the likely cause of the impairment; however, in accordance with Rule 62-303.710(4), F.A.C., the limiting nutrients are nitrogen and phosphorus based on a median TN/TP ratio of 23 (n=17).
10-3228	Lower Withlacoochee	1329A	Cross Florida Barge Canal	Estuary	3M		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3229	Lower Withlacoochee	1329A	Cross Florida Barge Canal	Estuary	3M		Nutrients (Chlorophyll-a)		TN = 0.74 (n=104) TP = 0.056 (n=105) BOD = 2.5 (n=5)	≤ 11 µg/L	2	5	5	Impaired	Medium	2003 (6.4 µg/L) 2004 (6.5 µg/L) 2005 (8.3 µg/L) 2006 (11 µg/L) 2007 (11 µg/L) 2008 (11 µg/L) 2009 (34 µg/L)	This canal was verified as impaired for nutrients because the annual average chlorophyll-a values exceeded 11 µg/l in 2009. Nitrogen and phosphorus are the limiting nutrients based on a median TN/TP ratio of 13 (n=104).
10-3230	Lower Withlacoochee	1329B	Lake Rousseau	Lake	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3231	Lower Withlacoochee	1329B1	Lake Rousseau Drain	Stream	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3232	Lower Withlacoochee	1329C	Withlacoochee River	Stream	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3233	Lower Withlacoochee	1329D	Withlacoochee River	Stream	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3234	Lower Withlacoochee	1329R	Wilson Head Spring	Spring	3F		Nutrients (Algal Mats)		TN = 0.66 (n=17) TP = 0.045 (n=18) BOD = No Data	Balanced natural population of flora.	N/A	5	5	Impaired	Medium	N/A	This spring has been verified as impaired for nutrients based on "other information" that indicated an imbalance in flora or fauna. It is included in a springs report "Florida Springs Initiative Monitoring Network Report 2008" that documents nutrient enrichment is apparent due to abundant algae documented through photography as well as bioassessment methods. Nitrate+nitrite levels range from 0.56 - 0.8 mg/L during the verified period and is the likely cause of the impairment; however, in accordance with Rule 62-303.710(4), F.A.C., the limiting nutrients are nitrogen and phosphorus based on a median TN/TP ratio of 14 (n=17).
10-3235	Lower Withlacoochee	1337	Withlacoochee River	Stream	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.

Withlacoochee River Group 4 Basin - Southwest District - Cycle 2 FINAL Verified List

Hydrologic Unit: Withlacoochee River

OGC Case Number	Planning Unit	WBD	Water Segment Name	Waterbody Type	Waterbody Class ¹	1998 303(d) Parameter Of Concern	Parameters Assessed Using the Impaired Surface Waters Rule (ISWR)	Dissolved Oxygen/Biology/Pollutant-of Concern	DO / Nutrient / Biology - TN, TP, BOD Median Values (mg/L) ²	Concentration of Criterion or Threshold Not Met	Previous EPA Integrated Report Category ¹ - Cycle 1 Assessment ¹	Current EPA Integrated Report Category ¹ - Cycle 2 Assessment ¹	Current Integrated Category ¹ - Final Assessment	Current Assessment Status	Priority for TMDL Development ³	Verified Period Assessment Data ⁴	Comments
10-3236	Lower Withlacoochee	1337A	Bypass Channel	Stream	3F		Mercury (in fish tissue)			Exceeds DOH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3237	Lower Withlacoochee	1338A	Gum Springs (Alligator Springs)	Spring	3F		Nutrients (Algal Mats)		TN = 1.31 (n=69) TP = 0.029 (n=71) BOD = 0.2 (n=1)	Balanced natural population of flora.	n/a	5	5	Impaired	Medium	N/A	This spring has been verified as impaired for nutrients based on "other information" that indicated an imbalance in flora or fauna. It is included in a springs report "Florida Springs Initiative Monitoring Network Report 2008" that documents nutrient enrichment is apparent due to abundant algae documented through photography as well as bioassessment methods. Nitrate+nitrite levels range from 0.14 - 1.4 mg/L during the verified period and is the likely cause of the impairment; however, in accordance with Rule 62-303.710(4), F.A.C., the limiting nutrient is phosphorus based on a median TN/TP ratio of 44 (n=69).
10-3238	Lower Withlacoochee	1357	Leslie-Hefner Canal	Stream	3F		Nutrients (Chlorophyll-a)		TN = 1.52 (n=32) TP = 0.1 (n=38) BOD = 2 (n=22)	≤ 20 µg/L	2	5	5	Impaired	Medium	2004 (ID) 2007 (ID) 2009 (44 µg/L)	This canal was verified as impaired for nutrients because the annual average chlorophyll-a value exceeded 20 µg/l in 2009. Nitrogen and phosphorus are the limiting nutrients based on a median TN/TP ratio of 18.36 (n=32).
10-3239	Rainbow River	1320A	Rainbow Springs Group	Spring	3F	Nutrients	Nutrients (Algal Mats)		TN = 1.58 (n=181) TP = 0.031 (n=181) BOD = 0.27 (n=16)	Balanced natural population of flora.	n/a	5	5	Impaired	Medium	N/A	This spring has been verified as impaired for nutrients based on "other information" that indicated an imbalance in flora or fauna. It is included in two spring reports "Florida Springs Initiative Monitoring Network Report 2008" and "Documentation to Support Listing of Nutrient Impaired Springs and Spring Runs" that documents the presence of epiphyte and algal mats in Rainbow Springs and Run and that nutrient enrichment is apparent due to the abundant algae documented through photography as well as bioassessment methods. Nitrate+nitrite levels range from 0.96 - 2.2 mg/L during the verified period and is the likely cause of the impairment; however, in accordance with Rule 62-303.710(4), F.A.C., the limiting nutrient is phosphorus based on a median TN/TP ratio of 52 (n=178).
10-3240	Rainbow River	1320B	Rainbow Springs Group Run	Stream	3F		Nutrients (Algal Mats)		TN = 1.4 (n=92) TP = 0.03 (n=91) BOD = No Data	Balanced natural population of flora.	n/a	5	5	Impaired	Medium	N/A	This spring has been verified as impaired for nutrients based on "other information" that indicated an imbalance in flora or fauna. It is included in two spring reports "Florida Springs Initiative Monitoring Network Report 2008" and "Documentation to Support Listing of Nutrient Impaired Springs and Spring Runs" that documents the presence of epiphyte and algal mats in Rainbow Springs and Run and that nutrient enrichment is apparent due to the abundant algae documented through photography as well as bioassessment methods. Nitrate+nitrite levels range from 1.0 - 1.7 mg/L during the verified period and is the likely cause of the impairment; however, in accordance with Rule 62-303.710(4), F.A.C., the limiting nutrient is phosphorus based on a median TN/TP ratio of 46 (n=91).
10-3241	Tsalo Apopka	1340A	Davis Lake	Lake	3F		Nutrients (TSI)		TN = 1.82 (n=20) TP = 0.042 (n=21) BOD = No Data	TSI ≤ 60; Color > 40	3b	5	5	Impaired	Medium	2009 (67; Color: 166 PCU)	This lake was verified as impaired because the TSI threshold of 60 was exceeded in 2009. Phosphorus is the limiting nutrient based on a median TN/TP ratio of 43.42 (n=20).
10-3242	Tsalo Apopka	1340E	Little Lake Consuella	Lake	3F		Nutrients (TSI)		TN = 1.095 (n=44) TP = 0.026 (n=43) BOD = No Data	TSI ≤ 40; Color ≤ 40	3b	5	5	Impaired	Medium	2007 (53; Color: 34 PCU) 2008 (46; Color: 31 PCU) 2009 (53; Color: 27 PCU)	This lake was verified as impaired because the TSI threshold of 40 was exceeded in 2007, 2008, 2009. Phosphorus is the limiting nutrient based on a median TN/TP ratio of 43.57 (n=43).
10-3243	Tsalo Apopka	1340L	Cooter Lake	Lake	3F		Nutrients (TSI)		TN = 0.555 (n=40) TP = 0.025 (n=41) BOD = No Data	TSI ≤ 40; Color ≤ 40	3b	5	5	Impaired	Medium	2007 (42; Color: 22 PCU) 2008 (38; Color: 19 PCU) 2009 (41; Color: 18 PCU)	This lake was verified as impaired because the TSI threshold of 40 was exceeded in 2007 and 2009. Nitrogen and phosphorus are the limiting nutrients based on a median TN/TP ratio of 25.47 (n=40).

Withlacoochee River Group 4 Basin - Southwest District - Cycle 2 FINAL Verified List
Hydrologic Unit: Withlacoochee River

OGC Case Number	Planning Unit	WBID	Water Segment Name	Waterbody Type	Waterbody Class ¹	1998 303(d) Parameter Of Concern	Parameters Assessed Using the Impaired Surface Waters Rule (ISWR)	Dissolved Oxygen/Biology Pollutant of Concern	DO / Nutrient / Biology - TN, TP, BOD Median Values (mg/L) ²	Concentration of Criterion or Threshold Not Met	Previous EPA Integrated Report Category ³ - Cycle 1 Assessment ⁴	Current EPA Integrated Report Category ³ - Cycle 2 Assessment ⁴	Current Integrated Category ³ - Final Assessment	Current Assessment Status	Priority for TMDL Development ⁵	Verified Period Assessment Data ⁵	Comments
10-3244	Upper Withlacoochee	1329E	Withlacoochee River	Stream	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3245	Upper Withlacoochee	1329F	Withlacoochee River	Stream	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3246	Upper Withlacoochee	1329G	Withlacoochee River	Blackwater	3F		Mercury (in fish tissue)			Exceeds DoH Threshold (< 0.3 ppm)	3c	5	5	Impaired	High*	Assessment based on DOH Fish Tissue Studies	Verified for impairment based on DOH fish consumption advisory data from 2003 for 12 Bluegill with an average mercury concentration of 0.37 ppm.
10-3247	Upper Withlacoochee	1378	Big Gant Canal	Stream	3F		Nutrients (Chlorophyll-a)		TN = 0.976 (n=103) TP = 0.046 (n=106) BOD = 1.9 (n=37)	≤ 20 µg/L	2	5	5	Impaired	Medium	2004 (12 µg/L) 2005 (8.2 µg/L) 2006 (4.6 µg/L) 2007 (23 µg/L) 2008 (6.8 µg/L) 2009 (15 µg/L) 2010 (ID)	This canal was verified as impaired for nutrients because the annual average chlorophyll-a value exceeded 20 µg/l in 2007. Nitrogen and phosphorus are the limiting nutrients based on a median TN/TP ratio of 20.7 (n=103).
10-3248	Upper Withlacoochee	1426	Pony Creek	Stream	3F		Dissolved Oxygen (Nutrients)	Total Phosphorus	TN = 1.66 (n=79) TP = 0.179 (n=79) BOD = No Data	≥ 5.0 mg/L	4c	5	5	Impaired	Medium	36/79	Impaired with total phosphorus identified as the causative pollutant. There are a sufficient number of exceedances to meet the verified list requirements and the total phosphorus median exceeds the 90th percentile value of 0.116 mg/L for the Peninsula region. 2004 SWFWMD land use statistics: 45% upland forest and wetlands, 44% agriculture and rangeland, 11% urban and built-up.
10-3249	Upper Withlacoochee	1449A	Lake Deeson	Lake	3F		Nutrients (TSI)		TN = 1.458 (n=18) TP = 0.06 (n=15) BOD = No Data	TSI ≤ 40; Color ≤ 40	3b	5	5	Impaired	Medium	2007 (71; Color: 20 PCU)	This lake was verified as impaired because the TSI threshold of 40 was exceeded in 2007. Nitrogen and phosphorus are the limiting nutrients based on a median TN/TP ratio of 23.7 (n=15).
10-3250	Upper Withlacoochee	1484A	Lake Tennessee	Lake	3F		Nutrients (TSI)		TN = 1.016 (n=29) TP = 0.025 (n=24) BOD = No Data	TSI ≤ 40; Color ≤ 40	3b	5	5	Impaired	Medium	2007 (57; Color: 6 PCU) 2008 (48; Color: 6 PCU) 2009 (42; Color: 9 PCU)	This lake was verified as impaired because the TSI threshold of 40 was exceeded in 2007, 2008 and 2009. Phosphorus is the limiting nutrient based on a median TN/TP ratio of 34.4 (n=24).
10-3251	Upper Withlacoochee	1484B	Lake Juliana	Lake	3F		Nutrients (TSI)		TN = 1.188 (n=33) TP = 0.03 (n=29) BOD = No Data	TSI ≤ 40; Color ≤ 40	3a	5	5	Impaired	Medium	2007 (53; Color: 11 PCU) 2008 (60; Color: 9 PCU) 2009 (59; Color: 9 PCU)	This lake was verified as impaired because the TSI threshold of 40 was exceeded in 2007, 2008 and 2009. Phosphorus is the limiting nutrient based on a median TN/TP ratio of 42.2 (n=29).

¹ Florida's waterbody classifications are defined as:

- 1 - Potable water supplies
- 2 - Shellfish propagation or harvesting
- 3F - Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in fresh water
- 3M - Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in marine water
- 4 - Agricultural water supplies
- 5 - Navigation, utility, and industrial use

² n is equal to the number of samples. When samples are collected at the same location less than 4 days apart, the median of those results represents a single sample for the purpose of determining n.

³ The Cycle 1 assessment was done in 2005 and included data from that Verified Period (January 1, 1998 through June 30, 2005).

⁴ The Cycle 2 assessment is the current assessment and includes data from the Verified Period (January 1, 2003 through June 30, 2010).

⁵ EPA's Integrated Report Category:

- 1 - Attains all designated uses
- 2 - Attains some designated uses and insufficient or no information or data are present to determine if remaining uses are attained
- 3a - No data and information are present to determine if any designated use is attained
- 3b - Some data and information are present but not enough to determine if any designated use is attained
- 3c - Enough data and information are present to determine that one or more designated uses may not be attained according to the Planning List methodology
- 4a - Impaired for one or more designated uses but does not require TMDL development because a TMDL has already been completed.
- 4b - Impaired for one or more designated uses but does not require TMDL development because the water will attain water quality standards due to existing or proposed measures as part of an approved Reasonable Assurance.
- 4c - Impaired for one or more criteria or designated uses but does not require TMDL development because impairment is not caused by a pollutant.
- 4d - The waterbody does not meet applicable criteria, but no pollutant can be identified thus a TMDL will not be developed at this time.
- 4e - Impaired, but recently completed or on-going restoration activities are underway to restore the designated uses of the waterbody.
- 5 - Water quality standards are not attained and a TMDL is required.

Withlacoochee River Group 4 Basin - Southwest District - Cycle 2 FINAL Verified List

Hydrologic Unit: Withlacoochee River

OGC Case Number	Planning Unit	WBID	Water Segment Name	Waterbody Type	Waterbody Class ¹	1998 303(d) Parameter Of Concern	Parameters Assessed Using the Impaired Surface Waters Rule (IWR)	Dissolved Oxygen/ Biology Pollutant of Concern	DO / Nutrient / Biology - TN , TP, BOD Median Values (mg/L) ²	Concentration of Criterion or Threshold Not Met	Previous EPA Integrated Report Category ³ - Cycle 1 Assessment ⁴	Current EPA Integrated Report Category ³ - Cycle 2 Assessment ⁴	Current Integrated Category ¹ - Final Assessment	Current Assessment Status	Priority for TMDL Development ⁵	Verified Period Assessment Data ⁶	Comments
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¹ Where a parameter was identified as impaired, a priority of "medium" was assigned except for waters where the impairment poses a threat to potable water or human health, which have been assigned a "high" priority, and fecal coliform impairments, which have been assigned a "low" priority.

It is our intent that listings with a "High" priority be addressed within the next 5 years, listings with a "Medium" priority be addressed within 5-10 years as resources allow, and listings with a "Low" priority be addressed within the next 10 years.

² VP - Verified Period (January 1, 2003 through June 30, 2010); Data include chlorophyll-a annual average, annual average TSI and color values, bioassessment results and # of exceedances/# of samples.

³ A statewide TMDL for mercury, that will address this waterbody, is scheduled to be completed in 2012.

⁴ FDEP Central laboratory determined that a threshold of 3 µg/L represents the lower end of reasonable detection limits for reporting known chlorophyll-a values.

Since the IWR permits annual mean chlorophyll-a value increases by no more than 50% over historical values, FDEP proposes to use 4.5 µg/L as a threshold for current conditions that must be exceeded in order to assess based on historic evaluations.

N/A = Not Applicable, does not apply, or was not assessed in the previous cycle (i.e. it's a new WBID, waterbody type change, etc.).

⁵ Beach advisories are based on FL Dept of Health Enterococcus (>103 CFU/100mL) or fecal coliform (>399 CFU/100mL) criteria.

Beach advisory data is based on "2010 Beach Advisories" created 2001 by Barbara Donner (FDEP Watershed Assessment Section).

Fish advisory data is based on "2008 Fish Advisories" created 2001 and updated 2009 by Barbara Donner of (FDEP Watershed Assessment Section).

The Group 4 Withlacoochee River FINAL Verified list is based on IWR Run 41x.

APPENDIX B

Existing ERP Permit Excerpts

APPENDIX B

- Existing Pond Capacity Calculations – From Kettering Road to US 98
- Required Hydraulic Clearance Calculations – From US 98 to US 301
- Pond Sizing Calculations - Basins 1-4 (assuming square ponds)

EXISTING POND CAPACITY CALCULATION

From the Permit Documents:

Pond A and G are Dry and are sized to retain and infiltrate 0.75" of the impervious area.

Ponds B-F are Wet and will treat 1.5 " of the impervious area.

(All the ponds looked dry in the field and in google maps)

From the typical section (4-lanes) (SR 50)

Impervious area in meters

3.6 per lane

1.5 outside shoulder

1.2 inside shoulder

19.8 Total (m)

65 Total (ft)

From the typical section (3 lanes) (SR 700)

Impervious area in meters

3.6 per lane

1.5 outside shoulder

13.8 Total (m)

45 Total (ft)

From proposed 6-lane typical section

Impervious area in feet

12 per lane

5 outside shoulders

82 Total (ft)

25 Total (m)

Per 40D-4.051 (12) and (13) sidewalks and recreational paths are not included in the treatment requirement calculations.

EXISTING POND CAPACITY CALCULATION

POND A- Dry (Systems 3&4)

From Station	1664+00.00	From Drainage Maps and report
To Station	1666+98.00	From Drainage Maps and report
Length	298 meters	

Basin Area	7.1 ac	From Report
Inpervious Area (Treated)	2.22 ac	From Report
Treatment Vol. Required	0.138 ac-ft	From Report
Treatment Vol. Provided	0.31 ac-ft	From Report

Verification of Impervious Area

4-Lane Typical	5900.4 sm	
	63511.906 sf	
	1.46 ac	< 2.22 ac

6-Lane Typical	7450 sm	
	80191.8 sf	
	1.84 ac	< 2.22ac

EXISTING POND CAPACITY CALCULATION

POND B - Wet Pond (System 5)

From Station	1667+71.50	From Drainage Maps and report
To Station	1668+80.00	From Drainage Maps and report
Length	109 meters	

Basin Area	3.97 ac	From Report
Inpervious Area (Treated)	0.89 ac	From Report
Treatment Vol. Required	0.111 ac-ft	From Report
Treatment Vol. Provided	0.12 ac-ft	From Report

Verification of Impervious Area

4-Lane Typical	2148.3 sm	
	23124.301 sf	
	0.53 ac	< 0.89 ac

6-Lane Typical	2712.5 sm	
	29197.35 sf	
	0.67 ac	< 0.89 ac

EXISTING POND CAPACITY CALCULATION

POND C - Wet Pond (System 5)

From Station	1668+80.00	From Drainage Maps and report
To Station	1670+70.00	From Drainage Maps and report
Length	190 meters	

Basin Area	7.89 ac	From Report
Inpervious Area (Treated)	1.46 ac	From Report
Treatment Vol. Required	0.183 ac-ft	From Report
Treatment Vol. Provided	0.239 ac-ft	From Report

Verification of Impervious Area

4-Lane Typical	3762 sm	
	40494.168 sf	
	0.93 ac	< 1.46 ac
6-Lane Typical	4750 sm	
	51129 sf	
	1.17 ac	<1.46 ac

EXISTING POND CAPACITY CALCULATION

POND D - Wet Pond (System 6)

From Station	1670+70.00	From Drainage Maps and report
To Station	1675+25.00	From Drainage Maps and report
Length	455 meters	
Basin Area	11.24 ac	From Report
Impervious Area (Treated)	3.53 ac	From Report
Treatment Vol. Required	0.441 ac-ft	From Report
Treatment Vol. Provided	0.633 ac-ft	From Report

From the report and the drainage maps only the south 2 lanes and the turn lanes drain to Pond 5. The north side drains directly to Cypress lake.

Length of Turn lanes

Left Side	1671+60.00
	1673+70.00
Total Length	210 m
Right Side	1670+70.00
	1671+40.00
Right Side	1672+91.00
	1675+25.00
Total Length	304.00 m

Median Turn out Area	6628.00 sf
	616 sm

Verification of Impervious Area

4-Lane Typical	7517 sm	This includes 2 thru lanes @ 3.6m, outside shldr @ 1.5m, 2 inside shldr @ 1.2m; the turn lanes at 3.6m
	80913 sf	this also includes Median Turn out
	1.86 ac	< 3.53 ac
6-Lane Typical	8063 sm	This includes 3 thru lanes @ 3.6m, the outside shldr at 1.5 m, turn lanes at 3.6m
	86786 sf	This also include Median Turn out
	1.99 ac	< 3.53 ac

EXISTING POND CAPACITY CALCULATION

POND E - Wet Pond (System 7)

From Station	1675+25.00	From Drainage Maps and report
To Station	1679+00.00	From Drainage Maps and report
Length	375 meters	

Basin Area	9.94 ac	From Report
Inpervious Area (Treated)	2.62 ac	From Report
Treatment Vol. Required	0.328 ac-ft	From Report
Treatment Vol. Provided	0.342 ac-ft	From Report

Verification of Impervious Area

4-Lane Typical	7425 sm	
	79922.7 sf	
	1.83 ac	< 2.62 ac

6-Lane Typical (No Shared Use Path)	9375 sm	
	100912.5 sf	
	2.32 ac	<2.62 ac

EXISTING POND CAPACITY CALCULATION

POND F - Wet Pond (System 8)

From Station	1679+00.00	From Drainage Maps and report
To Station	1692+40.00	From Drainage Maps and report
Length	1340 meters	

Basin Area	81.92 ac	From Report
Inpervious Area (Treated)	8.92 ac	From Report
Treatment Vol. Required	1.115 ac-ft	From Report
Treatment Vol. Provided	1.175 ac-ft	From Report

Verification of Impervious Area

4-Lane Typical	26532 sm	
	285590.448 sf	
	6.56 ac	< 8.92 ac

6-Lane Typical	33500 sm	
(No Shared Use Path)	360594 sf	
	8.28 ac	< 8.92 ac

EXISTING POND CAPACITY CALCULATION

POND G - Dry Pond (System 9)

From Station SR 50	1686+00.00 1/2 rdwy	From Drainage Maps and report
To Station SR50	1692+00.00 1/2 rdwy	From Drainage Maps and report
From Station SR 700	81+17.00	
To Station SR 700	88+00.00	
Length	1283 meters	
Basin Area	9.25 ac	From Report
Impervious Area (Treated)	1.61 ac	From Report
Treatment Vol. Required	0.101 ac-ft	From Report
Treatment Vol. Provided	0.339 ac-ft	From Report

Verification of Impervious Area

4-Lane Typical	15365.4 sm	
	165393.1656 sf	
	3.80 ac	> 1.61 ac
6-Lane Typical	16925.4 sm	
(No Shared Use Path)	182185.0056 sf	
	4.18 ac	> 1.61 ac

This assumes a true 6 lane typical section, however along SR 50 a transition occurs for approx. 1870'.

Subject: SR 50 - Basin 2 ✓

Comp by: APS

Date: 3/7/12

Sheet Number:

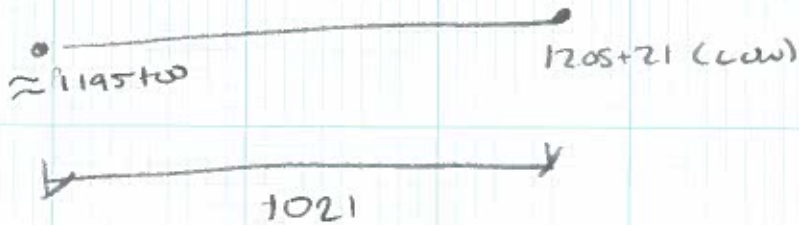
Check by: RM

Job Number:

Low Edge of Pmt = 71
LEOP

$$\text{Proposed LEOP} = 71 - (12)(0.003) = 7264 - 0.36 = 72.64$$

- Assume Pond at Beginning of Basin
Sta 1183+70



$$(1021)(0.001) = 1.02'$$

$$(1021)(0.0008) = 0.8 \text{ ft}$$

Subject: SR 50 - Basin 3 ✓

ATKINS

Comp by: ARS
Check by: RDM

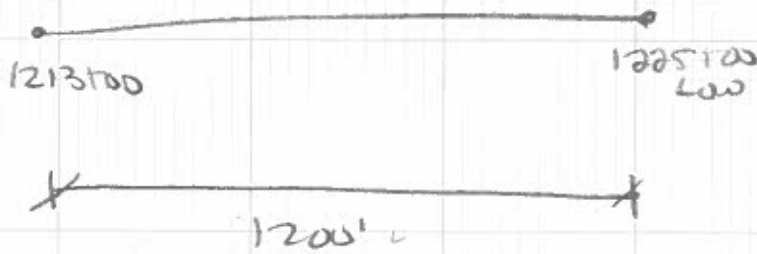
Date: 3/7/12
Job Number:

Sheet Number:

Exist L₂₀₀ = 71 ✓

Proposed L₂₀₀ = 71 - (12)(0.03) = 70.5 ✓

- Assume pond at beginning of basin (1213+00)



$$(1200)(0.001 \frac{ft}{ft}) = 1.2' ✓$$

SHWT 6' below EL at pond Loc

Existing ground at Pond Loc = 71.5 ✓

$$SHWT = 71.5 - 6 = 65.5 ✓$$

Subject: SR 50 - Basin 4 ✓

ATKINS

Comp by: APS

Date: 3/7/12

Sheet Number:

Check by: RM

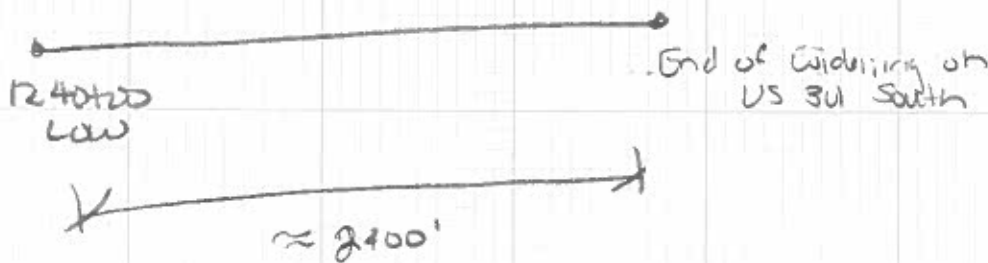
Job Number:

Existing LEOP = 70.0

Proposed EEOP = $70 - (12)(0.03) \approx 69.5$ ✓

Low at Approx Sta 1240+00

Assume Pond near Inter section, on South Side of SR 50



$$(2400)(0.001 \text{ ft/ft}) = 2.4' \checkmark$$

Existing ground at Pond Loc = 70 ✓

$$\text{SHWT} = 70 - 6 \approx 64' \checkmark$$

Subject: 82 50 - Basin 4 ✓
US 301 North side

ATKINS

Comp by: APS

Date: 3/8/12

Sheet Number:

Check by:

Job Number:

US 301 North (Trit in Ditches)

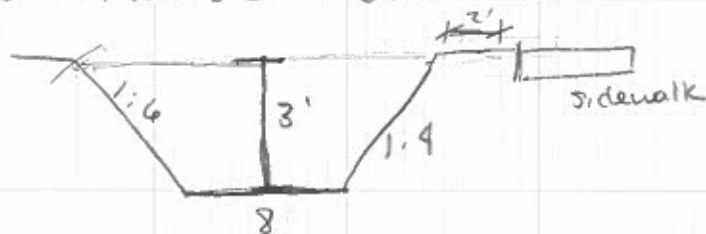
Impervious Area to be treated (DCIA)
(Measured in Microstation)

$$153233 \text{ sf} + \underbrace{(10')(1924')}_{\substack{\text{Sidewalk} \\ 5' \text{ each side}}} = 172473 \text{ sf} = 3.96 \text{ ac} \checkmark$$

Trit. Vol. Required

$$(3.96 \text{ ac}) \left(\frac{1 \text{ ft}}{12 \text{ in}} \right) = 0.29 \text{ ac-ft}$$

Width Available for ditch = 40'



Area of ditch per side of rdwy

$$\left(\frac{1}{2} \right) (8')(3') + (8')(3) + \left(\frac{1}{2} \right) (12')(3) = 69 \text{ sf}$$

$$\text{Volume of dt | side of rdwy} = (69 \text{ sf})(1924 \text{ ft}) = 132756 \text{ cf}$$

$$\text{Vol} = 3.0 \text{ ac-ft} \checkmark$$

* There is ample volume to provide trt in the ditches
using ditch blocks

ATKINS

S.R. 50 - Hernando County
FPID: 416732-2

Comp. By: APS
Checked By: RDU
Date: 02/29/12
Sheet No.: _____

Description: Summary of Pond Estimates

Basin	Begin Station	End Station	Basin Length (ft)	Treatment Depth Required (ft)	Attenuation Depth Required (ft)	Pond Size Estimate (ac)	Square Dimension (ft)
1	1150+00.00	1183+70.00	3370	1	1.4	3.3	378
2	1183+70.00	1213+00.00	2930	0.4	0.8	3.9	413
3	1213+00.00	1239+00.00	2600	1.3	2.2	1.7	276
4	1239+00.00	1261+68.00	2268	1.1	1.8	2.7	344
FPC	920+00.00	1261+68.00	34168	NA	NA	9.0	NA

NOTES:
1. The square dimensions include the maint. berm and tie downs.



ATKINS

Basin 1 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 1 Wet Pond Calculations

TREATMENT CALCULATIONS (Wet Detention)

Begin Station (SR 50) 1150+00
 End Station (SR 50) 1183+70
 Segment Total Roadway Length 3370 ft
 Total Segment Length (US 98) 3039 ft

Existing Conditions (SR 50)

Total R/W Width 200 ft
 Number of Lanes 4
 Lane Widths 12 ft
 Paved Outside Shoulder Width 5 ft
 Total impervious Width 58 ft

Existing Conditions (US 98)

Total R/W Width 163 ft
 Number of Lanes 3
 Lane Widths 12 ft
 Paved Outside Shoulder Width 5 ft
 Total impervious Width 46 ft

Proposed Conditions (SR 50)

Number of Lanes (includes turn lane) 7
 Lane Widths 12.0 ft
 Paved Outside Shoulder Width 5.0 ft
 Paved Inside Shoulder Width 0.0 ft
 Median Width 40.0 ft
 Sidewalks 5.0 ft
 Total impervious Width 104.0 ft

Existing condition Pavement (Includes US98)
 (measured in microstation) 7.8 ac

Proposed condition Pavement (Includes US98)
 (measured in microstation) 14.5 ac

Treat 1.5 in. of runoff over DCIA
 Includes Impervious Pond Area 16.0 ac
 Treatment volume required **2.00 ac-ft**

VOLUME RETENTION CALCULATIONS

Will attenuation be necessary? **Y**
 SWFWMD Rainfall Depth Zone 6 - 100yr/24hr (P) **11.0 in.**

Pre-development Conditions

Total Area to be attenuated for **26.84 ac**
 Impervious Areas
 Water 0.00 ac
 Pavement (roadways, driveways, concrete, etc.) **7.75 ac**
 Pervious Area **19.09 ac**

CN Calculations

Soil Type(s) Candler
 Hydrologic Group A
 SHWT Depth <6.0

		Area	CN	Weighted CN
Impervious Areas				
Water		0.00 ac	100	0.00
Pavement (roadways, driveways, concrete, etc.)		7.75 ac	98	28.29
Pervious	Fair	19.09 ac	68	48.36
			CN _{pre} =	76.6

SCS Method for Attenuation Volume:

$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 3.05 in.

Q_{pre} = 8.03 in.

Pre-development runoff volume = **17.97 ac-ft**

ATKINS

Basin 1 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 1 Wet Pond Calculations

ATTENUATION CALCULATIONS (CONT.)

Post-development Conditions

Total Area to be attenuated for **26.84 ac**
 Impervious Areas
 Water 1.58 ac
 Pavement (roadways, driveways, concrete, etc.) 14.46 ac
 Pervious area 10.81 ac

CN Calculations

Soil Type(s) Candler
 Hydrologic Group A
 SHWT Depth <6.0

	Area	CN	Weighted CN
Impervious Areas			
Water	1.58 ac	100	5.89
Pavement (roadways, driveways, concrete, etc.)	14.46 ac	98	52.77
Pervious Area	Fair	68	27.38
		CN _{post} =	86.0

SCS Method for Attenuation Volume:

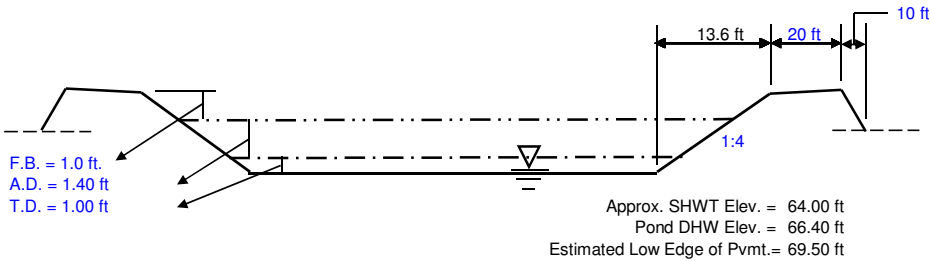
$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.62 in.
 Q_{post} = 9.27 in.
 Post-development runoff volume = **20.73 ac-ft**

Total Attenuation volume required (Post-Pre) for Basin 1 **2.76 ac-ft**

POND SIZE ESTIMATE



Square Dimensions

Square dimension at bottom of T.D. 291.2 ft
 Square dimension at top of A.D. 310.4 ft
 Treatment & Attenuation Volume provided 4.98 ac-ft *
 Square dimension at top of freeboard (F.B.) 318.4 ft
 Outside pond dimensions (including maint. berm & tie-down) 378.4 ft

Treatment Vol. Required*
2.00 ac-ft
 Attenuation Vol. Required
2.76 ac-ft

*includes pond area at treatment depth

* Pond dimensions meet treatment depth and volume requirements, which may exceed attenuation/head requirements.

Minimum Total Area Required: **3.3 ac**

ATKINS

Basin 2 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 2 Wet Pond Calculations

TREATMENT CALCULATIONS (Wet Detention)

Begin Station 1183+70
 End Station 1213+00
 Segment Total Roadway Length 2930 ft

Existing Conditions

Total R/W Width 200 ft
 Number of Lanes 2
 Lane Widths 12 ft
 Paved Outside Shoulder Width 5 ft
 Paved Inside Shoulder Width 0 ft
 Median Width 0 ft
 Total impervious Width 34 ft

Proposed Conditions

Number of Lanes (includes turn lane) 7
 Lane Widths 12.0 ft
 Paved Outside Shoulder Width 5.0 ft
 Paved Inside Shoulder Width 0.0 ft
 Median Width 40.0 ft
 Sidewalks 5.0 ft
 Total impervious Width 104.0 ft

Treat 1.5 in. of runoff over DCIA
 Includes Impervious Pond Area 8.4 ac

Treatment volume required **1.04 ac-ft**

VOLUME RETENTION CALCULATIONS

Will attenuation be necessary? **Y**
 SWFWMD Rainfall Depth Zone 6 - 100yr/24hr (P) **11.0 in.**

Pre-development Conditions

Total Area to be attenuated for **13.45 ac**
 Impervious Areas
 Water 0.00 ac
 Pavement (roadways, driveways, concrete, etc.) **2.29 ac**
 Pervious Area **11.16 ac**

CN Calculations

Soil Type(s) Sparr
 Hydrologic Group A/D
 SHWT Depth 1.5-3.5

		Area	CN	Weighted CN
Impervious Areas				
Water		0.00 ac	100	0.00
Pavement (roadways, driveways, concrete, etc.)		2.29 ac	98	16.66
Pervious	Fair	11.16 ac	68	56.41
CN _{pre} =				73.1

SCS Method for Attenuation Volume:

$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 3.69 in.
 Q_{pre} = 7.55 in.
 Pre-development runoff volume = **8.47 ac-ft**

ATKINS

Basin 2 - Wet Pond
SR 50 - Hernando County
WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 2 Wet Pond Calculations

ATTENUATION CALCULATIONS (CONT.)

Post-development Conditions

Total Area to be attenuated for **13.45 ac**
 Impervious Areas
 Water **1.40 ac**
 Pavement (roadways, driveways, concrete, etc.) **7.00 ac**
 Pervious area **5.06 ac**

CN Calculations

Soil Type(s) **Sparr**
 Hydrologic Group **A/D**
 SHWT Depth **1.5-3.5**

		Area	CN	Weighted CN
Impervious Areas				
Water		1.40 ac	100	10.41
Pavement (roadways, driveways, concrete, etc.)		7.00 ac	98	50.96
Pervious Area	Fair	5.06 ac	68	25.56
			CN _{post} =	86.9

SCS Method for Attenuation Volume:

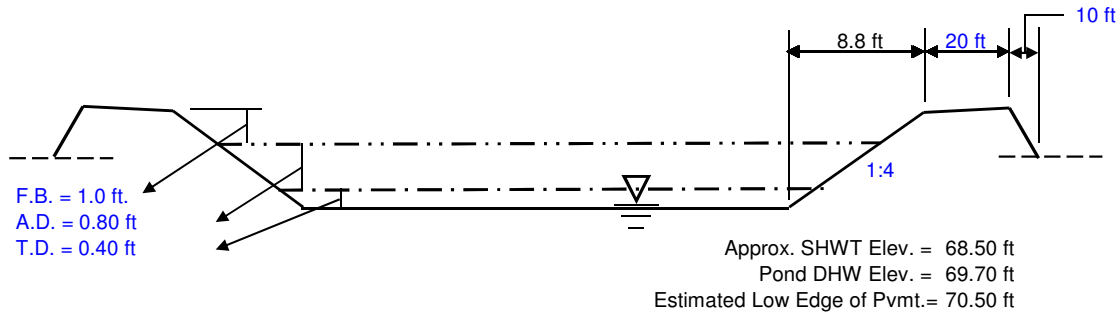
$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.50 in.
 Q_{post} = 9.38 in.
 Post-development runoff volume = **10.52 ac-ft**

Total Attenuation volume required (Post-Pre) for Basin 2 **2.05 ac-ft**

POND SIZE ESTIMATE



Square Dimensions

Square dimension at bottom of T.D. **334.9 ft**
 Square dimension at top of A.D. **344.5 ft**
 Treatment & Attenuation Volume provided **3.18 ac-ft ***
 Square dimension at top of freeboard (F.B.) **352.5 ft**
 Outside pond dimensions (including maint. berm & tie-down) **412.5 ft**

Treatment Vol. Required*
1.04 ac-ft
Attenuation Vol. Required
2.05 ac-ft

*includes pond area at treatment dept

Minimum Total Area Required: 3.9 ac

ATKINS

Basin 3 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 3 Wet Pond Calculations

TREATMENT CALCULATIONS (Wet Detention)

Begin Station 1213+00
 End Station 1239+00
 Segment Total Roadway Length 2600 ft

Existing Conditions

Total R/W Width 200 ft
 Number of Lanes 2
 Lane Widths 12 ft
 Paved Outside Shoulder Width 5 ft
 Paved Inside Shoulder Width 0 ft
 Median Width 0 ft
 Total impervious Width 34 ft

Proposed Conditions

Number of Lanes (includes turn lane) 7
 Lane Widths 12.0 ft
 Paved Outside Shoulder Width 5.0 ft
 Paved Inside Shoulder Width 0.0 ft
 Median Width 40.0 ft
 Sidewalks 5.0 ft
 Total impervious Width 104.0 ft

Treat 1.5 in. of runoff over DCIA
 Includes Impervious Pond Area 8.2 ac

Treatment volume required **1.02 ac-ft**

VOLUME RETENTION CALCULATIONS

Will attenuation be necessary? **Y**
 SWFWMD Rainfall Depth Zone 6 - 100yr/24hr (P) **11.0 in.**

Pre-development Conditions

Total Area to be attenuated for **11.94 ac**
 Impervious Areas
 Water 0.00 ac
 Pavement (roadways, driveways, concrete, etc.) **2.03 ac**
 Pervious Area **9.90 ac**

CN Calculations

Soil Type(s) Candler
 Hydrologic Group A
 SHWT Depth <6.0

		Area	CN	Weighted CN
Impervious Areas				
Water		0.00 ac	100	0.00
Pavement (roadways, driveways, concrete, etc.)		2.03 ac	98	16.66
Pervious Area	Poor	9.90 ac	68	56.39
CN _{pre} =				73.1

SCS Method for Attenuation Volume:

$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 3.69 in.
 Q_{pre} = 7.55 in.
 Pre-development runoff volume = **7.51 ac-ft**

ATKINS

Basin 3 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 3 Wet Pond Calculations

ATTENUATION CALCULATIONS (CONT.)

Post-development Conditions

Total Area to be attenuated for **11.94 ac**
 Impervious Areas
 Water 1.14 ac
 Pavement (roadways, driveways, concrete, etc.) 6.21 ac
 Pervious area 4.59 ac

CN Calculations

Soil Type(s) Candler
 Hydrologic Group A
 SHWT Depth <6.0

		Area	CN	Weighted CN
Impervious Areas				
Water		1.14 ac	100	9.55
Pavement (roadways, driveways, concrete, etc.)		6.21 ac	98	50.96
Pervious Area	Poor	4.59 ac	68	26.15
			CN _{post} =	86.7

SCS Method for Attenuation Volume:

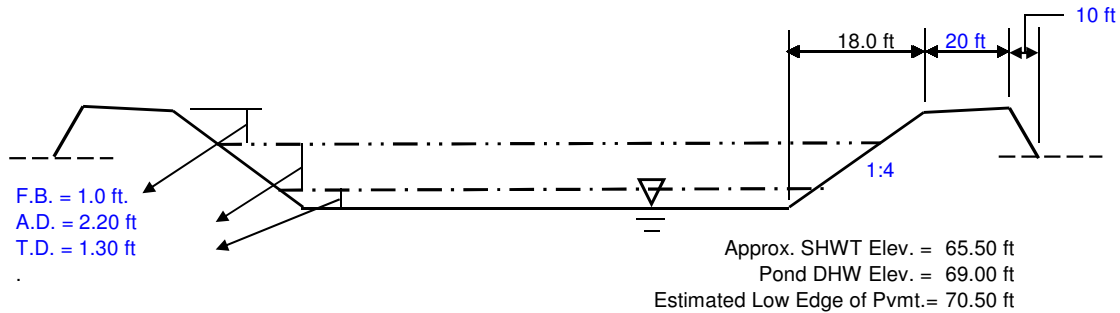
$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.54 in.
 Q_{post} = 9.35 in.
 Post-development runoff volume = **9.30 ac-ft**

Total Attenuation volume required (Post-Pre) for Basin 3 **1.79 ac-ft**

POND SIZE ESTIMATE



Square Dimensions

Square dimension at bottom of T.D. 179.7 ft
 Square dimension at top of A.D. 207.7 ft
 Treatment & Attenuation Volume provided 3.01 ac-ft *
 Square dimension at top of freeboard (F.B.) 215.7 ft
 Outside pond dimensions (including maint. berm & tie-down) 275.7 ft

Treatment Vol. Required*
1.02 ac-ft
Attenuation Vol. Required
1.79 ac-ft

*includes pond area at treatment dept

* Pond dimensions meet treatment depth and volume requirements, which may exceed attenuation/head requirements.

Minimum Total Area Required: 1.7 ac

ATKINS

Basin 4 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 4 Wet Pond Calculations

TREATMENT CALCULATIONS (Wet Detention)

Begin Station	1239+00	
End Station	1261+68	
Segment Total Roadway Length	2268 ft	
US 301 Total Roadway Length	3750 ft	measured in microstation
Existing Conditions (SR 50)		
Total R/W Width	200 ft	
Number of Lanes	2	
Lane Widths	12 ft	
Paved Outside Shoulder Width	5 ft	
Total impervious Width	34 ft	
Existing Conditions (US 301)		
Total R/W Width	181 ft	
Number of Lanes	2	
Lane Widths	12 ft	
Paved Outside Shoulder Width	5 ft	
Total impervious Width	34 ft	
Proposed Conditions		
Number of Lanes (includes turn lane)	7	
Lane Widths	12.0 ft	
Paved Outside Shoulder Width	5.0 ft	
Paved Inside Shoulder Width	0.0 ft	
Median Width	40.0 ft	
Sidewalks	5.0 ft	
Total impervious Width	104.0 ft	
Total Impervious are from US 301 Widening (Measured in Microstation)	7.3 ac	

Treat 1.5 in. of runoff over DCIA
 The impervious area was measured in microstation due to the tappers. This also includes the pond impervious area

13.4 ac

Treatment volume required **1.67 ac-ft**

VOLUME RETENTION CALCULATIONS

Will attenuation be necessary? **Y**
 SWFWMD Rainfall Depth Zone 6 - 100yr/24hr (P) **11.0 in.**

Pre-development Conditions

Total Area to be attenuated for Impervious Areas	26.00 ac
Water	0.00 ac
Pavement (roadways, driveways, concrete, etc.)	4.70 ac
Pervious Area	21.29 ac

CN Calculations

Soil Type(s) Candler
 Hydrologic Group A
 SHWT Depth >6.0

	Area	CN	Weighted CN
Impervious Areas			
Water	0.00 ac	100	0.00
Pavement (roadways, driveways, concrete, etc.)	4.70 ac	98	17.71
Pervious Area	Poor 21.29 ac	68	55.69
			CN _{pre} = 73.4

SCS Method for Attenuation Volume:

$$S = \frac{1,000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 3.62 in.
 Q_{pre} = 7.60 in.
 Pre-development runoff volume = **16.46 ac-ft**

ATKINS

Basin 4 - Wet Pond
 SR 50 - Hernando County
 WPSN: 416732-2

Comp. By: APS
 Checked By: RDU
 Date: 02/12/12

Description: Basin 4 Wet Pond Calculations

ATTENUATION CALCULATIONS (CONT.)

Post-development Conditions

Total Area to be attenuated for **26.00 ac**
 Impervious Areas
 Water 2.00 ac
 Pavement (roadways, driveways, concrete, etc.) 11.37 ac
 Pervious area 12.63 ac

CN Calculations

Soil Type(s) Candler
 Hydrologic Group A
 SHWT Depth <6.0

		Area	CN	Weighted CN
Impervious Areas				
Water		2.00 ac	100	7.69
Pavement (roadways, driveways, concrete, etc.)		11.37 ac	98	42.86
Pervious Area	Poor	12.63 ac	68	33.03
CN _{post} =				83.6

SCS Method for Attenuation Volume:

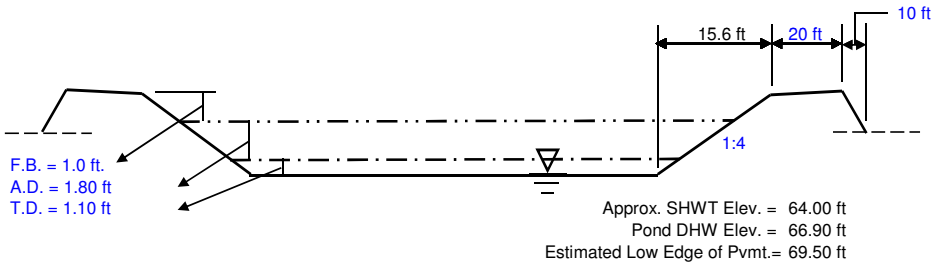
$$S = \frac{1000}{CN} - 10$$

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.96 in.
 Q_{post} = 8.95 in.
 Post-development runoff volume = **19.39 ac-ft**

Total Attenuation volume required (Post-Pre) for Basin 4 **2.93 ac-ft**

POND SIZE ESTIMATE



Square Dimensions

Square dimension at bottom of T.D. 252.8 ft
 Square dimension at top of A.D. 276.0 ft
 Treatment & Attenuation Volume provided 4.65 ac-ft *
 Square dimension at top of freeboard (F.B.) 284.0 ft
 Outside pond dimensions (including maint. berm & tie-down) 344.0 ft

Treatment Vol. Required*
1.67 ac-ft
Attenuation Vol. Required
2.93 ac-ft

* Pond dimensions meet treatment depth and volume requirements, which may exceed attenuation/head requirements.

Minimum Total Area Required: **2.7 ac**

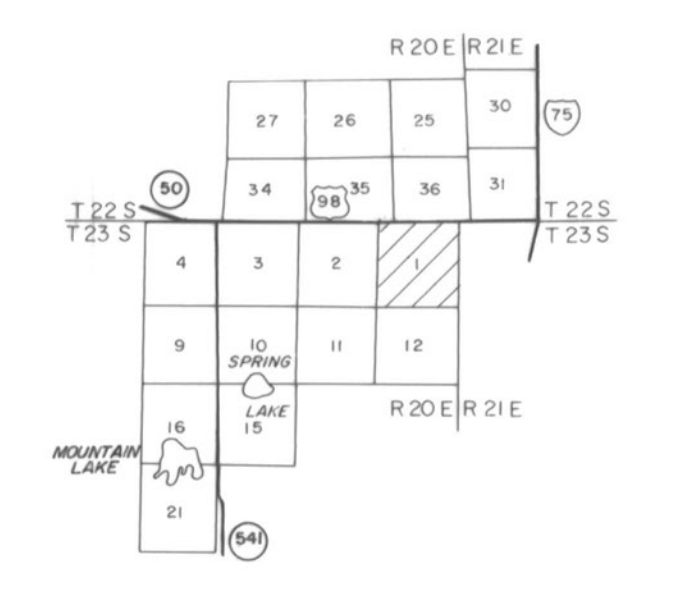
APPENDIX C

SWFWMD 1-Foot Contour Aerials

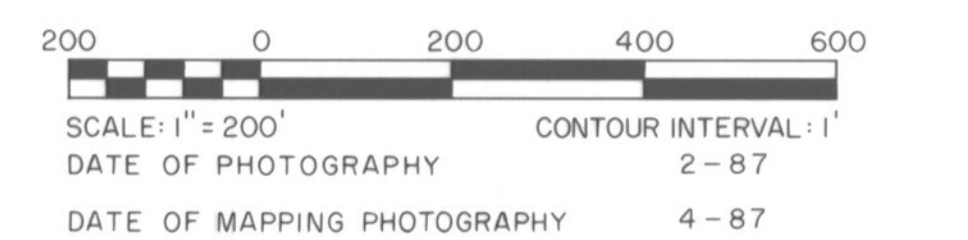


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 BY
PSI PHOTOGRAMMETRIC SERVICES, INC.
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 REYNOLDSBURG, OHIO 43068
 LEGEND

- HORIZONTAL CONTROL △ BL-5
- VERTICAL CONTROL x 8-6-3
70.6
- TEMPORARY BENCH MARK □ TBM 2-8
80.87
- SECTION CORNERS 141 13
23 24
- CONTOURS 40
35
- DEPRESSION CONTOURS 25
- SPOT ELEVATIONS 128.2
- INTERSTATE HIGHWAY 75
- U.S. HIGHWAY 41
- STATE HIGHWAY 45
- COUNTY ROAD 765



NOTE:
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 GRIDS BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE.
 ELEVATIONS BASED ON U.S.C.B.G.S. DATUM.



SOUTHWEST FLORIDA
 WATER MANAGEMENT DISTRICT
 WITHLACOCOCHEE RIVER BASIN

BYSTRE LAKE EAST

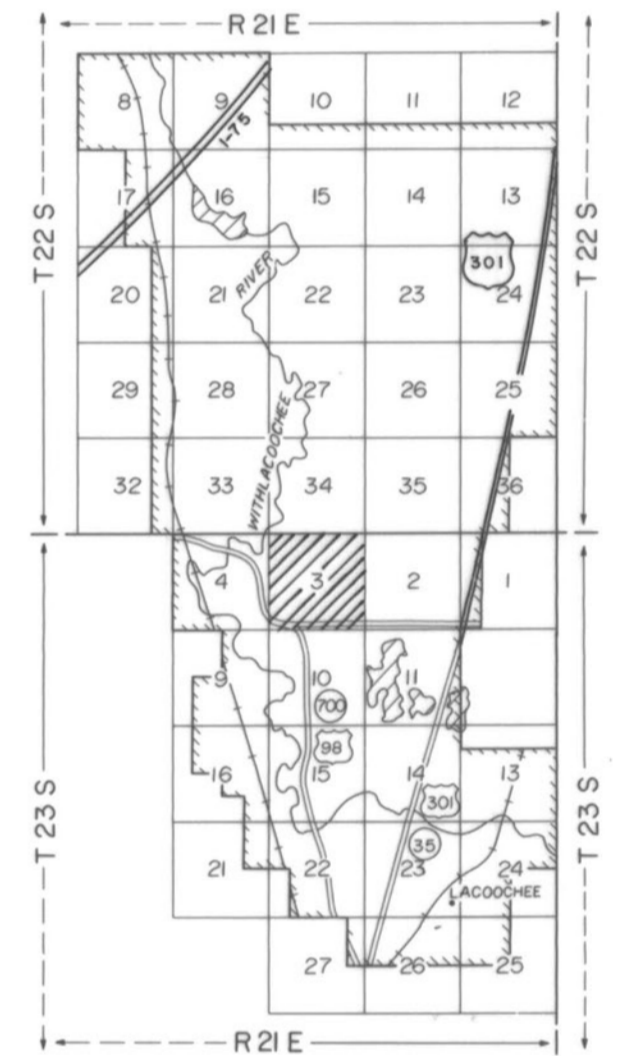
AERIAL PHOTOGRAPHY WITH CONTOURS

R20E | R21E



LEGEND

HORIZONTAL CONTROL USC&GS	A-25 Δ
TRAVERSE STATION	A-29 Δ
VERTICAL CONTROL	59.58 X
SECTION CORNERS	10 11 15 14
CONTOURS	
DEPRESSION CONTOURS	
SPOT ELEVATIONS	50.4



KEY MAP

NOTE:

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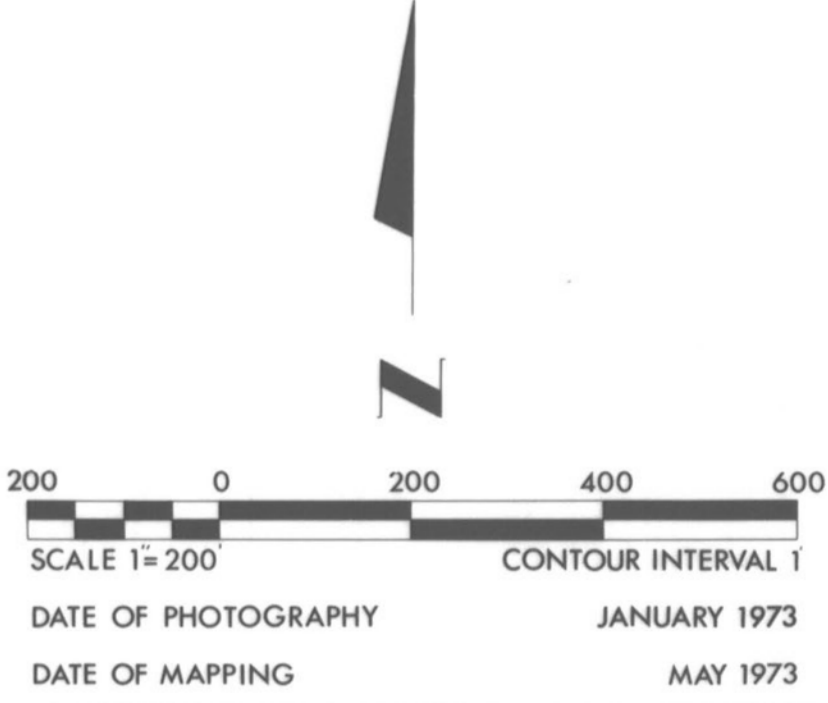
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GRIDS BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE.

ELEVATIONS BASED ON U.S.C. & G.S. DATUM



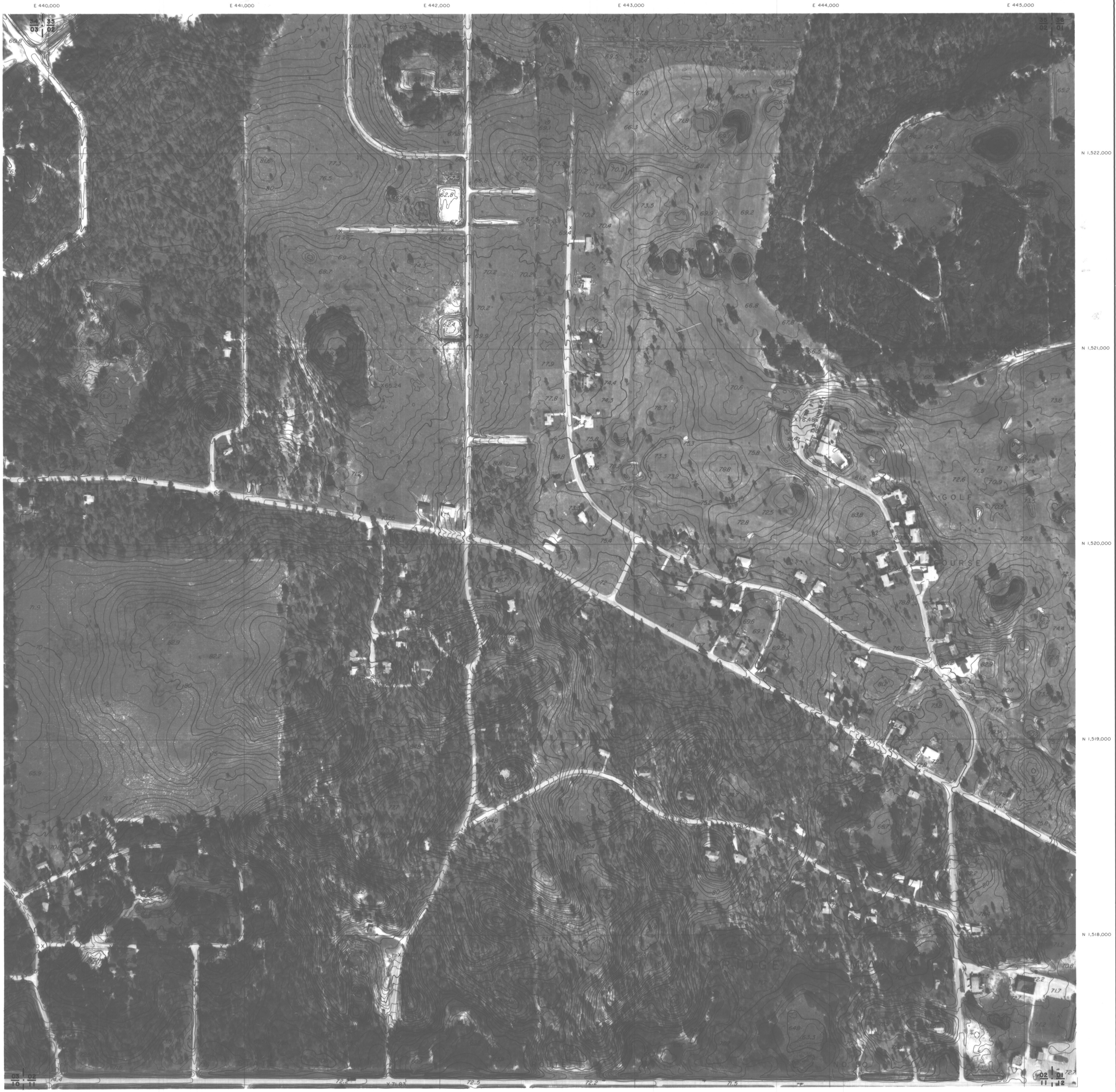
**SOUTHWEST FLORIDA
 WATER MANAGEMENT DISTRICT**

WITHLACOOCHEE RIVER BASIN

WITHLACOOCHEE RIVER

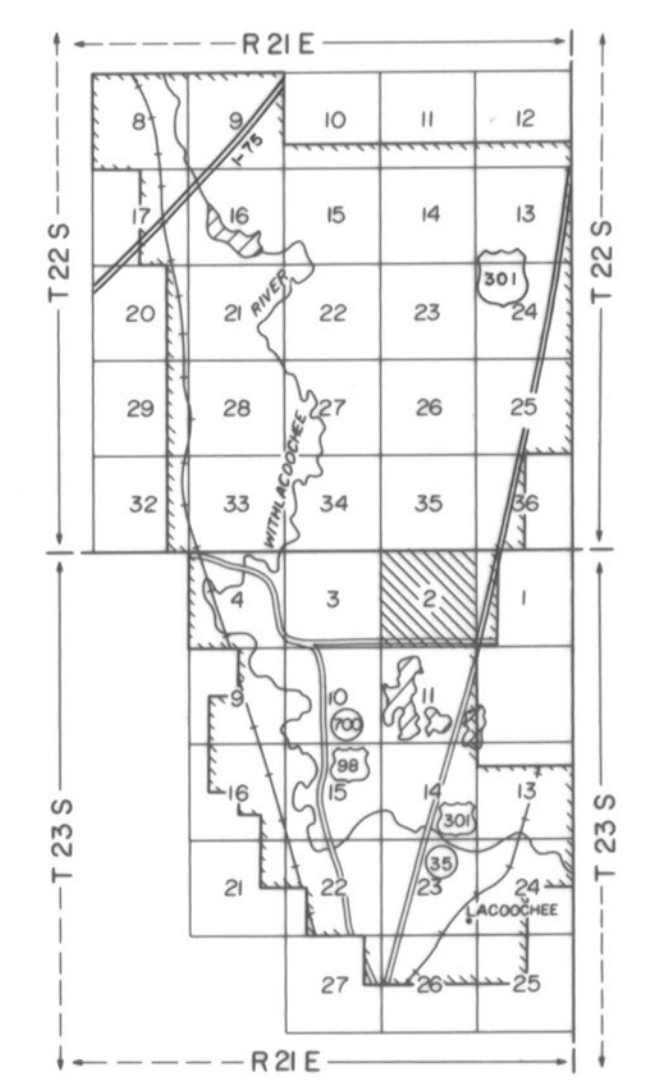
AREA 2

AERIAL PHOTOGRAPHY WITH CONTOURS
 SHEET NO. 03-23-21



LEGEND

- HORIZONTAL CONTROL US&G S A-25 Δ
- TRAVERSE STATION A-25 Δ
- VERTICAL CONTROL 59.58 X
- SECTION CORNERS 10 | 11
15 | 14
- CONTOURS
- DEPRESSION CONTOURS
- SPOT ELEVATIONS 50.4



KEY MAP

NOTE:

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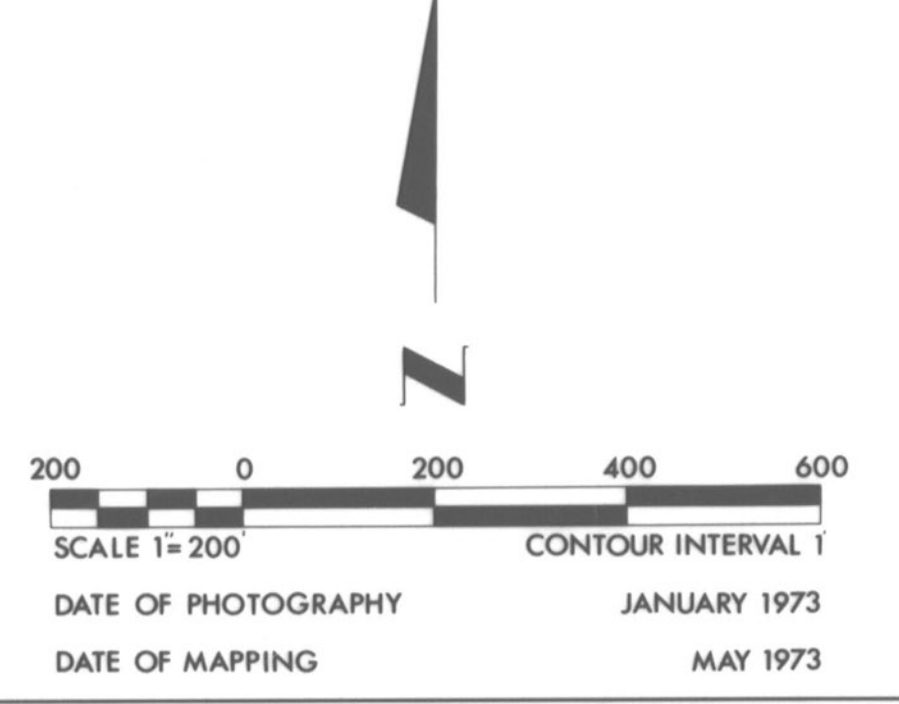
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GRIDS BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE.

ELEVATIONS BASED ON U.S.C. & G.S. DATUM



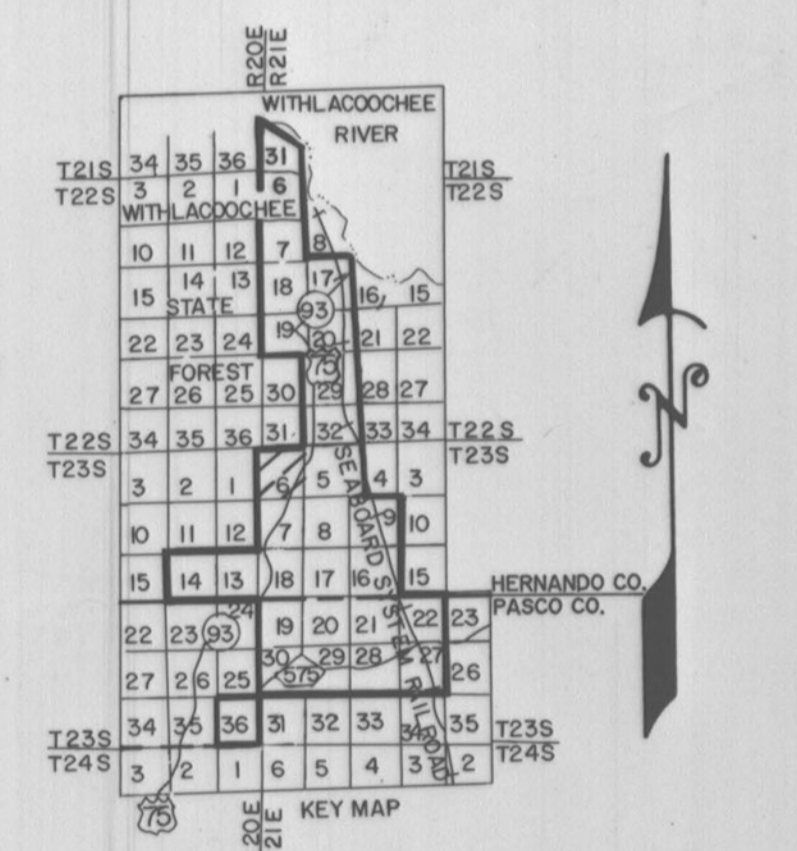
SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT
 WITHLACOOCHEE RIVER BASIN
WITHLACOOCHEE RIVER
AREA 2
 AERIAL PHOTOGRAPHY WITH CONTOURS
SHEET NO. 02-23-21



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- HORIZONTAL MONUMENT U.S.C.&G.S.
 - HORIZONTAL CONTROL CP-51
 - VERTICAL CONTROL 59.1
 - BM-5 X
 - SECTION CORNERS 10 11
15 14
 - COUNTY LINE
 - CONTOURS 45
40
30
 - DEPRESSION CONTOURS
 - SPOT ELEVATIONS x50.4
- 1927 DATUM = 1983 DATUM = SOLID GRID LINES



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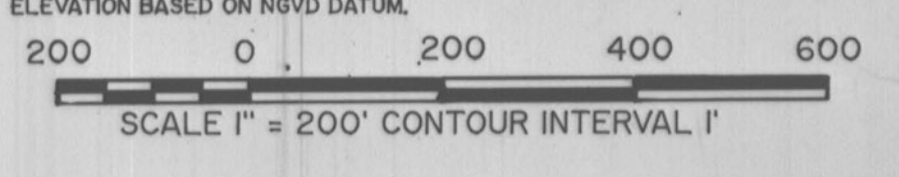
THE LAND LINE INFORMATION SHOWN HEREON IS COMPILED FROM THE BEST AVAILABLE DATA AND DOES NOT NECESSARILY REPRESENT TRUE LAND LINE LOCATION.

DASHED CONTOURS AND UNDERLINED ELEVATIONS INDICATE STANDARD VERTICAL ACCURACY REDUCED BY TREE COVER.

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GRIDS BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 27, NAD 83-W/790 ADM.

ELEVATION BASED ON MVD DATUM.



DATE OF BASE PHOTOGRAPHY: NOV.1991
DATE OF MAPPING PHOTOGRAPHY: NOV.1991

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT		
WITHLACOCHEE	RIVER	BASIN
RIDGE MANOR		
AERIAL PHOTOGRAPHY WITH CONTOURS		
SHEET NO. 6-23-21		

E 430,000

E 431,000

E 432,000

E 433,000



E 434,000

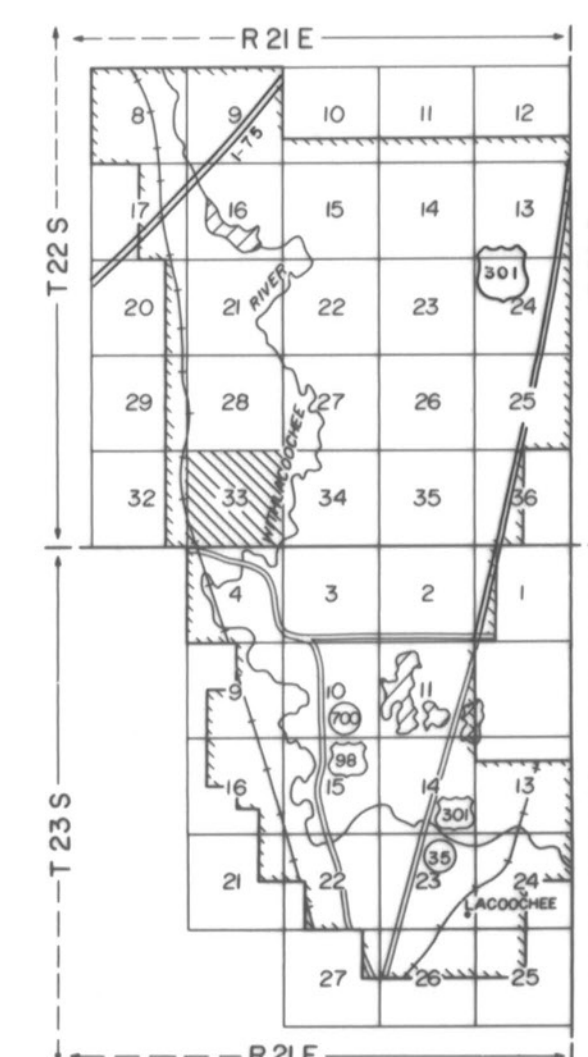
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CLEARWATER, FLORIDA



N 1,528,000
N 1,527,000
N 1,526,000
N 1,525,000
N 1,524,000
N 1,523,000

LEGEND

- HORIZONTAL CONTROL USC&GS A-25 Δ
- TRAVERSE STATION A-25 Δ
- VERTICAL CONTROL 59.58 X
- SECTION CORNERS 10 | 11
15 | 14
- CONTOURS 
- DEPRESSION CONTOURS 
- SPOT ELEVATIONS 50.4



KEY MAP

NOTE:

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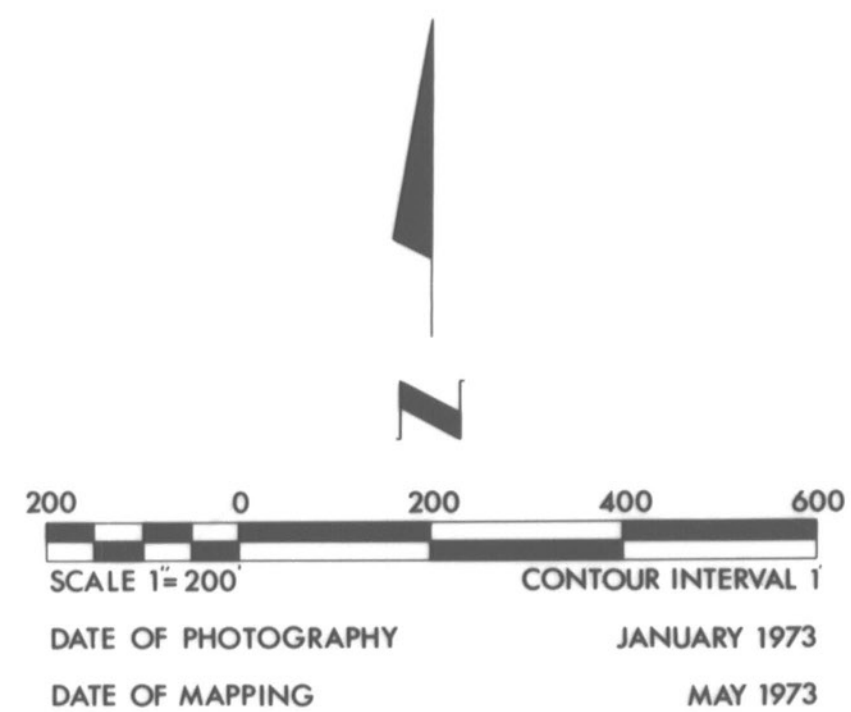
DASHED CONTOURS AND UNDERLINED ELEVATIONS INDICATE STANDARD VERTICAL ACCURACY REDUCED BY TREE COVER.

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GRIDS BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE.

ELEVATIONS BASED ON U.S.C. & G.S. DATUM



**SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT**

WITHLACOOCHIE RIVER BASIN

WITHLACOOCHIE RIVER

AREA 2

AERIAL PHOTOGRAPHY WITH CONTOURS
SHEET NO. 33-22-21

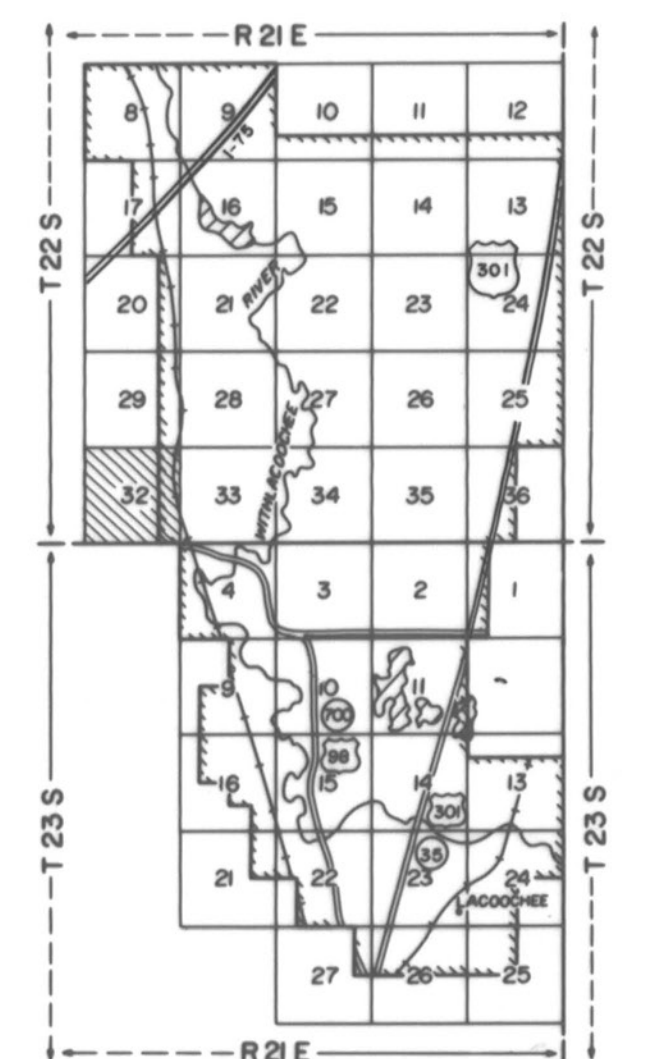
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 BY
BLACK, CROW & EIDSNES, INC.
 CLEARWATER, FLORIDA



LEGEND

- HORIZONTAL CONTROL USC&GS A-25 Δ
- TRAVERSE STATION A-29 ⊙
- VERTICAL CONTROL 59.58 X
- SECTION CORNERS 10 | 11
15 | 14
- CONTOURS
- DEPRESSION CONTOURS
- SPOT ELEVATIONS 50.4



KEY MAP

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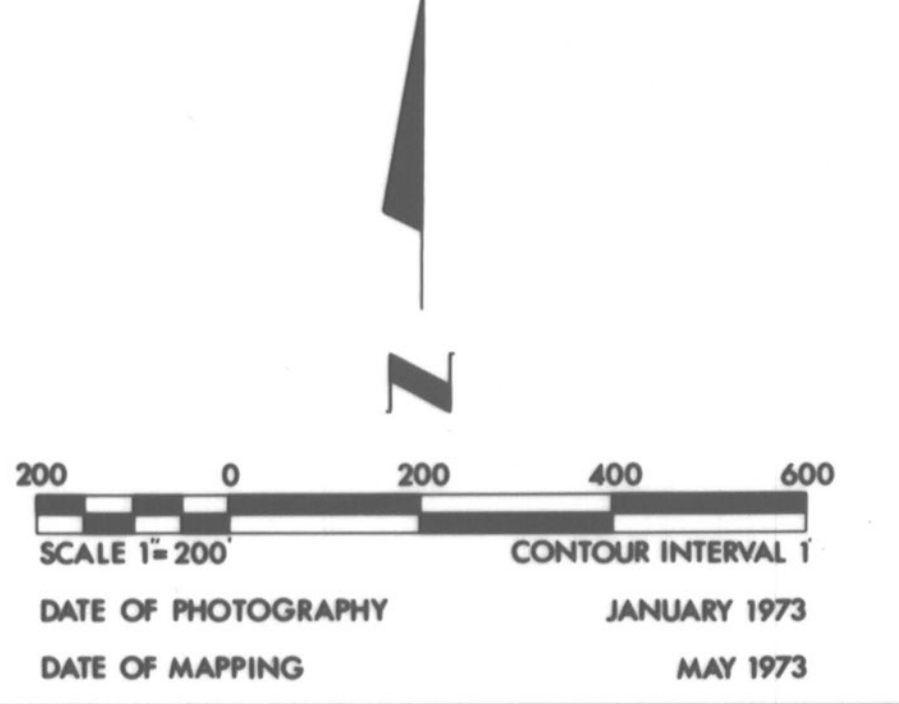
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**SOUTHWEST FLORIDA
 WATER MANAGEMENT DISTRICT**

WITHLACOOCHIE RIVER BASIN

WITHLACOOCHIE RIVER

AREA 2

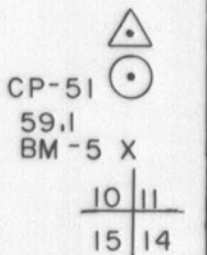
AERIAL PHOTOGRAPHY WITH CONTOURS
 SHEET NO. 32-22-21

E581,000 E582,000 E583,000 E584,000 E585,000

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CONTINENTAL
AERIAL SURVEYS, INC.
LEGEND

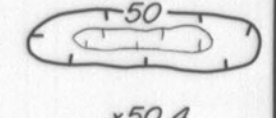
HORIZONTAL MONUMENT U.S.C.&G.S.
HORIZONTAL CONTROL
VERTICAL CONTROL
SECTION CORNERS



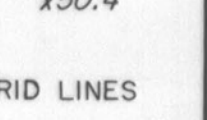
COUNTY LINE



CONTOURS

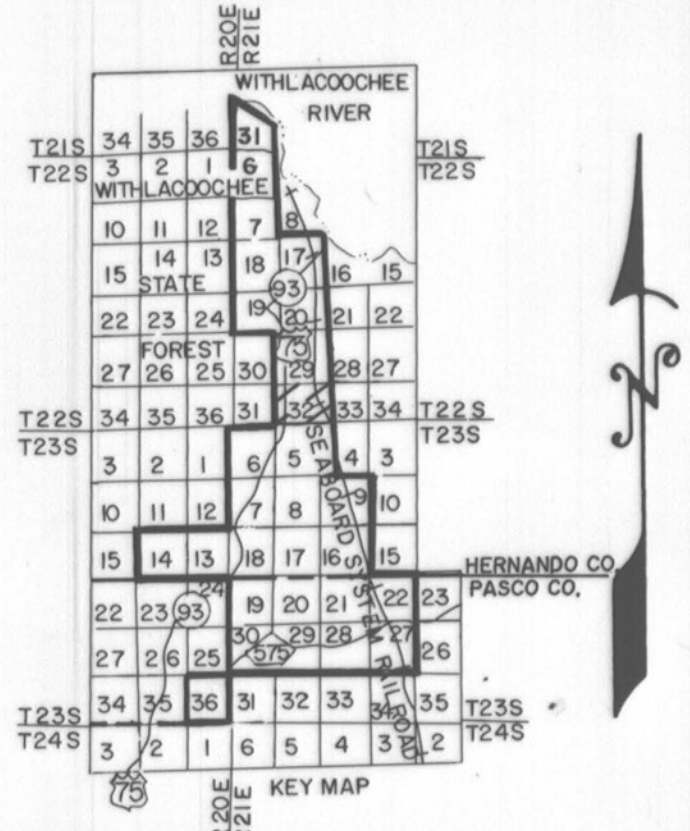


DEPRESSION CONTOURS
SPOT ELEVATIONS



1927 DATUM = 1983 DATUM = SOLID GRID LINES

N1528000
N1527000
N1526000
N1525000
N1524000
N1523000



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ELEVATION BASED ON NGVD DATUM.



DATE OF BASE PHOTOGRAPHY: NOV. 1991
DATE OF MAPPING PHOTOGRAPHY: NOV. 1991

**SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT**

WITHLACOOCHIE RIVER BASIN

RIDGE MANOR

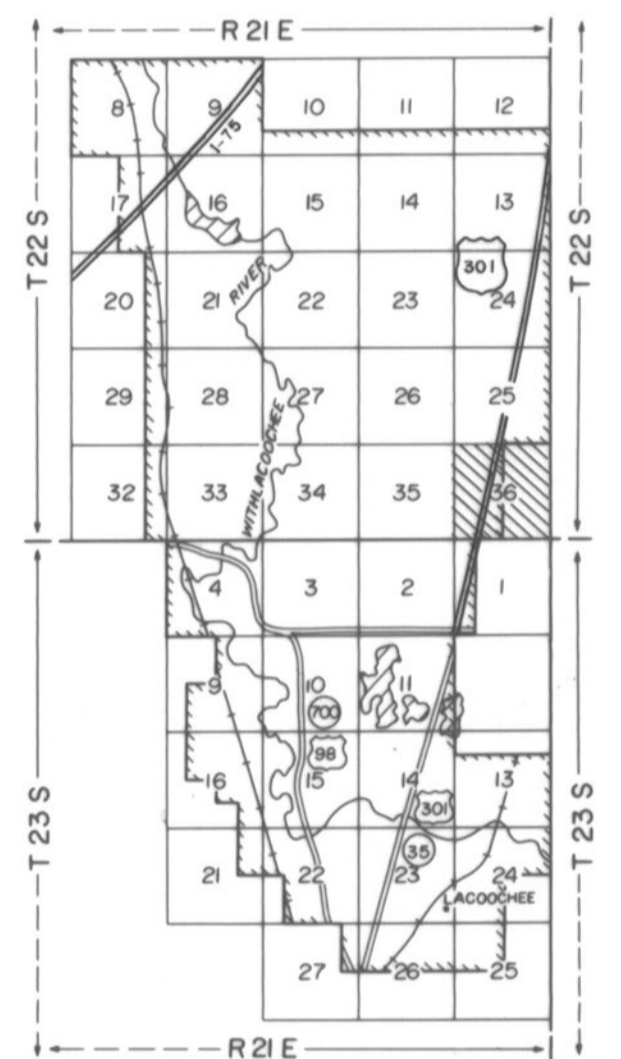
AERIAL PHOTOGRAPHY WITH CONTOURS

SHEET NO. 32-22-21



LEGEND

- HORIZONTAL CONTROL USC & GS A-25 Δ
- TRAVERSE STATION A-29 Δ
- VERTICAL CONTROL 59.58 X
- SECTION CORNERS $\frac{10}{15}$ | $\frac{11}{14}$
- CONTOURS
- DEPRESSION CONTOURS
- SPOT ELEVATIONS 50.4



KEY MAP

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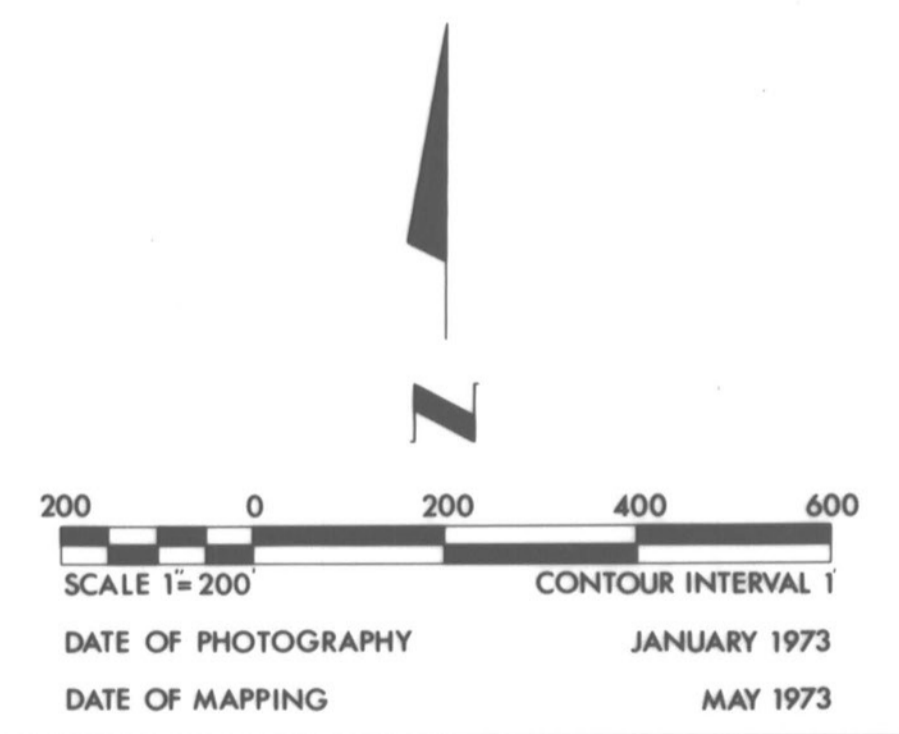
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ELEVATIONS BASED ON U.S.C. & G.S. DATUM

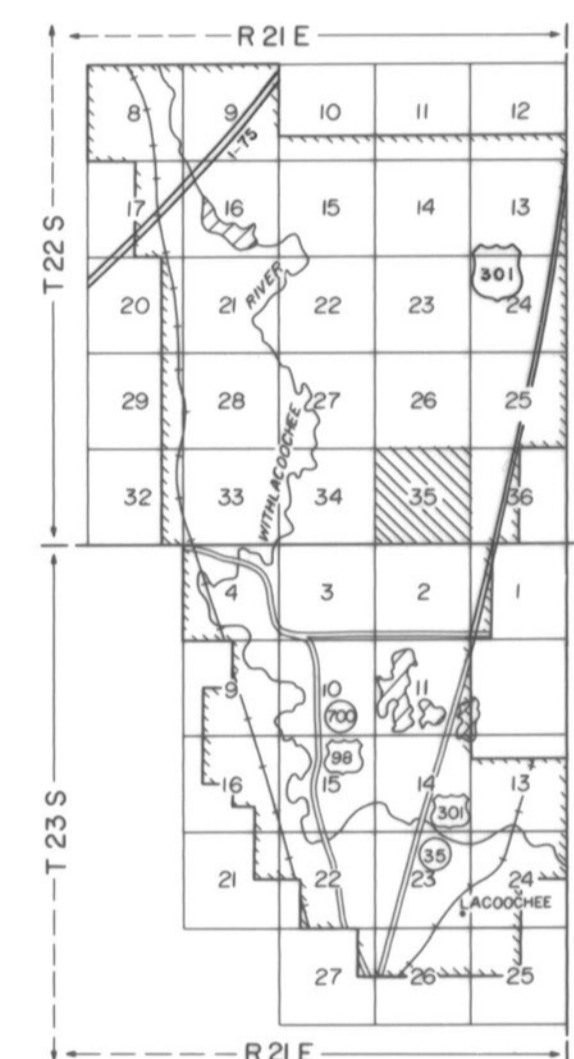


**SOUTHWEST FLORIDA
 WATER MANAGEMENT DISTRICT**
 WITHLACOOCHEE RIVER BASIN
 WITHLACOOCHEE RIVER
 AREA 2
 AERIAL PHOTOGRAPHY WITH CONTOURS
 SHEET NO. 36-22-21



LEGEND

HORIZONTAL CONTROL USC&GS	A-25 Δ
TRAVERSE STATION	A-29 ⊕
VERTICAL CONTROL	59.58 X
SECTION CORNERS	10 11 15 14
CONTOURS	
DEPRESSION CONTOURS	
SPOT ELEVATIONS	50.4



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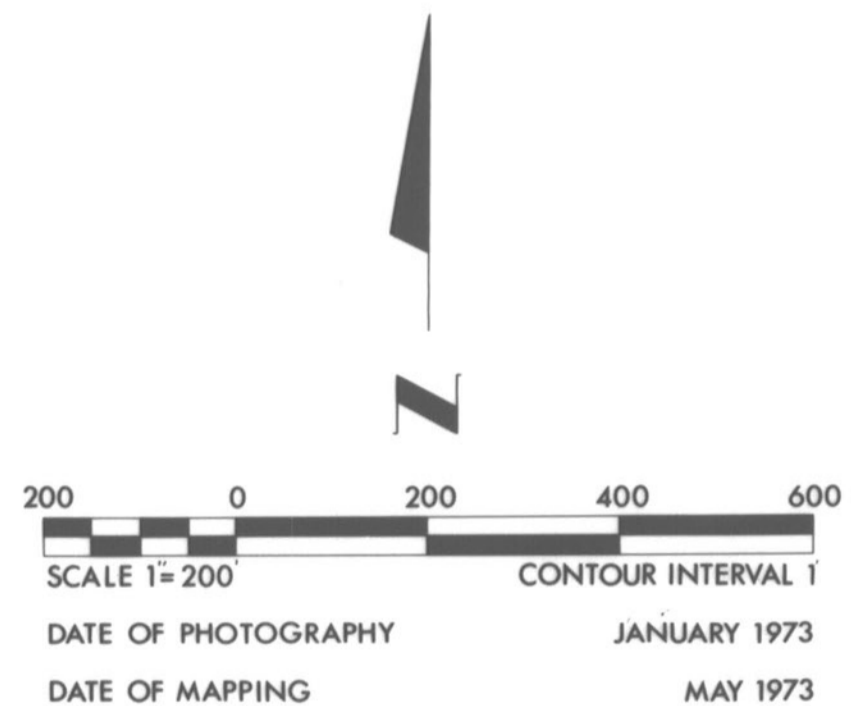
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**SOUTHWEST FLORIDA
 WATER MANAGEMENT DISTRICT**

WITHLACOOCHIE RIVER BASIN

WITHLACOOCHIE RIVER

AREA 2

AERIAL PHOTOGRAPHY WITH CONTOURS
 SHEET NO. 35-22-21

E 435,000 E 436,000 E 437,000 E 438,000 E 439,000 E 440,000

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